The Environmental Protection Agency's Implementation of the Endangered Species Act with Respect to Pesticide Registration

Prepared by

James Serfis
Richard Tinney
and
Roger E. McManus

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EXECUTIVE SUMMARY

INTRODUCTION

This report was written by the Center for Environmental Education (CEE) under contract to EPA's Office of Policy, Planning and Evaluation. It reviews Agency pesticide registration policy and procedure for implementing the Endangered Species Act (ESA), with respect to the regulation of pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). CEE analyzed and evaluated specific case studies of Agency pesticide actions associated with endangered species from 1980 through 1984. The report includes recommendations for changes in Agency procedures which, if implemented, could result in more timely and effective compliance with ESA requirements.

BACKGROUND

What ESA Requires: The ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of any endangered/threatened species. Under the ESA agencies are required to identify potential risks and, when risks are identified, to consult with the Department of Interior's Office of Endangered Species (OES) to obtain a biological opinion. If the opinion establishes jeopardy to endangered species, agencies are required to act to mitigate risks to the affected species.

What FIFRA Requires: EPA, through FIFRA, registers all pesticides used in the United States. Registration decisions are based upon evidence adequate to demonstrate that a pesticide's use will not pose unreasonable risks to people and the environment. Under the ESA, EPA must ensure that the registered uses of pesticides in the range of endangered/threatened species will not place the species or their critical habitats at risk.

STUDY DESIGN

Research for the CEE report included numerous interviews with government personnel responsible for regulatory activities regarding the protection of endangered species and review and analysis of all the chemical-specific consultations and generic (or use pattern) that occurred consultations between EPA and OES during the 1980-1984 period.

RESULTS

This report identified two major problem areas associated with EPA's implementation of the ESA under FIFRA during the period 1980-1984:

1) EPA did not take sufficient action to address risks cited in OES opinions, this arose both from a misinterpretation of ESA requirements by EPA and from inadequate communication within EPA and between EPA and OES during the consultation period.

2) EPA did not routinely conduct "may affect" analyses to determine if consultation with OES was appropriate for certain types of pesticide regulatory actions.

The report's most important recommendations are: 1) improve EPA compliance with ESA requirements by better identifying risks to endangered species; 2) expand the consultation process with OES; and 3) take appropriate action to mitigate jeopardy to listed species. Specifically, EPA should:

- Implement restrictions for products identified as posing jeopardy in chemical-specific and generic consultations;
- Implement pesticide container labeling to mitigate jeopardy by developing generic product labeling to convey endangered species precautions;
- Improve risk identification measures by conducting more intensive evaluation of endangered species impacts during the registration standard process.
- Improve the working relationship with OES by additional sharing of information, developing alternatives to mitigate jeopardy, and expediting the consultation process.

CONCLUSION

This study was commissioned by EPA as a critical self-examination of how effectively EPA implements the ESA with regard to pesticide regulation. Although improvements in EPA compliance during the study years are documented in the report, further improvements are needed, including the mitigation of jeopardy situations.

NOTE TO THE READER:

During and after the period covered by the CEE report, EPA initiated numerous activities to correct problems associated with the implementation of the ESA under FIFRA. Some corrections resulted from recommendations outlined in early drafts of the report, others were underway when the report was being written. In order to bring the reader up to date, a brief description of past and future changes in Agency implementation of the ESA follows.

EPA UPDATE ON THE IMPLEMENTATION OF THE ENDANGERED SPECIES ACT UNDER FIFRA

INTRODUCTION

In August 1984, EPA commissioned the Center for Environmental Education (CEE) to examine how effectively EPA was implementing the Endangered Species Act (ESA) in its pesticide actions. The attached CEE report outlines specific weaknesses in EPA's compliance with the ESA under FIFRA between 1980 and late 1984.

The report recommends several policy and procedural modifications to enhance the Agency's ability to meet ESA requirements. Although EPA began program modification prior to completion of CEE's research, the report underscores the need to implement changes promptly and to continue to mitigate risks to endangered species. The purpose of this update is to identify the changes EPA has initiated or will initiate to resolve issues raised by the CEE report.

EPA'S REVIEW/CONSULTATION PROCESS

EPA reviews the impact of pesticide uses to listed species and their habitat by conducting an endangered species risk assessment. When EPA determines that a pesticide use pattern "may affect" a listed species, EPA formally consults with the Office of Endangered Species (OES) in the Department of the Interior to determine whether or not listed species may be in

jeopardy.

Each year EPA assesses potential risks to endangered species for approximately 700 proposed new pesticide uses or changes to existing uses (only a small percentage of the reviews result in "may affect" determinations). While some pesticide registration actions reviewed by EPA between 1980 and 1984 were not evaluated for risks to endangered species, EPA now assesses all major outdoor pesticide uses that have the potential to affect endangered species.

EPA uses both case-by-case (or chemical-specific) and "cluster" (or use pattern) approaches to assess risks to endangered species.

Case-by-Case Reviews

Prior to 1982, EPA assessed endangered species risks only on a chemical-specific basis. Implementing mitigative measures resulting from case-by-case reviews did not, however, adequately protect endangered species from risks since users could shift from a chemical identified in OES jeopardy opinions to an unreviewed chemical that might pose an equal or greater risk to the species. EPA has not implemented mitigative measures for all case-by-case pesticide jeopardy opinions while others, like the 1080 toxic collar, dicofol, and zinc phosphide, have been.

The Cluster Approach

To address this problem presented by case-by-case reviews, EPA, in cooperation with OES, initiated the more efficient cluster approach. Under this approach, EPA assesses all chemicals

within the same use pattern together for effects on endangered species. OES then prepares biological opinions for each cluster, addressing all species at risk. Twelve clusters, representing over 70% of agricultural pesticide use, were selected: corn, cotton, soybeans, sorghum, small grains, rangelands, forests, mosquito larvicides, non-croplands (i.e., rights of way), aquatic herbicides, rice and alfalfa. Case-by-case reviews continue for pesticide uses not included in any one of the clusters.

Although completion of cluster risk assessments and accompanying OES biological opinions is a complicated and resource-intensive process, OES and EPA endorse the cluster approach because it is both consistent and effective.

EPA has assessed the risk to endangered species for the following eight clusters and has received OES biological opinions for each: corn, cotton, soybeans, sorghum, small grains, mosquito larvicides, forests, and rangelands. EPA's risk assessments and OES' biological opinions for the remaining clusters -- non-croplands, aquatic herbicides, alfalfa and rice -- will be finished in 1987.

When the Agency completes the cluster project, most pesticides registered under Section 3 of FIFRA will have been evaluated for risks to endangered species. All existing OES jeopardy opinions -- twelve identified in the CEE report and seven received since 1984 -- will be mitigated when all clusters are fully implemented.

IMPLEMENTATION OF MITIGATIVE MEASURES TO PRECLUDE JEOPARDY

EPA's primary mitigative measure is to restrict use of pesticides in ranges of jeopardized species. This is accomplished by: 1) placing a specific endangered species statement on the product label that prohibits pesticide use in the range of endangered species; and 2) providing users with additional information clearly identifying ranges of the endangered species to be protected.

Labeling - A generic label statement will be placed on each pesticide product determined by OES to jeopardize endangered species. The label will warn of endangered species risks; prohibit pesticide use in the range of endangered species; and require users to review specific endangered species range information. Label restrictions are legally binding under FIFRA.

Additional Information - While the generic label will prohibit pesticide use within ranges of endangered species, those ranges will be identified by providing users with additional information. EPA is considering two approaches in making their range information available to users.

The first approach is to develop Endangered Species Information Bulletins for certain clusters or use patterns. The appropriate bulletin would have to be obtained by affected users before using the pesticide in listed counties. Bulletins will be readily available through county extension agents, state fish and game agencies, farm supply stores, and regional

offices of EPA.

The other approach utilizes supplemental labeling. The agency would use the Label Improvement Program (LIP) to require pesticide registrants to change labels (the supplemental labeling could be attached to pesticide products) to include affected endangered species range maps. The LIP would be backed up by product cancellation if registrants do not comply.

Regardless of which approach is chosen, adequate range definition of jeopardized species has significantly slowed development of this additional information.

EPA'S IMPLEMENTATION SCHEDULE

Beginning in 1987, over 50% of species identified in existing OES jeopardy opinions will be protected by enforceable EPA labeling requirements. Product labeling requirements for the remaining species determined to be in jeopardy will go into effect in 1987.

EPA will, however, initiate an intensive public education campaign designed to reach users of pesticide products which jeopardize endangered species. Information about risks to species and ways to avoid those risks will be described and distributed to users. State agriculture and wildlife officials, pesticide dealers, and federal officials who will carry out EPA's endangered species plan also will be given information to help them explain the Agency's plan to pesticide users.

EPA expects to achieve full ESA implementation for the 1988 growing season and will mitigate all existing OES jeopardy opinions at that time. Specifically, endangered species labeling for the forest and mosquito larvicide cluster chemicals will be required in early 1987. Label changes for the remaining cluster chemicals will be required later in 1987, bringing EPA into full compliance with the ESA for the 1988 growing season.

ADDITIONAL PROGRAM MODIFICATIONS

A number of EPA program changes have been initiated to more fully assess risks to endangered species. These include:

- Routine Endangered Species Screening - EPA now routinely reviews all major outdoor use pesticide actions that have the potential to affect endangered species.

- Non-Cluster Crop Use Evaluations - EPA will evaluate pesticide use on crops not included in the established clusters for endangered species risks when a chemical is undergoing re-registration. In an effort to protect species in non-cluster crop sites, use of pesticides posing use-specific jeopardy will be prohibited on all crops grown in ranges cited in OES biological opinions.

- Emergency Actions (Section 18 actions) - EPA now reviews all Section 18 emergency exemptions for endangered species risks.

- EPA/OES Memorandum of Understanding (MOU) - EPA and OES are negotiating a MOU, which will provide for: improved communications during consultations; development of a common methodology to identify both risk and workable prudent alternatives; expedited consultations; and sharing of information sources.

- Endangered Species Database System - EPA has developed an Endangered Species Database System containing information on all formal EPA/OES consultations sought since April 1980. EPA will also use the Fish and Wildlife Service Endangered Species Information System when it becomes available.

- National Ecological Effects Monitoring Plan - EPA is developing a fish and wildlife component for the national pesticide monitoring plan that will assist in detecting ambient pesticide levels which may affect endangered species and other fish and wildlife.

- Endangered Species Product Labeling - EPA will require labeling to protect the endangered species included in all OES jeopardy opinions.

In summary, EPA has initiated appropriate program modifications to more fully assess risks to endangered species, will mitigate risks when they are identified, and has established a reasonable schedule to fully implement measures to preclude jeopardy in existing OES opinions. EPA must still resolve some implementation issues (endangered species range information). Regardless

of which option is chosen, however, EPA believes that endangered species will be adequately protected from pesticide risks without placing undue burden on pesticide users.

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I. Study Description

The purpose of this study is to examine the Environmental Protection Agency's (EPA) implementation of the Endangered Species Act (ESA) in relation to actions authorized by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). More specifically, the study identifies methods to enhance the effectiveness of the pesticide program, to correct any deficiencies in Agency actions, and to decrease the amount of resources needed for effective implementation. The study concentrated on administrative procedures of the pesticide programs and not the adequacy of toxicological testing and data required by EPA's pesticide regulations.

The ESA directs federal agencies to protect endangered and threatened species by avoiding those actions which will jeopardize "the continued existence of the species." Although all of EPA's actions concerning endangered and threatened species are covered by the ESA, the study includes only those decisions involving the regulation of pesticides.

The study focused on the consultations process between the EPA and the Interior Department that identifies pesticide use that may harm listed species or adversely affect their habitats. The study sample consisted of all of the consultations completed between April 1980 to November 1984. (A list and summary of these cases can be found in Appendix A and Table 1.) These consultations were initiated by the Ecological Effects Branch (EEB) of the Hazard Evaluation Division of the Office of Pesticide Programs (OPP). Although a number of consultations were completed

before and after those in the study sample, the majority of all the case-by-case consultations that have been completed by EPA were reviewed. Earlier consultations were excluded because they were conducted differently than later consultations, were completed by various branches within the Agency other than the EEB, and were not well documented. Later consultations were not included because they were still pending at the time the study was initiated.

The major source of information were EPA documents. Other background information was gathered from interviews with persons from the Registration Division (RD) of EPA, the Ecological Effects Branch (EEB) within the Hazard Evaluation Division of the Office of Pesticide Programs of EPA, the Fish Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), congressional staff, and non-government organizations. Information on the cluster approach was obtained from EEB documents and consisted of all eight of the completed clusters.

The Agency has conducted thousands of reviews of proposed pesticide uses. As the study was limited primarily to pesticide registration reviews subject to ESA consultations, the incidence of reviews that should have but were not subject to consultations, if any, is unknown.

II. Legislative Mandates and Requirements

A. The U.S. Endangered Species Act (ESA)

1. Section 7

Once a species is determined to be endangered or threatened the Endangered Species Act provides for protection of the individuals of that species and its recovery. Among the most significant provisions of the Act are the requirements of Section 7(a)(2) that require each federal agency to "ensure that any action authorized, funded or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat ... critical" to their survival. As applied to pesticide regulations, Section 7 requires EPA to:

- monitor its actions to ensure they do not jeopardize the continued existence of any endangered or threatened species; and
- take necessary precautions to avoid adverse impacts.

2. Consultation Process

To assist federal agencies in meeting this responsibility, Section 7 prescribes a process through which they are to consult with the Office of Endangered Species of the U.S. Fish and Wildlife Service (FWS) or the Office of Protected Species of the National Marine Fisheries Service (NMFS) (depending on which species is being considered). The Services have promulgated joint regulations (50 CFR Part 402) establishing the procedures for conducting these consultations.

The ESA requires federal agencies to:

- o review their activities and identify those that might have an effect on listed species or their habitats; and
- o request, in writing, consultation with the appropriate Service if potential adverse effects are indentified.

The Agency initiates consultation with either the FWS or the NMFS if a marine species is involved. The purpose of the consultation is to identify pesticide uses that may harm listed species or adversely affect their habitats. As stated in EPA's Standard Operating Procedures for pesticide registration activities, the consultation process serves as an early warning that will enable the Agency's Office of Pesticide Programs (OPP) to "...modify its programs or activities to eliminate possible adverse action." The consultation process is meant to supply advice or information. It is not a device to veto Agency actions. Although obliged to consult, the Agency determines the appropriate regulatory action after the consultation is completed. This action, however, must comply with the Act's mandate that all federal agencies conserve endangered or threatened species and not jeopardize their continued existence.

The request for consultation is to include all available information on the action, and may cover more than one activity if the activities are similar and occur within a given geographical area, administrative unit, or segment of a comprehensive plan.

The FWS and NMFS may themselves initiate a consultation if they identify an agency action on which no consultation has occurred and the action may have an effect on a listed species or its habitat. Amendments to the ESA in 1982 now allow a permit or

license applicant or prospective pesticide registrant to initiate consultation. The action agency may also consult informally with the FWS or the NMFS, but this is not a substitute for formal consultation.

Agencies must reinitiate consultation with the Services if:

- o new information shows that the activity for which a consultation has already been conducted may affect listed species or their habitats in such a way or degree not contemplated by the original consultations; and
- o the activity is modified, even if the modification is a consequence of the biological opinion resulting from the original consultation; and
- o a new species is listed and that species might be affected by the activity for which the original consultation was conducted.

3. Exemptions

If the Services find that an Agency action may jeopardize the continued survival of endangered species, the ESA provides a process whereby the federal agency and others can apply for an exemption from the requirements of Section 7.

To be considered for an exemption, the applicant, in addition to other criteria, must demonstrate that the consultation was carried out in good faith, made a reasonable and responsible effort to develop and fairly consider modifications or reasonable and prudent alternatives to the proposed action, and did not, after initiating consultation, make any irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of alternatives. Only actions of regional or national significance or of overriding benefit to the public can be granted an exemption. The applicant, in this case a federal agency, the Governor of the state in which the proposed

action may occur, or a person whose application for a permit or license was denied, initiates the exemption process by applying to the Secretary of the Interior for an exemption within 90 days of the final action by the agency to deny the proposed activity. The application must include:

- a copy of the biological opinion concerning the activity;
- a description of the consultation process; and
- a description of why the action can not be modified to avoid jeopardy to endangered species.

The Secretary of the Interior then has 20 days in which to determine that the agency concerned and the exemption applicant have:

- carried out the consultation responsibilities in good faith;
- made a "reasonable and responsible effort" to modify the proposed action so that endangered species would not be jeopardized;
- conducted any biological assessment required by the ESA; and
- refrained from making any "irreversible or irretrievable commitment of resources" to the proposed project.

If the Secretary makes a positive determination, he refers the application to the Endangered Species Committee, composed of seven members including the Secretary of Agriculture, the Secretary of the Army, the Chairmen of the Council of Economic Advisors, the Administrator of EPA, the Secretary of the Interior, the Administrator of NOAA, and a state member appointed by the President. An exemption is granted if, by a vote of not less than five of its members voting in person, if the committee determines that:

- o there are no reasonable and prudent alternatives to the agency action;
- o the benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserveration of the species and its critical habitat;
- o the action is of regional and national significance;
- o no irreversible or irretrievable commitment of resources has been made by the federal agency or the exemption applicant;
- o other reasonable mitigation and enhancement measures are established to minimize the adverse effects of the action.

No exemptions have ever been granted.

4. 1982 amendments and 1985 reauthorization

During the 1982 reauthorization, the Act was amended in a number of significant ways. First, Congress reaffirmed that the economic costs of protecting species were not to be considered in determining whether they would be designated as endangered or threatened. The Act specifies that the Services are to determine that a species is endangered or threatened through a regulatory process that does not consider the economic costs resulting from such protection.

Other modifications to the Act provide for prospective permit or license applicants to become directly involved in the consultation process. For example, an individual wishing to register a pesticide for a specific use who believes his registration may be affected by endangered species considerations, may initiate consultation between the Agency and the Services. Prior to the 1982 amendments the ESA required that consultations be concluded within 90 days or within such other time period that the Agency and the Services agreed. The new amendments also require that the Services notify applicants before the 90th day

if they and the Agency intend to extend the consultation up to 150 days. The consent of the applicant is needed, prior to the 90th day, before consultation can be expanded to 150 days or more.

At the time of this writing the 1985 reauthorization of the ESA is still pending. The House of Representatives has agreed to increase funding, to establish new rules to protect sea otters, and to extend protection to species that have not been determined by regulation to be endangered or threatened but have been identified by the Services as likely candidates for such determinations. The Senate has not voted on its reauthorization bill. While it is uncertain what changes to the ESA will be adopted by Congress during this reauthorization, none of the amendments proposed to date are likely to affect EPA's current obligations under the Act with respect to the regulation of pesticides.

B. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) actions requiring Endangered Species Act consideration

As summarized by a recent EPA pamphlet: "EPA registers specified uses of pesticide products on the basis of both safety and benefits. FIFRA requires EPA to determine whether a pesticide can perform its intended function without causing 'unreasonable adverse effects' upon human health or the environment while taking into account the potential benefits of the proposed use."

Nevertheless, the legislative and litigation history of the ESA demonstrates that the routine procedures for pesticide registration, which involve balancing of cost and benefits, are overridden by the requirements of Section 7(a)(2) of the Act. EPA's actions to register pesticides and otherwise license their use,

including experimental use permits, emergency exemptions, and special local need registrations, are subject to the consultation procedures prescribed by Section 7. Pesticides cannot be registered for uses that would jeopardize the continued existence of a species or destroy or adversely modify its critical habitat.

The core of the FIFRA pesticide regulation process is the "registration" of pesticides under Section 3 of FIFRA. Registration is the equivalent of granting a license. The license is a limited one, however, as registrations are granted subject to sets of standards, conditions, and restrictions specified on the label of the pesticide. Applicants who wish to register a new pesticide are required to submit information to EPA, including, among other things, the name of the pesticide, its chemical formula, a statement of all claims made for it, and a full description of all the tests, together with their results, upon which the claims are made.

The tests are required by EPA to demonstrate that the pesticide will perform its intended function without unreasonable adverse effects when used in accordance with commonly recognized practice. While EPA has guidelines recommending specific testing methods, alternate methods are acceptable so long as basic data requirements are satisfied. These tests, and the review of them and other data from the applicant, are done in conjunction with applications for registrations involving new active ingredients, new uses for an already registered pesticide, and changes in the the pesticide's formulation, method of application, or rate of use.

Section 3 of FIFRA also requires EPA to review past pesticide registrations and to update and improve the base of scientific data supporting their registered uses. This is known as re-registration. In the event substantial data gaps are discovered in the course of conducting these reviews, EPA may grant conditional registrations in lieu of suspending the registration of previously registered products or uses. Conditional registrations are granted contingent upon the registrant submitting additional data on a schedule set by EPA. This re-registration process is intended to bring older registrations, accepted with fewer data requirements, into compliance with the new standards that apply to current registrations.

FIFRA sets out a number of provisions creating exceptions to the Section 3 registration process. These are the experimental use permits authorized by Section 5 of FIFRA, emergency exemptions under Section 18, and special local need registrations under Section 24(c).

Experimental use permits (EUPs) are intended to allow the applicant to test the efficacy and properties of pesticides under field conditions. They may be granted only for research necessary for the accumulation of information needed to support a registration under Section 3. EPA is authorized to set conditions, terms, and time of use restrictions for the EUP.

Section 18 of FIFRA authorizes emergency exemptions from the Section 3 registration requirement. This authority was granted in recognition that occasionally serious infestations of pests occur for which no registered pesticides are available. Section 18 registrations may be authorized as specific, quarantine, public

health, or crises exemptions. One type of specific exemption is granted in situations where it is necessary to avert a significant risk to endangered and threatened species. Emergency exemptions are granted to state or federal agencies to allow them to use such pesticides, subject to restrictions set by EPA, to control or prevent the infestation. An exemption is authorized only after meeting several conditions, one of them being that the use of the pesticide under exemption will not cause, according to EPA regulations, "unreasonable adverse effects on the environment."

Section 24(c) allows individual states to provide registrations for additional uses of federally registered pesticides beyond those uses for which the federal registration has been granted. These state registrations are intended to address special local needs. No special local need registration may be granted for any use which has been denied, disapproved, or cancelled by EPA. A special local need registration is the equivalent of a full Section 3 registration, but only within the borders of the state granting the registration. After a state has granted a special local need registration the EPA has 90 days in which to disapprove it.

A 1982 congressional report on the EPA's pesticide regulatory process found that the Agency had significantly increased the rate of issuance of emergency exemptions and Special Local Needs registrations. Requirements for granting these registrations were much less stringent than Section 3 registrations and endangered species concerns were not routinely addressed. In 1985, EPA placed greater limitations on granting emergency exemp-

tions, whereby these are only issued in true emergency situations. Requirements for Special Local Needs registrations, however, have not changed, and therefore, endangered species concerns for pesticide use under such actions could go unidentified.

Emergency exemptions and Special Local Needs registrations are designed to expedite the registration process in an effort to address localized pest management emergency needs or unique pest control situations. Both types of registration are designed to address emergencies that may need immmediate attention. Consultations often take longer to conduct than the existing need for the registration (ie. consultation time can exceed the growing season or pest damage may occur before application can be processed) and, therefore, can slow the registration process to the point that these remedial actions are ineffective.

Another regulation pertinent to endangered species concerns is special review. This review, originally called the Rebuttable Presumption Against Registration, is a mechanism to expedite decisions by EPA to either remove a registered pesticide product from the market, or restrict its use, if new information indicates that its use may be a potential hazard to the public health or environment. According to EPA regulations, the criteria for initiating a review are triggered when it is determined that the use of a pesticide:

- may pose a risk of serious acute injury to humans or domestic animals;
- may pose a risk of inducing in humans an oncogenic, teratogenic, fetotoxic, reproductive effect, or a chronic or delayed toxic effect;
- may pose a risk of inducing a mutagenic effect in humans based on appropriate test systems or epidemiological data.

- may result in residues or other degradation products in the environment of non-target organisms at levels acutely or chronically toxic to such organisms or which have been determined to cause reproductive effects in such organism;

- may pose a risk to the continued existence of any endangered or threatened species or may result in the destruction or other adverse modification of any of their habitat.

III. Environmental Protection Agency's Implementation of the Endangered Species Act Under the Federal Insecticide, Fungicide, and Rodenticide Act

A. Case-by-case reviews

1. Current review process

a. general procedures

EPA regulations describe the procedures for processing applications for registration. Most of this process is administered by the Registration Division of EPA's Office of Pesticide Programs. Each pesticide product is assigned to a team headed by a Product Manager that generally handles all actions relating to that product including registration, amendments to registration, resubmissions, renewals, and cancellations and suspensions. The regulations cite that experimental use permits are not processed by the team, but in practice managers do process these permits. The teams do not handle matters such as enforcement of use restrictions, but even in these matters the Product Manager is kept informed of actions relating to the product for which he is responsible.

When an application is received by EPA, a copy of it is returned to the applicant as an acknowledgement. EPA publishes a notice of the application for a new or amended registration in the Federal Register if the pesticide formulation contains an active ingredient not already registered or if a changed use pattern is involved. Interested parties are given 30 days within which to comment on the application.

Complete applications are reviewed by the Product Manager to determine whether the application, together with the accompanying labels and data, meet the requirements of FIFRA and its imple-

menting regulations. The application is further reviewed to determine whether the product can reasonably be expected to result in any level of residue on food or feed when used as directed, whether it is effective for the uses claimed and the directions for use are both practical and adequate, and whether the label contains the necessary precautions to adequately prevent unreasonable injury to humans, beneficial animals, and the environment.

Once these reviews are completed, the Product Manager notifies the applicant of any deficiencies in the data or product label. The application may be denied if the pesticide product is determined to be ineffective (this requirement can be, and usually is, waived), is misbranded (e.g. if the label is misleading, lacks the necessary directions or precautions, or is an imitation of another pesticide), if the test data submitted in support of the application does not comply with the requirements of FIFRA, or if the pesticide will not perform its intended functions without unreasonable adverse effects on the environment, and other reasons. An application will also be denied if there are insufficient data to make the required determinations. Applicants are informed of the pending denial of their applications and given 30 days to correct the applications or to petition for its withdrawal.

The Registration Division (RD) will grant a conditional registration if the data and label are adequate and in compliance with FIFRA and Agency regulations. The conditional registration assigns a registration number to the pesticide product, outlines any necessary label changes, and requests that the final printed

label, containing the necessary changes, be submitted to EPA.

After the final printed label is submitted, RD will review it. If the label is acceptable, RD informs the applicant by letter and publishes a notice of approval of the registration in the Federal Register. The use becomes authorized on the date of the approval letter and remains effective for five years.

In the course of processing applications for various registration actions the Hazard Evaluation Division determines whether the use of the pesticide, in accordance with customary practices, will result in unreasonable adverse effects on the environment. EPA has developed a Standard Operating Procedure (SOP) to prescribe procedures for this process. (A copy of this document can be found in Appendix B)

The SOP specifies that in all instances of applications for registration under FIFRA Section 3 for new chemicals for outdoor uses, RD is to refer the applications to the EEB of the Hazard Evaluation Division (HED). New chemicals for indoor use are not referred to EEB. Most new outdoor uses of previously registered chemicals are referred to EEB, depending on the Product Manager's evaluation of the need for an incremental risk assessment.

Supplemental registrations and the so-called "me too" minor change amendments to product registrations normally are not referred to EEB, except for changes in products intended for use as mosquito larvicides, aquatic herbicides, piscicides, for forest uses, non-domestic rodenticides, and predator control products. All experimental use permits for new chemicals are referred to EEB, as are any experimental use permits for a new use of a previously registered product that the Product Manager

determines appropriate for referral.

Requests for emergency exemptions are evaluated by the Emergency Response Team to determine the necessity of an EEB review, such as in the case of a new use pattern which EEB has not already reviewed. Special Local Need registration requests are reviewed by the Product Manager to determine whether the registration poses an environmental threat.

Importantly, applications for registration are not all routinely referred to EEB. Since EEB does not review all applications there is a possibility that some adverse effects to endangered species may be overlooked.

b. endangered species risk evaluations

All EEB evaluations, regardless of the type of registration, are to be handled in essentially the same way through guidelines set in Standard Operating Procedures. With respect to endangered and threatened species, the procedures are designed to determine whether any listed species is likely to be exposed to the pesticide and whether the exposure will have any effect on the listed species or its environment. These determinations are to be made through a review of the distribution of protected species and examination of toxicological data submitted by the applicant as part of the application.

EEB uses LD50 or LC50 extrapolations to assess the potential threat to endangered and threatened species. A pesticide is considered potentially detrimental to such species when it exceeds a specific criterion. These criterion, referred to as triggers, are tripped when the chemical exceeds 1/10th the mammalian LD50 or LC50, 1/10th the avian LD50 or LC50, or 1/20th

the aquatic LD50 or LC50. For granular pesticides, the trigger for avian species is the number of granules required to reach 1/10th the LD50. This trigger is not considered serious if the number of granules required to reach the 1/10th mark is more than an avian species would normally ingest. There are no specific triggers for endangered plant species; however, a herbicide is considered to be a potential threat whenever its use occurs in the habitat of endangered plant species.

If EEB determines that a pesticide proposed for use in any regulatory action will pose a hazard to a listed species, it is to initiate a formal consultation under Section 7 of the ESA with the FWS or NMFS. Informal consultations may be made to determine if a formal consultation should be initiated. Although OES is aware of EEB triggers and, as indicated through interviews, they are considered "good ones," the language of the ESA and EPA criteria for initiation of consultation are dissimilar. Specifically, the EPA's "will pose a hazard" criterion is less conservative than the ESA's "is likely to have an effect" language since the term "will pose" implies a greater certainty than "will likely" and "hazard" implies a consequence greater than "effect." While quantitative triggers are the basis for initiating consultation, this dissimilar language may cause confusion and legal problems.

Regardless of these language differences, the ESA requires the Agency to consult with OES whenever a pesticide is likely to have an effect on a listed species. Whenever OPP determines an "effect" situation it must consult with OES, even when the registrations are similar or nearly identical.

c. OES consultations

Upon receiving a request for a consultation, the Services conduct an examination of the proposed action to determine whether it is likely to jeopardize the continued existence of a listed species or to result in destruction or adverse modification of its habitat. The Services traditionally have made use of their own information and data for implementing their responsibilities under the ESA, however, it is the Agency's responsibility to provide any additional data or information needed for the consultation. EPA can seek data and information from external sources, including from the applicant.

Prior to 1984 the FWS conducted consultations in the Office of Endangered Species (OES) in Washington, D.C. Now consultations are usually conducted in the regional offices where endangered species habitat and proposed pesticide use overlap. Only one pesticide-related consultation to date has involved NMFS.

The Services have 90 days, from the time of initation, to complete the consultations. Time extensions may be granted, but are limited to 149 days unless the applicant gives consent to a longer period. This consent must be sought prior to the end of the initial 90-day period.

At the conclusion of a consultation, the Services are required to provide the Agency with a written opinion detailing how the Agency action will affect the species or its critical habitat. If the action will jeopardize the continued existence of the species or will adversely alter the species' habitat, the Services are required to identify "reasonable and prudent alterna-

tives" which they believe "would not violate subsection (a)(2) and can be taken by the Federal agency or applicant in implementing the agency action."

Once the consultation has been completed and the biological opinion issued, it is the responsibility of the Agency to determine what action it will take. The Services do not have veto power over the proposed actions. Specifically, a federal agency must determine whether it will proceed with the activity in light of its obligations under Section 7 of the ESA to insure that its activities do not jeopardize listed species or their habitats. While it is each agency's responsibility to comply with Section 7, the courts have given great weight to the biological opinions of the Services in determining the effects of agency actions on endangered and threatened species. The firm opinion of the expert wildlife agency is given a presumption of validity, unless the consulting agency is able to produce overriding evidence in rebuttal.

For example, certain aspects of a new segment of a highway in Mississippi were enjoined by a federal court until changes were made so that the FWS could reach a no-jeopardy opinion, despite the court's observations that the acting agency has the final say on whether it has taken all necessary actions to ensure that it will not jecpardize endangered species or their habitat. Clearly this is no problem if the FWS or the NMFS issues a "no jeopardy" opinion, but if there is a finding of jeopardy, the agency must carefully assess its options.

If the Services issue biological opinions finding jeopardy, the Agency SOP identifies several regulatory options for Registra-

tion Division Product Managers. These regulatory options include, but are not limited to, the following:

- o classification of the pesticide as a restricted use pesticide;
- o labeling restrictions to mitigate jeopardy to endangered species;
- o clarification of the reasonable and prudent alternatives with OES;
- o involvement of the registrant to seek means to avert exposure of listed species (ie. alteration in the use pattern, restriction of the pesticide to specific sites only, and/or use by certified applicators only);
- o field studies to demonstrate possible safe usage at prescribed label rates using indicator species closely related to the listed species of concern; or
- o refer to special review procedures and cancellation if necessary.

2. Study findings on case-by-case reviews and recommendations

The following section describes the case-by-case consultations completed between 1980 and 1984.

a. Study findings

The investigation revealed that the FWS determined that endangered species would be in jeopardy in 27 of the 39 consultations reviewed. In all but one of the jeopardy opinions, the Service detailed alternatives that the Agency could take to avoid harm to endangered species. In 12 of the 39 cases (31%), the Agency did not properly comply with ESA requirements or its corresponding Standard Operating Procedures. These 12 cases involved 10 jeopardy consulations, 1 no jeopardy consultation, and one pesticide registration for which a consultation was not completed.

Specifically, these 12 consultations were not in compliance because:

- 6 registrations were granted before a consultation was completed,
- 5 registrations did not include OES recommendations in the product label, and
- 1 registration was granted without a consultation.

OES did not complete nine of the case-by-case consultations within the 90-day time period for conducting consultations, although EEB did not grant OES time-extensions. On average, these nine consultations were late by two and a half months. Although this study did not review consultations initiated after November 1984 in detail, available data suggests that delays in completing consultations are increasing, sometimes by as much as one year. According to EEB personnel, these delays are a result of the procedural change by FWS to complete consultations at regional field offices instead of its Washington office. Delays of any length can hinder or disrupt the process of pesticide registration.

During the FWS's completion of the 39 consultations nine extensions were requested. These extensions consisted of five for 30 days and four for 60 days.

The Agency complied with its own procedures and the provisions of the ESA in 27 of the 39 cases (69%). The annual record of such cases is summarized as follows:

year	number of cases not in violation
1980	2 out of 6 consultations
1981	9 out of 11 consultations
1982	4 out of 9 consultations
1983	5 out of 6 consultations
1984	7 out of 7 consultations

The following sections review the specific findings concerning the case-by-case registration of pesticides. These reviews are divided into categories taken from the larger study sample. (note that regulatory actions described in consultations as label amendments, amendment reviews, reevaluation, and evaluation are discussed below as registration reviews.)

1. registration reviews

The study sample included a total of 30 applications for registration that involved consultations with the Office of Endangered Species regarding possible or potential jeopardy to listed species. Of the 30, 23 resulted in jeopardy findings and 6 resulted in no jeopardy findings. In addition, one case never went beyond the informal consultation stage so no finding of any kind was made.

In 11 of the 30 registration cases (37%), the Agency did not properly comply with ESA requirements or its corresponding Standard Operating Procedures. Specifically, these 11 registration cases were not in compliance because:

- 5 registrations were accepted before a consulation was completed,
- 5 registrations did not include OES recommendations on the product label,
- 1 registration was accepted without a consultation.

Since this study limited its analysis to chemicals for which consultations were initiated, the set of chemicals for which consultation was warranted, but not initiated, is undefined. The failure to complete a consultation for this last case raises the concern that EEB has not initiated consultations on pesticide usage when necessary; however, analysis of EEB and RD information

revealed only one product for which consultations should have been initiated but were not. (see Appendix A under Lasso).

2. experimental use permit reviews

Five endangered species reviews were completed for experimental use permits. None of these reviews resulted in findings of jeopardy to listed species. The study revealed no compliance problems with the five permit reviews. Although no problems were identified, there is a potential for some risks to go undetected since EUP's are not routinely examined for endangered species risks.

3. emergency exemption reviews

An EPA memorandum dated December 5, 1979 asserts that the applicant, either a federal agency or governor of a state, is responsible for ensuring that the pesticide used under an emergency exemption is not applied in areas where endangered species would be negatively affected. Negative effects include a toxic exposure of a pesticide to the species or a disruption due to the pesticide in the habitat or food supply on which the species depends. While it is the applicant that must ensure that a pesticide does not negatively affect an endangered species, the Department of the Interior Office of the Solicitor has issued an opinion that the Agency is ultimately responsible for implementing Section 7, and that this responsibility cannot be delegated to regional, state, or local authorities. The Agency memorandum also states that prior to applying for an emergency exemption, state and federal agencies must consult with local state fish and wildlife agencies and must submit information about the pesticide to be used. According to EPA regulations, decisions regarding an

application for an exemption are to be made in a "timely manner". Such a decision could be delayed because of the consultation process. These delays could conceivable hinder the usefullness of the emergency exemptions.

The only emergency exemption that was reviewed for consultations was found to be in compliance with all EPA and ESA provisions.

4. special local need registration reviews

No special local need registration reviews have resulted in consultations with OES concerning possible jeopardy to listed species.

5. re-registration

An examination of currently registered pesticides is mandated by Section 3 of the FIFRA. This examination considers the health and environmental safety of previously registered products. The re-registration process has been conducted by reviewing the active ingredients and use patterns of different pesticides, rather than product by product. Once the review is completed, the agency establishes conditions to be met before re-registering the product. These conditions are compiled in a Registration Standard which is also used to register new pesticide products.

The process of re-registration is not addressed specifically in the SOP. But it is assumed that much of the process essentially parallels the procedures for case-by-case consultations. Two re-registration cases were considered for consultation. One of the two was not in compliance because:

- the registration standard was completed before the consultation could determine jeopardy or no-jeopardy.

