EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

August 19, 1985

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Based on the recommendation of the Office of Environmental Quality Control, I am pleased to accept the final revised environmental impact statement for the Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai, as a satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in deciding whether this project should be allowed to proceed. My acceptance of the statement is an affirmation of its adequacy under applicable laws and does not constitute an endorsement of the proposal.

When the decision is made regarding this action, I expect the proposing agency to carefully weigh the societal benefits against the environmental impact which will likely occur. This impact is adequately described in the statement and, together with the comments made by reviewers, provides a useful analysis of alternatives to the proposed action.

With warm personal regards, I remain,

Yours very truly,

George R. Ariyoshi

cc: Honorable Susumu Ono

Eradication of Marijuana on State-Owned And Managed Conservation District Lands Island of Kaua'i

FINAL REVISED ENVIRONMENTAL IMPACT STATEMENT

JULY 1985

FINAL REVISED

ENVIRONMENTAL IMPACT STATEMENT

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

ERADICATION OF MARIJUANA ON STATE-OWNED AND MANAGED CONSERVATION DISTRICT LANDS ISLAND OF KAUA'I

Libert K. Landgraf
Administrator, Division of Forestry and Wildlife
Department of Land and Natural Resources

JULY 1985

Prepared by

KRP INFORMATION SERVICES

Honolulu, Hawaii

FILE COPY

PROJECT:	ERADICATION OF MARIJUANA ON STATE-OWNED AND MANAGED LANDS
LOCATION:	CONSERVATION DISTRICT LANDS OWNED AND MANAGED BY THE STATE OF HAWAII ISLAND OF KAUA'I
APPLICANT:	DIVISION OF FORESTRY AND WILDLIFE DEPARTMENT OF LAND AND NATURAL RESOURCES
APPROVING AGENCY:	BOARD OF LAND AND NATURAL RESOURCES
ACCEPTING AUTHORITY:	THE HONORABLE GEORGE R. ARIYOSHI GOVERNOR, STATE OF HAWAII
CONTACT:	LIBERT K. LANDGRAF, ADMINISTRATOR DIVISION OF FORESTRY AND WILDLIFE DEPARTMENT OF LAND AND NATURAL RESOURCES 1151 PUNCHBOWL STREET HONOLULU, HAWAII 96813 PHONE: (808) 548 2861
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ACRONYMS AND ABBREVIATIONS

BLNR	Board of Land and Natural Resources, State of Hawaii
DEA	U.S. Drug Enforcement Administration
DLNR	Department of Land and Natural Resources, State of Hawaii
DOA	Department of Agriculture, State of Hawaii
DOCARE	Division of Conservation and Resources Enforcement, DLNR
DOFAW	Division of Forestry and Wildlife, DLNR
DPED	Department of Planning and Economic Development
EPA	U.S. Environmental Protection Agency
HSPA	Hawaiian Sugar Planters' Association
SCS	U.S. Soil Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SUMMARY OF MAJOR CHANGES MADE IN THE FINAL REVISED EIS

PART I The proposed action has been redescribed to indicate that the Department of Land and Natural Resources will consult with the U.S. Fish and Wildlife Service and others to determine areas where spraying should be controlled or avoided.

A description of the monitoring program and training for enforcement officers has been added. The description of application methods has been revised to clarify that only spot application, not broadcast, spraying will be done.

PART II Only minor changes.

PART III A list of invertebrates that are candidates for rare and endangered species has been added. A new appendix (Appendix C) listing candidate plant species has also been added.

Additional special areas have been identified.

PART IV No changes.

PART V A new section on clean-up of spills or accidental releases has been added. The section on groundwater has been rewritten and Table V-I revised accordingly. Site revegetation has been redescribed.

The section on glyphosate has been changed to clarify that the high exposure risk cited is only for mixer-loaders who might be exposed, not the general public.

Tables V-2 and V-4 have been revised to reflect changes in the text.

PART VI Approval of Weed Oil has been changed from registration to licensing.

PART VII The issue of legalization of chemicals to be used has been changed to reflect new information.

The issue of the decision process to be used by the Department of Land and Natural Resources has been deleted since the issue is now resolved.

A statement on the lack of empirical data on the environmental effects of spraying Weed Oil and diesel oil has been added.

OTHER Label information for Weed Oil and Roundup has been added and information on Rodeo deleted in Appendix B. A new Appendix C has been added.

SUMMARY

BACKGROUND

According to the 1984 Annual Report of the Select Committee on Narcotics Abuse and Control of the Ninety-Eighth Congress, marijuana is considered to be the number one drug problem in Hawaii. Local law enforcement officials cannot keep up with the great increase in marijuana growing. The report states that

> In 1983, approximately 636,000 pounds of marijuana were seized, representing 10-12 percent of the State's total crop. In previous years, Hawaiian law enforcement was able to seize up to 20 percent of the total crop. [p. 62]

Besides being dangerous to law enforcement officials and other persons who intentionally or inadvertently come near marijuana fields, marijuana growing is harmful to sensitive environmental areas. Cultivation of marijuana for sale is an intensive agricultural operation. Growers destroy native vegetation in the process of cultivation, including felling trees to provide more sunlight to their crops. (DEA, 1984). The County of Hawaii Police Department reports that growers have used herbicides such as glyphosate (Roundup) to clear areas in forest lands. The Maui County Police Department states that malathion insect spray, snail and slug pellets, mouse and rat poison, and commercial fertilizers are just a few of the chemicals that their officers assigned to marijuana eradication missions on state lands have discovered. This intense agricultural activity has caused the destruction of native vegetation and damage to the habitats of native birds.

Law enforcement officials use a variety of programs in their efforts to control marijuana. These include interception of marijuana shipments, including the highly successful "Operation Pele" which has concentrated on the U.S. mails; enforcement actions against both sellers and buyers; and eradication of marijuana by both mechanical and chemical means.

The eradication efforts have been extremely successful on private lands, however, most marijuana is grown on state lands. On Kaua'i, the Police Department estimates that 70-80% of the marijuana is grown on state lands, 10-20% on sugarcane lands, and about 10% in small private backyard settings. The estimates for Maui and Hawaii are similar. The success of the chemical eradication program on plantation lands has led DLNR to consider a similar program for state-owned and managed lands in the Conservation District on Kaua'i.

The U.S. Drug Enforcement Administration (DEA) is also considering use of chemicals in its marijuana eradication programs and has prepared a draft environmental impact statement for the "Eradication of Cannabis on Federal Lands in the Continental United States" dated May 1984. A supplement to this statement dated March 1985 has also been issued. The DEA has also prepared a draft EIS for marijuana eradication efforts on non-federal lands in all states (except Alaska). Much of the technical information in this report is derived from special studies done for the federal effort.

OBJECTIVES

The objective of the eradication program is to preserve the character and resources of the state-owned and managed Conservation District lands in order to make these areas safe for public recreational and other uses, and to protect native plant and animal habitats from further destruction by persons engaged in the cultivation of marijuana. The state also has a duty and responsibility to stop illegal activities and eradicate contraband on its lands. An additional objective of the proposed eradication program is to put potential growers on notice that they will be risking much time and effort with little chance of securing a harvest if they plant on state-owned Conservation District lands.

THE PROPOSED ACTION

Although DOFAW is the applicant in the proposed action, actual eradication operations will be undertaken by DLNR in cooperation with the Kaua'i County Police Department and DEA.

The chemicals that will be used are glyphosate, sold commercially as Roundup; Chevron Weed Oil, a commercial preparation similar to diesel oil; and emulsion of diesel oil and water. **Paraquat will not be used.**

Because it is not possible to identify the exact location where marijuana plants might be found and because swift follow-up is necessary for the success of the program, blanket approval from the Board of Land and Natural Resources (BLNR) is being requested whereby eradication actions would be approved by a person designated by the BLNR in accordance with the following process:

In developing guidelines for the field operations program, the Department of Land and Natural Resources will consult with the U.S. Fish and Wildlife Service and others to identify essential habitats and other sensitive areas. They will determine the areas where:

1. Spraying by helicopter would be allowed;
2. Spraying by portable knapsack units would be allowed;
3. Only manual eradication methods would be allowed.

No chemical spraying will be done until this process has been completed and approved by the BLNR-designated authority.

An oil and water emulsion is proposed for use because of its successful application on sugar cane lands by the police departments of both Kaua'i and Hawaii counties. The mixture is sprayed at low altitude from a helicopter through an extended boom. The sprayed marijuana plants die within a few hours, compared to several days or a week for other herbicides. The combination of large droplets and low-level delivery spraying results in very little drift, and has been very effective in eradicating marijuana without causing injury to the cane.

Chemical spraying will be carefully controlled, following the mitigatory measures identified in this report and summarized in Table V-4. It is expected that these

measures will form the basis for conditions of approval of the Conservation District Use permit.

Records will be kept on chemical spraying activities. A monitoring program will be established to determine:

1. The effectiveness of the marijuana eradication program.
2. The effects on soils, groundwater, wildlife, and non-target vegetation

Results of the monitoring program will be evaluated and changes in eradication methods made, if necessary.

Alternative methods of eradication being proposed include both manual removal and chemical spraying. Alternate disposal methods include either hauling the marijuana away for disposal or leaving it on the site (for chemical eradication methods only). At present, only manual methods of eradication and physical removal are being used. The proposed action will add chemical eradication methods and on-site disposal to current practices.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATORY MEASURES

The major concerns relating to the use of chemicals in the eradication of marijuana plants are the potential impacts on plant and wildlife habitats; soils and groundwater resources; fresh water resources and aquatic creatures; and human health. The method of application is the critical factor. All application will be either by helicopter boom sprayer or by ground crews using knapsack sprayers. In places where the spraying of chemicals would not be prudent, marijuana will be removed by mechanical means. The spraying will be made on individual plants as much as possible. Broadcast spraying by fixed-wing aircraft will **not** be done.

The operation will be conducted so as to maximize the safety of both the law enforcement officers conducting the operation and members of the public who may be present during the eradication process. Applicators will use protective hearing devices, respirators, rubber gloves, loose trousers, and safety boots, as appropriate. Standard application practices and mitigatory measures will be employed to minimize offsite herbicide drift. They include:

1. Use of drop booms, that produce a relatively uniform distribution of large droplet sizes under low pressure. Large droplets have a far lower tendency to drift than smaller droplets.

2. Careful monitoring of weather so that adverse conditions such as windspeeds greater than 8 miles per hour, thermal inversions, unstable air, and the combination of high temperature and low humidity may be avoided.

3. Observance of buffer distances to avoid drift to sensitive habitats such as streams.

A summary of mitigatory measures is presented in Table V-4.

PART I

DESCRIPTION OF THE PROPOSED PROJECT

INTRODUCTION

The Division of Forestry and Wildlife (DOFAW) of the Department of Land and Natural Resources (DLNR) proposes to eradicate, by chemical and physical means, marijuana (Cannabis sp.) growing on Conservation District lands owned and managed by the State of Hawaii on the island of Kaua'i. (Figure I-1)

The DEA 1984 EIS describes the plant and its growing characteristics as follows:

> Cannabis is a broadleaf, herbaceous annual that is readily grown in tropical climates. Under favorable growing conditions, it can grow to a height of 6 meters . . . Cannabis typically needs a growing season of up to 120 days, though there is some evidence that faster maturing strains have been developed . . .
>
> Sites for cannabis cultivation generally are chosen in areas remote enough to avoid detection by the general public, but accessible enough to carry in heavy gardening equipment . . . The experience of law enforcement officers over the last five years suggests that there are few areas where cannabis cannot be grown. The only limiting factors may be the length of the growing season, the possibility of detection, and the availability of water . . Because cannabis cultivation is illegal, growers usually will go to great lengths to avoid detection . . .
>
> The great majority of cannabis cultivation sites . . . occur in the more remote portions of forested or open woodland areas.

In Hawaii, marijuana is generally found growing on agricultural lands, especially in sugarcane fields; in small backyard plots; and on the edge of and in cleared areas of forest lands. The Kaua'i Police Department estimates that of the total marijuana grown on Kaua'i, 10% to 20% is on agricultural lands, 10% in the small individual plots, and 70% to 80% in the forest reserve areas.

This report is being prepared to accomplish the following:

1. to comply with Chapter 343, Hawaii Revised Statutes;
2. to inform the public of the proposed action and methods for the eradication of marijuana on state-owned Conservation District lands and to obtain public response to the proposed action;
3. to assess the environmental setting of the areas where this action is to occur;

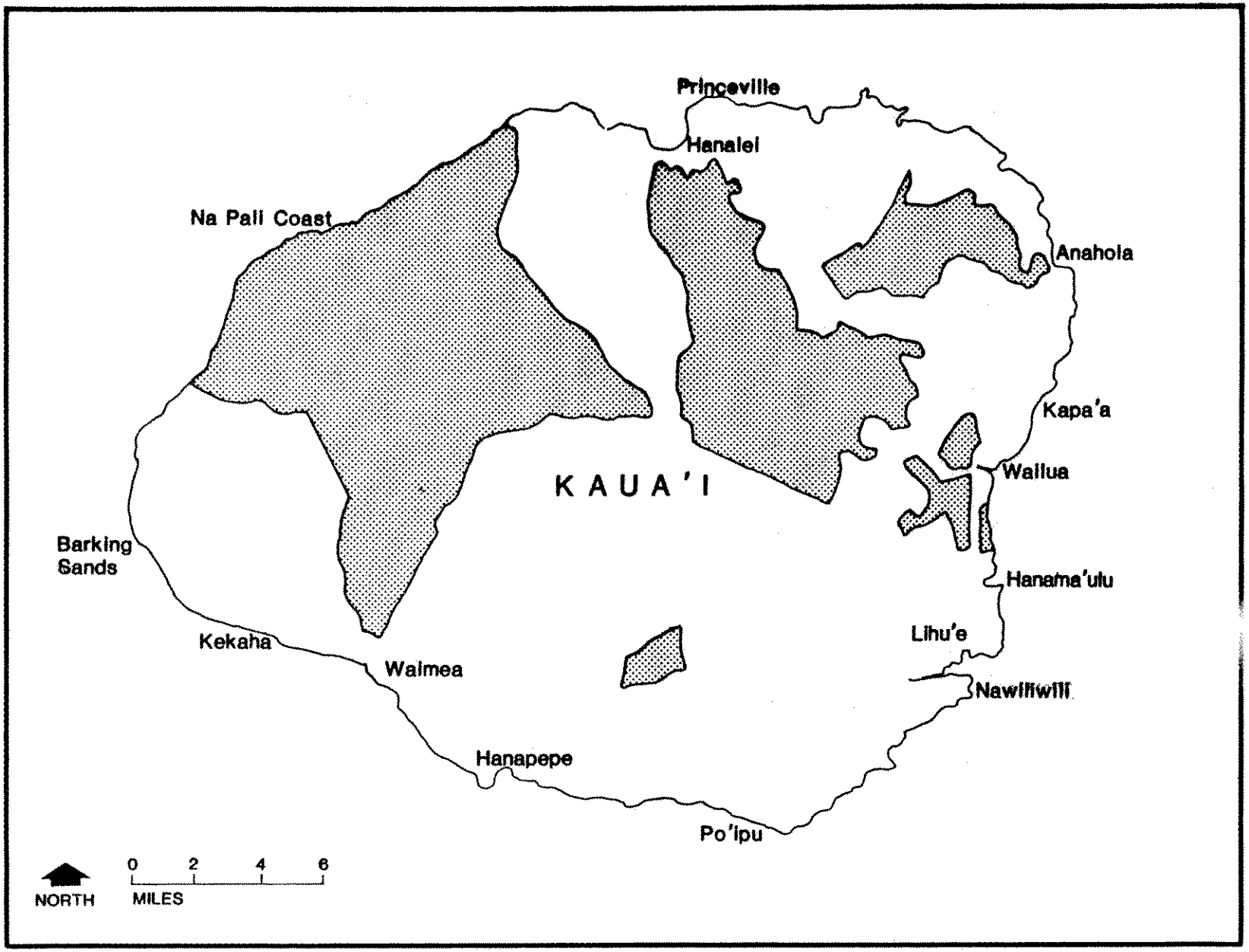

Figure I-1. State-Owned Conservation District Lands on Kaua'i

4. to assess the possible environmental impacts of the proposed action;
5. to set forth measures that can mitigate the potentially harmful environmental consequences of the proposed action; and,
6. to evaluate alternatives to the proposed action and assess possible impacts of these alternatives.

Comments received from the review of this report will be addressed and incorporated into the Final Environmental Impact Statement.

BACKGROUND

According to the 1984 Annual Report of the Select Committee on Narcotics Abuse and Control of the Ninety-Eighth Congress, marijuana is considered to be the number one drug problem in Hawaii. Local law enforcement officials cannot keep up with the increase in marijuana growing. The report states that:

> In 1983, approximately 636,000 pounds of marijuana were seized, representing 10-12 percent of the State's total crop. In previous years, Hawaiian law enforcement was able to seize up to 20 percent of the total crop.
>
> Hawaiian marijuana commands a high price on the illegal market, bringing in $4,500 a pound. [p. 62]
>
> Lt. Wakita of the Hawaii County Police Department reported to the Select Committee that his Police Department is facing some difficulties in detecting and eradicating the marijuana grown in his county. With nine investigators and two supervisors, his department has come to depend upon the helicopter as the most effective tool in marijuana eradication efforts . . . As a result of some effective eradication efforts, cultivators have begun to seek more remote areas for cultivation, and have been successful in eluding routine patrols . . .
>
> A new and disturbing trend was emerging in the marijuana business, Wakita said. Marijuana was being traded for cocaine instead of cash; "That's why we have so much cocaine coming into our county." [pp. 63-64]

The eradication of marijuana can be dangerous to law enforcement officials. The Select Committee Report notes that:

> Because of its tremendous profit, Hawaiian grown marijuana is protected vigorously by life threatening booby traps and firearms. Mr. Lilly [Michael Lilly, the then acting State Attorney General] demonstrated to the Committee the workings of a booby trap recently seized by law enforcement officials after an attempted raid on a marijuana field. The trap consisted of two trip wires hooked up to a 20 gauge shotgun shell which was activated when the wires were tripped. Murders are the common result of vigilant guarding of the marijuana fields. [p. 62]

Marijuana cultivation also is harmful to sensitive environmental areas. Growers destroy native vegetation in the process of cultivation, including felling trees to provide more sunlight to their crops (DEA, 1984). The County of Hawaii Police Department reports that growers have utilized herbicides such as glyphosate to clear areas in forest lands for cultivation. The Maui County Police Department states that malathion insecticide, snail and slug pellets, mouse and rat poison, and commercial fertilizers are just a few of the chemicals that their officers have discovered. This intense agricultural activity also may have resulted in damage to the habitats of native birds.

Law enforcement officials use a variety of programs in their efforts to control illegal marijuana operations. These include interception of marijuana shipments, including the highly successful "Operation Pele" which has concentrated on the U.S. mails; enforcement actions against both sellers and buyers; and eradication of marijuana by "Operation Green Harvest." The Green Harvest operations involve using helicopters to spot marijuana patches from the air. Enforcement officers rappel to the ground to destroy the marijuana plants, load the plants into slings to be carried away by helicopter, and then rappel up again to the helicopter at the end of the operation. This operation is highly dangerous. There have been injuries to the officers from knives, machetes, and chain saws used in eradication and from rappelling.

Because the Green Harvest operations are dangerous and require considerable personnel, law enforcement officials have sought alternative methods of eradication. Owners and managers of sugarcane plantations on the island of Hawaii requested police assistance in eradicating marijuana grown in the cane fields. Landowners conferred with the Hawaiian Sugar Planters' Association (HSPA) and Hawaii County Police, looking for something that would destroy the marijuana without damaging the sugarcane. Their proposal was to spray an emulsion of diesel oil and water on the plants. Diesel oil was suggested because it has been used for weed control in Hawaii for over fifty years, and was readily available. Dr. Wayne Hilton of HSPA notes that the preference for weed oils was based on 25 years experience with oil-based herbicide practices for sugarcane. One of the first uses was along railroad tracks to control weeds which could be ignited by sparks from steam engines. Prior to 1970, oil was a major weed control agent, applied by knapsack sprayers. Other herbicides, especially those applied directly to the soil, have since replaced oils. (See letter, Part VIII.)

The first "Operation Wilt" took place on the Big Island in May, 1984. Law enforcement officers report that they have destroyed 43,349 plants in six operations since then. On Kaua'i, 12,189 plants were destroyed in three days. In both counties all of these operations were on private lands at the request of and with the permission of landowners.

While the operation has been extremely successful on private lands, most marijuana is grown on state-owned lands. The Kaua'i Police Department estimates that within the county 70-80% of the total marijuana crop is grown on state-owned lands, 10-20% on sugarcane lands, and about 10% in small private backyard settings. The estimates for Maui and Hawaii are similar.

The success of the chemical eradication program on sugar plantation lands has led DLNR to consider a similar program for state-owned and managed Conservation District lands on Kaua'i.

The DEA is also considering use of chemicals in its marijuana eradication programs and has prepared a draft environmental impact statement (EIS) for the "Eradication of Cannabis on Federal Lands in the Continental United States" dated May 1984. A supplement to this EIS, dated March 1985, has also been issued. In addition, the DEA published a draft EIS for marijuana eradication efforts on non-federal and Indian lands for all states (with the exception of Alaska) in May, 1985. Much of the technical information and the description of eradication methods in this report is taken from the DEA 1984 EIS and the special studies done for the federal effort.

OBJECTIVES

The objective of the eradication program is to preserve the character and resources of the state-owned and managed Conservation District lands in order to make these areas safe for public recreation and other uses, and to protect native plant and animal habitats from further destruction by people engaged in the cultivation of marijuana. The state also has the duty and responsibility to stop illegal activities and eradicate contraband on its lands. An additional objective of the proposed eradication program is to put potential growers on notice that they will be risking much time and effort, with little chance of securing a harvest, if they plant on state-owned and managed Conservation District lands.

THE PROPOSED ACTION

Although DOFAW is the applicant in the proposed action, actual eradication operations will be undertaken by DLNR in cooperation with the Kaua'i County Police Department and DEA.

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1. Spraying by helicopter would be allowed;
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1. The effectiveness of the marijuana eradication program.
2. The effects on soils, groundwater, wildlife, and non-target vegetation

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Alternative methods of eradication being proposed include both manual removal and chemical spraying. Alternate disposal methods include either hauling the marijuana away for disposal or leaving it on the site (for chemical eradication methods only). At present, only manual methods of eradication and physical removal are being used. The proposed action will add chemical eradication methods and on-site disposal to current practices.

A description of alternative methods of eradication and the chemicals proposed to be used follows.

Eradication Methods

Physical

Manual Methods. Manual eradication involves the use of hand and portable power tools to cut down marijuana plants. The most common method is to uproot small plants; larger plants are cut down with hoes, axes, machetes, weedeaters, and both mechanized and hand saws. The advantages of this method include the low cost of equipment and the high degree of selectivity. For larger plots, however, the labor and time requirements of manual eradication are greater than for other methods of eradication. Figure I-2 illustrates the manual method of eradication.

The use of manual methods is also constrained by the time and effort required for the workers to reach the site. The distance and the nature of the terrain and its vegetation are key factors. In remote areas, helicopters are used to transport law enforcement officers to the sites.

Mechanical Methods. Mechanical eradication methods use self-propelled machinery to destroy the marijuana plants. Mowers, reapers, or bush hogs with high-speed rotary blades may be used to cut, shop, flail, or shred the plants. This process is nonselective in that all plants on the site are cut down when the equipment is used. Most mechanical equipment is not safe to operate on slopes of more than 30 to 35 degrees. Mechanical methods also are constrained in areas where soil is highly susceptible to compaction or erosion. In addition, site obstacles such as logs, stumps, and rocks reduce efficiency. Accessibility of the site and the availability of the equipment are other important considerations.

FIGURE I-2. MANUAL ERADICATION OF MARIJUANA

Chemical

Chemical eradication methods involve the application of herbicides or other chemicals to destroy the marijuana plants. A wide variety of chemicals are available for controlling annual broadleaf weeds such as marijuana. The chemicals that are effective in destroying cultivated plants and that are under consideration for use in eradicating marijuana from state-owned lands are glyphosate, Chevron Weed Oil and diesel oil. Two delivery methods are proposed: ground spot application and aerial spot application by helicopter.

Ground Spot Application. Ground spot application involves the localized application of chemicals by portable spray units to individual plants or small clumps of plants. This is illustrated in Figure I-3. Treatment effectiveness depends on the rate of application and the coverage on the marijuana plants. The advantage of this technique is that non-target plants are easily avoided. It has essentially the same disadvantages as the manual eradication methods. This method is more labor-intensive and time-consuming than aerial broadcast application.

Aerial Spot Application. Aerial spot application involves the application of chemicals by aerial spraying a plot or a number of plots, generally of an area greater than 0.1 acre. This method is proposed for use in areas that are remote or not readily accessible by surface means. This method is less costly than other methods because relatively few people are needed to treat large areas. Topography and accessibility are also less constraining for aerial applications than for ground spot application or for manual methods.

Aerial spraying will only be done from helicopters because in forested, mountainous areas, they can get closer to the ground than fixed-wing aircraft and thus can offer greater accuracy. Helicopters also are more maneuverable, which is advantageous in treating plots smaller than one acre. In general, aerial application of chemicals is conducted as close as possible to the ground and the target vegetation in order to minimize drift.

Chemicals are sprayed on target crops using specially designed spray nozzles and booms that effectively reduce drift onto offsite or nontarget areas. It can be done by a person inside the aircraft as illustrated in Figure I-4. More often it is done with equipment consisting of a compressor or pressure source and a boom mounted across the aircraft, with nozzles spaced across the boom to distribute the herbicide solution evenly. An example of this type is shown in Figure I-5. It is designed to create a minimum of air turbulence in the vicinity of the nozzle orifices to maintain a uniformly large droplet size and to prevent creation of aerosols. The bulk of the herbicide spray droplets produced by these systems are quite large, in the range of 400 to 1,200 microns (in contrast to insecticide droplets, which are in the range of 20 to 300 microns), so little of the herbicide drifts outside of the buffer zones around the target areas.

Aerial application of herbicides is done by specially trained and licensed aircraft pilots. Spray equipment must meet rigorous spray delivery specifications. The system must have an automatic vacuum shutoff to prevent overspraying. The

FIGURE I-3.
SPOT APPLICATION
ON THE GROUND

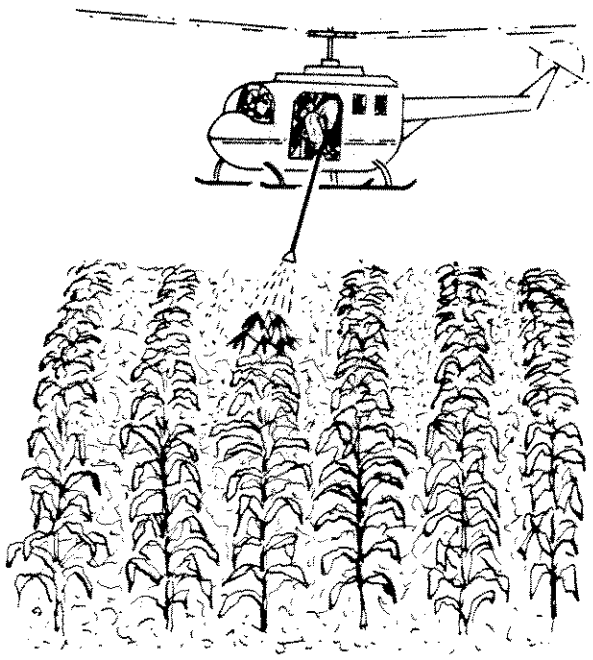


FIGURE I-4.
SPOT APPLICATION
FROM HELICOPTER

FIGURE I-5. HERBICIDES ARE SPRAYED ON TARGET PLOTS FROM SPECIALLY DESIGNED SPRAY BOOMS TO MINIMIZE DRIFT ONTO OFFSITE AREAS

delivery system must be calibrated to ensure delivery of the proper droplet size and distribution.

Weather conditions and spray delivery performance are will be monitored by onsite inspectors to minimize the chance of off-target drift, volatilization, runoff, or leaching of applied herbicides. (Assignment of responsibility for ensuring compliance with spray delivery specifications and for monitoring activities is made by site-specific analyses on a case-by-case basis.) Offsite drift could be a problem when winds exceed 8 miles per hour, when the humidity is low, or when the temperature is high enough to reduce the size of the droplets. Applying the herbicide when it is raining or when rain is imminent could contribute to runoff or dilution of herbicide and leaching through the soil. Therefore, spraying would be allowed only under favorable weather conditions. (Part IV describes the mitigatory measures that apply to aerial application methods.)

Spray swath width will be the same as that of the boom. In similar operations on sugarcane lands, helicopters fly very low, no higher than 10 feet and as low as 3 feet above the plants (Personal communmication, Osgood, HSPA).

Enforcement officers will undergo training in cooperation with the State Department of Agriculture to receive proper insterution in the safe handling of the chemicals to be used.

Chemicals Proposed to be Used

Paraquat will not be used. The principal chemical that will be used is an oil and water emulsion. Either diesel oil or Chevron Weed Oil, a commercial preparation similar to diesel oil, will be used. Under certain circumstances, glyphosate, sold commercially as Roundup, will be utilized.

Glyphosate

The following description of glyphosate is taken from DEA 1984 EIS and Monsanto's Material Safety Data (see Appendix B).

Glyphosate is the common name for N-(phosphonomethyl) glycine. Herbicidal formulations of the isopropylamine salt of glyphosate are manufactured under the trade names Roundup and Rodeo, registered trademarks of the Monsanto Chemical Company. Roundup is a general purpose herbicide while Rodeo is designed for aquatic vegetation management. The following discussion presents information on the parent chemical, glyphosate. It can be assumed that Roundup is characterized by the same properties unless otherwise noted.

Glyphosate is a white, odorless solid with a negligible vapor pressure and a solubility of 1.2% in water at 25°C. Roundup is a viscous liquid that is completely soluble in water. Glyphosate is a broad-spectrum, nonselective herbicide applied as a solution in water to the foliage of target plants. It is effective on deep-rooted perennial species and on annual and biennial species of grasses, sedges, and broadleaf weeds.

The exact mechanism by which glyphosate kills plants is not known. However, it has been postulated that glyphosate interferes with the biosynthesis of phenylalanine. Glyphosate is absorbed readily by plant foliage and is translocated to underground roots or rhizomes. Plants die slowly; wilting and yellowing of annuals may not appear for two to four days.

Glyphosate is a relatively new herbicide. The environmental fate and potential ecological effects of the use of glyphosate in forests have yet to be studied extensively. The limited data currently available are almost entirely from greenhouse and laboratory studies of agricultural systems and laboratory animals and have been generated largely by the manufacturer. These data indicate high effectiveness, short persistence in soil and water environments, and very low toxicity to animals.

Glyphosate is very rapidly and strongly adsorbed by soil. This strong adsorption accounts for the observed lack of mobility and low leaching tendency of glyphosate in soil and its "unavailability" for root uptake. The initial rapid inactivation of glyphosate in the soil results from adsorption on soil particles. Further inactivation results from microbial breakdown. The chemical itself does not sustain microbial growth, but soil bacteria are responsible for extensive glyphosate degradation.

The DEA 1984 EIS cites a study on the pattern of glyphosate behavior in water which indicates that concentrations in a forest stream diminished rapidly, partially through adsorption to bottom sediments, where extensive microbial breakdown occurred. After aerial application of 2.9 pounds per acre to an open stream, maximum concentrations were 0.2 parts per million (ppm) in a beaver pond, 0.08 ppm within six hours, and 0.005 ppm by day three. The study concluded that concentrations of glyphosate observed in streams were at no time high enough to cause injury to aquatic organisms.

Glyphosate has negligible volatility and a low order of acute toxicity. Animal feeding studies with glyphosate have indicated low toxicity to rats, mallard ducks, and quail and little or no potential for bioaccumulation. Teratogenicity was not detected at test dosages. Carcinogenicity and mutagenicity findings are not publicly available. Glyphosate can cause skin and eye irritation to applicators.

The following information on Chevron Weed Oil and diesel oil is taken from Chevron's Material Information Bulletins. (See Appendix B)

Weed Oil

Weed Oil is a light-bodied highly aromatic petroleum oil. Its typical composition is paraffin (including naphthenes) approximately 55%, aromatics (C_8+) approximately 45% and emulsifier or surfactant 0.03%. It is miscible with hydrocarbon solvents and emulsifiers in water.

Weed Oil is typically diluted with two parts water. The label states that it is good for general control of most annual and many perennial weeds. Best results are obtained by spraying weeds when they are small. Spray should be sufficient to cover weeds with a thin film of oil. Sprayed plants wilt and die within a few hours.

The label notes that Weed Oil will damage or kill all green plant growth. It should also be kept out of lakes, streams and ponds or fish and other aquatic life may be killed.

The Chevron Materials Information Bulletin on Weed Oil states that it is expected to cause no more than minor eye irritation and no more than minor skin irritation following prolonged or repeated contact. Breathing the vapors at concentrations above the exposure standard can cause central nervous system depression. It is not expected to be acutely toxic by ingestion. However, ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

The major hazard associated with Weed Oil as with other volatile petroleum products is that of fire. The liquid evaporates and forms vapors (fumes) which can burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. The fire hazard is greater as liquid temperature rises above 85 degrees Fahrenheit.

Diesel Oil

There are two kinds of diesel oil sold in Hawaii--Diesel Oil #1 and Diesel Oil #2. The bulk of the oil sold is Diesel Oil #2 because it is less expensive. According to Chevron Hawaii, Diesel Oil #2 is used mostly for tunnel work because it has less fumes.

In oils, the greater the aromatic proportions, the higher the toxicity and the longer that residues will be present. Diesel Oil #1 is more toxic than Diesel Oil #2, however, Weed Oil is more toxic than either of these (Personal Communication, Hilton, HSPA). The typical composition of Diesel Oil #1 is as follows:

Paraffins (incl. naphthenes)	74-88%
Aromatics:	
C_8^+	12-20%
Olefins	0-3%
Naphthalenes	0-3%

Eradication Alternatives

Three marijuana eradication methods—manual, chemical, and a combination of manual and chemical methods are being proposed.

Alternative 1 - Manual Eradication Method Alone

This alternative results in "no change" from current management direction or level of management intensity. The DLNR will continue using manual eradication techniques to eliminate illegal marijuana cultivation on state-owned and managed Conservation District lands on Kaua'i. Applicable mitigatory measures, described in Part V, will be followed.

Alternative 2 - Chemical Eradication Method

Under this alternative both ground and aerial application methods will be used. All mitigatory measures, as described in Part V for chemical methods, will be followed. Only trained personnel will be allowed to conduct chemical eradication activities. The operation will be conducted to maximize the safety of both law enforcement officers the public. Applicators will use respirators, rubber gloves, loose trousers, and safety boots, as appropriate.

Alternative 3 - Operations Flexibility (Preferred Alternative)

This alternative permits use of the full range of eradication methods, based on site-specific criteria. Manual methods and both ground and aerial spot chemical application methods will be used. Selection of the specific eradication method used will be based on a number of environmental factors including:

1. Proximity to water bodies.
2. Proximity to human habitation and developed recreation areas.
3. Topography.
4. Soil type.
5. Presence of unique resources, such as endangered or threatened plants or significant cultural resources.

Marijuana Disposal Alternatives

Alternative 1 - Haul Marijuana Out After Manual Eradication Operations and Burn/Bury

This alternative emphasizes traditional disposal methods such as removing marijuana by backpack, helicopter, or trucks and taking it to an incinerator, where it can be burned safely, or to a landfill for burial.

Alternative 2 - Leave Marijuana on Site After Chemical Eradication Operations

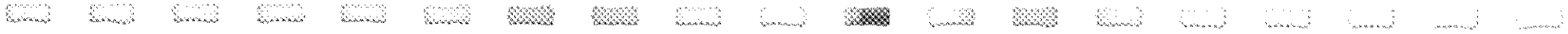
Under this alternative, the action of the chemical itself will be the disposal method. Notification that the area will be sprayed will be posted at all major points of access to the area. Additional notification and posting requirements are described in Part V.

Alternative 3 - Operations Flexibility (Preferred Alternative)

Under this alternative, all methods for disposal of eradicated marijuana will be available, including haul and burn, haul and bury, or posting of the area. Disposal methods are based on site-specific and situation-specific conditions.

Mitigatory Measures

Mitigatory measures are taken to avoid, compensate for, rectify, or reduce the identified adverse impacts of a proposed action. A number of measures to mitigate potential impacts of DLNR's eradication efforts have been incorporated as operational features in the alternative eradication methods described. In addition, other mitigatory measures to further reduce the likelihood of adverse impacts have been identified in Part V.



PART II

ALTERNATIVES TO THE PROPOSED ACTION

A number of alternative methods for control of mariiuana grown on state-owned and managed Conservation District lands have been considered in the preparation of this report. These are as follows:

NO ACTION

Under the No Action alternative, marijuana growers will continue their illegal activities on state-owned and managed Conservation District lands on Kaua'i. They will continue to clear land and use pesticides. The area will continue to be unsafe for other uses and an illegal activity will be, in effect, condoned by the state. This is an unacceptable alternative because this illegal activity interferes with the public's use of these lands and DLNR's obligation to enforce the laws of the State of Hawaii and the United States.

CONTINUE CURRENT MANUAL ERADICATION PROGRAM

Marijuana grown on state-owned land is usually in remote areas, several miles from a roadway, in difficult terrain. The current method of eradication involves flying in personnel by helicopter and lowering them to the ground via rope ladders. The marijuana plants are then cut down manually, using knives, machetes, chain saws, and other hand-operated tools. Both the enforcement officers and the killed plants are then removed by helicopter. The process is difficult, dangerous, and expensive. A number of personnel have received serious injuries during these "Green Harvest" operations. It is also slow and time consuming work, involving many helicopter trips, making it an expensive, as well as difficult, operation. There is also evidence that the transport of marijuana plants by helicopter results in some scattering of seeds that later root and produce more plants. Manual eradication will continue to be used in some areas, for example, near streams and/or critical habitats.

CHEMICAL ERADICATION METHODS

Chemicals under consideration for spray application are diesel oil, Chevron's Weed Oil, and glyphosate, sold as Roundup. Diesel oil is quick-acting, effective, and inexpensive. Weed Oil has the same effectiveness but is more expensive and more hazardous to applicators. Glyphosate is effective but slow-acting. It is also more expensive than diesel oil.

CHEMICAL ERADICATION COMBINED WITH MANUAL ERADICATION.

This method takes advantage of the effectiveness of chemical spraying for most applications and utilizes manual means where spraying might have adverse impacts

on essential habitats or waterways or where chemical spraying might be inappropriate for other reasons, e.g., rainy weather or isolated patches. The number of personnel and consequently the risks to health and safety will be reduced considerably by the use of chemicals on marijuana plants. If the proposed action is not adopted, the high risks and costs will continue to hamper successful accomplishment of an eradication program.

LEGALIZING THE USE OF MARIJUANA

Legalization has been suggested as an alternative to eradication. Neither Congress nor the Hawaii State Legislature has shown any indication that this would be a realistic alternative. (Although bills to legalize marijuana were introduced in the 1985 session in Hawaii, none was reported out of committee.) Further, as a signatory to the Single Convention on Narcotic Drugs, 1961, the United States is required to prohibit or control the domestic production of marijuana; to take appropriate measures to prevent illicit drug trafficking; and to seize and destroy illicitly cultivated marijuana.

If the State of Hawaii should legalize marijuana usage, it is unlikely that the Legislature would authorize growing it for sale. And, even if it did, growing of marijuana on state-owned and managed lands would be illegal until the proper permits were obtained from the BLNR.

Even if this were to be considered a viable alternative, it would undoubtedly take several years to put into effect during which time present activities would continue to be illegal.

EXPANDING/INTENSIFYING ENFORCEMENT PROGRAMS

It has been suggested that an expanded and vigorous program of apprehending and prosecuting marijuana growers similar to the successful program in operation on National Park lands would provide more of a deterrent than crop loss, and might result in the long-term reduction of illegal cultivation on state-owned and managed lands. Also suggested was an increased inspection and monitoring program of postal parcels leaving Kaua'i, similar to Operation Pele on the Big Island.

It is the intention of law enforcement officials to continue and expand apprehension and prosecution programs in conjunction with a vigorous eradication program.

BIOLOGICAL CONTROL METHOD

Biological control is the management of a pest using natural enemies. This alternative is attractive. However, it is a lengthy process to begin. There have been some efforts in this area but much more research is required. According to the DEA 1984 EIS, there has been some investigation of the use of a naturally occurring fungus, Fusarium oxysporum f. cannabis, identified after the fungus

severely infected an Italian hemp crop in 1959. It has substantially reduced the area devoted to the cultivation of hemp in Italy. There appears to be little research being conducted on the consequences of using a naturally occurring fungus on marijuana in the United States.

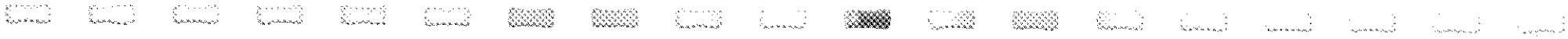
Even if a highly specific agent is found, extensive testing would be necessary before it would be available for use. Risks to Hawaii's endemic species need to be considered.

PRESCRIBED BURNING METHOD

Prescribed burning is the use of fire under specified conditions to obtain a management objective. Marijuana plants have a high moisture content and would be difficult to burn, therefore requiring added fuel, such as gelled gasoline. Given the location of the marijuana plots and the danger to native forests and wildlife, including the possibility of a widespread forest fire, the negative aspects of this alternative outweigh any possible benefits.

USE OF CHEMICALS OTHER THAN GLYPHOSATE, WEED OIL, AND DIESEL OIL

The DLNR is not considering the use of either 2,4-D or paraquat.



PART III

DESCRIPTIONS OF THE ENVIRONMENTAL, SOCIAL, CULTURAL AND ECONOMIC ELEMENTS

GENERAL DESCRIPTION

The island of Kaua'i is the fourth largest of the Hawaiian islands. Its extreme length is 33 miles and extreme width is 25 miles. Twenty-four percent of the island is above 2,000 feet elevation, 40.4 percent lies between 500 and 2,000 feet, and 35.6 percent is less than 500 feet above sea level. The highest peaks, located near the center of the island and at the southeastern corner of the Alaka'i Swamp, are Kawaikini at 5,243 feet and Mt. Wai'ale'ale at 5,148 feet. The island is 558.2 square miles in area, of which 549.4 square miles consist of land and 8.8 square miles of inland water. The estimated total resident population is approximately 40,600 as of July 1, 1982. (DPED, 1983).

STATE-OWNED AND MANAGED LANDS ON KAUA'I

As of January 1983, the State of Hawaii owned a total of 143,423 of the total 354,000 acres of land on Kaua'i. According to the State Public Land Inventory compiled by the Land Management Division of DLNR in 1982 and reported in 1983 Data Book, 83,900 acres of state lands on Kaua'i were in the forest reserve. Although marijuana is grown in many areas, particularly on sugarcane and other agricultural lands, these forest reserve lands are the primary focus of the proposed action because of their location in the Conservation District and the ecological sensitivity of some of the forest reserve areas. Figure I-1 shows state-owned and managed Conservation District lands on Kaua'i.

CLIMATE AND WEATHER

Average temperatures on Kaua'i in the coastal areas range from 71°F in February and March to 79°F in August and September, with cooler temperatures in the mountain areas (DPED & Kauai County, 1983). The highest temperature of record is 94°F at Kilauea, and the lowest 31°F at Koke'e. Rainfall varies widely depending on the location. The summit of Mount Wai'ale'ale is the wettest spot in the United States with a recorded rainfall of 451 inches a year. In Kekaha, only 20 miles away, rainfall averages only 20 inches a year. (DPED, 1983).

Warm temperatures and ample water create ideal conditions for the cultivation of marijuana. If the amount of rainfall is inadequate, growers install water supply systems. To obtain adequate sunlight, the growers usually plant on southern slopes and on the edge of clearings, or create their own clearings, if necessary. (DEA, 1984).

LANDFORMS, SOILS AND VEGETATIVE COVER

Kaua'i is the northernmost and the oldest of the high islands of the Hawaiian chain. Its geological history is more complex than the other islands. Roughly circular in shape, Kaua'i consists of a single shield volcano, shaped by a series of eruptions with long periods of erosion and weathering in between. This has resulted in spectacular cliffs and valleys, including the famous Waimea Canyon.

The U.S. Soil Conservation Service (SCS, 1972) has identified a number of soil types associated with the forest reserve areas. These soils and their natural vegetation are described generally as follows:

Kapa'a-Po'oku-Hali'i-Makapili Association: This association consists of well-drained and moderately well-drained, fine-textured soils on the uplands of east Kaua'i. They developed in material weathered from basic igneous rock. These soils are nearly level to steep. Elevations range from 100 to 1,000 feet. Natural vegetation is melastoma, rhodomyrtus, guava, ricegrass, hilograss, yellow foxtail, Christmas berry, false staghornfern, pangolagrass, kikuyugrass, kaimiclover, sensitive plant, java plum, and joee. The association makes up about 10% of the island.

Makaweli-Waiawa-Niu Association: This association consists of well-drained, moderately fine-textured and fine-textured soils on the uplands of south and west Kaua'i. They developed in material weathered from basic igneous rock. These soils are gently sloping to very steep. Elevations range from near sea level to 2,000 feet. The natural vegetation is kiawe, lantana, fingergrass, klu, koa haole, piligrass, aalii, guineagrass, indigo, and cactus. This association makes up about 9% of the island.

Rough Broken Land-Mahana-Koke'e Association: This association consists of well-drained, medium-textured and fine-textured soils on the uplands of south and west Kaua'i. They developed in material weathered from volcanic ash and basic igneous rock. These soils are moderately sloping to very steep. The elevation ranges from 1,500 to 4,200 feet. The natural vegetation is 'ohi'a lehua, pukiawe, blackberry, yellow foxtail, koa, plantain, uki uki, redwood, a'ali'i, ricegrass, molassesgrass, silver oak, lantana, joee, Japanese tea, passion flower, Boston fern, and uki. This association makes up about 9% of the island.

Wai'ale'ale-Alaka'i Association: This association consists of somewhat poorly drained to very poorly drained, organic soils on the uplands of central Kaua'i. These soils are level to very steep. The elevation ranges from 3,500 to 5,000 feet. These soils developed in organic debris deposited on basic igneous rock. The natural vegetation is 'ohi'a lehua, Hawaiian lobelia, mokihana, pukiawe, treefern, lapalapa, brackenfern, and uki uki. This association makes up about 3% of the island.

Rough Mountainous Land-Rough Broken Land-Rock Outcrop Association: This association consists of well-drained to excessively

drained land types on uplands on the island. The areas are very steep to precipitous. Elevations range from sea level to 5,170 feet. The natural vegetation is false staghorn fern, 'ohi'a lehua, java plum, kiawe, and koa haole. This association makes up about 50% of the island.

The dominant native tree of Kaua'i is 'ohi'a. Koa is found primarily in the Koke'e area and fringes both sides of the Waimea Canyon. 'Ohi'a and 'ohi'a-koa forests are found on about 88,500 acres or one-fourth of the total land area of the island. There are also many eucalyptus and pine plantations west of Waimea Canyon. In the Koke'e area and along the canyon road there are many introduced plants including lantana, blackberry, passion flower, and strawberry guava. (USFWS, 1983).

The Alaka'i Swamp lies east of Koke'e and the Waimea Canyon. It is a temperate rainforest with 'ohi'a trees averaging about 40 feet in height. The swamp is the primary habitat of the remaining endangered forest birds on Kaua'i. (USFWS, 1983)

Growers have been able to cultivate marijuana on almost any combination of terrain and soil types. Since the high profit margin of marijuana allows considerable investment in lime and fertilizers, most soils, except extremely rocky, saline, or wetland soils, generally are adequate for cultivation. (DEA, 1984)

WILDLIFE

Seabirds found on Kaua'i include the Laysan Albatross (Moli), Wedge-tailed Shearwater ('Ua'u-kani), Newell Shearwater ('A'o), Hawaiian Storm-petrel ('oeoe, 'ake'ake), White-tailed Tropicbird (Koa'e-kea), Red-footed Booby ('A), and the Great Frigatebird ('Iwa).

There is only one migratory shorebird, the Bristle-thighed Curlew (Kioea). Migratory waterfowl include the Mallard, Pintail (Kokoa-mapu), American Wigeon, and the Northern Shoveler (Koloa-moha). There is one resident waterfowl, the Hawaiian Duck (Koloa, Koloa-maoli). Water birds include the Hawaiian Gallinule ('Alae-'ula), Hawaiian Coot ('Alae-ke'oke'o), and the Hawaiian Stilt (Ae'o).