6. special reviews

One special review was considered in a consultation. This review was found to be in compliance with the provisions of ESA and EPA guidelines.

b. Discussion of study findings

One major finding is the number of actions subject to jeopardy opinions for which appropriate regulatory action has not been taken. The Service identified regulatory options, other than cancellation, which could have been implemented. Restrictive labeling to avoid jeopardy has not been implemented for approximately one-third of the jeopardy opinions issued for the case-by-case reviews.

The procedures most often recommended by the FWS are requirements to prohibit or restrict the use in specific counties. In response to OES jeopardy opinions, the Agency initiated only one special review. This review was on dicofol, for which the biological opinion stated that use limitations could not mitigate jeopardy and recommended cancellation. Jeopardy was associated with DDT contamination.

The Agency did not respond to any of the jeopardy opinions by classifying products as "Restricted-Use". Restricted-Use classification requires that products be applied by trained certified applicators or those under their supervision. Such regulatory action may be appropriate when risk mitigating measures allow the continued use of a product within a species habitat. For example, a pesticide's use during certain times of the year or on certain crops may be allowed under a biological opinion. A well-informed, trained applicator is more likely to follow label directions for

such use than an applicator which is not trained.

The Agency rarely designates products for restricted use only or invokes special reviews. Despite the delays and failure by the Agency to implement the labeling changes recommended by the FWS, Agency personnel explained to the investigators that the two procedures have not been utilized with regard to endangered species because they would not reduce a product's use in a timely fashion.

If the Agency desires to apply for an exemption, it will be difficult to argue that it acted in good faith or did not make irreversible or irretriveable commitments of resources in these and many other cases where registration actions were implemented without measures to mitigate risks identified in OES jeopardy opinions. In some cases, the Agency approved registration applications before endangered species consultation for those actions were complete.

Many of the Service's opinions identify clear threats to protected species and identify precise actions the Agency can take to avoid jeopardy. If the Agency disagrees with jeopardy opinions or believes the Service could improve its identification of reasonable and prudent alternatives, the SOP provides that it can initiate discussions to resolve those issues as soon as possible. The Agency is at serious risk from citizen lawsuit if it continues to delay in complying with the ESA. The results of such litigation cannot be predicted with confidence, but the litigation history of the ESA strongly suggests a ruling against the Agency that would adversely affect current registrations and

disrupt Agency regulations and procedures.

EPA has felt the consequences of failure to comply with the ESA in other contexts. For example, in Pacific Legal Foundation vs. Clark (539 F. Supp. 841, C.D. Cal. 1982) a non-profit organization sued to block the granting of Clean Water Act sewage project construction funds, asserting that EPA had failed to seek jeopardy opinions on certain sewage projects in the Los Angeles area. The court enjoined EPA from granting the funds until they complied with the ESA. In another case, Roosevelt Campobello International Peace Park Comm. vs. U.S. E.P.A. (684 F.2d 1041, 1st Cir. 1982), the court enjoined EPA from awarding a NPDES permit for the proposed Pittston, Maine, oil refinery until certain jeopardy-related studies were completed. As the Supreme Court observed in the Tellico Dam Case (TVA vs. Hill, 437 U.S. 153, 185 1978), as it brought the $100 million project to a halt, Congress explicitly decided to require agencies to afford first priority to the declared national policy of saving endangered species, even over the primary missions of the agencies.

A critical step in ensuring that the pesticide registration process is in compliance with the ESA is the determination of when a registration should be subject to a consultation with the FWS or NMFS. As noted in the study description, the focus of this study on the consultation records did not allow for a thorough analysis of the incidence of failure to initiate consultations when warranted. However, the study identified that one product posing potential risk was subject to consultation regulations but was not consulted on. (see lasso summary in Appendix section A). For most of this product's new uses, EEB was aware of potential

problems for endangered species. This example appears to violate statutory and regulatory requirements of the ESA.

The study identified that the information base, used in deciding when to initiate consultation, could be improved. This information could include such basic data as the distribution, behavior, and biology of endangered species, as well as a current list of species protected by the Act. These considerations, and the need for a data base to aid all federal agencies in the consultation process, has prompted the FWS to develop an Endangered Species Information System (ESIS). The system is designed to consider specific pesticide regulation needs, and is accessible by computer terminals using modems. When the data base is completed, it could meet most of EPA's endangered species needs, eliminating a duplicative effort by the Agency.

As a result of the study and the findings concerning the Agency review of proposed new uses and existing uses, the following recommendations are made:

Jeopardy Opinions

While recognizing the difficulty of restricting pesticide use, either for practical or political reasons, the Agency is responsible for ensuring registrations do not violate Section 7 of the ESA and must find a mechanism to control uses when their impact may be detrimental to endangered species. The following recommendation is therefore made:

- the Agency should take immediate steps to cancel or modify registration standards issued inconsistently with jeopardy opinions. If the Agency disagrees with opinions or reasonable and prudent alternatives it should confer with the Fish and Wildlife Service as soon as possible.

Screening Process

In an effort to ensure that all endangered species risks are appropriately identified, and that when necessary, consultations are appropriately initiated:

- all applications for outdoor registration should be routinely referred to EEB for screening. Such applications include routine new use and new chemical registrations, experimental use permits, emergency exemptions, and Special Local Needs Registrations. Re-registrations should also be routinely screened for endangered species concerns.

Limited Registrations

One important trend identified in a 1982 congressional study on EPA's pesticide regulatory program was the increasing use allowed under Section 18 and 24. Rules proposed in the Federal Register on April 8, 1985 have made Section 18 requirements stricter. According to a staff report issued from this study, Section 24 registrations place greater responsibility on state pesticide regulations, and "increase the chances of localized adverse environmental and wildlife impacts." Perhaps even more importantly, ESA does not allow delegation of federal responsibility to the states. To enhance protection of endangered species under Section 18 and 24, the following is recommened:

- the Agency should review its policies concerning delegation of its ESA Section 7 responsibilities to other federal and state agencies for FIFRA Section 24(c) Special Local Need registrations to ensure it is in compliance with the ESA.

- the Agency should adopt written policies to ensure protection of endangered and threatened species during special local need registrations.

- in an effort to resolve conflicts between registration deadlines and time needed for consultation, the Agency should negotiate with OES for an expedited consultation process or, if it appears that a jeopardy opinion is likely to be issued, consider denying the application.

General Procedures

To correct deficiencies in its procedures and to ensure their effective implementation the Agency should review and revise the current SOP (and, as necessary, governing regulations):

- to bring Agency procedures into compliance with the requirements of the ESA as amended. For example, amendments concerning the applicants role in time extensions should be incorporated into the current SOP.

- to establish requirements for maintaining comprehensive administrative records of ESA Section 7 consultations to assure effective monitoring of the process.

- to establish clear standards and procedures for implementing reasonable and prudent alternatives.

- to require EEB to notify the Services of its response to jeopardy opinions and the identified reasonable and prudent alternatives.

- to clarify when a Special Review is to be initiated because of endangered species concerns.

Information Sources

To improve the EPA's data base the following recommendation is made:

- the Agency should adopt the FWS Endangered Species Information System when completed and make it available to EPA Staff.

Labeling Requirements

The SOP provides that labeling can be used to restrict use if Product Managers determine that labeling is adequate to implement reasonable and prudent alternatives. Labeling for endangered species concerns has not been uniform between different products and has not clearly defined requirements for use. Recognizing that the Agency has conducted reviews of its labeling requirements with respect to endangered species we recommend the following:

- the agency should complete its reviews, determine standards for labeling to implement reasonable and prudent alternatives, and implement such standards as soon as possible to prevent jeopardy to the continued existence of listed species and to avoid adverse modification of their habitats.

At present, the most effective means for controlling the use of pesticides that may jeopardize protected species or adversely modify their habitats appears to be use restrictions placed on label instructions. Adherence to restrictions by users is dependent of their having readily available information about the product. This information is not currently available on many of the labels for pesticide use subject to jeopardy opinions from the FWS. Users of pesticides would be better informed and better able to comply with use restrictions if they had the following kinds of information included on the label:

- precise information concerning geographic locations and times where use is prohibited to avoid jeopardy;

- a warning that protected species may occur in other locations at other times and that the use is also restricted under such circumstances;

- information concerning applicator liability in the event their use of the pesticide results in the taking of an endangered species or threatened species.

- o the telephone number of the Agency's Pesticide Service Center Hotline or another 800 number where additional information may be obtained or where to report suspected poisonings of protected species.

Recognizing that the container label is limited in size, additional information would help the applicator comply with use restrictions and help satisfy the Agency's obligations under Section 7 of the ESA: brochures could be made available from the Services, the Agency, the USDA Extension Service, appropriate state agencies, and pesticide dealers. Such brochures could include:

- o detailed information on geographic restrictions;
- o additional information on Agency and applicator responsibilities under the ESA;
- o potential hazards of pesticides to wildlife and proper application techniques;
- o names and telephone numbers of federal or state government endangered species specialists from whom additional guidance can be obtained and to whom the reader can report suspected incidents of endangered or threatened species poisonings; and
- o the telephone number of the Center Hotline or other a 800 number from which additional information may be obtained and numbers of government endangered species specialists from whom additional information can be obtained and to whom suspected wildlife poisoning incidents can be reported.

If the Product Manager determines that labeling is not the best regulatory option available, the SOP provides several alternatives. These include reinitiation of consultations and the requirement of additional research by the pesticide registrant. In cases where measures to mitigate jeopardy to endangered species involves use-restrictions (such as use during certain times of the year or only on certain crops) as opposed to outright geographic restrictions, classifying a pesticide as "Restricted-Use (listed as an option in the SOP) may be an appropriate regulatory measure. However, when mitigating measures require outright geographic restrictions and use within a habitat is not allowed, Restricted-Use classification may result in little additional risk reduction.

- o the Agency should assess whether to revise its options for responding to jeopardy opinions and implementing reasonable and prudent alternatives. This could possibly eliminate the option of classifying a pesticide for restricted use only by a certified applicator.

B. Cluster reviews

1. Current review process

In 1982 the Ecological Effects Branch of the Hazard Evaluation Division undertook a project to improve the review process for pesticides that affect endangered and threatened species (A summary of these cases may be found in Appendix C and Table 2). This project, which has come to be known as "the cluster approach," was developed in response to several problems inherent in the case-by-case approach to reviews that had been conducted up to that time.

The primary problem with the case-by-case approach is that pesticides that had been through the review process were considered to be at a market disadvantage to those that had not been through the process since the review process tended to result in label restrictions on reviewed pesticides —— restrictions that were not borne by unreviewed pesticides. Additionally, individual pesticides, considered separately, sometimes received inconsistent treatment leading to different label restrictions for identical use patterns.

Finally, in use patterns involving several pesticides that could have effects on endangered or threatened species, the affected species would not be protected from the effects of the pesticides until the last pesticide in the use pattern was reviewed and the label restrictions implemented. All of these problems combined to produce an incentive to change the review approach of pesticides used on a particular crop or site.

The cluster approach was initiated to alleviate these problems. In this approach, all pesticides with the same use pattern

are considered together. The FWS reviews all of the pesticides registered for a particular major crop or use pattern and prepares a biological opinion addressing all listed species that might be affected by those pesticides. In this way, more products can be reviewed in comparison to the slower process of case-by-case analysis, and therefore more endangered species problems can be identified.

2. Study findings for cluster reviews and recommendations

The crops and uses covered in the completed cluster analysis include corn, cotton, soybeans, sorghum, small grains, forestry uses, and mosquito larvicide. Although the cluster consultations were completed in 1983 and 1984, OES recommendations have not been implemented for any of the clusters.

Once the biological opinion is rendered for a cluster, appropriate label restrictions are to be developed. As currently planned, the format for these label restrictions would be an Endangered Species Bulletin that would be available from a county extension agent, state fish and wildlife agencies, regional offices of the Fish and Wildlife Service, or through a toll free number. The container label would refer the user to the appropriate Bulletin depending upon the use pattern of the pesticide. These bulletins would outline all restrictions and prohibitions.

Although the cluster approach may identify those pesticides that are the most threatening in terms of their relative toxicities, and exposure potential to endangered species with respect to major crop uses, it does not address minor uses of these pesticides. This approach may result in restricting one use for one crop in the habitat of an endangered species, while allowing

its use on another crop in the same geographic region.

Another problem is that the cluster approach has been subject to delays of up to two to three years. The amount of work involved in completing the cluster project, both during the consultation stage and labeling formulation stage, has been the major reason for the delays. The EEB believes that implementing the FWS alternatives to avoid jeopardy will also require a considerable amount of time and work.

Cluster Approach

Since neither the case-by-case nor the cluster approach can by themselves offer a mechanism both detailed and expeditious, the following suggestions are made:

- o the Agency should combine the case-by-case and cluster approaches. Pesticides that exceed a trigger in the cluster analysis should be reviewed individually to identify the problems involving the pesticides' other crop uses.

- o the Agency should also accelerate its efforts to implement reasonable and prudent alternatives identified by the FWS for pesticide uses which will jeopardize the continued existence of Endangered Species.

C. Interaction between the Environmental Protection Agency and the Fish and Wildlife Service

There are a number of times when EPA can and should interact with FWS. One such time is before the consultation is initiated. Pre-consultation, or informal consultation, with field offices and other sources is authorized, but is not to be a substitute for formal consultation. Informal consultation is conducted to determine whether a formal consultation or reinitiation of a consultation is necessary. In practice, informal consultations can be used to identify modifications in the proposed Agency action so that it will not require formal consultation.

The EPA contacts OES to initiate and conduct a consultation.

During the course of the consultation, OES may ask for information and data concerning the specific action.

Either OES or EPA may ask to reinitiate a previously completed consultation. Reinitiation is requested if new information concerning the product use has been found since the consultation.

The study identified several cases in which, even after several requests from FWS, the EPA had consistently failed to communicate to FWS what action was taken concerning the consultations. In addition, according to EPA personnel, the OES has reversed several jeopardy opinions forcing EPA to withdraw proposals for product cancellations. It is in the interest of both agencies for the Service to know what actions have been taken to respond to jeopardy opinion and reasonable and prudent alternatives identified by the Services. Many problems result from the OES and EPA consultations because each agency uses different standards, language, and objectives. These sometimes include different scientific and procedural standards, definitions and terminology, and priorities and goals. These differences contribute to poor communication and sometimes can cause inefficiency in completing the consultation and complying with the requirements of the ESA.

OES and EPA interactions

To encourage a better working relationship between EPA and FWS, we suggest the following:

- the Agency and the Services should coordinate standards and guidelines used by the Services in determining jeopardy and identifying reasonable and prudent alternatives with those used by the Agency in restricting pesticide use. These issues should be addressed in a memorandum of understanding.

D. Monitoring of pesticide poisoning incidents

1. Study findings and recommendations

The use of pesticides must be monitored to ensure that the use does not cause harm to endangered species. Harmful effects due to pesticide use may arise regardless of precautions taken during registration. These effects could be the result of oversights during the registration process, the dynamic nature of endangered species, or an unforeseen property of the pesticide. Monitoring encourages compliance and enforcement of use restrictions and ensures that endangered species concerns are addressed during the registration process. Monitoring is therefore a necessary part of revising a pesticide's use so that it will not be detrimental to endangered species. Moreover, a national plan for monitoring pesticides is required by Section 20 of FIFRA.

The study identified that EPA had no system of collecting such information, with the exception of use of NMFS's mussel reports, or of making incident data available to OPP personnel for their administration of FIFRA. Neither is it apparent that there is a systematic program to make OPP staff aware of published accounts of such data in the scientific literature. OPP personnel seem unaware of any established mechanism for reporting pesticide poisonings that may result from misuse of the products. The study also revealed that current planning for establishing a national monitoring plan did not substantively address wildlife, including endangered or threatened species. A number of programs administered by FWS and NMFS could be used by EPA for monitoring purposes. For example, the FWS's Environmental Contaminant Evaluation Program monitors trends in levels of contaminants in fish

and wildlife. The FWS also investigates wildlife and endangered species mortalities that may have been caused by pesticide contamination.

The investigators found no indication that EPA had taken enforcement action on the poisoning of endangered or threatened species. In fact, personnel from the Office of Compliance Monitoring were unaware of any cases involving endangered or threatened species. When questioned about incidents of poisonings (Summaries of these poisoning incidents can be found in Appendix D and Table 3), FWS field personnel were unaware, with the exception of one case, of what action EPA had taken. In that exception, EPA knew of the reported deaths of brown pelicans in Puerto Rico but did not investigate these deaths or take any action.

Once the EPA becomes aware of poisoning incidents, the Agency should initiate an investigation, consult with OES on the implicated pesticide, and, if it determines that the continued existence of a listed species is at risk or its habitat may be destroyed or adversely modified, initiate a special review. The Agency could aid in specific enforcement efforts for violations of the ESA by identifying FWS and NMFS offices to which the public could report poisoning incidents.

Monitoring Pesticide Poisoning Incidents

The following is recommended so that pesticide incidents will be properly reviewed:

- the Agency should identify FWS and NMFS offices that should receive reports of endangered or threatened species poisonings and establish procedures for staff to direct the public to those offices. These two actions will help ensure that the Agency will meet the requirements of Section seven. This information could be provided to the Pesticide Service Center Hotline or the 800 number, and could be added to the endangered species brochures and

product labels. Better use of the existing enforcement current system could also include exchange of information between different agencies. Also the procedures for reviewing incidents should be incorporated into the SOP.

- o any initiative to develop a national monitoring plan should address incident and trends data concerning wildlife and pesticides. While resource limitations may argue against extensive new initiatives in obtaining poisoning incident data or in monitoring trends of pesticide incidence in wildlife, the Agency can, without great expense, compile data from existing sources, including the scientific literature and data bases already maintained by other federal agencies.

- o the Agency should enter into a memorandum of understanding with FWS and NMFS to ensure that it receives incident reports concerning wildlife pesticide poisonings and trends data. FWS enforcement personnel have indicated to the investigators that incident reports could be copied and conveyed to the Agency without difficulty. Arrangements to receive trends data, for example from starling or mollusc monitoring programs, should not be difficult to establish.

E. Public awareness

1. Study findings and recommendations

Agency publications examined during the course of this study contained little or no useful information on wildlife concerns including endangered or threatened species. Particularly notable was the absence of any such information in a pamphlet on restricted pesticides. This information would enhance EPA's ability to meet the requirements of Section 7 of the ESA by educating the pesticide user on safe use of the product.

The Agency provides the public with information concerning proper pesticide use through a variety of publications and a Pesticides Service Center Hotline, located in Texas, that can be reached 24 hours a day through a toll-free telephone number. The study found that hotline personnel are responsive to inquiries concerning endangered species, but have inadequate references to comply with information requests.

Public Awareness

To increase public awareness and participation in the process of pesticide regulation the following is recommended:

- the Agency should incorporate endangered species information in revisions of existing EPA publications such as the brochure entitled "Suspended, Cancelled and Restricted Pesticides." Continued use of pesticides subject to jeopardy opinions supposes compliance with reasonable and prudent alternatives. An appropriate and inexpensive step to ensure better compliance is to inform the public about the use restrictions and sources of additional information in the Agency's literature. A list of current publications should be compiled, revision schedules identified, and plans made to incorporate endangered species information in the publication of new issues.

- the Agency should review the Pesticide Service Center Hotline for its potential to assist the public in obtaining information about pesticide use and endangered species, to monitor pesticide poisoning incidents for such species and to facilitate enforcement of use restrictions. The Center Hotline potentially can serve a key function in the Agency's efforts to comply with the ESA. It would be relatively easy to review the resources and procedures of the facility and to provide additional references and devise new procedures to satisfy all of the objectives identified in the recommendation.

IV. Summary of Recommendations

Jeopardy Opinions

While recognizing the difficulty of restricting pesticide use, either for practical or political reasons, the Agency is responsible for ensuring that registrations do not violate Section 7 of the ESA and for finding a mechanism to control uses when their impact may be detrimental to endangered species. The study determined that a significant number of Agency actions were not completed by prescribed means and many were not in compliance with the Endangered Species Act. The following recommendation is therefore made:

- o the Agency should take immediate steps to cancel or modify registration standards issued inconsistently with jeopardy opinions. If the Agency disagrees with opinions or reasonable and prudent alternatives it should confer with the Fish and Wildlife Service as soon as possible.

Cluster Approach

The implementation of the cluster approach has been hindered by delays of two to three years. Although completed in 1983 and 1984, the OES recommendations have not been implemented for any of the clusters. Since neither the case-by-case nor the cluster approach can by themselves offer a mechanism both detailed and expeditious, the following suggestions are made:

- o the Agency should combine the case-by-case and cluster approaches. Pesticides that exceed a trigger in the cluster analysis should be reviewed in a single case study to identify the problems involving the pesticides other crop uses.

- o the Agency should also continue to accelerate its efforts to implement reasonable and prudent alternatives identifed by the FWS for pesticide uses which will jeopardize the continued existence of endangered species.

Screening Process

The study determined that applications for registration are not routinely referred to EEB. In an effort to ensure that all endangered species risks are appropriately identified, and that when necessary, consultations are appropriately initiated:

- o all applications for outdoor registration should be routinely referred to EEB for screening. Such applications include routine new use and new chemical registrations, experimental use permits, emergency exemptions, and Special Local Needs registrations. Re-registration should also be routinely screened for endangered species concerns.

OES and EPA interations

The OES and the EPA have not effectively coordinated their actions. This is primarily the result of differences in how each implements the Endangered Species Act. While both have similar obligations under the Act, each has its own system and standards from which decisions are made. The ensuing misunderstandings unnecessarily hinder the protection of endangered species.

- the Agency and the Services should coordinate standards and guidelines used by the Services in determining jeopardy and identifying reasonable and prudent alternatives with those used by the Agency in restricting pesticide use. These issues should be addressed in a memorandum of understanding.

General Procedures

The Standard Operating Procedures were found to be deficient in a number of ways. The guidelines were not in compliance with the requirements of the ESA, did not clarify the responsibilities of personnel, and lacked requirements necessary for an effective program. The Agency should review and revise the current SOP (and as necessary governing regulations):

- to bring it into compliance with the requirements of the ESA as amended. For example, amendments concerning the applicants role in time extensions should be incorporated into the current SOP.

- to establish requirements for maintaining administrative records of ESA Section 7 consultations.

- to establish clear standards and procedures for implementing reasonable and prudent alternatives.

- to require EEB to notify the Services of its response to jeopardy opinions and the identified reasonable and prudent alternatives.

- to clarify when a Special Review is to be initiated because of endangered species concerns.

Limited Registrations

According to a 1982 congressional report on EPA's pesticide regulatory program, an increased use of Section 24 could place greater responsibility on state pesticide regulation, "increase the chances of localized adverse environmental and wildlife impacts", and entail fewer "complete and rigorous data requirements." Based on the current system, EPA regulations for Section 24 registrations are not as strict as full or conditional registrations. To ensure that Section 24 registrations afford adequate protection to endangered species the following recommendations are made:

- o the Agency should review its policies concerning delegation of its ESA Section 7 responsibilities to federal and state agencies for FIFRA Section 24(c) Special Local Need registrations to ensure it is in compliance with the ESA.

- o the Agency should adopt written policies to ensure protection of endangered and threatened species during Special Local Need registrations.

- o in an effort to resolve conflicts between registration deadlines and time needed for consultation, the Agency should negotiate with OES for an expedited consultation process or, if it appears that a jeopardy opinion is likely to be issued, consider denying the application.

Endangered Species Information Base

The study revealed that the information relied upon by EPA personnel was not adequate to make informed decisions. Available sources of information were not used by the Agency. One source that could be very useful to the Agency is the Endangered Species Information System (ESIS). Although still under development, this data base should be able to meet most of the EPA'S endangered species information needs.

- o the Agency should enter into a memorandum of understanding with the U.S. Fish and Wildlife Service to ensure that the Endangered Species Information System can best provide endangered species information needed for Agency review of the potential effects pesticide uses may have on endangered or threatened species.

- o the Agency should make ESIS available to Office of Pesticide Program staff and other Agency personnel with responsibilities for implementing FIFRA, particularly as it concerns endangered species.

Labeling Requirements

The SOP provides that labeling can be used to restrict use if Product Managers determine that labeling is adequate to implement reasonable and prudent alternatives. Labeling for endangered species concerns has not been uniform between different products and has not clearly defined requirements for use. Recognizing that the Agency has conducted reviews of its labeling requirements with respect to endangered species we recommend the following:

- o the agency should complete its reviews,determine standards for labeling to implement reasonable and prudent alternatives, and implement such standards as soon as possible to prevent jeopardy to the continued existence of listed species and to avoid adverse modification of their habitats.

At present, the most effective means for controlling the use of pesticides that may jeopardize protected species or adversely modify their habitats appears to be use restrictions placed on label instructions. Adherence to restrictions by users is dependent of their having readily available information about the product. This information is not currently available on many of the labels for pesticide use subject to jeopardy opinions from the FWS. Users of pesticides would be better informed and better able to comply with use restrictions if they had the following kinds of information included on the label:

- o precise information concerning geographic locations and times where use is prohibited to avoid jeopardy;
- o a warning that protected species may occur in other locations at other times and that the use is also restricted under such circumstances;
- o information concerning applicator liability in the event their use of the pesticide results in the taking of an endangered species or threatened species.
- o the telephone number of the Agency's Pesticide Service Center Hotline or another 800 number where additional information may be obtained or where to report suspected poisonings of protected species.

Recognizing that the label container is limited in size, additional information would help the applicator comply with use restrictions and help satisfy the Agency's obligations under Section 7 of the ESA: brochures could be made available from the Services, the Agency, the USDA Extension Service, appropriate state agencies, and pesticide dealers. Such brochures could include:

- o detailed information on geographic restrictions;
- o additional information on Agency and applicator responsibilities under the ESA;
- o potential hazards of pesticides to wildlife and proper application techniques;
- o names and telephone numbers of federal or state government endangered species specialists from whom additional guidance can be obtained and to whom the reader can report suspected incidents of endangered or threatened species poisonings; and
- o the telephone number of the Center Hotline or other a 800 number from which additional information may be obtained and numbers of government endangered species specialists from whom additional information can be obtained and to whom suspected wildlife poisoning incidents can be reported.

If the Product Manager determines that labeling is not the best regulatory option available, the SOP provides several alternatives. These include reinitiation of consultations and the requirement of additional research by the pesticide registrant. In cases where measures to mitigate jeopardy to endangered species involves use-restrictions (such as use during certain times of the year or only on certain crops) as opposed to outright geographic restrictions, classifying a pesticide as "Restricted-Use (listed as an option in the SOP) may be an appropriate regulatory measure. However, when mitigating measures require outright geographic restrictions and use within a habitat is not allowed, Restricted-Use classification may result in little additional risk reduction.

- the Agency should assess whether to revise its options for responding to jeopardy opinions and implementing reasonable and prudent alternatives. This could possibly eliminate the option of classifying a pesticide for restricted use only by a certified applicator.

Monitoring Pesticide Poisoning Incidents

A system to monitor impacts of pesticides to endangered species is virtually non-existent. There has been very little or no coordination between EPA and FWS concerning incidents of endangered species poisoning. A number of poisoning incidents have occurred that have gone undetected by the Agency. The following is recommended so that pesticide incidents will be properly reviewed:

- the Agency should identify FWS and NMFS offices that should receive reports of endangered or threatened species poisonings and establish procedures for staff to direct the public to those offices. These two actions will ensure that the Agency will meet the requirements of the Section seven. This information could be provided to the Pesticide Service Center Hotline 800 number, and could be added to the endangered species brochures and product labels. Better use of the existing enforcement current system could also include exchange of information between different agencies. Also the procedures for reviewing incidents should be incorporated into the SOP.

- any initiative to develop a national monitoring plan should address incident and trends data concerning wildlife and pesticides. While resource limitations may argue against extensive new initiatives in obtaining poisoning incident data or in monitoring trends of pesticide incidence in wildlife, the Agency can, without great expense, compile data from existing sources, including the scientific literature and data bases already maintained by other federal agencies.

- the Agency should enter into a memorandum of understanding with FWS and NMFS to ensure that it receives incident reports concerning wildlife pesticide poisonings and trends data.

FWS enforcement personnel have indicated to the investigators that incident reports could be copied and conveyed to the Agency without difficulty. Arrangements to receive trends data, for example from starling or mollusc monitoring programs, should not be difficult to establish.

Public awareness

The system for disseminating information is inadequate. Little, if any, information on pesticide impacts to endangered species is available for public use. To increase public awareness and participation in the process of pesticide regulation the following is recommended:

- the Agency should incorporate endangered species information in revisions of existing EPA publications such as the brochure entitled "Suspended, Cancelled and Restricted Pesticides." Continued use of pesticides subject to jeopardy opinions supposes compliance with reasonable and prudent alternatives. An appropriate and inexpensive step to ensure better compliance is to inform the public about the use restrictions and sources of additional information in the Agency's literature. A list of current publications should be compiled, revision schedules identified, and plans made to incorporate endangered species information in the publication of new issues.

- the Agency should review the Pesticide Service Center Hotline for its potential to assist the public in obtaining information about pesticide use and endangered species, to monitor pesticide poisoning incidents for such species and to facilitate enforcement of use restrictions. The Center Hotline potentially can serve a key function in the Agency's efforts to comply with the ESA. It would be relatively easy to review the resources and procedures of the facility and to provide additional references and devise new procedures to satisfy all of the objectives identified in the recommendation.

Appendixes

List of pesticide products for which a consultation was initiated

1. Matacil
2. Lasso
3. Zinc Phosphide
4. Furadan
5. Chlorpyrifos
6. Chlorpyrifos
7. Lontrol
8. Tebuthiuron
9. Sumithion
10. Magnusium Phosphide
11. Zinc Phosphide
12. Velpar
13. Aluminum Phosphide
14. Metolachlor
15. Thimet
16. Gas Cartridges (predicide)
17. Rozol
18. Temik
19. Endosulfan
20. 1080 (single lethal baits)
21. Copper
22. Tebuthiuron
23. Gas Cartridges (fumigant)
24. Lindane
25. Bant
26. 1080 (single lethal baits)
27. 1080 (toxic collar)
28. Oust
29. 1080 (grain bait)
30. CGA-12223
31. Sonar
32. Endrin
33. Dicofol
34. Orthene
35. Prairie Dog Toxicants
36. Volid
37. Tilt
38. 1080 (single dose bait)

Survey of EPA actions involving endangered species

* denotes a problem with compliance

1. Matacil
-conditional registration
-review completed August 1, 1980
-consultation initiated April 2, 1980 (FWS) and April 30, 1980 (NMFS)
-jeopardy
-biological opinion July 23, 1980
-product was removed from market and new formulation was registered on October 4, 1982. Consultation was not reinitiated
-NMFS requested more information before making a decision on shortnose sturgeon

2. Lasso (Alachlor) *
-conditional registration
-review completed July 17, 1980
-consultation initiated August 6,1980
-no jeopardy
-registration accepted on September 15, 1980
-several EEB reviews completed before and after the consultation found potential impacts on endangered species but failed to initiate a consultation for each.
-biological opinion January 21, 1981

3. Zinc phosphide
-conditional registration
-review completed February 13, 1981
-consultation initiated September 23, 1980
-jeopardy
-biological opinion January 2, 1981
-registration accepted on August 17, 1981 with endangered species considerations.

4. Furdan
-conditional registration
-review completed December 23,1980
-consultation initiated January 5, 1981
-jeopardy
-biological opinion May 1, 1981
-registraton accepted October 1981. Label changes to include endangered species statements occured on January 20, 1982.

5. Chlorpyrifos *
-conditional registration
-reviews (4) completed April 3, 1980, December 16, 1980, May 26, 1981, and February 23, 1981.
-consultation initiated July 7, 1980 and reinitiated November 20, 1980
-jeopardy
-registration of 4E accepted on May 15, 1981

-biological opinion July 1, 1981
-disagreement between SD and EEB on endangered species concerns

5a. Chlorpyrifos * (second of two consultations)
-conditional registration (considered reinitiation of a previous consultation)
-review completed December 31, 1981
-consultation initiated January 8, 1982
-jeopardy
-registration accepted for 4E for use on alfalfa on April 22, 1982
-biological opinion May 21, 1982

6. Boiero *
-conditional registration
-review completed September 19, 1980
-consultation initiated December 29, 1980
-jeopardy
-biological opinion March 6, 1981
-registration accepted on February 26, 1982. label statements did not include endangered species considerations.
-EEB determed that criteria to initiate SPAR were fulfilled.

7. Lontrel
-conditional registration
-review completed January 21, 1981
-consultation initiated February 5, 1981
-no jeopardy
-biological opinion October 28, 1981
-registration held up because of study deficiencies

8. Tebuthiuron *
-conditional registration
-review completed February of 1980
-consultation initiated February 25, 1981
-jeopardy
-registration accepted on December 4, 1980
-biological opinion July 13, 1982
-EEB submitted label changes to include endangered species statements which were found to be satisfactory to FWS. It is uncertain if SD incorporated these label statements.

9. Sumithion
-conditional registration
-review completed February 4, 1981
-consultation initiated March 9, 1981
-no jeopardy
-biological opinion May 18, 1981
-registration accepted July 27, 1982

10. Magnesium phosphide
-conditional registration
-review completed February 13, 1981
-consultation initiated April 30, 1981

-jeopardy
-biological opinion June 19, 1981
-registration accepted on November 20, 1981

11. Zinc phosphide
-registration standard
-review completed February 13, 1981
-consultation initiated May 28, 1981
-jeopardy
-biological opinion July 24, 1981
-registration standard completed in June of 1982

12. Velpar *
-conditional registration
-review completed March 10, 1981
-consultation initiated February 5, 1982
-registration accepted on September 8, 1982
-a formal consultation was never completed even though OES recommended that one be completed and EEB knew of this
-the product has never been used commercially

13. Aluminium phophide
-conditional registration
-review completed July 7, 1981
-consultation initiated July 6, 1981
-jeopardy
-biological opinion July 24, 1981
-registration accepted October 13, 1981 with endangered species statements

14. Metpiachlor *
-conditional registration
-review completed September 19, 1980
-consultation initiated August 7, 1981
-jeopardy
-biological opinion November 17, 1981
-registration accepted December 16, 1981 without endangered species statements

15. Thimet *
-conditional registration
-review completed August 4, 1981
-consultation initiated August 31, 1981
-jeopardy
-registration accepted August 21, 1981 with a condition that endangered species statements be added at a later date
-biological opinion January 22, 1982
-label revisions to include endangered species statements did not occur

16. Gas cartridge
-conditional registration
-review completed March 10, 1981
-consultation initiated September 25, 1981
-no jeopardy

-biological opinion October 30, 1981
-registration acceptance date unknown

17. Bozol
-conditional registration
-review completed November 19, 1981
-consultation initiated November 18, 1981
-jeopardy
-biological opinion March 11, 1982
-registration accepted August 18, 1982 with endangered species statements

18. Temik
-conditional registration
-review completed February 20,1982
-consultation initiated October 9, 1981
-jeopardy
-biological opinion January 22, 1982
-registration accepted April 20, 1983 with endangered species statements

19. Endosulfan *
-registration standard
-consultation initiated February 4, 1982
-jeopardy
-biological opinion July 30, 1982
-endangered species considerations were not included in the standards

20. 1080 (single lethal bait)
-experimental use permit
-review completed March 2, 1982
-consultation initiated May 26, 1982
-no jeopardy
-biological opinion July 14, 1982

21. Copper *
-conditional registration
-review completed July 21, 1982
-consultation initiated July 21, 1982
-jeopardy
-biological opinion October 21, 1982
-registration accepted January 14, 1983 without endangered species statements
-product has never been used commercially

22. Tebuthiuron * (second consultation)
-conditional registration
-review completed April 15, 1982
-consultation initiated September 23, 1982
-jeopardy
-biological opinion November 17, 1982
-registration accepted July 22, 1982 without endangered species statements
-these statements were supposed to be included at a later

date but were not

23. Gas cartridges (second consultation)
-label review
-review completed September 23, 1982
-consultation initiated September 23, 1982
-jeopardy
-biological opinion November 4, 1982

24. Lindane
-emergency exemption use
-review completed October 25, 1982
-consultation initiated October 25, 1982
-biological opinion February 17, 1983
-no action was taken on registration

25. Bant
-conditional registration
-review completed November 2, 1982
-consultation initiated November 22, 1982
-jeopardy
-registrant withdrawal of product on January 20, 1983
-biological opinion February 2, 1983

26. 1080 (single lethal baits)
-amendment to experimental use permit
-review completed March 22, 1983
-consultation initiated January 31, 1983
-no jeopardy (described as consultation unnecessary)
-biological opinion March 21, 1983

27. 1080 (toxic collar)
-extension of experimental use permit
-consultation initiated November 15, 1983
-no jeopardy
-biological opinion March 23, 1984

28. Oust *
-conditional registration
-review completed April 22, 1983
-consultation initiated May 2 ,1983
-jeopardy
-registration accepted February 8, 1982
-biological opinion June 30, 1983

29. 1080
-experimental use permit request
-review completed July 25, 1983
-consultation initiated July 29, 1983
-no jeopardy
-biological opinion August 23, 1983

30. CGA-12223
-conditional registration
-consultation initiated November 10, 1984

-no jeopardy
-biological opinion January 10, 1984

31. Sonar
-conditional registration
-review completed September 24, 1982
-consultation initiated November 16, 1983
-jeopardy
-biological opinion February 21, 1984
-no action on registration

32. Endrin
-evaluation of use patterns
-consultation initiated February 6, 1984
-jeopardy
-biological opinion June 22, 1984

33. Dicofol
-special review
-consultation initiated March 28, 1984
-jeopardy
-biological opinion August 13, 1984

34. Orthene
-state registration
-review completed May 21, 1984
-consultation initiated May 18, 1984
-jeopardy
-biological opinion August 22, 1984
-registration of the product was not pursued

35. Prairie dog toxicants
-reevaluation of pesticides used to control prairie dogs
-consultation initiated May 31, 1984
-jeopardy
-biological opinion November 9, 1984

36. Voliid
-conditional registration
-consultation initiated June 7, 1984
-no jeopardy
-biological opinion November 2, 1984

37. Tilt
-conditional registration
-review completed March 24, 1984
-consultation initiated July 31, 1984
-jeopardy
-biological opinion November 20, 1984

38. 1080
-experimental use permit
-consultation initiated November 6, 1984
-formal consultation not required

Detailed summaries of EPA actions involving endangered species

1. Summary of Endangered Species Considerations for Matacil

1. Product Name/ Common name/ Chemical name
Matacil/ Amino carb/ 4-(Dimethylamino)-3-methylphenol methylcarbamate.

2. Regulatory Action
Proposed conditional registration. Insecticide for use on coniferious tree to control spruce budworm. Use in New England, new York, New Jersey, and Pennsylvania.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
Recommendation against registration of Matacil 1.5 oil soluble concentrate (osc) for use on coniferous forests in the Northeastern United States. Further recommendation against registration of any pesticide product containing nonylphenol in the indicated quantities of 6.425 oz./acre. Nonylphenol residues, at this rate of application, were determined to exceed the acute toxicity criteria for RPAR. "Therefore, the proposed use of Matacil 1.5 osc may pose an unreasonable hazard to aquatic species,including at least one endangered species [Chittenango ovate snail, Succinea chittenangoensis], in the use area". Review dated 8/1/80.

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Fish and Wildlife Service (FWS) on April 22, 1980 and to the National Marine Fisheries Service on April 30, 1980.

5. Consultation Administration
The NMFS reply to the EEB review was an informal letter stating that not enough information was available to issue a biological opinion, even though it was also stated, correspondence dated July 2, 1980, that Matacil could very well affect the shortnose sturgeon (Acipenser brevirostrum). EEB in reply agreed to delay the consultation and to reactivate the procedure when additional information was available.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FWS/OES EPA-80-2, letter received by EEB on July 23,1980) concluded that the use of Matacil could affect the Chittenango ovate snail (S. chittenangoensis) an endangered species in the area of Chittenango Falls State Park, Madison County, New York. Accordingly, the FWS found jeopardy to the Chittenango ovate snail (S. chittenangoensis).
The FWS stated that jeopardy could be avoided if one of two alternatives was implemented: 1) exclude use of Matacil in the Chittenango creek watershed upstream from Chittenango Falls; or 2) provide toxicity and fate in the environment data on aminocarb and nonylphenol which indicate no adverse impact to the

Chittenango snail (S. chittenangoensis) or its habitat.

The NMFS concluded that, although Matacil use could affect the shortnose sturgeon (A. brevirostrum), no action would be taken until more information was made available.

Sometime after the consultation was completed, EEB received information that the product had been removed from the market. Registration of a new formulation, one with a lower level of nonyl-phenol, was granted on October 4, 1982. Consultation was not re-initiated because the original formulation was dropped.

2. Summary of Endangered Species Considerations for Lasso

1. Product Name/ Common Name/ Chemical Name

Lasso/ Alachlor/ 2-chloro-2-6-n-(methoxymethyl) acetanilide plus mix with Atrazine/ 2-chloro-4-(ethylamino)-6-(isopropylamino)-6-triazine.

2. Regulatory Action

Label amendment to allow use of Lasso and Lasso plus Atrazine on post-emergence on corn.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

No objection to "the proposed label change allowing postemergence application of Lasso and Lasso plus Atrazine to corn". It was noted that only a conditional registration would be given since not all of the data requirements for Alachlor were satisfied. Since the use of Atrazine with Alachor doubles the exposure to nontarget organisms, there is "a substantial risk of depletion and/or extinction of the only remaining population of Texas wild-rice (Zizania texana), an endangered aquatic plant. Review dated 7/17/80.

4. Consultation Initiation

Initiated by Ecological Effects Branch, Hazard Evaluation Division originally on August 6, 1980 and in memorandum form on November 6, 1980.

5. Consultation Administration

The original consultation request was sent to the Fish and Wildlife Service (FWS) region 2 office and then, because the use of Lasso and Lasso-Atrazine mixture was considered a nationwide threat, was channeled to the FWS Washington office. Two other listed plants, bunched arrowhead (Sagittaria fasciculata) and green pitcher plant(Sarracenia oreophila), were considered in the the consultation. A 30 day extension was given on November 5, 1980, which would have made the due date during the second week of December. The review was to be completed on January 6, 1981.

6. Consultation Conclusions and Environmental Protection Agency Response

The registration of Lasso was accepted by RD on September 15, 1980.

The FWS (FWS/OES EPA-80-4, January 21, 1981) concluded that the proposed action could affect the above listed species. They stated that the evidence suggested that no listed plant or animal species had been jeopardized by the use of the chemical. Concerning Texas wild rice (Zizania texana), the potential for exposure was considered unlikely because of low corn acreage, even though, "technically speaking", incremental exposure to the rice from Atrazine could increase. The other two plants, bunched arrowhead (S. fasciculata) and green pitcher plant (S. oreophila), were considered unaffected since the proposal would change only the temporal aspects of use, not the amount of use. The FWS therefore concluded that the action would not jeopardize

the continued existence of the three listed species.

The FWS recommended that, "because of the lack of sufficient biological data concerning both immediate and long-term effects of Alachlor-Atrazine on living organisms", studies be done to test and monitor the effects of the herbicide mixture under field and laboratory conditions.

7. Notes on the Effectiveness of the Process

It is important to note the reviews made previous to and after the review described above. These reviews concern endangered species and , although the uses in the reviews seem to impact on two endangered species, no consultation was initiated. The following are brief descriptions of these reviews:

a) Review 1/17/80-2/29/80

The regulatory action in this review was a label amendment to add an additional application post-emergent to the crop but pre-emergent to the weeds. EEB concurred with the additional use of Lasso on peanuts. A potentially "adverse affect" on two endangered species, the Houston toad (Bufo Houstensis) and Red Hills salamander (Phaeognathus hubrichti), was determined and use restrictions were recommended in the review. No consultation was initiated.

b) Review 4/4/80-4/14/80

The regulatory action in this review was a label amendment to add the application of Lasso plus Atrazine to milo. EEB concurred conditionally to the addition. Threats to three endangered species were raised in the review. Two species of these species, Red Hills salamander (Phaeognathus hubrichti) and the masked bobwhite quail (Colinus virginianus ridgwayi), were not believed to be affected. A "possible hazard" to the third species, the Houston toad (Bufo houstensis), was determined and label modifications were therefore required. No consulation was initiated.

Consultation review 5/23/80-7/17/80

c) Review 12/11/80-2/10/81

The regulatory action in this review was the registration of Lasso for use on sunflower fields. EEB concluded that, provided label modifications be made, only a "minimal increase in risk" would occur for the Houston toad (Bufo houstensis). The risk to the toad was determined avoidable if label restrictions were made. No consultation was initiated.

d) Review 5/28/82-6/24/82

The regulatory action in this review was an amendment to change the formulation to a capsule form(Lasso ME), while its uses remained the same. EEB concluded that Lasso ME use on peanuts "may adversly affect" the Houston toad (Bufo houstensis) and the Red Hills salamander (Phaeognathus hubrichti). The review stated that EEB " requires as a pre-condition to registration", that the Lasso ME label restrict its use on peanuts in counties in which these two species are found. No consultation was initiated.

3. Summary of Endangered Species Considerations for Zinc Phosphide
(first of two consultations)

1. Product Name/ Common Name/ Chemical Name
Z.P. Rodent Bait AG/ Zinc Phosphide/ Zinc Phosphide.

2. Regulatory Action
Label amendments to include specific additions and deletions on current label. Approval of such changes would expand usage over large areas formerly free from Zinc Phosphide application. The rodenticide is used for the control of ground squirrels in noncrop areas, prairie dogs on rangelands, rats in sugar cane, roof rats in macadamia nut groves, voles in orchards, noncrop areas, groves, and nursery stock, and pocket gophers.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB determined that endangered species would be jeopardized by the use of Zinc Phosphide and initated a consultation with OES before the close of the review process. The review, therefore, included not only EEB's acknowledgement that harm would occur to endangered species, but also the results of the OES biological opinion. Label changes were included in the review which paralleled the results found in the opinion. (review 2/13/81)

4. Consultation Initation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on September 23, 1980.

5. Consultation Administration
The FWS requested an extension of the consultation on October 28, 1980.

6. Consultation Conclusion and Environmental Protection Agency Response
The FWS (FWS/OES EPA-80-5, January 2, 1981) concluded that the use of Zinc Phosphide would likely jeopardize the existence of the following species:

salt marsh harvest mouse	(Reithrodontomys raviventris)
Morro Bay kangaroo rat	(Dipodomys heermani morroensis)
Utah prairie dog	(Cynomys parvidens)
Puerto Rican plain pigeon	(Columbia inornata wetmorei)
yellow-shouldered blackbird	(Agelaius xanthomus)
Attwater's greater prairie chicken	(Tympanuchus cupido attwateri)
Aleutian Canada goose	(Branta canadensis leucopareia)
whooping crane	(Grus americana)
Laysan finch	(Telespyza cantans)
nihoa finch	(T. ultima)

The FWS noted that Zinc Phosphide had "...been recommended as the preferred alternative to strychnine, compound 1080, and other pesticides in seven previous biological opinions." (opin-

ions done before April of 1980) This recommendation was made because Zinc Phosphide is considered the least objectionable pesticide presently used as a field rodenticide. "However, no previous consultation has considered its affects on all listed and proposed species."

While FWS would not consider alternative modes of pest control, two "reasonable and prudent" alternatives were given as follows:

"1. Zinc Phosphide should be restricted from use within the areas (counties) specified in the [consultation] discussions and the Aleutian Canada goose [B. canadensis leucopareia], this pesticide needs to be restricted from use in the areas specified only during the months indicated [in the consultation]; and

2. In those areas specified in alternative 1, Zinc Phosphide could be available for a special use purpose on a case-by-case basis. If Critical Habitat or a species range is restricted to only a small portion of the county specified, there is no need to restrict the use of this pesticide over the entire county. Prior to use in these restricted areas, applicators should contact the U.S. Fish and Wildlife Service (Endangered Species personnel) for information pertaining to endangered and threatened species."

After further consultation, it was determined that the use patterns would not jeopardize the laysan finch (T. cantans) and the nihoa finch (T. ultima) and they therefore were not included in labeling considerations.

RD communicated to the registrant on April 13, 1981, that the application was considered deficient. It was indicated that precautionary labeling for endangered species concerns, taken from the 2/13/81 EEB review, would be necessary for acceptance of the registration. This labeling either prohibited the use in the habitat of the endangered species, restricted its use by including buffer zones around the habitat, or excluded use during certain times of the year.

On May 1, 1981, the registrant requested that the endangered species statements be modified. These modifications included changing the Attwater's greater prairie chicken (Tympanuchus cupido attwateri) statement from prohibiting the products use in specific counties to consulting with local, state, and federal authorities before use to insure the species is not present and changing the yellow-shouldered blackbird (A. xanthomus) and the Puerto Rican plain pigeon (C. inornata wetmore) statements from restrictions of above ground use in Puerto Rico to restricting use within 1/2 mile of their known habitats. The statement requests were then slightly "amended" by EEB and RD that each statement included where the product could not be used in Attwater's greater prairie chicken (T. cupido attwateri) habitat and where the product would have to be used in tamper-proof bait boxes in Puerto Rico.

RD accepted the use of Zinc Phosphide on August 17, 1981. (label included)

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

[illegible] away from humans, domestic animals and pets. May [illegible] fatal or harmful if swallowed. Avoid skin contact. [illegible] breathe dust. Avoid contamination of feed or food[illegible]. Avoid contact with acids.

ENVIRONMENTAL HAZARDS

[illegible] product is toxic to wildlife and fish. Birds and other [illegible] feeding on treated bait may be killed. Keep out of [illegible] body of water. Do not apply where runoff is likely to [illegible].

ENDANGERED SPECIES CONSIDERATIONS

[illegible]

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

NON CROP RIGHTS OF WAY

USE RESTRICTIONS: For control of California Ground Squirrels [illegible] ZP RODENT BAIT AG must not be applied on [illegible] over water or where plants are grown for food or feed.

[illegible]

RANGELAND

USE RESTRICTIONS: For control of prairie dogs [illegible]

RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's Certification.

ZP® Rodent Bait AG

FOR CONTROL OF GROUND SQUIRRELS (NONCROP AREAS), PRAIRIE DOGS (RANGELAND), RATS (SUGAR CANE, MACADAMIA NUT ORCHARDS), MEADOW MICE – PINE MICE, VOLES (ORCHARDS, GROVES, LAWNS, ORNAMENTALS, GOLF COURSES, PARKS & NURSERIES) GOPHERS (BELOW GROUND USE).

ACTIVE INGREDIENT . . .	Zinc Phosphide . . .	2%
INERT INGREDIENTS . . .		98%
	TOTAL	100%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

If swallowed: Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger.

Avoid use of all oils. Have patient lie down and keep warm. Do not induce vomiting or give anything by mouth to an unconscious person. Get medical attention.

If on skin or in eyes: Flush with plenty of water.

See left panel for additional precautionary statements.

® Registered Trademark BELL LABORATORIES, INC.

[illegible]

MACADAMIA NUT ORCHARDS

USE RESTRICTIONS: [illegible]

HAND BAITING: [illegible]

BROADCAST BAITING: [illegible]

ORCHARDS AND GROVES

USE RESTRICTIONS: For control of meadow and pine mice, voles [illegible]

HAND BAITING: [illegible]

TRAIL BUILDER: [illegible]

BROADCAST BAITING: [illegible]

AERIAL APPLICATION: Broadcast bait at a rate of 6-10 pounds per acre. [illegible]

NURSERY STOCK, ORNAMENTAL AND NON BEARING FRUIT TREES

USE RESTRICTIONS: For control of Meadow and pine mice, voles [illegible] ZP Rodent Bait AG must not be applied on [illegible]

BROADCASTING BAITING: [illegible] Apply at a rate of 6-10 pounds per acre.

HAND BAITING: [illegible]

GOPHERS

USE RESTRICTIONS: For control of the Plains pocket gopher [illegible] Southeastern pocket gopher [illegible] and the pocket gopher (Thomomys spp.).

HAND BAITING: Place one teaspoon (4 grams) of bait at 2-4 locations [illegible]

BURROW BUILDER: [illegible]

HAND BAITING IN NONCROP AREAS

Such as Lawns, Ornamentals, Golf Courses, Parks and Nurseries

USE RESTRICTIONS: For control of meadow and pine mice, voles (Microtus spp.), [illegible] ground squirrels [illegible] and California ground squirrels [illegible] ZP RODENT BAIT AG must not be applied on [illegible] where plants are grown for food or feed.

Prebaiting with 6 pounds of untreated oat groats per acre [illegible]

DIRECTIONS FOR USE

NON CROP RIGHTS OF WAY

RANGELAND

GRAIN

TRAIL BUILDER

BROADCAST BAITING

AERIAL APPLICATION

NURSERY STOCK ORNAMENTAL AND NON BEARING FRUIT TREES

GOPHERS

HAND BAITING

BROADCAST BAITING

HAND BAITING IN NONCROP AREAS Such as Lawns, Ornamentals, Golf Courses, Parks and Nurseries

STORAGE AND DISPOSAL

PESTICIDE DISPOSAL Pesticide that cannot be used according to label instructions must be disposed of according to Federal, State or Local procedures under the Resource Conservation Recovery Act

CONTAINER DISPOSAL Dispose of bag according to approved Federal State or Local procedures under the Resource Conservation Recovery Act

FOR CONTROL OF GROUND SQUIRRELS (NONCROP AREAS), PRAIRIE DOGS (RANGELAND), RATS (SUGAR CANE, MACADAMIA NUT ORCHARDS), MEADOW MICE – PINE MICE, VOLES (ORCHARDS, GROVES, LAWNS, ORNAMENTALS, GOLF COURSES, PARKS & NURSERIES) GOPHERS (BELOW GROUND USE).

ACTIVE INGREDIENT	Zinc Phosphide	2%
INERT INGREDIENTS		98%
	TOTAL	100%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

If swallowed - Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger

Avoid use of all oils Have patient lie down and keep warm Do not induce vomiting or give anything by mouth to an unconscious person Get medical attention

If on skin or in eyes Flush with plenty of water

See left panel for additional precautionary statements

® Registered Trademark BELL LABORATORIES, INC

Manufactured by
BELL LABORATORIES, INC.
MADISON, WI 53704 U.S.A.

EPA EST. NO. 12455-WI-1 EPA REG. NO. 12455-UAA

NET CONTENTS 50 lbs. (22.72 Kilos)

4. Summary of Endangered Species Considerations for Furadan

1. Product Name/ Common Name/ Chemical Name

Furadan/ Carbofuran/ 2,3-Dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate.

2. Regulatory Action

Proposed conditional registration for new or expanded uses of Furadan 10G and 4F formulation changes of Furadan 15G. The proposed amendments would expand or add the uses on sweet corn, peanuts, cotton, soybeans, potatoes, cucurbits, grapes, small grains, and sweet potatoes. Furdan 10G is currently used on field corn, sugar cane, peanuts, tobacco, peppers, sugar beets, potatoes, sorghum, siberian elm, cottonwood, pine seedlings, and southern pine seed orchards as an insecticide and nematicide. Furadan 4F is currently registered as an insecticide for use on potatoes, alfalfa, field corn, strawberries, sugar cane, and pine seedlings. The proposed changes of the 15G formulation would increase the toxic active ingredient by 50% .

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

In a review of Furadan 10G and 4F (12/23/80), EEB concluded that the proposal of new and expanded uses may affect endangered species. The review also stated that "[a]ll of the proposed uses may expose endangered species to levels which could be potentially deleterious." A review of the formulation change for 15G (11/5/80) concluded that increasing the active ingredient by 50% "may pose an unreasonable adverse hazard to avian wildlife." EEB included the following endangered species that were of particular concern:

Mississippi sandhill crane	(*Grus canadensis potia*)
whooping crane	(*G. americana*)
Aleutian Canada goose	(*Branta canadensis leucopareia*)
red-cockaded woodpecker	(*Picoides borealis*)
Attwater's greater prairie chicken	(*Tympanuchus cupido attwateri*)
Kirtland's warbler	(*Dendroica kirtlandi*)
Eskimo curlew	(*Numenius borealis*)
masked bobwhite quail	(*Colinus virginianus ridgwayi*)
ivory-billed woodpecker	(*Campephilus principalis*)

EEB stated that both reviews would be forwarded to the Office of Endangered Species for a biological opinion.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on January 5, 1981.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The registration of Furadan 15G was accepted on February 13,

1981. In a March 18, 1981 memorandum to HED, RD explained why it had decided to accept the 15G registration. The factors relevant to their decision included that use patterns and dosage rates for 15G were identical to 10G, that no real incremental risk occurs with approval of 15G since 1 granule of 10G will kill an avian species, that label requirements lessen any hazard, and that data on avian species reveal that hazards do not exist for such species.

In a March 30, 1981 memorandum that was intended for but never sent to RD, EEB expressed its concern that the 15G registration had been approved "...without benefit of a biological opinion..." According to this same memorandum, EEB had requested on February 17, 1981 that RD make field monitoring a condition of registration and that no further registrations be made until evaluation of these studies.

RD informed EEB on March 25, 1981 that the requested field monitoring was not made a condition of registration and that the request had not been made of the registrant.

The FWS (FWS/OES EPA-81-2, May 1, 1981) determined that the proposed uses of Furadan, as well as the existing registrations for all formulations of Furadan, would likely jeopardize the following three endangered species:

Attwater's greater prairie chicken (Tympanchus cupido attwateri)
Aleutian Canada goose (Branta canadensis leucopareia)
Kern primrose sphinx moth (Euproserpinus euterpe)

So that the continued existence of these species would not be in jeopardy, the FWS recommended the following reasonable and prudent alternatives: the use of Furadan should be prohibited in the Walker Basin, Kern county, California to protect the Kern primrose sphinx moth (E. euterpe), prohibited in four counties in California to protect the Aleutian Canada goose (B. canadensis leucopareia), and prohibited in the "occupied range" within nine Texas counties to protect the Attwater's greater prairie chicken (T. cupido attwateri).

The Service also recommended that several different types of studies on the effects of the products be initated so that the agency would be assisted in exercising its "...authority for the conservation of the species."

An EEB memorandum to RD on May 13, 1981 stated that "EEB still contends that the proposed amendments substantially increase the exposure and hazard to non-target organisms. The hazard to endangered species, can be, at least in part, mitigated by geographical restrictions on the label. Additional information is needed to further evaluate the hazard to endangered aquatic species. The registrant is still required to submit additional data to negate the presumption of an unreasonable hazard."

EEB submitted label changes to RD on July 15, 1981, incorporating the geographic restrictions for terrestrial endangered species. On August 4, 1981, EEB reiterated its concerns to RD regarding the hazards of Furadan and stated that the registrant's field studies were inadequate.

RD granted conditional registration for 4F and 10G in October 1981, provided that the registrant submit a fish embryo larvae study, an aquatic invertebrate life-cycle study and avian;

field studies by March 1, 1983. RD accepted label changes for 10G and 4F that included endangered species considerations on January 20, 1982.

EEB initated an informal consultation with OES to consider a proposed experimental use permit to allow the use of Furadan on sunflowers. FWS responded (FWS/OES EPA-82-2-I, August 13, 1982) that if the alternatives cited in the May 1, 1981 biological opinion were followed, no jeopardy would occur as a result of the experimental use permit.

5. Summary of Endangered Species Considerations for Chlorpyrifos
(addresses several formulations with multiple use patterns)
(first of two consultations on Chlorpyrifos)

1. Product Name/ Common Name/ Chemical Name
Lorsban 4E, 15G, 50W, Dursban 10 CR/ Chlorpyrifos/ (0,0-diethyl0-(3,5,6-trichloro-2-pyridyl) phosphorthioate.

2. Regulatory Action
Conditional registration for four formulations on 12 crops and mosquito larvae. The products would be used as an insecticide for control of various pests infesting field crops, and for aerial application (Dursban 10 CR)for mosquito larvae control.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
In the initial 4/3/80 review for lorsban 50W use on apples, 4E use on sorghum, and 15G use on peanuts, EEB concluded that "...proposed use of these products may adversly impact upon endangered/threatened species..." in the following manner:

Crop	Organisms impacted
Apples	All animal species
sorghum	All aquatic animal species
peanuts	All avian species

EEB recommended that formal consultation be initiated. The branch went on to note that OES "...may recommend against use of Lorsban in habitats frequented by endangered/threatened species" and that "[t]he use of Chlorpyrifos could be excluded in the product labeling from the counties and/or drainage basins in which these habitats occur." A list of endangered/threatened species found in areas where the three crops are grown was included. (See compiled list at end of this section)

A request for consultation was made on July 7, 1980. In the request letter, EEB stated that, although the products could adversly impact on endangered species, the registration of Chlorpyrifos could be made if the following statement accompanied the labeling: "This product must not be used in areas where adverse impact on federally designated endangered or threatened species is likely. Prior to making applications of this product, the user must determine that such species are not located in or immediately adjacent to the area to be treated. Consult your regional U.S. Fish and Wildlife Service Office (Endangered Species Speacialist) or the local Fish and Game Office for specific information on endangered species."

In the review dated 12/16/80, EEB considered a conditional registration for the use of Lorsban (4E,15G, and 50W) as an insecticide for control of various insect pests and mosquito larvae. EEB "...determined that the continued existence of numerous endangered or threatened species, in many states, may be jeopardized by both the registered and proposed uses of chlorpyrifos." EEB referred "all proposed registration actions" to OES for consultation. A list of endangered species was included. (see compiled list)

A third review (5/26/81) concerned the "[p]roposed conditional registration for the use of Lorsban 4E as an insecticide to control various pests on tomatoes." EEB concluded that risks to endangered species could not be assessed at the time because the consultation was still in process.

The following list is a compilation of those species cited in the 12/16/80 and 4/3/80 reviews as occurring in the areas of proposed use and those species believed to be jeopardized by the use of the products:

Fish

leopard darter	(Percina pantherina)
watercress darter	(Etheostoma nuchale)
Alabama cavefish	(Speoplatyrhinus poulsoni)
slackwater darter	(E. boschungi)
spotfin chub	(Hybopsis monacha)
bonytail chub	(Gila elegans)
humpback chub	(G. cypha)
Gila topminnow	(Poeciliopsis occidentalis)
Arizona trout	(Salmo apache)
Gila trout	(S. gilae)
woundfin	(Plagopterus argentissimus)
Mohave tui chub	(Gila bicolor mohavensis)
Owens River pupfish	(Cyprinodon radiosus)
unarmored threespine stickleback	(Gasterosteus aculeatus williamsoni)
Lahontan cutthroat trout	(S. clarki henshawi)
little kern golden trout	(S. aguabonita whitei)
Paiute cutthroat trout	(S. clarki seleniris)
Colorado squawfish	(Ptychocheilus lucius)
greenback cutthroat trout	(S. clarki stomias)
yellowfin madtom	(Noturus flavipinnis)
pahranagat bonytail	(Gila robusta jordani)
slender chub	(Hybopsis cahni)
cui-ui	(Chasmistes cujus)
moapa dace	(Moapa coriacea)
bayou darter	(Etheostoma rubrum)
fountain darter	(E. fonticola)
Maryland darter	(E. sellare)
Okaloosa darter	(E. okaloosae)
snail darter	(Percina tanasi)
shortnose sturgeon	(Acipenser brevirostrum)
big bend gambusia	(Gambusia gaigei)
Pecos gambusia	(G. nobilis)
Pahrump killifish	(Empetrichthys latos)
scioto madtom	(Noturus trautmani)
Tecopa pupfish	(Cyprinodon nevadensis calidae)
Comanche Springs pupfish	(C. elegans)
Devil's Hole pupfish	(C. diabolis)
Warm Springs pupfish	(C. nevadensis pectoralis)

Amphibians

Red Hills salamander	(Phaeognathus hubrichti)
blunt-nosed leopard lizard	(Gambelia silus)
desert slender salamander	(Batrachoseps aridus)
Santa Cruz long-toed	

salamander	(*Ambystoma macrodactylum croceum*)

Reptiles

San Francisco garter snake	(*Thamnophis sirtalis tetrataenia*)
Island night lizard	(*Xantusia riversiana*)
Atlantic salt march snake	(*Nerodia fasciata taeniata*)
Eastern indigo snake	(*Drymarchon corais couperi*)

Birds

Bachman's warbler	(*Vermivora bachmanii*)
Cape Sable seaside sparrow	(*Ammospiza maritima mirabilis*)
dusky seaside sparrow	(*A. maritima nigrescens*)
Everglade Kite	(*Rostrhamus sociabilis plumbeus*)

Mollusks

Alabama lamp pearly mussel	(*Lampsilis virescens*)
Higgin's eye pearly mussel	(*L. higginsi*)
fine-rayed pigtoe	(*Fusconaia cuneolus*)
pale lilliput pearly mussel	(*Toxolasma cylindrella*)
shiny pigtoe	(*F. edgariana*)
pink mucket pearly mussel	(*L. orbiculata*)
white warty-back pearly mussel	(*Plethobasus cicatricosus*)
orange-footed pearly mussel	(*P. cooperianus*)
fat pocketbook	(*Potamilus capax*)
Cumberland bean pearly mussel	(*Villosa trabalis*)
rough pigtoe	(*Pleurobema plenum*)
turbercled-blossom pearly mussel	(*Epioblasma torulosa torulosa*)
tan riffle shell	(*E. walkeri*)
yellow-blossom pearly mussel	(*E. florentina florentina*)
shiny pigtoe	(*Fusconaia edgariana*)
Sampson's pearly mussel	(*E. sampsoni*)
white cat's paw pearly mussel	(*E. suicata delicata*)
Curtis' pearly mussel	(*E. florentina curtisi*)
Appalachian monkeyface pearly mussel	(*Quadrula sparsa*)
birdwing pearly mussel	(*Conradilla caelata*)
Cumberland monkeyface pearly mussel	(*Q. intermedia*)
dromedary pearly mussel	(*Dromus dromas*)
green-blossom pearly mussel	(*E. torulosa*)
turgid-blossom pearly mussel	(*E. turgidula*)

Snails

Stock Island snail	(*Orthalicus reses*)
noonday snails	(*Mesodon clarki nantahala*)
painted snake coiled forest snail	(*Anguispira picta*)
Virginia fringed mountain	(*Polygyriscus virginianus*)
flat-spired three-toothed	(*Triodopsis platysayoides*)

Iowa Pleistocene	(*Discus macclintocki*)
Insects	
El Segundo blue butterfly	(*Euphilotes battoides allyni*)
Lange's metalmark butterfly	(*Apodemia mormo langei*)
Lotis blue butterfly	(*Lycaeides argyrognomav lotis*)
mission blue butterfly	(*Icaricia icaricides missionensis*)
San Bruno elfin butterfly	(*Callophrys mossii bayensis*)
Smith's blue butterfly	(*Euphilotes enoptes smithi*)
Kern primrose sphinx moth	(*Euproserpinus euterpe*)
Bahama swallowtail butterfly	(*Papilio andraemon bonhotei*)
Schaus swallowtail butterfly	(*Papilio aristodemus ponceanus*)
.blue black silver spot butterfly	(?)
Crustaceans	
Socorro isopod	(*Thermosphaeroma thermophilus*)
Mammals	
gray bat	(*Myotis grisescens*)
Indiana bat	(*M. sodalis*)

After determining that the "...scope of [the] hazards could not be adequately addressed by performing separate IRA'S for the various actions...", after modifying the 4/3/80 review, and after postponing the pending OES consultation, EEB found it necessary to respond to a rebuttal of the 4/3/80 review by the registrant. The rebuttal raised points which argued that the use of Lorsban would be less serious than the EEB review had implied. EEB disagreed on each of these points and continued to have "serious concerns over the expansion of the outdoor uses of Chlorpyrifos." (review dated 2/23/81)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on July 7,1980. After withdrawing the consultation request on September 3, 1980, the consultation process was reinitiated on November 20, 1980.

5. Consulation Administration

The initial consultation request, made on July 7,1980, was withdrawn on September 3, 1980. The withdrawal was based on EEB's recommendation against registering the product because of "projected unreasonable adverse effects to nontarget organisms." EEB stated that they would "request reactivation" of the consultation is if registration was pursued. On November 20,1980,in conference with OES staff (memo to OES dated 12/30/80) it was determined that consultation would be reintiated "...for all currently proposed use of Lorsban (Chlorpyrifos)." It was noted that EPAR criteria for endangered aquatic organisms were "..clearly exceeded by the mosquito larvicidal use."

Because of the complexity of the consultation, the FWS requested an extension of the consultation period from April to

June, and then to July.

6. Consulation Conclusion and Environmental Protection Agency Response

In an action memorandum, RD addressed the proposed use of Lorsban and the objections raised by EEB. The draft included the EEB conclusion that "...endangered species may be adversly affected." The product manager stated that RD "...should grant conditional registration for all proposed uses..." based on the "rather clean" use history of Chlorpyrifos , EEB's inability to provide "defensible" reasons for denying conditional registration, SPRD findings that EEB's referral of Chlorpyrifos to RPAR were not acceptable, and on specific crop use rationales.

A response to the RD action memorandum was made by EEB in a memorandum dated 4/6/81. This response noted that the PM had "...overlooked risk factors for assessing the impact of Chlorpyrifos proposals as reviewed by EEB." These omissions included RPAR criteria for endangered/threatened species. Many of the PM's points were addressed individually and thereby expressed EEB's disagreement with each.

The EEB memorandum was never sent to RD and therefore the PM's rationale never received critical review.

The RD accepted the registration of Lorsban 4E for use on sorghum and nectarines on May 15, 1981. (see label)

The FWS (FWS/OES EPA-81-1, July 1,1981) reviewed the proposed request for use of Lorsban 4E, 15G, and 50W on twelve crops and the "...expansion of the mosquito larvicide use of Dursban 10CR to allow aerial application." At the time of the consultation, Chlorpyrifos was registered only for use on field corn, sweet corn, and popcorn. The FWS determined that the proposed use of the above formulations would likely "...jeopardize listed species and destroy or adversely modify their respective critical habitats as follows:"

Proposed registation

Dursban 10CR for control of mosquito larvicide.

Species jeopardized	
Hawaiian coot	(Fulica americana alai)
Hawaiian stilt	(Himantopus himantopus knudseni)
Hawaiian duck	(Anas wyvilliana)
Hawaiian gallinule	(Gallinula chloropus sandvicensis)
Marianas mallard	(Anas oustaleti)
light-footed clapper rail	(Rallus longirostris levipes)
California clapper rail	(R. longirostris obsoletus)
Yuma clapper rail	(R. longirostris yumanensis)
all listed fish	
all listed mussels	
pine barrens treefrog	(Hyla andersonii)
Houston toad	(Bufo houstonensis)
San Marcos salamander	(Eurycea nana)
Red Hills salamander	(Phaeognathus hubrichti)
Atlantic salt marsh snake	(Nerodia fasciata taeniata)
all 13 listed insects	

Proposed registration
Lorsban 4E and 15G on corn.

Species jeopardized

Attwater's greater prairie chicken	(Tympanuchus cupido attwateri)
fountain darter	(Etheostoma fonticola)
Alabama cavefish	(Speoplatyrhinus poulsoni)
yellowfish madtom	(Noturus flavipinnis)
woundfin	(Plagopterus argentissimus)
spotfin chub	(Hybopsis monacha)
slackwater darter	(Etheostoma boschungi)
humpback chub	(Gila cypha)
Colorado squawfish	(Ptychocheilus lucius)
bonytail chub	(Gila elegans)
Maryland darter	(Etheostoma sellare)
Commanche Springs pupfish	(Cyprinodon elegans)
Pecos gambusia	(Gambusia nobilis)
pine barrens treefrog	(Hyla andersonii)
Houston toad	(Bufo houstonensis)
all listed mussels	
all listed insects	

Proposed registration
Lorsban 4E and 15G on peanuts.

Species jeopardized

Attwater's greater prairie chicken	(Tympanuchus cupido attwateri)
all listed mussels	
pine barrens treefrog	(Hyla andersonii)

Proposed registration
Lorsban 4E on sorghum.

Species jeopardized

fountain darter	(Etheostoma fonticola)
slackwater darter	(E. boschungi)
Commanche Springs pupfish	(Cyprinodon elegans)
pecos gambusia	(Gambusia nobilis)
Houston toad	(Bufo houstonensis)
all listed insects	

Proposed registration
Lorsan 4E on tobacco.

Species jeopardized

yellowfin madtom	(Noturus flavipinnis)
spotfin chub	(Hybopsis monacha)
slackwater darter	(Etheostoma boschungi)
all listed mussels	

Proposed registration
Lorsban 4E and 15G on cole crops.

Species jeopardized

spotfin chub	(Hybopsis monacha)
unarmored threespine stickleback	(Gasterosteus aculeatus williamsoni)
all listed insects	
all listed mussels	

Proposed registration
Lorsban 50W on apples.

Species jeopardized

woundfin	(Plagopterus argentissimus)
Colorado squawfish	(Ptychocheilus lucius)
Gila trout	(Salmo gilae)
Pecos gambusia	(Gambusia nobilis)
all listed mussels	
all listed insects	

The service made the following recommendations of "reasonable and prudent alternatives" to avoid jeopardy to listed species and to avoid destruction of their habitats resulting from the use of Chlorpyrifos:

1) "To avoid jeopardy to the Attwater's greater prairie chicken [T. cupido attwateri] the 4E formulation should not be applied on corn after April 15 and on peanuts after August 15..." in specific Texas counties that were listed. "Also, the 15G formulation for use on corn and peanuts should not be registered in ..." those same counties.

2) "To avoid jeopardy to listed fish and mussels, delete the aerial application on corn, sorghum, peanuts, and apples, and require a 100-yard buffer zone between any treated crop (except apples) and any aquatic habitat, and for apples, extend the buffer zone to 1/4 mile."

Three other recommendations were made in which jeopardy to the pine barrens treefrog (Hyla andersonii), Houston toad (Bufo houstonensis), and to listed insects could be avoided by prohibiting use in specific counties of their range. It was uncertain if any alternatives existed for avoiding jeopardy from the use of the mosquito larvicide. Such use was expected to cause high mortality and therefore OES stated that they "...must receive assurance that Dursban will not be used in the habitats utilized by listed species. If such assurance is possible, then jeopardy can be avoided."

On August 11, 1981, OES communicated to EEB that, after reevaluation, the Attwater's greater prairie chicken (T. cupido attwateri) would not be jeopardized by the use of Lorsban 15G on peanuts. The remainder of the biological opinion was not altered by this finding.

In a EEB memorandum to RD dated August 14, 1981, EEB, while concurring with the jeopardy opinion findings, proposed modifications to the OES recommendations by allowing buffer zones during aerial spraying so that such spraying need not be eliminated. EEB considered that these modifications would provide sufficient safeguards for endangered species. The memorandum ended by stating "[s]ince the agency has already issued conditional registrations of Chlopyrifos for many of the use patterns for which

ACCEPTED

MAY 1 5 1981

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 464-448

86-1641 PRINTED IN U.S.A. IN MAY, 1981.
INITIAL PRINTING WITH FEDERAL EPA APPROVED USES ONLY.

'jeopardy opinions' were obtained, the [EEB] believes that the continued existence of many of the listed species of concern is now even more tentative. We urgently request that this agency's efforts be directed at protecting these species by requiring that the use of Chlorpyrifos be conditional upon implementation of the 'reasonable and prudent alternatives' indicated."

A later EEB memorandum to RD, dated October 27, 1981, retracted the aerial spraying modifications stating that they would "...not provide adequate protection for endangered species."

As reiterated in the Chlorpyrifos Registration Standard (9/84), RD informed the registrant that they would implement endangered species label requirements under the cluster approach.