There are many forest birds in Kaua'i. There are three Babblers, all exotic: the Greater Necklaced Laughing Thrush, the Hwa-mei or Chinese Thrush, and the Red-billed Leiothrix or Japanese Hill Robin. Thrushes include the exotic Shama, and the endemic (and endangered) Kaua'i Thrush (Kama'o) and Puaiohi (Small Kaua'i Thrush). There is one Old World Flycatcher, the endemic Kaua'i 'Elepaio; one Honeyeater, the endemic and endangered Kaua'i 'O'o ('O'o 'a'a); and numerous endemic Hawaiian Honeycreepers. These include the Kaua'i 'Amakihi, 'Anianiau or Lesser 'Amakihi, Kaua'i Creeper ('Akikiki), Kaua'i 'Akepa ('Akeke'e, 'O'u-holo-wai), Kaua'i 'Akialoa, Kaua'i Nuku-pu-u, 'O'u, 'Apapane, and 'I'iwi.

Birds of prey include the exotic Barn Owl and the endemic Hawaiian Owl, the Pueo. There are also numerous exotic game birds.

The only endemic mammal on Ka[illegible]he endangered Hawaiian or Hoary Bat (Pe'a, 'Ope'ape'a). Game mammals [illegible] exotic feral pigs and mule deer. Rats and mice are also common. (DLNR, 1984).

Most marijuana cultivation sites are not attractive to wildlife. Growers use a variety of methods, including fences, repellents, poisons, and traps to protect their plants from wildlife. However, many wildlife species that inhabit the forest reserve lands could come into contact with marijuana sites. Deer, rabbits, and rodents are known to forage on the young shoots of these plants. Birds such as dove and quail feed on the seeds of the mature plants. (DEA, 1984).

ENDANGERED AND THREATENED SPECIES

Kaua'i is home to more of Hawaii's endangered forest birds than any other island. The Kaua'i Forest Birds Recovery Plan of 1983, prepared by USFWS, reports that:

> In historic times within the State of Hawai'i, 20 of 57 endemic passerine taxa (i.e. species and subspecies) have become extinct . . . With 13 native passerines on the Island of Kaua'i, there are more endemic passerines here than on any of the other Hawaiian Islands . . . six [are] endangered . . . Perhaps all of the seven "non-endangered" endemic, passerine forest birds of Kaua'i have depleted populations . . .
>
> The Kaua'i Forest Birds Recovery Plan is concerned with the following species: Large Kaua'i thrush, (Kama'o, Kanau, 'Oma'o), Phaeornis obscurus myadestina; Small Kaua'i Thrush, (Puaiohi), Phaeornis palmeri; Kaua'i 'O'o, ('O'o-'a'a), Moho braccatus; Kaua'i 'Aikaloa, Hemignathus procerus; Kaua'i Nuku-pu'u, Hemignathus lucidus hanapepe; 'O'u, ('O'u Po'olapalapa, 'O'u-laueo), Psittirostra psittacea.
>
> Throughout recorded history, the Nuku-pu'u, 'Akialoa, and Puaiohi have been relatively rare birds, but not nearly to the present extent. The 'Akialoa may be extinct . . . Shortly before the turn of the century, the Kaua'i 'O'o, Kama'o, and 'O'u were considered common to abundant, and had much wider distribution than at present . . . The Kama'o was then considered the most abundant forest bird on Kaua'i . . . In 1981, only two Kaua'i 'O'o were found during intensive surveys.

Other endangered and threatened birds on Kaua'i are the Newell Shearwater ('A'o) Puffinus puffinus newelli, Hawaiian Storm-petrel ('Oeoe,'Ake'ake) Oceandodroma castro cryptoleucura, Hawaiian Duck (Koloa, Koloa-maoli) Anas wyvilliana, Hawaiian Gallinule ('Alae-'ula) Gallinula chloropus sandvicensis, Hawaiian Coot ('Alae-ke'oke'o) Fulica americana alai, and the Hawaiian Stilt (Ae'o) Himantopus mexicanus knudseni.

The DEA 1984 EIS reports that:

> At present, there are no reports of any endangered or threatened plant species being near cannabis cultivation or eradication sites. Similarly, there have been no reports of endangered or threatened animal species feeding on cannabis plots. Foresters in the field have neither sighted nor found any evidence of endangered species in the course of their cannabis eradication activities.

Table III-1 lists the endangered and threatened species on Kaua'i and in the surrounding oceanic waters. There are no mollusks, plants, or insects on the list; however, a number of invertebrates and plants have been proposed to be classified as endangered and threatened. Kaua'i inverterbrates listed by the USFWS in the May 22, 1984 edition of the Federal Register as candidates for such classification include: the Kauai cave amphipod, Spelaeorchestia kokoena; the Kauai cave wolf spider (pe'e pe'e maka 'ole), Adelocosa anops; the Kauai thin-footed bush cricket, Thaumatogryllus variegatus; the Kauai parti-colred oliarus planthopper, Oliarus consimilis; the Kauai nesotocus weevil, Nesotocus kauaiensis; the Kauai flightless stagbeetle, Apterocychus honoluluensis; the Kauai yellow-faced bee, Nesoproscopis kauaiensis; and the Kauai nesomimesan sphecid wasp, Nesomimesa kauaiensis.

Numerous plants have been proposed. A list of these is included as Appendix C.

WATER RESOURCES AND AQUATIC SYSTEMS

Kaua'i has an abundance of fresh surface and ground water. Median rainfall on Kaua'i ranges from 699 to 977 billion gallons per year. There are numerous streams, most of them short and precipitous. Kaua'i, as the oldest of the Hawaiian islands, also has more large slower-flowing rivers than other Hawaiian islands. Stream characteristics are largely determined by surface geology and topography. Where surface levels are impervious, there is a large amount of runoff. However, most of the perennial streams depend on groundwater to sustain stream flows during low rainfall periods.

Freshwater habitats of Kaua'i are inhabited by a variety of fishes, amphibians, crustaceans, insects, mollusks, and annelids. The majority of these species are exotic and widespread. Many of the introduced species are managed for recreational fishing. Game fishes include black bass and rainbow trout.

While exotic organisms are found in Kaua'i's streams, many of these streams are nearly pristine and support large populations of endemic fishes, mollusks, crustaceans, and insects. Hawaii's endemic freshwater icthyofauna consists of a relatively small number of species: Awaous stamineus, Sicyopterus stimpsoni. Lentipes concolor, and Eleotris sandvicensis.

The major freshwater sources of the island have their headwaters in the forest reserve areas. Watershed protection is one of the principal reasons for management of these lands. In addition to providing habitats for freshwater and anadromous fish, they supply potable, industrial, and agricultural water. This is also Kaua'i's principal groundwater recharge area.

TABLE III-1
ENDANGERED AND THREATENED SPECIES OF KAUAI

Note: Unless otherwise noted, all species listed herein are considered to be endangered by both the federal and state governments.

COMMON NAME (Hawaiian Name)	SCIENTIFIC NAME
Birds	
*Newell Shearwater ('A'o)	Puffinus auricularis newelli
**Hawaiian (Band-rumped) Storm-Petrel ('Oe'oe)	Oceanodroma castro cryptoleucura
Hawaiian Duck (Koloa-maoli)	Anas wyvilliana
Hawaiian (Common Moorehen) Gallinule ('Alae-'ula)	Gallinula chloropus sandvicensis
Hawaiian Coot ('Alae-ke'oke'o)	Fulica americana alai
Hawaiian (Black-necked) Stilt ('Ae'o)	Himantopus mexicanus knudseni
**Hawaiian (Short-eared) Owl (Pueo)	Asio flammeus sandwichensis
Small Kauai Thrush (Puaiohi)	Phaeornis palmeri
Kauai Thrush (Kāma'o)	Phaeornis obscurus myadestina
Kauai 'Ō 'ō ('Ō 'ō 'a'a)	Moho braccatus
Kauai 'Akialoa	Hemignathus procerus
Kauai Nuku-pu'u	Hemignathus lucidus hanapepe
('Ō 'ū)	Psittirostra psittacea
**('I'iwi)	Vestiaria coccinea
Land Mammals	
Hawaiian bat ('Ō pe'ape'a)	Lasiurus cinereus semotus
Oceanic Mammals	
Hawaiian seal ('Ilio-holo'i-kauaua)	Monachus schauinslandi
Humpback whale	Megaptera novaenagliae
Fin or Finback whale	Balaenoptera physalus
Sperm whale	Physeter catodon
Oceanic Reptiles	
*Pacific green sea turtle (Honu)	Chelonia mydas agassizi
Pacific hawksbill turtle (Ea)	Eretmochelys imbricata bissa
Pacific leatherback sea turtle	Dermochelys coriacea schlegelii

* = Listed as Threatened
** = Listed as Endangered by State of Hawaii only

From statewide list prepared by State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife, March, 1984.

AIR QUALITY

Air quality in the forest reserve areas is generally excellent. Atmospheric pollutants that are present are locally generated by automobiles, trucks, power generating plants and other internal combustion engines. Because only small quantities of air pollutants are presumed to be generated at the present time and because of the wind patterns in the mountainous areas, the pollutant concentrations should be very low and well below both national and state air quality standards.

NOISE

The forest's relative quiet is a major attraction for most people. Logging, helicopters, vehicular traffic and maintenance operations are some of the sources of noise.

VISUAL RESOURCES

The scenic beauty of the forests is an important amenity sought by many people. Scenic quality is enjoyed by those driving or hiking through the forests, those flying over them, and those viewing mountains from the valleys or viewing the valleys and oceans from the cliffs and ridges. The DEA 1984 EIS notes that:

> Because the illicit cannabis growers occupy only a small percentage of the forest acreage, and because they . . [their products] are intended to be difficult for forest users and workers to detect, they normally have little (if any) visual impact. . . Indeed, some growers have gone to great lengths to camouflage their camps and plots. . . In fact, as the growers develop shade-tolerant strains of cannabis, the visual impacts of these plots will virtually disappear.

HISTORIC AND ARCHAEOLOGICAL SITES

Archaeological remains of human activity are invaluable aids to understanding the history of Hawaii. Under state law, the agency must identify and protect the cultural resources on the lands it manages. Since historical and archaeological sites continue to be discovered, it is certain that they have not been fully inventoried. None of the marijuana plots found so far in the continental United States have been associated with any cultural sites. (DEA, 1984)

SPECIAL AREAS

Certain areas have been established for special management consideration by the State of Hawaii. On Kaua'i, these include the Alakai Wilderness, two Natural Area Reserves and nine state parks.

Alakai Wilderness. The Alakai Wilderness was established in 1964, before the Natural Area Reserve System was created. Its 10,000 acres include the essential habitat of endangered forest birds.

Natural Area Reserves. There are two natural area reserves on Kaua'i. Hono O Na Pali Natural Area Reserve consists of 3,150 acres of both mesophytic forest and 'ohi'a rainforest, within the Na Pali Coast State Park between Haena and Kalalau Valley. There is a variety of native plants, some rare. (DLNR, 1982)

The Kui'a Natural Area Reserve consists of 1,636 acres of both mesophytic forest and dry scrub land to the west of Hono O Na Pali, makai of Koke'e. There is a variety of native plants but exotics are also present including planted stands. (DLNR, 1982)

State Parks. The nine state parks on Kaua'i and their respective acreages are as follows:

Name	Acreage
Ahukini State Recreation Pier	1.0
Ha'ena State Park	61.0
Koke'e State Park	4,345.0
Na Pali Coast State Park	1,337.4
Polihale State Park	140.0
Wahiawa Mauka State Park Reserve	52.3
Wailua River State Park	1,133.4
Waimea Canyon State Park	1,800.0
Waimea State Recreation Pier	1.3

Other Special Areas. Other special areas include the Kilauea Point, Hanalei, and Huleia National Wildlife Refuges, the proposed essential habitat for Kaua'i endangered forest plants and birds and waterbirds, and the Nature Conservancy's Kalua Home Reserve.

ECONOMIC ELEMENTS

Because growing marijuana is illegal, no reliable statistics exist on its relative value to the economy. According to the formula used by DEA, plants are valued at $1,000 each. A newspaper report stated that the "Operation Wilt" effort by the Kaua'i Police Department in October 1984 resulted in the eradication of 12,189 pounds of marijuana estimated to be worth $12,189,000 on agricultural cane lands (The Honolulu Advertiser, October 26, 1984). The police also estimate that only 10 to 20% of the marijuana is grown on agricultural lands and 70 to 80% on state-owned lands. If one assumed that this operation virtually destroyed all marijuana on agricultural lands, or 20% of Kaua'i's crop, the quantity of marijuana grown on state-owned lands would have a value of $48,000,000. It should be noted that not all marijuana enters the market place; some is consumed by the growers and their associates.

SOCIAL ELEMENTS

The socioeconomic groups affected by the eradication of marijuana on state-owned lands consists of the general public and three specific subgroups: state land users, state land managers, and marijuana users.

General public. Policies affecting state-owned lands concern all residents of the State of Hawaii, since they are all potential users of state-owned lands and all share in the ownership of these resources and their revenues. Use of state-owned lands for growing marijuana results in the destruction of wildlife habitats and other resource values. The DEA 1984 EIS cites a 1982 poll by Newsweek Magazine indicating that the majority of Americans (77%) do not favor legalizing marijuana consumption. It notes that:

> Even many of those who are tolerant of moderate marijuana use are opposed to drug dealing. That same Newsweek poll reported that 85 percent of the population think that growing marijuana for sale to others should be treated as a criminal offense, and many who would tolerate the cultivation of cannabis on private lands are probably opposed to growing it on Federal lands. Nearly all Americans seem to oppose cannabis cultivation on public lands for private profit.

State land users. State land users include all those who use state lands for legitimate economic, cultural and recreational purposes. The actions of marijuana growers interfere with these uses. There have been many reports of booby traps and shootings in areas of marijuana plots. Even if persons are not directly affected, they are reluctant to use remote trails for fear of being harmed.

State land managers. State employees are subject to essentially the same risk as the state land users. However, they are not as free to avoid dangerous areas because of their duties.

Marijuana users. There have been a number of studies conducted and reports published on the adverse and potentially dangerous effects of smoking marijuana. Although there has been some disagreement and controversy over some of the conclusions of these reports, there is strong evidence that continued use of marijuana may have detrimental effects to the health of users.

PART IV

THE RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE PROJECT AREA

STATE PLANS AND POLICIES

The use policies of state-owned Conservation District lands are in the jurisdiction of the Board of Land and Natural Resources (BLNR). Both the Hawaii State Plan and the State Conservation Lands Functional Plan adopted by the BLNR set forth objectives, policies, and implementing actions to guide the management of all Conservation District lands, including those privately owned. The BLNR has also adopted a number of different regulations to enable it to carry out its mission. The proposed marijuana eradication program is consistent with these adopted objectives, policies and implementing actions in that it is designed to stop an illegal activity that is harmful to native ecosystems with a minimum negative impact on the environment.

Hawaii State Plan

The Hawaii State Plan is the guiding document for all state agencies. A number of objectives and policies in the plan are relevant to the proposed marijuana eradication project. These are to be found in several sections, including three relating to the physical environment, Sections 11, 12, and 13, and in Section 26 relating to public safety.

The particularly relevant environmental objectives and policies are as follows:

Section 11:

(a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed at achievement of the following objectives:
  (1) Prudent use of Hawaii's land-based, shoreline, and marine resources.
  (2) Effective protection of Hawaii's unique and fragile environmental resources.

(b) To achieve the land-based shoreline, and marine objectives, it shall be the policy of this State to:
  (4) Encourage the beneficial use of statewide forest resources without generating costly or irreparable environmental damage.
  (6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.

Section 12:

(a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources:

(b) To achieve the scenic, natural beauty, and [illegible]oric objective, it shall be the policy of this State to:
(1) Promote the preservation and restoration of significant natural and historic resources.

Section 13:

(a) Planning for the State's physical environment with regard to land, air, and water quality shall be directed at achievement of the following objectives:
   (1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
   (2) Greater public awareness and appreciation of Hawaii's environmental resources.

(b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:
   (2) Promote the proper management of Hawaii's land and water resources.
   (3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.
   (4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.
   (8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people and their cultures.

Section 26:

(a) Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:
   (1) Assurance of public safety and adequate protection of life and property for all people.

(b) To achieve the public safety objectives, it shall be the policy of this State to:
   (1) Support law enforcement programs aimed at curtailing criminal activities.
   (2) Develop coordinated management programs for public safety and criminal justice throughout the State.

State Conservation Lands Functional Plan

Relevant objectives, polices and implementing actions in the State Conservation Lands Functional Plan include the following:

Policy A(1). Exercise an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources of the State of Hawaii and controlling use of hazardous areas.

Implementing Action A(1)(d). Provide for effective enforcement of rules and regulations and permit system applicable to the Conservation District.

Policy C(3). Protect and manage the lands with historic or natural resources value.

Implementing Action C(3)(c). Establish criteria and evaluate areas of public land with historic or natural resource value and establish management practices to ensure the protection of areas from further degradation.

Policy C(4). Provide opportunities and facilities to meet public needs for a wide range of recreational and educational activities within Conservation lands.

Implementing Action C(4)(a). Where possible, make available areas of unique biota or geology for public appreciation and enjoyment.

Implementing Action C(4)(b). Provide opportunities and access to use forest lands for outdoor recreation and education by constructing and maintaining facilities for hiking, hunting, camping, nature walks, viewing scenery, and horseback and trail bike riding.

DOFAW RULES FOR FOREST RESERVES

The DLNR has adopted rules regulating activities within forest reserve areas, Title 13, Administrative Rules, Chapter 104. These rules provide for the preservation of public property and resources. These rules are included in Appendix A.

PART V

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATORY MEASURES

INTRODUCTION

The major concern relating to the use of chemicals in the eradication of marijuana plants is the potential impact on plant and wildlife habitats; soils and groundwater resources; fresh water resources and aquatic creatures; and human health. The method of application is critical. Broadcast spraying by fixed-wing aircraft has the potential of being extremely destructive and therefore will **not** be done. All application will be either by helicopter boom sprayer or by ground crews using knapsack sprayers. Even these measures will have some adverse and unavoidable impacts.

LANDFORMS, SOILS AND VEGETATIVE COVER

Cultivation of marijuana involves disturbance of the soil similar to that of other agricultural operations. When compared to the impact of cultivation of marijuana, the impacts of eradication measures become slight.

General cultivation practices include the use of soil additives, such as lime and fertilizer, that are required to make the normally acid, low-nutrient forest soils more productive. The soil water regime is affected by irrigation from streams and gravity-fed or pump storage reservoirs made from portable swimming pools. In addition, poisons such as arsenic, which are used to control rodents that eat the plants, may leach into the soil.

Cultivation practices also may limit or disrupt soil organisms. Populations of soil microorganisms existing under cultivation conditions are probably quite different in number and species composition than those of the soils surrounding the marijuana site because of soil disturbance and compaction and the various chemical fertilizers and rodenticides. Soil macroorganism populations (for example, burrowing rodents, earthworms, and insects) may be absent or limited due to weeding, animal trapping, and soil compaction.

Potential soil impacts from marijuana eradication include soil disturbance and compaction due to foot and vehicular traffic; soil drying and erosion due to plant removal and increased sunlight and rainfall penetration; and impacts on soil organisms such as bacteria, fungi, insects, and burrowing animals, caused by soil disturbance or by herbicides. Herbicides may also affect the speed of vegetation of the site.

When compared to the impacts of cultivation practices discussed above, soil impacts of marijuana eradication are not likely to be significant. Most marijuana cultivation sites will revert to the surrounding natural vegetation during the next growing season. On intensively cultivated sites, soil moisture and nutrient

conditions that are maintained at artificially high levels by irrigation and fertilizers should provide ideal conditions for natural plant succession. On less intensively cultivated sites, nontarget herbaceous vegetation already existing on the site will provide the first stage of secondary succession.

Manual Eradication Operations

Soil impacts that may result from the foot traffic of ground crews involved in manual eradication operations are not likely to be significant. Any onsite nontarget vegetation will remain onsite after manual eradication to mitigate soil drying and erosion potential. Any vehicles involved in the operations onsite may cause slight soil impacts.

Chemical Eradication Operations

Site Revegetation. Indirect impacts on the soil resulting from the removal of protective plant cover and the resultant soil desiccation or susceptibility to erosion are possible under chemical eradication methods. Where marijuana is the only vegetation onsite, herbicide treatment will kill all plant cover regardless of the herbicide used. Where considerable nontarget vegetation exists onsite other than annual, broadleaf weeds, impacts on that vegetation and the resulting speed of site revegetation depend on the mode of action, selectivity, and persistence of the herbicide used.

The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegetation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process.

Populations of soil microorganisms may be affected by the alternative herbicides. However, those effects are not likely to be significant in magnitude or duration at the application rates recommended for marijuana eradication.

Glyphosate is adsorbed very strongly by soil clays and organic matter. It degrades relatively rapidly in soil. This degradation takes place microbiologically. Experimental evidence shows glyphosate to have little or no effect on soil microflora. Therefore, it is unlikely that soil microfauna would be affected since there will be no reduction in their food supply. (DEA, 1984)

Weed Oil and diesel oil spraying should have little or no adverse environmental impact because bacterial microbes in the soil cause a breakdown of oil molecules.

In Introduction to Soil Microbiology, (Alexander, 1977) the author describe this process as follows:

> The microflora responds to the addition to soil of paraffin, petroleum, petroleum products, and other aliphatic hydrocarbons, and the resultant community causes the added substrate to disappear. These transforma-

> tions are of great significance in the terrestrial cycle of carbon because waxes and other constituents of plant tissue contain aliphatic hydrocarbons. It has been estimated that approximately 0.02 percent of plant tissues may be considered as hydrocarbon or hydrocarbonlike in structure. Another source of supply is the soil microflora itself that can synthesize a variety of hydrocarbons or hydrocarbonlike molecules; for example, some species of bacteria and algae and the spores of fungi contain either aliphatic hydrocarbons or materials structurally similar to hydrocarbons. Hydrocarbon oxidizers also probably metabolize the oils used as carriers for pesticide sprays, which, even when applied to the foliage, ultimately reach the soil. In addition, the soil under asphalt-paved highways possesses a large bacterial flora capable of utilizing the asphalt.
>
> The short persistence of hydrocarbons of many types is indicative of vigorous populations, and counts in excess of 10^5 per gram have been recorded when paraffin is used as the growth substrate. Among the substances used by the flora are paraffin, kerosene, gasoline, mineral and lubricating oils, asphalts, tars, and natural and synthetic rubbers. Methane, ethane, propane, butane, pentane, hexane, and many other aliphatic hydrocarbons of the type structure C_nH_{2n+2} are decomposed as well. . . [p. 208]

The effectiveness of microbes in degrading oils is being utilized for pollution control. A feature article on hazardous waste management in the March 1985 issue of the National Geographic Magazine describes how oily wastes from petroleum refining at Chevron's El Segundo, California facility are "attacked by hydrocarbon-hungry bacteria, naturally occurring in the soil. The bugs convert the hydrocarbons into harmless carbon dioxide and water."

Limiting factors to microbiological activity are temperature, moisture and acidity of the soils. In the warm, moist forest soils of Kaua'i, only acidity would appear to be an inhibiting factor. Alexander notes that "many of the strains are sensitive to acidity and frequently show little growth below pH 5." Although much of the soil in Kaua'i forested areas could be expected to be acidic, marijuana does not do well in these acid soils. For marijuana to be present, either the soils will be naturally neutral or will have been treated with lime or some other substance. At a neutral pH level, microbes would be expected to highly active.

Intense repeated spraying or an accidental spill could cause adverse impacts. Chevron warns that "complete soil saturation may leave area bare or sterile." Under a worst-case accident scenario, soils could become saturated as a result of an accidental spill of 100 gallons of the mixture of chemicals used for aerial spraying or a helicopter carrying a full load could crash. Under this worst-case scenario, it must be assumed that in the area immediately surrounding the initial spill that all vegetation would be destroyed and soils would be saturated. Under the crash scenario, there would also likely to be a fire, causing additional damage. Recovery would be slow, but eventually the area would revegetate.

Precautions to be taken if materials are accidentally released or spilled are specified for each chemical in Appendix B. For the oils, it is advised that open

flames in the vicinity of a spill or release be eliminated. Spills should be cleaned up as quickly as possible. Large spills should be absorbed with absorbent clay, diatomaceous earth, or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor. Contaminated materials should be placed in dispoable containers and buried at an approved disposal area.

For glyphosate, spills should be scooped or swept up and disposed of at a landfill. Large spills should be contained where possible and picked up by suction or vacuum truck and disposed of by incineration or in an approved landfill.

Given the methods that will be employed and the likely infrequency of disasters or repeated application in the same spot, soil saturation appears unlikely. Further, experience in the use of oil for weed eradication indicates that vegetation reappears in a fairly short time after spraying. This may also mean regrowth of marijuana plants, and subsequently the need to respray the area. However, it appears unlikely that intense cultivation efforts by growers will resume since they will know their plots are known to law enforcement officials.

Oil sprays kill broadleaf plants within a few hours. Glyphosate causes complete plant kill in approximately 4 to 10 days at the 1.5 power active ingredient per acre application rate. (DEA, 1984)

Marijuana cultivation sites vary in the amount of non-target vegetation present. Most have considerable peripheral vegetation. Impacts on onsite nontarget vegetation that may result from marijuana eradication operations include direct effects, that is, killing of nontarget plants by cutting, mowing, trampling, or herbicides, and indirect effects, such as those stemming from soil impacts that may retard natural vegetation of the site. The amount of nontarget vegetation present, the size of the marijuana cultivation site, and the method of marijuana removal will determine the impacts on onsite nontarget plant species and the speed and pattern of site revegetation. Impacts on offsite plants, particularly those trees, shrubs, and herbaceous plants along the edges of the site, will result principally from herbicide drift. Manual methods would not affect offsite vegetation. Once marijuana is removed, increased sunlight penetration should lead to site revegetation and increased production of ecotone (edge) vegetation.

Ground spot application methods would remove only the target species from a site. There should be little impact on any non-target plants, although both onsite target plants and plants immediately surrounding individual marijuana plants may be damaged by drift.

Aerial spot application methods would remove all target and some non-target plants growing on a site. Particular impacts on non-target plants depend on the herbicide's selectivity, persistence, and mode of action as previously discussed.

With aerial application of herbicides, a portion of the peripheral understory vegetation may be defoliated or killed. Trees defoliated in the spray operation will be affected to the extent they are already stressed or diseased. It is unlikely that healthy trees will be killed, even though substantial defoliation occurs.

Temporary leaf brownout could occur in a narrow band approximately 5 to 25 feet wide for understory vegetation, narrower for canopy trees (DEA 1984). Spotting of foliage could occur over a wider band, depending on the vegetation and type of herbicide applied. Because of the strict meteorological and operational constraints that apply to aerial applications (see Table V-4), offsite spray deposition should be minimal—even over short distances.

Agricultural crops grown in the vicinity of marijuana cultivation sites could experience slight impacts, such as leaf-spotting from herbicide drift. Mitigatory measures described in Table V-4 specify precautions that minimize offsite drift.

On sites where non-target plants grow interspersed with the marijuana, aerial techniques using glyphosate would kill or suppress all the onsite vegetation. However, revegetation from seeds should occur quite rapidly because both herbicides are inactivated in most forest soils. Where oils are used, leaf-browning may occur depending on the susceptibility of the non-target plants. However, a number of non-target plants may remain alive.

Spraying of herbicides to eradicate marijuana involves the risk of injury to sensitive plants, particularly endemic species. The degree of risk depends on the proximity of the sensitive plants to the marijuana cultivation sites, the amount of herbicide that moves offsite, and the distance it travels.

Standard application practices and mitigatory measures described in Table V-4 are employed to minimize offsite herbicide drift. They include:

1. Use of drop booms that produce a relatively uniform distribution of large droplet sizes under low pressure. Large droplets have a far lower tendency to drift than smaller droplets.

2. Careful monitoring of weather so that adverse conditions such as windspeeds greater than 8 miles per hour, thermal inversions, unstable air, and the combination of high temperature and low humidity may be avoided.

3. Observance of buffer distances to avoid drift to sensitive habitats such as streams.

No negative impacts to onsite non-target vegetation would result from strictly controlled manual eradication. Removal of marijuana will result in invasion of the site by non-target plants and reversion to a revegetation cover. With manual eradication impacts to offsite vegetation would be minimized.

Herbicide impacts on nontarget vegetation depend on the herbicide's selectivity, mode of action, and persistence of residues in soil.

Glyphosate is listed as a very broad spectrum herbicide effective on deep-rooted perennial species and on annual and biennial species of grasses, sedges, and broadleaf weeds. Unlike the contact, desiccant action of paraquat, glyphosate's action is systemic. It is quickly adsorbed through leaf surfaces and translocated to all plant parts. Root uptake, however, is precluded by rapid soil inactivation of

glyphosate. Glyphosate is very effective in preventing resprouting from perennial species. Glyphosate has little residual action outside the treated plants because of its rapid inactivation by soil adsorption and rapid microbial breakdown. Therefore, site revegetation should occur almost immediately from seed stored in the soil. (DEA, 1984)

The oil sprays kill by contact and are not persistent. As noted earlier, areas sprayed with oil emulsions revegetate in a fairly short time.

The proposed methods of application, through precision spraying via a lowered boom by helicopter, or by individuals using knapsack sprayers, are designed to ensure that the spray reaches only the targeted plants. In addition, spraying will be done in morning hours of low wind less than 8 mph. Inversion conditions will be avoided to minimize the possibility of drift. Removal of the marijuana plants will allow revegetation. In essential habitat areas, only manual methods of eradication will be used.

WILDLIFE

The impact of marijuana eradication on wildlife will vary depending on the type of cultivation site. In general, because marijuana cultivation sites tend to be small and widely dispersed and because growers go to great lengths to discourage all wildlife, no additional significant impacts are likely to occur to any wildlife species population from any of the eradication alternatives.

Manual Eradication Operations

Impacts from manual eradication operations on wildlife should be similar to those from any brush clearing activities. Beneficial wildlife impacts may result from manual eradication of marijuana. Removing marijuana eliminates the need for growers to use wildlife deterrents and opens up the area for revegetation by nontarget herbaceous and woody plants that are beneficial to a wide variety of wildlife species.

While manual eradication operations may cause wildlife to flee the area temporarily, no direct injury or fatality to any individual animals is likely to occur. However, marijuana removal may affect the survival of one or more individuals, particularly if ground-nesting birds or small mammals are living on or immediately adjacent to the site itself.

No impacts on large mammals, peripheral canopy-nesting birds, or amphibians are anticipated using manual eradication methods.

Chemical Eradication Operations

Although relatively few data exist on the toxic effects of glyphosate to wildlife species, glyphosate is generally recognized to be a chemical of low toxicity in the environment. (See earlier discussion.) The oil sprays would be expected to affect wildlife much the same as humans--minor eye irritation, minor skin irritation, and headache and nausea from inhalation.

A negative impact associated with both manual eradication and spraying is that caused by the use of helicopters. The downwash and noise could disturb and disrupt birds nesting and interfere with reproduction.

A direct hit with oil spray will harm any insect on or near marijuana plants and could result in additional disruption of habitats of other creatures. Destruction of bird nests or small mammals may also occur. Birds may also ingest seeds from plants that have been sprayed. It is unlikely that either of these alternative eradication methods would affect any endangered or threatened species because of the small size of the plots on which the marijuana is grown. However, steps have been proposed that should increase the certainty that there will be no impacts to endangered or threatened species. These steps include the following:

1. Before any herbicidal eradication efforts are undertaken, qualified personnel will delineate areas where those endangered and threatened species are found or are likely to be found. No herbicides will be used in areas where an impact on state or federally designated endangered or threatened species is likely to occur.

2. In cases where eradication must be undertaken in known or suspected endangered or threatened species habitat, qualified personnel will conduct a site-specific assessment of the presence and distribution of the species and recommend the use of an eradication method that would not affect the species.

3. In no case where there is a reasonable likelihood of an endangered or threatened species being adversely affected by an eradication operation will that operation be undertaken.

Under a worst-case accident scenario, all wildlife in the immediate area could be killed or injured as a result of an accidental spill of 100 gallons of the mixture of chemicals used for aerial spraying or a helicopter crash. In the case of a crash, fire would also be likely, possibly causing a forest fire. Under this worst-case scenario, it must be assumed that in the area immediately surrounding the initial spill that both animals and their habitats would be seriously harmed. Downstream fauna could also be injured or killed. Recovery would be slow, but eventually the area would revegetate. Only in the unlikely event that the accident occurred at a spot where the last members of an endangered species were found would there be serious, permanent damage.

WATER RESOURCES AND AQUATIC SYSTEMS

In remote areas, the marijuana plots would be expected to be located in areas with adequate water supplies, such as near mountain streams. Kauai has several public water systems which receive their water from remote mountain streams which traverse Conservation District land. The Kalaheo system in the uplands of south Kauai uses the Alexander Reservoir as its source of potable water. Kokee State Park in west Kauai receives water from the Elekeinui Stream. Kuia Stream is the source for the Grove Farm - Koloa Water System.

The possible effects on water quality and aquatic systems resulting from marijuana eradication by manual methods and chemical spraying include sedimentation from runoff and herbicide contamination. Sedimentation occurs when significant amounts of vegetation cover are removed so that the soil is transported during the rainstorms. Herbicide contamination can result from drift, from failure to follow established procedures, or from accidents. Because of the small size and widely scattered distribution of marijuana plots on state lands, these effects are expected to be slight and of localized nature and short duration.

Manual Eradication Operations

No impacts on water quality and aquatic systems are anticipated as a result of manual eradication techniques. The size of most cultivated marijuana sites is insignificant compared to the total surface area of even a small watershed.

Chemical Eradication Operations

Herbicide contamination of surface water is of concern to the public, especially when water is diverted to irrigation or domestic use downstream of the application site, or when the water supports native species.

Small amounts of herbicide could reach aquatic systems from drift from aerial applications or from accidental application. Guidelines and standards for herbicide application minimize the probability of direct application of herbicides to water surfaces. (See Table V-4.) Special equipment would be used to produce large droplets and to minimize offtarget movement of drift. In addition, streamside cover will intercept a portion of the spray drift. These factors, however, do not eliminate the potential for direct contact with water surfaces because very small streams, ephemeral stream beds, and seep areas may be hidden from view, especially during aerial application.

Indirect routes of contamination include runoff from rainfall occurring immediately after an herbicide application or from contaminated sediment reaching the system in small amounts over time. The magnitude of contamination from indirect routes is influenced by soil type and topography. Coarse, rocky soils with low clay content have low water-retention capability and are move readily leached. Steep slopes increase the quantity of surface runoff and decrease retention time, thereby concentrating any sediment or chemical runoff into a shorter time span. In contrast, a soil matrix with organic matter or clay typically binds many chemical compounds, preventing the movement of chemicals away from application sites. Continuous ground cover of vegetation and plant litter minimizes surface runoff, and high aeration of soil and high organic matter content foster growth of soil microbes and fungi, which can biodegrade chemicals. Direct application and drift to surface waters or ephemeral stream channels are the most important routes of herbicidal contamination of water bodies.

If a stream is contaminated with herbicide, the risk for aquatic organisms is dependent on the concentration of the herbicide in the stream and on the duration of exposure. The concentration in the stream is dependent on how much enters the stream, as well as on how fast it is adsorbed, degraded, or diluted. Stream sediments and organic detrital matter provide sites for adsorption, which can

reduce the effective concentration in the water. Adsorbed molecules are not biologically available. The temperature, chemistry, and oxygen content of the stream affects the rate of biodegradation of the chemical. The velocity and mixing properties of a stream determine the duration of exposure to the critical concentration.

Ground Spot Application Methods. When herbicides are applied directly to individual target plants, they are unlikely to drift or fall directly onto surface water. Because of the adsorptive capacity of soils, the small numbers of plants likely to be sprayed, and the unlikely occurrence of marijuana plants close enough to water to enable a direct application to a water body, the use of spot application equipment is unlikely to result in any measurable contamination of water bodies.

Aerial Spot Application Methods. Under a worst-case accident scenario, 100 gallons of the mixture of herbicide used for aerial spraying are dumped completely into a stream. Under this worst-case scenario, it must be assumed that in the area immediately surrounding the initial spill there will be fish kills. Aquatic vegetation will adsorb herbicides, reducing the concentrations in the water column, but this vegetation could die in the process. This may reduce water quality depending on the rate of subsequent decomposition of the flora and will affect the levels of aquatic invertebrates that depend on the flora for substrate. Other invertebrates such as aquatic insects may also be killed. At worst, what could result is a localized zone of measurable, and probably visible, disturbance. However, these effects will be reversible and will not have a measurable impact on the total stream community since most streams depend primarily on vegetation that has fallen into the stream for their energy supplies.

Since both glyphosate and the oil sprays are biodegradable, there should be no long-term adverse effects to either aquatic habitats or potable water supplies.

Another concern is the possibility of groundwater contamination. The important factors in determining pollution potential are groundwater occurrence and movement and the type and permeability of soils.

In a document prepared for the Hawaii State Department of Health in 1977, Kiyoshi J. Takasaki of the U.S. Geological Survey evaluated the groundwater pollution potential of each island. Takasaki describes groundwater on Kaua'i as follows:

> The high perennial fair-weather flow of most streams of Kauai indicates that much of the ground-water discharge is into stream channels and that the underflow discharge of water directly to sea is only a small fraction of that which discharges as streamflow. This is the result of high water levels in the Napali Formation under the higher slopes and in the Koloa Volcanic Series under the lower slopes, which promote the flow of ground water into stream channels that cut deep into saturated rock.
>
> These factors should be considered in evaluating ground-water pollution... [p. 9]

Takasaki divides Kaua'i into 19 geohydrologic units. The Conservation District lands encompass seven of these: i.e., 1, 4, 5, 14, 15, [illegible] and 19. The topography and rock units and groundwater occurrence and movement for these seven areas on Kauai are described in Table V-1.

Takasaki estimated the pollution potential of both point sources (injection wells, cesspools, etc.) and nonpoint sources (seawater, irrigation water, and pasture runoff) as high, medium or low for each hydrogeologic unit. He notes that the designation is primarily based upon geohydrologic conditions, and secondarily upon geomorphic and climatic conditions. Given the variations in population, land use, and in the hydrologic elements within each unit, the designation is, at best, a generalized one. However, he notes, it does serve to flag those areas that may require a closer look or preventive measures and identifies areas that do not warrant immediate concern.

All of the geohydrologic areas in the Conservation District lands are designated as having a medium to high potential for pollution from point sources. Areas 1, 4, and 17 are important sources of domestic water.

Glyphosate has little potential for groundwater contamination because of its strong adsorption to soils. In a special study on Weed Oil and diesel oil conducted by the consultants to DEA in 1984, the authors point out that, at normal application rates:

> . . . neither product is likely to move down through the soil below the top inch unless rain follows immediately after spraying. Therefore, groundwater contamination immediately following a spray operation is not likely to occur. However, since the less volatile constitutents of both products are persistent in soils, there is a long-term possibility of grounwater contamination, particularly if an area is sprayed repeatedly. Areas most susceptible to groundwater contamination would be those with low porosity soils (gravels and sands), high water tables (i.e., close to the soil surface), and low populations of oil-degrading organisms. (Scerzenie et al 1984)

The mitigatory measures listed in Table V-4 will be followed.

AIR QUALITY

The use of helicopters and diesel oil spray will add hydrocarbons to the air. However, these added amounts of hydrocarbons will be negligible on other than a local, immediate basis. According to Monsanto, glyphosate will not vaporize. This reduces the likelihood of vapor inhalation by applicators or nearby animals, as well as vapor drift to adjacent non-target vegetation. More information on risks from herbicide drift is contained in other sections of this document.

TABLE V.-1

DESCRIPTION OF GEOHYDROLOGIC UNITS AND POLLUTION POTENTIAL RATINGS

State-Owned Conservation Lands on Kauai

Area	Geohydrologic Unit No.	Topography and rock units	Ground Water	
			Occurrence	Movement
Napali coast	1	Steep sea cliffs. Uplands dissected by numerous short streams. Permeable Napali lava flows, cut by numerous dikes in places.	Perched water in uplands, also many discontinuous dike-impounded water bodies. Basal water near shore and southwest part. One small dug well. Important source of small supplies.	Overflow of perched water to dike-impounded and basal water bodies. Dike-impounded water mostly to streams as spring flow and seeps. Basal water to sea at or near shore.
Makaleha Mountains and other nearby peaks	4	Eroded masses of Napali lavas projecting through and standing above surface of younger Koloa lavas. Napali lavas are cut by a few dikes. Soils poorly to moderately permeable.	Mostly basal water, but dikes may impound some water. Some perched water in southern flanks of Makaleha. At least 6 wells, 3 perched tunnels. Important source of domestic supplies.	Perched and dike-impounded water to springs or to underlying basal water. Most basal water discharges into Koloa rocks, from which the water discharges into stream channels or directly to sea.
Mauka areas of Kalihiwai, Anahola, Kapaa, and Wailua	5	Intermediate uplands, dissected by numerous shallow valleys in Koloa lava terrain. Koloa lavas are interbedded with layers of ash and soil.	Considerable perched water in Koloa lavas. Nature of groundwater below stream levels is not known. Not an important source of water at present.	Most groundwater discharges as springs and seeps in valleys. Some underflow to deeper water bodies in Koloa lavas.

TABLE V-1 (Cont.)

Area	Geohydrologic Unit No.	Topography and rock units	Ground Water: Occurrence	Ground Water: Movement
Steep east and south slopes of main volcanic dome	14	Eroded slopes. Mostly Napali lavas intruded by dikes.	Unknown in uplands. Basal water in lower southern flanks.	Moves into Koloa lavas, thence to stream channels or to sea.
Makaweli mauka/ Waimea Canyon	15	Southwestern slope of main volcanic dome. Depression-filling lavas flows of Makaweli Formation. Soils poorly to moderately permeable.	Unknown in uplands. Basal water in lower part.	Moves into Koloa lavas, thence to stream channels or to sea.
Southwest Kauai	17	Eroded eastern slope of main volcano. Mostly Napali lavas cut by numerous dikes. Soils highly permeable.	Mostly basal, may be dike impounded in uplands and in northern part. Extensive development of basal water. Important source of domestic and irrigation water.	Dike-impounded water moves to basal bodies in lavas or sediments, thence to sea. Basal water in lavas moves into sediments. Thence to sea or is lost to evapotranspiration.
Caldera Alakai Swamp	19	Centrol highlands. Olokele lava flows, which accumulated in broad caldera. Soils poorly to moderately permeable.	Perched water in weathered zones or in alluvium overlying denser rock.	Perched water moves to surface as seeps and springs in stream channels.

Notes to Table V-1.

Column 1, Geohydrologic unit, name.—Unit names in the column are principal place names or geographic features within the boundaries of the units.

Column 2, Geohydrologic unit, number.—Numbers in this column refer to areas labeled with bold numbers on the plate for each island.

Column 3, Topography and rock units.—Given first is a brief listing of the dominant topographic features in the area. Second is a listing of rock units that contain or control the groundwater. Some rock units are given as lithologic terms, such as "alluvium," "beach deposits," or "tuff." Others include shortened stratigraphic names with lithologic terms. For example, in table 1, the term "Napali lavas" refers to lava flows of the Napali Formation, and the term "Koloa lavas" refers to lava flows of the Koloa Volcanic Series on the island of Kauai.

Column 4, Groundwater, occurrence.—This column gives (1) a short description of the modes of occurrence of the groundwater, that is, whether the water is in basal, perched, or dike-impounded aquifers; (2) the extent of development of the water; and (3) the significance of the area as a source of supply.

Column 5, Groundwater, movement.—Simplified description of the movement of groundwater from the various aquifes in each area. For example, perched water may move down to a basal aquifer; dike-impounded water may discharge into streams; and basal water may flow directly from the rocks into the sea.

Adapted from Tables 1, 2 and 4, Plate 1 and accompanying text, p. 7. Kiyoshi J. Takasaki. Elements needed in design of a groundwater-quality monitoring network in the Hawaiian Islands. (Geological Survey Water-Supply Paper 2041) 1977.

VISUAL RESOURCES

The eradication efforts are likely to have only minimal, short-term impacts on visual resources. As noted earlier, the cultivation sites are located in remote areas and are difficult to find. Some visual impacts may result from leaf browning on the periphery of treated marijuana sites.

HISTORIC AND ARCHAEOLOGICAL SITES

None of the alternatives is likely to seriously harm any historic or archaeological resources. The location of known archaeological sites will be made available to law enforcement officials. The Forest areas were generally utilized as resource areas by the Hawaiians, but agricultural areas and habitation sites may potentially exist on other Conservation District lands. The State Parks Division considers the following areas to be archaeologically sensitive: Na Pali Coast from Polihale to Haena; Waimea Valley; Hanapepe Valley; Hanalei Valley; and the Wailua River.

One concern is the accidental spraying of archaeological sites with herbicides. Chemical sprays could interfere with the radiocarbon dating of artifacts. The radiocarbon dating techniques measure the ratio of elements left in the artifact to determine its age. The application of herbicides alone would affect only the surface of the object and would not impair the dating process which involves the subsurface portions of artifacts. However, oil products would seep below the surface. As long as archaeologists are alerted to the fact that an artifact may have been contaminated with oil, organic solvents can be used to remove the material. However, it is then difficult to get all the solvent out of the material and the solvent itself may contain carbon 14 which can interfere with the dating process. (Pers. comm., Labat-Anderson, Inc. 1985).

The State Historic Preservation Office has researched this subject since the Draft EIS was published and reports normal use of herbicides in reasonable amounts will not interfere with radiocarbon dating of charcoal or shell samples. See DLNR letter in Part IX.

PUBLIC HEALTH AND OCCUPATIONAL SAFETY

There are two health concerns. One is the risk to law enforcement officials and individuals who may inadvertently be exposed to herbicides. The other is the risk to someone who might intentionally or inadvertently smoke marijuana that has been sprayed.

Risk is a product of three factors: the probability of injury, the potential severity of the injury, and duration and frequency of exposure to the individual. The probability of injury depends on the inherent dangers present at cultivation sites and the characteristics of the tools or herbicides being used. Severity depends on the potential damage that booby traps, tools, or herbicides could cause on or off the site. The exposure depends on the amount of time an individual is exposed to these hazards.

In general, the greatest risk associated with marijuana cultivation and eradication operations is the risk to law enforcement personnel securing the site and checking for booby traps and to the public encountering "protected" marijuana cultivation sites on public lands.

The risk to law enforcement personnel from booby traps is assumed to be the same for all alternatives except aerial spraying. A goal of all the alternative eradication methods is to reduce the risk that marijuana cultivation operations pose to the public.

There are a number of risks to enforcement officers applying chemicals. These include flying at low levels in a helicopter, rappelling down (and back up) to the helicopter, and risk of exposure to chemicals. There is no question that helicopter operations of this kind are risky. There have been serious injuries to personnel involved in "Green Harvest" operations. However, police officers note that the "Green Harvest" methods of manual eradication involve a much larger number of personnel for much longer periods of time than "Operation Wilt" and that the overall risk is thereby much reduced. Applicators will wear protective clothing and follow standard safety procedures. Hearing protection devices will be provided to helicopter operators and passengers.

The amount of risk to individuals who may be exposed to the herbicides depends on the toxicity of the chemical used and the amount and length of time of exposure. The herbicides are generally less toxic than insecticides to humans and other animals because of basic biological and physiological differences between plants and animals. Herbicides are designed to interfere with vital plant processes such as seed germination, hormone (auxin)-mediated growth and development, and photosynthesis, which are processes that do not occur in animals. Nevertheless, like all chemicals, herbicides are toxic at some levels. Persons who are immunologically sensitive to chemicals would be at greater risk.

Persons receiving a direct hit from the aerial application of glyphosate should not experience any observable human health effects. The main risk would be to a mixer-loader working directly with the chemical, particularly a pregnant women because of the possible teratogenic effects (developmental malformation of fetus) (DEA 1984).

The exposure levels associated with an accident involving glyphosate would be approximately 34 times greater than the human reproductive system's estimated safe dose level. Such a situation is of serious concern because of the increased risk that this level poses for a fetus. While glyphosate has not been shown to be teratogenic, other reproductive effects have been observed in laboratory animal studies. These reproductive effects have probably been the result of maternal toxicity rather than direct effects on the fetus. There should be no effects on women mixer-loaders of child-bearing age if protective clothing is worn (DEA 1984).

As noted earlier, the major risk from the oil sprays is from dermal contact, inhalation of vapors, and accidental ingestion. There would be a serious health risk only if the exposed person vomited and aspirated the oil mixture into his lungs. Studies have indicated that long-term exposure to certain petroleum products is

related to various cancers, such as skin cancer (from dermal contacts) and lung cancer (from extended breathing of the fumes). Since contact with the oil sprays by both law enforcement officers and other individuals (growers or legitimate state land users) would be of short duration, the level of exposure would be relatively insignificant.

The risk of someone smoking the marijuana after it has been sprayed and the potential health effects of such an action are difficult to assess. The probability of someone harvesting the marijuana sprayed with oil appears to be extremely low. The plant dies very quickly, turning brown within a few hours; it is therefore unappealing for consumption and has an unpleasant odor. This contrasts to the effects of glyphosate or paraquat where the plant reacts at a slower rate. After several hours the plant loses the odor; during this time the toxic residues on the plant also are degrading and the plant turns brown and wilted.