SPECIMEN LABEL
REDUCED TO 55%

KEEP OUT OF REACH OF CHILDREN

WARNING

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN
Do Not Take Internally • Do Not Get in Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

If Swallowed: Do not induce vomiting. Consult physician, preferably by telephone. Call a physician immediately.
If On Skin: In case of exposure, remove contaminated clothing and immediately flush skin with soap and water. Wash contaminated clothing before reuse.
If In Eyes: Flush eyes with plenty of water for 15 minutes. Call a physician.
NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical Hazards

COMBUSTIBLE
Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

Environmental Hazards

This product is highly toxic to fish exposed to direct treatment or residues on crops. Avoid use when bees are actively foraging. Protective information may be obtained from your Cooperative Agricultural Extension Service.
LORSBAN 4E insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if their waters are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

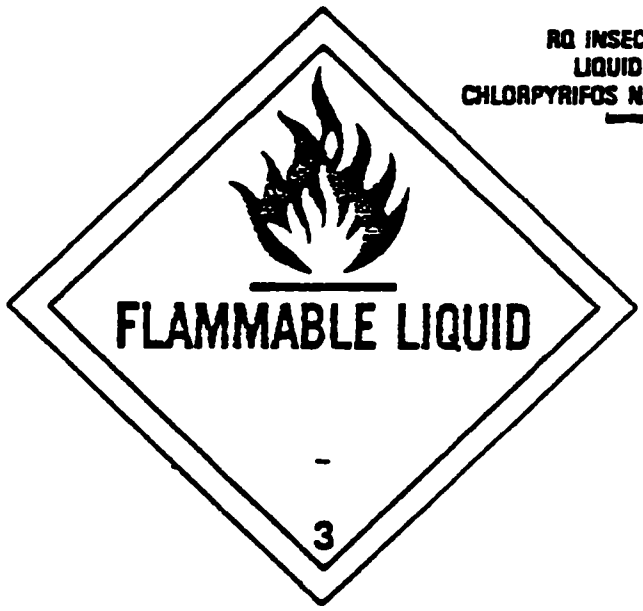
DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ AND FOLLOW COMPLETE DIRECTIONS FOR USE AND OTHER IMPORTANT INFORMATION GIVEN IN BOOKLET ATTACHED TO PRODUCT CONTAINER

STORAGE AND DISPOSAL

Storage: Keep away from food, foodstuffs, and domestic water supplies. Handle containers in a ventilated area. Keep container closed.
Disposal: Do not reuse empty container for any purpose. Promptly wash all surfaces and bury wash residue at a location away from water supplies. Follow official local pesticide container disposal regulations where applicable.



RQ INSECTICIDE LIQUID N.O.S. CHLORPYRIFOS NA 1993

NOTICE: Seller warrants that this product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with the directions under normal conditions of use. Buyer assumes the risk of any use not in accordance with the directions. Seller makes no other warranty or MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, except to the use of this product contrary to label or otherwise, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and Seller assumes the risk of any such use.

U.S. Patent No. 3,244,586

THE DOW CHEMICAL COMPANY
AND SUBSIDIARIES
MIDLAND, MICHIGAN 48640, USA HORGEN, SWITZERLAND HONG KONG
CORAL GABLES, FLORIDA 33134 USA SARNIA ONTARIO, CANADA

SL270R

ACC

MA

Under the Federal Fungicide as amended registered EPA Reg.

86-1

DOW

LORSBAN* 4E

INSECTICIDE

For Control of Various Insects Infesting Certain Field, Fruit, Nut, and Vegetable Crops

Complete Directions for Use, Use Precautions and Restrictions, Hazards and Other Important Information for the Proper Use, Handling, Storage and Disposal of this Product

M481

48378

*Trademark of THE DOW CHEMICAL COMPANY

EPA Reg. No. 464-324
EPA Est. 464-MO-1

THE DOW CHEMICAL COMPANY

AND SUBSIDIARIES

ENGLAND MICHIGAN 48640 USA HONG KONG QUEENSLAND HONG KONG
CORAL GABLES FLORIDA 33134 USA BARRIE ONTARIO CANADA

® Trademark of THE DOW CHEMICAL COMPANY

SPECIMEN LABEL

(BACK)

REDUCED TO 68%

READ ENTIRE LABEL BEFORE USING THIS PRODUCT

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

ENVIRONMENTAL HAZARDS

DIRECTIONS FOR USE

ACTIVE INGREDIENT

Chlorpyrifos O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate 48.7%

INERT INGREDIENTS 51.3%

TOTAL 100.0%

Contains 4 pounds of chlorpyrifos per gallon

SUMMARY TABLE

Page 6

CROP	PEST	APPROVED LABELING	PAGE
[illegible]	[illegible]	[illegible]	[illegible]

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Environmental Hazards

[illegible]

LORSBAN 4E [illegible]

DIRECTIONS FOR USE

[illegible]

LORSBAN 4E [illegible]

[illegible] LORSBAN 4E. [illegible]

FIELD CORN, POPCORN, SWEET CORN: For Use to Control Armyworms, Billbugs, Corn rootworms, Cutworms, Grasshoppers, Lesser cornstalk borer and Wireworms

[illegible] LORSBAN 4E [illegible]

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[illegible] LORSBAN 4E [illegible]

NOTE: [illegible]

[illegible] LORSBAN 4E [illegible]

NOTE: [illegible]

[illegible]

LORSBAN 4E [illegible]

HAZARDS
KEEP OUT OF REACH OF CHILDREN
WARNING
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN

Do Not Take Internally • Do Not Get In Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

[illegible]

NOTE TO PHYSICIAN: [illegible]

Physical and Chemical hazards

COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

In case of an emergency endangering life or property involving this product, call collect 517-636-4400

AGRICULTURAL CHEMICAL

Do Not Ship or Store with Food, Feeds, Drugs or Clothing

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[illegible] LORSBAN 4E [illegible]

[illegible]

Restrictions: [illegible] LORSBAN 4E [illegible]

Page 6

[illegible]

Timing for the best worm control

	Age (days)	Size	Instar
Get the	Hatch	[illegible]	Hatch
worms at	3	[illegible]	I
this stage	5	[illegible]	II
	6	[illegible]	III
	8	[illegible]	IV

TANK MIXTURE	RATE/ACRE
LORSBAN 4E plus [illegible]	1 to 2 [illegible] plus [illegible]
LORSBAN 4E plus [illegible]	1/2 to 1 [illegible] plus [illegible]
LORSBAN 4E plus [illegible] plus [illegible]	1 [illegible] plus [illegible] plus [illegible]
LORSBAN 4E plus [illegible] plus [illegible]	1 [illegible] plus [illegible] plus [illegible]

[illegible]

Restrictions: [illegible]

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[illegible] LORSBAN 4E [illegible]

Crop	Insect	Dosage LORSBAN 4E
[illegible]	[illegible]	[illegible]

[illegible] LORSBAN 4E [illegible]

Restrictions: [illegible]

[illegible] LORSBAN 4E [illegible]

[illegible] LORSBAN 4E [illegible]

Restrictions: [illegible]

Attention: [illegible]

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STORAGE AND DISPOSAL

Storage: [illegible]

Disposal: [illegible]

ATTENTION
Do Not Cut or Weld Container

NOTICE: [illegible] MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, [illegible]

Page

Ja: Summary of Endangered Species Considerations of Chlorpyrifos
(second of two consultations on Chlorpyrifos)

1. Product Name/ Common Name/ Chemical Name
Lorsban 4E and 15G/ Chlorpyrifos/ 0,0-diethyl 0-(3,5,6-trichloro-2-pyridyl) phosphorothioate.

2. Regulatory Action
Proposed conditional registration for the use of Lorsban as an insecticide to control various pests infecting soybeans, citrus crops, alfalfa, and sunflowers.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB considered the proposed registration of Lorsban on the four crops to be similiar to a previous determination that the use of Chlorpyrifos would jeopardize several endangered species. EEB concluded that a number of endangered species could be affected by the new uses. A list of those species considered affected by one or more of the uses is as follows:

Birds	
light-footed rail	(*Rallus longirostris levipes*)
California clapper rail	(*R. longirostris obsoletus*)
Yuma clapper rail	(*R. longirostris yumanensis*)
California least tern	(*Sterna albifrons browni*)
Attwater's greater prairie chicken	(*Tympanuchus cupido attwateri*)
Kirtland's warbler	(*Dendroica kirtlandii*)
thick-billed parrot	(*Rhynchopsitta pachyrhyncha*)
Everglades kite	(*Rostrhamus sociabilis plumbeus*)
Bachman's warbler	(*Vermivora bachmanii*)
Cape Sable seaside sparrow	(*Ammospiza maritima mirabilis*)
Mammals	
salt marsh harvest mouse	(*Reithrodontomys raviventris*)
Morro Bay kangaroo rat	(*Dipodomys heermanni morroensis*)
Fish	
yellowfin chub	(?)
Leon Springs pupfish	(*Cyprinodon bovinus*)
Clear creek gambusia	(*Gambusia heterochir*)
San Marcos gambusia	(*G. georgei*)
goodenough gambusia	(*G. amistadensis*)
pecos gambusia	(*Gambusia nobilis*)
Big Bend gambusia	(*G. gaigei*)
Moapa dace	(*Moapa coriacea*)
Scioto madtom	(*Noturus trautmani*)
yellowfin madtom	(*N. flavipinnis*)
Colorado squawfish	(*Ptychocheilus lucius*)
Alabama cavefish	(*Speoplatyrhinus poulsoni*)
Gila topminnow	(*Poeciliopsis occidentalis*)
woundfin	(*Plagopterus argentissimus*)
unarmored threespine stickleback	(*Gasterosteus aculeatus williamsoni*)

Pahranagat bonytail	(*Gila robusta jordani*)
Cui-ui	(*Chasmistes cujus*)
Kendall Warm Springs dace	(*Rhinichthys osculusthermalis*)
Pahrump killifish	(*Empetrichthys latos*)
longjaw cisco	(*Coregonus alpenae*)
blue pike	(*Stizostedion vitreum glaucum*)
bonytail chub	(*Gila elegans*)
humpback chub	(*G. cypha*)
Mohave chub	(*G. bicolor mohavensis*)
slender chub	(*Hybopsis cahni*)
spotfin chub	(*H. monacha*)
Arizona trout	(*Salmo apache*)
Gila trout	(*S. gilae*)
Little Kern golden trout	(*S. aguabonita whitei*)
Lahontan cutthroat trout	(*S. clarki henshawi*)
greenback cutthroat trout	(*S. clarki stomias*)
Paiute trout	(*S. clarki seleniris*)
leopard darter	(*Percina pantherina*)
fountain darter	(*Etheostoma fonticola*)
slackwater darter	(*E. boschungi*)
watercress darter	(*E. nuchale*)
Maryland darter	(*E. sellare*)
bayou darter	(*E. rubrum*)
snail darter	(*Percina tanasi*)
Owens River pupfish	(*Cyprinodon radiosus*)
Comanche Springs pupfish	(*C. elegans*)

Amphibians

San Marcos salamander	(*Eurycea nana*)
Houston toad	(*Bufo houstonensis*)
pine barrens treefrog	(*Hyla andersonii*)
Santa Cruz long-tailed salamander	(*Ambystoma macrodactylum croceum*)
desert slender salamander	(*Batrachoseps aridus*)
Red Hills salamander	(*Phaeognathus hubrichti*)

Insects

California elderberry Beetle	(*Desmocerus californicus dimorphus*)
Delta green ground beetle	(*Elaphrus viridis*)
El Segundo blue butterfly	(*Euphilotes battoides allyni*)
Lotis blue butterfly	(*Lycaeides argyrognomon lotis*)
mission blue butterfly	(*Icaricia acaroides missionensis*)
Smith's blue butterfly	(*E. enoptes smithi*)
San Bruno elfin butterfly	(*Callophrys mossii bayensis*)
Lange's metalmark butterfly	(*Apodemia mormo langei*)
Kern primrose sphinx moth	(*Euproserpinus euterpe*)

EEB referred the conditional registration proposals to OES for a formal biological opinion.(review dated 12/31/81)

4. Consultation Initiation

Initated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on January 8, 1982. this action to be a reinitiation of the formal consultation process since a previous consultation had been done.

5. Consultation Initiation

EEB and OES agreed to a 30 day extension,. which placed the conclusion of the consultation on May 22, 1982.

6. Consultation Conclusion and Environmental Protection Agency Response

The RD accepted the registration of Lorsban 4E for use on Alfalfa on April 22, 1982.

The FWS (FWS/OES EPA-82-3, May 21 1982) determined that "...the sunflower and citrus uses of Chlorpyrifos are likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of their respective critical habitats." OES did determine "...that the alfalfa and soybean uses are likely to jeopardize the continued existence of certain listed species and result in the destruction or adverse modifications of their respective critical habitat as follows:

Alfalfa

Pahranagat bonytail	(Gila robusta jordani)
Cui-ui	(Chasmistes cujus)
moapa dace	(Moapa coriacea)
fountain darter	(Etheostoma fonticola)
Pecos gambusia	(Gambusia nobilis)
San Marcos gambusia	(G. georgei)
pahrump killifish	(Empetrichthys latos)
Comanche Springs pupfish	(Cyprinodon elegans)
Colorado squawfish	(Ptychocheilus lucius)
unarmored three-spine stickleback	(Gasterosteus aculeatus williamsoni)
Lahontan cutthroat trout	(Salmo clarki henshawi)
woundfin	(Plagopterus argentissimus)
Houston toad	(Bufo houstonensis)
rough pigtoe	(Pleurobema plenum)
Higgin's eye pearly mussel	(Lampsilis higginsi)

Soybean

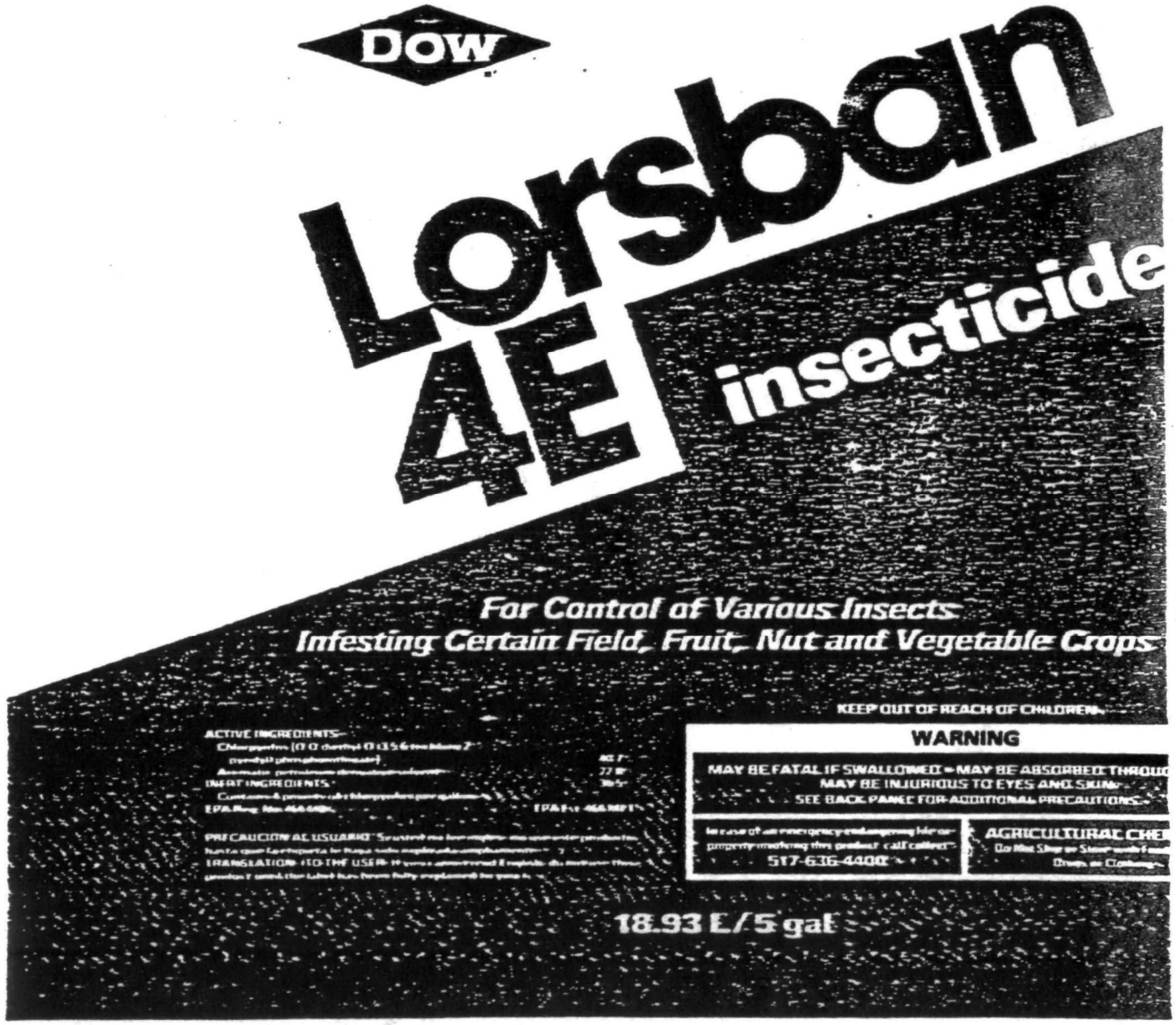
bayou darter	(Etheostoma rubrum)
slackwater darter	(E. boschungi)
snail darter	(Percina tanasi)
Pecos gambusia	(Gambusia nobilis)
Scioto madtom	(Noturus trautmani)
Comanche Springs pupfish	(Cyprinodon elegans)
orange-footed pearly mussel	(Plethobasus cooperianus)
white warty-back pearly mussel	(P. cicatricosus)
pale lilliput pearly mussel	(Toxolasma cylindrella)
pink mucket pearly mussel	(Lampsilis orbiculata)
Alabama lamp pearly mussel	(L. virescens)
Higgin's eye pearly mussel	(L. higginsi)
tubercled-blossom pearly mussel	(Epioblasma torulosa)
green-blossum pearly mussel	(E. torulosa gubernaculum)
turgid-blossum pearly	

ACCEPTED

JUL 19 1982

Under the Federal Insecticide Fungicide and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 464-448

*



86-1417 PRINTED IN U.S.A. IN JUNE, 1982.
REPLACES SPECIMEN LABEL 86-1417 PRINTED IN MAY, 1982.
DISCARD PREVIOUS SPECIMEN LABELS.
REVISIONS INCLUDE: (1) ADDITION OF CITRUS FRUIT CROPS, (2) GRASSHOPPER CONTROL FOR COTTON, AND (3) VARIOUS INSECT CONTROL ON SUNFLOWERS.

SL149

RQ INSECTICIDE
LIQUID N.O.S.
(Chlorpyrifos) NA 1993

NY

Lorsban™ 4E insecticide

For Control of Various Insects Infesting Certain Field, Fruit, Nut, and Vegetable Crops

Complete Directions for Use. Use Precautions and Restrictions, Hazards and Other Important Information for the Proper Use, Handling, Storage and Disposal of this Product.

EPA Reg No 464-448 EPA Est 464-MI-1

T582

* Trademark of THE DOW CHEMICAL COMPANY

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN 48640 USA HORGEN SWITZERLAND HONG KONG
CORAL GABLES FLORIDA 33134 USA SARNIA ONTARIO CANADA
Trademark of THE DOW CHEMICAL COMPANY

45378 T582

READ ENTIRE LABEL BEFORE USING THIS PRODUCT

PRECAUCION AL USUARIO Si usted no lee ingles no use este producto hasta que la etiqueta le haya sido explicada ampliamente

TRANSLATION (TO THE USER. If you cannot read English, do not use this product until the label has been fully explained to you.)

In case of an emergency endangering life or property involving this product, call collect 517-636-4400

ACTIVE INGREDIENTS	
Chlorpyrifos (O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate)	46.7%
Aromatic petroleum derivative solvent	22.8%
INERT INGREDIENTS	36.5%

Contains 4 pounds of chlorpyrifos per gallon

In case of an emergency endangering life or property involving this product, call collect 517-636-4400

AGRICULTURAL CHEMICAL

Do Not Ship or Store with Food, Feeds Drugs or Clothing

Do not use or sell or for structural pest control. Do not formulate this product into other end use products.

CONTENTS

HAZARDS
KEEP OUT OF REACH OF CHILDREN
WARNING
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN

Do Not Take Internally • Do Not Get In Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

If Swallowed Do not induce vomiting. Contains aromatic petroleum solvent. Call a physician immediately.

If On Skin In case of contact, remove contaminated clothing and immediately flush skin with soap and water. Wash contaminated clothing before reuse.

If In Eyes Flush eyes with plenty of water for 15 minutes. Call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical hazards
COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

LORSBAN 4E insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if their waters are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

General Information

LORSBAN 4E insecticide forms an emulsion when diluted with water and is suitable for use in all conventional hand- and power-operated ground spray equipment. Aerial spray equipment also may be used where specified.

Mixing Instructions

To prepare the spray, add a portion of the required amount of water to the spray tank and with agitation add the LORSBAN 4E. Complete filling the tank with the balance of water needed. Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture.

LORSBAN 4E insecticide may also be used in tank mixtures with certain herbicides and/or with non-pressure fertilizer solutions as recommended under specific crop use directions. Prepare tank mixtures in the same manner as recommended above for use of LORSBAN 4E alone. When tank mixtures of LORSBAN 4E and herbicides are involved, add wettable powders first, flowables second, and emulsifiable concentrates last. Where a fertilizer solution is involved, it is strongly recommended that a fertilizer pesticide compatibility agent such as Unite[1] or Compex[2] be used. Maintain constant agitation during both mixing and application to ensure uniformity of the spray mixture.

NOTE Test compatibility of the intended tank mixture before adding LORSBAN 4E to the spray or mix tank. Add proportionate amounts of each ingredient to a pint or quart jar and

[illegible] LORSBAN 4E insecticide [illegible]

[illegible] Trademark of The Rogers Agricultural Chemical Company
[illegible] Trademark of Helena Laboratories, Inc.

Use and Dosage Recommendations

ALFALFA Use LORSBAN 4E to control the following pests at the dosages indicated by application as a broadcast foliar spray.

Armyworms, corn rootworms (adults), grasshoppers	½ to 1 pint per acre
Alfalfa blotch leafminer, alfalfa looper, alfalfa weevil, armies cutworms, Egyptian alfalfa weevil, giant bugs, leafhoppers	1 to 2 pints per acre

Mix the required dosage with enough water to ensure thorough coverage of crop foliage and apply using aerial (fixed-wing or helicopter) or power-operated ground spray equipment. For aerial application use at least 2 gallons of water per acre. Treat when field counts or crop injury indicates that damaging pest populations are developing or present, however do not apply more than once per cron cutting.

LORSBAN 4E insecticide should not be tank-mixed with pesticides, surfactants or fertilizer formulations unless prior use has shown the combination non-injurious under your current conditions of use. Some phytotoxic symptoms may be observed on young, tender rapidly growing alfalfa when treated with LORSBAN 4E. Alfalfa will outgrow the symptoms and no yield loss should be expected.

Restrictions: *Do not cut or graze treated alfalfa within 14 days after application of 1 pint of LORSBAN 4E per acre nor within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per year.*

CITRUS FRUITS Use LORSBAN 4E insecticide at the rates indicated to control the following pests. Use the lower rates for light infestations and increase the dosage for heavier infestations.

CROP	PEST	Dosage LORSBAN 4E for Spray Coverage: Dilute (Pints/100 gal water)	Dilute or Concentrate (Pints/Acre)	Gallons of Spray Per Acre For Dilute Applications	Remarks
Grapefruit, Lemons, Oranges and Other Citrus fruits	Aphids, Katydids, Lepidopterous larvae, Cutworms, Fruit tree leafroller, Orange tortrix, Western tussock moth	Outside Coverage Spray (OCS) ½ to 1	2 to 7	200 to 700	All states including Calif.
	Citrus thrips[1], Mealy bugs[1], Scale insects[1], Black scale, Brown soft scale, Californa red scale, Snow scale, Chaff scale	½ to 1	2 to 7	200 to 700	All states except Calif.

Use recommended rate in not less than 10 gallons of water per acre and apply as a broadcast spray to the soil surface using suitable power operated ground spray equipment. On the same day of treatment incorporate the insecticide into the top 2 to 4 inches of soil using a disc, field cultivator or equivalent equipment.

LORSBAN 4E insecticide may also be applied in tank mixtures with non-pressure fertilizer solutions and/or with Blades, Eradicane[3], Sutan[3], Lasso[4], Dual[5] and Atrazine herbicides. See the Mixing Instructions section of this Label for further information. Read and carefully follow all applicable directions, restrictions and precautions on labeling for the other products used in combination with LORSBAN 4E.

[1] Trademark of Shell Chemical Company
[2,3] Trademark of Stauffer Chemical Company
[4] Trademark of Monsanto Company
[5] Trademark of Ciba-Geigy Corporation

Postemergence Treatment: Use LORSBAN 4E at the following rate by application in sufficient water to ensure thorough coverage of treated plants:

Grasshoppers	½ to 1 pint per acre.
Armyworms, chinch bugs, aphids	1 to 2 pints per acre.
European and southwestern corn borer	1.5 to 2 pints per acre.
Cutworms, billbugs, lesser cornstalk borer, flea beetle adults	2 to 3 pints per acre.

Treat when field counts indicate that pests are or may become a problem. For best billbug, chinch bug, and flea beetle adult control, apply with sufficient water to ensure a minimum spray volume of 20 to 40 gallons per acre and 40 psi using ground spray equipment. On corn less than 6 inches tall, apply the insecticide spray in a 9 to 12 inch wide band over the row. On corn greater than 6 inches tall, apply the insecticide spray using drop nozzles directed to the base of the plant. When chinch bugs continue to immigrate to corn over a prolonged period or under extreme pressure, a second application of LORSBAN 4E may be needed.

HAZARDS

KEEP OUT OF REACH OF CHILDREN

WARNING

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN

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Statements of Practical Treatment

If Swallowed Do not induce vomiting Contains aromatic petroleum solvent. Call a physician immediately

If On Skin In case of contact remove contaminated clothing and immediately flush skin with soap and water Wash contaminated clothing before reuse

If In Eyes Flush eyes with plenty of water for 15 minutes Call a physician

NOTE TO PHYSICIAN Chlorpyrifos is a cholinesterase inhibitor Treat symptomatically Atropine only by injection is an antidote

Physical and Chemical hazards

COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area

LORSBAN 4E insecticide is toxic to fish birds and other wildlife Fish and crustaceans may be killed if their waters are contaminated with this product Keep out of lakes streams ponds tidal marshes and estuaries Do not apply where runoff is likely to occur Do not apply when weather conditions favor drift from treated areas Do not contaminate water by cleaning of equipment or disposal of wastes Use this product only as specified on this label

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling

General Information

LORSBAN 4E insecticide forms an emulsion when diluted with water and is suitable for use in all conventional hand- and power-operated ground spray equipment. Aerial spray equipment also may be used where specified.

Mixing Instructions

To prepare the spray, add a portion of the required amount of water to the spray tank and with agitation add the LORSBAN 4E. Complete filling the tank with the balance of water needed Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture

LORSBAN 4E insecticide may also be used in tank mixtures with certain herbicides and/or with non-pressure fertilizer solutions as recommended under specific crop use directions. Prepare tank mixtures in the same manner as recommended above for use of LORSBAN 4E alone When tank mixtures of LORSBAN 4E and herbicides are involved, add wettable powders first, flowables second, and emulsifiable concentrates last. Where a fertilizer solution is involved, it is strongly recommended that a fertilizer pesticide compatibility agent such as Unite[1] or Compex[2] be used. Maintain constant agitation during both mixing and application to ensure uniformity of the spray mixture.

NOTE. Test compatibility of the intended tank mixture before adding LORSBAN 4E to the spray or mix tank. Add proportionate amounts of each ingredient to a pint or quart jar, cap.

[illegible] that should not be used

[1]Trademark of [illegible] Company
[2]Trademark of [illegible]

Use and Dosage Recommendations

ALFALFA Use LORSBAN 4E to control the following pests at the dosages indicated by application of a broadcast foliar spray

Armyworms corn rootworms (adults), grasshoppers ½ to 1 pint per acre
Alfalfa blotch leafminer alfalfa looper alfalfa weevil aphids cutworms Egyptian alfalfa weevil plant bugs leafhoppers 1 to 2 pints per acre

Mix the required dosage with enough water to ensure thorough coverage of crop foliage and apply using aerial (fixed-wing or helicopter) or power-operated ground spray equipment For aerial application use at least 2 gallons of water per acre Treat when field counts or crop injury indicates that damaging pest populations are developing or present however do not apply more than once per crop cutting

LORSBAN 4E insecticide should not be tank-mixed with pesticides surfactants or fertilizer formulations unless prior use has shown the combination non-injurious under your current conditions of use Some phytotoxic symptoms may be observed on young tender rapidly growing alfalfa when treated with LORSBAN 4E Alfalfa will outgrow the symptoms and no yield loss should be expected

Restrictions. *Do not cut or graze treated alfalfa within 14 days after application of 1 pint of LORSBAN 4E per acre nor within 21 days after application of rates above 1 pint per acre Do not make more than 4 applications per year*

CITRUS FRUITS Use LORSBAN 4E insecticide at the rates indicated to control the following pests Use the lower rates for light infestations and increase the dosage for heavier infestations

CROP	PEST	Dosage LORSBAN 4E for Spray Coverage: Dilute (Pints/100 gal water)	Dosage LORSBAN 4E for Spray Coverage: Dilute or Concentrate (Pints/Acre)	Gallons of Spray Per Acre For Dilute Applications	Remarks
Grapefruit Lemons Oranges and other Citrus fruits	Aphids Katydids Lepidopterous larvae Cutworms Fruit tree leafroller Orange tortrix Western tussock moth	Outside Coverage Spray (OC) ½ to 1	2 to 7	200 to 700	All states including Calif
	Citrus thrips[1] Mealy bugs[1] Scale insects[1] Black scale Brown soft scale California red scale Snow scale Chaff scale	½ to 1	2 to 7	200 to 700	All states except Calif

[illegible] LORSBAN 4E [illegible] acre [illegible] sprays for dilute sprays [illegible] per acre

[2]In California apply as Thorough Coverage (TC) using dosages as in [illegible] For dilute sprays apply 1200 to 240[illegible] of spray per acre but do not apply more than [illegible] LORSBAN 4E per acre

[3]Gallonage per acre based on average size of mature [illegible] Adjust to tree size per acre

For dilute applications use the specified dosage [illegible] gallons of water for the spray type indicated for pe[sts] controlled For concentrate sprays use the same a[mount of] LORSBAN 4E per acre that would be needed for [application] as a dilute spray using appropriate application [equipment and] procedures Treat when insects become a proble[m in] accordance with the local spray schedule recomme[nded by] your State Extension Service Specialist Do not apply [during] bloom period or when temperature exceeds 95°F

Restrictions *Do not apply more than 2 applications [per] year or more than 15 pints of LORSBAN 4E insecticide per acre per fruit year Do not make second application w[ithin] [illegible] days of the first application Do not treat within 21 days of harvest for applications up to 7 pints of LORSBAN 4E per acre nor within 35 days for application of rates above 7 pi[nts per] acre Do not pick fruit or do other work involving conta[ct with treated] trees within 2 days after treatment Do not allow lives[tock to] graze in treated areas*

FIELD CORN POPCORN SWEET CORN For use to [control] cutworms armyworms chinch bugs grasshoppers [wire]worms flea beetle larvae and adults aphids billbugs symphylans and lesser cornstalk borer

Preplant Incorporation Treatment Use LORSBAN 4E [at the] following rates by application in sufficient water to [the soil] surface and incorporate into the so[il]

Cutworms, symphylans [illegible] 2 to 4 pints [per acre]
Wireworms, [illegible] flea beetle larvae, grubs [illegible] 4 [pints] per a[cre]

Use recommended rate in not less than [illegible] gallons of [water] per acre and apply as a broadcast spray to the soil [surface] using suitable calibrated ground [illegible] equipment [On] the same day of treatment incorporate the insecticide [into] the top 2 to 4 inches of soil using a disc field cultiva[tor or] equivalent equipment

LORSBAN 4E insecticide may also be applied in tank mix with non-pressure fertilizer solutions and or with [illegible] Eradicane[2] Sutan[3] Lasso[4] Dual[5] and Atrazine herbi[cides] See the Mixing Instructions section of this label for fu[rther] information Read and carefully follow all applicable [direc]tions restrictions and precautions on labeling for the products used in combination with LORSBAN 4E

[1] Trademark of Shell Chemical Company
[2,3] Trademark of Stauffer Chemical Company
[4] Trademark of Monsanto Company
[5] Trademark of Ciba-Geigy Corporation

Postemergence Treatment: Use LORSBAN 4E at the fol[low]ing rate by application in sufficient water to ensure thoro[ugh] coverage of treated plants:

Grasshoppers ½ to 1 pint per a[cre]
Armyworms chinch bugs aphids 1 to 2 pints per a[cre]
European and southwestern corn borer 1.5 to 2 pints per a[cre]
Cutworms, billbugs lesser cornstalk borer, flea beetle adults . . . . .2 to 3 pints per a[cre]

Treat when field counts indicate that pests are o[r] become a problem For best billbug chinch bug and [flea] beetle adult control apply with sufficient water to ensur[e] minimum spray volume of 20 to 40 gallons per acre and 40 using ground spray equipment. On corn less than 6 inc[hes] tall, apply the insecticide spray in a 9 to 12 inch wide ba[nd] over the row On corn greater than 6 inches tall apply [the] insecticide spray using drop nozzles directed to the base [of] the plant When chinch bugs continue to immigrate to co[rn] over a prolonged period or under extreme pressure a seco[nd] application of LORSBAN 4E may be needed

...orm, armyworm, aphid, European and southwestern ...r, grasshoppers, and lesser cornstalk borer control, ...a broadcast spray using either aerial (fixed-wing or ...rt) or power-operated ground spray equipment. For ...plication, use at least 2 gallons of spray per acre. For ...s, it is preferable to apply LORSBAN 4E when soil is ...d worms are active on or near the soil surface. If ...s dry, cloddy or crusty at time of treatment, worms ...protected from the spray and effectiveness will be ...If such conditions exist, shallow incorporation using ...tool or other suitable equipment immediately before ...after treatment may improve control. Consult your ...ral Experiment Station or Extension Service special... ...additional information concerning cutworm control ...in your area. For first-generation European corn ...trol, treat when 25 to 50 percent of the corn plants ...hole feeding or leaf-feeding scars. Ground applica... ...uld be directed into the corn whorls. For second-...n European corn borer control, treat when field ...egg masses indicate pests are or may become a ... For southwestern corn borer control, treat when ...its of egg masses indicate pests are or may become ... A second application may be applied 10 to 14 days ...eeded due to reinfestation.

...: (Do not apply within 35 days before harvest of ...not apply more than a total of 15 pints of LORSBAN ...re per season. Do not allow livestock to graze in ...reas nor harvest treated corn silage as feed for ...airy animals within 14 days after last treatment. Do ...reated corn fodder to meat or dairy animals within ...fter last treatment.

For best results on bollworms, it is suggested that fields be scouted twice per week and treatments made when worms are ¼ inch or less in length. The following table illustrates the size of worms in relation to age and stage of development (instar) as a guide to timing of treatments for best control.

From the table it can be seen that a scouting schedule of only once per week will not be satisfactory since the worms may be too big to control effectively by the seventh or eighth day.

Timing for the best worm control

	Age (days)	Size	Instar
Get the worms at this stage	Hatch	1/16"	Hatch
	3	3/32"	I
	5	9/32"	II
	6	7/16"	III
	8	11/16"	IV

Proper application techniques help to ensure thorough spray coverage and correct dosage and are thus important in obtaining good control of pests. Consider these suggestions when applying LORSBAN 4E insecticide on cotton.

Aerial Application: Shorten boom length to avoid spray entering the vortices at the wing tips. Swath width should be reduced when wind direction is the same as direction of spraying.

TANK MIXTURE	RATE/ACRE
LORSBAN 4E plus Ambush[1] 2E	1 to 2 pints plus 1/5 to 2/5 pint
LORSBAN 4E plus Pounce[2] 3.2E	1 to 2 pints plus 1/8 to 1/4 pint
LORSBAN 4E plus Pydrin[3] 2.4E	1 to 2 pints plus 1/6 to 1/3 pint
LORSBAN 4E plus Bolstar[4] 6E	1/2 to 1 pint plus 2/3 to 1 1/3 pints
LORSBAN 4E plus methyl parathion[5] plus toxaphene[5]	1 pint plus 1 lb a.i. plus 2 lb a.i.
LORSBAN 4E plus methyl parathion[5] Plus EPN[5]	1 pint plus 0.6 lb a.i. plus 0.6 lb a.i.

[1]Trademark of ICI Americas Inc.
[2]Trademark of FMC Corporation.
[3]Trademark of Shell Oil Company.
[4]Trademark of Farbenfabriken Bayer GmbH Leverkusen.
[5]Use only emulsifiable formulations containing these active ingredients (a.i.).

Mix the tank mixture components in sufficient water to ensure thorough coverage of plants (at least 1 gallon of spray per acre) and apply using aerial spray equipment. Treat when field counts indicate damaging insect populations are developing or present. Re-treat as necessary to maintain control.

***Restrictions:** Make no applications of these tank mixtures closer to harvest than the longest pre-harvest interval shown for any of the products in the tank mixture. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock. Workers entering the field within 48 hours after application should wear protective clothing.*

GRAIN SORGHUM: Use LORSBAN 4E to control infestations of the Sorghum midge by application as a broadcast, foliar spray at the rate of ½ pint per acre. Mix the specified

Armywo... thrips. ... ground or aeri... damaging insec... Mix the required ... coverage.

LORSBAN 4E ... surfactants, or ... shown the com... conditions of us... 4E is applied to ... perature and dir...