Most of the information on the effects of diesel oil relate to direct breathing of fumes, rather than from inhaling smoke resulting from burning. However, breathing of combusted diesel oil fumes is common; it has had widespread use as a stove fuel, and almost every city-dweller has had the unpleasant experience of being stuck in traffic behind a diesel oil-burning bus or truck.

The risk associated with glyphosate is very low. A risk analysis on the effect of smoking glyphosate-contaminated cigarettes conducted by Labat Anderson, Inc. for DEA indicates that, under very conservative assumptions, a person could smoke 137 cigarettes a day with no adverse health effects as a result of the herbicide. (DEA, 1985)

ECONOMIC ELEMENTS

The use of diesel oil sprays has already been demonstrated to be cost-effective by the Counties of Hawaii and Kaua'i. Impacts of eradication of marijuana on state and county economies should be directly related to the effectiveness of the operation. It is difficult to predict the economic effect, due to the unreliability of existing data. If the state and county law enforcement officials are successful in reducing the amount of marijuana available to potential consumers, it can be expected that the laws of supply and demand will continue to apply and the price of marijuana will go up accordingly. The diminished supply may command such a high price that it will offset the economic loss to growers and/or alternate methods of marijuana cultivation may be developed. On the other hand, increased community educational efforts on prevention of drug abuse may result in a reduced demand accompanying the diminished supply. An effective eradication program on state-owned lands on Kaua'i may result in growers moving their operations to private lands, indoors under artificial lights, or to another island.

SOCIAL ELEMENTS

Marijuana eradication efforts will be perceived differently by various social groups constituting the general public. Some people strongly oppose marijuana use and will support any eradication method. Others support total legalization of

marijuana and would oppose any eradication effort. Still others oppose marijuana but also oppose any use of herbicides. Hikers, hunters, and other people who use public lands for recreation are expected to respond positively to the improved safety conditions that will result from a successful eradication program. The majority of people could be expected to support eradication of marijuana grown on state-owned lands if it is done sensitively and does not appreciably harm the environment.

CUMULATIVE IMPACTS

Cumulative impacts are those impacts on the environment that occur from individually minor but collectively significant actions taking place over a period of time. One type of cumulative impact is geographical. Given the small size of most marijuana plots and their wide dispersement, there is unlikely to be any significant cumulative impact. While it is possible certain sites may have to be revisited for eradication, it is more likely that growers will either discontinue operations or move to new sites.

Another possible cumulative impact is that of actions by other agencies or individuals in conjunction with the state eradication program. For example, an area where marijuana is grown on state-owned Conservation District lands near agricultural lands may receive a larger application of herbicide because of spraying activities on both parcels.

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The relationship between short-term uses of man's environment and the maintenance of long-term productivity depends upon site-specific information. Glyphosate persists in soil, but becomes biologically unavailable relatively rapidly. The hydrocarbon in the oils are broken down by soil microbes. Removal of the plant cover and resultant soil desiccation or susceptibility to erosion are possible under chemical eradication methods. However, none of these activities are expected to result in long-term effects on the soil's productivity. The preferred alternative of operational flexibility allows DLNR to choose from a full range of eradication and disposal methods based on the sensitivities of each site.

To the extent that marijuana cultivation may restrict natural regeneration of vegetative growth in the forest, clearcuts, or natural clearings, eradication activities could serve to free the site from an artificially maintained agricultural situation, thus enhancing long-term productivity.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The time, manpower, and cost spent on the eradication of marijuana represent an irreversible and irretrievable commitment of government resources. From an

environmental standpoint, it is not expected that any of the eradication methods will irreversibly or irretrievably commit resources.

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The temporary brownout of vegetation that occurs under the herbicide alternative and the noise associated with all eradication methods are temporary adverse effects. The worst-case accident scenario described represents the most probable adverse effects, and adherence to the mitigatory measures and operational features built into the alternatives should minimize these adverse effects. The potential for, degree, and severity of any adverse effects will be examined in site-specific analyses as well before eradication operations are undertaken.

AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The DLNR is obligated to enforce laws on state property. The use of public lands for private cultivation of marijuana is in violation of the law. Further, these activities interfere with the use and enjoyment of state-owned lands by residents of and visitors to Kaua'i. The activities of the marijuana growers are destructive to the environment, and their efforts to protect their plots, such as using booby traps and other weapons, endanger innocent citizens. Although some environmental damage may ensue from eradication of marijuana crops, it will be offset by the improvement in the environment upon removal of this exotic vegetation and accompanying chemicals used in its cultivation, and by the improvements in public safety.

TABLE V-2
SUMMARY OF IMPACTS ON NATURAL ELEMENTS

Effectors	Soils and Water	Vegetation	Wildlife
Marijuana Cultivation	Growers amend or even replace the local soils. They add lime and fertilizers; they plow, plant, and weed; they mound soil around plants; and they compact the soil between rows, along their trails, and at their campsites.	Growers remove some or all of the natural revegetation from their plots. They use herbicides and cultivation techniques to reduce competition from other plants. Effects on native vegetation from unrestricted use of pesticides could be significant.	By clearing the plots, the growers may destroy existing nests and habitats. To keep wildlife away, they use fences, repellents, traps, and poisons. Most cultivation sites are not attractive to wildlife.
Eradication Alternatives			
Manual	The soil would be compacted slightly by the workers' footsteps. If they uprooted the marijuana plants, clumps of soil would be disturbed. Removal of marijuana cover increases penetration of (1) sunlight, which makes the soil drier, and (2) rainfall, which increases the danger of erosion.	There would be increased sunlight and decreased competition for soil nutrients and moisture. Eradication under any method will usually result in the reversion of the site to natural forest vegetation.	If wildlife are present at the plot, as the workers move through the plot, the birds would fly away, the larger animals would leave the area and enter the nearest protective cover, and the smaller animals would head for cover in the ground, under logs, or in trees. After the workers left, the animals would eventually return or would move to a satisfactory habitat nearby. Under any of the alternatives, removing the marijuana opens the area to plant species that are beneficial to a variety of wildlife species.

TABLE V-2 (Cont.)

Effectors	Soils and Water	Vegetation	Wildlife
Eradication Alternatives (cont.)			
Chemical	None of the three chemicals under consideration would have any direct effect on any of the physical properties of the soils. With aerial application, no compaction would occur. With ground spot application, compaction would be greater than manual but less than mechanical. There could be slight increases in soil drying and erosion, depending on the selectivity of the chemical. Normal operations should not affect aquatic systems. Under a worst-case extraordinary situation, the dumping of 100 gallons of any of the chemicals into a stream would result in a localized fish kill.	All the vegetation in the plot would be killed or injured depending on the selectivity of the chemical, application method, and the type of vegetation. With aerial application, there may be temporary brownout of peripheral vegetation. Healthy trees may be partially defoliated, but none should be killed. Spot application should result in no or slight impact on non-target plants. The affected area should return to its natural first stage cover within a year.	The chemicals may be sprayed on birds or animals and they may breathe the spray or eat leaves, berries, or seeds that are still damp with the spray. Mitigatory measures call for using manual eradication methods when adverse impacts to state and federally designated threatened and endangered species are likely.
Diesel Oil	Hydrocarbons will adsorb to soil; soluble aromatics may leach to groundwater. Accidental application to open water will result in localized fish kills.	All broad-leaf vegetation sprayed would be killed.	Small mammals and birds may be killed or have reduced reproductive success.
Weed Oil	Similar to diesel oil, but with a higher toxicity proportionately more hazardous.	Same as for diesel oil.	Same as for diesel oil.

TABLE V-2 (Cont.)

Effectors	Soils and Water	Vegetation	Wildlife
Eradication Alternatives (cont.)			
Glyphosate	Glyphosate is rapidly inactivated by soil adsorption and microbial breakdown. No impacts to aquatic organisms are likely to occur if they receive drifted spray or a direct hit.	Glyphosate kills even deep-rooted perennials as well as annuals. It kills grasses, sedges, and broad-leaf plants.	Glyphosate is relatively harmless to wildlife.
Disposal			
Haul Away and Burn or Bury	Slight soil compaction from loading operations.	Slight damage to nontarget plants may result from the use of heavy machinery.	Similar to effects of manual or mechanical eradication (noise and activity may cause wildlife to temporarily leave the site).
Leave Standing	None.	Revegetation should occur within one growing season.	The birds and animals (if any) that had been living on the site would be able to return.

Table modified and adapted from similar table in the **Draft Environmental Impact Statement on the Eradication of Cannabis on Federal Lands in the Continental United States.** U.S. Department of Justice, Drug Enforcement Administration. May 1984. Washington, D.C. Information on diesel oil and Weed Oil from **Diesel Oil and Weed Oil: Issues in Their Use for Marijuana Eradication.** Paper prepared by P. J. Scerzenie, T. J. Vigerstad and A. M. Myslicki. July 1984.

TABLE V-3

SUMMARY OF IMPACTS ON PEOPLE

Effectors	Workers	State Land Users	Marijuana Users
Marijuana Cultivation	The growers use active and passive measures (for example, pot shots and booby traps) to intimidate and injure the workers.	Public land users face the same risks associated with booby traps and protective measures taken by the growers.	Growing marijuana on state lands would probably have some incremental impacts on supply and price of marijuana.
Eradication Alternatives			
Manual	Potential impacts include site hazards such as steep slopes and poisonous vegetation and injuries from misuse or failure of tools and equipment.	Noise from equipment could have temporary adverse effect on recreationists. Removal of booby traps will increase public safety. Under any eradication alternative, lands previously appropriated by growers will be restored to multiple-use potential.	None.
Chemical	If the mitigatory measures are followed properly, no effects should occur under normal operating conditions. However, those transporting, mixing, spraying the chemicals or even observing the operation may be exposed to them through equipment malfunction. Since diesel oil and Weed Oil are highly imflammable, misues may result in a	Under normal conditions, no one offsite should suffer any ill effects. Hikers receiving a direct hit would be discomforted but suffer no adverse health effects. Fruits and berries sprayed with the oils have a strong repulsive odor and wilt quickly. Even eating berries	See Disposal—Leave standing

TABLE V-3 (Cont.)

Effectors	Workers	State Land Users	Marijuana Users
Chemical (cont.)	fire. Diesel oil and Weed Oil may cause minor eye and minor skin irritation following prolonged or repeated contact. Inhalation of vapors may cause central nervous system depression. Ingestion or subsequent vomiting of diesel oil or Weed Oil can result in aspiration of light hydrocarbon liquid which can cause pneumonitis, a severe lung inflammation. In a worst-case accident situation, a worker exposed to 1/2 liter of glyphosate spray mix over the upper half of the body, the reproductive toxicity estimated safe dose for humans could be exceeded. This risk would be reduced if women of reproductive age wore protective clothing.	and game birds contaminated with glyphosate should not result in any ill effects.	
Disposal			
Haul Away and Burn or Bury	Whether the marijuana is treated with chemicals or not, loading and hauling provide additional opportunities for accidents associated with site hazards and operation of equipment. Handling combustion agents and potential smoke inhalation are risks faced by workers when marijuana is burned in an open field.	Marijuana burned in open fields has the potential to burn adjacent areas, if not properly controlled.	None.

TABLE V-3 (Cont.)

Effectors	Workers	State Land Users	Marijuana Users
Disposal (cont.)			
Leave Standing	None.	There is a remote possibilty that a hiker might wander into the area sometime after spraying is completed and might be dermally exposed to the chemical by brushing against contaminated marijuana. No serious adverse effect would be experienced if this were to happen.	The area will be posed to notify the public that the marijuana has been treated. There is a small possibility that marijuana that has been sprayed with glyphosate could reach consumers. In the event that marijuana sprayed with glyphosate reaches consumers, marijuana smokers should not experience any adverse health effects resulting from the chemical. For marijuana contaminated with glyphosate, smokers could smoke one gram cigarettes a day without exceeding the estimated safe dose.

Table modified and adapted from similar table in Supplement to the **Draft Environmental Impact Statement on the Eradication of Cannabis on Federal Lands in the Continental United States.** U.S. Department of Justice, Drug Enforcement Administration. March 1985. Washington, D.C. Information on diesel oil and Weed Oil from **Diesel Oil and Weed Oil: Issues in Their Use for Marijuana Eradication**. Paper prepared by P. J. Scerzenie, T. J. Vigerstad and A. M. Myslicki. July 1984.

TABLE V-4

MITIGATORY MEASURES AND OPERATIONAL FEATURES

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
ALL METHODS	
1. Follow all applicable federal, state, and local laws and regulations in conducting eradication operations.	All
2. Coordinate with land managers to establish notification procedures for eradication operations when they occur in proximity to recreation areas or areas of high public use. (See section on chemical methods for more detailed notification procedures to be followed for chemical treatment.)	Public Health
3. Record all data necessary to document operations (for example, treatment site location; control method; weather conditions; unusual conditions).	All
4. Instruct workers on use of equipment, materials, and procedures and supervise to ensure the procedures are followed properly.	Worker Safety
5. Use manual eradication methods in sensitive areas where adverse impacts on endangered or threatened plant or animal species are likely.	Plants and Animals

TABLE V-4 (Cont.)

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
CHEMICAL METHODS (Aerial and Ground):	
1. Strictly follow instructions.	All
2. Mix all chemicals away from water bodies to minimize risks of inadvertent environmental contamination.	All
3. Carefully monitor weather conditions (that is, wind speed, precipitation, precipitation probability, temperature, temperature inversions, atmospheric stability, humidity) before and during application of chemicals to prevent drift, volatilization, leaching, or surface runoff.	All
4. Strictly observe all label instructions for handling, storage, and disposal of chemicals and chemical containers.	All
5. Do not apply chemicals where water table is high, where leaching or surface runoff is possible, or when precipitation is expected.	Water Quality Land Use
6. Monitor chemical residues in soil and ground and surface water to identify patterns of persistence and mobility at sensitive sites.	Water Quality Land Use Public Health Plants and Animals
7. Use lowest application rate possible for effective kill. Spray coverage should be uniform and complete.	All
8. Spray on sunny days for optimum efficiency.	All

TABLE V-4 (Cont.)

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
CHEMICAL METHODS (Aerial and Ground) (continued):	
Aerial Application Method	
1. Install temporary project area signs at points of common public access that identify the chemical used, date applied, purpose, and telephone number of the local enforcement office.	Public Health
2. Keep people off treated areas during spray operations until spray solution has dried.	Public Health
3. Before spraying, inspect the site to disclose the presence of people (for example, hunters, hikers, berrypickers). Take all reasonable steps to notify everyone (including residents) before spraying.	Public Health
4. Spray tanks will not be washed out in or near any streams. Chemical containers will be disposed of at State-approved sites.	All
5. Mixing and loading operations will take place in an area where an accidental spill will not contaminate a stream or body of water.	Water Quality

TABLE V-4 (Cont.)

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
Aerial Spot Application Method (continued):	
6. Avoid applications to roads and trails.	All Plants
7. Avoid application on known locations of endangered or threatened plant species.	
8. Avoid use of glyphosate on soils lacking clay minerals, such as pure sand, peat, or muck, to prevent damage to emerging nontarget vegetation.	Plants
9. On sites requiring multiple swaths, turn spray off at the end of spray runs and during the time when a turn is being made to start another spray run. Initial spray swaths along buffer strips or areas to be protected will be made parallel to these areas and before spraying commences on the rest of the project. To ensure aerial application remains onsite, require shutoff of spray delivery system 50 feet from the edge of the buffer zone. (Spray delivery specifications allow 50 feet for system to achieve dripless shutoff.)	Water Quality
10. Use no-drip nozzles that use a vacuum or syphon automatic shutoff system or ball-check valve that will draw the chemical back from the boom when not spraying. Spray nozzles on the boom will not be extended horizontally on the boom to more than six-sevenths of the length of the helicopter rotor.	Public Health

TABLE V-4 (Cont.)

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
Aerial Spot Application Method (continued):	
11. In aerial applications of restricted pesticides, the contractor shall provide at least one qualified (or certified) individual for each mixing truck to handle fueling, mixing spray solutions, and loading. The contractor shall also provide a qualified individual to supervise operations. The supervisor shall be equipped and trained to take remedial action in the event of equipment malfunction or spills of chemicals.	All
12. To minimize drift and volatilization, aerial spraying will usually be prohibited when any of the following conditions exists on the spray areas: wind velocity exceeds 8 miles per hour; raining or rain imminent; foggy weather; low relative humidity, and temperature exceeds 95 degrees Fahrenheit (applies to water-based sprays only); air turbulence (thermal updrafts, etc.) is so great as to seriously affect the normal spray pattern; temperature inversions are present, which could lead to offsite movement of the spray.	All
13. Measurements of weather conditions will be made by trained personnel at spray sites before and during application. Additional measurements will be made anytime it appears that a weather change may be taking place that could jeopardize safe placement of the spray on the target area.	All
14. Helicopters will normally be required to spray at an air speed of 15 to 25 miles per hour and as low as possible while still at a safe distance above the vegetation. Spray pressure in the boom will normally be 20 to 35 pounds per square inch. Maximum drift reduction with normal spray formulations and application equipment will be used.	All
15. Maintain a radio network that links all parts of the project. Direct radio communications between spray aircraft and ground crews will be established.	All

TABLE V-4 (Cont.)

Mitigatory Method	Potential Impacts to Which Mitigatory Measure Applies
Aerial Spot Application Method (continued):	
16. Pre-spray reconnaissance flights will be made to orient pilots to project area boundaries, buffer zones, and any sensitive areas such as agricultural lands, streams, residences, and fish hatcheries that are near the target areas.	All
17. Plan helicopter ferrying routes between staging area and spray area to avoid overflights of aquatic systems and human habitats.	All

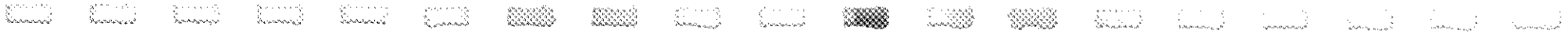
Label directions will be followed in lieu of the above if they prescribe the use of different conditions.

Table modified and adapted from similar table in the **Draft Environmental Impact Statement on the Eradication of Cannabis on Federal Lands in the Continental United States.** U.S. Department of Justice, Drug Enforcement Administration. May 1984. Washington, D.C.

PART VI

LIST OF NECESSARY APPROVALS

APPROVAL NEEDED	APPROVING AGENCY OR BODY
Federal	
Clearance under Section 7 of the Endangered Species Act, as applicable	U.S. Fish & Wildlife Service
State	
Conservation District Use Permit	Board of Land & Natural Resources
Licensing of Weed Oil	Department of Agriculture
Experimental Use Permit for diesel oil	Department of Agriculture U.S. Environmental Protection Agency

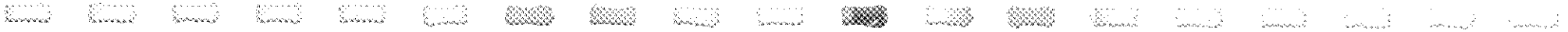


PART VII

UNRESOLVED ISSUES

The three chemicals that are proposed to be used in the eradication of marijuana are glyphosate, Weed Oil and diesel oil. Glyphosate is registered by the U.S. Environmental Protection Agency and licensed by the Hawaii State Department of Agriculture. Weed Oil is registered by the EPA and is used in California; it is no longer licensed in Hawaii. It will have to be relicensed before it can be used. Since diesel oil is not registered, clearance is being sought from EPA and DOA for its use in this program.

There is a lack of empirical data on Weed Oil because it was registered with EPA before the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was passed and on diesel oil because it has never been sold as an herbicide and thus has not previously been regulated under FIFRA. Monitoring programs that will be undertaken as part of the marijuana eradication program will provide data for further evaluation of the safety and efficacy of these chemicals.



PART VIII

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONSULTED

The following list includes those agencies, organizations, and individuals to whom copies of the EIS Notice of Preparation were sent, and those who were consulted during the preparation of this report. It also serves as a distribution list for this report. An asterisk indicates those from whom written comments were received. The comment and the corresponding response follow in the order of the list presented below.

FEDERAL

Department of Agriculture
- *Soil Conservation Service
- *U.S. Forest Service - Institute of Pacific Islands Forestry and Pacific Islands Forestry

Department of the Interior
- *Fish and Wildlife Service
- Geological Survey

Department of Justice
- Drug Enforcement Administration

Environmental Protection Agency
National Aeronautics & Space Administration, Ames Research Center, California
Air Force, Hickam Air Force Base

STATE OF HAWAII

*Department of Agriculture
Department of Hawaiian Home Lands
*Department of Defense
*Department of Health
Department of Health, Kaua'i District Health Office
Department of Planning and Economic Development
Department of Transportation
Office of Environmental Quality Control

Department of Land and Natural Resources
- Planning Office
- Conveyances
- Aquatic Resources
- Enforcement
- Land Management
- Land Management - Kaua'i Agent
- *State Parks

Water & Land
Natural Area Reserves
Animal Species Advisory Committee

*University of Hawaii Environmental Center, further distributed to:

Barry Brennan, Agricultural Biochemistry
James Brewbaker, Horticulture
Hampton Carson, Genetics
Chin Chung, Public Health Sciences
Sheila Conant, General Science
John Hylin, Agricultural Biochemistry
Kenneth Kaneshiro, Entomology (Hawaiian Evolutionary Biology Program)
Charles Lamoureux, Botany
Mark Merlin, General Science
Marshall M ɔ k, Kaua'i CC
Edwin Murabayashi, Water Resources Research Center
James Parrish, Hawaii Cooperative Fisheries Unit
Frank Peterson, Geology
Frank Scott, Agricultural and Resource Economics
Barbara Siegel, Pesticide Hazard Assessment Project

State Legislature

Honorable Peter Apo
Honorable Alfred Lardizabal
Honorable Richard Kawakami
Honorable Lehua Fernandes Salling
Honorable James Aki

Honorable Mark Andrews, Chairman
House Committee on Planning, Energy, Ecology
and Environmental Protection

Honorable Herbert Honda, Chairman
House Committee on Agriculture

Honorable Ron Menor, Chairman
House Committee on Corrections
and Rehabilitation

Honorable Robert Bunda, Chairman
House Committee on Health

Honorable Calvin Say, Chairman
House Committee on Water, Land Use
Development and Hawaiian Affairs

Honorable Bertrand Kobayashi, Chairman
Senate Committee on Health

Honorable Malama Solomon, Chairman
Senate Committee on Agriculture

Honorable Joseph Kuroda, Chairman
Senate Committee on Tourism and Recreation

COUNTY OF KAUA'I

County Council
Office of the Mayor
*Planning Department
Police Department
Public Works Department
Water Department

COUNTY OF HAWAII

*Police Department

COUNTY OF MAUI

*Police Department

CITY & COUNTY OF HONOLULU

Police Department

ORGANIZATIONS AND INDIVIDUALS

Ahulau
American Lung Association of Hawaii
Bernice P. Bishop Museum
Conservation Council of Hawaii
East Kaua'i Soil and Water Conservation District
*Environmental Law Center of the Pacific
Garden Isle Gun Club
Hawaii Audubon Society
*Hawaii Beekeepers Association
Hawaii's Thousand Friends
Hawaiian Academy of Science
Hawaiian Botanical Society
Hawaiian Entomological Society
Hawaiian Malacological Society
*Hawaiian Sugar Planters' Association
Hawaiian Trail and Mountain Club
Kaua'i Chamber of Commerce
Kaua'i Fish and Wildlife Advisory Council
*Kaua'i Guardians Hawaii
Kaua'i Hunters Association
Kaua'i Outdoor Circle
Labat-Anderson Incorporated (consultants to the U.S. Department of Justice, Drug Enforcement Administration)
Life of the Land
*Mae Mull
The Nature Conservancy
*Sierra Club, Hawaii Chapter
Sierra Club, Kaua'i Group
1000 Friends of Kaua'i
West Kaua'i Soil and Water Conservation District
The Wildlife Society, Hawaii Chapter

INDIVIDUALS CONSULTED

Eugene Akazawa, Department of Health
Larry Cude, Monsanto Company
Fritz Klattendorf, Kaua'i County Police Departemnt
Art Hollinger, Chevron Hawaii
Wayne Hilton, HSPA
James Ikeda, Department of Health
Chris Jansen, Pacific Resources International
Po Yung Lai, Department of Agriculture
Philip Motooka, Cooperative Extension Service, Kona
Hector Masuda, Department of Agriculture
Andrea Myslicki, Labat-Anderson, Washington, D.C.
Ted Norton, John Burns School of Pharmacology
Charles Peters, Chevron Hawaii
Rudy Ramirez, DEA, Washington, D.C.
Jay Sasan, Mauna Kea Sugar Company
Terry Sekioka, Cooperative Extension Service, Kaua'i
Howard Tagomori, Maui County Police Department
Wayne Ueoka, Department of Health
Charles Wakita, Hawaii County Police Department
Dean Yoshizu, Department of Agriculture

PART IX

COMMENT LETTERS AND RESPONSES: DRAFT EIS

The following list includes those agencies, organizations, and individuals who reponded to the Draft EIS in writing. The comment and the corresponding response (where appropriate) follow in the order of the list presented below.

FEDERAL

Department of Agriculture
- Forest Service
- Soil Conservation Service

Department of Defense
- Army Engineer District, Honolulu
- Department of the Navy

Department of the Interior
- Fish and Wildlife Service
- Geological Survey

Department of Justice
- Drug Enforcement Administration

STATE OF HAWAII

Department of Accounting and General Services
Department of Agriculture
Department of Defense
Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Social Services and Housing
Department of Transportation
Office of Environmental Quality Control
University of Hawaii
- Environmental Center
- Water Resources Research Center

Senator Bertrand Kobayashi

COUNTY OF KAUA'I

Office of the Mayor
Councilmember Joann Yukimura
Department of Public Works
Department of Water

COUNTY OF HAWAII

Police Department

COUNTY OF MAUI

Police Department

CITY & COUNTY OF HONOLULU

Police Department

ORGANIZATIONS AND INDIVIDUALS

Caren Diamond
Environmental Law Center of the Pacific
Hawaiian Sugar Planters' Association
Hawaii's Thousand Friends
Sam Hollard
Kaua'i Guardians Hawaii
Kekaha Sugar Company
Lihue Plantation
Kathryn Lowery
Terry A. Oliver and others
Janelle Ryan
Michael Sarenter
Sunee Seae
Frederick D. Sengstacke II, M.D.
Sierra Club, Kaua'i Group
Anita C. Simons
Natalie Sjaardinia
Craig R. Wall
Almitra S. Zion
Christopher A. Zion

UNABLE TO RESPOND

Mikel Wilson (no return address)
Two not signed

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PACIFIC SOUTHWEST REGION
REGIONAL OFFICE
630 SANSOME STREET
SAN FRANCISCO, CA 94111

RECEIVED
'85 JUN 17 A11:49
FORESTRY & WILDLIFE
STATE OF HAWAII

REPLY TO: 1950

DATE: JUN 11 1985

Libert K. Landgraf, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Landgraf:

We have completed a review of the DEIS for Eradication of Marijuana for State Owned Conservation District Lands on Kauai. The review was conducted by our Land Management Planning and Forest Pest Management Staffs. We offer the following suggestions for your consideration:

1. The analysis of effects of the No Action Alternative (Marijuana Cultivation) - Table V-2 could be strengthened. The potential effects on wildlife and vegetation, particularly sensitive plants or T&E species, could be significant, caused by unrestricted use of pesticides by illegal growers.

2. An adverse effect of the No Action Alternative is restricted use of public lands by the public. This is a public safety item.

3. A possible mitigation for the No Action Alternative would be to post public lands - warning the public regarding traps and other protective devices.

4. Page V-12. The exposure level disclosed on this page of 34 times the safe exposure level needs to be substantiated. It appears high to us, but no basis is provided, or cited, for this statement. Also, additional details could be provided in the appendix.

Hopefully these comments will be useful to you in preparation of the final environmental analysis.

Sincerely,

for JON D. KENNEDY, Director
Land Management Planning

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Jon D. Kennedy
Director, Land Management Planning
U.S. Forest Service
Pacific Southwest Region
U.S. Department of Agriculture
630 Sansome Street
San Francisco, CA 94111

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 11, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

Thank you for your recommendations for strengthening the section on the "No Action" alternative. They will be incorporated into the Revised EIS.

The section on glyphosate will be rewritten and additional information provided in a new appendix in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for: Libert K. Landgraf,
Administrator

United States Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii
96850

March 4, 1985

Mrs. Jacqueline Parnell
KRP Information Services
P.O. Box 27506
Honolulu, Hawaii 96827

Dear Mrs. Parnell:

Subject: Environmental Assessment and Notice of Preparation of EIS for the Eradication of Marijuana on State-owned Lands Island of Kauai, Hawaii

We have reviewed the subject environmental assessment and notice of preparation of an environmental impact statement and have no comments to make.

Thank you for the opportunity to review the document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCE

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMEN
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMI

May 14, 1985

Mr. Francis C.H. Lum
State Conservationist
U.S. Soil Conservation Service
P.O. Box 50004
Honolulu, HI 96850

Dear Mr. Lum:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 4, 1985. Your "no comment to make" response is appreciated.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

United States Department of Agriculture
Forest Service
Pacific Southwest Region
State & Private Forestry
1151 Punchbowl St., Rm 323, Honolulu HI 96813

Reply to 2100

Date March 8, 1985

KRP Information Services
Attn: Jacqueline Parnell
P. O. Box 27506
Honolulu HI 96827

Dear Ms. Parnell:

This is a response to your February 1985 Notice of Preparation of Environmental Impact Statement for the Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i.

The Purpose of Notice (Page 1) should be expanded by one key item as follows:

7. To put potential growers for the 1985 and subsequent seasons on notice that they will be risking much effort and time with small chances of securing a harvest if they plant on State-owned Conservation Lands.

I believe that such a purpose is essential to the overall success of the effort for two key reasons:

a. If properly done, it will reduce the size of the law enforcement effort required;

b. If properly done, it will minimize the amount of oil sprayed on watersheds, hence total environmental impact will be minimal.

The remainder of my comments are secondary in importance to this main concern. I will take them in order as they appear in the document:

Page 4, third paragraph: glyphosate use should be carefully documented and applied only in extreme cases, as it is a very broad-spectrum herbicide.

Page 14, item 10: my experience on Kaua'i is that helicopter noise is already a nearly constant irritation in many areas. The proposed action will of course add to this noise.

Page 21, item 7: The first three sentences are all assumptions of the broadest nature. Cultural resources are irreplaceable. The fact that they are difficult to find, identify and protect often leads to such assumptions on the part of project proponents, who find it convenient to assume them away. Please give more thought to this item and assure adequate mitigation.

KRP Information Services

Page 23, Federal agencies: Please correct the second entry under Dept. of Agriculture to read: US Forest Service - Institute of Pacific Islands Forestry and Pacific Islands Forester.

Thank you for the opportunity to review this document.

Sincerely,

LEONARD A. NEWELL
Pacific Islands Forester

cc:
Mr. Libert Landgraf
Mr. Susumu Ono, Thru: Mr. Landgraf
Mr. R. E. Greffenius, S&PF

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

May 1, 1985

Mr. Leonard A. Newell
Pacific Islands Forester
U.S. Forest Service
1151 Punchbowl Street, Room 323
Honolulu, HI 96813

Dear Mr. Newell:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 8, 1985 concerning the subject Notice of Preparation. Your comments and suggestions are appreciated and will be incorporated into the Environmental Impact Statement.

Very truly yours,

LIONEL K. LANDGRAF
Administrator

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307
MAR 13 1995

KRP Information Services
Attn: Jacqueline Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

Re: Environmental Assessment (EA) for Eradication of Marijuana on State-owned Conservation Lands, Kauai, Hawaii

Dear Ms. Parnell:

We have reviewed the referenced document and offer the following comments for your consideration.

The Service's primary concerns regarding the proposed action are the potential impacts of diesel oil spraying on Federally listed and candidate endangered and threatened species, other native plants, forest birds, arthropods and mollusks, the recovery of native communities after spraying, potential runoff of herbicides into streams and wetlands and their effects on aquatic animals, and the cumulative effects of spraying on native forest ecosystems.

The following are specific comments regarding the EA.

Page 4 - 5. The information provided to the Board of Land and Natural Resource's delegated authority by the Division of Forestry and Wildlife does not appear to provide adequate consideration for endangered and threatened species and for ecologically sensitive areas. We recommend that the information that will be used in the go/no go decision be expanded to include consideration of these concerns.

Page 12. While exotic organisms are found in Kauai's streams, many of Kauai's streams are nearly pristine and support large populations of endemic fishes, mollusks, crustaceans, and insects. The importance of maintaining populations of these endemic animals in Kauai's streams should be stressed in the EA. The statement that "Hawaii's endemic fresh water fishes are few in number" should be clarified. Hawaii's endemic freshwater icthyofauna consists of a relatively small number of species; (Awaous stamineus, Sicyopterus stimpsoni, Lentipes concolor, and Eleotris sandvicensis). Populations of these fishes may be depleted on a local scale.

CONSERVE AMERICA'S ENERGY

Page 17. The section on alternatives to spraying should include a discussion of the National Park's program of apprehending and prosecuting marijuana growers on National Park lands. The Service believes that prosecution may be more of a deterrent than crop loss, and may result in the long-term reduction of illegal marijuana cultivation on State-owned lands. Another alternative that could be discussed is increased inspection and monitoring of parcels leaving Kauai; this would be similar to a program conducted by the U.S. Postal Service on the Big Island.

Page 19. One of the Service's main concerns is the recovery of native vegetation in areas sprayed with diesel oil. The EIS would be enhanced if information on the persistence of diesel oil in soils and the recovery of native vegetation after spraying was included.

Page 19 - 20. The section on the impacts on vegetation, wildlife, and aquatic life needs to include a discussion of cumulative impacts on these resources. The impacts of overflying in helicopters and the associated downwash and noise on endangered and threatened forest bird species also need to be discussed.

We suggest that the EIS include a list of the endangered species found on Kauai and a discussion of the distribution of these species. This information is available in the U.S. Fish and Wildlife Service's Kauai Forest Bird Recovery Plan (1983) and from this office.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: HDF&W
HDAR
OEQC
EPA, San Francisco
RO, FWS, Portland, OR (AHR)

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 14, 1985

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, HI 96850

Dear Mr. Kosaka:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 13, 1985 concerning the subject Notice of Preparation. Your comments, corrections, and suggestions are appreciated and will be incorporated in the Environmental Impact Statement.

We share your concern about the protection of native fauna flora. One of the areas that will receive added attention in the EIS is the exisitng condition of the places where marijuana is grown.

Marijuana-growing is an intensive agricultural enterprise. Growers abuse much of the existing forest cover and use herbicides and other pesticides freely to protect their valuable crops. While care will be taken to ensure that sites of native vegetation are not damaged, the eradication method chosen will be decided through an operations guideline developed by the Department of Land and Natural Resources subject to the nature and security of marijuana eradication operations.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

March 8, 1985

KRP Information Services
Attn: Ms. Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

Subject: Environmental Assessment (EA) and Notice of Preparation of EIS for Eradication of Marijuana on State Conservation Lands, Island of Kaua'i.

The Department of Agriculture has reviewed this document and has the following comments to offer.

Previously, we had submitted to the Department of Land and Natural Resources comments on the related Conservation District Use Application, which did not contain the subject EIS (see attached memorandum dated January 10, 1985). We note that the EA contains information concerning application of herbicides and a listing of herbicides to be used. The other concerns we expressed on January 10 need to be considered as the draft EIS is prepared. In particular, the chemicals to be used must be registered and approved for marijuana eradication by the U.S. Environmental Protection Agency. Also, the EA states on page 19 that broadcast spraying will not be done; however, applications will be made from helicopters with boom sprayers (page 4). Boom spraying is considered to be a form of broadcast spraying.

Sincerely,

Jack K. Suwa
Chairman, Board of Agriculture

Attachment

cc: DLNR

January 10, 1985

MEMORANDUM

To: Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources

Subject: Request for Comments: Conservation District Use Application
FITe No.: KA-11/23/34-1760
Marijuana Eradication
Kauai Island (State Lands) - Various

The Department of Agriculture has reviewed the subject CDUA and offers the following comments.

The proposed action would permit the eradication, by chemical and mechanical means, of marijuana growing on conservation lands owned and managed by the State of Hawaii.

We have not yet received the EIS referred to in Attachment No. 2, which indicates that this document is still being prepared. Consideration of the subject application may be premature until the EIS is available.

In Attachment No. 1, under "Description of Proposed Activity", the second paragraph states that chemicals will be used by ground crews and helicopters equipped with boom sprayers. The specific chemicals to be used are not indicated. What chemicals will be used, under what circumstances? Any chemical used for marijuana eradication must be properly registered and approved for that use by the U.S. Environmental Protection Agency. Under what circumstances would broadcast spraying be done? What mitigative measures will control overspraying and chemical drift if boom spraying from a helicopter is deemed necessary?

In order to assess the environmental impacts of the proposed action, for which blanket approval is being sought, the above information at a minimum should be included in considerable detail in the EIS. Until an acceptable EIS is available for review, the Department of Agriculture recommends that no further action be taken on the application in its present form.

Mr. Susumu Ono
Page -2-
January 7, 1985

Thank you for the opportunity to comment. Please be advised that the request for comment, dated December 13, 1984, was not received by our Department until December 26.

JACK K. SUWA
Chairman, Board of Agriculture

cc: OEQC

bcc: Plant Industry

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCE

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMEN
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPM

May 14, 1985

Mr. Jack Suwa
Chairperson
Board of Agriculture
P.O. Box 22159
Honolulu, HI 96822

Dear Mr. Suwa:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 8, 1985 concerning the subject Notice of Preparation. Your comments are appreciated; they will serve as guides in the drafting of the Environmental Impact Statement.

In reference to your correction on broadcast spraying, the distinction that had been intended was between the broad coverage by winged aircraft as opposed to the lesser coverage (spot) spraying by helicopters equipped with booms.

On the matter of your comment that any chemical used for marijuana eradication must be properly registered and approved for that use by EPA, we will be taking the steps necessary for approval.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816

ALEXIS T. LUM
MAJOR GENERAL
ADJUTANT GENERAL

DANIEL K. C. AU
COLONEL
DEPUTY ADJUTANT GENERAL

HIENG

MAR 7 1985

KRP Information Services
ATTN: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Gentlemen:

Eradication of Marijuana on State-Owned Conservation Lands - Kauai

Thank you for providing us the opportunity to review the Environmental Assessment (EA) and Notice of Preparation of Environmental Impact Statement (EIS) for the aforementioned proposed project.

While we concur with the objective of the project, Eradicate the Marijuana from State-Owned Lands, we do have some concerns about the possible impacts from the use of chemicals. Our major concerns can be summarized as the potential impact on human health, air quality, soils, water quality and aquatic systems. These concerns were identified in the EA and will be addressed in more detail in the EIS.

In that respect, we suggest the following points or questions to be addressed in the EIS.

1. A comparison of the different chemicals proposed to be used and the possible environmental impacts of each would be convenient. This might help the general public and decision makers to evaluate alternatives and the best chemical to use.

2. Soils (page 19). The "fairly short time" after spraying with each chemical that the natural vegetation reappears should be specified. If it is assumed that it will take the same "fairly short time" for the soil to be suitable for replanting marijuana then the proposed action (spray again) should be addressed.

3. Public Health (page 20-21). The possible risk to the people other than the applicators and marijuana growers that might use the site (with permission), pass thru, or wander in the sprayed areas should be addressed. If there are significant health effects from the chemicals, will some kind of warning signs or any other preventive measure be used?

We hope that these questions and suggestions help in developing the EIS.

If you have any questions to the above matter, please call Nydia Daniels, our Environmental Engineer, at 735-3522.

Yours truly,

Jerry M. Matsuda

JERRY M. MATSUDA
Major, HANG
Contr & Engr Officer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 14, 1985

Major Jerry M. Matsuda
Office of the Adjutant General
Department of Defense
3949 Diamond Head Road
Honolulu, HI 96816

Dear Major Matsuda:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 7, 1985 concerning the subject Notice of Preparation. Your comments on making a comparison of the different chemicals to be used, and further discussion of the possible effects on public health, are appreciated and will be addressed in the Environmental Impact Statement.

The impact of repeated sprayings will also be discussed in the EIS. We do not think this will be a serious problem because it is expected that the growers' awareness that their locations are now known to law enforcement officials and will be under surveillance will have a strong deterrent effect on replanting plans.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EPHSD

February 22, 1985

Ms. Jacqueline Parnell
KRP Information Services
P. O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

Subject: Request for Comments on Environmental Assessment for Eradication of Marijuana on State-Owned Conservation Lands, Kauai

Thank you for allowing us to review and comment on the subject environmental assessment.

Our comments are:

1. Limit the type of chemical to be used on the marijuana plants to diesel oil, if acceptable, water and surfactant. People are concerned that paraquat may be used.

2. The information list for the person designated to approve the proposed eradication on a case-by-case basis should also include maps of watershed areas.

3. No chemicals should be used for plant eradication in watershed areas.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

MELVIN K. KOIZUMI
Deputy Director for
Environmental Health

cc: Chief Sanitarian, Kauai

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer
EPHSO/SAN/DW

March 8, 1985

Ms. Jacqueline Parnell
KRP Information Services
320 Ward Avenue, Suite 106
P. O. Box 27506
Honolulu, HI 96827

Dear Ms. Parnell:

SUBJECT: ERADICATION OF MARIJUANA ON STATE-OWNED CONSERVATION LANDS, ISLAND OF KAUAI

Through the February 8, 1985 issue of the OEQC BULLETIN, The Department of Health has become aware of plans to eradicate marijuana illegally on Kauai's Conservation District lands by physical and chemical means. It is our understanding that the principal chemical used will be diesel oil or Chevron Weed Oil. Glyphosate (Rodeo or Roundup) may also be be used. Paraquat will not be used. Applications of the chemicals will be made by ground crews with knapsack sprayers or by helicopters equipped with boom sprayers. Based on our understanding of this proposal, the Drinking Water Proram would like to offer several comments.

The Drinking Water Program is concerned primarily with potable water sources which may be affected by this proposal. The Environmental Impact Statement must address the potential adverse effects on surface or groundwater sources in the areas where chemicals will be applied. The location of existing and potential water resources must be considered in relation to the location of the area to be sprayed. Special precautions must be taken when the chemical will be applied by boom sprayers on helicopters. Surface water sources in cultivation areas cannot easily be protected from the effects of the sprays. For groundwater sources, the depth to the water table and permeability information should be reviewed and carefully considered before application on any chemical. Because diesel oil is essentially immersible in water, one might expect that oil is not a significant threat to water. This, however, is not the case because oil contains several hydrocarbon components with significant solubility in water.

In remote areas, the cultivation of marijuana would be expected to be associated in areas with adequate water supplies such as near mountain streams. Kauai has several public water systems which receive their water from remote mountain streams which

traverse state conservation land. The Kalaheo system in the uplands of South Kauai uses the Alexander Reservoir as its source of potable water. Kokee State Park in West Kauai receives water from the Elekeinui Stream. Kuia Stream is the source for the Grove Farm - Koloa Water System. Other streams supply water to irrigation ditch systems used for legally grown plants.

The Drinking Water Program would like to ensure that all pertinent issues related to or affecting the use of potable water will be addressed in the Environmental Impact Statement. I hope these comments will assist you in preparing for the EIS. If you have any questions, please contact the Drinking Water Program at 548-2235.

Sincerely,

THOMAS E. ARIZUMI
Supervisor
Drinking Water Program
Sanitation Branch
Environmental Protection and
Health Services Division

TEA:gm

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
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WATER AND LAND DEVELOPM

May 14, 1985

Mr. Melvin K. Koizumi
Deputy Director for
Environmental Health
Department of Health
P.O. Box 3378
Honolulu, HI 96801

Dear Mr. Koizumi:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of February 22, 1985 concerning the subject Notice of Preparation and the subsequent letter dated March 8 expressing the specific concerns of the Drinking Water Program. Your comments are appreciated.

Your concerns will be considered and addressed in the Environmental Impact Statement. Please note, however, that while spraying near streams will be avoided, it will not be feasible to prohibit the use of chemical for plant eradication in watershed areas generally. Marijuana growers seek inaccessible areas for their operations, and many of these are in watershed areas. The method that is being used to minimize adverse environmental impacts on water resources is in the choice of chemicals and the use of manual methods when appropriate. Glyphosate, in the form of "Roundup," is a low-toxicity herbicide; and the oils, being organic, are readily broken down by the micro-organisms in the soil. As noted in the Preparation Notice, paraquat will not be used. A more complete discussion of this topic will be included in the Environmental Impact Statement.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 621
HONOLULU, HAWAII 96809

February 28, 1985

Ms. Jacqueline Parnell
KRP Information Services
P.O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

SUBJECT: Review of the Environmental Assessment and Notice of Preparation of an Environmental Impact Statement for the Eradication of Marijuana on State-owned Conservation Lands on the Island of Kauai.

Thank you for the opportunity to review and comment on this proposed undertaking. In the discussion of the possible impacts on the cultural resources (Page 21) by the proposed eradication of the marijuana plants, it should be understood that the survey of archaeological sites on State-owned lands on the island of Kauai is incomplete. Therefore, it is difficult to evaluate the potential impact on the cultural resources without this background information.

The forest areas were generally utilized as resource areas by the Hawaiians but agricultural areas and habitation sites may potentially exist within the conservation district lands. Also, it is not necessarily true that sites would be disturbed by marijuana growing activities. Oftentimes, agricultural sites will be reused with little modification. We would suggest that the following areas on Kauai be considered archaeologically sensitive and the possible adverse effects should be addressed for these areas.

1. Na Pali Coast from Polihale to Haena
2. Waimea Valley
3. Hanapepe Valley
4. Hanalei Valley
5. Wailua River

As stated in the Environmental Assessment, we concur that the State Historic Preservation Office should be contacted if any archaeological or historical sites are encountered during the eradication program.

Sincerely yours,

Ralston H. Nagata
State Parks Administrator

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GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 1, 1985

Mr. Ralston H. Nagata
State Parks Administrator
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Nagata:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letter of February 28, 1985 concerning the subject Notice of Preparation. Your comments on the possible impacts on cultural resources are appreciated and will be addressed in the Environmental Impact Statement.

Very truly yours,

LLOYD R. LANDGRAF
Administrator

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

March 8, 1985

PN:0041

KRP Information Services
Attention: Jacqueline Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

Environmental Assessment & EIS Preparation Notice
Eradication of Marijuana on State-Owned Conservation Lands
Island of Kauai

The Environmental Center, in response to a request from the Division of Forestry and Wildlife, Department of Land and Natural Resources, has conducted a review of the above cited document with the assistance of: Barry Brennan and John Hylin, Agricultural Biochemistry; James Brewbaker, Horticulture; Arthur Kodama, Public Health; Kenneth Kaneshiro, Entomology (Hawaiian Evolutionary Biology Program); Charles Lamoureux, Botany; Mark Merlin, General Science; Edwin Murabayashi, Water Resources Research Center; James Parrish, Hawaii Cooperative Fishery Research Unit; Frank Peterson, Geology; Frank Scott, Agricultural and Resource Economics; B.Z. Siegel, Pacific Biomedical Research Center (Pesticide Hazard Assessment Project), Jacquelin Miller and Juliane Mansur, Environmental Center. Although we do not usually review EIS's at the preparation stage, given the unusual and potentially significant impacts to be addressed in assessing a project of this type, we are pleased to have the opportunity to offer our suggestions as to the content of the EIS.

The proposed action intends to eradicate by chemical and physical means, including spraying of diesel fuel from helicopters, marijuana illegally grown on conservation district lands owned by the State of Hawaii on Kauai. To aid in the comprehensive development of this program our reviewers have identified several key issues, offered advice on certain aspects, and suggested references for further study in the preparation of the Environmental Impact Statement.

Application by helicopter

There are several problems associated with the spraying of diesel fuel from a boom attachment on a helicoptor. The ability to accurately control precision spraying from helicopters is difficult at best because of the downdraft created by the helicoptor, and made more difficult during windy conditions. The EIS should address the downdraft and wind problems. Because of Kauai's rough terrain and dense vegetation very few sites of

marijuana "farms" are visible from the air, and the effectiveness of spot applications of diesel from the air will be limited for this reason. It is our understanding that spraying by helicopter in the steep valleys is highly hazardous for obvious reasons (rough terrain, high winds, dense foliage), and the risk may not be worth the benefit. This risk/benefit issue should be addressed in the EIS. If spraying by helicopter is to be done, a "broom applicator" may be considered for use. This wipes the herbicide (diesel) on the plant like a wet cloth and may be more effective than spraying outright. Training sessions and trial runs should be part of the instructional process of using the product for eradication. Forknowledge of what will occur under various wind conditions, for example, may prevent misapplications.