***Restrictions:** Do ... season at a rate ... not exceed 4 pin... chlorpyrifos (ach... harvest within 21 ... peanut forage or ...*

PEPPERMINT: U... cast, foliar spray ... per acre and mi... Mix the specified ... gallons of spray ... equipment. For c... when field count... developing or pre... length use the 2 ... length use the ... during the grow... before harvest. ... harvest when fie... tions are devel... approximately 1 ... after application ... Make only one p...

...se LORSBAN 4E for control of the following pests ...es except Arizona and California at the dosages

...plant bugs ...us) — ½ to 1 pint per acre.

...d fall armyworm, ...ears, spider mites, ...ow-striped ... — ½ to 1 pint per acre.

...worm, bollworms ...pp.), boll weevil, ...pink bollworm, salt ...ercular — 1½ to 2 pints per acre.

...e recommended dosage rate of ½ pint per acre will ...e the high degree of control of the higher label rate. ...inimize the damage done by plant bugs and cotton ...r and allow the beneficial insects to survive, build ...be available to aid in the control of bollworms ...cotton.

...BAN 4E for control of the following pests in Arizona ...rnia at the dosages indicated:

...ns, cotton aphid, cotton ...r, Lygus, salt marsh ...thrips .... 1 to 2 pints per acre;

...s (Heliothis spp.), boll ...tworms, pink bollworm — 2 pints per acre.

...e 2 pint rate will aid in the suppression of cotton ...ator and spider mites.

...equired dosage with sufficient water to ensure ...coverage of plants and apply using aerial or power-...ground spray equipment. For aerial application, use ...gallon of spray per acre. Treat when field counts ...damaging insect populations are developing or ...re-treat as necessary to maintain control.

...ve control of spider mites when large numbers of ...resent, apply a second spray 3 to 5 days after initial ...to control newly hatched nymphs.

The proper nozzle arrangement and swath width to avoid skips and vortices effect can be checked out by flying over a paper tape (adding machine paper) using water with or without soluble dye. (The dye gives a permanent record.)

Flying at a height of 5-15 feet above the target results in the best coverage.

Nozzle orientation of the boom is important. More break-up occurs when nozzles are pointed straight down versus the straight back position. Desired droplet size (100-200 microns) can be obtained by angling the nozzles somewhere in this range.

Marking of swath by flagging or permanent markers is essential.

Ground Application: Orient the boom and nozzles so that uniform coverage is obtained. The swath width should not be wider than the boom; drift spray is wasted spray so do not depend on it. Use flat fan or disc-core hollow cone nozzles with maximum spacing of 20 inches and a spray pressure of 40-60 psi with a droplet size of 100-200 microns.

***Restrictions:** Do not apply within 14 days before harvest. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock.*

LORSBAN 4E insecticide may also be used in tank mixtures in all states to control armyworms, bollworms (*Heliothis spp.*), boll weevil, cotton fleahopper, plant bugs (*Lygus, Miridae*), and spider mites as indicated in the following table.

dosage in enough water to ensure thorough coverage and apply using suitable aerial or ground spray equipment. Make the first application when 20 to 50 percent of the seed heads are in bloom and midge adults are present. A second and third treatment at 3 day intervals may be needed but do not exceed 3 applications. To avoid phytotoxicity, do not treat plants that are under extreme heat and drought stress.

***Restrictions.** The treated crop is not to be used for forage, fodder, hay or silage within 14 days after the last treatment. Do not treat sweet varieties of sorghum.*

NECTARINES, PEACHES: Use LORSBAN 4E insecticide for the control of peach tree borers by application as a trunk spray before newly hatched borers enter the trees. Mix 3 quarts of LORSBAN 4E with 100 gallons of water and apply as a coarse, low-pressure spray to give uniform coverage of tree trunks. Thoroughly wet all bark areas from ground level to scaffold limbs. Do not allow spray to contact fruit. Consult your State Agricultural Experiment Station or Extension Service Specialist for proper time to treat in your area.

***Restrictions:** Make only one application per season. Do not apply within 14 days before harvest. Do not allow meat or dairy animals to graze in treated orchards.*

ONIONS (dry bulb): Use LORSBAN 4E insecticide to control onion maggot by application as an in-furrow drench at seeding. Apply LORSBAN 4E at the rate of 1.1 fluid ounce per 1000 linear feet of row at an 18-inch row spacing. Use a minimum of 40 gallons of total drench per acre. Incorporate to a depth of 1 to 2 inches.

***Restrictions.** For use on direct seeded onions only. Do not make more than one application per year. Based on available residue data, use of LORSBAN 4E on onions (dry bulb) is restricted to Idaho, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Washington, and Wisconsin.*

PEANUTS: Use LORSBAN 4E for control of the following pests at the dosages indicated.

Lesser cornstalk borer — 2 to 4 pints per acre (as a directed spray to the base of the plants in an 8 to 10-inch wide band).

SOYBEANS: Us... following pests...

Lesser cornst... at planting ... band for ... per acre at ... by a secon...

Cutworms, Eu... green stink...

Bean leaf bee...

Mexican bear...

Velvetbean ca... pints per ac... as a broa... requirement ... populations ... necessary.

Mix the required ... coverage. For gr... spray per acre.

***Restrictions.** Do ... per acre or 3 app... acre per season ... before harvest n... days apart. Do nc... nor otherwise fee... animals within 14 ... from treated soy... days after applic...*

STRAWBERRIES ... tion as ... weevil ... gallon ... days (a... berries are prese... with pesticides ... prior use has...

ACCEPTED

APR 22 1982

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended for the pesticide registered under EPA Reg. No. 464-448

DOW

Lorsban 4E insecticide

*

For Control of Various Insects Infesting Certain Field, Fruit, Nut and Vegetable Crops

KEEP OUT OF REACH OF CHILDREN

ACTIVE INGREDIENTS

WARNING

MAY BE FATAL IF SWALLOWED — MAY BE ABSORBED THROUGH SKIN. MAY BE INJURIOUS TO EYES AND SKIN. SEE BACK PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

517-636-4400

AGRICULTURAL CHEMICAL

18.93 L / 5 gal

86-1417 PRINTED IN U.S.A. IN MARCH, 1982.
REPLACES SPECIMEN LABEL 86-1417 PRINTED IN JANUARY, 1982.
DISCARD PREVIOUS SPECIMEN LABELS.
REVISIONS INCLUDE: USE ON ALFALFA AND SOYBEANS TO CONTROL CERTAIN INSECTS INFESTING THESE CROPS.

SPECIMEN LABEL
REDUCED TO 55%

KEEP OUT OF REACH OF CHILDREN

WARNING

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN
Do Not Take Internally • Do Not Get in Eyes, on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

IF Swallowed: Do not induce vomiting. Contains aromatic petroleum solvent. Call a physician immediately.

IF On Skin: In case of contact, remove contaminated clothing and immediately wash skin with soap and water. Wash contaminated clothing before reuse.

IF In Eyes: Flush eyes with plenty of water for 15 minutes. Call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical Hazards

COMBUSTIBLE
Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on crops. Avoid use when bees are actively foraging. Protective information may be obtained from your Cooperative Agricultural Extension Service.

Crustaceans: All pesticides is toxic to fish, birds and other wildlife. Fish and crustacean species may be killed if their habitats are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply under weather conditions which drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ AND FOLLOW COMPLETE DIRECTIONS FOR USE AND OTHER IMPORTANT INFORMATION GIVEN IN BOOKLET ATTACHED TO PRODUCT CONTAINER

STORAGE AND DISPOSAL

Storage: Keep away from food, feedstuffs and domestic water supplies. Handle contents in a ventilated area. Keep container closed.

Disposal: Do not reuse empty container for any purpose. Promptly crush or perforate and bury with wastes at a location away from water supplies. Follow official local pesticide container disposal regulations where applicable.

RQ INSECTICIDE
LIQUID N.O.S.
CHLORPYRIFOS NA 1993

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use. Buyer accepts the warranties and any other warranties of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE express or implied, contained in the use of this product contrary to label directions or under abnormal conditions or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

U.S. Patent No. 3,244,586

10359-0734

THE DOW CHEMICAL COMPANY

AND SUBSIDIARIES

MIDLAND MICHIGAN 48640 USA HORGEN SWITZERLAND HONG KONG
CORAL GABLES FLORIDA 33134 USA SARNIA, ONTARIO, CANADA

® Trademark of THE DOW CHEMICAL COMPANY

SL1090

SPECIMEN LABEL

(BACK)

REDUCED TO 75%

LORSBAN* 4E

INSECTICIDE

For Control of Various Insects Infesting Certain Field, Fruit, Nut, and Vegetable Crops

Complete Directions for Use, Use Precautions and Restrictions, Hazards and Other Important Information for the Proper Use, Handling, Storage and Disposal of this Product

FED C282

THE DOW CHEMICAL COMPANY

MIDLAND, MICHIGAN 48640 USA [illegible]

READ ENTIRE LABEL BEFORE USING THIS PRODUCT

PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

TRANSLATION (TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you.)

In case of an emergency endangering life or property involving this product, call collect 517 636 4400

ACTIVE INGREDIENTS

Chlorpyrifos (O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate)	40.7%
Aromatic petroleum derivative solvent	22.8%
INERT INGREDIENTS	36.5%

Contains 4 pounds of chlorpyrifos per gallon

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HAZARDS TO HUMANS AND DOMESTIC ANIMALS

MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN

Do Not Take Internally • Do Not Get in Eyes, on Skin or on Clothing • Avoid Breathing Vapors and

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical Hazards

COMBUSTIBLE

Do Not Use or Store Near Heat or Open Flame

Do Not Cut or Weld Container

In case of an emergency endangering life or property involving this product, call collect 517 636 4400

AGRICULTURAL CHEMICAL

Do Not Ship or Store with Food, Feeds, Drugs or Clothing

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area. [illegible]

LORSBAN 4E [illegible]

DIRECTIONS FOR USE

[illegible]

Mixing Instructions

To prepare the spray, add a portion of the required amount of water to the spray tank and with agitation add the LORSBAN 4E. Complete filling the tank with the balance of water needed. Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture.

LORSBAN 4E insecticide may also be used in tank mixtures with certain herbicides and/or with non-pressure fertilizer solutions as recommended under specific crop use directions. [illegible]

NOTE: [illegible]

Use and Dosage Recommendations

ALFALFA: Use LORSBAN 4E to control the following pests [illegible]

water per acre. Treat when field counts or crop injury indicates that damaging pest populations are developing or present. However, do not apply more than once per crop cutting.

LORSBAN 4E insecticide should not be tank mixed with [illegible]

Restrictions: Do not cut or graze treated alfalfa within 14 days after application of 1 pint of LORSBAN 4E per acre nor within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per year.

FIELD CORN, POPCORN, SWEET CORN: For use to control cutworms, armyworms, stink bugs, grasshoppers, [illegible]

Preplant Incorporation Treatment: Use LORSBAN 4E at the following rates [illegible]

Cutworms, symphylans — 2 to 4 pints per acre

Wireworms, billbugs, flea beetle larvae, grubs — 4 pints per acre

[illegible]

he plant. When chinch bugs continue to immigrate to corn over a prolonged period or under extreme pressure, a second application of LORSBAN 4E may be needed.

For cutworm, armyworm, aphid, grasshopper and lesser cornstalk borer control, apply as a broadcast spray using either aerial (fixed wing or helicopter) or power operated ground spray equipment. For aerial application, use at least 2 gallons of spray per acre. For cutworms, it is preferable to apply LORSBAN 4E when soil is moist and worms are active on or near the soil surface. If ground is dry, cloddy or crusty at time of treatment, worms may be protected from the spray and effectiveness will be reduced. If such conditions exist, shallow incorporation using a rotary hoe or other suitable equipment immediately before or soon after treatment may improve control. Consult your State Agricultural Experiment Station or Extension Service specialist for additional information concerning cutworm control practices in your area.

LORSBAN 4E insecticide may also be applied in tank mixtures with non-pressure fertilizer solutions and/or with Bladex[1], Eradicane[2], Sutan[3], Lasso[4], Dual[5], and Atrazine herbicides. See the Mixing Instructions section of this label for further information. Read and carefully follow all applicable directions, restrictions, and precautions on labeling for the other products used in combination with LORSBAN 4E.

[1] Trademark of Shell Chemical Company
[2,3] Trademark of Stauffer Chemical Company
[4] Trademark of Monsanto Company
[5] Trademark of Ciba Geigy Corporation

Restrictions: Do not apply more than 3 pints of LORSBAN 4E by postemergence application per season. Do not allow livestock to graze in treated areas nor feed treated corn silage, fodder or grain to meat or dairy animals within 50 days after treatment.

armyworm | ½ to 1 pint per acre

Beet armyworm, bollworms (Heliothis spp.), boll weevil, cutworms, pink bollworm, salt marsh caterpillar | 1½ to 2 pints per acre

NOTE: The recommended dosage rate of ½ pint per acre will not achieve the high degree of control of the higher label rate but will minimize the damage done by plant bugs and cotton fleahopper and allow the beneficial insects to survive, build up, and be available to aid in the control of bollworms infesting cotton.

Use LORSBAN 4E for control of the following pests in Arizona and California at the dosages indicated:

Armyworms, cotton aphid, cotton fleahopper, Lygus, salt marsh caterpillar, thrips | 1 to 2 pints per acre

Bollworms (Heliothis spp.), boll weevil, cutworms, pink bollworm | 2 pints per acre

NOTE: The 2 pint rate will aid in the suppression of cotton leafperforator and spider mites.

Mix the required dosage with sufficient water to ensure thorough coverage of plants and apply using aerial or power operated ground spray equipment. For aerial application, use at least 1 gallon of spray per acre. Treat when field counts indicate damaging insect populations are developing or present. Retreat as necessary to maintain control.

For effective control of spider mites when large numbers of eggs are present, apply a second spray 3 to 5 days after initial treatment to control newly hatched nymphs.

Timing for the best worm control

	Age (days)	Size	Instar
Get the worms at this stage	Hatch	1/16	Hatch
	3	2/16	I
	5	3/16	II
	6	5/16	III
	8	11/16	IV

Proper application techniques help to ensure thorough spray coverage and correct dosage and are thus important in obtaining good control of pests. Consider these suggestions when applying LORSBAN 4E insecticide on cotton.

Aerial Application: Shorten boom length to avoid spray entering the vortices at the wing tips. Swath width should be reduced when wind direction is the same as direction of spraying.

straight back position. Desired droplet size (100-200 microns) can be obtained by angling the nozzles somewhere in this range.

Marking of swath by flagging or permanent markers is essential.

Ground Application: Orient the boom and nozzles so that uniform coverage is obtained. The swath width should not be wider than the boom; drift spray is wasted spray so do not depend on it. Use flat fan or disc core hollow cone nozzles with maximum spacing of 20 inches and a spray pressure of 40-60 psi with a droplet size of 100-200 microns.

Restrictions: Do not apply within 14 days before harvest. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock.

LORSBAN 4E insecticide may also be used in tank mixtures in all states to control armyworms, bollworms (Heliothis spp.), boll weevil, cotton fleahopper, plant bugs (Lygus, Miridae) and spider mites as indicated in the following table:

plus Pydrin[7] 2.4E	plus 1/6 to 1/3 pint
LORSBAN 4E plus Bolstar[8] 6E	1/2 to 1 pint plus 2/3 to 1 1/3 pints
LORSBAN 4E plus methyl parathion[9] plus toxaphene[9]	1 pint plus 1 lb a.i. plus 2 lb a.i.
LORSBAN 4E plus methyl parathion[9] Plus EPN[9]	1 pint plus 0.5 lb a.i. plus 0.5 lb a.i.

[7] Trademark of ICI Americas Inc.
[8] Trademark of FMC Corporation
[9] Trademark of Farbenfabriken Bayer GmbH Leverkusen
[9] Use only emulsifiable formulations containing these active ingredients (a.i.).

Mix the tank mixture components in sufficient water to ensure thorough coverage of plants (at least 1 gallon of spray per acre) and apply using aerial spray equipment. Treat when field counts indicate damaging insect populations are developing or present. Retreat as necessary to maintain control.

Restrictions: Make no applications of these tank mixtures closer to harvest than the longest pre-harvest interval shown for any of the products in the tank mixture. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock. Workers entering the field within 48 hours after application should wear protective clothing.

GRAIN SORGHUM: Use LORSBAN 4E to control infestations of the Sorghum midge by application as a broadcast foliar spray at the rate of ½ pint per acre. Mix the specified dosage in enough water to ensure thorough coverage and

apply using suitable aerial or ground spray equipment. Make the first application when 30 to 50 percent of the seed heads are in bloom and midge adults are present. A second and third treatment at 3 day intervals may be needed but do not exceed 3 applications. To avoid phytotoxicity, do not treat plants that are under extreme heat and drought stress.

Restrictions: The treated crop is not to be used for forage, fodder, hay or silage within 14 days after the last treatment. Do not treat sweet varieties of sorghum.

PEANUTS: Use LORSBAN 4E for control of the following pests at the dosages indicated:

Lesser cornstalk borers: 2 to 4 pints per acre (as a directed spray to the base of the plants in 6 to 18 inch wide band);

Armyworms, corn earworm, [illegible] 1 to 2 pints per acre (as a broadcast foliar spray using ground or aerial equipment when field counts indicate damaging insect populations are developing or present).

Mix the required dosage in enough water to ensure thorough coverage.

LORSBAN 4E should not be tank mixed with pesticides, surfactants, or fertilizer formulations unless prior use has shown the combination non-injurious under your current conditions of use. Phytotoxicity may occur when LORSBAN 4E is applied to [illegible] experiencing high temperature and drought stress.

Restrictions: Do not make more than one application per season as a directed spray. Directed and foliar sprays should not exceed 8 pints of LORSBAN 4E per acre or 4 pounds of chlorpyrifos (active ingredient) per acre per season. Do not harvest within 21 days after treatment. Do not feed treated peanut forage or hay to meat or dairy animals.

PEACHES, NECTARINES: Use LORSBAN 4E insecticide for the control of peach tree borers by application as a trunk spray before newly-hatched borers enter the trees. Mix [illegible] quarts of LORSBAN 4E with 100 gallons of water and apply as a coarse, low pressure spray to give uniform coverage of tree trunks. Thoroughly wet all bark areas from ground level to scaffold limbs. Do not allow spray to contact fruit. Consult

your State Agricultural Experiment Station or Extension Service Specialist for proper time to treat in your area.

Restrictions: Make only one application per season. Do not apply within 14 days before harvest. Do not allow meat or dairy animals to graze in treated orchards.

PEPPERMINT: Use LORSBAN 4E by application as a broadcast, foliar spray to control cutworms at the rate of 2 to 4 pints per acre and mint root borer at the rate of 4 pints per acre. Mix the specified dosage in water to give no less than 10 gallons of spray per acre and apply using ground spray equipment. For cutworm control, treat during May and June when field counts indicate damaging insect populations are developing or present. When larvae are less than ½ inch in length, use the 2 pint rate. When larvae are ½ inch or more in length, use the higher rate. Make only one application during the growing season. Do not apply within 90 days before harvest. For mint root borer control, apply post harvest when field counts indicate damaging insect populations are developing or present. Follow treatment with approximately 1 acre inch of sprinkler irrigation immediately after application to incorporate the insecticide into the soil. Make only one post harvest application per season.

SOYBEANS: Use LORSBAN 4E insecticide for control of the following pests at the dosages indicated:

Lesser cornstalk | 4 pints per acre (at planting or postemergence in a 6 to 18 inch wide band followed by light incorporation); 2 pints per acre (at cracking in a 6 to 18 inch wide band) followed by a second spray 5 days after the initial treatment)

Cutworms, European corn borer, corn earworm, southern green stink bug | 2 pints per acre

Bean leaf beetle | 1 to 2 pints per acre

Mexican bean beetle, armyworms | 1 to 1½ pints per acre

Velvetbean caterpillar, green cloverworm | ½ to 1 pints per acre (as a broadcast foliar spray using ground or aerial equipment when field counts indicate damaging insect populations are developing or present; retreat as necessary to maintain control)

Mix the required dosage in enough water to ensure thorough coverage. For ground application use at least 10 gallons of spray per acre.

Restrictions: Do not apply more than 6 pints of LORSBAN 4E per acre or 3 pounds of chlorpyrifos (active ingredient) per acre per season. Do not apply last treatment within 28 days before harvest nor apply last two treatments closer than 14 days apart. Do not allow livestock to graze in treated areas nor otherwise feed treated soybean forage to meat or dairy animals within 14 days after application. Do not feed straw from treated soybeans to meat or dairy animals within 28 days after application.

SWEET POTATOES: Use LORSBAN 4E to control Conoderus wireworms, Systena flea beetles and the sweet potato flea beetle by preplant application at the rate of 6 pints per acre as a broadcast (overall) spray to the soil surface followed by incorporation. Mix the specified dosage with enough water to obtain uniform coverage of the treated area and apply as a coarse spray using suitable ground spray equipment. After application incorporate the insecticide into the soil to a depth of 4 to 6 inches using a rotary hoe, disc cultivator or other suitable incorporation equipment. Plant the crop in the usual manner as soon as possible after treatment.

Restrictions: Do not make more than one application per season.

TREE FRUITS: Use LORSBAN 4E as a dormant or delayed dormant spray at the rates indicated to control the following insects on the crops listed:

Crop	Insect	Dosage LORSBAN 4E
Apples	Rosy apple aphid, San Jose scale, Cutworms	½ to 1 pint
Pears	San Jose scale, Cutworms, Pear psylla adults	½ to 1 pint
Plums, Prunes	San Jose scale, Mealy plum aphid, Cutworms, Peach twig borer	½ to 1 pint
Almonds, Peaches, Nectarines	San Jose scale, Peach twig borer, Cutworms	½ to 1 pint

Tank mix the specified dosage with 1 to 2 gallons of a petroleum spray oil recommended for dormant use in 100 gallons of water and spray the entire tree by application to runoff using suitable ground spray equipment. Use the higher dosage of LORSBAN 4E for severe infestations. Use oil as recommended by your State Agricultural Experiment Station or Extension Service Specialist.

Restrictions: Make only one application during the dormant season. Do not allow meat or dairy animals to graze in treated orchards.

VEGETABLES: Use LORSBAN 4E to control root maggots on the following crops at the dosages indicated:

Broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, turnips | 1.6 to 3.3 fl oz per 1000 linear feet of row

For direct seeded crops apply the specified dosage in a water based spray as a 3 to 6 inch wide band over the row at planting time, either ahead of the planter shoe or in front of the press wheel to achieve shallow incorporation. Apply at a minimum of 20 gallons of total spray per acre.

For transplanted crops apply LORSBAN 4E as a water based soil drench to transplants immediately after setting. Use a minimum of 20 gallons of total drench per acre and apply to soil at the base of the plants.

Restrictions: Do not apply more than 4½ pints per acre. Do not make more than one application per season. Do not apply within 30 days before harvest.

Radishes | 1.0 fl oz per 1000 linear feet of row

Apply the specified dosage as a water based drench in the seed furrow with the seed at planting time. Use at least 20 gallons of total drench per acre.

Restrictions: Do not apply more than 5½ pints of LORSBAN 4E per acre. Do not make more than one application per season.

Rutabagas | 1.6 to 3.3 fl oz per 1000 linear feet of row

Apply the specified dosage in a water based spray as a 3 to 6 inch wide band over the row at planting time, either ahead of the planter shoe or in front of the press wheel to achieve shallow incorporation. Apply a minimum of 20 gallons of total spray per acre.

Restrictions: Do not apply more than 4½ pints of LORSBAN 4E per acre. Do not apply more than one application per season. Do not use rutabaga tops for food or feed purposes.

Attention: Before using this product, read and carefully observe all hazard information given in this booklet.

STORAGE AND DISPOSAL

Storage: Keep away from food, feedstuffs and domestic water supplies. Handle concentrate in a ventilated area. Keep container closed.

Disposal: Do not reuse empty container for any purpose. Promptly crush or perforate and bury with wastes in a location away from water supplies. Follow official local pesticide container disposal [illegible] where applicable.

Al[illegible]
Do Not Cut [illegible] Container

NOTICE: Seller warrants that the product conforms to its

HAZARDS
KEEP OUT OF REACH OF CHILDREN
WARNING
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
MAY BE FATAL IF SWALLOWED • MAY BE ABSORBED THROUGH SKIN • MAY BE INJURIOUS TO EYES AND SKIN
Do Not Take Internally • Do Not Get In Eyes on Skin or on Clothing • Avoid Breathing Vapors and Spray Mist • Wash Thoroughly After Handling

Statements of Practical Treatment

If Swallowed: Do not induce vomiting. Contains aromatic petroleum solvent. Call a physician immediately.

If On Skin: In case of contact remove contaminated clothing and immediately flush skin with soap and water. Wash contaminated clothing before reuse.

If In Eyes: Flush eyes with plenty of water for 15 minutes. Call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos [illegible] cholinesterase inhibitor. Treat symptomatically. Atropine only by injection is an antidote.

Physical and Chemical hazards
COMBUSTIBLE
Do Not Use or Store Near Heat or Open Flame
Do Not Cut or Weld Container

In case of an emergency endangering life or property involving this product, call collect 617-636-4400

AGRICULTURAL CHEMICAL
Do Not Ship or Store with Food, Feeds, Drugs or Clothing

Environmental Hazards

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops if bees are visiting the treatment area.

LORSBAN 4E insecticide is toxic to fish, birds and other wildlife. Fish and crustaceans may be killed if these waters are contaminated with this product. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Use this product only as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

General Information

LORSBAN 4E insecticide forms an emulsion when diluted with water and is suitable for use in all conventional hand and power operated ground spray equipment. Aerial spray equipment also may be used where specified.

Mixing Instructions

To prepare the spray, add a portion of the required amount of water to the spray tank and with agitation add the LORSBAN 4E. Complete filling the tank with the balance of water needed. Maintain sufficient agitation during both mixing and application to ensure uniformity of the spray mixture.

LORSBAN 4E insecticide may also be used in tank mixtures with cotton herbicides and/or with non pressure fertilizer solutions as recommended under specific crop use directions. Prepare tank mixtures in the same manner as recommended above for use of LORSBAN 4E alone. When tank mixtures of LORSBAN 4E and herbicides are involved, add wettable powders first, flowables second, and emulsifiable concentrates last. Where a fertilizer solution is involved, it is strongly recommended that a fertilizer pesticide compatibility agent such as Unite[a] or Compex[b] be used. Maintain constant agitation during both mixing and application to ensure uniformity of the spray mixture.

NOTE: Test compatibility of the intended tank mixture before adding LORSBAN 4E to the spray or mix tank. Add proportionate amounts of each ingredient to a pint or quart jar, cap, shake and let set 15 minutes. Formation of precipitates that do not readily redisperse indicates an incompatible mixture that should not be used.

[a] Trademark of The Hopkins Agricultural Chemical Company
[b] Trademark of Kalo Laboratories, Inc.

Use and Dosage Recommendations

ALFALFA: Use LORSBAN 4E to control the following pests at the dosages indicated by application as a broadcast foliar spray.

Armyworms, corn rootworms (adults), grasshoppers	½ to 1 pint per acre.
Alfalfa blotch leafminer, alfalfa looper, alfalfa weevil, aphids, cutworms, Egyptian alfalfa weevil, plant bugs, leafhoppers	1 to 2 pints per acre

Mix the required dosage with enough water to ensure thorough coverage of crop foliage and apply using aerial (fixed wing or helicopter) or power operated ground spray equipment. For aerial application use at least 2 gallons of water per acre. Treat when field counts [illegible] apply indicates that damaging pest populations are developing or present. However, do not apply more than once per crop cutting.

LORSBAN 4E insecticide should not be tank mixed with pesticides, surfactants or fertilizer formulations unless prior use has shown the combination non-injurious under your current conditions of use. Some phytotoxic symptoms may be observed on young, tender rapidly growing alfalfa when treated with LORSBAN 4E. Alfalfa will outgrow the symptoms and no yield loss should be expected.

Restrictions: Do not cut or graze treated alfalfa within 14 days after application of 1 pint of LORSBAN 4E per acre nor within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per year.

FIELD CORN, POPCORN, SWEET CORN: For use to control cutworms, armyworms, chinch bugs, grasshoppers, wireworms, flea beetle larvae and adults, aphids, billbugs, grubs, symphylans and lesser cornstalk borer.

Preplant Incorporation Treatment: Use LORSBAN 4E at the following rates by application in sufficient water to the soil surface and incorporate into the soil.

Cutworms, symphylans	2 to 4 pints per acre.
Wireworms, billbugs, flea beetle larvae, grubs	4 pints per acre

Use recommended rate in not less than 10 gallons of water per acre and apply as a broadcast spray to the soil surface using suitable power operated ground spray equipment. On the same day of treatment, incorporate the insecticide into the top 2 to 4 inches of soil using a disc, field cultivator or equivalent equipment.

Postemergence Treatment: Use LORSBAN 4E at the following rate by application in sufficient water to ensure thorough coverage of treated plants.

Grasshoppers	½ to 1 pint per acre.
Armyworms, chinch bugs, aphids	1 to 2 pints per acre.
Cutworms, billbugs, lesser cornstalk borer, flea beetle adults	2 to 3 pints per acre

Treat when field counts indicate that pests are or may become a problem. For best billbug, chinch bug and flea beetle adult control, apply with sufficient water to ensure a minimum spray volume of 20 to 40 gallons per acre and 40 psi using ground spray equipment. On corn less than 6 inches tall, apply the insecticide spray in a 8 to 12 inch wide band over the row. On corn greater than 6 inches tall, apply the insecticide spray using drop nozzles directed to the base of the plant. When chinch bugs continue to immigrate to corn over a prolonged period or under extreme pressure, a second application of LORSBAN 4E may be needed.

For cutworm, armyworm, aphid, grasshopper and lesser cornstalk borer control, apply as a broadcast spray using either aerial (fixed wing or helicopter) or power operated ground spray equipment. For aerial application use at least 2 gallons of spray per acre. For cutworms, it is preferable to apply LORSBAN 4E when soil is moist and worms are active on or near the soil surface. If ground is dry, cloddy or crusty at time of treatment, worms may be protected from the spray and effectiveness will be reduced. If such conditions exist, shallow incorporation using a rotary hoe or other suitable equipment immediately before or soon after treatment may improve control. Consult your State Agricultural Experiment Station or Extension Service specialist for additional information concerning cutworm control practices in your area.

LORSBAN 4E insecticide may also be applied in tank mixtures with non pressure fertilizer solutions and/or with Bladex[a], Eradicane[b], Sutan[b], Lasso[c], Dual[d] and Atrazine herbicides. See the Mixing Instructions section of this label for further information. Read and carefully follow all applicable directions, restrictions and precautions on labeling for the other products used in combination with LORSBAN 4E.

[a] Trademark of Shell Chemical Company
[b] Trademark of Stauffer Chemical Company
[c] Trademark of Monsanto Company
[d] Trademark of Ciba-Geigy Corporation

Restrictions: Do not apply more than 3 pints of LORSBAN 4E by postemergence application per season. Do not allow livestock to graze in treated areas nor feed treated corn silage, fodder or grain to meat or dairy animals within 35 days after treatment.

COTTON: Use LORSBAN 4E for control of the following pests in all states except Arizona and California at the dosages indicated.

Cotton fleahopper, plant bugs (Lygus, Miridae)	½ to 1 pint per acre.
Cotton aphid, fall armyworm, spider mites, thrips, yellow striped armyworm	½ to 1 pint per acre.
Beet armyworm, bollworms (Heliothis spp.), boll weevil, cutworms, pink bollworm, salt marsh caterpillar	1½ to 2 pints per acre

NOTE: The recommended dosage rate of ½ pint per acre will not achieve the high degree of control of the highest label rate but will minimize the damage done by plant bugs and cotton fleahopper and allow the beneficial insects to survive, build up, and be available to aid in the control of bollworms infesting cotton.

Use LORSBAN 4E for control of the following pests in Arizona and California at the dosages indicated.

Armyworms, cotton aphid, cotton fleahopper, Lygus, salt marsh caterpillar, thrips	1 to 2 pints per acre.
Bollworms (Heliothis spp.), boll weevil, cutworms, pink bollworm	2 pints per acre

NOTE: The 2 pint rate will aid in the suppression of cotton leafperforator and spider mites.

Mix the required dosage with sufficient water to ensure thorough coverage of plants and apply using aerial or power operated ground spray equipment. For aerial application use at least 1 gallon of spray per acre. Treat when field counts indicate damaging insect populations are developing or present. Retreat as necessary to maintain control.

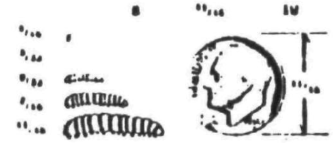
For effective control of spider mites when large numbers of eggs are present, apply a second spray 3 to 5 days after initial treatment to control newly hatched nymphs.

For best results on bollworms, it is suggested that fields be scouted twice per week and treatments made when worms are ¼ inch or less in length. The following table illustrates the size of worms in relation to age and stage of development (instars) as a guide to timing of treatments for best control.

From the table it can be seen that a scheduling schedule of only once per week will not be satisfactory since the worms may be too big to control effectively by the seventh or eighth day.

Timing for the best worm control

	Age (days)	Size	Instar
Get the worms at this stage	Hatch	¹/₁₆	Hatch
	3	²/₁₆	I
	5	³/₁₆	II
	6	⁴/₁₆	III
	8	¹¹/₁₆	IV



Proper application techniques help to ensure thorough spray coverage and correct dosage and are thus important in obtaining good control of pests. Consider these suggestions when applying LORSBAN 4E insecticide on cotton.

Aerial Application: Shorten boom length to avoid spray entering the vortices at the wing tips. Swath width should be reduced when wind direction is the same as direction of spraying.

The proper nozzle arrangement and swath width to avoid skips and vortices effect can be checked out by flying over a paper tape (adding machine paper) using water with or without soluble dye. (The dye gives a permanent record.)

Flying at a height of 8-10 feet above the target results in the best coverage.

Nozzle orientation of the boom is important. More break up occurs when nozzles are pointed straight down versus the straight back position. Desired droplet size (100-200 microns) can be obtained by angling the nozzles somewhere in this range.

Marking of swath by flagging or permanent markers is essential.

Ground Application: Orient the boom and nozzles so that uniform coverage is obtained. The swath width should not be wider than the boom, drift spray is wasted spray so do not depend on it. Use flat fan or disc core hollow cone nozzles with maximum spacing of 20 inches and a spray pressure of 40-60 psi with a droplet size of 100-200 microns.

Restrictions: Do not apply within 14 days before harvest. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock.

LORSBAN 4E insecticide may also be used in tank mixtures in all states to control armyworms, bollworms (Heliothis spp.), boll weevil, cotton fleahopper, plant bugs (Lygus, Miridae) and spider mites as indicated in the following table.

TANK MIXTURE	RATE/ACRE
LORSBAN 4E plus Ambush[1] 2E	1 to 2 pints plus 1/5 to 2/5 pint
LORSBAN 4E plus Pounce[2] 3.2E	1 to 2 pints plus 1/8 to 1/4 pint
LORSBAN 4E plus Pydrin[2] 2.4E	1 to 2 pints plus 1/6 to 1/3 pint
LORSBAN 4E plus Bolstar[3] 6E	1/2 to 1 pint plus 2/3 to 1 1/3 pints
LORSBAN 4E plus methyl parathion[4] plus toxaphene[4]	1 pint plus 1 lb a.i. plus 2 lb a.i.
LORSBAN 4E plus methyl parathion[4] Plus EPN[4]	1 pint plus 0.5 lb a.i. plus 0.5 lb a.i.

[1] Trademark of ICI Americas Inc.
[2] Trademark of FMC Corporation
[3] Trademark of Farbenfabriken Bayer GmbH Leverkusen
[4] Use only emulsifiable formulations containing these active ingredients (a.i.)

Mix the tank mixture components in sufficient water to ensure thorough coverage of plants (at least 1 gallon of spray per acre) and apply using aerial spray equipment. Treat when field counts indicate damaging insect populations are developing or present. Retreat as necessary to maintain control.

Restrictions: Make no applications of these tank mixtures closer to harvest than the longest pre-harvest interval shown for any of the products in the tank mixture. Do not allow livestock to graze in treated areas. Do not feed gin trash or treated forage to livestock. Workers entering the field within 48 hours after application should wear protective clothing.

GRAIN SORGHUM: Use LORSBAN 4E to control infestations of the Sorghum midge by application as a broadcast foliar spray at the rate of ½ pint per acre. Mix the specified dosage in enough water to ensure thorough coverage and

apply using suitable aerial or ground spray equipment. Make the first application when 30 to 50 percent of the seed heads are in bloom and midge adults are present. A second and

For direct seeded stage apply the specified dosage in a water based spray as a 2 to 4 inch wide band over the row of

6. Summary of Endangered Species Considerations for Bolero

1. Product Name/ Common Name/ Chemical Name

Bolero 8EC/ Thiobencarb/ S-[(4-chlorophenyl)methyl] diethylcarbamothioate.

2. Regulatory Action

Proposed conditional registration for use in dry seeded rice in Texas, Louisiana, Mississippi, and Arkansas to control watergrass and sprangletop.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB considered that, although the product was not hazardous to non-endangered birds and mammals, it could be hazardous to endangered organisms. Since the product was considered extremely hazardous to aquatic organisms, EEB stated that when applied the user "...must contact the office of endangered species and the local Department of Fish and Game to determine if any endangered/threatened species are located adjacent to the treated areas." The review noted that an area of major concern would be in Arkansas where the fat pocketbook pearly mussel (Potamilus cupax) is found near rice regions. EEB stated that the product "...must not be used in areas where impact of endangered/threatened species is likely."

EEB also determined that FIFRA criteria were fulfilled because residues in water were greater than 1/2 the acute LC50 values for many indicator species and exceeded levels that produce chronic effects in estuarine and freshwater invertebrates and estuarine fish.

Based on the available data, EEB objected to the registration of Bolero 8EC for use as a herbicide on rice fields.(review dated 9/19/80)

4. Consultation Initiation

Initiated by Hazard Evaluation Division, (Ecological Effects Branch) to Office of Endangered Species on December 29, 1980.

5. Consultation Administration

The consultation was to be completed by the FWS Atlanta office. Requests for additional time and/or material were not made.

6. Consultation Conclusion and Environmental Protection Agency Response

On November 10,1980, the registrant commented on the EEB Bolero review. This additional information was to demonstrate that the proposed use of the product would not cause unreasonable adverse effects to non-target aquatic organisms. EEB responded to the comments on January 9, 1981 by stating that its position was the same as documented in the September 19, 1980 review. EEB believed that the registrant had not "...demonstrated the environmental safety of Bolero."

While consideration for the registration was taking place, the state of Mississippi requested a emergency exemption for the

products use on rice beds. EEB determined that they could not agree to the granting of an exemption for the use of Bolero since "...it exceeded the RPAR risk criteria for acute and chronic hazards to non-target aquatic organisms." No evidence was found indicating whether the exemption was granted.

The FWS (FWS/OES, March 6,1981) determined that the use of Bolero would be detrimental to, and therefore could jeopardize, the fat pocketbook pearly mussel (Potamilus (=Proptera) capax). This determination was based on testing that showed that Bolero was highly toxic to aquatic invertebrates, was persistent in the environment, and has a potential for bioaccumulation.

"Reasonable" alternatives to avoid jeopardy to the listed species included the following:

1)"Bolero should not be registered for use on dry seeded rice to control watergrass and sprangletop."

2."Registration of Bolero should be approved only after the completion of further testing."

3. "Bolero should not be used on an emergency use basis until the additonal field testings are completed."

The FWS recommended, so that EPA would be able to excercise its "authority for the conservation of the species", that alternative, less detrimental pesticides be used in dry seeded rice.

RD accepted the registration of Bolero on February 26, 1982. This registration was made with a number of conditions, one of which was a field monitoring program that would be undertaken to assess the environmental impacts of the products use. Reports of findings were to be submitted after every growing season with a final report submitted within 4 years from the date of registration. Endangered Species concerns were not included in the labeling statements. (label included)

The monitoring program was reaffirmed when the registrant's request for discontinuation of testing was denied on April 13, 1984. RD stated that the conditions for registration would not be considered satisfied if monitoring was to end.

7. Summary of Endangered Species Considerations for Lontrel

1. Product Name/ Common Name/ Chemical Name

M-3972 herbicide, 3,6-Dichloropicolinic acid/ Lontrel/ 3,6-dichloro-2-pyridinecarboxylic acid.

2. Regulatory Action

Proposed conditional registration. Herbicide use for the selective control of broadleaf weeds in spring and winter wheat, barley, and oats which are not underseeded with a legume.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB, while reviewing a proposal to allow a experimental use permit (EUP) for Lontrel, determined that the product would be "highly hazardous to non-target plants." At the time of the review, a "may affect" determination had already been made for Lontrel's use on areas with endangered plants. EEB concluded that a formal consultation would be necessary to register the product. EEB did "...not object to the issuance of the EUP on the condition that , in order to protect endangered species, geographic restrictions be made once sites were selected. A list of counties in Texas and New Mexico where endangered plants are found was included. Consultation with OES was not initiated.

Shortly after the EUP was issued, Lontrel was proposed for registration. EEB determined that at least 9 endangered and threatened plant species "...may occur in close proximity to fields in which...wheat, barley, and oats are grown." EEB believed that the use of Lontrel might affect the following nine listed species:

solano grass	(*Orcuttia mucronata*)
Texas wild-rice	(*Zizania texana*)
Northern wild monkshood	(*Aconitum noveboracense*)
Spineless hedgehog cactus	(*Echinocereus triglochidiatus* var. *inermis*)
Uinta Basin hookless cactus	(*Sclerocactus glaucus*)
Arizona hedgehog cactus	(*E. triglochidiatus* var. *arizonicus*)
Nichol's turk's head cactus	(*Echinocactus horizonthalonius* var. *nicholii*)
Texas poppy-mallow	(*Callirhoe scabriuscula*)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on February 5, 1981.

5. Consultation Administration

On May 4, 1981 FWS(OES) advised HED (EEB) that additional phytotoxicity data on Lontrel were needed from the applicant before a biological opinion could be rendered. This letter also confirmed a 60-day extension of the consultation period.

6. Consultation Conclusion and Environmental Protection Agency Response

The FWS (FWS/OES, October 28, 1981) determined that "...the proposed action [would be] unlikely to affect..." those listed species cited by EEB. "In that Lontrel 205 is effective only for the control of broadleaf weeds, neither of the ...listed grasses (solano grass [*Q. mucronata*] nor Texas wild-rice [*Z. texana*]) will be affected by the application of this pesticide. In addition, after reviewing the distribution of the ... listed species, there seems to be little chance of overlap between the usage of this herbicide and the range of these listed plants."

EEB, while concurring with OES's opinion, "...continued to be concerned with the potential aquatic phytotoxic characteristics of Lontrel 205..." (November 6,1981 memorandum to RD) EEB therefore recommended that the label should carry "...a very prominent and clear warning about its potential phytoxicity to non-target terrestrial and aquatic plants." The warning was to indicate that Lontrel 205 "...could be very toxic to the aquatic environment and that contamination of this sort must be avoided..."

As of July 23,1982, RD has not accepted the registration of Lontrel 205 herbicide "...because of the number of studies which do not meet the minimum data requirements."

8. Summary of Endangered Species Considerations for Tebuthiuron
(first of two consultations on Tebuthiuron)

1. Product Name/ Common Name/ Chemical Name

Graslan 20P, Graslan 10P/ Tebuthiuron/ N-[S-1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea.

2. Regulatory Action

Proposed conditional registration. Herbicide use for the control of woody plant species on rangeland in the southwest. The proposal would expand the use to include the states of Arizona, Kansas, New Mexico, Oklahoma, and Texas.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

Prior to the review of the proposal, EEB had determined in February of 1980 that several listed plants species could be adversely affected by the use of the product that had been registered in 1979. Although consultation was not initiated, EEB requested RD to "...advise the registrant to exclude its use in several identified counties where these plants occur." The branch was not certain if this information was conveyed to the company. EEB recommended against the proposed conditional registration because it would increase the area in which the product would be used and important data was still missing. Since EEB considered the action a hazard to endangered plants, a consultation was to be requested.

4. Consultation Initiation

Initiated by Hazard Evaluation Division, (Ecological Effects Branch) to the Fish and Wildlife Service on February 25, 1981.

5. Consultation Administration

The FWS (FWS/OES EPA-81-4, April 19,1981) requested studies on run-off and leaching potential and possible fish reproductive problems and also clarification of effects of the product on cacti. An additional request for information was made by the FWS on January 6, 1982.

6. Consultation Conclusions and Environmental Protection Agency Response

RD registered Graslan for use in Texas, Oklahoma, Kansas, Arizona, and New Mexico on December 4, 1980. This product label was modified and registered on July 27, 1981. (labels included)

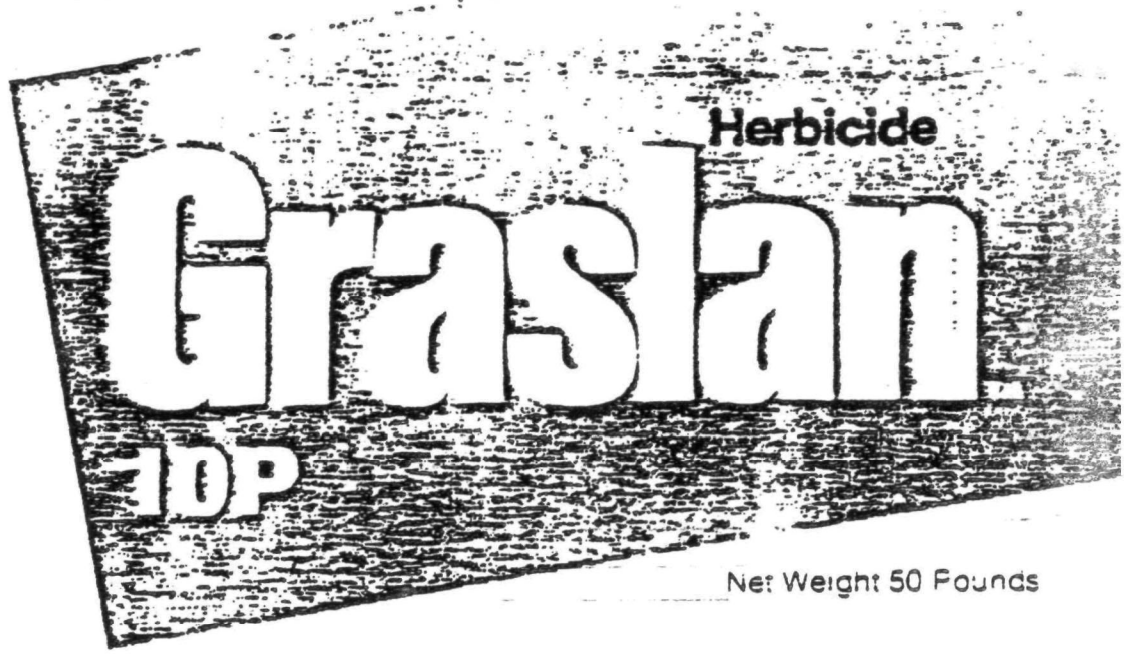
On January 29, 1982, so that the consultation would not be delayed, EEB sent label statements to OES. These statements required that the user consult with the FWS before application and included lists of geographic areas where endangered plants are found in Arizona, New Mexico, and Texas, as well as on rangeland. These label statements were modified on February 5, 1982 to further restrict usage in several counties in all three states. The statements expressed that use of the product in the above areas would pose a hazard to listed species and it should not be used in areas where an adverse impact on endangered species would be likely.

The FWS (FWS/OES EPA-81-4, July 13, 1982) determined that the proposed use would potentially affect 19 listed plants and a number of candidate plant species. All of these species are found in Arizona, New Mexico, and Texas. FWS concluded that, "...based on the means of uptake, the persistence of this chemical, and the broad range of target species of Tebuthiuron...", the following endangered species would likely be jeopardized by the use of the product:

Arizona	
silver pincushion cactus	(Pediocactus sileri)
Brady pinchusion cactus	(P. bradyi)
pebbles Navajo cactus	(P. peeblesianus var. peeblesianus)
Nichol's Turk's head cactus	(Echinocactus horizonthalonius var. nicholii)
Arizona hedgehog cactus	(E. trigiochidiatus var. arizonicus)
New Mexico	
Knowlton cactus	(P. knowltonii)
Mesa Verde cactus	(Scherocactus mesae-verdae)
Kuenzler hedgehog cactus	(E. knenzleri)
gypsum wild buckwheat	(Eriogonum gypsophilium)
Sneed pincushion cactus	(Coryphantha sneedii var. sneedii)
Texas	
Tobusch fishhook cactus	(Ancistrocactus tobuschii)
Nellie cory cactus	(C. minima)
bunched cory cactus	(C. ramillosa)
Lloyd's hedgehog cactus	(E. lloydii)
black lace cactus	(E. reichenbachii var. albertii)
Davis' green pitaya	(E. viridiflorus var. vardaeissii)
Lloyd's Mariposa cactus	(Neolloydia mariposensis)
Texas poppy-mallow	(Callirhoe scabriuscula)
Sneed pincushion cactus	(C. sneedii var. sneedii)
Texas wild rice	(Zizania texana)

The FWS concurred with the label statements that EEB had submitted on January 29, 1982 and recommended them as an alternative to jeopardy. In addition, the Service recommended that restrictions be made in one other county in Texas, so that Texas wild rice would be protected, and that further phytotoxicity studies be conducted. No further action was taken to incorporate endangered species statements on the label.

ELANCO



Net Weight 50 Pounds

For Control of Brush on Rangeland in Texas, Oklahoma, Kansas, Arizona and New Mexico

Active Ingredient:
tebuthiuron: *N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-*N*,*N*'-dimethylurea 10.0%
Inert Ingredients: 90.0%
Contains 5 pounds active ingredient per 50 pound bag

CAUTION: Keep out of reach of children. See back panel for additional caution statements.

*Grasian™—the trademark for Elanco Products tebuthiuron

1471-115

WT 6511 AMX

Directions for Use

Read All Directions Carefully Before Applying

[illegible] violation of Federal Law to use this product in a manner inconsistent with the label.

[illegible]ly Grasian 10P with air equipment calibrated to distribute the pellets uniformly. Apply the pellets at 5 to 10 pounds per acre depending on target brush species.

Grasian 10P may be applied at any time. Treatments become effective after sufficient rainfall has occurred to move the chemical into the root zone where it is taken into the plant. Applications just prior to seasonal rainfall will give the most rapid response. Brush control may continue for several months after application. During this time woody plants may go through repeated defoliations.

Grasian 10P may cause slight injury or suppress desirable grasses. Injury can be minimized by applying when grasses are dormant. If injury to perennial grasses does occur, it will be temporary. Forage grass production usually increases as brush competition is reduced. However, increased grass production is also dependent on adequate rainfall and a sound range management program.

Areas treated with Grasian 10P may be overseeded with a locally adapted variety of tall fescue. Consult your local Range Management Specialist for details on reseeding, such as, varieties, seeding rates, timing and fertilizer programs.

Application Rates:

Grasian 10P is recommended for the control of the following species of undesirable woody plants at the indicated range of application rates.

Higher dosages within the recommended range should be used on deep profile fine textured soils or when treating deep rooted plants.

Woody Species Controlled		Grasian 10P
Common Name	Scientific Name	Pounds Per Acre
Creosotebush	*Larrea tridentata*	5-10
Oak, Sand Shinnery	*Quercus havardii*	

Grasian 10P applied as directed will also control several broadleaf weeds found in association with undesirable woody plants.

Weeds Controlled		Grasian 10P Pounds Per Acre
[illegible]mweeds,		5-10
Common	*Gutierrezia dracunculoides*	
Perennial	*Xanthocephalum sarothrae*	
Texas	*Gutierrezia texana*	

Grasian 10P is not recommended for control of persimmon, prickly pear or cholla cactus.

Use Precautions:

Do not apply Grasian 10P on field crops, near desirable trees or shrubs, or areas into which their roots may extend, or in locations where the chemical may be washed in contact with their roots as injury or death may occur.

Do not apply Grasian 10P to newly seeded areas.

Do not apply Grasian 10P under conditions which will cause pellet movement to nontarget areas during application.

Apply Grasian 10P only once per year.

Grasian 10P may seriously injure desirable forage legumes such as lespedeza or clover.

Do not cut forage grass for hay from Grasian-treated areas for two years after application.

Do not allow lactating dairy animals to graze on or consume hay harvested from Grasian-treated areas for two years after application.

Thoroughly clean all traces of Grasian 10P from application equipment after use. Residues cleaned from application equipment should not be emptied on areas where they will come into contact with the roots of desirable trees, shrubs, plants, or water source.

PRECAUTIONARY STATEMENTS
HAZARD TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed. Avoid contact with skin, eyes or clothing. In case of contact, flush with water.

ENVIRONMENTAL HAZARD

Keep out of lakes, ponds, or streams. Do not contaminate water by cleaning of equipment or disposal of wastes.

STORAGE AND DISPOSAL

Do not contaminate water, food, feed, other pesticides, fertilizer or seeds.

Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies and desirable vegetation.

Dispose of empty container in an incinerator or landfill [illegible] or bury in a [illegible] place away from desirable vegetation.

[illegible]

ELAN[illegible]

G[illegible]

10P

For Cont[illegible]
in Texas, [illegible]
and New [illegible]

Active ingredie[illegible]
tebuthiuron [illegible]
thiadiazol-2[illegible]
Inert ingredient[illegible]
Contains 5 pou[illegible]

CAUTIO[illegible]

"Grasian"—the[illegible]

Net Weight 50 Pounds

For Control of Brush on Rangeland in Texas, Oklahoma, Kansas, Arizona and New Mexico

Active Ingredient:
tebuthiuron: *N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-*N*,*N*'-dimethylurea 10.0%
Inert Ingredients: 90.0%
Contains 5 pounds active ingredient per 50 pound bag

CAUTION: Keep out of reach of children.
See back panel for additional caution statements.

*Graslan™—the trademark for Elanco Products tebuthiuron

ACCEPTED
JUL 2 7 1981
Under the Federal Insecticide, Fungicide and Rodenticide Act, as amended for the pesticide registered under EPA Reg. No. 1471-115

WT 6512 AMX

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, IN 46285, U.S.A.

EPA Reg. No. 1471-115

Grasian 10P [illegible]

Grasian 10P [illegible]

Application Rates:

Grasian 10P [illegible] recommended for the control of the following species of undesirable woody plants at the indicated ranges of application rates.

Higher dosages within the recommended range should be used on deep profile fine textured soils or when treating deep rooted plants.

Woody Plants Controlled		GRASLAN 10P
Common Name	Scientific Name	Pounds Per Acre
Catclaw Mimosa	*Mimosa biuncifera*	5-10
[illegible]	*Leucaena pulverulenta*	
[illegible]	*Prosopis glandulosa*	
[illegible]	*Acacia farnesiana*	
[illegible]	*Acacia greggii*	
[illegible]	*Acacia constricta*	
[illegible]	*Lycium berlandieri*	

Woody Plants Suppressed		GRASLAN 10P
Common Name	Scientific Name	Pounds Per Acre
Acacia Catclaw	*Acacia greggii*	[illegible]
Mesquite	*Prosopis glandulosa*	

Grasian 10P applied as directed will also control several broadleaf weeds found in association with [illegible]

Weeds Controlled		GRASLAN 10P
Common Name	Scientific Name	Pounds Per Acre
Broomweed		5-10
Common	*Gutierrezia dracunculoides*	
Perennial	*Xanthocephalum sarothrae*	
Texas	*Gutierrezia texana*	
Burrowweed	*Haplopappus tenuisectus*	
Ragweed Common	*Ambrosia artemisiifolia*	
Ragweed Western	*Ambrosia psilostachya*	
Rubberweed Bitter	*Hymenoxys odorata*	

GRASLAN 10P is not recommended for control of persimmon prickly pear or cholla cactus

Use Precautions:

Do not apply Grasian 10P on field crops near desirable trees or shrubs or areas into which their roots may extend or in locations where the chemical may be washed in contact with their roots as injury or death may occur

Do not apply Grasian 10P to newly seeded areas

Do not apply Grasian 10P under conditions which will cause pellet movement to nontarget areas during application

Apply Grasian 10P only once per year

Grasian 10P may seriously injure desirable forage legumes such as lespedeza or clover

Do not cut forage grass for hay from Grasian-treated areas for two years after application

Do not allow lactating dairy animals to graze on or consume hay harvested from Grasian-treated areas for two years after application

Thoroughly clean all traces of Grasian 10P from application equipment after use. Residues cleaned from application equipment should not be emptied on areas where they will come into contact with the roots of desirable trees, shrubs, plants or water source.

PRECAUTIONARY STATEMENTS
HAZARD TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed. Avoid contact with skin, eyes or clothing. In case of contact, flush with water.

ENVIRONMENTAL HAZARD

Keep out of lakes, ponds or streams. Do not contaminate water by cleaning of equipment or disposal of wastes.

STORAGE AND DISPOSAL

Do not contaminate water, food, feed, other pesticides, fertilizer or seeds.

Pesticide spray mixture or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies and desirable vegetation.

Dispose of empty container in an incinerator or landfill approved for pesticide containers or bury in a safe place away from desirable vegetation.

Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

The manufacturer makes no warranties, express or implied, concerning this product or its use, which extend beyond the description on the label. All statements made concerning this product apply only when used as directed.

9. Summary of Endangered Species Considerations for Sumithion

1. Product Name/ Common Name/ Chemical Name

Sumithion 8E/ Sumithion, Fenitrothion/ 0,0-dimethyl 0-(3-methyl-4-nitrophenyl) phosphorothioate.

2. Regulatory Action

Proposed conditional registration for use in controlling the southern pine beetle (*Dendroctonus frontalis*).

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that the proposal would provide "...for a significant increase in exposure and acute risks to nontarget organisms." The use of Sumithion would be expected "...to kill large numbers of non-target organisms through acute exposures." Most of these effects were considered to be more likely to occur with aerial application and, although the proposal was for ground application, "adverse effects" were still expected. EEB determined that the use of Sumithion "...could represent catastrophic losses for endangered species." The following endangered species were considered to be "adversely affected" by the products use:

red-cockaded woodpecker	(*Picoides borealis*)
Ivory-billed woodpecker	(*Campephilus principalis*)
Kirtland's warbler	(*Dendroica kirtlandii*)
pine barrens treefrog	(*Hyla andersonii*)
Houston toad	(*Bufo houstonensis*)
eastern indigo snake	(*Drymarchon corais couperi*)

The following list of endangered fish species which could be affected by runoff or drift from areas of use was also included:

slackwater darter	(*Etheostoma boschungi*)
watercress darter	(*E. nuchale*)
Okaloosa darter	(*E. okaloosae*)
Maryland darter	(*E. setilare*)
Bayou darter	(*E. rubrum*)
Alabama cavefish	(*Speoplatyrhinus poulsoni*)
spotfin chub	(*Hybopsis monacha*)
snail darter	(*Percina tanasi*)
yellowfish madtom	(*Noturus flavipinnis*)
slender club	(*H. cahni*)

The review was to be forwarded to OES for a consultation and was to be used "...in further evaluating the potential hazard to endangered species and possible label restrictions which may be appropriate."

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on March 9, 1981.

5. Consultation Administration

No additional time and/or material was requested.

6. Consultation Conclusion and Environmental Protection Agency Response

The FWS (FWS/OES EPA-81-5, May 18, 1981) determined that all of the fish species noted in the EEB review, with the exception of the Okaloosa darter (*E. okaloosae*) and the spotfin club (*Hybopsis moncacha*), would not be affected by the use of Sumithion because their habitat does not occur near "managed" pine forests where it would be applied. Likewise, the ivory-billed woodpecker (*C. principalis*) would not be affected because of its habitat requirements nor would the Kirtland warbler (*D. kirtlandii*) be affected since it does not frequent areas where application would occur.

The FWS considered six other species, the eastern indigo snake (*D. corais couperi*), Okaloosa darter (*E. okaloosae*), spotfin chub (*Hybopsis monacha*), Houston toad (*B. houstonensis*), pine barrens treefrog (*Hyla andersonii*), and the red-cockaded woodpecker (*Picoides borealis*), that might be affected by the proposed registration of Sumithion. The opinion concluded that these species would not be jeopardized because either the habitat of pine forests were not that important as a part of their range, treatment areas would be very small, contamination would be small if compliance occured, the product would not be widely used compared to salvage operations, and/or "awareness" of the endangered species presence would lead to "...additional safeguards to protect the species habitat..."

Recommendations, at the close of the biological opinion, included marketing the product under a "...restricted use label to reduce the likelihood of misuse or abuse...", a label statement to exclude its use within 1/2 mile of red-cockaded woodpecker (*Picoides borealis*) colonies, and that use in Houston toad (*B. houstonensis*) habitat "...should only occur after contact with endangered species personnel of Texas Parks and Wildlife or the U.S. Fish and Wildlife Service to insure adequate safeguards..."

EPA accepted the registration of sumithion for control of pine beetles (*D. frontalis*) on July 27, 1982. The label statements included the red-cockaded woodpecker (*P. borealis*) and Houston toad (*B. houstonensis*) concerns and the product was only to be used by professional applicators. (Label included)

(Stau fer Shield)

SUMITHION® 8E

Insecticide For Use Only By Professional
Applicators For Control of Southern Pine Beetles

ACTIVE INGREDIENTS:

O,O-Dimethyl O-(4-nitro-m-tolyl) phosphorothioate* . . .	76.8%
Aromatic petroleum distillate.	7.3%
INERT INGREDIENTS:	15.9%
	100.0%

*SUMITHION

Contains 8 pounds of SUMITHION per gallon

KEEP OUT OF REACH OF CHILDREN

WARNING

SEE SIDE PANEL FOR PRECAUTIONARY STATEMENTS

_____GAL. NET _____LITERS

EPA Reg. No. 476-2200
EPA Est. No. 476-FL-1

A-1

® Registered Trademark of Sumitomo Chemical America, Inc.

Made by

STAUFFER CHEMICAL COMPANY
Westport, CT. 06880-0850

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

WARNING:

May be fatal if swallowed. Harmful if inhaled, or absorbed through the skin. Do not breathe vapors. Do not get in eyes, on skin, or on clothing. Thoroughly wash skin or clothing with soap and water if they become contaminated.

Keep out of domestic or animal water supplies.

Do not store or transport with food or animal feed.

STATEMENT OF PRACTICAL TREATMENT

FOR PESTICIDE EMERGENCY

CALL A PHYSICIAN IMMEDIATELY: If a known exposure occurs or is suspected, immediately initiate the recommended procedures below. Simultaneously contact a Poison Control Center, a physician or the nearest hospital. Describe the situation and follow the advice given. NOTE: Be sure to advise the physician that the compound is a cholinesterase inhibitor, and follow the physician's advice.

For further information, call collect, day or night: Stauffer Chemical Company (203)-225-6602 or Pesticide Team Safety Network, (800)-424-9200.

If swallowed, immediately give large quantities of water but do not induce vomiting. This product contains hydrocarbon solvent. If vomiting occurs, give fluids again. Have a physician determine if condition of patient will permit evacuation of stomach. Never give anything by mouth to an unconscious person.

For eye contact, hold eyelids apart and flush with large amounts of running water for at least 15 minutes. Get medical attention.

For skin contact, flush with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if irritation occurs. Wash clothing before re-use.

If inhaled, remove to fresh air. Seek medical attention if respiratory irritation occurs.

Note to Physician:

Exposure may cause cholinesterase inhibition. Atropine by injection is antidotal. 2-PAM is also antidotal when administered early and in conjunction with atropine.

ENVIRONMENTAL HAZARDS

This product is toxic to fish, birds, bees and other wildlife.

Avoid direct application to lakes, streams, and ponds. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes.

Do not apply when weather conditions favor drift from area treated.

Do not use this product within one-half mile of any red-cockaded woodpecker colonies.

Use in Bastrop and Burleson Counties, Texas, should only occur after contact with Endangered species personnel of Texas Parks and Wildlife or the U.S. Fish and Wildlife to ensure adequate safeguards for the Endangered Houston Toad.

Apply this product only as specified on this label.

PHYSICAL HAZARDS

Combustible. Do not use, pour, spill, or store near heat or open flame. Do not heat above 176°F (80°C). Do not expose to prolonged heat. Contact of container with flames or high temperatures will cause an explosion.

IN CASE OF SPILL

ISOLATE the spill.
HOLD this package, other cargo and vechicles involved.
IMMEDIATELY TELEPHONE 800-424-9300 for 24-hour emergency assistance.

PRODUCT INFORMATION

SUMITHION 8E is an emulsifiable concentrate containing 8 lbs. of SUMITHION per gallon. After dilution with water it is intended for use by Professional Applicators in the control of southern pine beetles.

Treatment of pines with SUMITHION 8E Insecticide will reduce mortality caused by the southern pine beetle. Apply SUMITHION 8E as a dilluted spray to individual trees using suitable hand or power-operated ground application equipment. SUMITHION 8E may be used either to prevent southern pine beetle attack (preventive treatment) or to control beetles already established in trees (remedial treatment).

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Preventive Treatment: Prepare a 2% solution by diluting 2.5 fluid ounces of SUMITHION 8E with sufficient water to make one gallon of finish spray (or 2.125 gallons of SUMITHION 8E per 100 gallons of water). Apply the solution to the tree trunk from ground level up to the first limbs in early spring or anytime trees are threatened with beetle attack from nearby infested trees. Apply to point of runoff. Repeat at intervals of 90 days during the summer and early fall or as long as the threat of attack exists.

Remedial Treatment: Prepare a 1% solution by diluting 1.25 fluid ounces with sufficient water to make one gallon of finished spray (or 1.06 gallons of SUMITHION 8E per 100 gallons of water). Apply the mixture to the infested portion of the tree or to all sides of logs and limbs cut from such trees after beetle attack has occurred but prior to beetle emergence. Apply to point of runoff.

STORAGE AND DISPOSAL

1. STORAGE: Containers should be stored in a cool, dry, well-ventilated area. Do not expose to prolonged heat. Contact of containers with flames or high temperatures will cause an explosion. This product will support combustion. Do not use, pour, spill, or store near heat or open flame. Keep container closed when not in use.

2. PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

3. PESTICIDE DISPOSAL: Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to Federal or approved state procedures under Subtitle C of the Resource Conservation and Recovery Act.

4. CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling, reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedures.

5. GENERAL: Consult federal, state, or local disposal authorities for approved alternative procedures.

NOTICE - READ CAREFULLY

CONDITIONS OF SALE:

Stauffer (and seller) offer(s) this product for sale subject to, and buyer and all users are deemed to have accepted, the following conditions of sale and warranty which may only be varied by written agreement of a duly authorized representative of Stauffer.

WARRANTY LIMITATION:

Stauffer warrants that this product conforms to the chemical description in the directions for use on the label subject to the inherent risks referred to below. Stauffer makes no other express warranties: THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY and there are no warranties which extend beyond the description on the label hereof.

INHERENT RISKS:

The directions for use of this product are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks associated with use. Buyer assumes all risks associated with use or application of this product contrary to label instructions or resulting from extraordinary weather conditions.

LIMITATION OF LIABILITY:

In no case shall Stauffer be liable for special, indirect or consequential damages resulting from the use or handling of this product and no claim of any kind shall be greater in amount than the purchase price of the product in respect of which such damages are claimed.

10. Summary of Endangered Species Considerations for Magnesium Phosphide

1. Product Name/ Common Name/ Chemical Name

Magnesium Phosphide/ unknown/ unknown

2. Regulatory Action

Proposed conditional registration. Fumigant for the control of burrowing rodents and moles.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that a hazard assessment was not possible since "pertinent fate and toxicological data" were lacking. EEB therefore could not concur with the registration. In order to assess the risks involved, the following data were required:

1)bird studies to evaluate LD50 and "no effect" levels,
2) environmental fate data,
3) specific target species,
and 4) precautionary labeling "...to reflect outdoor use patterns and endangered species considerations."

EEB also concluded that the use of the product could pose a "may affect situation" to endangered species. The black footed ferret (Mustela nigripes) and the eastern indigo snake (Drymarchon corais couperi) were mentioned as two species that might be jeopardized by the products use. The possibility of impacts on other endangered species was also mentioned. Consultation with the Fish and Wildlife Service (FWS) was to be initiated as soon as bioassay tests, environmental fate, and toxicity branch data were received and validated.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered species on April 30, 1981.

5. Consultation Administration

Requests for additional materials and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-81-6, June 19, 1981) determined that, besides the black-footed ferret (M. nigripes), the eastern indigo snake (D. corais couperi), and the San Joaquin kit fox (Vulpes macrotis mutica), "...the Utah prairie dog (Cynomys parvidens), the blunt-nosed leopard lizard (Gambelia silus), and the desert tortoise (Gopherus agassizii) may be affected, and , therefore should be included in [the] consultation."

FWS noted that, as indicated by analysis of the chemical action, the areas of intended use, and life history and ecological data of endangered species, "...any species using or inhabiting burrow systems could be impacted by the use of this pesticide." Therefore, the species included in the consultation "...are known to use or inhabit either rodent burrows or similiar appearing burrow systems in habitats where this pesticide may be used." FWS concluded that the above mentioned species were likely

to be jeopardized by the proposed use of Magnesium Phosphide.

The FWS suggested that, "...because of the nature of this chemical action, and the areas of intended use, Magnesium Phosphide should be prohibited in the areas, including critical habitat, where these species are found." It was further stated that jeopardy could only be avoided if label restrictions were made. These restrictions included avoiding use of Magnesium Phosphide in the range of the black-footed ferret (M. nigripes) or substituting its use with alternative pesticides, and avoiding the use of the product in those counties where the other endangered species were found.

The FWS requested that EEB submit to OES, in writing, the course of action in regard to the consultation.

In a 7/2/81 review, EEB stated that the product label should include restrictions under the precautionary statement section to appear beneath the heading "endangered species considerations." These restrictions included instructions not to use the product in the range of the black-footed ferret (M. nigripes) and to arrange for ferret surveys before its use to ensure the ferrets are not present and prohibit the product's use in those counties where the other endangered species were found. The statements pertaining to the Utah prairie dog (C. parividens) were deemed to be sufficient, so changes were not suggested. EEB concurred with the registration of Magnesium Phosphide upon the receipt of a written statement agreeing to the endangered species considerations and a final label reflecting the proposed changes. Until the receipt of such material, further or additional registration actions were not to be recommended.

A note was made to the product manager (RD) indicating that, "...in order for the agency not to be in violation of a section 7 consultation...", a written copy of the final actions concerning the product would have to be submitted to OES. EEB requested that the product manager send a copy of the letter "...to the registrant informing him of the endangered species considerations."

The RD suggested to the registrant, letter dated July 16, 1981, that the endangered species statements should be a part of the product label. The RD accepted the registration of Magnesium Phosphide on November 20, 1981. The endangered species statements that were written by EEB were included on the accepted product label. (label included)

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS & DOMESTIC ANIMALS
DANGER

[illegible]

SYMPTOMS: [illegible]

ENVIRONMENTAL HAZARDS

[illegible]

[illegible]

ENDANGERED SPECIES CONSIDERATIONS

[illegible]

PHYSICAL OR CHEMICAL HAZARDS

Keep away from liquid or water [illegible]

RESTRICTED USE PESTICIDE

[illegible]

DEGESCH MAG-DISC*

FOR CONTROL OF BURROWING RODENTS AND MOLES

OUTDOOR USE ONLY

*Active Ingredient: Magnesium Phosphide	49.6%
Inert Ingredients	50.4%

KEEP OUT OF REACH OF CHILDREN

DANGER POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Induce vomiting by touching back of throat with finger or blunt object. Call physician immediately.

IF INHALED: [illegible] to open air and remove contaminated clothing. Keep victim warm. Call physician immediately.

DEGESCH AMERICA, INC.

[illegible]

[illegible]

EPA Reg. No. [illegible]

Contents: [illegible] Net Weight [illegible]

DIRECTIONS FOR USE

[illegible]

STORAGE AND DISPOSAL

Store only in cool, dry, locked and ventilated room. Protect from moisture, open flames, or heat. Containers [illegible] may be disposed in an approved [illegible]

FOR CONTROL OF FOLLOWING BURROWING RODENTS AND MOLES: [illegible] Woodchucks and Yellow Belly [illegible] Prairie Dogs (except Utah [illegible] Dogs), Norway and Roof Rats, House Mice, Ground Squirrels, Moles, Voles, [illegible]

DIRECTIONS FOR USE AGAINST BURROWING PESTS: [illegible]

OUTDOOR USE ONLY: Do not use within [illegible] feet of [illegible] buildings. [illegible]

[illegible] State and Federal Game Authorities to ensure that endangered species do not inhabit the area proposed for treatment.

OPEN ONLY OUT OF DOORS. DO NOT ALLOW MAG-DISCS TO CONTACT LIQUID WATER. DO NOT APPLY DURING RAIN OR WHEN GROUND IS WET. MAG-DISCS REACT VIGOROUSLY WITH WATER AND MAY FLASH.

WARRANTY: Seller warrants that the product conforms to its chemical description and when used according to label directions under normal conditions of use it is reasonably fit for the purposes stated on the label. Seller makes no other warranty either express or implied, and buyer assumes all risk should the product be used contrary to label instructions.

FORM [illegible]

iii. Summary of Endangered Species Considerations for Zinc Phosphide
(second of two consultations, registration standard)

1. Active Ingredient/ Chemical Name
Zinc Phosphide/ Zinc Phosphide.

2. Regulatory Action
Registration standard. Zinc Phosphide is a rodenticide registered for a variety of large use sites such as agriculture areas, rangelands, aquatic noncrop areas, and urban and rural indoor commercial establishments.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB determined that Zinc Phosphide is an acutely toxic rodenticide. Based on dietary studies, the agency concluded that it is highly toxic to upland game birds and moderately toxic to waterfowl. The endangered species considerations were taken from the 2/13/81 EEB review.

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on May 28, 1981.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusion and Enviriomental Protection Agency Response
The FWS (FWS/OES EPA-81-7, July 24,1981) determined that no additional species, other than those mentioned in the January 2,1981 consultation, except the Laysan finch (*Telespyza cantans*) and the nihoa finch (*T. ultima*) which were removed from consideration after further consultation, would likely be jeopardized by the continued use of Zinc Phosphide.

It was recommended that the label restrictions for the pesticide should remain the same and be included on the appropriate labels. The following species were still considered likely to be jeopardized by the use of the product:

salt marsh harvest mouse	(*Reithrodontomys raviventris*)
Morro Bay kangaroo rat	(*Dipodomys heermani morroensis*)
Utah prairie dog	(*Cynomys parvidens*)
Puerto Rican plain pigeon	(*Columbia inornata wetmorei*)
yellow-shouldered blackbird	(*Agelaius xanthomus*)
Attwater's greater prairie chicken	(*Tympanuchus cupido attwateri*)
Aleutian Canada goose	(*Branta canadensis leucopareia*)
whooping crane	(*Grus americana*)

The registration standard was completed in June of 1982. Labelling statements were included that were identical to those on the product label. A description of when each species specific statement should be on the label, depending on the use site and its geographic location, was also included.

12. Summary of Endangered Species Considerations for Velpar

1. Product Name/ Common Name/ Chemical Name

Velpar Gridball lcc Brush Killer/ Hexazinone/ 3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione.