In evaluating the effectiveness of the eradication program, the perception of its success by the marijuana growers will likely be important. We suggest that people may become somewhat discouraged from growing marijuana on conservation lands with this program in effect. In this regard the EIS might address public awareness, notification and general publicity requirements for the project.

Plants after spraying

According to the preparation notice, the sprayed plants may not be collected with this program as they are with Green Harvests. After spraying the plants will turn brown within a few hours and have an obvious odor for a few days. The potential for the plants to become a fire hazard after spraying should be considered. If it is significant, consideration should be given to possible mitigating measures such as removal. Because the smell or odor wears off, it may be a good idea to consider coloring the product to be sprayed with a non-toxic coloring agent for easier identification by those people who may attempt to sell or buy the sprayed plants.

Limited Use

It is likely that some areas, particularly those at higher elevations, will contain critical habitats for some species. Our reviewers have expressed particular concern for certain insect and bird habitats and the possible synergistic effects of the spray on the biota. The Alakai swamp, for example, is a unique habitat in the state with a sensitive biota. Its cool climate, very damp soil, and limited sunshine are not as conducive to growing marijuana as other less environmentally unique habitats. Careful attention should be paid to identify, among the potential eradication sites, those locations where particular care must be given to avoid undue adverse impacts to sensitive ecosystems.

Textual Clarifications and Documentation

Several statements need clarification and/or documentation for the EIS. To facilitate your reference we have cited them by page number as follows:

(Page 5, item 6) "...the weather conditions under which chemicals would not be used...." Is it possible to quantify or give parameters for these weather conditions?

(Page 7) "Cultivation of marijuana has caused the destruction of native vegetation and damage to the habitats of native birds." What is the reference for this statement? A document? Legal cases? Green Harvest records? Police files?

(Page 12, item 5) The game fishes are listed here by common names only. Since more than one species is frequently known by the same common name, it is important that the scientific name also be provided. Also, there are only four endemic fishes in Hawaii, not five. Hawaii has no endemic, anadromous fishes.

(Page 15, item 2) "Surveys have shown that regardless of their feeling about legalization or use of marijuana, nearly all Americans seem to oppose cannabis cultivation on public lands for profit." This is a very good point. Can you provide a reference for this statement?

(Page 15-16, item 2) Under marijuana users: "...there is strong evidence that continued use of marijuana can have detrimental effects to the health of users." This is an extremely controversial subject. We would suggest rephrasing the "can have" to "may have" to avoid reproof and we suggest that the statement be referenced.

(Page 19, item B1) "Bacterial microbes in the soil cause a breakdown of diesel oil molecules fairly rapidly." Can this time factor be more closely defined? This will also need a reference.

(Page 19, Item B2) "In addition, spraying will be done only on windless days in the morning before the air is warm to minimize any possibility of drift." This is a very important limitation and should be stressed in the EIS. However, because of the downdraft of the rotor, it is doubtful that drift can be eliminated. We would suggest that the word "any" be changed to "the" so that the statement reads to minimize the possibility of drift."

(Page 20, item 4) "Spraying will not be done within 100 feet of any waterway and not during rainy weather, to minimize runoff." Is there a reason for the limit being set at 100 feet? What exactly is 'rainy weather'? What about the effects of mist and clouds? It is probably not reasonable, given the high rainfall over much of Kauai, to assume that the spray can be retained without significant runoff in a high percentage of the application cases. The potential for runoff and the effects on nontarget species needs to be fully considered in the EIS.

(Page 20, item 3) "In areas of critical habitats, only manual eradication methods will be used." What is the criteria for 'critical habitat'? If an area is considered a 'critical habitat' won't manual eradication methods be destructive also? We suggest that "with extreme care" be added to the sentence.

Toxicology

Some people consider diesel oil carcinogenic. Recent references need to be checked and the EIS should examine the issue, not only from the aspect of the effects on the adjacent or non-target animals and species, but also on the applicator or potential consumers of the marijuana. (See the references we cite at the end of this review.)

Water contamination

This potential problem needs to be further examined in the EIS, as it relates to surface water and ground water. The concerns will need to be considered on an area-specific basis.

Insects

There is little mention of the impact of spraying diesel oil on insects. Many insect populations are present in very small numbers and are already in a tenuous situation. Spraying could threaten a whole species of insect types. Are they to be considered in the "critical habitat" definition? (see reference list) Again the synergistic effects may be the most critical, i.e., pollinators, food chains, soil cultivators etc.

Marijuana species controvery

Throughout the assessment marijuana is referred to as "(Cannabis sativa)". There exists a controversy over the taxonomy of cannabis. Some botanists believe there is only a single species while others believe that there are more than one species (see our reference list). Our reviewers have suggested that the EIS refer only to "(Cannabis sp.)" so that legal actions involving marijuana will not be complicated by this issue.

Legality of using diesel oil

Diesel oil is not a registered pesticide. Hence its use as a pesticide is, strictly speaking, illegal except under certain circumstances. The registration process is time consuming, costly and not likely to be accepted by the State of Hawaii. There appears to be a special authorization program available to the state and a preemption section described in the Public Law-Toxic Substances Control Act (please see our reference list). We assume that the state will need to acquire this special authorization in order to proceed with the proposed project. Recognition of this issue should be made in the EIS.

Non-target species/areas

Since it is questionable that precision spraying can occur, the potential effects to non-target plants, animals, insects, soil and water need to be considered. In this regard the issues will likely need to be addressed on a more site specific level. The EIS should include a discussion of: the break down products of diesel oil and its attachment in the soil, affects on the watershed, and physiological effects to birds or other native biota if the sprayed plants and/or seeds are ingested.

The EIS should be more specific as to types of animals and plants that live in the target areas as well as in the non-target areas that may be sprayed inadvertently. Overspray, drift, accidental release, and transport across terrain by animals may cause a wider range of program influence.

Alternatives

In examining alternatives to the proposed spraying project, attention should be given to the alternative of directing efforts toward the arrest and conviction of growers in contrast to efforts toward destruction of the plants.

Mitigation

It was difficult for our reviewers to suggest specific mitigating measures without more information on the particular areas that will be sprayed. Certainly this will be one of the more important sections of the EIS and one in which perhaps we can offer further suggestions at the draft EIS stage.

References

For endangered species habitats:
Earnest Kosaka, Fish and Wildlife Service

For scientific names of fish:
John Ford, Fish and Wildlife Service
James Parrish, Hawaii Cooperative Fishery Research, UH

For legal issues:
Hawaii Pesticides Law, Chapter, 149A
Public Law 94-469, Oct 11, 1976, 90 stat .2003
"Toxic Substances Control Act"

For effects on insects:
Tri-Fly DEIS references

For Hawaii Natural Energy Institute wind maps:
Dick Neill, HNEI

For one or three species controversy:
Ernest Small, The Species Problem on Cannabis, 2 volumes.
William Emboden, Cannabis-A Polytypic Genis, Economic Botany, Vol. 28, 1974, pp. 304-310.

For information on diesel fuel:
Kirk Smith, East West Center, Energy Institute

For information on carcinogenic properties:
Irving N. Sax, Dangerous Properties of Industrial Materials, 4th ed., 1975, Van Nostram Pheinhold (?) Co.

We appreciate the opportunity to review this document and hope our comments are useful in guiding further analysis of this proposed project.

Yours truly,

Doak C. Cox
Director

cc: Victor Tanimoto, DLNR, Forestry & Wildlife Division
OEQC
UH reviewers

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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WATER AND LAND DEVELOPMENT

May 14, 1985

Dr. Doak Cox
Director
Environmental Center
University of Hawaii
Crawford 317
2550 Campus Road
Honolulu, HI 96822

Dear Dr. Cox:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 8, 1985 concerning the subject Notice of Preparation. Your assistance in soliciting extensive comments from many disciplines within the University is greatly appreciated. The suggestions and comments will be considered and addressed in the Environmental Impact Statement.

However, there is one area that cannot be addressed. That is "more information on particular areas to be sprayed." Although some of the areas have been identified, their location cannot be revealed because of the nature of the operation and the possibility of jeopardizing the safety of enforcement officers. There will also very likely be new areas discovered in the future. The intention is for the EIS to address the methods of eradication with mitigating measures appropriate to wherever marijuana may be found.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

TONY T. KUNIMURA
MAYOR

AVERY H. YOUN
PLANNING DIRECTOR

TOM H. SHIGEMOTO
DEPUTY PLANNING DIRECTOR

TELEPHONE (808) 246-3919

COUNTY OF KAUAI
PLANNING DEPARTMENT
4280 RICE STREET
LIHUE, KAUAI, HAWAII 96766

March 6, 1985

KPR Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Subject: Eradication of Marijuana on State-Owned Conservation Lands, Island of Kauai. Environmental Assessment and Notice of Preparation of Environmental Impact Statement.

In regards to the above document, we recommend the following:

1. The use of any chemicals in Conservation Districts along the shoreline and/or in areas in close proximity to critical habitats, streams, watersheds, and wetland areas should not be permitted. Manual removal only is recommended in these areas.

2. Only one method of application should be utilized, preferably by ground crews with knapsack sprayers, in order to insure uniformity of application and to minimize unforeseen impacts to adjacent areas due to helicopter prop wash, wind, rain or drainage.

3. Only one chemical (preferably the diesel oil and water mixture) should be utilized in order to effectively monitor long-term impacts. The permit should be temporary, for a one year period, with subsequent testing of each site at different intervals to determine any type of biological impact to wildlife species, foodchains, ecosystems, and/or natural habitats.

We believe the end-result of eradicating marijuana growing on State lands can still be achieved by incorporating the above recommendations while at the same time minimizing inadvertent long-term chemical impacts to Kauai's natural environment.

Thank you for allowing us this opportunity to comment.

Tom H. Shigemoto

TOM H. SHIGEMOTO
Deputy Planning Director

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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WATER AND LAND DEVELOPMENT

May 14, 1985

Mr. Tom H. Shigemoto
Deputy Planning Director
Planning Department
County of Kauai
4280 Rice Street
Lihue, Kauai, HI 96766

Dear Mr. Shigemoto:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 6, 1985 concerning the subject Notice of Preparation. Your comments are appreciated.

Your concerns will be considered and addressed in the Environmental Impact Statement. Please note, however, that while spraying near streams and on wetlands will be avoided, it will not be feasible to prohibit the use of chemcials for plant eradication in watershed areas generally. Marijuana growers seek inaccessible areas for their operations, and many of these are in watershed areas. The method that is being used to minimize adverse environmental impacts on water resources is in the choice of chemicals in conjunction with the use of manual methods. Glyphosate, in the form of "Roundup," is a low-toxicity herbicide; and the oils, being organic, are readily broken down by the micro-organisms in the soil. As noted in the Preparation Notice, no highly toxic chemical such as paraquat will be included in the Environmental Impact Statement.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

POLICE DEPARTMENT

COUNTY OF HAWAII
349 KAPIOLANI STREET
HILO, HAWAII 96720

OUR REFERENCE

YOUR REFERENCE

GUY A. PAUL
CHIEF OF POLICE

WAYNE G. CARVALHO
DEPUTY CHIEF

March 1, 1985

KRP Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

The following are our comments on the Environmental Assessment and Notice of Preparation of Environmental Impact Statement for the Eradication of Marijuana on State-Owned Conservation Lands on Kaua'i.

1. On page 4, paragraph 1, besides preserving the character and resources of state lands and making the areas safe for public recreational uses and plant and animal habitats, the State has an inherent duty and responsibility to eradicate the illegal contraband.

2. On page 4, paragraph 4, the addition of one quart surfactant is based on 100 gallons of solution.

3. On page 5, paragraph 1, the requirement for prior notification is cumbersome and affects the security of the mission and safety of the personnel assigned. Another method must be used with safety of personnel the primary consideration.

4. On page 9, paragraph 6, and page 10, paragraph 1, we know that growers have also utilized herbicides such as glyphosate (Roundup) to clear areas in forest lands to cultivate their marijuana.

5. On page 14, paragraph 5, the formula for value of marijuana has been amended from $200/lb. (wet) to the Federal standard of $1,000/plant regardless of size, hence the overall value would increase proportionately.

6. On page 20, paragraph 5, Paraquat affects the plant almost immediately as does the diesel oil emulsion.

Thank you for this opportunity to submit our comments.

GUY A. PAUL
CHIEF OF POLICE

WGC
sf

cc: Susumu Ono

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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WATER AND LAND DEVELOPMENT

May 14, 1985

Mr. Guy Paul
Chief of Police
County of Hawaii
349 Kapiolani Street
Hilo, HI 96720

Dear Chief Paul:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 1, 1985 concerning the subject Notice of Preparation. Your comments and corrections are appreciated and will be addressed in the Environmental Impact Statement.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

POLICE DEPARTMENT
COUNTY OF MAUI
P. O. BOX 1029
WAILUKU, HAWAII 96793
AREA CODE (808) 244-7811

JOSEPH CRAVALHO
CHIEF OF POLICE

HOWARD H. TAGOMORI
DEPUTY CHIEF OF POLICE

OUR REFERENCE
ST:yyc
YOUR REFERENCE

March 5, 1985

KRP Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

Thank you for providing a copy of and allowing us to comment on your Environmental Assessment and Notice of Preparation of Environmental Impact Statement.

We have reviewed your report and agree with the contents of your assessment, however, we believe one visible shortcoming of the report is apparent; the introduction of pesticides and other chemicals by marijuana growers on state lands.

Our officers assigned to marijuana eradication missions on state lands have identified contaminants such as Malathion insect spray, Ortho Bug-geta snail and slug pellets, mouse and rat poison, Gaviota fertilizer, and Miracle Grow fertilizer as few of the types of chemicals used to facilitate the growth of marijuana.

Each year, more marijuana crops are grown on state lands, thus increasing the amount of contaminants dispensed in restricted areas. Our statistics reveal that manual eradication efforts have proved to be ineffective due to helicopter and manpower constraints. As a result, the cultivation of marijuana have increased over the past seven years despite Green Harvest Operations. At the present time, we do not have a suitable cost effective method to reverse the trend.

The point we are trying to establish is that spraying diesel emulsion may have a negative impact on the environment, but a greater danger will be the introduction of unknown quantities and uncontrolled use of pesticides and other chemicals on state lands. At some point in time, these chemicals will affect the ecology of areas utilized for the cultivation of marijuana.

If you have any questions or require additional information, please feel free to call on us.

Very truly yours,

JOSEPH CRAVALHO
Chief of Police

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
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WATER AND LAND DEVELOPMENT

May 1, 1985

Mr. Joseph Cravalho
Chief of Police
County of Maui
P.O. Box 1029
Wailuku, HI 96793

Dear Mr. Cravalho:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 5, 1985 concerning the subject Notice of Preparation. Your comments and suggestions are appreciated and will be incorporated into the Environmental Impact Statement.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

Environmental Law Center of the Pacific
250 South Hotel Street 2nd floor Auditorium Honolulu Hawaii 96813

March 8, 1985

KRP Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Re: Eradication of Marijuana-EIS

Dear Ms. Parnell:

The notice you sent ELC was informative but seemingly missed an opportunity that should not be lost, i.e., a study as to the probable consequences of decriminalizing marijuana. Perhaps the legislature has not recognized its legalization but the Courts have in State v. Bachman, 61 Haw. 71 (1979). Your decision not to consider this alternative is an error of law. On behalf of ELC I ask you reconsider for under EQC Regulations 1:42(g) alternatives such as this must be discussed.

Mahalo,

Jack Schweigert

JFS:vs/dd31

808 533 7491

Environmental Law Center of the Pacific
250 South Hotel Street 2nd floor Auditorium Honolulu Hawaii 96813

March 15, 1985

KRP Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Re: Eradication of Marijuana - EIS

Dear Ms. Parnell:

This letter supplements my earlier one to you dated 3/8/85 (Enclosure 1). The reason for this amendment is gleened from the newspaper discussion attached hereto (Enclosure 2). Reading the opinion of Justice Aguilar reminds me of the addage of the exception swallowing the rule. The projected fight on marijuana is similar to the fight against booze during the days of Prohibition with Elliott Ness at the helm.

Please reconsider your decision not to consider decriminalization of marijuana. What could possibly be the harm? If any, certainly the benefits of not reliving prohibition outweigh this.

Regards,

Jack Schweigert

JFS:vs/dd50

Encls.

808 533 7491

Honolulu Star-Bulletin

A-12 Thursday, March 14, 1985

Illegal Anti-Pot Drive

By Jack Anderson

WASHINGTON — Two hundred years ago, still smarting from King George III's royal trampling on private property, the Founding Fathers passed the Fourth Amendment to the Constitution.

Now a federal judge has felt it necessary to order the Drug Enforcement Administration to observe the amendment's protections in its freewheeling assault on marijuana growers in northern California.

The drug-busters, it seems, have been behaving in a manner as high-handed as King George's redcoats.

The decision by U.S. District Judge Robert P. Aguilar cites case after case where DEA's campaign against marijuana planting violated the Fourth Amendment rights of citizens whose only crime was to live in an area where marijuana was being grown.

Consider these examples from Aguilar's decision and wonder how Sam Adams or Thomas Jefferson would have reacted.

A [illegible] "tea[illegible]" ab[illegible]25 armed officers surrounded (one woman's) home, ordered her family out of the house with their hands up, and held the entire family at gunpoint for 2½ hours while conducting an identification check," the judge wrote. "One of the family dogs, which . . . was standing still and barking, was shot and killed by a team member." The nearest marijuana field was 600 yards away — on a neighbor's property.

● One innocent householder testified that a DEA pilot "put the nose of the helicopter about 100 feet away at my eye level (I live on a hillside) and hovered, watching me (seated in) my outhouse." He added: "I didn't move, so he moved right above me (and) blew the toilet paper away."

● A woman said she was "continually buzzed" while taking outdoor showers in what had once been the privacy of her isolated home.

● Two 12-year-old girls were chased by DEA helicopters flying about 50 feet above the ground. "The helicopters chased them up Perry Meadow Road for about 20 minutes," the mother of one girl testified. "When my daughter and her friend would hide under the bushes, the helicopters would lift up; when the girls would try to run to the nearest house, the copters would come again and frighten them."

A SPOKESMAN FOR the DEA said that the judge's order is "under review." But the agency admitted in court that these airborne Peeping Toms and Georgie Porgies were "private contractors with no law enforcement expertise," who had been given only two days' "orientation" before setting out in search of marijuana growers. Other complaints:

● "In order to land their helicopters . . . on my land, the (DEA) officers cut down . . . four fir trees and three madrone [illegible]

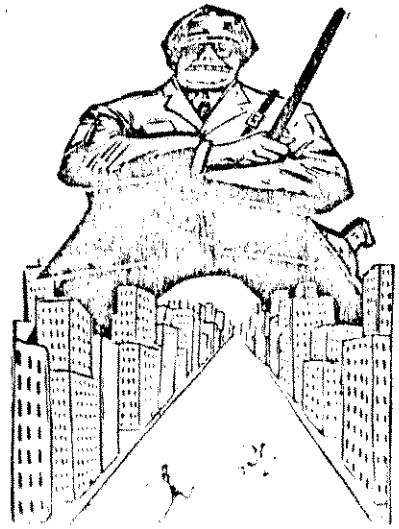
"One of these trees was my prized Christmas tree, which I had cared for and trimmed for this Christmas season. My planted lawn was scarred and my flower gardens were completely destroyed."

● A former Army helicopter pilot testified: "In my opinion, the helicopters . . . were being operated in an extremely unsafe manner. They appeared to be using tactics similar to those I observed used in Vietnam to terrorize the populace."

AGUILAR WROTE: "There can be only two conclusions: These technically proficient pilots were acting pursuant to instructions or the tacit consent of (DEA), or due to inadequate training and supervision they were habitually engaging in some sport of their own . . . (the) repeated buzzings, hoverings and dive bombings . . . at best disturb and at worst terrorize the hapless residents below."

The practice of searching homes and seizing property without warrants "virtually anywhere in the vicinity of the crime" is "unconstitutional on its face," Aguilar concluded.

United Feature Syndicate



And justice for all

Environmental Law Center of the Pacific
250 South Hotel Street 2nd floor Auditorium Honolulu Hawaii 96813

March 20, 1985

KRP Information Services
Attention: Jacqueline Parnell
P. O. Box 27506
Honolulu, Hawaii 96827

Re: Eradication of Marijuana - EIS

Dear Ms. Parnell:

On March 8th and 15th, 1985, letters were sent to you regarding the feasibility of studying the decriminalization of marijuana. These letters are incorporated herein by reference. This letter is designed to strengthen ELC's claim of the need to include the legalization issue in the EIS. In that regard, H.R.S. §343-1(7) directs that an EIS "...must disclose the alternatives to the action and their environmental effects." Since a significant effect DOES include those actions which irrevocably commit a natural resource, H.R.S. §343-1(8), or affect economic or social welfare of the State, I have attached Enclosures #3, 4 & 5. These enclosures show the potential dollar loss of marijuana to the State. They also show that prominent people have discussed the alternative of decriminalization of marijuana. In that text, please note that, in addition to these enclosures, both Hugh Downs and Barbara Walters, speaking as hosts of ABC's 20/20 which aired Sunday, 3/17/85, said that legalizing such drugs takes them away from the criminal sector and they felt it a proper step to take.

Regards,

Jack Schweigert

JFS:vs/dd58

Encls.

808 533 7491

A-4 Honolulu Star-Bulletin Monday, January 7, 1985

Nation's Pot Harvest Hits a Record

Combined Dispatches

WASHINGTON — U.S. marijuana growers harvested a record $16.6 billion worth of pot in 1984, with Hawaii's $1 billion crop ranking second among the top 10 marijuana-producing states, according to the National Organization for the Reform of Marijuana Laws.

The estimated domestic harvest, which for the first time filled more than half the nation's demand, was worth 20 percent more than the 1983 crop and continued to make marijuana America's second most valuable agricultural product, NORML said in its annual cultivation report.

The U.S. Department of Agriculture estimates that the nation's corn crop last year was worth $19.5 billion, followed by hay at $11.5 billion and soybeans at $11.3 billion.

Last year, the House Select Committee on Narcotics Abuse and Control estimated marijuana could be worth from $10 billion to $50 billion a year in the United States.

MARIJUANA was estimated by NORML to be the most valuable crop last year in Hawaii and nine other states: Alabama, California, Idaho, New Mexico, Oregon, South Carolina, Tennessee, Virginia and West Virginia.

NORML said the top 10 marijuana-producing states were California, $2.5 billion; Hawaii, $1 billion; Oregon, $850 million; Kentucky, $800 million; North Carolina, $650 million; Arkansas, $550 million; Oklahoma, $550 million; Tennessee, $525 million; Georgia, $500 million; and Washington, $500 million.

The NORML estimates, if true, would mean that illicit marijuana production far outpaced sugar as Hawaii's leading agricultural product in 1984, when the state's sugar crop had an estimated value of $404.3 million.

Illegal domestic pot farmers raised about 11 million pounds nationwide in 1984, or 55 percent of the 20 million-pound total amount available to the 30 million or more Americans using marijuana on a regular basis, according to NORML.

THE GROUP, which advocates legalization of marijuana, said that in 1983, U.S.-grown marijuana accounted for about half the pot available in this country.

Why Do They Call It Dope?

Chicago Tribune-N.Y. News

CHICAGO—I've been playing around with a fascinating number—14,000 tons. That's the amount of marijuana—foreign and domestic—that's said to be consumed each year in this country.

Actually, the federal narcs think it might be even higher. A recent raid in northern Mexico turned up 10,000 tons. The narcs were stunned because they thought that Mexico produced only one fourth that amount.

But for this column's purpose, let's stay with the 14,000-ton figure.

If you break that down, it comes to 448,000,000 ounces.

I'm told that one ounce of marijuana will produce between 20 to 40 joints, depending on whether you are frugal and make skinny ones, or are self-indulgent and make them stogie-sized.

There's also a waste factor—seeds, twigs, bugs, spillage, and so on.

So let's be conservative and figure 20 joints an ounce.

That's just under 10 billion joints a year.

If you divide that by the population of this country, it comes to about 40 joints for every man, woman and child.

Now, we can assume that millions of little toddlers and preschoolers don't smoke it. We can even assume that most kids in elementary school don't, since most of them don't have the purchase price.

And we can assume that millions of old codgers in nursing homes or two-room flats don't use it.

So who's doing all this grass-smoking? Recent studies say that teen-agers are smoking less and less pot. So the biggest users are the age groups that range from young adults to middle-agers.

And they're a huge part of the population. If they aren't

Mike

the majority, they're not far from it.

That tells us something obvious. That there's a great demand in this country for marijuana.

As any Harvard economist—or dry goods saleman—will tell you, when there's a great demand for something that isn't hard to supply, somebody is going to supply it.

It ought to be obvious by now that the politicians in Washington can talk all they want about stamping it out, but they can't do it. It has become one of this country's biggest cash crops. It's a big part of Mexico's economy.

So maybe it's time to give up trying to stamp it out, and consider legalizing it, thereby controlling it.

If it were legal, we wouldn't have gun-crazy dealers spraying Florida and other big import states with machine gun bullets. They wouldn't be bribing politicians in this and other countries. In other words, it would be taken out of the hands of the criminal dope dealers, who are quickly becoming some of the world's wealthiest creeps.

Who would sell it? Private enterprise, I suppose. The day it became legal, we'd see nationwide pot franchises springing up.

And we could stop feuding with Mexico, since our own needy farmers could grow enough to meet all local demands.

Why, they'd probably wind up dealing in marijuana futures on the Board of Trade.

The sale could be regulated just as we now regulate the sale of booze. TV and radio advertising of pot would be banned, just as we've banned the advertising for liquor and cigarettes. Minimum age limits would be set.

Sure, it would be impossible to enforce the laws 100 percent. But the fact that teen-agers find ways to buy beer doesn't prevent the rest of us from drinking it.

And, yes, I'm aware that marijuana isn't good for us, although scientists still aren't sure what the effects really are.

However, the scientists do know a lot more about the effects of even the finest scotches, the most elegant gins, the most regal cognacs. Even if you pay $5 a shot and tip the bartender a deuce, they will still quiver your liver and strain your brain.

So it might be time for us to stop pretending that we can do something to stop marijuana from being sold and consumed. In a country where the citizens—and even illegal aliens—have unlimited freedom of movement, and where there is almost no control of its own borders, we can't do it.

Then why not try to at least regulate it and let our own farmers and businessmen make a buck.

Are we ready for a McJoint?

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

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WATER AND LAND DEVELOPMENT

May 1, 1985

Mr. Jack Schweigert
Environmental Law Center
of the Pacific
250 South Hotel Street
2nd Floor Auditorium
Honolulu, Hawaii 96813

Dear Mr. Schweigert:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letters of March 8, 15, and 20, 1985 concerning the subject Notice of Preparation. Your comments are appreciated.

You are correct in stating that all alternatives must be considered, including legalization of marijuana, even if they are not within the control of the agency. They will be discussed in more detail in the Environmental Impact Statement.

However, it should be noted that even if marijuana were to be legalized by the State of Hawaii in the future, the use of State-owned lands in the Conservation District for agricultural purposes is not allowed without specific written permission of the Board of Land and Natural Resources. Unless this permission is granted, such activity would continue to be illegal.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

Pls send copy to KRP Info Svcs. Dept (1260

GEORGE W. HOLESO
3885 Claudine Street • Honolulu, Hawaii 96816
Telephone: 737-2992

RECEIVED
85 MAR 13 A9:43
STATE OF HAWAII

5 March 1985

Department of Land & Natural Resources
KRP Information Services
ATTN: Jacqueline Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

Dear Mr. Ono:

I thank you for sending me the copy of the Environment Assessment and Notice of Preparation of Environmental Impact Statement on the Eradication of Marijuana on State-Owned Conservation Lands Island of Kaua'i. My comments follows.

Before I go into my remarks, I would like to let you know, that as the present president of the Hawaii Beekeepers Association, this particular item was placed on the agenda of our association of February 25, 1985. The general membership felt that no action should be takened at this time until more studies are available. The members also felt that the spraying of the diesel oil on marijuana plants, especially when mixed with other commercial preparations, makes this concoction into a herbicide--thus a dangerous chemical.

Let me state my personal unqualified support for the objective of the project to eradicate marijuana growing on state lands by use of diesel oil, or a commercial preparation similar to diesel oil.

I have been familiar with the use of diesel oil to kill unwanted vegetation while growing up on Hawaiian Homestead Land on the Big Island. The preparation my father used was half diesel and half soapy water. The soapy water usually came from the thick soap suday water of the Saturday afternoon clothes washing tub in the back yard. This really did the job! I still use this preparation on my own property., of course diesel oil cost a little more than 10 cents a gallon,.. about$1.60 a gallon at the present time, but still cheaper than a regular chemical weed killer on the market.

In summary, it seems to me that the aerial spraying with diesel oil will be less expensive, more succesful, less dangerous to police or other personnel, than the present method of pulling or hacking at this obnoxious and dangerous plants.

Let us preserve the character and resources of our Lands...let us again make our Lands safe for everyone. PAU WITH PAKALOLO ! !

Very truly yours,

George W. Holeso

Roger ____ Post ____
Aki ____ Library ____
Anne ____ Maurie ____
Dean ____ Barbara ____
File as #1760
Ya Carol For ____

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 14, 1985

Mr. George W. Holeso
President
Hawaii Beekeepers' Association
3885 Claudine Street
Honolulu, HI 96816

Dear Mr. Holeso:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kauai, Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 5, 1985. The Hawaii Beekeepers' Association's concern about the dangers of diesel oil "concoctions" will be taken into account in the Environmental Impact Statement.

It is good to hear that you personally support the intent and the proposed actions of the marijuana eradication program.

Also, thank you for sharing your diesel oil-soap recipe with us.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

HSPA

HAWAIIAN SUGAR PLANTERS' ASSOCIATION, 99-193 AIEA HEIGHTS DRIVE, AIEA, HAWAII
MAILING ADDRESS: P.O. BOX 1057, AIEA, HAWAII 96701-1057, TELEPHONE: (808) 487-5561

March 11, 1985

KRP Information Services
Attention Ms. Jacqueline Parnell
P. O. Box 27506
Honolulu, HI 96827

Dear Jackie:

I have reviewed the Environmental Assessment and Notice of Preparation of an EIS for Eradication of Marijuana on State-owned Conservation Lands on Kaua'i. I agree with the statements and conclusions within my areas of knowledge of the subject.

Sugarcane borders on conservation lands in a number of areas, although it may not be grown on such lands. As such, small amounts of herbicide drift from spraying on conservation lands may contact sugarcane foliage, causing minor contact burn of the leaves. This contact would not be expected to have any measurable effect on plant growth, nor would it be expected to result in residues in sugar or molasses. Oil residues in bagasse, if any occur, would be burned as fuel.

The preference for weed oils is based on at least 25 years experience with oil-based herbicide practices for sugarcane. Prior to 1970, oil was a major weed control agent, applied by hand knapsack. Other herbicides, especially those applied to soil, have replaced oils, as a means of reducing labor cost. The oils generally have low toxicity as long as they are not ingested, the soil breakdown is rapid, harvest residues are unlikely for most if not all crops, and the oils are safe to the public and the workers. Drift would not be expected to have any real effect on wildlife, although application to water should be avoided. At the time that oils were most heavily used for weed control in many crops, there was a blanket exemption from the requirements of a residue tolerance for weed oils. Although they are less widely used today, to my knowledge there are no crop residue tolerances required for oils.

There are only a few specific comments: page 4--the surfactant acts as an emulsifying agent to disperse the oil in water, not as a sticking agent.

On page 8, kiawe is misspelled.

Page 19 (vegetation) might be modified. Low wind conditions are desirable, but totally windless days my indicate temperature inversions which can contribute more to drift than a low breeze. I would suggest that "spraying will be done in morning hours of low wind less than 8 mph. Inversion conditions should be avoided to minimize the possibility of drift."

The 100-ft restriction limit for aircraft should apply to homes and other domestic buildings that are adjacent to (and especially downwind of) the conservation area if treatment is made at the edge of the area.

I hope these comments are useful.

Sincerely,

H. Wayne Hilton, Ph.D.
Department Head
Crop Science

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
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May 1, 1985

Dr. Wayne Hilton
Hawaiian Sugar Planters' Association
P.O. Box 1057
Aiea, HI 96701

Dear Dr. Hilton:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 11, 1985 concerning the subject Notice of Preparation. Your comments and suggestions are appreciated and will be incorporated into the Environmental Impact Statement.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

KAUAI GUARDIANS HAWAII
Environmental Education and Research

K R P Information Services
320 Ward Ave, Suite 106
P.O. Box 27506
Honolulu, Hi 96827
Jacqueline Parnell

February 26, 1985

Dear Ms. Parnell:
Please send our organization a copy of the Environmental Assessment and Notice Of Preperation of Environmental Impact Statement entitled "Fradication of Marijuana on State- Owned Conservation Lands Island of Kauai. Also please add Kauai Guardians Hawaii to the list of notified organizations. Mahalo

Sincerely,
Robert Macknowski
Robert Macknowski

P.O. Box 1421 • Hanalei, Kauai, HI 96714 • (808) 826-6735 /826-6995
NON-PROFIT

KAUAI GUARDIANS HAWAII
Environmental Education and Research

March 9, 1985

Ms Jacqueline Parnell
KRP Information Services
Box 27506
Honolulu, Hi 96827

Dear Ms Parnell:

We have received the environmental assessment/notice of preparation of the environmental impact statement for the eradication of marijuana on State-owned Conservation Lands, Island of Kauai.

Our study reveals a very serious health hazard posed to the workers who would apply the chemical "Roundup," as well as the general public if used as an alternative in place of alternative A of C(1) listed on pages 17 and 18 of the environmental assessment document.

The most disturbing, we find, is what the U.S. Government thought it knew about Paraquat and Roundup which has been recently cast in doubt.

The following is information taken from an excellent research paper published in Science Digest, June, 1983, by Andrew C. Revkin entitled "Paraquat, a Potent Weed Killer is Killing People." We strongly suggest that you obtain a copy of this article.

Please keep in mind that "Roundup" is considered to be just as effective as Paraquat - only more expensive, and was tested for toxicity by a laboratory since closed down because of fraudulent experiments.

The Evvironmental Protection Agency published a report on the research of the health effects of the herbicide. It lists everything from birth defects to cancer causing, and the data deemed "inadequate."

The report:

Teratogenicity (the tendency to cause birth defects): Research in the medical literature is "inadequate."

Mutagenicity (the tendency to cause gene mutations): "The Agency could not come to any conclusion."

Reproductive Effects: "The Agency (found) that the available studies relating to reproductive effects are inadequate."

Oncogenicity (the potential for causing cancer): Tests were inadequate and invalid. Of the four tests reviewed, one performed by Imperial Chemical Industries, Great Britain, in 1972 was found to be deficient. The remaining three were performed by Industrial Bio-Test Laboratories, Northbrook, Illinois. All of these tests on the herbicides "Roundup and Paraquat," were invalidated.

Several government audits opened the lab for investigation and government scientists found fictitious data. A mouse dying and coming back to life (actually replaced by a different mouse.) IBT's scientists and executives had their trial in Federal Court, Chicago. IBT, once the largest laboratory in the U.S., is now closed. This is where all information about Roundup and Paraquat came from!

Chevron markets paraquat. Chevron's name appears in the environmental assessment document and their product "Weed Oil" as consideration for use in the marijuana eradication plan for Kauai.

Chevron's name also appears in a landmark court case in Washington D.C. The jury awarded $137,000 to the family of an agriculture worker who died from poisioning of paraquat which connected Chevron

More lawauits are piling upon Chevron. One is for $25 million by the survivors of another man dead from paraquat poisoning claiming Chevron was aware of the skin exposure hazard and did nothing to warn of it.

Chevron is experiencing a wave of adverse publicity and is deeply involved with the controversy associated with Paraquat and Roundup. (Incidentally, Roundup is manufactured by Monsanto Chemical, who also produces detonators, timers, and explosive pellets for nuclear weapons at the Mound Laboratory in Miamisburg, Ohio.)

This information only represents the tip of the iceburg. We are prepared to submit much more documentation to expose the extreme danger connected with Roundup and Paraquat.

In view of the multi-million dollar lawsuits involving these herbicides, Chevron, the high risks of lawsuits and serious health hazards to users and the public, the eradication of marijuana plan for Kauai does not appear to be "cost effective" or "safe." Nor do we think the plan is a realistic alternative. Indeed, the plan reeks of irreparable harm to the population of Kauau and its environment - the total environment!

It is our conclusion then, rather than run the risk of lawsuits, cancer, genetic damage and mutations, etc., we believe a more realistic, cost effective, safe alternative would be C(1) page 18 of the environmental assessment calling for more detailed study of the legalization/regulation of marijuana, before eliminating

P.O. Box 1421 • Hanalei, Kauai, HI 96714 • (808) 826-6735 /826-6995
NON-PROFIT

this alternative from consideration - or alternative A (no action) continue current manual eradication program.

The bottom line is: All the research conducted for toxicity on Roundup and Paraquat is invalid, multimillion dollar lawsuits are increasing as a result of these two herbicides and their usage.

We trust the foregoing information will be seriously considered, and the plan to use Roundup, Rodeo, or any other harmful chemicals on Kauai's environment and population is eradicated.

If more information is needed, please feel free to contact me at any time.

Sincerely,

Robert Macknowski

cc: Garden Island
Kauai County Council

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 1, 1985

Mr. Robert Macknowski
Kauai Guardians Hawaii
P.O. Box 1421
Hanalei, HI 96714

Dear Mr. Macknowski:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letters of February 26 and March 9, 1985 concerning the subject Notice of Preparation. We appreciate your comments and suggestions. A copy of the Draft Environmental Impact Statement will be sent to you for your review and comments upon completion.

Please note that paraquat will not be used in the eradication of marijuana. Also, additional toxicity tests have been made on glyphosate and will be discussed in the EIS.

Very truly yours,

LIBERT K. LANDGRAF
Administrator

MAE E. MULL
P O BOX B 275
VOLCANO, HI.
96785

Feb. 24, 1985

Ms. Mae Mull
P.O. Box B275
Volcano, HI 96785

Dear Ms. Mull:

I ask to be considered jointly in the preparation of the EIS for the proposed to eradication of marijuana on state-owned conservation lands, Island of Kaua'i.

Please send me a copy of the EIS Preparation Notice. Any concern to the potential deleterious on native biological communities from chemical spraying. Specific measures will be taken to protect native habitats will be identified in the Draft EIS.

Very truly yours,

Mae E. Mull

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 1, 1985

Ms. Mae Mull
P.O. Box B275
Volcano, HI 96785

Dear Ms. Mull:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your communication of February 24, 1985 concerning the subject Notice of Preparation. A copy of the Notice has been sent to you, and we will be pleased to include you as a consulted party in the preparation of the Environmental Impact Statement.

We share your concern about the potential deleterious impact on native biological communities from chemical spraying. Specific measures to protect native habitats will be identified in the Draft EIS.

Very truly yours,

LINNEY K. LANDGRAF
Administrator

SIERRA CLUB, HAWAI'I CHAPTER
P.O. BOX 11070 HONOLULU, HAWAI'I 96828
(808) 946-8494

11 March 1985

Ms. Jacqueline Parnell
KRP Information Services
320 Ward Avenue, Suite 106
P. O. Box 27506
Honolulu, Hawai'i 96827

Dear Jackie:

The Sierra Club, Hawai'i Chapter wishes to be a consulted party for the EIS for

Eradication of marijuana on State-owned lands, island of Kaua'i.

If possible, we would appreciate copies of the draft EIS being sent to:

Nelson Ho, Conservation Chairman
Sierra Club, Hawai'i Chapter
P. O. Box 590
Mountain View, Hawai'i 96771

Sierra Club, Honolulu Group
c/o Lynn Nakkim
3140A Huelani Place
Honolulu, Hawai'i 96822

Sierra Club, Kaua'i Group
c/o John Townsend
P. O. Box 527
Kalaheo, Hawai'i 96741

Mahalo!

Susan Miller
for Lola Mench, Legislative Chair

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
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WATER AND LAND DEVELOPMENT

May 1, 1985

Ms. Lola Mench
Legislative Chair
Sierra Club, Hawaii Chapter
P.O. Box 11070
Honolulu, HI 96828

Dear Ms. Mench:

Subject: Eradication of Marijuana on State-owned Conservation Lands, Island of Kaua'i Environmental Impact Statement Notice of Preparation

Thank you for your letter of March 11, 1985 concerning the subject Notice of Preparation. We will be pleased to include the Sierra Club, Hawaii Chapter, as a consulted party in the preparation of the Environmental Impact Statement. Copies of the Draft EIS will be sent to the persons indicated in your letter.

Very truly yours,

LIGHT K. LANDGRAF
Administrator

d. With regard to direct exposure to aerial spray applications (DEIS, p. V-12), a more immediate risk than that described for pregnant women would be to persons who are immunologically sensitive to the chemicals being used. An allergic reaction occurring in an isolated area, far from medical assistance, could be serious.

e. To help mitigate against unnecessary direct exposure of hikers and others to chemical sprays (DEIS p. V-12), a public address warning could be broadcast from the helicopter over each site a short time (say 10 minutes) prior to treatment.

f. As noted in the DEIS, the proposed action, if effective, will likely drive up the price of marijuana, offsetting the effect of crop losses, and acting as an incentive for the growers to continue production using changing cultivation strategies (DEIS, p. V-13). An environmentally undesirable strategy which is likely to evolve is that growers will deliberately seek environmentally sensitive upland areas (e.g., areas known to harbor endangered species) where chemical treatments would be difficult or destructive.

g. Page V-13 of the DEIS states that increased educational efforts may result in a reduced demand accompanying the diminished supply. However, such education efforts are not described in the DEIS. Are they to be included as part of the proposed action?

h. In Table V-2, the assertion that "Eradication under any method will usually result in the reversion of the site to natural forest vegetation" is unsubstantiated. Exotic, weedy species are more likely to dominate following disturbance. Also, erosion of exposed soil on steep slopes receiving treatments is not addressed in the DEIS.

i. Should the proposed action be implemented, accurate records of all treated sites should be maintained, including (but not limited to) date, exact location, elevation, area treated, method of treatment, and type and quantities of chemicals used. This data

would provide some basis for evaluating the effectiveness of the program and the environmental impacts resulting from it. A random sample of treated sites should be closely monitored over time to collect data on succession of the biological communities following treatment.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

cc: Parnell

United States Department of Agriculture

Soil Conservation Service

P.O. Box 50004
Honolulu, Hawaii
96850

June 19, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

Subject: Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kauai, HI

We reviewed the subject draft environmental impact statement and have no comments to make.

Thank you for the opportunity to review the document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

cc:
Mr. Libert K. Landgraf, Administrator
Division of Forestry & Wildlife
Department of Land & Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Ms. Jacqueline Parnell, Consultant ✓
KRP Information Services
P.O. Box 27506
Honolulu, HI 96827

The Soil Conservation Service is an agency of the United States Department of Agriculture

50

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

June 18, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

We have reviewed the Draft Environmental Impact Statement (DEIS) for Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kauai. We offer the following comments on the DEIS:

a. The expansion/intensifying of enforcement programs is listed as an alternative (DEIS, p. II-2) but it is then stated on the same page that this "is not considered an alternative...". Clarification is needed. It should be noted that this alternative would cause less environmental damage than the proposed action.

b. Because of wind drift and unavoidable irregularities in spraying, an effect of chemical treatments will likely be to enlarge each of the already disturbed areas occupied by marijuana. In native forest areas, such enlargement of disturbed areas could increase the risk that they will eventually be revegetated not by native plants but by some exotic, weedy species (such as Clidemia hirta). The impact would be cumulative and is likely to increase the dominance of exotic species in native forest areas which receive numerous treatments over time. The DEIS predicts "natural plant succession" (p. V-2) and "natural revegetation cover" (p. V-5) but ignores the problem of the spread of introduced, weedy plants. The final EIS should discuss impacts of the proposed action on forest succession with respect to competition between native and exotic plant species.

c. In the "worst case accident scenario" (DEIS, p. V-7), exposure of downstream fauna, not just the biota in the immediate vicinity of the spill, should be considered. Possible generation of a forest fire in a remote area following a helicoptor crash should also be addressed.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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CONVEYANCES
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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Kisuk Cheung
Chief, Engineering Division
U. S. Army Engineer District, Honolulu
Fort Shafter, HI 96858-5440

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 18, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

a. We agree that the expansion and intensification of enforcement programs, as as suggested by you and other readers, could be an alternative to eradication itself. We had intended to convey the idea that improved enforcement programs would run parallel with eradication programs. This statement will be clarified in the Revised EIS.

b. The phrases "natural plant succession" and "natural revegetation succession" was not intended to refer to native plants but to the previously existing vegetation at the site. The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegetation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process. This will be clarified in the Revised EIS.

c. We agree that in the "worst case" accident scenario, downstream fauna would also be affected. The generation of a forest fire by the crash of an helicopter is always a possibility. This will be added to that section.

d. Persons sensitive to chemicals will be included in those at risk from chemical spraying.

e. A series of actions have been recommended to ensure that there is adequate public notice given before spraying. The use of a public address system is one that may be appropriate.

f. We share your concern that successful eradication efforts or even the threat of these efforts may encourage growers to deliberately seek out environmentally sensitive areas. This will make eradication efforts more difficult since chemical methods of eradication will be not be used or will be severely restricted in these areas.

g. Increased education efforts are being undertaken by the U.S. Drug Enforcement Administration and a number of public and private agencies. They are not part of the Deaprtment of Land and Natural Resource's eradication program.

h. The "natural vegetation" question has been addressed in b. above. Soil erosion on steep slopes is a problem only where manual eradication methods are used because vegetation is left in place when chemical methods are used, and is noted in the table.

i. A monitoring program will be designed and implemented. This will be described in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Sincerely,

Libert K. Landgraf,
Administrator

DEPARTMENT OF THE NAVY
HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO:
9510
Ser 002B/1025
3 JUN 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

ENVIRONMENTAL IMPACT STATEMENT
ERADICATION OF MARIJUANA ON STATE-OWNED AND MANAGED
CONSERVATION DISTRICT LANDS

The EIS for the Eradication of Marijuana on State-owned and Managed Conservation District Lands has been reviewed and the Navy has no comments to offer.

Thank you for the opportunity to review the EIS.

Sincerely,

[redacted]
[redacted] U.S. Navy
[redacted]

Copy to:
Mr. Libert K. Landgraf, Administrator
Division of Forestry & Wildlife
Department of Land & Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Ms. Jacqueline Parnell, Consultant
KRP Information Services
P.O. Box 27506
Honolulu, Hawaii 96827

4

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P.O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

JUN 20 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement (DEIS) on the Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Kauai

Dear Ms. Uyehara:

The U.S. Fish and Wildlife Service (FWS) has reviewed the referenced DEIS and offers the following comments for your consideration.

General Comments

The FWS supports the efforts of the State of Hawaii Department of Land and Natural Resources to eliminate illegal marijuana cultivation on State-owned and managed conservation district lands on Kauai. However, the FWS is concerned about the potential negative impacts of herbicide spraying on Federally listed and candidate endangered and threatened species, the effects on other native plants, forest birds, arthropods and tree snails, the recovery of native forest communities after the spraying, the potential runoff of herbicides into streams and wetlands and their effects on aquatic animals, and the cumulative effects of various proposed pesticide and herbicide spraying programs (eradication of the tri-fly by the U.S. Department of Agriculture and the eradication of marijuana by the U.S. Department of Justice, Drug Enforcement Agency) on the forest ecosystems on Kauai.

The DEIS makes a genuine attempt to describe the numerous potential adverse impacts of the proposed herbicide spraying program on native forest and aquatic ecosystems. However, there is little empirical information available that directly addresses the impacts of this proposed spraying program on native forest and aquatic ecosystems in Hawaii. The scope and magnitude of the impacts can only be estimated at this time.

Specific Comments

a. Page I-4. The Proposed Action. The decision to spray would be made by a person designated by the Board of Land and Natural Resources. The EIS should identify what sources of information will be used by the designated authority to determine

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the ecological sensitivity of an area and the presence of endangered species. The FWS recommends that determinations on the ecological sensitivity and presence of endangered species be fully coordinated with Division of Forestry and Wildlife biologists and our office on a case-by-case basis.

b. Page I-7. Chemical Methods. The EIS states that the spray swath width would range from 15 to 50 feet. On Page V-4, Chemical Eradication Operations, the EIS states that leaf brownout would occur in a narrow band approximately 5 to 25 feet wide. The EIS would be enhanced if the sources for these estimates were included.

1. The EIS should include information on the length of the spray booms. If the spray booms are significantly shorter than the height of the trees in the proposed spray zone, large peripheral areas may be affected by the herbicide spraying.

c. Page I-8. Weed Oil. The EIS states that Weed Oil should be kept out of streams, lakes, and ponds because it is toxic to fish and other aquatic life. Because of the potential for runoff into streams and wetlands, the Service recommends that Weed Oil not be used in the proposed marijuana eradication program.