2. Regulatory Action

Proposed conditional registration. Herbicide use in non-cropland areas for the control of undesirable woody plants. The proposed registration would allow the use of the product in rangeland.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB Concluded "...that the proposed use provides for no significant increase in exposure or risks to non-target animals. However, the use on rangeland provides for a significant increase in exposure and risks to endangered/threatened species."

The following list of endangered/threatened plants that occur on rangeland was included in the review:

Brady pincushion cactus (*Pediocactus bradyi*)
Siler pincushion cactus (*P. sileri*)
peebles Navajo cactus (*P. peeblesianus* var. *peeblesianus*)
Uinta basin hookless cactus (*Sclerocactus glaucus*)
mesa verde cactus (*S. mesae-verdae*)
Spineless hedgehog cactus (*Echinocereus triglochidiatus* var. *inermis*)
Osgood mountains milk-vetch (?)
Kuenzler hedgehog cactus (*E. kuenzleri*)
Black lace cactus (*E. reichenbachii* var. *albertii*)
Lloyd's hedgehog cactus (*E. lloydii*)
Davis' green pitaya (*E. viridiflorus* var. *davisii*)
Knowlton cactus (*Pediocactus knowltonii*)
gypsum wild buckwheat (*Eriogonum gypsophilum*)
Macfarlane's four o'clock (*Mirabilis macfarlanei*)
bunched cory cactus (*Coryphantha ramillosa*)
Nellie cory cactus (*Coryphantha minima*)
tobusch fishhook cactus (*Ancistrocactus tobuschii*)
Texas poppy-mallow (*Callirhoe scabriuscula*)

The review was to be forwarded to the FWS so that a formal biological opinion would be initiated. EEB stated that "[t]he information from OES [would] be used in more accurately evaluating the hazard to endangered plant species."

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on March 27, 1981. Reinitiated on February 5, 1982.

5. Consultation Administration

The FWS, after discussing the proposal with EEB, requested additional information before completing the consultation. The information necessary was "...phytotoxicity data on selected cacti, broadleaf plants, and grasses from which potential effects

of Velpar on listed plants species could be extrapolated." FWS also stated that "...although only listed plants in the western U.S. were included in your letter [requesting consultation], they felt that Velpar had the "...potential for nationwide appliction and should be reviewed with this potential in mind."(FWS/OES EPA-81-8, August 14, 1981).

6. Consultation Conclusions and Environmental Protection Agency Response

Within the RD file on Velpar, a note written by RD staff was attached to the EEB 5/19/81-6/23/81 review. The note indicated that, [supposedly in reference to the review's conclusion that a formal biological opinion was necessary], "[t]his may be changed by the policy that endangered species will be looked at when the standard or LIP [labeling improvement program] are written." The note also indicated, in concurring with EEB staff, that OES was "...still looking to see if any exposed plants [existed]." It was mentioned that a EEB staff person "...suggested that we inform the company of the concern if they had any phototoxicity data to cactus to let us know. We can't make any formal request for data until we know that there's exposure." The FWS (FWS/OES EPA-81-8-1 November 10, 1981) concluded that, since pertinent information was lacking, the consultation should be pursued "...on a informal basis by providing a list of endangered and threatened species, or species for listing, which may occur in the area of influence of this action." The furnished list included the species cited above, with the exception of the Osgood mountain milk-vetch(?), and the following species:

Endangered

Truckee barberry (Berberis sonnei)
McDonald's rock-cress (Arabis mcdonaldiana)
Contra costa wallflower (Erysimum capitatium var. angustatum)
Santa Barbara Island liveforever (Dudleya traskiae)
San Clemente Island broom (Lotus dendroideus ssp. traskiae)
San Diego mesa mint (Pogogyne abramsii)
San Clemente Island bush-mallow (Malacothamnus clementinus)
Eureka Valley evening primrose (Oenothera avita ssp. eurekensis)
Antioch Dunes evening-primrose (O. deltoides ssp. howellii)
Solano grass (Orcuttia mucronata)
Eureka Dune grass (Swallenia alexandrae)
San Clemente Island larkspur (Delphinium kinkiense)
San Clemente Island Indian paint brush (Castilleja grisea)
Salt marsh bird's-beak (Cordylanthus maritimus ssp. maritimus)
Arizona hedgehog cactus (Echinocereus triglochidiatus var. arizonicus)
Sneed pincushion cactus (Coryphanta sneedii var. sneedii)
Texas wild-rice (Zizania texana)
Nichol's Turk's head cactus (Echinocactus horizonthalonius var. nicholii)
Wright fishhook cactus (Sclerocactus wrightiae)
Green pitcher plant (Sarracenia oreophila)
dwarf poppy mallow (Arctomecon humilis)

Threatened
Lloyd's Mariposa cactus (Neolloydia mariposensis)
Proposed
walden phacelia (Phacelia formosula)
Malheur wire-lettuce (Stephanomeria malheurensis)
Navasota ladies-tresses (Spiranthes parksii)
McKittrick pennyroyal (Hedeoma apiculatum)
Todsen's pennyroyal (H. todsenii)

The consulation letter reminded the EEB that it was their reponsibility to determine if a proposed action may jeopardize an endangered, threatened, or proposed species, and that such a finding would require a formal consultation process. The FWS requested a copy of the biological assessment and "...any other relevant information that assisted..." EEB in reaching their conclusion.

After reviewing the OES list of potentially effected species, EEB sent a memorandum to RD, dated February 5, 1982, to convey that they had determined that the only species "seriously threatened by the proposed action" were those listed in the 6/23/81 EEB review. Label suggestions were made and the counties where Velpar was considered to be a hazard were included. EEB stated that "[t]he registrant may negate the need for the ...label statement by providing appropriate phytotoxicity data."

The above memorandum was forwarded to OES, along with a explanatory letter. In that letter, EEB indicated that they had reviewed the OES list and had "...determined that appropriate label statements would avert exposure of this product to listed species." EEB closed by stating that they did not "...see any necessity to prepare an additional biological assessment and therefore wish to withdraw our request for consultation on this product."

The FWS responded (dated March 1,1982) to the EEB February 5 Momorandum by stating that they did "...not feel that the pertinent issues regarding this proposed conditional registration [had] been adequately addressed." In response to EEB determining that only those species listed in the 6/23/81 review were "seriously threatened" and that additional species on the FWS list (consultation letter, November 25, 1981) could be protected by labeling, the FWS questioned how conclusions were made and what evidence supported giving "a number of additional species" protection through appropriate labeling statements.

The FWS also disagreed with EEB's contention "...that the use of the broad term 'rangeland' restricts the area of consideration to eight states", believing instead that the product had a nationwide use pattern unless restricted by label statements. "In order to determine if formal consultation should be initiated..." the FWS requested more information "...detailing how [EEB] conclusions were formulated and which 'additional species' [EEB] ...included in the label restrictions." Determination on whether a formal consultation was necessary was to have been made after FWS received the information.

In a handwritten file memorandum, dated 3/9/82, EEB wrote of its uncertainty of how to respond to RD's actions regarding the

registration of Velpar. RD had indicated to EEB that they, in the words of EEB staff, "...did not agree that the February 5,1982 statement was necessary and that the registration had been issued without it." EEB had explained to RD that OES wanted to include many other endangered species to those considered in the EEB review. EEB stated that, considering the actions made by RD, "...we cannot reasonably expect that they would accept a similiar statement incorporating more species." Also it was agreed that on rangeland plant species initially identified within the 6/23/81 review should be of immediate concern. A note on the back of the 3/9/82 memorandum, dated 3/18/82, indicated that after confering with the EEB chief, no action was to be taken on the Velpar consultation "...in light of the current circumstances."

RD accepted the registration of Velpar Gridball lcc Brush Killer on September 8, 1982.

The product has never been used commercially.

13. Summary of Endangered Species Considerations for Aluminum Phosphide

1. Product Name/ Common Name/ Chemical Name

Aluminium Phosphide/ unknown/ unknown

2. Regulatory Action

Proposed conditional registration. Fumigant for the control of burrowing rodents and moles.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that, since "...any life in the burrow will be destroyed..." by the use of the fumigant, the product could directly destroy numerous non-target organisms that prey on prairie dogs or utilize prairie dog burrows. The following six endangered species were determined to be in jeopardy through the use of Aluminum Phosphide:

black-footed ferret	(*Mustela nigripes*)
eastern indigo snake	(*Drymarchon corais couperi*)
San Joaquin kit fox	(*Vulpes macrotis mutica*)
Utah prairie dog	(*Cynomys parvidens*)
blunt-nosed leopard lizard	(*Gambelia silus*)
desert tortoise	(*Gopherus agassizii*)

EEB recommended that the product label incorporate statements that the product should not be used in the ranges or dens of the above endangered species, except the Utah prairie dog (*C. parvidens*). Safeguards for this species were considered adequately conveyed by language found in the target animal section of the label. The black-footed ferret (*M. nigripes*) statement also included instructions to contact the nearest FWS office before using the product so that a survey could be done to ensure no ferrets were present. EEB required that the registrant submit a written statement agreeing to the inclusion of the endangered species statements. Other further or additional registration actions were recommended against until the written statement was submitted. (review dated 7/7/81)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on July 6, 1981.

5. Consultation Administration

Requests for additional materials and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-81-9, July 24, 1981) determined that the effects of Aluminum Phosphide would be "precisely the same" as they are for Magnesium Phosphide. The FWS therefore determined that the use of Aluminum Phosphide would jeopardize the existence of the above listed endangered species. To avoid jeopardy, the FWS recommended the same alternatives that were recommended in

the Magnesium Phosphide biological opinion. These alternatives included avoiding use of Aluminum Phosphide in the range of black-footed ferret (*M. nigripes*) or substituting its use with alternative pesticides, and avoiding the use of the product in those counties where the other endangered species were found.

These label restrictions were forwarded to the registrant on August 26, 1981, for inclusion on the product label. The RD accepted the registration of Aluminum Phosphide on October 13, 1981. (label included)

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS & DOMESTIC ANIMALS
DANGER

[illegible]

ENVIRONMENTAL HAZARDS

[illegible]

[illegible]

ENDANGERED SPECIES CONSIDERATIONS

[illegible]

PHYSICAL OR CHEMICAL HAZARDS

[illegible]

ACCEPTED
OCT 1 5 1981
Under ... Fungi... as amended, ... registered under EPA Reg. No. 40285-1

RESTRICTED USE PESTICIDE

[illegible]

DEGESCH Phostoxin*

NEW COATED TABLETS R
Pat. No. 3132067

FOR CONTROL OF BURROWING RODENTS AND MOLES

*Active Ingredient: Aluminum phosphide	55%
Inert Ingredients	45%

KEEP OUT OF REACH OF CHILDREN

DANGER POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: induce vomiting by touching back of throat with finger or blunt object. Call physician immediately.

IF INHALED: remove victim to open air and remove contaminated clothing. Keep victim warm. Call physician immediately.

DEGESCH AMERICA, INC.
Weyers Cave, Virginia 24486 USA • Telephone (703) 234-9281
EPA Est. No. 40285-VA-01
EPA Reg. No. 40285-1

Contents: 500 round tablets • Net Weight: 1500 g (3.3 lbs.)

It is a violation of federal law to ... product is for outdoor use only.

Store only in cool, dry, lock... or heat. Containers triple rin... or disposal in an approved... burying.

FOR CONTROL OF FOLL... sp. – Woodchucks and Yellow... Dogs), Norway and Roof Rat... Chipmunks.

DIRECTIONS FOR USE A... Phostoxin Tablets to the burr... packing the opening with cr... Phostoxin tablets and slowing ... soil conditions and higher rates... burrows a second time 1 to 2 da...

OUTDOOR USE ONLY: Do not use within 15 feet (5 m... open under or into occupied bui...

Please consult Local, State, an... not inhabit the area proposed fo...

WARRANTY: Seller warrants... used according to label direct... purposes stated on the label.... buyer assumes all risk should th...

RESTRICTED USE PESTICIDE

For retail sale to and use only by Certified applicators or persons under their direct supervision and only for those uses covered by the Certified applicator's certification

*DEGESCH Phostoxin®

NEW COATED TABLETS - R
Pat No 3133867

FOR CONTROL OF BURROWING RODENTS AND MOLES

*Active Ingredient: Aluminum phosphide	56%
Inert Ingredients	45%

KEEP OUT OF REACH OF CHILDREN

DANGER-POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED induce vomiting by touching back of throat with finger or blunt object. Call physician immediately

IF INHALED remove victim to open air and remove contaminated clothing. Keep victim warm. Call physician immediately

DEGESCH AMERICA, INC.
Weyers Cave, Virginia 24486 USA • Telephone (703) 234 9261
EPA Est No 40285 VA 01
EPA Reg. No 40285-1

Contents: 500 round tablets • Net Weight: 1500 g (3.3 lbs.)

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. This product is for outdoor use only.

STORAGE AND DISPOSAL

Store only in cool, dry, locked, and ventilated room. Protect from moisture, open flames or heat. Containers triple rinsed with water may be offered for recycling, reconditioning, or disposal in an approved landfill or buried in a safe place. Dispose of stoppers by burying.

FOR CONTROL OF FOLLOWING BURROWING RODENTS AND MOLES: Marmots sp. Woodchucks and Yellow-Belly Marmots (Rockchuck), Prairie Dogs (except Utah Prairie Dogs), Norway and Roof Rats, House Mice, Ground Squirrels, Moles, Voles, Gophers, and Chipmunks.

DIRECTIONS FOR USE AGAINST BURROWING PESTS: Add from 2 to 4 DEGESCH Phostoxin Tablets to the burrow. Seal tightly by shoveling soil over the entrance after first packing the opening with crumpled newspaper. This will prevent soil from covering the Phostoxin tablets and slowing down their action. Use lower rates in smaller burrows under moist soil conditions and higher rates in larger burrows when soil moisture is very low. Treat reopened burrows a second time 1 to 2 days after the initial treatment. For use on non crop areas only.

OUTDOOR USE ONLY:
Do not use within 15 feet (5 meters) of inhabited structures. Do not apply to burrows which may open under or into occupied buildings.

Please consult Local, State, and Federal Game Authorities to ensure that endangered species do not inhabit the area proposed for treatment.

WARRANTY: Seller warrants that the product conforms to its chemical description and when used according to label directions under normal conditions of use, it is reasonably fit for the purposes stated on the label. Seller makes no other warranty either express or implied, and buyer assumes all risk should the product be used contrary to label instruction.

14. Summary of Endangered Species Considerations for Metolachlor

1. Product Name/ Common Name/ Chemical Name

Ontrack/ Metolachlor/ 2-chloro-n-(2-ethyl-6-methylphenyl)-n-(2-methyoxy-1-methylethyl) acetamide.

2. Regulatory Action

Conditional registration for use on railroad rights-of-way. Herbicide use to control annual grass weeds, or annual broadleaf and grass weeds. The herbicide is to be applied as a mixture of Ontrack 8E plus Atratol 80w or Princeps 80w. A subsequent amendment was made to revise the label precautions on buffer zones for bodies of water. (EEB review 9/19/80)

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

The submission to register Metolachlor for railroad rights-of-way was made on March 10,1980 and was forwarded to EEB on the 24th of March. It had initially been a part of the product's broader use on crops, but was then changed to a separate use on rights-of-way.

The registration of Metolachlor was accepted on September 22, 1980. (Label attached)

A request was made by the registrant to delete buffer zone precautions on the label because the statement was "hindering" the product from being competitive in the market place. This request was sent to EEB for review on July 7,1981.

EEB had made no mention of hazards to endangered species in the conditional registration review. (EEB review 9/19/80) No consultation was initiated by EEB regarding the original registration of Metolachlor. Any general ecological hazards would be mitigated if precautions were made on the product's use near bodies of water. With reference to the label changes submitted by the registrant, EEB initiated a consultation and, in a November 10,1981 EEB memorandum to RD, EEB agreed to such changes if application rates were added to the label. No indication of impacts on endangered species was made in the documentation except that impacts were said to be a part of an ongoing Label Improvement Program (LIP) in EEB.

[It is important to note that a consultation with OES had been initiated by EEB on August 7, 1981 and a preliminiinary draft biological opinion had been made on November 2,1981 and had been received by EEB on the following day, so this information was in hand prior to the November 10 memorandum]

Consultation was to be initiated because EEB believed that the "...product could impact on endangered aquatic species and possibly endangered plants (aquatic and/or terrestrial)." The formal consultation was to address the registrant's desire to change the label restrictions on the layoff distance from bodies of water. EEB stated that if the "...statements were removed, then a sufficient quantity of the toxicant could reach the water to cause reproductive impairment of fish."

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects

Branch) to the Office of Endangered Species on August 7, 1981.

5. Consultation Administration

A preliminary draft was completed by FWS on November 2, 1981 and was sent to EEB the following day. This draft was substantially identical to the final jeopardy opinion.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-81-9 November 17,1981) concluded that the use of Metolachlor on railroad rights-of-way is "...likely to adversly affect only 10 listed species, the Red Hills salamander [Phaeognathus hubrichti] and 9 plant species. Other listed species are not likely to come into contact with sufficient environmental concentrations of Metolachlor resulting from the railroad use to cause any concern." The nine plant species included the following:

branched arrowhead (Sagittaria fasciculata)
Conta Costa wallflower (Erysimum capitatum var. angustatum)
Solano grass (Orcutta mucronata)
salt marsh bird's beak (Cordylanthus maritimus ssp. maritimus)
San Diego mesa mint (Pogogyne abramsii)
Unnamed Phacelia (Phacelia argillacea)
Wright's fishhook cactus (Sclerocactus wrightiae)
Uinta basin hookless cactus (Sclerocactus glaucus)
Chapman rhododendron (Rhododendron chapmanii)

Concerning the endangered plant species, OES assumed that the "...herbicide is toxic to any of the listed species with which it may come in contact. Therefore the use of the herbicide in an area inhabited by listed plants would be expected to destroy those plants."

The FWS concluded that jeopardy could be avoided to listed species if "reasonable and prudent alternatives" would be followed. To avoid jeopardy to the Red Hills salamander (P. hubrichti) it was recommended that studies be provided which demonstrate that closely related salmanders are not detrimentally affected by Metolachlor or that spraying be prohibited on certain sections of the track. A list of counties where the railroad lines and the salamander's habitat coincide was included in the consultation.

The recommendations to avoid jeopardy to the plants were similiar to the salamander recommendations. A study of similiar plants and a prohibition of spraying in the plants habitat were recommended. A list of locations was included.

FWS also concluded that no endangered or threatened aquatic species were found along the railroad rights-of-way. They therefore determined that "...the recommendation of a 50 foot layoff distance from lakes, rivers, streams, or any other body of water for the proposed label is not necessary for the protection of endangered or threatened species."

The EEB, in a memorandum concerning a Label Improvement Program for all herbicides used on railroad rights-of-way dated

November 19, 1981, made recommendations to RD as to what restrictions should be made on the herbicide labels. The program had been initiated at the time the Metolachlor label change were being contemplated and was to include consideration of other competitive products used on railroad rights-of-way. The label changes were to be statements occuring under the heading endangered species. One set of restrictions stated "Do not apply along the following sections of track " and then was followed by a list of counties where such prohibition was to take place. This list was identical to the Red Hills salamander (P. hubrichti) habitat list provided in in the consultation.

The other restrictions were to contain the application of the herbicide by requiring a boom device and directing the application downward. The restricted areas were included and this list was nearly identical to the OES list of counties and rights-of-way where spraying was to be prohibited so that plant species would not be jeoparized.

RD accepted the label revisions to exclude buffer zones to bodies of water on December 16, 1981. (label attached) No endangered species considerations were included on the Metolachlor label, or on subsequent labels, including the latest 1982 label.(label attached)

A confirmation of this omission was made in conversation with the Product Manager (PM) resonsible for the product. The PM said that the recommendations were probably excluded because it was RD's philosophy to avoid "...putting [too] much on the label."

Ontrack 8E

Herbicide

For weed control on railroad rights-of-way

Active Ingredient:	
Metolachlor: 2-chloro-*N*-(2 ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl) acetamide	**86.4%**
Inert Ingredients:	**13.6%**
Total:	**100.0%**

Ontrack 8E contains 8 lbs. active ingredient per gallon.

Keep Out of Reach of Children.

Warning

See additional precautionary statements at end of label.

EPA Reg. No. 100-610

Control No. 52950

30 Gallons

U.S. Standard Measure

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT. Read the entire Directions for Use and the Conditions of Sale and Warranty before using this product

Conditions of Sale and Warranty

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of CIBA-GEIGY or the Seller. All such risks shall be assumed by the Buyer.

CIBA-GEIGY warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use subject to the inherent risks referred to above. **CIBA-GEIGY makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall CIBA-GEIGY or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product.** CIBA-GEIGY and the Seller offer this product and the Buyer and user accept it subject to the foregoing Conditions of Sale and Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of CIBA-GEIGY.

Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Ontrack 8E plus Atratol® 80W or Princep® 80W Tank Mix Combination for Railroad Rights-of-Way.

Use only for control of annual grass weeds or annual broadleaf and grass weeds on railroad rights-of-way.

Broadcast the tank mixture of Ontrack 8E plus Atratol 80W or Princep 80W (Princep 4L or Princep Caliber "90") at rates of 4 pts. plus 6-12.5 lbs. respectively in sufficient water for thorough ground and plant coverage to control barnyardgrass, crabgrass, dogbane, fall panicum, giant foxtail, kochia, little barley, pigweed, ragweed, ricecut brome, Russian thistle, ryegrass, sprangletop, volunteer wheat, wild oats and witchgrass. Use the lower rates in the rate range for light weed infestations and the higher rates for heavier infestations.

For best results, apply immediately prior to weed emergence. The combination of Ontrack 8E plus Atratol 80W may also be applied after weeds emerge but before they exceed 6 inches in height.

Note: Do not spray within 50 feet of lakes, rivers, streams or any other body of water.

Precautions: Do not use near desirable trees, shrubs, plants or in greenhouses or injury may occur.

* When using Princep 4L or Princep Caliber 90, use equivalent rates. One lb. of 80W equals 1.6 pts. of 4L or 0.9 lb. of Caliber 90.

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide spray mixture or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

This is a refillable container. If the container is to be refilled, do not rinse with any material or introduce any pesticide other than Ontrack 8E. Pesca and return the container to an authorized CIBA-GEIGY refilling facility. If the container is not to be refilled, triple rinse (or equivalent) and dispose of in an incinerator or landfill approved for pesticide containers or bury in a safe place. Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

This product may be stored at temperatures down to 30 degrees below 0° F.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

The active ingredient metolachlor may cause skin sensitization reactions in certain individuals. Wear protective clothing while handling or using this product. Causes skin and eye irritation. Do not get in eyes, on skin or on clothing. May be fatal if inhaled. Do not breathe spray mist.

Harmful if swallowed or absorbed through the skin. Wash thoroughly after handling. Avoid contamination of food.

First Aid: In case of contact, immediately flush eyes and or skin with plenty of water for at least 15 minutes. Call a physician. Remove and wash contaminated clothing before reuse.

Environmental Hazards

Keep out of any body of water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from areas treated.

Atratol® trademark of CIBA-GEIGY

Ontrack® trademark of CIBA-GEIGY
U.S. Patent No. 3,937,730 (metolachlor)

Princep® trademark of CIBA-GEIGY for simazine

Agricultural Division
CIBA-GEIGY Corporation
Greensboro, North Carolina 27409
CGA 70L1

CIBA-GEIGY

ontrack® 8E

Herbicide

For weed control on railroad rights-of-way

Active Ingredient:

Metolachlor: 2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl) acetamide	86.4%
Inert Ingredients:	13.6%
Total:	100.0%

Ontrack 8E contains 8 lbs. active ingredient per gallon.

Keep Out of Reach of Children.

Warning

See additional precautionary statements at end of label.

EPA Reg. No. 100-610

Control No. 52950

30 Gallons

U.S. Standard Measure

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT. Read the entire Directions for Use and the Conditions of Sale and Warranty before using this product

Conditions of Sale and Warranty

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application all of which are beyond the control of CIBA-GEIGY or the Seller. All such risks shall be assumed by the Buyer.

CIBA-GEIGY warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use subject to the inherent risks referred to above. **CIBA-GEIGY makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall CIBA-GEIGY or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product.**

CIBA-GEIGY and the Seller offer this product and the Buyer and user accept it, subject to the foregoing Conditions of Sale and Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of CIBA-GEIGY

Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Ontrack 8E plus Atratol® 80W or Princep® 80W Tank Mix Combination for Railroad Rights-of-Way.

Use only for control of annual grass weeds, or annual broadleaf and grass weeds on railroad rights-of-way

Broadcast the tank mixture of Ontrack 8E plus Atratol 80W or Princep 80W (Princep 4L or Princep Caliber* 90)* at rates of 4 pts. plus 6-12.5 lbs., respectively, in 50-100 gals. of water per acre to control barnyardgrass, crabgrass, fall panicum, giant foxtail, kochia, little barley, pigweed, ragweed, ripgut brome, Russian thistle, ryegrass, sprangletop, volunteer wheat, wild oats, and witchgrass. Use the lower rates in the rate range for light weed infestations and the higher rates for heavier infestations. Use no more than 4 pts. of Ontrack 8E per acre in tank mixtures with Atratol 80W or Princep.

For best results, apply immediately prior to weed emergence. The combination of Ontrack 8E plus Atratol 80W may also be applied after weeds emerge, but before they exceed 6 inches in height.

Precautions: Do not use near desirable trees, shrubs, plants or in greenhouses, or injury may occur.

* When using Princep 4L or Princep Caliber 90, use equivalent rates. One lb. of 80W equals 1.6 pts. of 4L or 0.9 lb. of Caliber 90.

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty containers. Pesticide, spray mixture, or rinsate that cannot be used according to label instructions must be disposed of according to federal, state, or local procedures under the Resource Conservation and Recovery Act. Triple rinse (or equivalent) and offer for recycling or reconditioning, or dispose of in a sanitary landfill or by incineration if permitted by state and local authorities.

This product may be stored at temperatures down to 30 degrees below 0°F.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

The active ingredient, metolachlor, may cause skin sensitization reactions in certain individuals. Wear protective clothing (coveralls and gloves) while handling or using this product. Causes skin and eye irritation. Do not get in eyes, on skin, or on clothing. May be fatal if inhaled. Do not breathe spray mist.

Harmful if swallowed or absorbed through the skin. Wash thoroughly after handling. Avoid contamination of food.

First Aid: In case of contact, immediately flush eyes and/or skin with plenty of water. Call a physician. Remove and wash contaminated clothing before reuse.

If inhalation occurs, the victim should be moved to fresh air and medical attention should be sought.

If swallowed, contact your local Poison Control Center, hospital, or physician immediately. If patient is unconscious, maintain breathing and heartbeat (CPR, cardiopulmonary resuscitation). If patient is conscious, induce vomiting (syrup of ipecac if not available, stimulate back of throat with finger). Never give anything by mouth to an unconscious person! Note to Physician: If swallowed, there is no specific antidote. Induce emesis and lavage stomach. Treat symptomatically! The use of an aqueous slurry of activated charcoal (such as Norit A) and a saline cathartic should be considered.

Environmental Hazards

Do not apply directly to any body of water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from areas treated.

Atratol® trademark of CIBA-GEIGY

Ontrack® trademark of CIBA-GEIGY
U.S. Patent No. 3,937,730 (metolachlor)

Princep® trademark of CIBA-GEIGY for simazine

CIBA-GEIGY Corporation
Agricultural Division
CIBA-GEIGY Center
Greensboro, North Carolina 27419
CGA 70L1A

CIBA-GEIGY

Ontrack® 8E

Herbicide

For weed control on railroad rights-of-way

Active Ingredient:
Metolachlor: 2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl) acetamide 86.4%
Inert Ingredients: 13.6%
Total: 100.0%

Ontrack 8E contains 8 lbs active ingredient per gallon.

ACCEPTED AUG 9 82

Keep Out of Reach of Children.

Warning

See additional precautionary statements at end of label.

EPA Reg. No. 100-610

Control No. 52950

30 Gallons

U.S. Standard Measure

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire Directions for Use and the Conditions of Sale and Warranty before using this product.

Conditions of Sale and Warranty

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of CIBA-GEIGY or the Seller. All such risks shall be assumed by the Buyer.

CIBA-GEIGY warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use subject to the inherent risks referred to above. **CIBA-GEIGY makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall CIBA-GEIGY or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product.** CIBA-GEIGY and the Seller offer this product, and the Buyer and user accept it, subject to the foregoing Conditions of Sale and Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of CIBA-GEIGY.

Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Ontrack 8E plus Atratol® or Princep® Tank Mix Combination for Railroad Rights-of-Way

Use only for control of annual grass weeds or annual broadleaf and grass weeds on railroad rights-of-way.

[illegible] the tank mixture of Ontrack 8E plus Atratol® 80W [redacted] Princep 80W (Princep 4L or Princep Caliber® 90) at rates of 4 pts plus 6-12.5 lbs respectively in 50-100 gals of water per acre to control barnyardgrass, crabgrass, fall panicum, giant foxtail, kochia, little barley, [illegible]weed, ragweed, ripgut brome, Russian thistle, ryegrass, sprangletop, volunteer wheat, wild oats and witchgrass. Use the lower rates in the rate range for light weed infestations and the higher rates for heavier infestations. Use no more than 4 pts Ontrack 8E per acre in tank mixtures wi[redacted] Princep.

For best results, apply immediately prior to weed emergence. The combination of Ontrack 8E plus [redacted] may also be applied after weeds emerge but before they exceed 6 inches in height.

Precautions: Do not use near desirable trees, shrubs, plants or in greenhouses, or injury may occur.

*When using [redacted] 90, Princep 4L or Princep Caliber 90, use equivalent rates. One lb of 80W equals 1.6 pts of 4L or [illegible] [redacted] or Caliber 90.

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container. Pesticide, spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to federal, state or local procedures under the Resource Conservation and Recovery Act. Triple rinse (or equivalent) and offer for recycling or reconditioning, or dispose of in a sanitary landfill, or by incineration, or if allowed by state and local authorities.

This product may be stored at temperatures down to 30 degrees below 0 F.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

The active ingredient metolachlor may cause skin sensitization reactions in certain individuals. Wear protective clothing (coveralls and gloves) while handling or using this product. Causes skin and eye irritation. Do not get in eyes, on skin, or on clothing. Harmful if inhaled. Avoid breathing spray mist.

Harmful if swallowed or absorbed through the skin. Wash thoroughly after handling. Avoid contamination of food.

First Aid: In case of contact, immediately flush eyes and/or skin with plenty of water. Call a physician. Remove and wash contaminated clothing before reuse. If inhalation occurs, the victim should be moved to fresh air and medical attention should be sought.

If swallowed, contact your local Poison Control Center, hospital or physician immediately. If patient is unconscious, maintain breathing and heartbeat (CPR: cardiopulmonary resuscitation). If patient is conscious, induce vomiting (syrup of ipecac; if not available, stimulate back of throat with finger). Never give anything by mouth to an unconscious person! (Note to Physician: If swallowed, there is no specific antidote. Induce emesis and lavage stomach. Treat symptomatically. The use of an aqueous slurry of activated charcoal (such as Norit A) and a saline cathartic should be considered.)

Environmental Hazards

Do not apply directly to any body of water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from areas treated.

Agricultural Division
CIBA-GEIGY Corporation
Greensboro, North Carolina 27419
CGA 70L1B

CIBA-GEIGY

15. Summary of Endangered Species Considerations for Thimet

1. Product Name/ Common Name/ Chemical Name

Thimet 20G, Rescue/ Phorate/ O,O-diethyl s-[(ethlythio) methyl] phosphorodithioate.

2. Regulatory Action

Proposed conditional registration. Insecticide for the control of a variety of insects on 18 crops. The new proposal would increase the concentration of a previously registered product.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that the proposed registration would cause an "...insignificant incremental risk to nonendangered, nontarget organisms..." The proposal was viewed as potentially threatening to endangered and/or threatened species because of "...demonstrated field hazards associated with the proposed rates of application of Phorate, and the demonstrated availability of toxic granules on the soil surface..." Based on these conclusions, the registration was to be referred to OES for consultation. (review dated 8/4/81)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on August 31, 1981.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusion and Environmental Protection Agency Response

RD accepted the registration of Thimet on August 21, 1981 (the same date that consultation was initiated). One condition for this registration was the revision of labeling to include any modifications that would be required as a result of OES's review (label included).

The FWS (FWS/OES EPA-81-10, January 22, 1982) determined that the following species would be affected by the proposal:

masked bobwhite	(*Colinus virginianus ridgwayi*)
eskimo curlew	(*Numenius borealis*)
Attwater's greater prairie chicken	(*Tympanuchus cupido attwateri*)
Aleutian Canada goose	(*Branta canadensis leucopareia*)
whooping crane	(*Grus americana*)
Mississippi sandhill crane	(*G. canadensis pulla*)
Kern primrose sphinx moth	(*Euproserpinus euterpe*)
Alabama cavefish	(*Speoplatyrhinus poulsoni*)
Delmarva Peninsula fox squirrel	(*Sciurus niger cinereus*)
San Joaquin kit fox	(*Vulpes macrotis mutica*)

According to the review, the use of Thimet could affect listed terestrial species by exposure through direct ingestion of granules or indirectly through ingestion of invertebrates that

have either died from contact with the pesticide or have concentrations of the granules on their surface. Listed aquatic species could be exposed to the product from runoff of treated fields or drift from aerial applications. It was noted that most endangered species habitats do not occur near areas which would be treated, however when they do, the runoff would be short-term and diluted. The action was therefore deemed unlikely to jeopardize aquatic endangered species. The only exception was the Alabama cavefish (Speoplatrhinus poulsoni), which was to receive special consideration.

The FWS determined that the Attwater's greater prairie chicken (T. cupido attwateri), the Aleutian Canada goose (B. canadensis leucopareia), and the Kern primrose sphinx moth (E. euterpe) would likely be jeopardized by the use of Thimet. To avoid jeopardy, alternatives were recommended that included limiting the applications of the product to certain times of the year, in specific counties, for the protection of the Aleutian Canada goose (B. canadensis leucopareia) and prohibiting the use in specific counties in the ranges of the other two jeopardized species.

The FWS also determined that the proposal would not jeopardize the continued existence of the following endangered species:

Mississippi sandhill crane	(G. canadensis pulla)
whooping crane	(G. americana)
San Joaquin kit fox	(V. macrotis mutica)
eskimo curlew	(N. borealis)
Delmarva peninsula fox squirrel	(Sciurus niger cinereus)
Alabama cavefish	(Speoplatrhinus poulsoni)
masked bobwhite	(C. virginianus ridgwayi)

So that EPA would be assisted in exercising their "authority for the conservation" of these listed species, a number of recommendations were provided. The use of Thimet was to be prohibited in specific counties to protect the whooping crane (G. americana), the Delmarva peninsula fox squirrel (Sciurus niger cinereus), and the Alabama cavefish (Speoplatyrhinus poulsoni).

On March 12, 1982, the RD communicated to the registrant that the OES recommendations would have to be incorporated into the product label. These recommendations were taken word for word from the biological opinion.

A meeting was held between representatives of EEB, RD, and the registrant on March 30, 1982 (as reported in a April 2, 1982 EEB memorandum) to discuss label requirements. It was agreed that the RD proposals of March 12 were "...too cumbersome for the label and unfairly singled-out [the registrant's] product in the use patterns of concern." RD suggested that the current labeling of Thimet be suspended until alternatives could be worked out between OES and the registrant, with EEB serving as the moderator.

On March 31, 1982, the EEB representative met with OES to discuss the labeling concerns. OES responded favorably to labeling "negotiations" and expressed that RD had overreacted to their biological opinion. They believed RD had been too restrictive with those species which were not considered in jeopardy, but had

received recommendations for their conservation. OES believed it was possible to avoid label statements about the Kern primrose sphinx moth (E. euterpe) "...since a cooperative agreement could be worked out with the state of California and the landowners..." where the moth is found. Specific concerns for the Aleutian Canada goose (B. canadensis leucopareia) and Attwater's greater prairie chicken (T. cupido attwateri) were to be re-evaluated once new information "...on the timing of actual applications and the actual pest distribution in specific counties identified in the...biological opinion." The April 2, 1982 memorandum closed with a statement made by a RD representative which expressed that RD had not been "...consistent on its reporting of ES opinions to industry nor on its ES label requirements/proposals with respect to the ES situation in general."

No evidence exists that the label has been revised since acceptance of Thimet's registration on August 21, 1981.

(red)

(Illustration)

THIMET® 20-G

soil and systemic insecticide

CYANAMID

Active Ingredient:

Phorate (O,O-diethyl] S-[(ethylthio)methyl] phosphorodithioate 20.0%

Inert Ingredients 80.0%

EPA Reg. No. 241-257

EPA Est. No.

Organic phosphate compound mixture, dry

(18 pt. type) KEEP OUT OF REACH OF CHILDREN

(12 pt. type) DANGER!

 POISON  (red)

See Side Panel For Antidote And Other Precautions

AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

(TO THE USER: If you cannot read English, do not use this product until the label has been fully explained to you)

RECEIVED

Net Weight: lb.

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS (AND DOMESTIC ANIMALS)

DANGER!

Danger, fatal if swallowed, inhaled or absorbed through the skin. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to poisoning.

Do Not Get In Eyes, On Skin, On Clothing

Wear freshly laundered, long-sleeved work clothing daily. While transferring from package to equipment, wear a clean cap and gloves (rubber or cotton). If cotton gloves are used, they must be laundered or discarded after each day's use. Rubber gloves should be washed with soap and water after each use. Do not wear the same gloves for other work. Destroy and replace gloves frequently.

In case of contact, immediately remove contaminated clothing and wash skin thoroughly with soap and water. Launder clothing before reuse. Wash thoroughly with soap and water before eating or smoking. Bathe at the end of the work day and change outer clothing.

Do Not Breathe Dust

Wear a face mask or other respiratory equipment while emptying bags of product into a hopper. While emptying bags into equipment, pour downwind and allow as little free fall as possible. Do not pour at face level and do not allow dust to reach the breathing zone.