1. The EIS would be improved if a table which compared the toxicity of Weed Oil, glyphosate, and diesel oil on various aquatic and terrestrial species was provided.

d. Page I-11. Marijuana Disposal Alternatives. The FWS recommends that the herbicide treated marijuana be disposed off-site if the spray area is greater than 500 square feet to reduce the potential for accidental forest fires.

e. Page III.5. Endangered and Threatened Species. The DEIS correctly states that no endangered mollusks, plants, or insects are found on Kauai. However, there are several candidate endangered invertebrates (spiders, insects, and amphipods), candidate endangered plants, and potential candidate endangered land snails on Kauai.

f. Page III.6. Special Areas. Alakai Wilderness. The term "critical habitat" is a specific legal term. To date, no critical habitat for endangered forest birds on Kauai has been designated. The FWS suggests that "critical habitat" be replaced with "essential habitat."

1. The FWS recommends that the special area list be expanded to include the Kilauea Point, Hanalei, and Huleia National Wildlife Refuges, the proposed essential habitat for Kauai endangered forest birds and waterbirds, and the Nature Conservancy's Kalua Honu Reserve.

g. Page V-1. Landforms, Soils, and Vegetative Cover. To the best of our knowledge, there are no moles on Kauai.

h. Page V-2 - V-5. Site Revegetation. One of the Service's primary concerns is the recovery of the herbicide treated sites by native vegetation. There is no published empirical information on the recovery of native vegetation on sites treated with the proposed herbicides. The critical element is not whether the sites revegetate, it is what type of plants revegetate the treated site. The EIS should note this current lack of predictive information.

i. Page V-6 - V-7. Wildlife. The EIS states that no additional significant impacts, other than those associated with marijuana cultivation, are likely to occur to any wildlife species from any of the eradication techniques. This section also states that the downwash from the helicopters may disrupt nesting and reproduction in forest birds. This discrepancy should be clarified.

1. The EIS states that no herbicides will be used in areas that State or Federally listed endangered or threatened species are likely to occur. The FWS recommends that aerial spraying of herbicide be prohibited in the following areas: (1) in the proposed essential habitat for the endangered Kauai forest birds; (2) in areas known to harbor candidate and potential endangered species; (3) in the Hono O Na Pali and Kuia Natural Area Reserves; (4) within the watersheds of the Hanalei and Huleia National Wildlife Refuges; (5) within 1-mile of the Kilauea Point National Wildlife Refuge; (6) along streams and wetlands.

2. In cases where eradication must be conducted in these sensitive habitats, mechanical or spot application from a backpack sprayer should be used only.

j. Page V-13. Cumulative Impacts. This section should be expanded to discuss the cumulative effects of the proposed Department of Agriculture's Tri-Fly eradication program and the proposed Department of Justice, Drug Enforcement Agency's marijuana eradication program.

k. The EIS should also include a description of the "broom applicator" and its applicability to marijuana eradication.

Summary Comments

The magnitude of the potential adverse impacts of the proposed project can only be estimated at this time. The Service recommends that a pilot program specifically designed to determine the scope and magnitudes of the potential impacts to endangered species and native forest ecosystems be initiated. The information derived from the the pilot program would provide direct empirical information on the impacts of the proposed project and would be used to determine the environmental acceptability of the proposal.

The pilot program would address the following:

a. Does native vegetation re-colonize the herbicide treated sites?

b. How long is the recovery of native vegetation in herbicide treated sites?

c. What is the effect on forest birds by helicopter downwash, noise, and spray drift?

d. What is the size of the non-target area affected by herbicide spray drift? How does this vary with canopy height and understory vegetation?

The FWS is willing to provide technical assistance to the Department of Land and Natural Resources in designing, monitoring, and analyzing the results of the proposed pilot program.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: RD, FWS, Portland, OR (AHR)
EPA, San Francisco
HDF&W, Mr. Libert Landgraf
HDAR
KRP Information Services, Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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DEPUTY TO THE CHAIRMAN

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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
U.S. Fish and Wildlife Service
300 Ala Moana Blvd.
P.O. Box 50167
Honolulu, Hawaii 96850

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 20, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

General comments

The U.S. Drug Enforcement Administration's program is carried out in Hawaii through state and local enforcement officers, not as a separate program. Therefore the potential cumulative effects of proposed pesticide and herbicide programs would be confined to this program and the tri-fly eradication program of the U.S. Department of Agriculture. The tri-fly program has been opposed by both the State of Hawaii and the U.S. Environmental Protection Agency, and it appears unlikely to be implemented in the near future. It is difficult to predict the combined effects of utilizing herbicides to control plant growth with insecticides designed to kill living creatures. There could be some synergistic effects; however, any predictions at this time would be speculative rather than informative.

It is true that there is little empirical data to directly address effects of the use of oil sprays in the proposed eradication program. A monitoring program will be established by the Department of Land and Natural Resources, and which will be described generally in the Revised EIS, should provide more definitive information. Your offer of assistance in setting up this program is appreciated.

Specific Comments

a. The Department has decided to change the procedures for making the decision on the use of chemical sprays. The Department will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

The "go/no go" decision by a person designated by the BLNR would thus be employed only under special or unusual circumstances.

b. The references to the statements noted will be cited in the Revised EIS. More information on helicopter booms will also be included.

c. Diesel oil is preferred to Weed Oil because it is less expensive and not as toxic. Weed Oil will be used only if diesel oil cannot be used. A table such as you suggest was considered but could not be done. Since Weed Oil was registered under old procedures in effect before the passage of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and diesel oil is not a registered pesticide, very little data on specific effects on specific aquatic and terrestrial species exist.

d. Offsite disposal is considered to create a greater environmental hazard than leaving the sprayed weeds on site. In their comment letter, the Office of Environmental Quality Control recommends that the material not be removed.

e. A list of candidate endangered species will be included in the Revised EIS.

f. The phrase "critical habitat" will be replaced by "essential habitat" in the revised EIS. The special areas you suggest will also be added to the list.

g. The reference to moles will be deleted in the Revised EIS.

h. The phrases "natural plant succession" and "natural revegetation succession" were not intended to refer to native plants but to the previously existing vegetation at the site. The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegetation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process. This will be clarified in the Revised EIS.

i. Downwash from helicopters was considered to have possible negative effects but was not considered to have a significant impact on wildlife. The rest of the comments under this section are addressed under a. above.

j. See General Comments above.

k. The broom application has been considered. It may be used in certain areas.

Summary Comments

As noted earlier, chemical eradication measures will be accompanied by a monitoring program. This should provide answers to the questions you pose.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Sincerely,

Libert K. Landgraf,
Administrator

United States Department of the Interior

GEOLOGICAL SURVEY

Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

June 11, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

The draft EIS "Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai" has been reviewed by Kiyoshi Takasaki of this office. Mr. Takasaki offers the following comments:

Page V-8, Table V.-1 Geohydrologic unit numbers 1, 4, 5, 14, 15, 17, 19.

> These units, except for unit 17, are generally not suitable for even moderate-size agricultural development owing to their steep slopes, inaccessibility, or heavy rainfall. A low pollution potential rating was assigned to these units under the non-point source category in Plate 1 of his report because these units do not contain any significant agricultural development, nor are they expected to in the future.
>
> Because of the small size and scatter of the marijuana plots in areas generally not suitable for large agricultural developments, a point rather than non-point source category should be assigned to pollutants from these plots. Under these circumstances, we feel that a medium to high pollution potential rather than the low potential assigned in the EIS would be more appropriate.

Thank you for the opportunity to comment on the draft EIS.

Sincerely,

Stanley F. Kapustka
District Chief

cc: L. K. Landgraf, DLNR
J. Parnell, KRP Info Services

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY AND WILDLIFE
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DEPUTY TO THE CHAIRMAN

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WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Stanley Kapustka
District Chief
Water Resources Division
U.S. Geological Survey
300 Ala Moana Blvd.
P.O. Box 50166
Honolulu, HI 96850

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 11, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We appreciate the clarification of the meaning of Mr. Kiyoshi Takasaki's report on groundwater pollution potential. Table V-1 and the narrative portion on page V-8 will be rewritten in the Revised EIS to reflect this.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for: Libert K. Landgraf,
Administrator

UNITED STATES DEPARTMENT OF JUSTICE
DRUG ENFORCEMENT ADMINISTRATION
Washington, D.C.

June 20, 1985

Libert K. Landgraf, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Landgraf:

Thank you for the opportunity to comment on the "Department of Land and Natural Resources, State of Hawaii, Draft Environmental Impact Statement on the Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai."

We wish to clarify statements attributed to the Drug Enforcement Administration (DEA), on page 2 of the summary and on page I-4 of your Draft Environmental Impact Statement (DEIS). DEA is not considering widespread use of chemicals in its domestic eradication program. DEA is proposing to use a full range of eradication methods, including manual, mechanical, and herbicidal. Herbicides are proposed for use only where they could be used safely and effectively.

It also should be noted that DEA published a programmatic DEIS on cannabis eradication on non-Federal and Indian lands in the contiguous United States and Hawaii in May 1985. This DEIS and DEA's previous DEIS on Federal lands were conceived and written as broad, comprehensive background documents which any subsequent environmental analyses can utilize, such as that prepared by the Department of Land and Natural Resources (DLNR).

The last sentence on page II-3 dismisses paraquat and 2,4-D "because of the problems and controversy" associated with them. The DLNR DEIS fails, however, to specifically identify the problems associated with each herbicide or to describe why each is controversial. We recommend that the DLNR DEIS explain in more detail why these herbicides have been eliminated from detailed study. As you are aware, DEA's DEIS on non-Federal Lands concludes that glyphosate, paraquat, and 2,4-D are all appropriate herbicides for cannabis eradication. The choice of eradication method, however, is left to participating states, based on local needs. If, as appears to be the case, you believe that political or administrative concerns preclude the use of paraquat or 2,4-D in Hawaii, the DLNR DEIS should say so, rather than simply referring to unspecified "problems."

It should be noted that paraquat is the most effective in terms of speed or action; at an application rate of 0.5 pound active ingredient per acre, desiccation and discoloration are evident within several hours of application on sunny days and complete kill occurs within 3 days.

Thank you again for the opportunity to comment on this DEIS.

Sincerely,

Rodolfo Ramirez, Jr.
Project Officer
Cannabis Investigation Section

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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HONOLULU, HAWAII 96813

July 19, 1985

Mr. Rodolfo Ramirez, Jr.
Project Officer
Cannabis Investigation Section
Drug Enforcement Administration
U.S. Department of Justice
1405 Eye Street, N.W.
Washington, D.C. 20537

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 20, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

The statements on DEA's proposed actions on page 2 of the summary and Page I-4 of the Draft EIS will be rewritten to reflect your concern and describe DEA's program accurately. We will also reference DEA's programatic Draft EIS on non-Federal and Indian lands which was received after our Draft EIS was published.

The portion of the statement on the decision to not use paraquat or 2,4-D that refers to "problems and controversy" will be deleted in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Sincerely,

Libert K. Landgraf,
Administrator

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

HIDEO MURAKAMI
COMPTROLLER

MIKE N. TOKUNAGA
DEPUTY COMPTROLLER

LETTER NO. (P)1294.5

JUN 7 '88

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Draft EIS on Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai

We have reviewed the subject document and have no comments to offer.

Very truly yours,

T. Tominaga

TEUANE TOMINAGA
State Public Works Engineer

SM:jk
cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

June 21, 1985

MEMORANDUM

TO: Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
State of Hawaii

SUBJECT: Draft Environmental Impact Statement (DEIS)
Eradication of Marijuana on State-Owned and Managed
Conservation District Lands, Island of Kauai

The Department of Agriculture has reviewed the subject DEIS with respect to the concerns we expressed in our memorandum of March 8, 1985, concerning the Environmental Assessment and Notice of Preparation.

As stated on page VII-1 of the DEIS, the use of chemicals proposed for the eradication of marijuana (glyphosate, weed oil, and diesel oil) is an unresolved issue. Although glyphosate is a registered herbicide with the Environmental Protection Agency, it is not approved for use against marijuana (cannabis sp.). There is presently no chemical specifically approved for marijuana eradication in Hawaii, although according to the DEIS, weed oil is registered for that use in California.

Options available for the registration and use of appropriate chemicals for marijuana eradication in Hawaii are the following. Since diesel oil is not registered as an herbicide for any use by the EPA, the only way it might legally be used in Hawaii is if the State were to apply for a crisis exemption with the EPA, pursuant to Section 18 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Such exemption would allow the use of the requested chemical for pest control in an emergency situation for a period of two weeks, which could be extended up to a maximum of one year upon submission of appropriate justification for a specific exemption. Weed oil and glyphosate (under their respective trade names) are registered as herbicides with the EPA, in which case the State could apply for a special local need registration for marijuana eradication pursuant to

Section 24(c) of the FIFRA. In the case of weed oil, however, there presently is no licensed distributor in Hawaii. Special local need registration, upon approval by the EPA, would allow the requested use of the chemical for a period up to five years.

As previously stated, the Department of Agriculture is also concerned that the possibility of pesticide drift be minimized at the time of application. In this regard, the spot application from a helicopter using an extended wand, as illustrated in Figure I-4 of the DEIS, would be acceptable. Boom spraying from a helicopter or fixed wing aircraft, as illustrated in the photograph on page 2-13 of the Draft EIS entitled "Cannabis Eradication on Non-Federal and Indian Lands in the Contiguous United States and Hawaii" (U.S. Drug Enforcement Administration, May, 1985) would not be acceptable.

The Department of Agriculture would be happy to assist the Department of Land and Natural Resources with any of the pesticide approval procedures of the EPA. Thank you for the opportunity to comment.

Jack K. Suwa
Chairman, Board of Agriculture

cc: Mr. Libert K. Landgraf, DLNR
Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Jack Suwa
Chairperson, Board of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. Following are our responses to your comments:

The question of the legality of the use of diesel oil for eradication of marijuana is being resolved jointly by our two agencies through an application for an experimental use permit in accordance with Section 5 of the Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA). This will be described in the Revised EIS.

The question of the legality of the use of glyphosate and Weed Oil for eradication of marijuana has been resolved by the attached letter from the Office of Pesticide Programs, U.S. Environmental Protection Agency, received by our consultant in response to her inquiry on the subject. EPA's position on the use of glyphosate and Weed Oil is that these herbicides are registered by EPA for broadleafed weed control on both crop and non-crop sites. Since marijuana is considered to be a broadleafed weed, these herbicides may be used on marijuana as long as all pertinent label directions, dosages and limitations are followed. That provision is expressed in Section 2(ee) of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. Since marijuana is the target weed to be controlled, it would be considered the "target pest" as defined in 2(ee).

Helicopter spraying will be done by spot application only, using an extended wand, as illustrated in the Draft EIS. No broadcast spraying will be done.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Libert K. Landgraf,
Administrator

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

4/22/85

APR 17 1985

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Ms. Jacqueline Parnell
KRP Information Services
P.O. Box 27506
Honolulu, Hawaii 96827

Dear Ms. Parnell:

Mr. Schatzow has asked me to reply to your letter of April 3, 1985, concerning the use of weed oil in your marijuana eradication program.

As you point out, DEA did not include the petroleum oil herbicides in their proposed eradication programs. However, our position would be the same as previously expressed for paraquat, glyphosate and 2,4-D; any herbicide may be used for control of a weed not expressly name on a label as long as all other label directions, dosages and limitations are followed. That provision is expressed in Section 2(ee) of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. Since marijuana is the target weed to be controlled, it would be considered the "target pest" as defined in 2(ee).

We cannot confirm, as your letter requests, that weed oil is an "appropriate" herbicide to use in Hawaii since we know nothing of your program. But we can confirm that within the limits outlined in 2(ee), the use of weed oil for marijuana control would not be a use inconsistent with its labeling.

If we can be of further assistance, please contact us at any time.

Sincerely,

T. E. Adamczyk

Thomas E. Adamczyk
Deputy Branch Chief
Fungicide-Herbicide Branch
Registration Division (TS-767C)

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816-4495

ALEXIS T. LUM
MAJOR GENERAL
ADJUTANT GENERAL

DANIEL K. C. AU
COLONEL
DEPUTY ADJUTANT GENERAL

HIENG

JUN 19 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mrs. Uyehara:

Eradication of Marijuana on State-Owned and Managed
Conservation District Lands - Kauai

Thank you for providing us the opportunity to review the Draft Environmental Impact Statement (DEIS) for the aforementioned proposed project.

We have no comments to offer at this time about the project.

Yours truly,

JERRY M. MATSUDA
Major, HANG
Contr & Engr Officer

cc: L. Landgraf, DLNR
J. Parnell,KRP Information
Services

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

CHARLES G. CLARK
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EPHSD-

June 17, 1985

COPY

MEMORANDUM

To: Ms. Letitia Uyehara, Director, Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Eradication of Marijuana on State-Owned and Managed Conservation District Lands

Thank you for allowing us to review and comment on the subject EIS.

We have no objection to the proposed marijuana eradication program so long as the environmental mitigatory measures identified in the May 1985 Draft EIS are adhered to. Monitoring of the programs compliance with these measures should be done by an independent agency.

The proposed use of Glyphosate (roundup), Chevron Weed Oil, and a diesel oil-water emulsion to control marijuana should not adversely affect public health. The proposed application methods have properly addressed the concerns for affecting non-target plants and wildlife.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

MELVIN K. KOIZUMI

cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell
DLNR, Kauai

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Mr. Melvin K. Koizumi
Deputy Director for Environmental Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 17, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

A monitoring program will be established before chemical eradication operations are commenced. We would appreciate your assistance in developing this program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for: Libert K. Landgraf,
Administrator

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

REF. NO.: CPO-1104-85

JUL 3 1985

Ms. Letitia N. Uyehara
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

We have reviewed the environmental impact statement (EIS) for marijuana eradication on state conservation lands on Kauai and have a number of comments to offer.

Aquatic Resources

We fully support the use of the chemicals (glyphosate, weed oil, diesel oil) and other methods of application proposed to carry out the objectives of this project.

We believe that the application of the proposed chemical sprays as described will have minimal, if any, direct impact on aquatic resource concerns within the state-owned and managed conservation district lands. This opinion is based on our personal experience with the use of glyphosates, in particular, within and around state-managed freshwater public fishing areas, and also aquaculture ponds for weed control purposes. It has proven effective yet safe for aquatic organisms.

Archaeology

We received a reply from Beto Analytic, Inc., regarding the potential effects of herbicides on the accuracy of radiocarbon dating. Their findings indicate that the normal use of herbicides, in reasonable amounts, should not interfere with radiocarbon dating of charcoal or shell samples.

Water Resources

The final EIS should indicate the circumstances under which each herbicide will be used as well as a comparison of herbicide effectiveness. If Diesel Oil No. 2 will accomplish the objective, why consider using the more toxic, more persistent and more expensive Diesel Oil No. 1 and Chevron Weed Oil?

Persistence of Weed Oil, diesel oil emulsions and glyphosate in soil, and in moving and still waters should be more fully discussed. There is no indication, in terms of hours, days, or weeks, of how long it takes soil microbes to break down the residual oil and glyphosate.

We note the statement in Table V-4, Chemical Methods, Item 6, indicating that chemical residues in soil and ground and surface water are to be monitored to identify patterns of persistence and mobility at sensitive sites. We concur with this measure, but maintain that the additional information on persistence, if available, should be provided in the EIS.

Some discussion of residual oil breakdown on dying and dead plants should also be provided. Will the oil film remaining on the plant leaves be readily degraded by microbes or is it persistent enough to wash off in the first rain that follows spraying and thereby enter nearby streams?

A "worst case oil or chemical spill" is mentioned several times indicating likely impacts. Table V-4, Item 11, indicates that a supervisor will be equipped and trained to take "remedial action" in the event of equipment malfunction or spills of chemicals. The Herbicide Information Bulletins (Appendix B) indicate precautions to be utilized in case of a spill.

The "remedial action" to be used should be clearly defined. Procedure and methods to contain a spill and clean up should be given in detail. An emergency plan should also be provided to deal with unexpected herbicide drift or accidental spraying of surface waters.

Very truly yours,

SUSUMU ONO, Chairperson
Board of Land and Natural Resources

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received DLNR's letter of July 3, 1985 commenting on the subject Draft Environmental Impact Statement. Following are our responses to the comments:

Archaeology

the information on the effect of herbicides on the accuracy of carbon dating will be incorporated into the Revised EIS.

Water Resources

Although Weed Oil is two to three times more effective that diesel fuel in killing target vegetation because of its much higher aromatic content, Diesel Oil #2 is preferred for use over Diesel #1, which in turn would be preferred over Weed Oil, for the reasons cited in your letter.

We have not been able to find a spcific reference to the actual degradation rate of either glyphosate or oil products in soils. References on glyphosate refer to the breakdown in soils as "immediate" or "rapid" without giving a specific time in hours or days. For example, the May 1985 Draft EIS prepared by the U.S. Drug Enforcement Administration states that:

> Immediately after application, glyphosate is rendered biologically inactive by being rapidly bound to soil clay particles and organic matter. Soils with high levels of kaolinite, illite, and bentonite clays have the highest adsorption rates. Glyphosate displaced from these binding sites is rapidly degraded by soil microrganisms. (p. 4-9).

References on soil microbiology also use words like "rapid" or "very quickly" when describing the action of microbial action on hydrocarbons. The planned monitoring program should provide more definitive answers to these questions.

Oils are frequently used along with other herbicides to promote adherence of the herbicide to plants. Plants wilt and die within hours of spraying with the oil-only mixtures. Even with heavy rain following spraying, it is unlikely that there will be sufficient residues to wash off and flow into a stream if the recommended procedures are followed and spraying maintained at an adequate distance from open waterways. Spraying will also be done only under favorable weather conditions, when heavy rains are not forecast.

Procedures for handling accidental spills at the time of mixing and loading of materials and equipment will be described in the Revised EIS. Given the remoteness of the areas where spraying is expected to take place, remedial actions to remedy spills and provide clean-up for accidents that may occur during field operations will necessarily be limited to materials available at the time.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for: Libert K. Landgraf,
Administrator

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 • TELEX: 7430250 HIDPED

GEORGE R. ARIYOSHI, GOVERNOR
KENT M. KEITH, DIRECTOR
MURRAY E. TOWILL, DEPUTY DIRECTOR
LINDA KAPUNIAI ROSEHILL, DEPUTY DIRECTOR

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ENERGY DIVISION
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LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION

OFFICES:
DIRECTOR'S OFFICE
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-1877

June 19, 1985

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: DEIS for the Eradication of Marijuana on State-Owned and Managed Conservation District Lands on Kauai

We have reviewed the subject draft environmental impact statement (DEIS) and have the following comments.

Given the general nature of the eradication program, it is difficult to determine exactly where the marijuana is grown or will be sprayed. The use of sprays to eradicate marijuana near streams or rare and endangered species may result in detrimental effects on these resources and lead to violations of the Coastal Zone Management law, Chapter 205A, Hawaii Revised Statutes. We recommend that this be further elaborated on, to include recommended mitigating measures, in the final EIS.

Thank you for the opportunity to review and comment on this document.

Very truly yours,

Kent M. Keith

cc: Mr. Libert K. Landgraf, Administrator
Division of Forestry & Wildlife, DLNR
Ms. Jacqueline Parnell, Consultant
KRP Information Services

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Kent Keith
Director
Department of Planning and Economic Development
P.O. Box 2359
Honolulu, HI 96804

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i

We have received your letter of June 19, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

The Deaprtment of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program. The review process will be described in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

fr. Libert K. Landgraf,
Administrator

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING

FRANKLIN Y. K. SUNN
DIRECTOR

RICHARD K. PAGLINAWAN
DEPUTY DIRECTOR

ALFRED K. SUGA
DEPUTY DIRECTOR

May 30, 1985

MEMORANDUM:

TO: The Honorable Letitia N. Uyehara, Director
Office of Environmental Quality Control

FROM: Franklin Y. K. Sunn, Director

SUBJECT: Environmental Impact Statement - Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai

The Department has reviewed subject EIS and has no comments to offer relative to the proposed action at this time.

Thank you for allowing us to comment on this matter.

Franklin Y. K. Sunn
Director

Attachment

cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

STP 8.10670

June 17, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Eradication of Marijuana on
State-Owned and Managed
Conservation District Lands
Island of Kauai

We do not anticipate any significant impacts from the eradication of marijuana on state lands upon our transportation system.

Very truly yours,

Wayne J. Yamasaki
Director of Transportation

GEORGE R. ARIYOSHI
GOVERNOR

LETITIA N. UYEHARA
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

June 14, 1985

Mr. Libert K. Landgraf, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1150 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Landgraf:

Subject: Eradication of Marijuana on State-Owned and Managed Conservation District Lands Draft EIS

The proposed eradication of marijuana on conservation lands involves the spraying of pesticides in watersheds and some of the most sensitive environmental areas on Kauai. Although we are not opposed to the intent of this project, we believe that the application of pesticides must be done with a great deal of caution. Our primary concern is that safeguards be provided to insure that law enforcement officials are cognizant of environmental considerations in addition to their enforcement functions.

We assume that the marijuana plants, once sprayed with pesticides, will not be removed since doing so will present a hazard to workers and the removal process will not provide a significant advantage to present manual eradication methods. For this reason, we suggest the use of a pesticide that degrades rapidly and which will not present a long-term hazard to the environment.

Sincerely,

Letitia N. Uyehara
Director

cc: Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
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WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

Thank you for your letter of June 14, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

The Deaprtment of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program. This process will be described in the Revised EIS.

We will also establish a monitoring program to follow spraying activities. If any problems develop, eradication methods will be changed as appropriate.

The intention is to use herbcides that degrade rapidly and to leave the sprayed plants on the ground.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for Libert K. Landgraf,
Administrator

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

June 21, 1985

RE:0297

Ms. Letitia N. Uyehara
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Draft Environmental Impact Statement
Eradication of Marijuana
State Owned and Managed Conservation District Lands
Island of Kauai

The above cited Draft Environmental Impact Statement (DEIS) addresses the potential impacts that are likely to be associated with the proposed eradication of marijuana (Cannabis sp.) grown on conservation district lands on Kauai. The Environmental Center review of the DEIS has been prepared with the assistance of Barry Brennan and John Hylin, Agricultural Biochemistry; Kenneth Kaneshiro, Entomology/Hawaiian Evolutionary Biology; Arthur Kodama, Public Health Service; Marshall Mock, Kauai Community College; James Parrish, Hawaii Cooperation Fishery Research Unit; Frank Scott, Jr., Agricultural and Resource Economics; B.Z. Siegel, Pacific Biomedical Research Center/Pesticide Hazard Assessment Project; Sanford Siegel, Botany; Jacquelin Miller and Noreen Tashima, Environmental Center.

The Proposed Action (p. 2)

The use of oil and water emulsions in cane fields for the eradication of marijuana, as proposed, is feasible since marijuana can be readily distinguished from cane. However, even the most experienced plant scientists have some difficulty distinguishing marijuana from native forest species from the air even when they are surveying from low flying helicopters. There are many forest plants that have general leaf patterns and growth habits which can easily be mistaken for marijuana. Although, the pigmentation and reflectance properties of leaves may enable aerial observers to differentiate one plant species from another, the varied greens of the local forest make it most difficult to distinguish marijuana from plants in mixed forest habitats. As pointed out in the DEA 1984 EIS (p. III-6), marijuana plantations "occupy only a small percentage of the forest acreage" and are often camouflaged so that the "visual impacts of these plots will virtually disappear". Because of the difficulty of recognition from the air, we consider that, among the proposed methods for eradication of marijuana, only backpack-spray application is suitable in most forest areas.

The Proposed Action (p. I-4)

We recognized the need for DLNR and the Kauai county police department to undertake marijuana eradication action as expeditiously as possible. We are concerned, however, with the use of the various proposed methods in sensitive areas. The DEIS states that a person will be designated with the authority to make the necessary "go/no-go" decisions with regard to the eradication based on various conditions including consideration of "open water, vegetation types, the ecological sensitivity of the area, presence of endangered or threatened species, etc." We note further that only manual methods will be used in critical habitat areas and that, prior to chemical eradication measures, "qualified personnel will delineate areas where those endangered or threatened species" or their habitats are likely to occur (p. V-5-7). A specific definition of "critical habitat" should be provided. In general, the procedural safeguards noted in the DEIS (pp. V-6-7) should adequately protect the sensitive areas. However, the time available to assure that critical habitat and species will not be adversely affected, may in some cases be insufficient to permit an informed decision on the part of the person with the designated "go/no-go" responsibility (p. I-4). It would seem advisable to prepare maps as soon as possible identifying, at least in general, the sensitive areas and the eradication methods appropriate for use in those areas. If such maps already exist, or the information is available in other forms, we suggest that adherence to their content be made a part of the procedural requirements for eradication specified in this EIS. On page I-4, the statement is made that Weed Oil will damage or kill all green plant growth and that it should be kept out of water or aquatic life may be killed. This statement further coroborates the need for some pre-evaluation procedures so that appropriate eradication techniques can be instituted in potentially sensitive habitats.

Eradication Methods (p. I-6)

Our reviewers have expressed general concern with the application of each of the herbicides proposed for use, including Weed Oil, by aerial methods for the reasons cited previously, and for the most part recognized in the DEIS. The use of back-pack applicators should reduce the potential for drift for both Weed Oil and Glyphosate. Wipe-on application is preferred as it would be less likely to harm non-target species.

Since diesel oil and Weed Oil are contact herbicides, in contrast to the systemic action of glyphosate, spray drift of the oils to non-target species should have somewhat less impact.

Diesel oil is not now registered for use as a herbicide and there appears to be little specific data on its environmental characteristics in terms of biological toxicity to animals and residence time for concentration in soil and water. The information provided in the DEIS seems to be largely based on characteristics of Chevron Weed Oil. However, the environmental effects of Chevron Weed Oil may be quite different from those of diesel oil. For example, Weed Oil emulsifies in water. Whereas, the diesel oil is insoluble in water. These characteristics alone may produce quite different impacts to non-target species or habitats including soil recovery times. It would seem essential, prior to the use of diesel oil, that these characteristics be evaluated. If published sources of information on the use of diesel oil as an herbicide are available they should be cited in the EIS. If the information is not available, its lack should be acknowledged in the Unresolved Issues Section (Part VII).

Endangered and Threatened Species (p. III-5)

Unfortunately, there have been no systematic studies of many of the potentially endangered or threatened species on Kauai. This is particularly true of the less obvious biota, such as mollusks and insects. It would be most helpful for future eradication efforts if a before and after application study was done on the population structure of samples of mollusk, plant, and insect species to determine whether significant impacts result from the eradication methods employed.

Chemical Eradication Operations (p. V-2)

The DEIS claims that the herbicide products used will be adsorbed by the soils and rapidly broken down by bacterial action so that revegetation is expected to be rapid. It is well to recognize that in any disturbance of the forest ecosystem, which certainly includes the cultivation of marijuana or any other exotic plant, as well as the use of herbicides, the regrowth after harvest or eradication is most likely to be noxious weeds rather than native species. We mention this only to call attention to the need to be most discriminating in eradication treatment so as to avoid any unessential disturbance to the ecosystems.

It is our understanding that many of Hawaii's soils are acidic in nature. The DEIS discusses the bacterial breakdown of the oil products in neutral soils and suggests that since marijuana farmers neutralize their soils with lime that bacterial breakdown will occur in the marijuana sites. It is not clear whether under these conditions, sufficient populations of bacteria would be present to be effective. Is there any evidence for the success of bacterial degradation of the herbicides under these conditions?

Water Resources and Aquatic Systems (p. V-7)

The use of Rodeo in the state of Hawaii is limited to treatment of only one side of a stream at a time. This is to reduce the quantity of dead and dying vegetation which otherwise can lead to oxygen deficiency and result in eutrophication. Roundup may not be used on bodies of water. In general, runoff control of the herbicides to streams appears to be adequately addressed in the DEIS.

Public Health and Occupational Safety (p. V-11)

Under the section on occupational safety considerations for helicopter operations, the need for hearing protection should probably be added to the list of personal protective measures.

The discussion on the possible teratogenic effects of glyphosate (p. V-12) is confusing and appears to be inconsistent. Reference is made to such effects but a few lines further it is stated that the product has not been shown to be teratogenic, i.e., the "reproductive effects have probably been the result of maternal toxicity rather than direct effects on the fetus". While technically it may be important to determine whether a product, by definition, is or is not teratogenic, if adverse reproductive effects result from exposure the end result is the issue of concern. The discussion on this topic should be clarified.

Economic Elements (p. V-13)

The discussion of cost effectiveness of the use of diesel-oil sprays implies that the findings have been quantified. It would be appropriate to include the substantiating explanations or references for this economic analysis. The use of the term "economically desirable" is unclear. This section further states that "impacts on state and county economies should be directly related to the effectiveness of the operation". Yet in the next sentence, the estimation of the economic effect is cited as being "difficult to predict". This statement seems to be in conflict with the earlier statement implying that the program would be cost effective and "economically desirable." What is most likely intended is that the proposed methods would be the least costly means of eradicating marijuana. The "economic elements" section would be strengthen by more quantitative information.

List of Necessary Approvals (p. VI-1)

It should be noted that Weed Oil may be registered by the Department of Agriculture but it is not likely that diesel oil can be used as there are no toxicological data to back up the registration. Hawaii cannot register a product that is not also registered by EPA. It would appear that Weed Oil and glyphosate, though more expensive, are far better candidates in so far as legal questions are concerned. Were other herbicides, besides paraquat and 2,4,-D, considered?

Concluding Remarks

In the interest of public safety, we suggest that a notification procedure be developed, by the appropriate state and county agencies, for warning users of state lands of the hazards of booby traps and aerial spray operations. Such notices should accompany hiking, hunting, or camping permits. After spraying, disclosure of the sprayed areas should receive full news coverage so that the public is made aware of the use of glyphosate and may withhold smoking or buying marijuana for at least 4 days to make sure that the marijuana is not contaminated. The news media coverage may also serve as a deterrant to the sale of non-sprayed crops, since consumers are likely to be more cautious about their purchases.

We appreciate the opportunity to comment on this DEIS and hope you will find our comments useful in the preparation of the final document.

Yours truly,

Doak C. Cox

Doak C. Cox
Director

cc: Jacqueline Parnell, KRP Information Services ✓
Libert Landgraft, DLNR, Div. of Forestry & Wildlife
Victor Tanimoto, DLNR, Div. of Forestry & Wildlife
HH Reviewers

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
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EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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AQUATIC RESOURCES
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CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Ms. Jacquelin Miller
Environmental Center
317 Crawford Hall
University of Hawaii
2550 Campus Rd
Honolulu, HI 96822

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

The Proposed Action

A new procedure will be adopted by the Department of Land and Natural Resources. Rather than waiting until marijuana is discovered and making a decision whether to use chemicals on a case by case basis, the Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff personnel to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

Eradication Methods

There are few published documents on the use of diesel oil for herbicidal purposes. A special study was made by the consultants to the U.S. Drug Enforcement Administration in July, 1984. This is cited in the Draft EIS as an unpublished paper. This paper in turn cites several references, most of them written in relation to accidental application of oils, including diesel oil. One study with specific information on diesel oil use in weed control is the Transmission Facilities Vegetation Management Program, Final Environmental Impact Statement prepared by the Bonneville Power Administration, U.S. Department of Energy, 1983. This will be added to the list of references in the Revised EIS.

It should be noted that a surfactant is added to the diesel oil and water solution to make an emulsion and therefore its characteristics would be similar to Weed Oil.

Endangered and Threatened Species

As noted earlier, the U.S. Fish and Wildlife Service will be consulted prior to spraying. It is expected that they will decide whether special studies are needed.

Chemical Eradication Operations

The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegetation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process. This will be clarified in the Revised EIS.

As noted in the Draft EIS, the rapidity of bacterial degradation is a function of a number of factors, including temperature, moisture, and acidity of the soil. Microbes are present in all soils, it is only that their activity is inhibited in highly acid soils. The addition of lime to the soil would reduce the acidity and therefore increase microbial action.

Water Resources and Aquatic Systems

Roundup would be the herbicide used for marijuana eradication, rather than Rodeo. Data on Rodeo was provided only for information.

Public Health and Occupational Safety

Hearing protection for helicopter operations will be added to the list in the revised EIS.

The section on glyphosate will be rewritten and additional information provided in a new appendix in the Revised EIS.

Economic Elements

The section cited was intended to relate to cost-effectiveness. This will be clarified in the Revised EIS.

Unfortunately, any discussion on the economic effects of marijuana eradication is mostly speculative. There is no reliable quantitative information available. As the U.S. Drug Enforcement Administration's May 1985 Draft EIS on marijuana eradication on non-federal lands points out

> There are too many variables that can influence the supply and demand for marijuana and too little reliable data to predict (with any degree of confidence) the economic effects on marijuana costs of the eradication alternatives considered in detail in this EIS.

List of Necessary Approvals

The question of the legality of the use of diesel oil for eradication of marijuana is being resolved jointly with the Hawaii Department fo Agriculture through an application for an experimental use permit in accordance with Section 5 of the Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA).

A number of herbicides were considered for use in the eradication program, but only glyphosate, Weed Oil, and diesel oil were selected for evaluation in the Draft EIS.

Concluding Remarks

The suggestion of a notification procedure for public safety is well taken, and the specific examples you mentioned will be considered in the field operations/monitoring program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for: Libert K. Landgraf,
Administrator

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

13 June 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Rm. 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Draft Environmental Impact Statement for Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai, Division of Forestry and Wildlife, Department of Land and Natural Resources, May 1985

Having reviewed the subject DEIS and given the small scale and tight controls and constraints to be implemented in the eradication, we have no comment. We trust that all due caution will be exercised as expressed in the document.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi

Edwin T. Murabayashi
WRRC EIS Coordinator

ETM:jmn

cc: L.K. Landgraf
J. Parnell ✓

The Senate
The Thirteenth Legislature
of the
State of Hawaii

STATE CAPITOL
HONOLULU, HAWAII 96813

June 20, 1985

Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Hale Kauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara,

Regarding the Environmental Inpact Statement which you sent for my review and comments. Thank you for considering me, but at this time I would like to return it and acknowledge "no comment"

Sincerely,

Bert Kobayashi per [illegible]

Bertrand Kobayashi
State Senator

cc: Libert K. Landgraf
✓Jacqueline Parnell

TONY T. KUNIMURA
MAYOR

JOSHUA HEW
ADMINISTRATIVE ASST

OFFICE OF THE MAYOR
4396 RICE STREET
LIHUE, KAUAI, HAWAII 96766

May 30, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Ms. Jacqueline Parnel, Consultant
KRP Information Services
P. O. Box 27506
Honolulu, Hawaii 96727

Mr. Libert K. Landgraf, Administrator
Division of Forestry & Wildlife
Dept. of Land & Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

RE: Draft of Environmental Impact Statement on Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai

Thank you for the opportunity to comment on the EIS draft on the Eradication of Marijuana on State-Owned and Managed Conservation District Lands on the Island of Kauai.

The EIS draft reflects a very comprehensive and thorough analysis of the issue. In addition, the EIS draft appears to have addressed every possible area of concern that the marijuana eradication program may affect. After carefully reviewing this draft, coupled with my personal observation of this operation in the field from the initial preparation stage to the final stage, I would like to express my wholehearted and unreserved endorsement of the proposed marijuana eradication program.

During the entire operation, every effort was made to protect the environment and to prevent contamination of unaffected areas. These measures, when viewed in

conjunction with the fact that marijuana plants are destroyed within a few hours after contact and that personnel are not subjected to hazardous or dangerous situations which often arise during manual marijuana eradication methods, lead me to conclude that this process is the most effective, safe and efficient manner for the State and related law enforcement personnel to eliminate this illegal activity.

With the widespread cultivation of marijuana in the State of Hawaii, particularly in the State conservation district lands which are normally adjacent to lands accessible to the public, marijuana growers pose a definite threat and danger to innocent hunters, hikers, residents and other individuals who enjoy the recreational use of these State lands. Moreover, as the EIS draft states, marijuana growers may already have endangered the environment by their usage of herbicides and contaminants for their illegal crops.

As I am extremely concerned about the welfare, health and safety of our people and the environment in which we live, I am compelled to offer my endorsement of the marijuana eradication program which will rid the environment of this vegetation and improve the public's safety and welfare.

Very truly yours,

TONY T. KUNIMURA
Mayor, County of Kauai

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Honorable Tony T. Kunimura
Mayor, County of Kaua'i
Office of the Mayor
4396 Rice Street
Lihue, Hawaii 96766

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

Thank you for your letter of May 30, 1985 commenting on the subject Draft Environmental Impact Statement. Your comments on the Draft EIS and your continued support of this project are deeply appreciated. Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

COUNTY COUNCIL

RONALD D. KOUCHI, Chairman
JESSE FUKUSHIMA, Vice-Chairman
NORMAN AKITA
BILL KAIPO ASING
JOHN F. BARRETTO, JR.
MAXINE CORREA
JO ANN A. YUKIMURA

Ph. (808) 245-4771

4396 RICE STREET
LIHUE, KAUAI, HI 96766

OFFICE OF THE COUNTY CLERK

JEROME Y. K. HEW, County Clerk
C. BUNJI SHIMOMURA, Deputy Clerk

Ph. (808) 245-4785

June 21, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality
Control
550 Halekauwila St., Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

RE: EIS: Eradication of Marijuana on State-Owned and Managed Conservation District Lands

Thank you for the opportunity to comment on the above-mentioned Draft EIS dated May 1985.

I am strenuously opposed to the use of the chemicals glyphosate (manufactured under the trade names "Roundup" and "Rodeo") and Weed Oil because of their potential harmful effects and because of the uncertainties in the application process.

There are many unknowns about the two chemical substances proposed to be used. Recent history is replete with horror stories of what has happened when new products are used before their impacts are thoroughly determined. In addition, without long term study which investigates cumulative effects, unforeseen impacts can unfold as time goes by, possibly resulting in human and ecological tragedies. The following is excerpted from the EIS to emphasize this concern:

> "Glyphosate is a relatively new herbicide. The environmental fate and potential ecological effects of the use of glyphosate in forests have yet to be studied extensively. The limited data currently available are almost entirely from greenhouse and laboratory studies of agricultural systems and laboratory animals and have been generated largely by the manufacturer." (Page 1-3)

One of the greatest dangers, suggested on page V-12 of the Draft EIS, is the possibility of deleterious impacts on babies and infants when mothers are exposed to the spray during pregnancy.

> "A person receiving a direct hit from the aerial application of glyphosate should not experience any observable human health effects. The main risk would be to pregnant women because of the possible teratogenic effects (developmental malformation of fetus).
>
> The exposure levels associated with an accident involving glyphosate would be approximately 34 times greater than the human reproductive system's estimated safe dose level. Such a situation is of serious concern because of the increased risk that this level poses for a fetus. While glyphosate has not been shown to be teratogenic, other reproductive effects have been observed in laboratory animal studies. These reproductive effects have probably been the result of maternal toxicity rather than direct effects on the fetus." (Page V-12)

Government should not expose society to such risks.

Another concern is the impact these chemicals would have on our water resources, flora, endangered species, or useful species such as bees. Part 5 of the EIS which identifies anticipated impacts does not provide the kind of hard, scientific data to alleviate the concerns raised by use of these chemicals.

Aside from the inherent dangers of the chemicals themselves, a key problem area is in the application process. I am not assured that the controls and checks are sufficient to insure that the application will be as proposed, and with all the precautions as stated. This lack of monitoring during the application process becomes even more serious when the more dangerous chemicals are used.

Under this proposal, blanket approval from the BLNR is being requested whereby eradication actions would be approved on a case-by-case basis by a person designated by the BLNR (page 1-4). Part VII "Unresolved Issues" of the EIS points out that the decision process to be followed by the DLNR in determining what chemicals to use on particular parcels will be worked out by the Department. In order to fully understand the impacts of this proposal, the exact process needs to be spelled out in more detail.

As you can see, I firmly believe that more definite assurances have to be given before we embark on a chemical-use program that could have potentially detrimental effects upon the health and safety of our people and upon our natural resources.

Thank you for this opportunity to comment.

Sincerely,

JOANN A. YUKIMURA
Councilmember

/jh

cc: Mr. Libert K. Landgraf, Administrator
Division of Forestry & Wildlife
Dept. of Land & Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Ms. Jacqueline Parnell, Consultant
KRP Information Services
P. O. Box 27506
Honolulu, HI 96827

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Honorable Joann A. Yukimura
Councilmember
Kaua'i County Council
4396 Rice Street
Lihue, Hawaii 96766

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

Your concerns about the use of chemicals to eradicate marijuana are appreciated. The procedures for deciding on their use have been revised by the Department. The Deaprtment of Land and Natural Resources will confer with the Office on Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program. This process will be described in the Revised EIS.

Training for enforcement officers will also be provided, to ensure that all safety measures are taken. A monitoring program will also be designed and implemented. This will be described in the Revised EIS.

As noted in the Draft EIS, no indiscriminate use of chemicals in the eradication of marijuana is planned. The procedures outlined in the EIS will be followed.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Libert K. Landgraf
Administrator

May 28, 1985

Miss Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

RE: ENVIRONMENTAL IMPACT STATEMENT
ERADICATION OF MARIJUANA ON
STATE-OWNED AND MANAGED
CONSERVATION DISTRICT LANDS

Thank you for the opportunity to review and comment on the subject EIS.

We are returning the EIS which accompanied your letter. We have no comments to offer at this time.

Very truly yours,

ORIGINAL SIGNED
by LAWRENCE KITAMURA

LAWRENCE KITAMURA
County Engineer

KU/ls

Attachment

cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell

DEPARTMENT OF WATER

COUNTY OF KAUAI
P. O. BOX 1706
LIHUE, HAWAII 96766-5706

June 10, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Re: Eradication of Marijuana on State-Owned and Managed Conservation District Lands

We have reviewed the subject Environmental Impact Statement and have no comments to make.

Thank you for the opportunity to comment.

Raymond H. Sato

Raymond H. Sato
Manager and Chief Engineer

WH:rm
Enclosure

cc: Mr. Libert K. Landgraf, DLNR
Ms. Jacqueline Parnell, KPP Information Services

POLICE DEPARTMENT
COUNTY OF HAWAII
349 KAPIOLANI STREET
HILO, HAWAII 96720

GUY A. PAUL
CHIEF OF POLICE

WAYNE G. CARVALHO
DEPUTY CHIEF

OUR REFERENCE

YOUR REFERENCE

June 19, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila St., Room 301
Honolulu, HI 96813

RE: ERADICATION OF MARIJUANA ON STATE-OWNED AND MANAGED CONSERVATION DISTRICT LANDS.

Thank you for the opportunity of reviewing the Environmental Impact Statement, titled Eradication of Marijuana on State-owned and Managed Conservation District Lands.

The following comments are concerns of this agency regarding the above subject.

Page I-3, the third paragraph states that..."Because Green Harvest Operations are both dangerous and inefficient, enforcement officials have sought alternative methods of eradication." We suggest that the word inefficient be deleted because Green Harvest Operations have been efficient.

Page I-4/I-5, THE PROPOSED ACTION

This section, as interpreted, states that all marijuana eradication missions on state lands, chemical or manual, requires notification of BLNR designate. We request that in manual eradication of marijuana that the notification of the BLNR designate be made after the marijuana is eradicated for the following reasons:

In cases where the marijuana became evidence against a suspect, the timely recovery and control of the contraband becomes a major factor in proving the guilt or innocence of a suspect.

Also, in cases where marijuana is observed in state lands adjacent to suspected marijuana growers properties, immediate extraction of the contraband is necessary to protect the evidentiary nature of the marijuana. If the marijuana is not immediately removed by police, the growers themselves would harvest it, encouraging them to replant the illegal crop in the same location.

Your work on this document is appreciated.

GUY A. PAUL
CHIEF OF POLICE

RP/fk

cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Guy A. Paul
Chief of Police
Hawaii Police Department
349 Kapiolani Street
Hilo, HI 96720

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 19, 1985 commenting on the subject Draft Environmental Impact Statement. Following are our responses to your comments:

The description of the Green Harvest operations will be clarified as you suggest.

We appreciate your observation on the wording of the Board of Land and Natural Resources (BLNR) notification procedure. This was intended to apply only to chemical eradication activities. This will pose no problem because this section is being rewritten to reflect a change in the procedures. The Deaprtment of Land and Natural Resources will confer with the Office on Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program. A case by case "go/no go" decision by the BLNR would only be required under special or unusual circumstances, and only for chemical eradication methods.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

Libert K. Landgraf,
Administrator

POLICE DEPARTMENT
COUNTY OF MAUI
P. O. BOX 1029
WAILUKU, HAWAII 96793
AREA CODE (808) 244-7811

JOSEPH CRAVALHO
CHIEF OF POLICE

HOWARD H. TAGOMORI
DEPUTY CHIEF OF POLICE

OUR REFERENCE
ST:yyc
YOUR REFERENCE

June 18, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

We have reviewed the environmental impact statement draft of the Eradication of Marijuana on State-Owned and Managed Conservation Lands and have no comments to make.

We would like to thank the Department of Land and Natural Resources and Ms. Jacqueline Parnell for considering our comments and allowing us to review the current document.

Very truly yours,

JOSEPH CRAVALHO
Chief of Police

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 AREA CODE (808) 945-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE DI-GF

June 6, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

We have completed our review of the draft EIS regarding the Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i and have concluded that we do not have any definitive objections to the project at this time.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

May 30, 1985

Aloha Letitia N Uyehara,

I am writing concerning the Department of Land & Natural Resources proposal to spray herbicides on marijuana patches in its Conservation District on Kauai.

I highly object to the use of any poison, be it chemical or oil sprayed on our conservation lands. These lands are full of beautiful birds, owls and many endangered species. They will be poisoned along with the marijuana. Our island is so wet, the rains would wash the poison everywhere, including our precious streams and rivers, oceans. The fish will be contaminated. And down to the People. You say it is safe, yet "may" cause fetuses to be deformed. People go hiking for pleasure and beauty. The Conservation lands are some of the most beautiful places in the world, must we brown it out, poison it, ourselves, deform our children, kill our wildlife and vegetation. For a plant? I think that's unreasonable. How many tourists would want to "risk" a visit.

It seems someone wants us to be poisoned, first Malathion for fruit flies and now this.

What is to stop growers from harvesting the sprayed marijuana and selling it?

The Department of Land & Natural Resources is supposed to protect the environment, not poison it, the wildlife, plants and people. This is not an acceptable solution to the marijuana problem.

Sincerely, Caren Diamond
PO 536
Hanalei, Hi. 96714

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Caren Diamond
P.O. Box 536
Hanalei, HI 96714

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of May 30, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

Libert K. Landgraf,
Administrator

Environmental Law Center of the Pacific

250 South Hotel Street 2nd floor Auditorium Honolulu Hawaii 96813

June 22, 1985

KRP Information Services
Attention: Jacqueline Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

Re: Eradication of Marijuana - EIS

Dear Ms. Parnell:

Under section 1:42(M) EQC Regulations, the proposing agency is duty bound to reproduce the comments in full, thereby informing the public of all of the concerns of those who are commenting on the project. Notwithstanding, NONE of the attachments to ELC's comments dated 3/8/85; 3/15/85, and 3/20/85 were attached to the draft EIS.

Additionally, the response that was given was based on a faulty premise. In fact, legislation has been introduced during recent legislative sessions regarding legalization of marijuana and its taxation. Therefore your statement there has not been "any indication" from the legislature regarding marijuana's legalization is without merit. Furthermore, our neighbor state Alaska has legalized marijuana for personal use.

Based on the foregoing, ELC asks that you rethink your position and furthermore publish ELC's full comments in a supplimental draft EIS.

Regards,

Jack Schweigert

808 533 7491

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

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STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Jack Schweigert
Environmental Law Center
of the Pacific
250 S. Hotel Street, #200
Honolulu, HI 96813

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 22, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

Our oversight in not publishing the attachments to your letters of March 8, March 15, and March 20, 1985 will be corrected in the Revised EIS.

Your observation that the legislature has given support to the legalization of marijuana is a matter of interpretation. Bills for legalization have indeed been introduced; however, none have been reported out of committee. This will be clarified in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for: Libert K. Landgraf,
Administrator

HSPA

HAWAIIAN SUGAR PLANTERS' ASSOCIATION, 99-193 AIEA HEIGHTS DRIVE, AIEA, HAWAII
MAILING ADDRESS: P.O. BOX 1057, AIEA, HAWAII 96701-1057, TELEPHONE: (808) 487-5561

May 30, 1985

Mrs. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Mrs. Uyehara:

We acknowledge the receipt of the draft environmental impact statement on the eradication of marijuana on state-owned and managed conservation district lands on the island of Kauai. Our comments follow.

The proposed method of spraying by helicopter is referred to as broadcast spraying. I suggest changing the terminology to aerial spot spraying with a drop boom. This will more accurately describe the spray operation. It is my experience that weeds need to be thoroughly drenched with diesel oil to get effective control. Broadcast applications would be ineffective and would be of greater environmental hazard. References to the microfoil boom and a TVB boom should be eliminated. The boom which should be used is pictured opposite page I-7. This is a drop boom which can be used either for broadcast spraying or spot spraying. The recommended procedure is spot spraying.

You should delete references to the Rodeo formulation of glyphosate, which is used only for aquatic weeds. This is a 4-lb per gallon a.e. formulation of glyphosate without surfactant.

You should also include the label for Roundup and Chevron weed oil. The material safety data sheet and the technical bulletin are proper to include; however, the label is the legal document regarding application and use.

Sincerely,

Robert V. Osgood

Robert V. Osgood
Agronomist

RVO:lyk

cc: Mr. Libert K. Landgraf, DLNR
Ms. Jacqueline Parnell, KRD Information Services
D. J Heinz
H. W. Hilton

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Robert V. Osgood
Agronomist
Hawaiian Sugar Planters' Association
P.O. Box 1057
Aiea, HI 96701

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of May 30, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

You comments and corrections on the description of the helicopter spraying operations are appreciated. Corrections will be made in the Revised EIS.

Rodeo was only mentioned for purposes of identification. References to it will be reviewed and revised or deleted as necessary to make it clear that only Roundup would be used.

We are attempting to obtain labels for Roundup and Chevron Weed Oil. If they are available they will be included in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for Libert K. Landgraf,
Administrator

HAWAII'S THOUSAND FRIENDS

Blaisdell on the Mall Suite 402 • 1154 Fort Street • Honolulu, Hawaii 96813 • (808) 538-1296

June 21, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
530 Halekauwila Street, Room #301
Honolulu, Hawaii 96813

RE: Draft Environmental Impact Analysis for the Eradication of Marijuana on State-owned and Managed Conservation District Lands.

Dear Ms. Uyehara:

We have reviewed the Draft EIS and have the following comments to offer for your consideration.

The objective, as described in the Draft Environmental Impact Statement, is to preserve the character and resources of the State-owned and managed conservation District lands and to stop illegal activities. While Hawaii's Thousand Friends agrees that the problem of illegal harvest of marijuana must be addressed, we share the concerns that public officials and expert individuals have voiced in the following areas:

Flora/Fauna: there is inadequate discussion of the cummulative impacts of the proposed action on vegetation, wildlife and aquatic life, endangered and threatended forest bird species. A complete discussion on the recovery rates of native vegetation in the areas sprayed with diesel oil and its persistence in the environment should also be incorporated in your Final EIS.

Water/Air Quality: the effects of the use of proposed chemicals on surface, ground water and potable water supplies are inadequately defined. The area in which the proposed action is to take place is nearly pristine and located in the watershed recharge area. Your final EIS should include more comprehensive studies to determine the extent of impact on the area, a definition of the watershed boundaries and the effects on water systems which receive waters traversing state conservation land boundaries.

Methodology: in the description of the proposed activity, it states that chemicals will be used; however, the specific chemicals to be used are not referenced. Which chemicals are to be used and under what circumstances? Are the proposed chemicals registered and approved for use by the U.S. Environmental Protection Agency?

Cultural Sites: the impact on cultural sites has not been thoroughly addressed and the identification of archaeologically sensitive areas incomplete. Will the use of proposed chemicals affect the ability to carbon date significant sites? Will the survey of the sites be completed prior to commencing the eradication process if granted?

In conclusion, Hawaii's Thousand Friends believes that in order to truly assess the implications involved in granting blanket approval for the proposed action we recommend "no further action" be taken on the application in its present form until comprehensive biota evaluations have been completed. Thank you for the opportunity to offer our comments.

Sincerely,

Martha G. Diaz-Colon
Administrative Assistant

mdc

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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WATER AND LAND DEVELOPMENT

July 19, 1985

Ms. Martha G. Diaz-Colon
Administrative Assistant
Hawaii's Thousand Friends
1154 Fort Street Mall # 402
Honolulu, HI 96813

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

Flora/Fauna

The persistence of diesel oil in the environment is discussed in the EIS. Unfortunately there is no empirical data available on the recovery rates of native vegetation after spraying with diesel oil. The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegetation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process. This will be clarified in the Revised EIS.

Water/Air Quality

The Department of Land and Natural Resources will confer with the Office on Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program. This procedure will be described in the Revised EIS.

Methodology

As stated in the Draft EIS, the chemicals to be used are diesel oil, Weed Oil, and glyphosate. Weed Oil and glyphosate are registered and approved for use on marijuana by the U.S. Environmental Protection Agency. The Department of Land and Natural Resources is working with the Hawaii Department of Agriculture for approval of diesel oil through an application for an experimental use permit in accordance with Section 5 of the Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA).

Cultural Sites

The safety of the proposed chemicals in respect to carbon dating has been verified by additional information on this subject. It will be included in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for Libert K. Landgraf,

Administrator

Keiki Fun Rides

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(808) 847-7775

5-21-85

Letitia n Uyehara, Reference Herbicide spraying.

I live across the street from the waikiki Homesteads Park (about 200') I have lived here for six years, I am down wind of the park, my Bedroom is facing the park. When they spray Round up in the park, it makes my nose drain & my eyes water at night.

Dont believe that it's not Harmful.

I strongly object to use of Round up or any Herbicide on Kauai.

Sam Hollard

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Sam Hollard
Keiki Fun Rides
273 Lanakila Road
Kapaa, HI 96746

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of May 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

There will be no widespread aerial spraying of marijuana. As the Draft EIS notes, spraying will be done in limited areas under controlled conditions. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

KAUAI GUARDIANS HAWAII
Environmental Education and Research

Letitia N. Uyehara
Office of Environmental Quality
550 Halo St. Rm 301
Honolulu, HI 96813

Dear Ms Uyehara:

June 5,1985

Enclosed is a copy of the letter published in the Environmental Impact Statement and also in the Garden Island Newspaper dated Sunday June 2, 1985.

In addition to the coments in this letter, I would like to add and point out the error of law being made by not addressing the alternative of legalization or regulation of marijuana as required and is made clear in the communications of the Environmental Law Center of the Pacific.

Kauai Guardians Hawaii would like to be on record in support of the Environmental Law Center of the Pacific's position on certain points of law as required by the Hawaii Revised Statutes, and are valid regarding the Marijuana Eradication Plan for the Island of Kauai.

It is quite possible that Kauai Guardians Hawaii will seek injunctive relief from the courts on numerous grounds blocking this dangerous plan that grossly threatens the health of Kauai's population, as well as adversly impacting the environment.

Sincerely,
Robert Mackowski
Robert Mackowski

P.O. Box 1421 Hanalei Kauai Hawaii 96714

KAUAI GUARDIANS HAWAII
Environmental Education and Research

March 9, 1985

Ms Jacqueline Parnell
KBI Information Services
Box 27506
Honolulu, Hi 96827

Dear Ms Parnell:

We have received the environmental assessment/notice of preparation of the environmental impact statement for the eradication of marijuana on State-owned Conservation Lands, Island of Kauai.

Our study reveals a very serious health hazard posed to the workers who would apply the chemical "Roundup," as well as the general public if used as an alternative in place of alternative A of C(1) listed on pages 17 and 18 of the environmental assessment document.

The most disturbing, we find, is what the U.S. Government thought it knew about Paraquat and Roundup which has been recently cast in doubt.

The following is information taken from an excellent research paper published in Science Digest, June, 1983, by Andrew C. Revkin entitled "Paraquat, a Potent Weed Killer is Killing People." We strongly suggest that you obtain a copy of this article.

Please keep in mind that "Roundup" is considered to be just as effective as Paraquat - only more expensive, and was tested for toxicity by a laboratory since closed down because of fraudulent experiments.

The Evvironmental Protection Agency published a report on the research of the health effects of the herbicide. It lists everything from birth defects to cancer causing, and the data deemed "inadequate."

The report:

Teratogenicity (the tendency to cause birth defects): Research in the medical literature is "inadequate."

Mutagenicity (the tendency to cause gene mutations): "The Agency could not come to any conclusion."

Reproductive Effects: "The Agency (found) that the available studies relating to reproductive effects are inadequate."

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NON-PROFIT

oncogenicity (the potential for causing cancer): Tests were inadequate and invalid. Of the four tests reviewed, one performed by Imperial Chemical Industries, Great Britain, in 1972 was found to be deficient. The remaining three were performed by Industrial Bio-Test Laboratories, Northbrook, Illinois. All of these tests on the herbicides "Roundup and Paraquat," were invalidated.

Several government audits opened the lab for investigation and government scientists found fictitious data. A mouse dying and coming back to life (actually replaced by a different mouse.) IBT's scientists and executives had their trial in Federal Court, Chicago. IBT, once the largest laboratory in the U.S., is now closed. This is where all information about Roundup and Paraquat came from!

Chevron markets paraquat. Chevron's name appears in the environmental assessment document and their product "Weed Oil" as consideration for use in the marijuana eradication plan for Kauai.

Chevron's name also appears in a landmark court case in Washington, D.C. The jury awarded $137,000 to the family of an agriculture worker who died from poisioning of paraquat which connected Chevron.

More lawsuits are piling upon Chevron. One is for $25 million by the survivors of another man dead from paraquat poisoning claiming Chevron was aware of the skin exposure hazard and did nothing to warn of it.

Chevron is experiencing a wave of adverse publicity and is deeply involved with the controversy associated with Paraquat and Roundup. (Incidentally, Roundup is manufactured by Monsanto Chemical, who also produces detonators, timers, and explosive pellets for nuclear weapons at the Mound Laboratory in Miamisburg, Ohio.)

This information only represents the tip of the iceburg. We are prepared to submit much more documentation to expose the extreme danger connected with Roundup and Paraquat.

In view of the multi-million dollar lawsuits involving these herbicides, Chevron, the high risks of lawsuits and serious health hazards to users and the public, the eradication of marijuana plan for Kauai does not appear to be "cost effective" or "safe." Nor do we think the plan is a realistic alternative. Indeed, the plan reeks of irreparable harm to the population of Kauau and its environment - the total environment!

It is our conclusion then, rather than run the risk of lawsuits, cancer, genetic damage and mutations, etc., we believe a more realistic, cost effective, safe alternative would be C(1) page 18 of the environmental assessment calling for more detailed study of the legalization/regulation of marijuana, before eliminating

this alternative from consideration - or alternative A (no action) continue current manual eradication program.

The bottom line is: All the research conducted for toxicity on Roundup and Paraquat is invalid, multimillion dollar lawsuits are increasing as a result of these two herbicides and their usage.

We trust the foregoing information will be seriously considered, and the plan to use Roundup, Rodeo, or any other harmful chemicals on Kauai's environment and population is eradicated.

If more information is needed, please feel free to contact me at any time.

Sincerely,

Robert Macknowski

cc: Garden Island
Kauai County Council

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Mr. Robert Macknowski
Kaua'i Guardians Hawaii
P.O. Box 1421
Hanalei, HI 96714

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 5, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

The alternative of legalization or regulation of marijuana has been included in the draft EIS and will be included in the Revised EIS. Your earlier comments were addressed in the Draft EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for Libert K. Landgraf,
Administrator

KEKAHA SUGAR COMPANY, LIMITED

P. O. BOX XX 549
KEKAHA, HAWAII 96752
TELEPHONE: (808) 337-1472

AN Amfac COMPANY

June 12, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Reference: Eradication of Marijuana on State-Owned and Managed Conservation District Lands, Island of Kauai

We have reviewed the draft copy of the Environmental Impact Statement dated May, 1985 and note that the qualification of the applicators is not mentioned in the table of contents or the report itself. In the summary pages 1 to 3, the objectives, proposed action, and the anticipated environmental impact and migratory measures are listed.

We suggest that you include a section on the proper training of the law enforcement officials in the safe handling and application of the herbicides.

Please send us a copy of the final EIS when it is printed. We will retain the draft copy for our records.

Yours very truly,

L. A. FAYE JR.,
President and Manager

SI/ls

cc: Mr. Libert K. Landgraf
Ms. Jacqueline Parnell

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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July 19, 1985

Mr. L.A. Faye, Jr.
President and Manager
Kekaha Sugar Company. Ltd.
P.O. Box 549
Kekaha, Hawaii 96752

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i

We have received your letter of June 12, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

A description of the qualification of the applicators and proposed training programs for law enforcement officers will be included in the Revised EIS.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

for Libert K. Landgraf,
Administrator

THE LIHUE PLANTATION CO., LTD.

AN Amfac COMPANY

P.O. BOX 751
LIHUE, HAWAII 96766

June 19, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila St. Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

Re: Eradication of Marijuana on State-Owned and Managed Conservation Disctrict Lands
Island of Kauai - Environmental Impact Statement (EIS)

We have no comments on the EIS.

If we can be of further help to you, please do not hesitate to call on us.

Very truly yours,

Lefty H. Kawazoe
President and Manager

o

cc: L. K. Landgraf, Admin. - DLNR
J. Parnell, Consultant - KRP Info Svcs.

6 10 85

Dear Ms Letitia,

I am writing in regards to the proposed program of spraying marijuana growing on State lands. I strongly am opposed to this type of action. Not only is it a waste of our, the taxpayers, money, but it also poses a severe health threat to all of us living on Kauai. There is no need to pollute our environment. Marijuana may be illegal, but it is scientifically proven to be less of a health threat than either alcohol or cigarettes. Both alcohol and cigarettes are known killers, whereas marijuana is not. Use our ~~tax~~ hard-earned money on promoting drug programs in the schools, instead of wasting it on a deadly spraying program. ~~We~~ We need to attack the source of the problem, not the symptom. And the source is better education for our children.

Sincerely,
Kathryn Lowery

Kathryn Lowery
PO Box 340
Waimea, HI 96796

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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DEPUTY TO THE CHAIRMAN

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DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Kathryn Lowery
P. O. Box 340
Waimea, HI 96796

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 10, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

G. Libert K. Landgraf,
Administrator

Terri Oliver
4707 Pelehu Rd.
Kapaa, HI
96746

Letitia N. Uyehara
Office of Environmental Quality
550 Halekauwila St., Rm 301
Hon., HI
96813

Ms Uyehara:

This letter is in response to the recent EIS that was written for the island of Kaua'i. I wonder if the people who wrote this statement have ever been to the island? Anyone who looks at our island must see that we have a unique and beautiful place to live. It is the desire of myself and many other citizens of this island to keep our beauty and quality of life here on Kaua'i. We pride ourselves in our lush tropical forrests, clean flowing rivers, and our many native birds. The recent eagerness of our county and state to spray our island with pesticides and now herbicides is frightening. In 1985 we would hope that we learn from the pollution that has been caused in the mainland by pollutants carelessly used in that place.

Not long ago we were encouraged to spray malathion all over us to eradicate the fruit fly, now we are told to spray the illegal crop of marijuana. Both of these procedures are questionable because they cannot guarantee the total eradication of either the fruit fly or the marijuana.

Your own EIS states that there is a chance of the poison going to the water shed. Isn't that enough? The slightest possibility is more than enough to convince us that you are not sure of the effects of such reckless spraying. It would be nice if everyone was conscientious and honest about how the spraying would be carried out but we know that is not the case. As it is now with Green Harvest, certain plots are"missed" by the harvesters. With spraying it will be no different and the very people who have large scale growing will be even more protective of their lucrative crop. Meanwhile our bird life will be deformed by the residues of glyphosate. You cannot guarantee the birds will not be effected by this spray because even the monsanto co. says there have been deformities in animal fetuses in the laboratory. How much more proof do you need to know that this idea is unsafe, unhealthy, and unnessecary. Does all our bird life have to die before we realize what we are doing?

For myself I do a lot of hiking in the mountains and have yet to be approached by any growers and I feel very strongly that those who are may have been looking for what they found, trouble.

Our forrests are full of native vegetation, maile, lehua, mokihana, and various ferns. Do you realize that a one hundred year old tree can be killed in 48 hours by roundup? That is from a sabudong worker who saw it happen to a tree too close to a canefield. We must tolerate spraying by the cane co. to preserve jobs but the spraying of our forrests will not do what is expected.

The EIS that was put out by your co. says there is a chance of the herbicide getting to our water even the slightest chance is too much. Must we repeat the problems of Mililani to be sure that these sprays can and do enter our water. Will my daughters give birth to deformed children in the year 2000 to find out that we were wrong about these chemicals? Will we look at our mountains and see brown instead of lush green? Do we have to destroy our beautiful island before we say we were wrong? Why are we so insistant on polluting everyclean place in our beautiful country?

In closing I want to say LEAVE OUR FORRESTS ALONE, they are the one place we can retreat to when we seek solitude and nature untouched by man. There are still people who care and will not sit and watch you destroy our lives. We should continue to deal with marijuana the way we have been. Maybe a few more arrests would curb the large scale growing, but as long as people want to buy marijuana there will be people growing the illegal crop. We think you are wasting our environment and a lot of money. Prohibitiondidn't stop the moonshiners and it won't cure our marijuana problem by spraying our forrests and killing our healthy environment.

Respectfully and with much concern for our island and our children,

Terri A. Oliver
4707 Pelehu Rd.
Kapaa, Hi 96746
822-0357

Cathy Sanchez
Kapaa, Kauai

[illegible]
Kapaa, Kauai
5/28/85
5/29/85

Mike Omella
5/30/85

Mr + Mrs Anthony A. Borden
PO Box 793 Kapaa 5-31-85

Carol Kincaid
Po Box 537
Kapaa Kauai
96746

Margaret J. Rigor
[illegible] Kuhio Rd
Kapaa Hi 96746
822-9567

[illegible]
[illegible]

Mr. + Mrs Mark Nicholas
Po Box 2170 6/1/85
Puhi, HI. 96766

Nell Perez
POBox 30 Kapaa Hi 96746

Harry Ago
3184 Hinoka St.
Lihue Kauai 96766

George Abney
3352A Lihue Kauai
Hawaii 96766

Annette McMillon
Jode Ramirez
Jimmy Roldan

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Terri Oliver and Others
4707 Pelehu Road
Kapaa, HI 96746

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i

We have received your letter commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

June 21, 1985
Summer Solstice
In Response to EIS
which i read cover to cover
Incomplete, vague, and
extremely thoughtless to
environmental concerns
this is proposed without
the research and
consideration required
to protect life, now
and in the future!!
the water, the birds,
insects, the whole area
is Sacred!! STOP this Plan! for ourselves our children the earth

Project Assistant
Janelle Ryan
P.O. Box 423
Hanalei

attention
Letitia N. Uyehara:
Office of Environmental
Quality
550 Halekauwila St.
Room 301
Honolulu 96813
~ Earth ~

In Holy Hawaii many forms of Hula dancing are seen. This group is performing a hula from ancient Hawaii
Photo: Love Guthrie

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JUN 24 1985

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Janelle Ryan
P.O. Box 423
Hanalei, HI 96714

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i

We have received your postcard of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your postcard will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

RECEIVED

'85 JUL -2 P2:07

FORESTRY & WILDLIFE
STATE OF HAWAII

Dear MR. Landgraft; IN RE. TO EIS STUDY

Im writing to you to voice my support for the spraying of Leased Emulsion on pakalolo on state lands. Being a supervisor for Lihue plantation I see first hand which methods of control are efficient and those that are not. The spraying method by far superior and in my opinion relatively safe to the Environment. Ive seen its use + Effect when sprayed in our Cane fields and Im very pleased with this method. The spraying method uses 1/4 the manpower and is approx 10-15 X as effective when Compared to hand pulling a (green harvest). From past Experience the green harvest method may get 5-10% of the plants out of my fields (on the large patches) due to manpower + Time limits whereas the spraying method is ~ 100% which speaks for itself. I hope this testemony can be used to get a permit to spray state lands - because its the only effective method -

Thank you
Michael Saunter
Lihue Plantation Co.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Mr. Michael Saunter
Lihue Plantation
P.O. Box 751
Lihue, HI 96766

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

Thank you for your letter of July 2, 1985 commenting on the subject Draft Environmental Impact Statement. We appreciate your support for our proposed program.

Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

— James C. Saite
Box 808 Hanalei, Hi. 96714

TO. LETITIA N. UYEHARA/
June 8, 85

Respected Person/

I'm writing in regard to the proposal spraying of Round-up on our State Lands/

I'm against the spraying of this insidious poison/

It is a known and proven mutant agent/

Rather than poisoning our land, water, wildlife and people, let us utilize our natural skills and apparent economics in employing safe, effective, environmental [illegible] in vindicating [illegible]

2. State Land's/

Simply, it is more intelligent to support our local work forces, paying them a fair wage for the skill required, rather than feed the bulging pockets of mainland corporations whom use illicit and illegal tactics in falsly trying to verify the supposed safty of their lousy poison/ Lets face it, the labrotory that tested and gave Round-up a marginal safty OK was Federally busted and closed down permanently because they were found to be bought off liars/ Subsequent test and real life experimentation [illegible]

had fully proven that Round-up is a horrible danger/

How about asking the parents of Eureka California who incurred deformed children as a result of ingesting minimal amounts of this poison/ they of course have multi-million dollar suits pending against the government/ yet the same will realize that money can never replace a whole healthy babe in their arms/ Nor can it assure that chronic genetic damage has not already been done to our species by greedy lazy specimens of mankind/ truly is man kind/ or is he/she more like a

dumb evil entity out to lunch on his brothers/

How we the people of Hawaii respond to this issue of poisonous adversary will be one more small proof in answering a question the living God Christ has for so long asked of us/ are we a god loving people willing to extend our given life and energy in a sane peaceful manner to nurture, cleanse and care for the creation made accessable to us/ or are we badly extincted dead meat celestial being will require a full answer real soon. Just like snow, Jim starting

NO ROUNDUP Here Please THANK U

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

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BOARD OF LAND & NATURAL RESOURCES

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FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Sunee Seae
P.O. Box 808
Hanalei, HI 96714

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 8, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

Libert K. Landgraf,
Administrator

KAUAI MEDICAL GROUP, INC.

Accredited by the Accreditation Association for Ambulatory Health Care

3420-B KUHIO HIGHWAY • LIHUE HAWAII 96766

PRESIDENT
MEDICAL DIRECTOR
ANESTHESIOLOGY
DERMATOLOGY
EMERGENCY MEDICINE
E.N.T.-HEAD AND NECK SURGERY
FAMILY PRACTICE
OBSTETRICS & GYNECOLOGY
INTERNAL MEDICINE
OPHTHALMOLOGY
ORTHOPEDICS
PATHOLOGY & BIOCHEMISTRY
PEDIATRICS
RADIOLOGY
SURGERY
ASSISTANT ADMINISTRATOR
CHIEF FISCAL OFFICER
OFFICE LOCATIONS

June 12, 1985

Letitia N. Uyehara
OFFICE OF ENVIRONMENTAL QUALITY
550 Hale Kauwila Street
Room #301
Honolulu, Hawaii 96813

Dear Sirs:

Concerning a recent letter that was published in the Garden Island newspaper in Kauai, I would like to submit the following response. There is great concern over the use of pesticides in the Hawaiian Islands for the legitimate growth of crops as well as to erádicate marijuana. The concern of the public is certainly warranted concerning the issue of the effect of these toxic substances on one's health. I have been seeing a much higher incidence of reproductive dysfunction including spontaneous abortion and low sperm counts in males on the island of Kauai. I am currently applying for research funds in order to study this problem. I have a very strong suspicion that the reproductive failure rate in the Hawaiian Islands is directly associated to the use of these toxic substances in the environment. I would like very much to add some input to the use of these agents in the Hawaiian Islands. I feel that if the government plans to spray the marijuana crops with these toxic substances, they will pose a serious health hazard to the population at large. It is very difficult at this point in time to prove a causal relationship between pesticides and reproductive failure because the proper controlled studies have not been completed. However, there is a great deal of support in the medical literature that has confirmed the effect of these agents on reproduction and fertility. I am very concerned because this is my primary area of interest. I hope that the government takes these serious health hazards into consideration when debating the issue as to whether or not to use these toxic substances for its eradication program.

Thank you very much for your time.

Sincerely,

FREDERICK D. SENGSTACKE II, M. D.
Chief of Division of Reproductive Endocrinology and Infertility
Department of OB-GYN, Kauai Medical Group
Assistant Clinical Professor, University of Hawaii College of Medicine

---

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

DIVISIONS:
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AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Frederick D. Sengstacke II, M.D.
Dept. of OB-GYN
Kauai Medical Group
3420-B Kuhio Highway
Lihue, Hawaii 96766

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed Conservation District Lands, Island of Kaua'i

We have received your letter of June 12, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the health of the people of Kauai. We have no intention of utilizing widespread aerial broadcast spraying for eradication of marijuana. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. Most of the Conservation District lands where marijuana is grown are away from centers of population. As noted in the Draft EIS, a number of precautionary procedures will be taken to make sure that persons who may be in the area to be sprayed are adequately notified.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

fr. Libert K. Landgraf,
Administrator

SIERRA CLUB
KAUAI GROUP OF THE HAWAII CHAPTER
P.O. BOX 3412
LIHUE, HI 96766

June 21, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Subject: Environmental Impact Statement on Eradication of Marijuana on State-Owned and Managed Conservation District Lands on Kauai.

Our Concerns are as follows:

1. We were quite disappointed that we were unable to review the transcript of the January 24, 1985, public hearing on the Conservation District Use Application regarding this matter. We were told that the only transcript available was in Honolulu.

2. Only one application method should be used, in order to assure uniformity in application, and we prefer that the method be by ground crews using knapsack sprayers, in order to minimize impacts to adjacent areas.

3. Only one chemical should be used so as to be able to adequately monitor any long-term impacts.

4. Chemical use should not be permitted along the shoreline or near watersheds, streams, or wetland areas.

5. At the time of spraying, provision should be made for monitoring of environmental dangers by interested parties, such as scientists, citizens, environmental groups, Bishop Museum, and the U.S. Fish and Wildlife Service.

6. Target areas should be well publicized before spraying, since this would be a deterrent in itself to growing marijuana in a particular area.

7. The EIS does not adequately address the topic of how soon an area would be able to be replanted after spraying.

8. Any permit should be temporary, for a one-year period, with subsequent testing to determine biological impacts.

On the other hand, we feel it would be MORE prudent for the State to put the resources required for this project toward APPREHENDING the marijuana growers, rather than attempting to eradicate the crop at such a high risk to the environment.

Sincerely,

Janis D. Lyon

Janis Lyon
Chairman

P.S. The Hawaii Chapter of the Sierra Club reserves the right to comment on the FINAL Environmental Impact Statement after it has been issued.

cc: U.S. Fish & Wildlife Service
Bishop Museum
Sierra Club, Hawaii Chapter
Jack Schweigert
Garden Island
Kauai Times
Honolulu Advertiser
Honolulu Star-Bulletin

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

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FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Ms. Janis Lyon
Kaua'i Group
Sierra Club
P.O. Box 3412
Lihue, HI 96766

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 21, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

Items 1. - 5.

A variety of methods are planned to be used in marijuana eradication as appropriate for the area. Three different chemicals have been identified for use to allow the Department of Land and Natural Resources flexibility in its eradication efforts.

New procedures will be adopted by the Department that should address several of your concerns. The Department will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

In addition, a monitoring program will be established by the Department. The procedures and the monitoring program will be described in the Revised EIS.

Item 6.

We cannot implement your suggestions that "target areas should be well publicized before spraying". We believe the effect of this action would only be to provide the growers ample time to harvest their crops without fear of any interference from law enforcement officers.

Item 7.

There is no intention at this time to replant any sprayed areas. The eradication of marijuana will allow whatever grew there before to reemerge. This could be native vegetation or it could be one or more exotic species or noxious weeds. Since marijuana is itself an exotic species, there would not necessarily be an increase in exotic species in the area. However, if the previous vegeation cover consisted of a mixture of native plants and exotic species, it could be expected that the more aggressive exotic species would dominate in the revegative process. This will be clarified in the Revised EIS.

Item 8.

The permit termination date will be decided by the Board of Land and Natural Resources. The Revised EIS, including your letter, will be one of the documents used in their review.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised EIS.

Libert K. Landgraf,
Administrator

June 20

Dear Ms. Uyehara

I am a registered voter here on Kauai and would like my opinion to go on record as being against spraying "Roundup" on this island.

I feel there is too much to risk using a spray from a plane or helicopter. The biological dangers of the spray getting in the water level are too hazardous there might be irreversable problems from using this spray.

So please mark me down against using the spray.

Thank you.

Sincerely,

Anita C. Simons
PO Box 1024
Hanalei Hi
96714

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
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DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Ms. Anita C. Simons
P.O. Box 1024
Hanalei, HI 96714

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 20, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for Lihert K. Landgraf,
Administrator

I have great concern regarding the spraying of our land on Kauai. PoT is a misdemeanor and only in large quantities a felony. I dont see why we must poison our land and not to mention all birds, insects, water, and the community just over PoT. Why dont you consider our whole environment in a more intelligent way.

a concerned Kauai Resident
Natalie Sjaardema
Box 509 KILAUEA
Kauai HI
96754

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
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EDGAR A. HAMASU
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1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

July 19, 1985

Ms. Natalie Sjaardema
P.O. Box 509
Kilauea, HI 96754

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

Libert K. Landgraf,
Administrator

May 28, 1985

Lolidia N. Uyehara
Office of Environmental Quality
Room 301
550 Halekauwila St.
Honolulu, Hawaii

Dear Ms Uyehara,

I am concerned about the possibility of glyphosate being used as an herbicide applied aerially by law enforcement officers to irradicate marijuana. I cannot have confidence in an environmental impact statement that would persuade us that such spraying is harmless.

As a fruit grower and small gardener I have occassionally used glyphosate (ROUNDUP) as an herbicide to control weeds around bananas and to clear land for new planting. Even in such controlled applications I have observed how easy it is to overspray. I have witnessed the destruction of hardy species, such as ironwood, caused by a minor ~~overspray~~ of a dilute

solution of ROUNDUP. Anyone who has used this herbicide can testify to the genetic mutations in plants that often occur near areas of heavy application. The product label itself warns against use near pasture and water sources. Can law enforcement officers, who would prefer spraying to cutting because they "cut themselves with their own tools", be trusted to use this poison more safely than farmers concerned with the preservation of their own crops and livestock?

I will not argue the ethical or political motivation behind efforts to irradicate marijuana but I cannot accept aerial application of herbicides as a preferable alternative to

3

the simple hand cutting of cultivated plants.

Sincerely,
Craig Rudael

Craig R. Wall
Box 357
Kilauea, Hi 96754

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
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WATER AND LAND DEVELOPMENT

July 19, 1985

Craig R. Wall
P.O. Box 357
Kilauea, HI 96754

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of May 28, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. We have no intention of utilizing widespread aerial broadcast spraying for eradication of marijuana. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate.

In developing guidelines for the field operations programs, the Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

TO Letitia N. Uyehara. June 3, 85

I am writing to you Because I sincerely hope you will listen to the voice of the people. I pray that you see it is a grave mistake to spray the island of Kauai particularly the Napali Coast. I first visited this island 8 years ago where kalalau Valley on the Napali was a sanctuary for me. it remains today protected as a state park. This in a sense means it Belongs to the people it is a sacred place. A long established temple for the people. It would pose a serious threat to me particularly as I have allergies, spraying the coast in fact would make it off limits to many of us, who need a chemical free Environment. I don't NAT feel that Because a small few are using the area to grow pot. That the rest of us should suffer. I urge you all to Think about this. There is a power greater than you That protects This island and if you are foolish with The laws of karma I know those who are responsible for this insane idea, will pay. I would also like To let you know That on Behalf of the people of Kauai, I personally plan to file a class action suit for damages to our land and Sanctuary if this spray is allowed to happen. (over)

Thank you
sincerely

Almitra S. Zion
Box 3556
Princeville Kauai
96722

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

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FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Almitra S. Zion
P.O. Box 3556
Princeville, HI 96722

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter of June 3, 1985 commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

We share your concern for the environmental quality of Kauai. The Division of Forestry and Wildlife is responsible not only for the protection of the forests and the wildlife of Hawaii, but also the health and safety of Hawaii residents and visitors who enjoy the use of the forest lands.

Unfortunately, many of these areas are no longer safe for plants, animals, or human visitors because of the activties of marijuana growers. Natural vegetation is destroyed as areas are cleared with the use of tools and herbicides. The growers also use booby traps and other weapons to harass and threaten outsiders.

We have no intention of adding to this problem. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate. The Department of Land and Natural Resources will confer with the Office of Environmental Services of the U.S. Fish and Wildlife Service and other appropriate staff to review environmentally sensitive areas on Kauai and determine: (1) where chemical spraying may be done by helicopter; (2) where chemical spraying may be done by hand; and (3) where only manual methods of eradication will be utilized. This will ensure that no essential habitats, endangered or threatened species, or other sensitive areas, including streams, will be harmed by the marijuana eradication program.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

for Libert K. Landgraf,
Administrator

Letitia N. Uyehara
Office of Environmental Quality
550 Hale Kauwila Street Rm 301
Honolulu 96813

In regard to the plan to spray conservation land or any other land with Round-up or Rodeo as a deterrent for marijuana growing. Bad plan! No foresight! It's bad enough we have ignorant people using these products at all on these beautiful islands. These poisons cause severe chromosone damage. They effect the baby reproduction. They effect animal reproduction. Let alone the effects on our organs which have to work overtime to try to filter this un-natural poison from our system.

My daughter is three years old. We moved from the Big Island to save her life. She was exposed to toxins from the Geothermal well and the Volcanic eruptions resulting in a liver shut down. She almost died. She was in intensive care on Oahu for five days. We moved to Kauai to give her a cleaner environment. She can not take any more poisons in any form. Not only could she die She might have de-formed children as a result of exposure to Round-up - Rodeo or this other asinine plan to spray Malathion. When are the fools going to stop? Leave well enough alone. Why destroy what took 16 million years to evolve. God, I'm sure, is very hurt by the idea of destruction of something so precious as life itself.

Face it. Marijuana growers will just grow somewhere else. There aren't that many growing in the Na Pali. You can't stop it anyway. The only way

patch or area of patches is to hike to it and cut it down. That's up to law enforcement.

Conservation land is CONSERVATION LAND. Remember what that means? Don't let them destroy God's beautiful creation: NATURE

I will personally support and encourage others to seek out those responsible and sue them for all they are worth and more if this insanity continues!

We the people of Kauai say BACK OFF!

Leave well enough alone

Don't kill my daughter
Don't kill the flora
Don't kill the goats

Sincerely

Christopher A Zwin
Stained Glass Artist
PO Box 3556
Princeville HI
96722

Please Reply!

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1985

Christopher A. Zion
P.O. Box 3556
Princeville, HI 96722

Subject: Draft Environmental Impact Statement
Eradication of Marijuana on State-owned and Managed
Conservation District Lands, Island of Kaua'i

We have received your letter commenting on the subject Draft Environmental Impact Statement. The following are our responses to your comments:

There will be no widespread aerial spraying of marijuana. As the Draft EIS notes, spraying will be done in limited areas under controlled conditions. The chemicals that have been selected for use are those which are known to be safest. They will be used only in areas where they are appropriate.

We hope that we have adequately addressed your comments. Your letter will be included in the Revised Environmental Impact Statement.

Libert K. Landgraf,
Administrator

6/3/85

This letter is addressed to the few individuals who are threatning the natural cleanliness and beauty of Kauai by planning to chemically pollute the environment and solve a social problem. This letter is also sent to arouse concerne among the public who enjoy the island. I believe that broad casting a [redacted] man-made chemical across Mother Nature will result in horrible effects which are totally worse than the problem at hand. Please, get the Big Picture. The chemicals will still be harming wildlife, plants, animals, and men after many years have passed. Don't punish nature for proving a crop or a plant, punish the source of evil -> men. The court system provides the arena for civilized men to fight for himself. I will definately stand against poisioning the natural living beauty of Kauai. Anyone who wishes to destroy life should be punished to the full extent of the Law! Kid you not! Sincerely Mikel [redacted] Wilson,

Firefighter Paramedic
Lover of Life.
Kauai

6/3/85

TO WHOM EVER IT MAY CONSERN, I FEEL THAT ANY SUCH KIND OF POISING FROM AIRNAUTILLE POSITIONING IS UNHEARABLE AND SHOULD NEVER TAKE PLACE. FOR IF IT DID TAKE PLACE YOU WOULD THEN HAVE TO EXPECT THE FOLLOWING:

1) LONG TERM AFFECTS.

a) NOT ONLY ON THE HUMAN RACE BUT ON THE NATURAL HABBITAT.

2) POISON MAY SPREAD, ESPECIALY SINCE THE WINDS ON KAUAI ARE SUCH UARIBLE AND VERY STRONG TOO.

THESE ARE ONLY A COUPLE OF REASONS! THAT AN EVENT LIKE THIS SHOULD NEVER TAKE PLACE) AND IF THE PEOPLE ARE TALKING THIS WOULD STOP FOR ONE MINNUTE AND THINK OF SOME OF THE EFFECTS THERE SELVES, I'M SURE THEY WILL THINK TWICE BEFORE RUINING A NATURAL ENVIROMENT AND A SANCTARY MONUMENT.

IF PAKOLOLO IS SUCH A BIG ISSUE HERE THEN, THERE MUST BE OTHER ALTERNITIVES, LET THEM MEET THESE ALTERNITIVES BEFORE THEY ACTIONS →

ONE METHOD THAT I KNOW OF IS VERY SAFE AND REWARDING, THAT IS BY GOING INTO THE MOUNTAINS BY FOOT AND AXING IT DOWN!

SINCERLY,
NON-POT-SMOKER

LETITIA N UYEHARA
OFFICE OF ENVIRMENTAL
QUALITY.

TO WHOM IT MAY CONCERN,

IN RESPONSE TO THE ARTICLE ABOUT THE DLNR PROPOSAL TO SPRAY STATE LANDS WITH GLYPHOSATE. THIS IS OBVIOUSLY A DANGEROUS & IRRESPONSIBLE PLAN THE MERE FACT THAT GLYPHOSATE IS KNOWN TO COURSE DEFORMITY IN UNBORN FETUS IS ENUF REASON ALONE NOT TO SPRAY. IF THERE WAS ONLY ONE CHANCE IN A MILLION OF ~~THERE~~ THIS HAPPENING THEN IT SHOULD NOT BE DONE. THERE ALSO SEEMS TO BE SOME QUESTIONS AS TO THE AFFECTS OF GLYPHOSATE ON NOT ONLY HUMANS BUT WILDLIFE AS WELL. SO IT SEEMS TO ME TO BE LUDICROUS TO BE SPRAYING A CHEMICAL, ALL OVER THE ISLANDS, THAT IS MORE DANGEROUS THAN THE NATURAL PLANT THEY ARE TRYING TO ERADICATE.

DUE TO THE HIGH RAINFALL & UNPREDICTABLE NATURE OF THE WEATHER, ON KAUAI ESPECIALLY, THE DLNR WOULD NOT BE ABLE TO GUARANTEE THAT THE GLYPHOSATE WOULD NOT EVENTUALLY LEECH INTO THE DRINKING WATER & OTHER WATERWAYS INHABITED & USED BY WILDLIFE.

THE STATEMENT BY THE DLNR ABOUT THE FERTILISERS & PESTICIDES BEING USED BY POT GROWERS BEING MORE ADVERSE TO THE ECOLOGY THAN GLYPHOSATE IS ALSO BLATANT PROPAGANDA. THE FERTILISERS & PESTICIDES USED BY THE POT GROWERS (WHO ARE UNAWARE ENUF TO USE THESE CHEMICALS) CAN ONLY BE THE SAME THAT ARE BEING DUMPED INTO OUR ENVIRONMENT BY THE TONS BY OTHER UNAWARE FARMERS e.g. THE CANE COY'S & PAPAYA FARMERS etc.

ALL THESE ANTI-GUERRILLA TYPE TECHNIQUES USED TO ERADICATE POT ARE NOT ONLY DANGEROUS & IRRESPONSIBLE BUT THEY WILL NOT WORK. THE POT PLANT HAS BEEN GROWN & USED FOR 1000'S OF YEARS & NOW BECAUSE OF THE LEGAL ATTITUDE HAS BECOME AN ECONOMIC FACTOR. SO PEOPLE AREN'T ABOUT TO STOP THE GROWING OF POT. IF ANYTHING THIS SPRAYING PROPOSAL MAY AROUSE THE MORE RADICAL & EXTREME MINORITY WHO WILL WISH TO PROTECT THEIR CROPS.

THE ONLY WAY TO CONTROL POT IS TO CONTROL THE USE & ABUSE OF IT THRU EDUCATION — AS IS BEING DONE WITH CIGARETTES & ALCOHOL.

SO DO NOT ALLOW THE DLNR'S OVER-REACTION TO DUMP MORE TOXINS INTO OUR ALREADY OVER POLLUTED ENVIRONMENT.

YOURS SINCERELY, A CONCERNED CITIZEN!!

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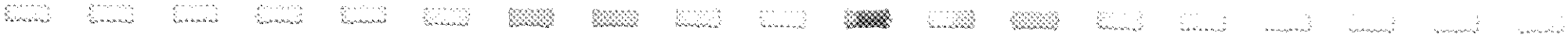
APPENDIX A

DIVISION OF FORESTRY
AND WILDLIFE

RULES FOR FOREST
RESERVES



TITLE 13

DEPARTMENT OF LAND AND NATURAL RESOURCES

SUBTITLE 5 FORESTRY AND WILDLIFE

PART 1 FORESTRY

CHAPTER 104

RULES REGULATING ACTIVITIES WITHIN FOREST RESERVES

Subchapter 1 General Provisions

Subchapter 2 Public Use

Subchapter 3 Permits

Historical Note: Chapter 104 of Title 13, Administrative Rules, is based substantially upon Regulation 1 [Eff. 12/9/43; am 8/12/76] and Regulation 10 [Eff. 12/12/59] of the Division of Fores-

try, Department of Land and Natural Resources. [R SEP 2 8 1981]

Subchapter 1 General Provisions

§13-104-1 Purpose and applicability. (a) The purpose of these rules is to regulate activity within forest reserves established pursuant to sections 183-11 and 183-15, Hawaii Revised Statutes.

(b) These rules shall apply to all persons entering the boundaries of a forest reserve. [Eff. SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-2 Definitions. As used in these rules, unless context requires otherwise:

"Administrator" means the administrator of the division of forestry and wildlife.

"Authorized representative" means the administrator, foresters, conservation enforcement officers, and other persons authorized by the board of land and natural resources to act for the board.

"Board" means the board of land and natural resources.

"Division" means the division of forestry and wildlife.

"Department" means the department of land and natural resources.

"Forest reserve" means those lands designated as forest reserves by the department pursuant to sections 183-11 and 183-15, Hawaii Revised Statutes, and other lands for plant sanctuaries and baseyards under the custody and control of the division.

§13-104-3 Penalty. Any person violating any of the provisions of these rules shall be penalized as provided in sections 183-4 and 183-18, Hawaii Revised Statutes. [Eff. SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §§183-4, 183-18)

Subchapter 2 Public Use

§13-104-4 Preservation of public property and resources. The following activities are prohibited within a forest reserve:

(1) To remove, injure, or kill any form of plant or animal life, either in whole or in part, except as authorized by the board or its authorized representative;
(2) To remove, damage, or disturb any natural feature or natural resource (e.g. natural stream beds) except as authorized by the board or its authorized representative;
(3) To remove, damage, or disturb any historic or prehistoric remains;
(4) To remove, damage, or disturb any notice, marker, or structure;
(5) To enter, occupy, or use any building, structure, facility, motorized vehicle, machine, equipment, or tool within or on the forest reserve except as authorized by the board or its authorized representative;
(6) To engage in any construction or improvement except as authorized by the board.
(7) To sell, peddle, solicit, or offer for sale any merchandise or service except with written authorization from the board.
(8) To distribute or post handbills, circulars, or other notices. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §§183-2, 183-17)

§13-104-5 Litter and sanitation. The following acts are prohibited within a forest reserve:
(1) To drain, dump, or leave any litter, animal waste or remains, or any other material which pollutes or is likely to cause pollution in the forest reserve including streams and other water sources;
(2) To deposit any body waste in areas without comfort stations without digging a hole and covering all signs of the waste;
(3) To deposit any body waste within 150 feet of a spring, stream, lake, or reservoir; and
(4) To dump or leave a derelict or abandoned vehicle or any other large refuse such as refrigerators and stoves. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-6 Report of injury or damage. All incidents resulting in injury or death to persons or damage to property shall be reported by the person or persons involved as soon as possible to the board or its authorized representative. This report does not

relieve persons from the responsibility of making any other accident reports which may be required under federal, state, or county statutes, ordinances, and rules. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-7 Fire use restrictions. The following acts are prohibited within a forest reserve:

(1) To build any fire on the ground;
(2) To build any fire without a portable stove or other self-contained unit;
(3) To build a fire against any structure, large hollow log, tree, stump, or in any area of plant life where the fire may be difficult to extinguish;
(4) To leave a fire unattended without extinguishing all traces of heat;
(5) To deposit or discard any potential fire producing material such as embers, coals, or ashes that are too hot to touch;
(6) To set on fire or cause to be set on fire any grass, brush, or tree, except for department fire control measures;
(7) To start a fire in windy conditions in a place or manner that is likely to cause grass, brush, or trees to be set on fire; and
(8) To use any motor vehicle, motorized equipment, or other machine powered by steam engines, internal combustion engines, or electric motors unless equipped with efficiently operating fire or spark arresting equipment. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §§183-2, 185-1)

§13-104-8 Hunting and fishing. The hunting, fishing, trapping, or disturbing of any fish, animal, or bird is prohibited except as permitted by department hunting or fishing rules. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-9 Firearms or other weapons. Firearms including air or gas operated, bow and arrow and other weapons are prohibited except as permitted by department hunting rules and are subject to all applicable federal, state, and county statutes, ordinances, and rules. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-10 Swimming and bathing. Swimming and bathing in all waters within a forest reserve are permitted at an individual's own risk, except in waters and at times where the activities are prohibited by the board or its authorized representative in the interest of public health and safety. The excepted waters and times shall be designated by posted signs. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-11 Vehicles and transportation. (a) The following acts are prohibited within a forest reserve:

(1) To drive, operate, or use any motorized ground vehicle, glider, hang glider, aircraft, balloon, or parachute carelessly and without due caution for the rights or safety of others and in a manner that endangers any person or property;
(2) To launch or land airplanes, gliders, helicopters, balloons, parachutes, or other similar means of transportation without a special use permit from the board or its authorized representative; provided, however, that landing is authorized without a permit in case of an emergency;
(3) To drive, operate, or use any motorized ground vehicle, including recreational off-road vehicles, in areas and on roads or trails not designated for that purpose;
(4) To park any motorized ground vehicle or trailer except in designated areas;
(5) To drive or ride a horse, mule, or other animal in areas and on roads or trails that are posted against such activity; and
(6) To drive, operate, or use any motorized ground vehicle without a functioning street legal muffler.

(b) Any vehicle or property left unattended within a forest reserve for longer than seventy-two hours without prior written permission from the board or its authorized representative shall be considered abandoned. Any abandoned vehicle or property may be impounded or towed away by the board or its authorized representative at the expense of the owner. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-12 Animals. (a) Dogs, cats, and other animals are prohibited within a forest reserve unless

crated, caged, on a leash, or otherwise under restrictive control at all times except for hunting dogs when permitted by chapters 122 and 123, Administrative Rules.

(b) All dogs used for hunting shall be crated, caged, leashed, or otherwise under restrictive control during transportation to and from hunting areas within the forest reserve.

(c) Dogs, cats, or other domestic animals, observed by an authorized representative of the board to be running at large or in the act of killing, injuring, or molesting humans, wildlife, or property, may be disposed of in the interest of public safety and the protection of the forest reserve. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-13 Audio devices and noise. Creating noise or sound within a forest reserve, either vocally or otherwise (i.e. public address systems, radios, television sets, musical instruments) or use of any noise producing devices (i.e. electric generating plants or other equipment driven by motors or engines) in a manner and at times which creates a nuisance is prohibited. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-14 Explosives. The use or possession of fireworks, firecrackers, or explosive devices within a forest reserve is prohibited. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-15 Disorderly conduct. Disorderly conduct, as defined in section 711-1101, Hawaii Revised Statutes, is prohibited within a forest reserve. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §§183-2, 711-1101)

§13-104-16 Residence on forest reserve lands. Residing within a forest reserve is prohibited except with written permission from the board. [Eff. SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-17 Compliance with laws. All persons entering the boundaries of a forest reserve shall comply with all federal, state, and county laws,

ordinances, and rules. [Eff. SEP 28 1981]
(Auth. HRS §183-2) (Imp: HRS §183-2)

Subchapter 3 Permits

§13-104-18 General provisions for permits.
(a) The board or its authorized representative may issue the following types of permits:
(1) Camping;
(2) Special use;
(3) Collecting;
(4) Commerical harvest; and
(5) Access.
(b) All permits are subject to the following provisions:
(1) Permits are subject to denial, cancellation, or termination at any time by the board or its authorized representative upon violation of these rules or any conditions of the permit or any federal, state, or county statutes, ordinances, and rules or for danger to the public or because of natural causes.
(2) Permits shall not be transferable.
(3) Persons or organizations to whom permits are issued shall be held responsible for all conditions stipulated on the permit.
(4) All persons eighteen years of age or older shall be eligible to secure a permit and all minors shall be allowed use of the premises provided that they are under the direct supervision of one adult for every ten minors.
(5) The size of groups as well as the length of time any permit may be in effect may be limited by the board or its authorized representative.
(6) The board or its authorized representative may require the permittee, at the permittee's own cost, to provide police protection in the interest of the public safety and welfare and for the protection of property when the number of persons using the forest reserve is one hundred or more.
(7) Fees and charges as set by the board may be assessed when permits are granted for the exclusive use of areas or facilities, or when charges are necessary to defray the cost of special facilities, services, or supplies provided by the State, or as

otherwise determined by the board or its authorized representative when necessary to carry out the provisions of chapter 183, Hawaii Revised Statutes. Charges may be waived by the board or its authorized representative if the waiver is in the public interest.

(8) All permittees shall, upon request, show the permit to any law enforcement officer, the board, or its authorized representative. [Eff. SEP 28 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-19 Camping permits. (a) All persons, groups, organizations, or associations wishing to camp within a forest reserve shall obtain a camping permit authorizing the use of the specific area and facilities for camping purposes.

(b) Camping permits shall be obtained from the district offices of the division during regular working hours of the department.

(c) Persons applying for a permit shall provide their names and addresses and shall produce identification satisfactory to the board or its authorized representative. The board or its authorized representative may require the names, addresses, and telephone numbers of all persons included on a permit.

(d) Each permit will reserve the use of a designated area for the stated date or dates of use. Camping is permitted only in designated areas or sites.

(e) No person, group, organization, or association shall remain at any one specific camping site for longer than fourteen days; provided that the board or its authorized representative may extend the length of stay for good cause; provided further that the length of stay (including the extension as well as the permitted stay) shall not exceed thirty days.

(f) After the expiration of a permit, a period of thirty days shall pass before another permit may be issued to the same person for the same designated area. This restriction shall apply to all persons named on the expired permit. The board or its authorized representative may waive a portion of the thirty day period for good cause.

(g) Camping with recreational trailers or other camper units is permitted only at locations designated by the board or its authorized representative.

(h) Permits may be denied, cancelled, or terminated for the following reasons:

(1) When the size of the group exceeds the capacity of the existing site or facilities;
(2) When there are inadequate facilities to meet the immediate needs of the camper or campers;
(3) When repairs or improvements are being made at the campsite; or
(4) When a state of emergency is declared by the board or its authorized representative. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-20 Special use permits. (a) Special uses are permitted within a forest reserve only by a permit issued by the board or its authorized representative. Special uses are all types of uses other than those provided for herein and which are considered compatible with the functions and purposes of each individual area, facility, or unit within a forest reserve. Special uses include but are not limited to activities such as meetings, weddings, concerts, shows, and other community events or activities.

(b) Applications for special use permits shall be received by the board or its authorized representative at least fifteen working days in advance of the date the permit is to be in effect, unless otherwise received and accepted by the board or its authorized representative.

(c) A request for a special use permit shall be considered on its own merits including its effect on the premises, facilities, and the public's use and enjoyment of the forest reserve. [Eff: SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-21 Collecting permits. (a) Persons wishing to collect forest items (e.g. ti leaves, bamboo) for personal use and at no charge shall obtain a collecting permit authorizing the collection in a specific area.

(b) Collecting permits shall be obtained from the district offices of the division during regular working hours of the department.

(c) Persons applying for a permit shall provide their names and addresses and shall produce identification satisfactory to the board or its authorized representative.

(d) Collecting permits shall specify:
(1) The date or dates of collection;

(2) The quantities and items to be collected;
(3) The areas of collection; and
(4) Any other terms and conditions deemed necessary by the board or its authorized representative.

(e) Permits shall not be issued for collecting items for sale.

(f) No permits shall be issued for the collection of endangered or threatened wildlife or plants except as provided by chapter 124, Administrative Rules. [Eff. SEP 28 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-22 Commercial harvest permits. (a) The board or its authorized representative may issue permits for the purpose of purchasing, harvesting, and removing forest products (e.g. timber, seedlings, greenery, tree fern, cinder, and lava rock).

(b) Permits shall be obtained from the district offices of the division during regular working hours of the department.

(c) Each application for a harvest permit shall be considered on its own merits including its effect on the premises and the public's use and enjoyment of the forest reserve.

(d) Permits will not be issued for harvesting material for direct resale.

(e) The value of the raw material to be harvested shall not exceed $1,000. The quantity to be harvested shall be decided by the board or its authorized representative.

(f) The time of entry for harvesting shall not exceed 14 days, except that the board or its authorized representative may extend this time for good cause.

(g) No more than one permit within a thirty day period or three permits within a calendar year may be issued to the same person, group, organization, or association for harvesting the same product.

(h) Each permit shall specify:
(1) The products to be harvested;
(2) The amount to be harvested;
(3) The dollar value of the products;
(4) The designated area to be harvested
(5) The date or dates the harvesting may take place; and
(6) Any other terms or conditions deemed necessary by the board or its authorized representative. [Eff. SEP 28 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

§13-104-23 Access permits. (a) Permits for access to or entry into forest reserves may be required by the board or its authorized representative for the following purposes:

(1) To comply with the requirements of private landowners or lessees who permit access to forest reserves through their land;

(2) To control the number of people using a forest reserve or an area within a forest reserve in order to minimize the impact upon environmentally sensitive areas;

(3) To control the types of uses of a forest reserve or an area within a forest reserve in order to minimize the dangers of incompatible uses in the same area (e.g. horseback riding and motorcycle riding); and

(4) To control periods of use of a forest reserve, especially during periods when fire danger levels are high.

(b) Access permits shall be obtained from the district offices of the division during regular working hours of the department.

(c) Persons applying for an access permit shall provide their names and addresses and shall produce identification satisfactory to the board or its authorized representative. The board or its authorized representative may require the names, addresses, and telephone numbers of all persons included on a permit. [Eff. SEP 2 8 1981] (Auth: HRS §183-2) (Imp: HRS §183-2)

APPENDIX B

CHEMICAL INFORMATION AND SAFETY DATA

Chevron U.S.A. Inc.

Material Information Bulletin

(Approved – "Essentially Similar" to Form OSHA 20, Material Safety Data Sheet)

CHEVRON Diesel Fuel No. 1

CPS 270003

DANGER! **HARMFUL OR FATAL IF SWALLOWED**
COMBUSTIBLE
KEEP OUT OF REACH OF CHILDREN

TYPICAL COMPOSITION

Paraffins (incl. naphthenes)	74-88%
Aromatics:	
C_8+	12-20%
Olefins	0-3%
Naphthalenes	0-3%

EXPOSURE STANDARD

The suggested Threshold Limit Value is 200 ppm (parts of vapor per million parts of air) for a daily 8-hour exposure. There is no OSHA exposure standard.

PHYSIOLOGICAL & HEALTH EFFECTS

EMERGENCY & FIRST AID PROCEDURES

Eyes

May cause eye irritation.

Wash eyes with fresh water for at least 15 minutes. If irritation continues, see a doctor.

Skin

Expected to produce no more than minor skin irritation following prolonged or frequently repeated contact.

Wash thoroughly with soap and water following skin contact. Launder contaminated clothing.

Inhalation

Breathing the vapors at concentrations above the exposure standard can cause central nervous system depression. See Additional Health Data.

If there are signs or symptoms, as described in this bulletin, due to breathing this material, move the person to fresh air. If breathing has stopped, apply artificial respiration. Call a doctor immediately.

Ingestion

Not expected to be acutely toxic by ingestion. **Note to Physician:** Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

If swallowed, DO NOT make person vomit. Call a doctor immediately.

ADDITIONAL HEALTH DATA

Signs and symptoms of central nervous system depression may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Affected persons usually experience complete recovery when removed from the exposure area.

Data available for a similar material indicate that this material is not expected to be acutely toxic.

SPECIAL PROTECTIVE INFORMATION

Eye Protection: Avoid contact with eyes. Eye contact can be avoided by wearing chemical safety goggles.

Skin Protection: Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing impervious protective clothing including rubber gloves.

Respiratory Protection: Wear approved respiratory protection such as an organic vapor cartridge respirator or an air-supplying respirator unless ventilation equipment is adequate to keep airborne concentrations below the exposure standard.

Ventilation: Use adequate ventilation to keep the airborne concentrations of this material below the exposure standard.

FIRE PROTECTION

Liquid evaporates and forms vapors (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

Flash Point: (P-M) 107-120°F
Autoignition Temp.: NDA
Flammability Limits: NDA
Extinguishing Media: CO_2, Dry Chemical, Foam, Water Spray.
Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire bulletin.

SPECIAL PRECAUTIONS

See Page 3.

ENVIRONMENTAL PROTECTION

Environmental Impact: Certain geographical areas have air pollution restrictions concerning the use of materials in work situations which may release volatile components to the atmosphere. Air pollution regulations should be studied to determine if this material is regulated in the area where it is to be used.

Precautions if Material is Released or Spilled: Eliminate all open flames in vicinity of spill or released vapor. Clean up spills as soon as possible, observing precautions in Special Protective Information. Absorb large spills with absorbent clay, diatomaceous earth or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor.

Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable.
Incompatibility (Materials to Avoid): May react with strong oxidizing materials.
Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.
Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES

Solubility: Insoluble in water; miscible with hydrocarbons.

Appearance (Color, odor, etc.): Pale yellow liquid.
Boiling Range: 150-290°C
Freeze Point: -40°
Specific Gravity: 0.784-0.811
Vapor Pressure (mm Hg & Temp.): NDA
Vapor Density (Air = 1): NDA
Percent Volatile (Volume %): NDA
Evaporation (= 1): NDA
Viscosity: 8 cSt @ -30°F

NDA = No Data Available

Material Information Bulletin

CHEVRON Diesel Fuel No. 1. **CPS 270003**

SPECIAL PRECAUTIONS

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL

Contains Petroleum Distillate.
DO NOT USE or STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA.
Keep container closed.
DO NOT weld, heat or drill container.
Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

WARNING! Not for use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

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Chevron U.S.A. Inc.

Material Information Bulletin

(Approved – "Essentially Similar" to Form OSHA 20, Material Safety Data Sheet)

CHEVRON Diesel Fuel No. 2 **CPS 272102**

DANGER!

HARMFUL OR FATAL IF SWALLOWED
PROLONGED OR REPEATED CONTACT WITH SKIN CAN BE HARMFUL
COMBUSTIBLE
KEEP OUT OF REACH OF CHILDREN

TYPICAL COMPOSITION

A blend of paraffins, naphthenes, aromatics and olefins

EXPOSURE STANDARD

No OSHA exposure standard or Threshold Limit Value has been established for this material. However, due to the possible carcinogenic effect, exposure should be reduced to the lowest feasible level.

PHYSIOLOGICAL & HEALTH EFFECTS

EMERGENCY & FIRST AID PROCEDURES

Eyes

Expected to cause no more than minor eye irritation.

Wash eyes with fresh water for at least 15 minutes. If irritation continues, see a doctor.

Skin

Prolonged or frequently repeated contact may cause skin irritation or may cause the skin to become cracked or dry from the defatting action of the material. See Additional Health Data.

Wash thoroughly with soap and water following skin contact. Launder contaminated clothing.

Inhalation

Prolonged breathing of high vapor concentrations can cause central nervous system depression. See Additional Health Data.

If there are signs or symptoms, as described in this bulletin, due to breathing this material, move the person to fresh air. If breathing has stopped, apply artificial respiration. Call a doctor immediately.

Ingestion

Not expected to be acutely toxic by ingestion. **Note to Physician:** Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

If swallowed, DO NOT make person vomit. Call a doctor immediately.

ADDITIONAL HEALTH DATA

See Page 3.

SPECIAL PROTECTIVE INFORMATION

Eye Protection: Avoid contact with eyes. Eye contact can be avoided by wearing chemical safety goggles.
Skin Protection: Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing impervious protective clothing including gloves.
Respiratory Protection: This material may be an inhalation hazard, and unless ventilation is adequate, the use of an approved respirator is recommended.
Ventilation: Use this material only in well ventilated areas.
Other: If eye or skin contact can occur, washing facilities for eyes and skin should be available nearby.

FIRE PROTECTION

Liquid evaporates and forms vapors (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

Flash Point: (P-M) 85°C (Typical)
Autoignition Temp.: NDA
Flammability Limits: n/a

Extinguishing Media: CO_2, Dry Chemical, Foam, Water Spray.

Special Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire bulletin.

SPECIAL PRECAUTIONS

See Page 3.

ENVIRONMENTAL PROTECTION

Environmental Impact: This material is not expected to present any environmental problems other than those associated with oil spills.

Precautions if Material is Released or Spilled: Eliminate all open flames in vicinity of spill or released vapor. Clean up spills as soon as possible, observing precautions in Special Protective Information and on product label. Absorb large spills with absorbent clay, diatomaceous earth, or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor.

Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable.

Incompatibility (Materials to Avoid): May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

PHYSICAL PROPERTIES

Solubility: Miscible with hydrocarbons; insoluble in water.

Appearance (Color, Odor, etc.): Pale yellow liquid.

Boiling Range: 157-371°C
Melting Point: n/a
Specific Gravity: 0.82 @ 60/60°F (Typical)
Vapor Pressure: 0.04 psia @ 40°C
Vapor Density (Air = 1): NDA
Percent Volatile (Volume %): NDA
Evaporation (= 1): NDA
Viscosity: 1.9-4.1 cSt @ 40°C

n/a = Not Applicable
NDA = No Data Available

Material Information Bulletin

CHEVRON Diesel Fuel No. 2 **CPS 272102**

ADDITIONAL HEALTH DATA

Signs and symptoms of central nervous system depression may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Affected persons usually experience complete recovery when removed from the exposure area.

There is no evidence to indicate that this produce can cause cancer in humans. However, a similar product caused a slight increase in tumors when repeatedly applied to the skin of mice for the expected life span of a mouse (approximately 2 years). Another related product was examined in several mutagen testing systems. Only the Mouse Lymphoma Assay showed a positive result.

While brief or intermittent skin contact with this product is not expected to have serious effects, such contact should be reduced to a minimum by following the precautions outlined in this bulletin and promptly washing the skin in cases of accidental exposure.

SPECIAL PRECAUTIONS

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Contains Petroleum Distillate.
DO NOT USE OR STORE near flame, sparks, or hot surfaces. USE ONLY IN WELL VENTILATED AREA.
Keep container closed.
DO NOT weld, heat or drill container.
Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

WARNING! Not for use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

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No. 525 - Rev. 12/82

Material Information Bulletin

(Approved – "Essentially Similar" to Form OSHA 20, Material Safety Data Sheet)

Chevron

CHEVRON Weed Oil

CMS 276506

CAUTION! **HARMFUL OR FATAL IF SWALLOWED**
COMBUSTIBLE
KEEP OUT OF REACH OF CHILDREN

TYPICAL COMPOSITION

Paraffins (incl. naphthenes)	≤55%
Aromatics	
C_8^+	≥45%
Emulsifier	~0.03%

EXPOSURE STANDARD

The OSHA exposure standard and the Threshold Limit Value (TLV) (1980) is 5 mg/m^3 (milligrams of material per cubic meter of air) for a daily 8-hour exposure. This is the OSHA exposure standard and the TLV for mineral oil mists.

PHYSIOLOGICAL & HEALTH EFFECTS

Expected to cause no more than minor eye irritation.

Expected to produce no more than minor skin irritation following prolonged or frequently repeated contact.

Breathing the vapors at concentrations above the exposure standard can cause central nervous system depression. See Additional Health Data.

Not expected to be acutely toxic by ingestion. **Note to Physician:** Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

EMERGENCY & FIRST AID PROCEDURES

Eyes

Wash eyes with fresh water for at least 15 minutes. If irritation continues, see a doctor.

Skin

Wash thoroughly with soap and water following skin contact. Launder contaminated clothing.

Inhalation

If respiratory irritation or any signs or symptoms, as described in this bulletin occur, move the person to fresh air. If any of these effects continue, see a doctor.

Ingestion

If swallowed, DO NOT make person vomit. Call a doctor immediately.

Chevron Environmental Health Center/P.O. Box 1272, Richmond, CA 94802
Emergency Phone Number (415) 233-3737

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No. 07 Rev. 8/82

ADDITIONAL HEALTH DATA

See Page 3.

SPECIAL PROTECTIVE INFORMATION

Eye Protection: Avoid contact with eyes. Eye contact can be avoided by wearing chemical safety goggles.

Skin Protection: Avoid prolonged or frequently repreated skin contact with this material. Skin contact can be minimized by wearing impervious protective clothing including gloves.

Respiratory Protection: If operating conditions create airborne concentrations which exceed the exposure standard, the use of an approved respirator is recommended.

Ventilation: Use adequate ventilation to keep the airborne concentrations of this material below the exposure standard.

FIRE PROTECTION

Liquid evaporates and forms vapors (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

Flash Point: (PM) 66°C (Min.)
Autoignition Temp.: 260°C
Flammability Limits: 1.0-6.0%

Extinguishing Media: CO_2, Dry Chemical, Foam, Water Spray.

Fire Fighting Procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus. See Hazardous Decomposition Products. Read the entire bulletin.

SPECIAL PRECAUTIONS

See Page 3.

ENVIRONMENTAL PROTECTION

Environmental Impact: This material is not expected to present any environmental problems other than those associated with oil spills. However, because of its dispersant properties, this material forms emulsions with water. For help with any spill, leak, fire, or exposure involving this material, call day or night (415) 233-3737.
Precautions if Material is Released or Spilled: Eliminate all open flames in vicinity of spill or released vapor. Clean up spills as soon as possible. Absorb large spills with absorbent clay, diatomaceous earth, or other suitable material. A fire or vapor hazard may exist since these cleanup materials will only absorb liquid; they will not absorb vapor.
Waste Disposal Methods: Place contaminated materials in disposable containers and bury in an approved dumping area.

REACTIVITY DATA

Stability (Thermal, Light, etc.): Stable.

Incompatibility (Materials to Avoid): May react with strong oxidizing materials.

Hazardous Decomposition Products: Normal combustion forms carbon dioxide and water vapor and may produce oxides of sulfur; incomplete combustion can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

PHYSICAL PROPERTIES

Solubility: Miscible with hydrocarbon solvents; emulsifies in water.

Appearance (Color, Odor, etc.): Amber liquid.

Boiling Range: 180-343°C
Melting Point: n/a
Specific Gravity: 0.893 (Min.)
Vapor Pressure: < 1 mm Hg @ 25°C
Vapor Density (Air = 1): NDA
Percent Volatile (Volume %): NDA
Evaporation (= 1): NDA
Viscosity: 2.5 cSt @ 40°C

n/a = Not Applicable
NDA = No Data Available

Material Information Bulletin

CHEVRON Weed Oil **CMS 276506**

ADDITIONAL HEALTH DATA

Signs and symptoms of central nervous system depression may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Affected persons usually experience complete recovery when removed from the exposure area. Data available for a similar material indicate that this material is not expected to be acutely toxic.

SPECIAL PRECAUTIONS

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

DO NOT USE OR STORE near flame, sparks or hot surfaces.
USE ONLY IN WELL VENTILATED AREA.
Keep container closed.
DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

CRR-6745(C)(10M-4-81) Printed in U.S.A.

Chevron

CHEVRON®
Weed Oil

CONTAINS PETROLEUM DISTILLATE

Active Ingredient	
Petroleum Oil	99.97%
Inert Ingredient	.03%

KEEP OUT OF REACH OF CHILDREN

CAUTION

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

TRANSPORTED IN BULK

Sold by
Chevron U.S.A. Inc.
San Francisco CA 94119

EPA Reg. No. 522-44-AA EPA Est. 522-CA-1 Made in U.S.A.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS & DOMESTIC ANIMALS

CAUTION

Harmful or fatal if swallowed. Avoid breathing of vapor or contact with skin or eyes.

STATEMENT OF PRACTICAL TREATMENT

If swallowed, DO NOT MAKE PERSON VOMIT. CALL A DOCTOR IMMEDIATELY. Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

Note to Physicians: Emergency Information - call (415) 233-3737.

PHYSICAL OR CHEMICAL HAZARDS

COMBUSTIBLE. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed. Clean up spills immediately. Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85° F.

DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

REENTRY STATEMENT

Keep all unprotected persons out of operating areas or vicinity where there may be danger of drift.

Do not enter treated areas without protective clothing until sprays have dried.

Certain states may require more restrictive reentry intervals; consult your State Department of Agriculture for further information.

Written or oral warnings regarding use of protective clothing and accidental exposure must be given to workers who are expected to be in treated areas or in areas about to be treated.

STORAGE AND DISPOSAL

PROHIBITIONS

Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment.

Open dumping is prohibited.

PESTICIDE DISPOSAL

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

DIRECTIONS

Chevron Weed Oil is a light-bodied highly aromatic petroleum oil, which may be diluted up to 2 parts water with one part oil for general control of most annual and many perennial weeds on ditch banks, along roadways, fence lines, railroad right of ways and in orchards, vineyards or groves where non-cultivation is practiced. Also used as a preemergence weed killer on row crops such as sweetcorn, onions and tomatoes. Use 20-40 gallons straight oil or mixture 1 part oil - 2 parts water, at rate of 30-60 gallons per acre. Application to be made at a minimum of 48-72 hours prior to anticipated plant emergence from the soil. Best results are obtained by spraying weeds when they are small. Spray sufficient on all weeds to be killed to completely cover them with a thin film of oil. Chevron Weed Oil will defoliate practically all plants when applying to orchard floors, citrus groves, and grape vineyards. Use a directed spray and keep off crop stem and foliage. Apply carefully to prevent oil from contacting valuable plants and trees.

CONDITIONS OF SALE

1. This Company (manufacturer) warrants that this material conforms to the chemical description of the label and is reasonably fit for use as directed hereon. Manufacturer neither makes nor authorizes any agent or representative to make any other warranty of FITNESS or of MERCHANTABILITY, guarantee or representation, express or implied, concerning this material.
2. Critical and unforeseeable factors beyond the manufacturer's control prevent it from eliminating all risks in connection with the use of chemicals. Such risks include but are not limited to damage to plants and crops to which the material is applied, lack of complete control, and damage caused by drift to other plants or crops. Such risks occur even though the product is reasonably fit for the uses stated hereon and even though label directions are followed. Buyer and user acknowledge and assume all risks and liability (except those assumed by the manufacturer under 1 above) resulting from handling, storage and use of this material.

B & B WEED OIL

P.O. BOX 218, Carpinteria, Ca., 93013

B & B WEED OIL — ACTIVE INGREDIENT: PETROLEUM HYDROCARBONS — 100%

Sub-packaged in accordance with California Administrative Code, Title 3, Agriculture Section 2396. B & B is an aromatic petroleum effective for weed killing. Effectiveness depends on the application by user. Seller makes no warranty, expressed or implied, concerning the use of this product other than as indicated on the label. Buyer assumes all risk of use and/or handling of this material, when such use and/or handling is contrary to label instructions.

FOR THE BEST RESULTS WE RECOMMEND THE FOLLOWING DIRECTIONS: ADD FROM 1 TO 3 PARTS OF WATER FOR CONTROLLING WEEDS IN THE GROUPS FROM "OLD" OR "HARD TO KILL" TO THE "YOUNG" OR "EASY TO KILL" GROUP. THE MIXTURE MUST BE AGITATED IMMEDIATELY PRIOR TO BEING SPRAYED.

CAUTION CAUTION

AVOID EXCESSIVE CONTACT WITH BODY, REMOVE CLOTHING QUICKLY IF SATURATED WITH OIL. NOT FOR HUMAN CONSUMPTION IN ANY FORM. DO NOT ALLOW SPRAY OR SPRAY DRIFT TO CONTACT VALUABLE PLANTS OR EDIBLE FRUITS OR VEGETABLES. HARMFUL IF SWALLOWED. AVOID INHALATION OF VAPORS OR SPRAY MIST. DO NOT CONTAMINATE WATER BY CLEANING OF EQUIPMENT OR DISPOSAL OF WASTES. KEEP OUT OF ANY BODY OF WATER. DO NOT APPLY WHERE RUNOFF IS LIKELY TO OCCUR. DO NOT REUSE EMPTY CONTAINER. DISPOSE OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS.

****NORMAL APPLICATION AREAS****

Non-cultivation areas such as Citrus Groves, Canal Ditches, Road areas, Power Line areas, Fence Lines, Airports and any Industrial Plant or Building where weeds are a problem.

****WEEDS EFFECTIVE ON****

All known California weeds and grasses including but not limited to, "Chick Weed", "Bermuda Grass", "Star Thistle", "Malva Weed (Cheese Weed)" and "Orchard Grass".

FLASH POINT 196°F. CAUTION: KEEP OUT OF REACH OF CHILDREN

"STATE REG. NO. 11103-50001 ZA"

B & B WEED OIL
5025 8th St.
Carpinteria, California, 93013

ECONOMIC POISON REGISTRATION LAWS

LET THE SELLER BEWARE — is the attitude of the courts with regard to the sale of economic poisons. Therefore, all products sold for use as a pesticide, herbicide, etc., must be registered with the U.S. EPA.

We are required to register certain Special Products as economic poisons with the states in which we market as well as with the Environmental Protection Agency. Where the particular state's Department of Agriculture has listed our product as a "restricted use" pesticide, state law may also require the local dealer or distributor to be licensed by the state. Only one product is registered currently:

Sold Only in Bulk:	EPA	Calif.	Ariz.	Nev.
Chevron Weed Oil	X	X	X	X

BULK TANK CAR, TANK TRUCK & TRAILER OR TANK TRUCK DELIVERIES

When this product is sold in bulk, as indicated above, please adhere to the procedure set forth below:

1. Attach the appropriate product tag (MOT series) to the outlet valve of each compartment in a tank truck, tank truck and trailer or tank car containing the product. An appropriate label (EP series) must also be attached to any Chevron U.S.A. bulk tank containing CHEVRON WEED OIL.

2. The driver making the tank truck or tank truck and trailer delivery of any economic poison must present a copy of the product label (P series) to the customer at the delivery site. This label should be attached to the transfer invoice or S-800-A. In the case of tank car deliveries, the product label (P series) should be mailed directly to the customer along with the shipping notice.

3. If a delivery vehicle returns to a Chevron U.S.A. plant with a retain of this product, the quantity must be pumped into barrels having the appropriate label attached.

4. Appropriate product tags (MOT series) for vehicle outlet valves can be obtained from the Richmond Stationery Warehouse, 841 Standard Avenue, Richmond, CA 94820. Specify product name and code.

   Chevron Weed Oil MOT-273-31

5. Appropriate product labels (EP and P series) for use on bulk deliveries of this product can be obtained from the Packaging Coordinator, Chevron U.S.A. Inc., 575 Market Street, San Francisco, CA 94105. Please order by product name and specify the plant supplying the product.

Chevron Weed Oil (Richmond production)	EP-70	P-70
Chevron Weed Oil (El Segundo production)	EP-72	P-72

GENERAL

Products registered as economic poisons cannot be sold to a consumer except for those end uses stated on the labels. Similarly, nonregistered products (such as CHEVRON DIESEL FUEL) cannot be sold for direct application to plant or weed growth. SUCH SALES ARE PROHIBITED BY FEDERAL LAW.

We repeat, "LET THE SELLER BEWARE." Don't violate these procedures in any way or Chevron may be subject to lawsuits, imposition of large fines and penalties, or one or more of our plants may be closed.

SPECIAL NOTE

Under no conditions are sales personnel, Jobbers, Commissioned Agents or others to make any agricultural use recommendations on a registered economic poison. Customers are to be advised that the product label covers the usage and instructions for the product.

CHEVRON WEED KILLER APPLICATIONS

Recommended application rates for Chevron Weed Oil should be adhered to in order to provide the customer maximum weed control with little or no plant damage.

CONDITIONS OF SALE:

1. Chevron U.S.A. Inc. (manufacturer) warrants that these materials conform to the description on the label and are reasonably fit for use as directed. Manufacturer neither makes, nor authorizes any agent or representative to make, any other warranty of FITNESS or of MERCHANTABILITY, guarantee or representation, express or implied, concerning these materials.

2. Critical and unforseeable factors beyond the manufacturer's control prevent it from eliminating all risks in connection with the use of these materials. Such risks include, but are not limited to, damage to plants and crops to which the material is applied, lack of complete control, and damage caused by drift to other plants or crops. Such risks occur even though the products are reasonably fit for the uses stated and even though label directions are followed. Buyer and user acknowledge and assume all risks and liability (except those assumed by the manufacturer under 1 above) resulting from handling, storage, and use of these materials.

Users should also note the following points:

1. Too high a spray pressure produces fine sprays that drift, and therefore will not deposit on the weeds.

2. Proper agitation is necessary when Chevron Weed Oil is mixed with water. Emulsion break time is important in order to insure a uniform spread of the oil film over the weed leaf to promote killing of the weed.

3. Nozzle spacing, spray rig travel speed and spray pressures govern application rates per acre. We outline examples below for a spray rig with nozzles spaced 18" apart. Generally, the spray rig manufacturer specifies the type and size nozzles — spray pressures — and travel speeds to achieve the application rate desired.

Speed of Travel	3MPH			4 MPH			5 MPH		
Gals-Desired Per Acre	GPM	Nozzle Number	Pound Pressure	GPM	Nozzle Number	Pound Pressure	GPM	Nozzle Number	Pound Pressure
50	.45	46	65	.60	59	70	.76	59	100
100	.91	67	80	1.21	78	85	1.62	78	125

CHEVRON WEED OIL

TYPICAL TEST DATA*

Test	Data
Gravity, °API	24
Viscosity @ 40°C, cSt	2.0
Flash Point, °F, PM	170
Aromatics, % ASTM D 1319	75
Aniline Point Mixed, °F	110
Distillation, °F ASTM D86	
Initial	350
50%	490
90%	580
End Point	640

PRODUCT DESCRIPTION

CHEVRON WEED OIL is a light-bodied highly aromatic petroleum oil which may be diluted up to 2 parts water with one part oil for general control of most annual and many perennial weeds on ditch banks, along roadways, fence lines, railroad right of ways and in orchards, vineyards or groves where non-cultivation is practiced. Also used as a pre-emergence weed killer on row crops such as sweetcorn, onions and tomatoes. Best results are obtained by spraying weeds when they are small. Spray sufficiently on all weeds to be killed to completely cover them with a thin film of oil.

Active Ingredient
Petroleum Oil 99.97%
Inert Ingredient 0.03%

CHEVRON WEED OIL will damage or kill all green plant growth. Do not use on any desirable crop or ornamental plant.

Fish and other aquatic life may be killed by this product. Keep out of lakes, streams or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on label.

Do not use where weather conditions favor drift of spray to any crop or plant. Complete soil saturation may leave area bare or sterile. CHEVRON WEED OIL is not recommended as a carrier for 2, 4-D or similar chemicals.

CONDITIONS OF SALE

1. Chevron U.S.A., Inc. (manufacturer) warrants that this material conforms to the chemical description on the label and is reasonably fit for use as directed thereon. Manufacturer neither makes nor authorizes any agent or representative to make any other warranty of FITNESS or of MERCHANTABILITY, guarantee or representation, express or implied, concerning this material.

2. Critical and unforeseeable factors beyond the manufacturer's control prevent it from eliminating all risks in connection with the use of chemicals. Such risks include, but are not limited to, damage to plants and crops to which the material is applied, lack of complete control, and damage caused by drift to other plants or crops. Such risks occur even though the product is reasonably fit for the uses stated on the label and even though label directions are followed. Buyer and user acknowledge and assume all risks and liability (except those assumed by the manufacturer above) resulting from handling, storage and use of this material.

WARNING STATEMENT

HAZARDS TO HUMANS & DOMESTIC ANIMALS

CAUTION: KEEP OUT OF REACH OF CHILDREN
Harmful or fatal if swallowed

CONTAINS PETROLEUM DISTILLATE. Avoid breathing of vapor or contact with skin or eyes.

STATEMENT OF PRACTICAL TREATMENT

If swallowed, DO NOT MAKE PERSON VOMIT. CALL A DOCTOR IMMEDIATELY. Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

Note to Physician: Emergency Information • call (415) 233-3737.

PHYSICAL OR CHEMICAL HAZARDS

COMBUSTIBLE. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed. Clean up spills immediately. Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85°F.

DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

*Subject to change without notice.

Chevron

CHEVRON WEED OIL, continued

TYPICAL USES

GENERAL WEED CONTROL: Use sprayer with mechanical agitator. Fill with oil to desired levels; add water (Chevron Weed Oil can be diluted up to one part oil to two parts water); continue to run agitator until solution is used. For best results, spray pressures should range between 20–50 psi. Too high a pressure will cause drift and may damage crops.

PRE-EMERGENCE USE: Use 20–40 gallons straight oil or mixture 1 part oil to 2 parts water, at rate of 30–60 gallons per acre.

DITCH BANKS, ROAD SIDE AREAS, NON-CROPPED AREAS, RIGHT OF WAYS, ETC.: Apply 50 to 150 gallons per acre plus water, depending upon the density of the weeds. Best results are obtained when the weed is at the tender stage. Repeat as needed.

CITRUS GROVES (LEMONS, ORANGES, ETC.) AND VINEYARDS: Apply 35 to 100 gallons per acre plus water, depending upon the density of the weeds. Best results are obtained when the weed is 2–4 inches high. In vineyards do not apply after vine begins to fold. Use low pressure, approximately 20–30 psi, to minimize drift. Repeat as needed.

PERENNIAL GRASSES (SUCH AS BERMUDA GRASS AND JOHNSON GRASS): Apply undiluted at rate of 25 to 150 gallons per acre. Use higher pressure to ensure full coverage (45–50 psi). Repeat treatment at first sign of regrowth; reduce rate of application for regrowth.

POTATO DEFOLIATION: Apply 15 to 35 gallons per acre (diluted one part to 2 parts of water if desired) and cover foliage thoroughly.

CAUTION: Apply to mature potatoes only after tops have started to turn brown, or vascular discoloration of the potato will result. Avoid drift to other plant growth during application.

COTTON BOLL DESICCANT: Apply (air or ground) 10 to 15 gallons per acre. Primary use to dry the cotton boll when the lack of frost prevents the boll from opening in normal manner. Normally takes 4 to 5 days for boll to pop.

CAUTION: Excessive application rates will stain the partially open boll. Avoid drift to other plants. Will defoliate any plants contacted.

ALFALFA: For control of annual weeds. Apply 25–75 gallons per acre diluted one part oil to two parts water, to alfalfa which has been established one or more years. For applications by air, apply 15 to 35 gallons of straight oil per acre. The alfalfa and young weeds will be killed to ground level. The alfalfa will regrow from the crown.

CAUTION: Do not apply to first-year stand of alfalfa. Avoid drift to other plant growth. Alkali or dry soil, weak plants and abnormal weather conditions may retard crown regrowth of alfalfa, thus reducing the stand.

MILO MAIZE DESICCANT: Apply (by ground or air) 12 to 20 gallons of straight oil per acre. Primary use is to reduce moisture content in Milo Maize prior to harvest. For best results, apply at temperatures above 60°F and 10 days or longer before harvest.

CAUTION: Excessive application rate will fully desiccate plant and release maize. Avoid drift to other desired plant growth.

LEGUMES: To desiccate mature small seed legumes, (alfalfa, clover, trefoil), apply up to 15 gallons per acre by air and up to 40 gallons per acre by ground rig (may be diluted one part oil with up to two parts water). Heavy crop growth may require more than one application to assure complete coverage of plant parts.

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

PROHIBITIONS

Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment.

Open dumping is prohibited.

PESTICIDE DISPOSAL

Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to applicable federal, state, or local procedures.

CUSTOMER BENEFITS

Advantages of Chevron Weed Oil Versus Diesel Fuel:

1. Weed Oil is two to three times greater in phytotoxicity.
2. Provides a more uniform plant kill.
3. Can be applied in lower volumes, therefore less expensive.
4. Has higher aromatic content.
5. Supplemental herbicides not required.

Advantages of Chevron Weed Oil Versus Persistent Herbicides:

1. Weed oil does not contaminate if applied at recommended concentrations.
2. Does not transfer to crops.
3. Low toxicity to birds and wildlife.

SPECIAL NOTE

Under no conditions are our sales personnel, Jobbers, Commissioned Agents or others to make any agricultural use recommendations on a registered economic poison. Customers are to be advised that our label covers the usage and instructions for the product.

See page 104.11 for specific instructions to follow when selling registered economic poisons.

Chevron

MONSANTO PRODUCT NAME

GLYPHOSATE TECHNICAL

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-4000

PRODUCT IDENTIFICATION

Synonyms:	None
Chemical Name:	N-(phosphonomethyl) glycine
Chemical Formula:	$C_3H_8NO_5P$
Active Ingredient:	Glyphosate Technical is a wet-cake of glyphosate, 95% minimum assay (dry basis)
Inert Ingredient:	Glyphosate Technical wet-cake typically contains 10-20% water
CAS Reg. No.:	1071-83-6
EPA Reg. No.:	Not Applicable
DOT Shipping Name:	Not Applicable
DOT Hazard Class/ I.D. No.:	Not Applicable
DOT Label(s):	Not Applicable
Hazardous Substance(s)/RQ(s):	Not Applicable
U.S. Surface Freight Classification:	Weed Killing Compound, N.O.I.B.N.

WARNING STATEMENTS

Keep out of reach of children.
CAUTION!
HARMFUL IF SWALLOWED!

PRECAUTIONARY MEASURES

Do not get in eyes, on skin or on clothing.
Avoid contamination of seed, feed and foodstuffs.

EMERGENCY AND FIRST AID PROCEDURES

IN CASE OF CONTACT, immediately flush skin or eyes with plenty of water for at least 15 minutes. For eyes, call a Physician.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical safety goggles to minimize eye contact during mixing and dumping operation or other activities when exposure is likely.

Skin Protection: Glyphosate Technical does not present a significant skin concern requiring special protection.

Respiratory Protection: Use NIOSH approved equipment when airborne exposure exceeds established limits for nuisance dusts. Consult respirator manufacturers to determine the appropriate type of equipment for a given application.

Ventilation: Provide ventilation to control exposure levels below nuisance dust limits.

Airborne Exposure Limits: Product: GLYPHOSATE TECHNICAL - 100% by wt.

Although no specific exposure limit has been established for this material, OSHA and ACGIH have established limits for nuisance dusts.

OSHA PEL/TWA: Total 15 mg/m³; Respirable 5 mg/m³
ACGIH TLV/TWA: Total 10 mg/m³; Respirable 5 mg/m³

Exposure should be kept below these limits.

FIRE PROTECTION INFORMATION

Flash Point: Non-Flammable, Non Combustible. Heating above 212F in a closed container can generate pressure due to steam formation from water present.

Extinguishing Media: In case of FIRE, use water spray, foam, dry chemical or CO_2.

Special Fire Fighting Procedures: None.

Unusual Fire And Explosion Hazards: None.

PHYSIOLOGICAL EFFECTS SUMMARY

Oral LD_{50} (Rat): 5600 mg/kg, practically non-toxic
Dermal LD_{50} (Rabbit): > 5000 mg/kg, practically non-toxic
Eye Irritation (Rabbit): (FHSA) Score = 6.9/110, slightly irritating
Skin Irritation (Rabbit): (FHSA) Score = 0.1/8.0, practically non-irritating

Three different types of microbial mutagenicity tests were performed using glyphosate. A total of 8 strains (7 bacterial and 1 yeast) including 5 *S. typhimurium* strains and one strain each of *B. subtilis, E. coli* and *S. cereveciae* (yeast) were treated. No mutagenic effect was observed in any strain.

Male mice were given 200, 800 or 2000 mg glyphosate per kg body weight and subsequently mated with untreated females. No evidence of mutagenicity was observed in this dominant lethal mutation assay.

Glyphosate was fed to rats and beagle dogs for 2 years at dietary concentrations of 30, 100 and 300 ppm. No evidence of carcinogenicity was detected in these animals. Similarly, mice fed 300 ppm glyphosate for 1.5 years showed no evidence of carcinogenicity.

PHYSIOLOGICAL EFFECTS SUMMARY (Continued)

A 3-generation rat reproduction study was conducted with glyphosate fed at dosages of 3, 10 and 30 mg glyphosate per kg body weight. No treatment-related effects were observed in parental or pup body weight gain, behavior, survival or reproductive performance.

Glyphosate was administered to pregnant rabbits at dosages of 75, 175 and 350 mg/kg/day on days 6 through 27 of gestation. No evidence of fetal toxicity or birth defects in the offspring (teratogenic response) was observed.

Pregnant rats were treated with glyphosate at dosages of 300, 1000 and 3500 mg/kg/day on days 6 through 19 of gestation. No evidence of birth defects in the offspring was observed.

A neurotoxicity study was conducted with glyphosate in chickens. Ten adult hens were dosed orally with 1.25 g/kg, 2-times daily, for 3 consecutive days. This regimen was repeated to give a cumulative dose of 15.0 g/kg of glyphosate. No behavioral or microscopic treatment-related changes were observed.

Glyphosate is not an acetylcholinesterase inhibitor.

PHYSICAL DATA

Appearance/Odor: White, odorless solid.

Solubility: 1.2% in water at 25C. Insoluble in organic solvent.

Melting Point: 200C, Decomposes.

Vapor Pressure: Negligible.

REACTIVITY DATA

Stability: Formulations of glyphosate are quite stable under temperatures up to 140F. However, they will freeze at -20F, but will go back into solution upon thawing. Heated facilities are not required.

Incompatibility: Non-corrosive to stainless steel, polyethylene, plastics. Corrosive to mild steel, galvanized steel and zinc. This material and solutions of this material react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode if ignited by open flame, spark or other ignition sources.

Hazardous Decomposition Products: None.

Hazardous Polymerization: Does not occur. This product can react with caustic (basic) materials to liberate heat. This is not a polymerization but rather a chemical neutralization in an acid-base reaction.

SPILL, LEAK & DISPOSAL INFORMATION

Avoid skin and eye contact - Use goggles, gloves, and boots.
Scoop or sweep up and dispose of in approved landfills.
Large spills should be contained where possible and picked up by suction or vacuum truck and disposed of by incineration or in an approved landfill.

ADDITIONAL COMMENTS

Environmental Toxicity Information:
96-hr LC_{50} Bluegill: 120 ppm, practically non-toxic
96-hr LC_{50} Trout: 86 ppm, slightly toxic
96-hr TL_{50} Carp: 115 ppm, practically non-toxic
96-hr TL_{50} Atlantic Oyster: > 10 mg/kg, no more than slightly toxic
96-hr TL_{50} Shrimp: 281 ppm, practically non-toxic
96-hr TL_{50} Fiddler Crab: 934 mg/l, practically non-toxic
96-hr LC_{50} Harlequin Fish: 168 ppm, practically non-toxic
48-hr LC_{50} Daphnia: 780 mg/l, practically non-toxic
5-day LC_{50} Ducks: > 4640 ppm, practically non-toxic
5-day LC_{50} Quail: > 4640 ppm, practically non-toxic

A series of residue and metabolism studies have shown that glyphosate is very slowly absorbed across the gastro-intestinal membrane and that there is minimal tissue retention and rapid elimination of residues in several animal species, including mammals, birds and fish. Thus, it is concluded that glyphosate will not bioaccumulate in the food chain.

DATE: March, 1982 **REVISED:** New **SUPERSEDES:** None
MSDS NO.: 1071-83-6

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CALL: 314-694-4000

This form has been approved by the Occupational Safety and Health Administration as "equivalent to" OSHA Form 20.

Monsanto MATERIAL SAFETY DATA

MONSANTO PRODUCT NAME
ROUNDUP®
HERBICIDE

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO. 63167

Emergency Phone No.
(Call Collect)
314-694-4000

PRODUCT IDENTIFICATION

Synonyms:	None
Chemical Name:	Not Applicable, Formulated Product
Active Ingredient:	*Isopropylamine salt of Glyphosate 41.0%
Inert Ingredients:	..... 59.0%
	100.0%

**Contains 480 grams per liter or 4 pounds of the active ingredient isopropylamine salt of N-(phosphonomethyl) glycine per U.S. gallon. Equivalent to 356 grams per liter or 3 pounds per U.S. gallon of the acid, glyphosate.*

CAS Reg. No.:	Not Applicable, Formulated Product
CAS Reg. No. Active Ingredient:	38641-94-0
EPA Reg. No.:	524-308-AA
DOT Shipping Name:	Not Applicable
DOT Hazard Class/ I.D. No.:	Not Applicable
DOT Label(s):	Not Applicable
Hazardous Substance(s)/ RQ(s):	Not Applicable
U.S. Surface Freight Classification:	Weed Killing Compound, N.O.I.B.N.

WARNING STATEMENTS

Keep out of reach of children.
WARNING!
CAUSES EYE IRRITATION.
HARMFUL IF SWALLOWED.
See Additional Comments section for Physical or Chemical Hazards.

PRECAUTIONARY MEASURES

Do not get in eyes, on skin or on clothing.
Avoid contamination of seed, feed and foodstuffs.

EMERGENCY AND FIRST AID PROCEDURES

FIRST AID: *IF IN EYES*, immediately flush with plenty of water for at least 15 minutes. Call a physician. *IF ON SKIN*, flush with water. Wash clothing before reuse.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: During mixing or pouring operations or other activities in which eye contact with undiluted Roundup® herbicide is likely to occur, splash goggles should be worn.

Skin Protection: In case of skin contact, wash exposed area thoroughly. In cases in which prolonged or repeated skin contact with Roundup herbicide may occur, long-sleeved shirt, long pants and rubber or plastic gloves are recommended. Clothing soaked with Roundup solution should be promptly removed and laundered before reuse.

In manufacturing and processing operations, the use of a face shield is recommended when handling undiluted Roundup herbicide in a pressurized system where equipment failure might result in facial contact with liquid splash or aerosol spray.

Respiratory Protection: Respiratory protection is not required for normal use and handling. During periods of abnormal exposure to heavy spray or mist, use a NIOSH approved dust/mist respirator.

Ventilation: No special precautions recommended.

Airborne Exposure Limits: Product: ROUNDUP herbicide — 100% by wt.
OSHA PEL/TWA and ACGIH TLV/TWA/STEL not established.

FIRE PROTECTION INFORMATION

Flash Point (TCC): > 200F. Water-based formulation, Non-Flammable, Non-Combustible.

Extinguishing Media: In case of FIRE, use water spray, foam, dry chemical or CO_2.

Special Firefighting Procedures: None.

Unusual Fire And Explosion Hazards: None.

PHYSIOLOGICAL EFFECTS SUMMARY

Oral LD_{50} (Rat): 5400 mg/kg, practically non-toxic
Dermal LD_{50} (Rabbit): > 5000 mg/kg, practically non-toxic
Eye Irritation (Rabbit): (FHSA) Score = 18.4 on a scale of 110, moderately irritating
Skin Irritation (Rabbit): (FHSA) Score = 4.3 on a scale of 8.0, moderately irritating
Inhalation LC_{50} (Rat): 3.28 mg/l for 4 hour aerosol exposure, slightly toxic

Tests on the biologically active ingredient in this formulation (glyphosate) showed that glyphosate did not cause any mutagenic, carcinogenic, teratogenic (birth defects), adverse reproductive changes, or neurotoxic effects.

PHYSICAL DATA

Appearance: Clear, viscous amber-colored solution.

Odor: Practically odorless to slight amine-like odor.

pH: 4.8

Specific Gravity (Water = 1): 1.17

REACTIVITY DATA

Stability: Stable for at least 5 years under normal conditions of warehouse storage. Heated facilities are not required.

Incompatibility: Non-corrosive to stainless steel, aluminum, polyethylene, plastic, fiberglass. Corrosive to mild steel, galvanized steel and zinc. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode if ignited by open flame, spark or other ignition sources.

Hazardous Decomposition Products: None.

Hazardous Polymerization: Does not occur. The product can react with caustic (basic) materials to liberate heat. This is not polymerization, but rather a chemical neutralization in an acid-base reaction.

SPILL, LEAK & DISPOSAL INFORMATION

Open dumping is prohibited.

This product, spray mixture or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides.

Triple rinse container and offer for recycling, reconditioning, or disposal in approved landfill.

Consult federal, state or local disposal authorities for additional or alternative requirements.

Avoid skin and eye contact—see Occupational Control Procedures.

Soak up small amounts with absorbent clays (kitty litter, oil dri, etc.).

Sweep or scoop up spilled material and dispose of in approved landfill.

Wash down surfaces (floors, truck beds, streets, etc.) with detergent and water solution.

ADDITIONAL COMMENTS

Environmental Toxicity Information:
96-hr TL_{50} Bluegill: 14 mg/l, slightly toxic
96-hr TL_{50} Carp: 3.9 ppm, moderately toxic
96-hr TL_{50} Trout: 11 mg/l, slightly toxic
96-hr LC_{50} Catfish: 16 mg/l, slightly toxic
96-hr LC_{50} Crayfish: > 1000 ppm, practically non-toxic
96-hr LC_{50} Fathead Minnow: 9.4 mg/l, moderately toxic
48-hr LC_{50} *Daphnia*: 5.3 mg/l, moderately toxic

Carp contained in a static pond were unaffected at any time during the 90-day observation period by exposure to an aerial application of ROUNDUP herbicide at the intended use level. Tissue residue analyses indicated that glyphosate will not bioaccumulate.

Physical or Chemical Hazards: Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, polyethylene, plastic and fiberglass containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS.

ADDITIONAL COMMENTS (Continued)

This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette, or other ignition source.

DATE: March, 1982 **REVISED:** New **SUPERSEDES:** None
MSDS NO.: M00007588

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CALL: 314-694-4000

This form has been approved by the Occupational Safety and Health Administration as "equivalent to" OSHA Form 20.

Roundup
Herbicide by Monsanto

Complete Directions for Use

EPA Reg. No. 524-308-AA

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

This product has been approved for use in California except as stated otherwise

1984-2 897.10-002.22/53

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

LIMIT OF WARRANTY AND LIABILITY

(Not applicable to consumer applications applied by the homeowner for noncommercial purposes as permitted by the supplemental labeling for one-quart containers.)

This company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this company, including but not limited to incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather (i. weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied with the normal range being determined on the basis of the average range for the prior 40 years computed from the best available information, and ii. weather perils, including but not limited to hurricanes, tornadoes and floods) as well as weather considerations set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY OR, IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

The buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES EYE IRRITATION.
HARMFUL IF SWALLOWED.
MAY CAUSE SKIN IRRITATION.
Do not get in eyes, on skin or on clothing.
Wash thoroughly after handling.

FIRST AID: IF IN EYES: immediately flush with plenty of water for at least 15 minutes. Call a physician.

IF ON SKIN: immediately flush with plenty of water. Remove contaminated clothing. Wash clothing before reuse.

IF SWALLOWED: this product will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk. Call a physician.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Avoid direct applications to any body of water. Do not contaminate water by disposal of waste or cleaning of equipment.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

Storage and Disposal

Do not contaminate water, foodstuffs, seed or feed by storage and disposal.

See container label for STORAGE AND DISPOSAL instructions.

ACTIVE INGREDIENT:	
*Isopropylamine salt of glyphosate	41.0%
INERT INGREDIENTS:	59.0%
	100.0%

*Contains 480 grams per litre or 4 pounds of the active ingredient isopropylamine salt of N-(phosphonomethyl) glycine per U.S. gallon. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI, 63167 U.S.A.

GENERAL INFORMATION

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

Roundup® herbicide, a water soluble liquid, mixes readily with water to be applied as a foliage spray for the control or destruction of most herbaceous plants. It may be applied through most standard industrial or field type sprayers after dilution and thorough mixing with water in accordance with label instructions.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow down activity of this product and delay visual effects of control. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of above ground growth and deterioration of underground plant parts.

Unless otherwise specified on this label delay application until vegetation has emerged and reached the stages described for control of such vegetation under the "Weeds Controlled" section of this label. Unemerged plants arising from unattached underground rhizomes or root stocks of perennials will not be affected by the spray and will continue to grow. For this reason best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity.

fall. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Johnsongrass – Apply 1 to 3 quarts of this product per acre. In annual cropping systems apply 1 to 2 quarts of this product per acre. Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Use 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre. In non-crop or areas where annual tillage (no-till), is not performed, apply 2 to 3 quarts of this product in 10 to 40 gallons of water per acre. For best results, apply to actively growing plants when most are at least 18 inches in height and have reached the boot-to-head stage of growth. Allow 7 or more days after application before tillage. Do not tank mix with residual herbicides when using the 1 quart per acre rate. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Lantana – Apply this product as a 1 to 1¼ percent solution using hand-held equipment only. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth. Allow 7 or more days after application before tillage.

Milkweed (common) – Apply 3 quarts of this product per acre. Apply when actively growing and most of the milkweed has reached the late bud to flower stage of growth. Following small grain harvest or mowing, allow milkweed to regrow to a mature stage prior to treatment. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Nutsedge (purple, yellow) – Apply 3 quarts of this product per acre as a broadcast spray, or apply a 1 percent solution from hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Treat when plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control. Wait 7 days after treatment before tillage. Tillage will stimulate nutlet germination.

Quackgrass – In Annual Cropping Systems, or in Pastures and Sods Followed by Deep Tillage: Apply 1 to 2 quarts of this product per acre. For the one quart rate, apply 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Use the 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. For the 2 quart rate, apply in 10 to 40 gallons of water per acre. Do not tank mix with residual herbicides when using the 1 quart rate. Spray when quackgrass is 8 to 12 inches in height and actively growing. Do not till between harvest and fall applications or in fall or spring prior to spring application. Allow 3 or more days after application before tillage. In pastures or sods, for best results use a moldboard plow.

Pasture or Sod or Other Noncrop Areas Where Deep Tillage is Not Planned Following Application: Apply 2 to 3 quarts in 10 to 40 gallons of water per acre. Spray when the quackgrass is greater than 8 inches tall and actively growing. Do not till between harvest and fall application or in fall or spring prior to spring application. Allow 3 or more days after application before tillage.

See Directions for use and "Mixing and Application" section of this label for labeled uses and specific application instructions.

Reed Canarygrass / Ryegrass (perennial) / Timothy Wheatgrass (western) – Apply 2 to 3 quarts of this product per acre. For best results, apply to actively growing plants when most have reached the boot to head stage of growth. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Sweet Potato, Wild – Apply this product as a 2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be required. Allow the plant to reach the recommended stage of growth before retreatment. Allow 7 or more days before tillage.

Tall Fescue – Apply 3 quarts of this product in 10 to 40 gallons of water per acre to actively growing plants when most have reached boot-to-early seedhead stage of development. For partial control in pasture or hay renovation apply 2 quarts of this product plus 0.5 to 1 percent by total spray volume of nonionic surfactant in 5 to 10 gallons of water per acre. Use 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. Apply to actively growing plants when most have reached 4 to 12 inches in height. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections and "PASTURES" in the "Cropping Systems" section of this label for labeled uses and specific application instruction.

Torpedograss – Apply 4 to 5 quarts of this product per acre to provide partial control of torpedograss. Apply to actively growing torpedograss when most plants are at or beyond the seedhead stage of growth. Repeat applications will be required to maintain control. Fall treatments must be applied before frost. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Wirestem Muhly / Kikuyugrass – Apply 2 to 3 quarts of this product per acre. Spray when most kikuyugrass or wirestem muhly is at least 8 inches in height (3 or 4 leaf stage of growth), and actively growing. Do not fall plow or spring till prior to spring application. Allow 3 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Woollyleaf Bursage – For control apply 2 quarts of this product plus 1 pint of Banvel™ per acre. For partial control apply 1 quart of this product plus 1 pint of Banvel per acre. Add 0.5 to 1 percent nonionic surfactant by total spray volume and apply 3 to 20 gallons of water per acre. Use 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. Apply when plants are producing new active growth which has been initiated by moisture for at least 2 weeks and when plants are at or beyond flowering. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

Other perennials listed on this label – Apply 3 to 5 quarts of this product per acre. Apply when actively growing and most have reached early head or early bud stage of growth. Allow 7 or more days after application before tillage. See "Directions for Use" and "Mixing and Application" sections of this label for labeled uses and specific application instructions.

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WOODY BRUSH AND TREES

When applied as recommended under the conditions described, this product CONTROLS or PARTIALLY CONTROLS the following woody brush plants and trees:

Alder
Alnus spp.
Ash*
Fraxinus spp.
Aspen (quaking)
Populus tremuloides
Birch
Betula spp.
Blackberry
Rubus spp.
Cascara*
Rhamnus purshiana
Catsclaw*
Acacia greggi
Ceanothus:
Deerbrush*
Ceanothus integerrimus
Redstem*
Ceanothus sanguineus
Cherry:
Bitter
Prunus emarginata
Black
Prunus serotina
Pin
Prunus Pensylvanica
Coyote brush
Baccharis consanguinea
Dewberry
Rubus trivialis
Elderberry
Sambucus spp.
Elm*
Ulmus spp.
Hawthorn
Crataegus spp.
Hazel
Corylus spp.
Honeysuckle
Lonicera spp.
Kudzu
Pueraria lobata
Locust* (black)
Robinia pseudoacacia
Maple:
Red**
Acer rubrum
Sugar
Acer saccharum
Vine*
Acer circinatum
Multiflora Rose
Rosa multiflora
Oak:
Black*
Quercus velutina
Northern Pin
Quercus palustris
Post
Quercus stellata
Red
Quercus rubra
Southern Red
Quercus falcata
White*
Quercus alba
Persimmon*
Diospyros spp.

Poison Ivy
Rhus radicans
Poison Oak
Rhus toxicodendron
Poplar* (yellow)
Liriodendron tulipifera
Raspberry
Rubus spp.
Salmonberry
Rubus spectabilis
Sassafras
Sassafras albidum
Sourwood*
Oxydendrum arboreum
Sumac:
Poison*
Rhus vernix
Smooth*
Rhus glabra
Winged*
Rhus copallina
Sweetgum
Liquidambar styraciflua
Swordfern*
Polystichum munitum
Thimbleberry
Rubus parviflorus
Trumpet Creeper
Campsis radicans
Virginia creeper*
Parthenocissus quinquefolia
Willow
Salix spp.

*Partial control
**See below for Control or Partial Control instructions.

NOTE: If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stages of growth.

Apply this product when plants are actively growing, and unless otherwise directed, after full leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late summer or fall after fruit formation. Ensure thorough coverage when using hand-held equipment. Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

See "Directions for Use" and "Mixing Application" sections of this label for labeled uses and specific application instructions.

Apply this product as follows to control or partially control the following woody brush and trees.

Alder/Blackberry/Dewberry/Honeysuckle/Post Oak/Raspberry – For control, apply 3 to 4 quarts per acre of this product as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Aspen (quaking) / Bitter Cherry / Black Cherry / Hawthorn/Pin Cherry/Southern Red Oak/Sweetgum/Trumpet Creeper – For control, apply 2 to 3 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Birch/Elderberry/Hazel/Salmonberry/Thimbleberry – For control, apply 2 quarts per acre of this product as a broadcast spray or as a 1 percent solution with hand-held equipment.

Catsclaw – For partial control, apply as a 1 to 1½ percent solution with hand-held equipment.

Coyote Brush – For control, apply a 1½ to 2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Kudzu – For control, apply 4 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.

Multiflora Rose – For control, apply 2 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.

Poison Ivy/Poison Oak – For control, apply 4 to 5 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment.

Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.

Red Maple** – For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray.

Sugar Maple/Northern Pin Oak/Red Oak – For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Willow – For control, apply 3 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment.

Other Woody Brush and Trees listed on this label* – For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment. Apply when plants are actively growing and after full leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. Best results are achieved when application is made in late summer or fall after fruit formation. Fall treatments must be applied before a killing frost. Symptoms may not appear prior to frost or senescence with fall treatments.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

NON-CROP USES

See "General Information" and "Mixing and Application Instructions" sections of this label for essential product performance information and the following NON-CROP SECTIONS for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE OF DESIRABLE TURFGRASSES, TREES, SHRUBS, OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

NOTE: If spraying areas adjacent to desirable plants, use a shield made of cardboard, sheet metal or plyboard while spraying to help prevent spray from contacting foliage of desirable plants.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seeds.

Roundup herbicide does not provide residual weed control. For subsequent weed control, follow a label approved herbicide program.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

INDUSTRIAL, RECREATIONAL AND PUBLIC AREAS

When applied as directed for "Non-Crop Uses", under conditions described, this product controls annual and perennial weeds listed on this label growing in areas such as airports, ditch banks, dry ditches, dry canals, fencerows, golf courses, highways, industrial plant sites, lumberyards, parking areas, parks, petroleum tank farms and pumping installations, pipelines, power and telephone rights-of-way, railroads, roadsides, schools, storage areas, other public areas and similar industrial or non-crop areas.

For specific rates of application and instructions for control of various annual and perennial weeds and woody brush and trees, see the "Weeds Controlled" section of this label.

This product may be applied with recirculating sprayers, shielded applicators, or wiper applicators in any non-crop site specified on this label. See the "Selective Equipment" part of "APPLICATION EQUIPMENT AND TECHNIQUES" section of this label for information on proper use and calibration of this equipment.

TANK MIXTURES NON-CROP SITES

When applied as a tank mixture, this product provides control of the emerged annual weeds and partial control of the emerged perennial weeds listed in this label. When applied as a tank mixture, the following residual herbicides will provide pre-emergence control of the weeds listed in the individual product labels.

- ROUNDUP® plus KROVAR™ I
- ROUNDUP plus KROVAR II
- ROUNDUP plus PRINCEP™ CALIBER™ 90
- ROUNDUP plus PRINCEP 4L
- ROUNDUP plus PRINCEP 80W
- ROUNDUP plus SURFLAN™ 75W
- ROUNDUP plus SURFLAN AS

When tank mixing with residual herbicides add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution. Use 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. See the "Mixing and Application Instructions" section of this label before preparing these tank mixtures.

this label growing in or around sugarcane or in fields to be planted to sugarcane. This product will also control undesirable sugarcane.

NOTE: Where repeat treatments are necessary, do not exceed a total of 10.6 quarts of this product per acre per year. Do not apply to vegetation in or around ditches, canals or ponds containing water to be used for irrigation.

Broadcast Treatment – Apply this product in 10 to 40 gallons of water per acre on emerged weeds growing in fields to be planted to sugarcane.

For specific rates of application and instructions for control of various annual and perennial weeds see the "Weeds Controlled" section of this label.

For removal of last stubble or ratoon cane, apply 4 to 5 quarts of this product in 10 to 40 gallons of water per acre to new growth having at least 7 or more new leaves. Allow 7 or more days after application before tillage.

Spot Treatment in or Around Sugarcane Fields – For dilution and rates of application using Hand-Held Equipment, see "Mixing and Application" and "Weeds Controlled" sections of this label.

For control of volunteer or diseased sugarcane, make a 1 percent solution of this product in water and spray to wet the foliage of vegetation to be controlled.

NOTE: When spraying volunteer or diseased sugarcane, the plants should have at least 7 new leaves.

Avoid spray contact with healthy cane plants since severe damage or destruction may result.

■ TANK MIXTURES ■
Minimum Tillage Systems
CORN

When applied as recommended under the conditions described, these tank mixtures control many emerged weeds, and give preemergence control of many annual weeds when corn will be planted directly into a cover crop, established sod, or in previous crop residues.

Refer to specific product labels for crop rotation restrictions and cautionary statements of all products used in these tank mixtures. Lasso® EC herbicide may be substituted for Lasso herbicide in these tank mixtures. For mixing instructions, see the "Mixing and Application Instructions" section of this label.

■ **ROUNDUP® plus LASSO®** ■

Do not use these tank mixtures on sand or loamy sand soils.

■ **ROUNDUP plus LASSO plus ATRAZINE** ■

or

■ **ROUNDUP plus LASSO plus BLADEX™** ■

or

■ **ROUNDUP plus LASSO plus PRINCEP™** ■

or

■ **ROUNDUP plus ATRAZINE plus PRINCEP** ■

Apply these tank mixtures in 10 to 40 gallons of water per acre after planting or during planting in such manner that the planter does not disturb the treated soil. Do not apply these mixtures after crop emergence.

REDUCED CONTROL MAY RESULT IF THIS PRODUCT IS USED IN TANK MIXTURES CONTAINING FLUID FERTILIZERS.

CONTROL OF EMERGED WEEDS

Annual Weeds – Apply to actively growing grasses and broadleaf weeds. Use 1 quart of Roundup herbicide per acre in these tank mixtures if weeds are less than 6 inches tall. If weeds are over 6 inches tall, apply 1.5 quarts of this product per acre. For emerged annual weeds controlled, see the "Weeds Controlled" section of this label.

Perennial Weeds – At normal application dates in minimum tillage systems, perennial weeds may not be at the proper stage of growth for control. See the "General Information" section of this label for the proper stage of growth for perennial weeds.

Use of 2 to 4 quarts of Roundup herbicide per acre in these tank mixtures, under these conditions provides top kill and reduces competition from many emerged perennial grass and broadleaf weeds. For emerged perennial weeds controlled, see the "Weeds Controlled" section of this label. To obtain control, follow recommendations on this label for stage of growth and rate of application for specific perennial weeds. To obtain the desired stage of growth, it may be necessary to apply Roundup herbicide alone in the late summer or fall and then follow with a label approved seedling weed control program at planting.

NOTE: When using these tank mixtures, do not exceed 4 quarts of Roundup herbicide per acre.

USE OF THESE TANK MIXTURES FOR BERMUDAGRASS OR JOHNSONGRASS CONTROL IN MINIMUM TILLAGE SYSTEMS IS NOT RECOMMENDED. For bermudagrass control, follow the instructions under "Control of Perennial Weeds" section of this label and then use a label approved seedling weed control program in a minimum tillage or conventional tillage system. For Johnsongrass control, follow the instructions under the "Control of Perennial Weeds" section of the label, and then use a label approved seedling weed control program with conventional tillage.

PREEMERGENCE WEED CONTROL

■ **LASSO*** ■

For weeds controlled preemergence, see the "Weed Control with Lasso*" section of the label for Lasso herbicide.

See the following table for recommended rates of Lasso in this tank mixture with Roundup herbicide on various soil types.

Lasso*

SOIL TEXTURE GROUP**	BROADCAST RATE PER ACRE Lasso* (Quarts)
COARSE	2.5 to 3
MEDIUM	3
FINE	3.5 to 4

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestation or when organic matter content is 3 percent or more.

■ **LASSO® plus ATRAZINE** ■

For weeds controlled preemergence, see the "Weed Control with Lasso and Lasso plus atrazine (Tank Mixture)" sections of the label for Lasso herbicide.

See the following table for recommended rates of Lasso plus atrazine 80W in this tank mixture with Roundup herbicide on various soil types.

Lasso® plus atrazine

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE Lasso® (Quarts)	atrazine 80W** (Pounds)
COARSE		
Sandy Loam only	2 to 2.5	1.25 to 1.5
MEDIUM	2.5 to 3	1.5 to 2
FINE	2.5 to 3	2 to 2.5

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

**When using atrazine 4L or AAtrex™ 4LC use equivalent rates. One quart equals 1.25 pound of atrazine 80W.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestation or when fall panicum or crabgrass will be present.

Use the higher rate of atrazine in the recommended ranges on soils with greater than 3% organic matter.

■ **LASSO* plus BLADEX** ■

For weeds controlled preemergence see the "Weed Control with Lasso and Lasso plus Bladex (Tank Mixture)" sections of the label for Lasso herbicide.

See the following table for recommended rates of Lasso plus Bladex in this tank mixture with Roundup herbicide on various soil types.

Lasso® plus Bladex

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE Lasso* (Quarts)	+	Bladex** 4L (Quarts)
COARSE	2 to 2.5		1 to 1.6
MEDIUM	2.5 to 3		1.2 to 1.6
FINE	2.5 to 3		1.6 to 2.2

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

**When using Bladex 80W use equivalent rates. One quart Bladex 4L equals 1.25 lbs. of Bladex 80W.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestation or when fall panicum or crabgrass will be present.

Use the higher rate of Bladex in the recommended ranges on soils with greater than 3% organic matter.

NOTE: Do not use this mixture on sand or loamy sand soils with less than 2% organic matter.

™Bladex is a trademark of the Shell Chemical Company.

■ LASSO* plus PRINCEP™ ■

For weeds controlled preemergence see the "Weed Control" sections of the labels for Lasso and Princep.

See the following table for recommended rates of Lasso plus Princep in this tank mixture with Roundup herbicide on various soil types.

Lasso® plus Princep

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE Lasso* (Quarts)	Princep 80W** (Pounds)
COARSE		
Sandy Loam only	2 to 2.5	1.25 to 1.5
MEDIUM	2.5 to 3	1.5 to 2
FINE	2.5 to 3	2 to 2.5

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

**When using Princep 4L use equivalent rates. One quart equals 1.25 pounds of Princep 80W.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestation or when fall panicum or crabgrass will be present.

Use the higher rate of Princep herbicide in the recommended ranges on soils with greater than 3% organic matter.

*Lasso is a registered trademark of Monsanto Company
™Princep is a trademark of Ciba-Geigy Corporation
™AAtrex is a trademark of Ciba-Geigy Corporation

■ ATRAZINE PLUS PRINCEP ■

For weeds controlled preemergence see the "Weed Control" sections of the labels for atrazine and Princep.

See the following table for recommended rates of atrazine 80W and Princep 80W in this tank mixture with Roundup herbicide on various soil types.

Atrazine 80W plus Princep 80W

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE atrazine 80W** (Pounds)	Princep 80W** (Pounds)
COARSE		
Sandy Loam only	1.25	1.25
MEDIUM	1.25 to 1.75	1.25 to 1.75
FINE	1.5 to 2	1.5 to 2

*Refer to the Soil Texture of the label to determine the corresponding soil texture group for the soil to be treated.

**When using atrazine 4L, AAtrex 4LC or Princep 4L use equivalent rates. One quart equals 1.25 pounds of atrazine 80W or Princep 80W.

Use the higher rate of these products in the recommended ranges on soils with greater than 3% organic matter.

■ TANK MIXTURES ■
Minimum Tillage Systems
SOYBEANS

When applied as directed under the conditions described, these tank mixtures control many emerged annual weeds, suppress many emerged perennial weeds and give preemergence control of many annual weeds when soybeans will be planted directly into a cover crop, stale seed bed, or in previous crop residues such as wheat stubble. These tank mixtures will not control regrowth from perennial weeds.

Refer to specific product labels for crop rotation restrictions and cautionary statements of all products used in these tank mixtures. Lasso EC herbicide may be substituted for Lasso herbicide in these tank mixtures. For mixing instructions, see the "Mixing and Application Instructions" section of this label.

■ **ROUNDUP* plus LASSO*** ■
or
■ **ROUNDUP plus LASSO plus LOROX™** ■
or
■ **ROUNDUP plus LASSO plus LEXONE™** ■
or
■ **ROUNDUP plus LASSO plus SENCOR™** ■

Apply these tank mixtures in 10 to 40 gallons of water per acre after planting or during planting in such manner that the planter does not disturb the treated soil. Do not apply these mixtures after crop emergence.

REDUCED CONTROL MAY RESULT IF THIS PRODUCT IS USED IN TANK MIXTURES CONTAINING FLUID FERTILIZERS.

CONTROL OF EMERGED WEEDS

Annual Weeds — Apply to actively growing grasses and broadleaf weeds. Use 1 quart of Roundup per acre in these tank mixtures if weeds are less than 6 inches tall. If weeds are over 6 inches tall, apply 1.5 quarts of this product per acre. For emerged annual weeds controlled, see the "Weeds Controlled" section of this label.

Perennial Weeds — At normal application dates in minimum tillage systems, perennial weeds may not be at the proper stage of growth for control. See the "General Information" section of this label for the proper stage of growth for perennial weeds. Use of 2 to 4 quarts of Roundup herbicide per acre in these tank mixtures under these conditions provides top kill and reduces competition from many emerged perennial grass and broadleaf weeds. For emerged perennial weeds controlled, see the "Weeds Controlled" section of this label. To obtain control, follow recommendations on this label for stage of growth and rate of application for specific perennial weeds. To obtain the desired stage of growth, it may be necessary to apply Roundup herbicide alone in the late summer or fall and then follow with a label approved seedling weed control program at planting.

NOTE: When using these tank mixtures, do not exceed 4 quarts of Roundup herbicide per acre.

USE OF THESE TANK MIXTURES FOR BERMUDAGRASS OR JOHNSONGRASS CONTROL IN MINIMUM TILLAGE SYSTEMS IS NOT RECOMMENDED. For bermudagrass control, follow the instructions under "Control of Perennial Weeds" section of this label and then use a label approved seedling weed control program in a minimum tillage or conventional tillage system. For Johnsongrass control, follow the instructions under the "Control of Perennial Weeds" section of the label, and then use a label approved seedling weed control program with conventional tillage.

PREEMERGENCE WEED CONTROL

■ LASSO* ■

For weeds controlled preemergence, see the "Weed Control with Lasso" section of the label for Lasso herbicide.

See the following table for recommended rates of Lasso in this tank mixture on various soil types.

Lasso*

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE Lasso* (Quarts)
COARSE	2.5 to 3
MEDIUM	3
FINE	3.5 to 4

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestation, or when organic matter content is 3 percent or more.

■ LASSO® plus LOROX ■

For weeds controlled preemergence, see the "Weed Control with Lasso and Lasso plus Lorox 50WP" sections of the label for Lasso herbicide.

See the following table for recommended rates of Lasso plus Lorox 50WP in this tank mixture with Roundup herbicide on various soil types.

Lasso® plus Lorox

SOIL TEXTURE GROUP*	BROADCAST RATE PER ACRE Lasso® (Quarts)	Lorox 50WP (Pounds)
COARSE		
Sandy Loam only	2 to 2.5	1 to 1.5
MEDIUM	2.5 to 3	1.5 to 2
FINE	2.5 to 3	2 to 3

*Refer to the Soil Texture section of the label to determine the corresponding soil texture group for the soil to be treated.

Use the higher rate of Lasso in the recommended ranges in areas of heavy grass infestation or when fall panicum or crabgrass will be present.

Use the higher rate of Lorox 50WP in the recommended ranges on soils with greater than 3% organic matter.

Do not use this mixture on sand or loamy sand or on soil with less than 1% organic matter as crop injury from Lorox may occur.

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■ **LASSO* plus LEXONE** ■
or
■ **LASSO plus SENCOR** ■

For weeds controlled preemergence, see the "Weed Control with Lasso and Lasso plus Lexone or Sencor" sections of the label for Lasso herbicide.

See the following table for recommended rates of Lasso plus Lexone 50WP or Lasso plus Sencor 50WP in this tank mixture on various soil types.

Lasso* plus Lexone 50WP or Lasso* plus Sencor 50WP

	BROADCAST RATE PER ACRE	
SOIL TEXTURE GROUP*	Lasso* (Quarts)	Lexone 50WP** or Sencor 50WP** (Pounds)
COARSE		
Sandy Loam only	2 to 2.5	0.5 to 0.75
MEDIUM	2.5 to 3	0.75 to 1
FINE	2.5 to 3	1 to 1.5***

*Refer to the Soil Texture section of this label to determine the corresponding soil texture group for the soil to be treated.

**When using Lexone 4L or Sencor 4 Flowable use equivalent rates. One quart equals 2 pounds of Lexone 50WP or Sencor 50WP.

***On the silty clay or heavy clay soils of the Mississippi Delta, use 1.5 to 2 pounds of Lexone or Sencor per acre.

Use the higher rate of Lasso herbicide in the recommended ranges in areas of heavy grass infestations or when fall panicum or crabgrass will be present.

Use the higher rate of Lexone or Sencor herbicides in the recommended ranges on soils with greater than 2% organic matter.

Do not use this mixture on sand or loamy sand soils as crop injury from Lexone or Sencor may occur.

Do not use on muck soils.

Do not apply on alkaline soils with a pH of more than 7.4.

Crop injury may occur if any atrazine was applied on the soil the year before use of this Lexone or Sencor tank mixture.

DO NOT REPLANT CROPS OTHER THAN SOYBEANS FOR 120 DAYS AFTER APPLICATION.

™Lexone is a trademark of E. I. duPont de Nemours and Company.

™Sencor is a trademark of the parent company of Farbenfabriken Bayer GmbH, Leverkusen.

PRE-HARVEST APPLICATIONS

When applied as directed under the conditions described, this product controls annual and perennial weeds listed on this label prior to the harvest of COTTON.

For specific rates of application and instructions for control of various annual and perennial weeds, see the "Weeds Controlled" section of this label.

Ground Applications — Apply this product in 10 to 40 gallons of water per acre on emerged labeled annual and perennial weeds.

Timing of Application — Apply this product for pre-harvest weed control after 80% of the cotton bolls have opened.

NOTE: DO NOT APPLY TO CROPS GROWN FOR SEED.

Allow a minimum of 7 days between application and harvest.

Do not feed or graze treated areas within 8 weeks after application.

TREE AND VINE CROPS

This product is recommended for weed control in established groves, vineyards, or orchards, or for site preparation prior to transplanting crops listed in this section. Applications may be made with boom equipment, CDA, shielded sprayers, hand-held and high-volume wands, lances, or orchard guns, or with wiper applicator equipment, except as directed in this section. See the "Application Equipment and Techniques" section of this label for specific information on use of equipment.

When applying Roundup alone, refer to the "WEEDS CONTROLLED" and "FALLOW AND REDUCED TILLAGE SYSTEMS" sections for recommended rates to be used.

NOTE

Repeat treatments may be necessary to control weeds originating from underground parts of untreated weeds or from seeds. This product does not provide residual weed control. For subsequent weed control, follow a program using residual herbicides or use repeated applications of this product. Do not apply more than 10.6 quarts of this product per acre per year.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE SOLUTION, SPRAY, DRIFT, OR MIST WITH FOLIAGE OR GREEN BARK OF TRUNK, BRANCHES, SUCKERS, FRUIT, OR OTHER PARTS OF TREES OR VINES. CONTACT OF THIS PRODUCT WITH OTHER THAN MATURED BROWN BARK CAN RESULT IN SERIOUS CROP DAMAGE.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut and have not been allowed to regrow to the recommended stage for treatment.

For specific rates of applications and instructions, see the "Weeds Controlled" section of this label.

■ TANK MIXTURES TREE AND VINE CROPS ■

When applied as a tank mixture, this product provides control of the emerged annual weeds and partial control of the emerged perennial weeds listed in this label. The following residual herbicides will provide pre-emergence control of those weeds listed in the individual product labels.

■ ROUNDUP* plus GOAL™ 1.6E ■
■ ROUNDUP plus KARMEX™ WP ■
■ ROUNDUP plus KROVAR™ I ■
■ ROUNDUP plus KROVAR™ II ■
■ ROUNDUP plus PRINCEP™ CALIBER™ 90 ■
■ ROUNDUP plus PRINCEP 4L ■
■ ROUNDUP plus PRINCEP 80W ■
■ ROUNDUP plus SOLICAM™ 80WP ■
■ ROUNDUP plus SURFLAN™ AS ■
■ ROUNDUP plus SURFLAN 75W ■
■ ROUNDUP plus PRINCEP (80W, or 4L, or CALIBER 90) plus SURFLAN (AS or 75W) ■
■ ROUNDUP plus GOAL (1.6E) plus SURFLAN (AS or 75W) ■
■ ROUNDUP plus GOAL (1.6E) plus PRINCEP (80W, or 4L, or CALIBER 90)* ■

*See the Roundup plus Goal plus Princep tank mixture section below for specific use instructions.

When tank mixing with residual herbicides add an agriculturally approved nonionic surfactant. Use 0.5 percent surfactant concentration when using surfactants which contain at least 50 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 50 percent active ingredient. See the "Mixing and Application Instructions" section of this label.

Do not apply these tank mixtures in Puerto Rico.

CONTROL OF EMERGED WEEDS

Annual Weeds — Apply 1 quart per acre of this product in these tank mixtures when weeds are less than 12 inches tall. For weeds greater than 12 inches tall, apply 1.5 quarts per acre.

Perennial Weeds — For partial control of perennial weeds using these tank mixtures apply 2 to 5 quarts per acre of this product. Follow the recommendations in the "Weeds Controlled" section of this label for stage of growth and rate of application for specific perennial weeds.

PREEMERGENCE WEED CONTROL

The following are the labeled rates for the recommended residual herbicides.

PRODUCT	RATE / ACRE
Goal 1.6E	1.25 to 5 qts.
Karmex WP	2 to 8 lbs.
Krovar I	2 to 8 lbs.
Krovar II	2 to 8 lbs.
Princep Caliber 90	1.1 to 10.6 lbs.
Princep 80W	1¼ to 12 lbs.
Princep 4L	2 to 9.6 qts.
Solicam 80WP	2½ to 5 lbs.
Surflan AS	2 to 4 qts.
Surflan 75W	2⅔ to 5⅓ lbs.

NOTE: These residual herbicides may provide post-emergence activity on certain annual weed species.

Refer to the individual product labels for specific crops, rates, geographical restrictions and precautionary statements.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the labels of all products. Use according to the

most restrictive label directions for each product in the mixture.

For specific rates of application and instructions see the "Weeds Controlled" section of this label.

■ **ROUNDUP® plus GOAL plus PRINCEP** ■
(California only)

Roundup may be tank mixed with Goal plus Princep for broad spectrum postemergence and preemergence control. Refer to the following table for approved crops and rate ranges for each product in this tank mix. Refer to the individual product labels for weeds controlled, geographical restrictions, precautionary statements and specific use rates.

	RATE RANGES*			
CROP	ROUNDUP® (quarts)	+ GOAL 1.6E* (quarts)	+ PRINCEP 80W** (Pounds)	
Grapes	1 to 1.5	1 to 4	2.5 to 5	
Almond	1 to 1.5	1 to 4	1.25 to 2.5	

Use equivalent rates of Caliber 90 or Princep 4L.

*Rate dependent on weeds present.

**Rate dependent on soil type and weeds present.

[1]Goal is a trademark of Rohm and Haas Company.

[1]Karmex and [1]Krovar are trademarks of E. I. du Pont de Nemours and Company.

[1]Princep and [1]Caliber are trademarks of Ciba-Geigy Corporation.

[1]Solicam is a trademark of Sandoz, Inc.

[1]Surflan is a trademark of Elanco Products Company.

TREE CROPS

Citrus*: citron, grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine.

Nuts**: almond, filbert, macadamia, pecan, pistachio, walnut.

Pome Fruit*: apple, pear.

Stone Fruit*: apricots, cherries, nectarines, peaches plums/prunes.

For cherries, any application equipment listed in this section may be used in all states.

For citron, apply as a directed spray only.

Any application equipment listed in this section may be used in apricots, nectarines, peaches, and plums/prunes growing in Arizona, California, Colorado, Idaho, Kansas, Kentucky, New Jersey, North Dakota, Oklahoma, Oregon, Texas, Utah, and Washington, except for peaches grown in the states specified in the following paragraph. In all other states use wiper equipment only.

For PEACHES grown in Alabama, Arkansas, Florida, Georgia, North Carolina, South Carolina, and Tennessee only, apply with a shielded boom sprayer or shielded wiper applicator which prevents any contact of this product with the foliage or bark of trees. Apply no later than 90 days after first bloom. Applications made after this time may result in severe damage. Remove suckers and low hanging limbs at least 10 days prior to application. Avoid applications near trees with recent pruning wounds or other mechanical injury. Apply only near trees which have been planted in the orchard for 2 or more years. EXTREME CARE MUST BE TAKEN TO ENSURE NO PART OF THE PEACH TREE IS CONTACTED.

Tropical Fruit: avocado*, banana, coffee*, guava, mango*, papaya, tea. Allow a minimum of 1 day between last application and harvest of guava and papaya. In coffee and banana delay applications 3 months after transplanting to allow the new coffee or banana plant to become established.

NOTE:

*Allow a minimum of 14 days between last application and harvest.

**Allow a minimum of 21 days between last application and harvest of these crops.

VINE CROPS

Grapes*: any variety of table, wine, or raisin grape may be treated with any equipment listed in this section. Applications should not be made when green shoots, canes, or foliage are in the spray zone.

In the northeast and Great Lakes regions, applications must be made prior to the end of bloom stage of grapes to avoid injury.

NOTE:

*Allow a minimum of 14 days between last application and harvest.

CALIFORNIA

Roundup* herbicide has been approved by the U.S. Environmental Protection Agency for the uses, crops and sites listed in this label and by California under label designation 1984-1. Approval of the items listed below is pending under the State of California registration requirements. With the exception of these items, this booklet contains the material approved by California in label 1984-1.

These use conditions, crops and sites may not be treated with this product in California until approval is received:

- Control of Catsclaw and Virginia Creeper.
- Use in Pineapple and Watercress.
- 1% surfactant concentration with less than 50% active ingredient for Bluegrass, Tall Fescue, Dormant Bermudagrass, Woollyleaf Bursage and non-crop tank mixtures.
- Inhibition of Bahiagrass seedhead emergence and suppression of vegetative growth.
- Roundup plus Goal plus Princep, and Roundup plus Goal plus Surflan tank mixtures for use on tree and vine crops in California only.
- Use as a directed spray on citron in tree crops.
- Use of dyes in hand-held and high-volume equipment.
- Round plus Surflan AS in non-crop sites.
- Silvicultural applications with Microfoil boom within 50-foot buffer zone.

ROUNDUP® Herbicide Complete Directions for Use
in NON CROP AREAS such as
Industrial, Recreational and Public areas
Farmstead Weed Control
Ornamentals
Silvicultural Sites and Rights of Way
Turfgrasses and Grasses for Seed Production
in CROPPING SYSTEMS

Alfalfa	Corn	Parsnips
Artichoke (Jerusalem)	Cotton	Peanuts
Asparagus	Cranberries	Peas (English, green)
Barley	Forage Grasses	Pineapple
Beans Edible (all)	Forage legumes	Potato (Irish, sweet)
Beet Greens	Horseradish	Radish
Beets (red, sugar)	Kale	Rice
Broccoli	Lentils	Rutabaga
Cabbage	Lettuce	Sorghum (milo)
Carrot	Mustard greens	Soybeans
Cauliflower	Oats	Spinach
Celery	Okra	Sugarcane
Chicory	Onion	Watercress
		Wheat

Fallow and Reduced Tillage Systems
Pastures
Preharvest Applications to Cotton
Sugarcane
in TREE CROPS

Citrus (as listed)	Pome Fruit (as listed)
Cherry	Stone Fruit (as listed)
Nuts (as listed)	Tropical Fruit (as listed)

in GRAPES — Wine, Table and Raisin
in MINIMUM TILLAGE SYSTEMS for Corn/Soybeans

This product has been approved for use in California except as stated otherwise on pages 106 and 107

EPA Reg. No. 524-308-AA

1984-2 897 10 002 22 53

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

APPENDIX C

KAUA'I PLANT TAXA PROPOSED FOR LISTING
AS ENDANGERED AND THREATENED SPECIES
FEDERAL REGISTER
12/15/80

from Federal Register, 1980

CANDIDATE T&E PLANTS UNDER REVIEW ON KAUAI

1. Nototrichium sandwicense var. decipiens
2. Nototrichium sandwicense var. olokeleanum
3. Nototrichium viride
4. Peuceudium kauiense
5. Pteralyxia kauiensis
6. Rauvolfia helleri
7. Rauvolfia sandwicensis var. sandwicensis
8. Rauvolfia sandwicensis var. subacuminata
9. Cheirodendron helleri var. helleri
10. Cheirodendron helleri var. microcarpum
11. Cheirodendron helleri var. sodalium
12. Munroidendron racemosum
13. Tetraplasandra bisattenuata
14. Tetraplasandra kavaiensis var. koloana
15. Tetraplasandra lihuensis var. gracilipes
16. Tetraplasandra meiandra var. degeneri
17. Tetraplasandra waialealae var. urceolata
18. Tetraplasandra waimeae var. angustior
19. Pritchardia eriophora
20. Bidens cervicata
21. Bidens conjunctata
22. Dubautia laevigata var. parvifolia
23. Dubautia latifolia
24. Dubautia microcephala
25. Dubautia waialealae var. megaphylla
26. Hesperomannia lydgatei
27. Lipochaeta deltoidea
28. Lipochaeta fauriei
29. Lipochaeta micrantha
30. Lipochaeta waimeansis
31. Wilkesia hobdyi
32. Lepidium serra
33. Brighamia citrina
34. Cyanea chockii
35. Cyanea leptostegia
36. Cyanea rivularis
37. Lobelia niihauensis
38. Lobelia tortuosa
39. Silene lanceolata
40. Drypetes phyllanthoides
41. Euphorbia atrococca
42. Euphorbia celastroides var. kealiana
43. Euphorbia celastroides var. nematopoda
44. Euphorbia celastroides var. stokesii
45. Euphorbia haeeleeleana
46. Euphorbia halemanui
47. Euphorbia multiformis var. sparsiflora

CANDIDATE T&E PLANTS UNDER REVIEW ON KAUAI - PROBABLY EXTINCT

138. Aster sandwicensis
139. Bidens valida
140. Dubautia magnifolia
141. Remya kauaiensis
142. Tetramolopium consanguineum
143. Cyanea linearifolia
144. Cyrtandra kauaiensis
145. Haplostachys haplostachya var. leptostachya
146. Phyllostegia parviflora var. canescens
147. Botrychium subbifoliatum
148. Poa mannii
149. Poa siphonoglossa
150. Diellia mannii
151. Pelea knudsenii
152. Pelea macropus
153. Pelea waimeaensis
154. Neraudia kauaiensis
155. Rollandia parvifolia
156. Lycopodium mannii

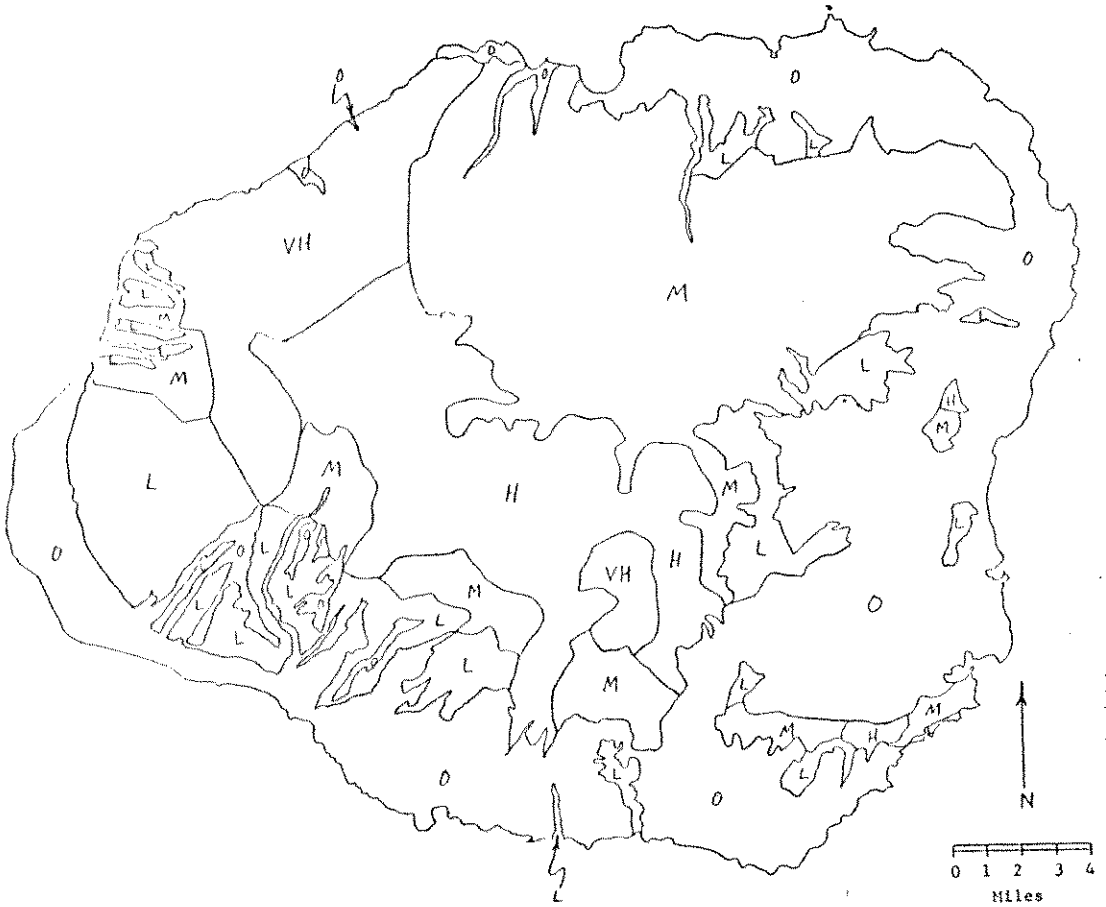
CANDIDATE T&E PLANTS UNDER REVIEW WITH INDETERMINATE LOCALITIES

157. Achyranthes mutica
158. Vigna o-wahuensis
159. Cyrtandra glauca
160. Cyrtandra malacophylla var. malacophylla
161. Scaevola coriacea
162. Labordia kaalae var. kauaiensis
163. Ophioglossum concinnum
164. Diellea erecta
165. Vigna sandwicensis

CANDIDATE T&E PLANTS UNDER REVIEW WITH INDETERMINATE LOCALITIES - PROBABLY EXTINCT

166. Aerva sericea
167. Schiedea amplexicaulis
168. Stenogyne sororia
169. Psychotria insularum var. paradisii
170. Ctenitis squamigera

ISLAND OF KAUAI



This map should be used only as a guideline based upon limited information and further refinement. It illustrates the concentrations of 209 endemic plant taxa for Hawaii which are listed or under review for endangered or threatened status for the State of Hawaii. It is based mainly upon historical collections with some recent observations. (Note: Individual rare species sometimes grow only within areas that may have an overall low species concentration rating.)

LEGEND

O = little or no T&E species
L = low concentration
M = medium concentration
H = high concentration
VH= very high concentration