Keep all unprotected persons out of operating areas.

Keep Out of Reach of Domestic Animals

ENVIRONMENTAL HAZARDS

This product is toxic to fish, shrimp, crab, birds and other wildlife. Birds and other wildlife in treated areas may be killed. Keep out of lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes. Shrimp and crab may be killed at application rate recommended on this label. Do not apply where these are important resources. Apply this product only as specified on this label.

This pesticide is toxic to bees exposed to direct application. Applications should be timed to coincide with periods of minimum bee activity, usually between late evening and early morning.

(red)

In case of an emergency endangering life or property involving this product, call collect, day or night, Area Code 201 - 835-3100.

Antidote: Atropine is an antidote. Consult your physician about obtaining a supply of 1/100 grain (0.6 milligram) tablets for emergency use. If symptoms include blurred vision, stomach cramps or tightness in chest, don't wait for a physician but take two tablets at once. Do not take atropine unless symptoms of poisoning have occurred. Anyone who has been sick enough to have taken atropine must be seen by a physician as soon as possible.

FIRST AID

If swallowed, drink one or two glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person. Get medical attention.

If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

CALL A PHYSICIAN AT ONCE IN ALL CASES OF SUSPECTED POISONING

NOTE TO PHYSICIANS: Warning symptoms include weakness, headache, tightness in chest, blurred vision, nonreactive pinpoint pupils, salivation, sweating, nausea, vomiting, diarrhea and abdominal cramps. Give atropine intramuscularly or intravenously, depending on severity of poisoning, 2 to 4 milligrams (3 to 6 tablets, 1/100 grain each) every 10 minutes until fully atropinized as shown by dilated pupils, dry flushed skin and tachycardia. Twenty to thirty milligrams, or more, may be required during the first 24 hours. Never give opiates or phenothiazine tranquilizers. Clear chest by postural drainage. Artificial respiration or oxygen administration may be necessary. Observe patient continuously for at least 48 hours. Allow no further exposure to any cholinesterase inhibitor until cholinesterase regeneration has taken place as determined by blood tests.

Pralidoxime chloride (2-PAM; PROTOPAM chloride) may be effective as an adjunct to atropine. Use according to label directions.

®Trademark
Lot No.

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use or application of the product contrary to label instructions, all of which are beyond the control of American Cyanamid Company. All such risks shall be assumed by the user.

American Cyanamid warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use, subject to the risks referred to above.

Any damages arising from a breach of this warranty shall be limited to direct damages and shall not include consequential commercial damages such as loss of profits or values or any other special or indirect damages.

American Cyanamid Company makes no other express or implied warranty, including any other express or implied warranty of FITNESS or of MERCHANTABILITY.

(12 pt. type) DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Fields may be reentered on day of treatment with soil applications of THIMET 20-G. Do not enter fields within 7 days after plants have been treated with foliar applications. THIMET 20-G should be applied with a granular pesticide applicator properly calibrated to assure accurate placement and proper dosage.

IMPORTANT! Read precautionary statements before using this product.

(12 pt. type) STORAGE AND DISPOSAL

PROHIBITIONS

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Sweep up and bury spillage, whether it occurs indoors or in the field. Once a bag has been opened, use it completely or bury the remainder. Make sure that the hoppers of equipment are emptied while still in the field. Not for use or storage in or around the home.

PESTICIDE DISPOSAL

Pesticide or spillage that cannot be used according to label instructions must be disposed of according to federal, state or local procedures under the Resource Conservation and Recovery Act.

CONTAINER DISPOSAL

Completely empty bag by shaking and tapping sides and bottom to loosen any clinging material. Empty the residues into the application equipment. Dispose of bags in a sanitary landfill, or by other approved State and local procedures.

GENERAL

Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

16. Summary of Endangered Species Considerations for Gas Cartridges (predacide)

1. Product Name/ Common Name/ Chemical Name
Gas cartridges/ Sodium Nitrate/ unknown.

2. Regulatory Action
Proposed conditional registration. Predacide fumigant for the control of coyotes.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB concurred with the registration of gas cartridges. Six studies were considered necessary for completion of the registration, but "...[b]ecause of the unique application techniques, the already existing endangered species section of the label, and the lack of exposure to nontargets when label directions are followed..." , EEB did not feel that they would enhance a hazard assessment. EEB recommmended that the prexisting endangered species section of the label be enlarged and that maps showing "closed areas because of listed species" be enclosed with each package. (Review dated 3/10/81)

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on September 25, 1981.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FWS/OES EPA, October 30, 1981) considered language changes for endangered species restrictions to be included on the gas cartridge label. The Service had previously determined in a biological opinion dated February 28, 1979, that gas cartridges would not jeopardize the continued existence of any endangered species. This determination was reaffirmed.
The Service recommended slight modifications on the endangered species section of the label.

17. Summary of Endangered Species Considerations for Rozol

1. Product Name/ Common Name/ Chemical Name

Rozol Pocket gopher bait/ Chlorophacinone/ 2[(p-chlorophenyl)phenyacetyl]-1-3.

2. Regulatory Action

Proposed conditional registration. Rodenticide for below ground use to control burrowing pocket gophers in lawns, golf courses, parks, rangeland and alfalfa fields.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that "...the proposal uses provide for a significant increase in exposure and acute risks to nontarget organisms." Their preliminary assessment was that "...secondary toxicity will significantly affect mammalian and reptilian gopher predator populations." The following list of endangered species that might be affected by the use of Rozol was included in the review (11/19/81)

red wolf	(*Canis rufus*)
ocelot	(*Felis pardalis*)
jaguarundi	(*Felis yagouaroundi cacomitli*)
black-footed ferret	(*Mustela nigripes*)
Mexican gray wolf	(*Canis lupus baileyi*)
San Joaquin kit fox	(*Vulpes macrotis mutica*)
salt marsh harvest mouse	(*Reithrodontomys raviventris*)
Morro Bay kangaroo rat	(*Dipodomys heermanni morroensi*)
Florida panther	(*Felis concolor*)
gray wolf	(*Canis lupus*)
grizzly bear	(*Ursus arctos horribilis*)
northern rocky mountain wolf	(*Canis lupus irremotus*)
New Mexican ridge nosed snake	(*Crotalus willardi obscurus*)
eastern indigo snake	(*Drymarchon corais couperi*)
Attwater's greater prairie chicken	(*Tympanuchus cupido attwateri*)
masked bobwhite quail	(*Colinus virginianus ridgwayi*)

It was determined that a biological opinion would be necessary for completion of the hazard assessment.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on November 18, 1981.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusion

The FWS (FWS/OES EPA-82-2, March 11,1982) review included those species identified by EPA and the blunt-nosed leopard lizard (*Gambelia silus*) and the California condor (*Gymnogyps californianus*).

The FWS concluded that Chlorophacinone "...is likely to

jeopardize the continued existence of only the black-footed ferret (Mustela nigripes) and the San Joaquin kit fox (Vulpes macrotis mutica)..." To avoid jeopardy to the black-footed ferret (M. nigripes), the FWS recommended that Chlorophacinone not be used within prairie dog towns in the range of the black-footed ferret without first contacting endangered species personnel. To avoid jeopardy to the San Joaquin kit fox (V. macrotis mutica), the pesticide "...should not be used within 1 mile of active dens..." in 10 California counties, and prior to use, the California Department of Fish and Game or the FWS Portland regional office were to be contacted. A request was made that EPA advise FWS in writing whether implementation of the alternatives for the black-footed ferret (M. nigripes) and the San Joaquin kit fox (V. macrotis mutica) had occurred.

The label statement recommendations were conveyed to RD thru EEB, and then became a prerequiste for the registration of the product. RD accepted the registration of Rozol on August 18, 1982. (label attached)

PRECAUTIONARY STATEMENTS
HAZARD TO HUMANS AND DOMESTIC ANIMALS
CAUTION

...ep away from humans, domestic animals, and ...ts. If swallowed or absorbed through skin, this ...icide may reduce the clotting ability of the ...od and cause bleeding. If on skin, wash with ...ap and water. If swallowed, call a physician at ...

...TE TO PHYSICIAN:

...f ingested, administer Vitamin K_1 intramuscularly ...r orally as indicated in bishydroxcoumarin ...verdose. Repeat as necessary based on ...onitoring of prothrombin times.

...NVIRONMENTAL HAZARDS

...s product is toxic to fish and wildlife. Keep ...t of lakes, streams or ponds. Do not ...ntaminate water by cleaning of equipment or ... of wastes.

...NDANGERED SPECIES CONSIDERATIONS

... use this product within prairie dog towns in the range of the ... ferret without first contacting endangered species ... U.S. Fish and Wildlife Service, Denver Regional Office.

...product should not be used within one mile of active dens of ... Joaquin Kit Fox in the following California Counties: Kern, ...no, San Luis Obispo, Merced, Monterey, Santa Barbara, ...are, and San Benito. Prior to use, contact endangered ... at the California Department of Fish and Game or ... and Wildlife Service, Portland Regional Office for ...

STORAGE AND DISPOSAL

...O NOT CONTAMINATE WATER, FOOD OR ...EED BY STORAGE OR DISPOSAL.

...ESTICIDE DISPOSAL:

...esticide that cannot be used according to label ...structions must be disposed of according to ... Federal, state, or local procedures.

...AINER DISPOSAL:

... containers – Triple rinse (or equivalent), ... for recycling or reconditioning, or ... in a sanitary landfill, or by incineration ... by state and local authorities.

... assumes all risks of use, storage ... this material not in strict ... directions given herewith.

ROZOL

POCKET GOPHER BAIT

FOR THE CONTROL OF POCKET GOPHERS

ROZOL BAITS ARE ACTUALLY IMPREGNATED BY THE TOXICANT

Active ingredient:	
...	
...	0.005%
Inert Ingredients	99.995%
Total	100.000%

*Chlorophacinone ...

KEEP OUT OF REACH OF CHILDREN
CAUTION

... ary Statements

ACCEPTED

7/12/84

... S, INC.
CHEM ... TS DIVISION
... NUE

GE... CLASSIFI...
DI...TIONS FOR USE:

It is a violation of Federal law to use this pro... manner inconsistent with its labeling.

RoZol Pocket Gopher Bait is recommended for use on ... courses, range land, alfalfa fields, and non-crop ...

Directions for using RoZol Pocket Gopher Bait for Pocket Gopher Control: Burrowing pocket gophers (*Thomomys* sp. and *Geomys* sp.) throw out low, fan-shaped mounds on either side of their underground ... These lateral tunnels coming to the surface ... the flat side of the fan and these ... with loose soil.

... be made in one or both of the following ...

1. ... rounded tablespoon, carefully remove ... the flat side of the fan. Carefully ... of bait as far down into the hole as ... enclose opening, being careful not to cover the bait with soil.
2. Using a metal rod, probe 6–12 inches deep to locate the main tunnel. Consult diagram below ... to probe. Drop 1/2 cup bait into the ... cover the hole so light will not enter ... system.

... and state rodent control bulletins for ... of pocket gopher burrowing habits.

... treatments per burrow system. Bury dead animals and spilled bait found on soil surface ... Maintain a constant supply of bait in ... system for as long as there is gopher activity. Do not apply bait on surface soil.

... the wrong ways to use a probe for ... are shown above. Be sure the ... main runway — not in the laterals or ... bottom of the runway.

18. Summary of Endangered Species Considerations for Temik

1. Product Name/ Common Name/ Chemical Name

Temik 15-G, Temik 10-G/ Aldicarb, Temik/ 2-methyl-2 (methylthio)propionaldehyde-O-(methylcarbamoyl)oxine.

2. Conditional Registration

Proposed conditional registration. Granular nematicide for use on tomatoes, sorghum, and citrus.

3. Hazard Evaluation Branch (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that the use of Temik on additional crops would "result in [a] significant increase in exposure, but not an acute risk to non-endangered, non-target fish and wildlife." The proposal was considered likely to cause "...a significant increase in exposure and acute risk [*Tympanchus cupido attwateri*]" (Review dated 2/20/82).

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects branch) to the Office of Endangered Species on October 9, 1981.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-82-1, January 22, 1982) concluded that listed species would be precluded from adverse exposure with the exception of the Attwater's greater prairie chicken (*T. cupido attwateri*) and the San Joaquin kit fox (*Vulpes macrotis mutica*). The FWS determined that the kit fox (*V. macrotis mutica*) would not likely be jeopardized since the impact of the product on this species was expected to be low. Because of the extensive use of sorghum fields by prairie chickens and "the documented acute toxicity of Aldicarb to avian species", the Service determined that the Attwater's greater prairie chicken (*T. cupido attwateri*) would likely be jeopardized by the proposed action.

As a reasonable and prudent alternative, the Service recommended that the use of Temik on sorghum be prohibited in 13 counties in Texas.

RD accepted the registration of Temik on April 20, 1982. The label required that before using the product in the 13 counties cited above, the applicator "must determine that this species is not located in or immediately adjacent to the area to be treated."

PRODUCT BULLETIN

UNION CARBIDE AGRICULTURAL PRODUCTS COMPANY, INC.
T. W. ALEXANDER DRIVE
P.O. BOX 12014
RESEARCH TRIANGLE PARK, NC 27709

RESTRICTED USE PESTICIDE
TEMIK 15G Aldicarb Pesticide

EPA Reg. No. 264-330

Supplemental Labeling
For Control of Nematodes, Greenbugs and Chinch Bugs
On Sorghum

Crop & Time of Application	Pests Controlled	Pounds/Acre TEMIK 15G (Based on 36" Rows)	Ounces/1000 Feet of Row TEMIK 15G	Recommended Application
Grain Sorghum At Planting	Nematodes	7 3.5 (Texas and Oklahoma only)	7.5 4	Apply granules in seed furrow and cover with soil.
	Greenbug And Chinch Bug Suppression	7	7.5	

PRE-HARVEST AND GRAZING USE INFORMATION AND LIMITATIONS:

- Do not make more than one application per year.
- Do not harvest within 90 days of application.
- Do not feed green forage to livestock.

~~ENVIRONMENTAL~~ HAZARDS: The Endangered Species Act protects Attwater's ~~Greater Prairie~~ Chicken in ~~the Texas~~ counties of Arkansas, Refugio, Goliad, ~~Austin, Colorado~~, Galveston, Harris, Victoria, ~~Waller, Wharton~~, Fort Bend, ~~DeWitt, and~~ Brazoria. Users must not apply TEMIK to sorghum fields in this area.

For ~~further information~~, users should contact the regional U.S. ~~Fish and Wildlife~~ Service office (Endangered Species Specialist) or personnel of the State Fish and Game Agency.

See acceptance letter for correct Endangered Species statement to be placed above.

IMPORTANT: Before using TEMIK 15G Aldicarb Pesticide, read and carefully observe the precautionary statements and all other information appearing on the product label. This bulletin contains new and supplemental directions for use of this product which may not appear on the package label. Follow the directions carefully.

ACCEPTED

APR 20 1982

4. You will submit production information (pounds produced) for these products for the fiscal year in which the uses on sorghum are conditionally registered, in accordance with Section 29 of FIFRA. The fiscal year begins October 1 and ends September 30.

   The production information will be submitted to the Agency no later than November 15, following the end of the preceding fiscal year.

If the conditions of this amendment are not complied with, the registration will be subject to cancellation in accordance with Section 6(e) of the Act.

Stamped copies of the labels are enclosed for your records.

Submit five copies of the revised final printed labeling for each product incorporating the Endangered Species statement listed below.

> NOTICE: Under the Endangered Species Act, it is a Federal offense to use any pesticide in a manner that results in the death of a member of an endangered species.
>
> This Act protects Attwater' Greater Prairie Chicken in the Texas counties of Aransas, Austin, Brazoria, Colorado, Galveston, Goliad, Harris, Refugio and Victoria.
>
> Prior to making application in these counties the user must determine that this species is not located in or immediately adjacent to the area to be treated.
>
> If the user is in doubt whether or not the above named endangered species may be affected he should contact either the regional U.S. Fish and Wildlife Service office (Endangered Species Specialist) or personnel of the State Fish and Game Office.

Sincerely,

Jay S. Ellenberger
Product Manager (12)
Insecticide-Rodenticide Branch
Registration Division (TS-767C)

19. Summary of Endangered Species Considerations for Endosulfan (Registration Standard)

1. Active Ingredient/ Chemical Name

Endosulfan/ 6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3-oxide.

2. Regulatory Action

Registration Standard. Endosulfan is used as a insecticide and acaricide on 145 agricultural and ornamental crops. Endosulfan is a chlorinated hydrocarbon registered for both ground and aerial application.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

Determination that "...the use of endosulfan as directed on many of the registered labels, may affect the continued existence of many endangered/ threatened species." EEB concluded, based on the data examined for avian and aquatic species, that technical Endosulfan is considered highly toxic to avian species, moderately to slightly toxic to upland game and waterfowl when administered in subacute dietary tests, very highly toxic to freshwater invertebrates, very highly toxic to coldwater and warmwater fish, and very highly toxic to estuarine invertebrates and fish. Hazards to terrestrial species were not fully assessed at the time of the Standard's writing because of data gaps.

4. Consultation Initiation

Initiated by the Hazard Evaluation Division, Ecological Effects Branch, to the Fish and Wildlife(FWS) on February 4, 1982.

5. Consultation Administration

The consultation period was extended twice. The first extended the process until July 12, 1982 "...because of the complexity of the consultation.." and the difficulty in "...obtaining certain information in a timely fashion..." The second extended the process until July 30, 1982 because new information became available.

6. Consultation Conclusions and Environmental Protection Agency Response

The Registration Standard for Endosulfan was completed on 9/18/81. Some four months later, the EEB reviewer responsible for endosulfan informed the chief of EEB that the use patterns for Endosulfan "...should be referred to OES for formal consultations under section 7 of the Endangered Species Act. The basis for his determination was that "...endangered species risk criteria [were] exceeded..." and there were "...numerous aquatic organism kill reports in the endosulfan files." (memo dated January 22,1982 to EEB chief from section 3 wildlife biologist).

On February 4, 1982, a letter was sent from EEB to FWS requesting that formal consulation be initiated. The Endosulfan standard was published by EPA in April of 1982 and a jeopardy opinion was received by EEB on August 2,1982.

The FWS (FWS/OES EPA-82-4, July 30, 1982) concluded that "...the use of Endosulfan is likely to jeopardize listed fish, listed mussels, listed insects, [the] Hawaiian hoary bat [Lasiurus cinereus semotus], Aleutian Canada goose [Branta canadensis leucopareia], Attwater's greater prairie chicken [Tympanuchus cupido attwateri), Pine Barrens tree frog [Hyla andersonii], Houston toad [Bufo houstonensis], and the Santa Cruz long-toed salamander [Ambystoma macrodactylum croceum]."

The FWS suggested that alternatives might be taken so that jeopardy to individual species might be avoided. Generally, the alternative cited for the above species consisted of one or more of the following:

"1) Strictly prohibit the ground application of Endosulfan within 200 yards of any aquatic habitat, and prohibit the aerial application within 1/4 mile of any aquatic habitat to reduce the amount of endosulfan which enters the aquatic environment.

2) Limit use rates of Endosulfan.

3) Avoid use in counties where listed species occur or at times when listed species are present.

4) Obtain a list of the exact locations of the listed fish/mussels and prohibit the use of endosulfan in those areas through specific label restrictions.

5) In cooperation with the OES and the Cooperative Extension service, develop specific safeguards at the local level which will qualify as labeling under the FIFRA, thus avoiding specific restrictions on national labels." The FWS recommended that the "...EPA develop procedures to analyze the effects of pesticide usage on listed species. Such procedures should include the gathering of toxicity data on reptiles, amphibians, freshwater mussels, and snails so that impacts to various groups of species can be better evaluated."

Shortly after receiving the jeopardy opinion, the EEB endangered species coordinator requested that a peer group comment on the OES document. The report, dated 8/18/82, addressed the need for clarification of issues concerning the jeopardy opinion and the standard. The report stated that the points should be clarified "...prior to sending the OES biological opinion to RD...". The peer group questioned whether the Endosulfan jeopardy opinion was intended for all use patterns, or whether limitations could be applied to specific sites. Their concern centered on whether there were any Endosulfan use patterns that posed a threat to only some or none of the designated endangered species. In a memorandum dated August 24, 1982, the reviewer responded to the peer group by noting that the OES, in his opinion, had clearly indicated use-specific concerns and that OES intended jeopardy "..to apply to any use of Endosulfan which would be within the specified distances of the habitats of concern." At the same time, the reviewer pointed out that the six alternatives cited by FWS gave the branch a considerably degree of flexibility. The sixth alternative, which suggested that EEB could come up with their own alternatives, affords, in the words of the reviewer, an "..open-ended approach to resolve some of the difficult endangered species issues.." The reviewer reasoned that the endangered species problem would reoccur "...simply because the specificity we're used to dealing with on incremental risk

assessments and section 3's ... is lacking in the generic projects." The reviewer went on to state that "..EPA's options with Endosulfan, for purposes of the standard, range from no immediate regulatory requirements..while we're in the process of filling residue monitoring and non-target effects data gaps... to developing use pattern limitations, site-specific (geographics) restrictions, or 'cluster approach'..."

The peer group recommended that EEB formulate a policy on how to implement the conclusions drawn in the OES opinion. The policy would address the feasibility of the alternatives recommended in the opinion; it was noted that some were consistent with the "cluster approach".

In a memorandum to the EEB endangered species coordinator, dated December 9, 1982, the reviewer conveyed his concern that the issues raised in the peer group report had not been resolved and that "..[s]ince the agency [had] published the Endosulfan standard with a reference to obtaining a biological opinion from OES, [the reviewer felt] that the "Jeopardy" opinion thus obtained could be a liability to the agency and EEB in its present state (ie. in the active ingredient files, awaiting transmission to RD)." The reviewer requested that a reinitiation of formal consultation with OES be made to resolve the issues raised by the peer group report.

The recommendations made by OES were put on hold because they were considered by EEB to be unworkable and unreasonable. This view, a reliance on the cluster approach to resolve such problems, and the fact that the registration standard had already been issued were used as the rationale for not sending the endangered species information to RD. No further action was taken.

Endosulfan is still widely used, but watercress and forestry uses have been deleted by the manufacturers from all the product labels. A number of label revisions not related to endangered species considerations were made in the registration standard, but were lacking in the guidance package. It is therefore unlikely that all of the registrants knew of the revision recommendations, but a number of registrants submitted revised labeling which incorporated these revisions from the Registration Standard.

20. Summary of Endangered Species Considerations for 1080 (Single lethal baits) (first of five consultations involving 1080)

1. Product Name/ Common Name/ Chemical Name
1080/ Sodium monofluoroacetate/ unknown.

2. Regulatory Action
Proposed experimental program "...to assess the efficacy and environmental hazards of single lethal dose 1080 baits as used for coyote control in the Federal Cooperative Animal Damage Control Program." The field tests were to occur in Texas, Montana, and Idaho.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB determined that the experimental program could pose a hazard to several endangered species in the proposed test areas. The following endangered species were considered "...at risk if the proposed tests were conducted in their range:"

grizzly bear	(*Ursus arctos horribilis*)
gray wolf	(*Canis lupus*)
peregrine falcon	(*Falco peregrinus*)
black-footed ferrit	(*Mustela nigripes*)
northern swift fox	(*Vulpes velox hebes*)
ocelot	(*Felis pardalis*)
bald eagle	(*Haliaeetus leucocephalus*)

EEB determined that a "may effect" situation could be avoided for the majority of these species if 1080 single lethal dose baits would be prohibited in their known ranges.
EEB concluded that the proposed experimental program would not "...significantly impact non-target species with the possible exception of endangered species." A final determination on the impacts on endangered species was to be deferred until consultation with the Office of Endangered Species was complete. (Review dated 3/2/82)

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on May 26, 1982.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FWS/OES EPA-82-5, July 14, 1982) concluded that, based on evidence that endangered species would not be affected, a formal consultation would not be required. A list of counties in the three states where the tests were to occur was included.

21. Summary of Endangered Species Considerations for Copper

1. Product Name/ Common Name/ Chemical Name

Red copper special formula/ cuprous oxide/ unknown.

2. Regulatory Action

Proposed registration of copper-based anti-fouling paint for use in preventing the attachment of algae, freshwater sponges, and invertebrate animals on concrete irrigation structures. The request for registration was made by the Bureau of Reclamation, U.S. Department of Interior.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that the proposed use pattern would "...result in limited exposure to non-target organisms outside of the treatment areas...", but that the exposure to non-target organisms in the canals and irrigation ditches would be unavoidable. Since some food sources of fish would be the target organisms, impact to fish was considered likely. Depletion of oxygen, as a result of decomposing vegetable matter killed by the anti-fouling paint, was also determined to be potentially harmful to fish. It was noted that many fish die-offs had been caused by Copper in the past. EEB, through informal consultation, determined that the following four species of endangered fish are found in the irrigation systems that would be treated:

Comanche Springs pupfish	(Cyprinodon elegans)
Gila topminnow	(Poeciliopsis o. occidentalis)
Pecos gambusia	(Gambusia nobilis)
woundfin	(Plagopterus argentissimus)

EEB indicated that, because of "...the proposed pattern and the toxicity of copper to fish and fish food items..." a formal consultation would be initiated.(review dated 7/21/82) A peer group concurred with the request for consultation on 7/20/82.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on July 21,1982.

5. Consultation Administration

Requests for additional materials and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The Bureau of Reclamation addressed the endangered species concerns in a September 29, 1982 letter to the registrant. The Bureau believed that the "...exposure of an anti-fouling coating applied to an irrigation canal water measurement structure would create a very minimal hazard to any endangered species listed." Each of the species cited in the EEB review was considered and each was determined to be at little risk of exposure. Emphasis was given to the point that the canals make "...generally very poor habitats for fish. Also, since other pesticides are used to

control plant growth in canals and most of the systems are dewatered in the winter, the small amount of copper paint used was considered "...insignificant as compared to other hazards that might affect endangered species."

The FWS (FWS/OES EPA-82-7, October 21, 1982) included the Moapa dace (Moapa coriacea) and the species cited by EEB for consideration in the consultation. The FWS determined that the registration of the toxicant would likely jeopardize the continued existence of the Comanche Springs pupfish (C. elegans), the Moapa dace (M. coriacea), and the Gila topminnow (P. o. occidentalis). It was determined that the other species would not face this same threat. These conclusions were based on the potential of harm due to reduced availability of food, reduced amount of available cover, and the toxic effects of copper.

To avoid jeopardy, the FWS recommended label restrictions to prohibit the use of the paint in those counties where the three fish species live.

On November 5, 1982, a meeting was held to discuss data requirements and endangered species considerations. Attending this meeting were representives of HED, RD, the registrant, and the Bureau of Reclamation. It was determined that the EEB review, and subsequent OES biological opinion, had not correctly considered the proposed use pattern. The use was described as occurring over a smaller section of the canal system and would therefore be less detrimental to endangered species. The meeting led to recommendations, made on November 19, 1982, to rewrite the label to better define precise areas that would be painted, consider waiver of data requirements, and to inform OES of EEB's misinterpretation of labeling and, "if deemed appropriate", to reinitiate formal consultation.

In a January 6, 1983 memorandum to RD, EEB commented on the registrant's submission of a revised label and additional supporting documents. These materials confined the use of the product to a very small area of the irrigation systems, but the label did not limit the use to areas adjacent to flume gates as addressed in the documents. Based on the OES biological opinion and recommendations, EEB strongly recommended "...that the label be revised to insure the protection of..." the affected endangered species. This revision would satisfy EEB's concerns for endangered species.

As of January 14, 1983, when the registration of the product was accepted by RD, the endangered species statements did not appear as part of the label directions. (label included) The anti-fouling paint has never been used commercially.

PETTIT

marine paint

SPECIALTY

Active Ingredient	
Cuprous Oxide	26.2
Inert Ingredients	73.8
	100.0%

...per is metallic 23.0%

...this product contains petroleum ...distillates.

350-60

1 GALLON
3.785 LITERS

KEEP OUT OF REACH OF CHILDREN.

WARNING! SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

PETTIT PAINT CO., INC.

USE DIRECTIONS

PRODUCT DESCRIPTION

Flume Red Copper Antifouling paint is manufactured as an antifouling
on concrete irrigation structures and wood and iron flume gates. It
applied over old, soft or hard, antifouling paints that are in good

PREPARATION OF SURFACE

The surface to be painted should be dry, clean, and oil free. It sh
lightly wire-brushed or sandblasted to remove all loose soil, rust, s
paint. On hardwood or iron, first apply one coat of a suitable p
Electrolytic corrosion could occur if the material is directly applie
ferrous materials without adequate preparation.

APPLICATION AND TEMPERATURE

Flume Red Copper Antifouling can be applied by brush, roller, or spra
work should be done between 9 a.m. and 4 p.m. under good conditions.
perature range for application is 40° to 90° F. One coat would gene
sufficient for effective antifouling protection. Yearly renewal is
required, dependent on conditions of exposure.

PREPARATION OF PAINT

Flume Red Copper Antifouling contains cuprous oxide, a heavy pigment,
a tendency for settling to occur, especially if the paint has been on
for several months. It is necessary to thoroughly mix the paint bef
it is used. Shake the can of paint in a mechanical paint shaker. C
check the sides and bottom of the can to make sure all of the pigment
thoroughly incorporated. If mixing will be done with a wooden paddl
electric drill mixer, pour half of the liquid from the top of the can
another can and properly mix any settled pigment; then remix the two
together thoroughly.

DRY TIME

Let the paint dry overnight before resuming water delivery.

COVERAGE

Flume Red Copper Antifouling covers approximately 9 m^2 of surface pe

MAINTENANCE OF ANTIFOULING PAINT

No antifouling paint can be effective under all conditions of exposur
pollution and natural occurrences can adversely affect antifouling pa
mance. Extreme hot and cold water temperatures, silt, dirt, oil, br
and electrolysis can ruin an antifouling paint. Therefore, we stron
that the irrigation structures be checked several times per month to
they are clean and that no growth is occurring. If necessary, light
the surface with a soft brush, to remove attached materials.

(continued from left hand panel)

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. See back panel for USE DIRECTIONS.

GENERAL DESCRIPTION

[illegible] RED COPPER ANTIFOULING PAINT is a protective coating to control filamentous green algae genera including *Stigeoclonium*, [illegible], *Ulothrix*, *Cladophora*, and *Spirogyra*; filamentous [illegible] algae including *Phormidium* and *Oscillatoria*; and small invertebrate organisms including Black Fly (*Simulium* sp.) Caddis Fly (*Hydropsyche* spp.) and *Bryozoa*.

STORAGE & DISPOSAL

Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to Federal or approved state procedures under Subtitle C of the Resource Conservation and Recovery Act.

Container - Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedur

E.P.A. REG. NO. 390-

E.P.A. EST. NO. 390-NJ-1

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
WARNING

Causes eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes or clothing. Wear protective clothing such as gloves, long-sleeved cotton shirt, long pants, and hat. May be fatal if swallowed or inhaled. Do not breathe sanding dust, vapor or spray mist. While spraying or sanding any flume surface, wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

If swallowed: Drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Get medical attention.

If in eyes: Flush with plenty of water. Get medical attention.

If on skin: Wash with plenty of soap and water. Get medical attention.

If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

ENVIRONMENTAL HAZARDS

"This material is toxic to fish. Do not apply directly to water by cleaning of equipment or disposal of wastes. Do not allow chips and dust generated during paint removal to enter water. Dispose of paint debris in an approved landfill."

PHYSICAL OR CHEMICAL HAZARD

COMBUSTIBLE! Do not use or store near heat or open flame

(continued on right hand panel)

22. Summary of Endangered Species Considerations for Tebuthiuron
(second of two consultations on Tebuthiuron)

1. Product Name/ Common Name/ Chemical Name

Graslan 20P, Graslan 10P, Graslan 40P/ Tebuthiuron/ N-[S-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea.

2. Regulatory Action

Proposed conditional registration. Herbicide use for the control of woody plant species on rangeland in the southwest. The proposal would expand the use to include 17 additional states.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that terrestrial and aquatic animal endangered and threatened species would not be affected, but that some plant species "...could be unreasonably threatened by use of tebuthiuron." A list of species that would be threatened was included, as well as label recommendations to avoid their jeopardy.

4. Consultation Initiation

Initiated by Hazard Evaluation Division, (Ecological Effects Branch) to the Fish and Wildlife Service on September 23, 1982.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-81-48, November 17, 1982) determined the use of tebuthiuron "...will have no effect on aquatic or terrestrial animal species..." and would not change any findings of the previous tebuthiuron opinion (FWS/OES EPA-81-4, July 13, 1982). The expanded use of the product would likely jeopardize the continued existence of the following additional endangered species:

Colorado

Uinta Basin hookless cactus	(*Sclerocactus glaucus*)
Mesa Verde cactus	(*Sc. mesae-verdae*)
spineless hedgehog cactus	(*Echinocereus triglochidiatus*)

Phacelia formosula

Idaho and Oregon

MacFarlene's four o'clock	(*Mirabilis macfarlanei*)

North and South Carolina

bunched arrowhead	(*Sagittaria fasciculata*)

Tennessee

Tennessee purple cone flower	(*Echinacea tennesseensis*)

Utah

purple-spined hedgehog cactus	(*Echinocactus engelmannii* var. *purpureus*)

Uinta Basin hookless cactus (Sclerocactus glaucus)
spineless hedgehog cactus (Echinocereus triglochidiatus var. inermus)
wright fishhook cactus (Sclerocactus wrightiae)

The Service suggested that as a reasonable and prudent alternative, "Tebuthiuron should not be applied in the specific habitats where these plant species are known to occur without first contacting the Fish and Wildlife Service."

The RD accepted the registration of Tebuthiuron for 17 additional states on July 22, 1982. The label statements did not include endangered species considerations.

On January 10, 1983, EEB suggested label modifications to include endangered species concerns. These changes included specific counties where the species are found.

The label was modified to remove dairy cow grazing and feeding restrictions by RD on August 11, 1983. None of the changes included endangered species considerations. (labels included)

Directions for Use

Read All Directions Carefully Before Applying

Woody Plants Controlled			GRASLAN 10P
Scientific Name	Common Name	Scientific Name	Pounds Per Acre
	Sourbush Sand Sand Shinnery Oak Tasajillo Mesquite Huisache		5 10

Woody Plants Partially Controlled			GRASLAN 10P
Scientific Name	Common Name	Scientific Name	Pounds Per Acre
	Mesquite		10

Weeds Controlled			GRASLAN 10P
Scientific Name	Common Name	Scientific Name	Pounds Per Acre
	Ragweed Western Ragweed		5 10

Use Precautions

PRECAUTIONARY STATEMENTS
HAZARD TO HUMANS AND DOMESTIC ANIMALS
CAUTION

ENVIRONMENTAL HAZARD

STORAGE AND DISPOSAL

ELANCO ID 5510

Graslan 10P

Herbicide

TM

Net Weight 50 Pounds

For Control of Brush on Rangeland in Arizona, Arkansas, Colorado, Idaho, Kansas, Missouri, Montana, New Mexico, Nevada, Oklahoma, Oregon, Texas, Utah, Washington and Wyoming

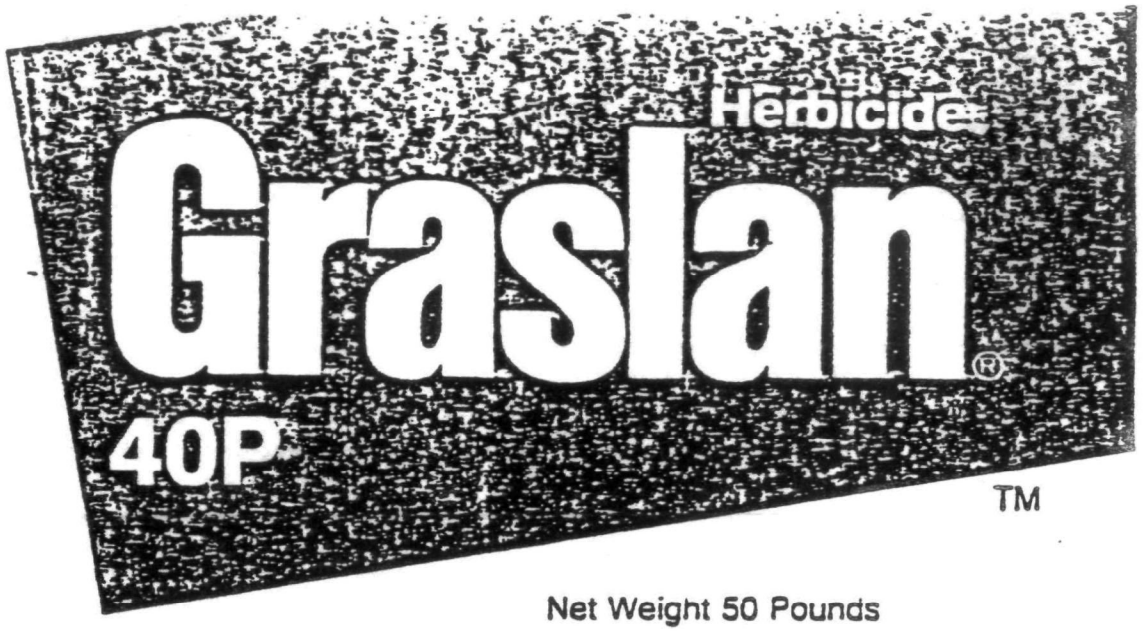
ACCEPTED
JUL 22 1982
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No.

Active Ingredient:
tebuthiuron: *N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-*N*,*N*'-dimethylurea 10.0%
Inert Ingredients: 90.0%
Contains 5 pounds active ingredient per 50 pound bag
"Graslan"—the registered trademark for Elanco Products tebuthiuron

CAUTION: Keep out of reach of children.
See back panel for additional caution statements.

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, IN 46285, U.S.A.

EPA Reg No 1471-115



Net Weight 50 Pounds

For Control of Brush on Rangeland in Arizona, Arkansas, Colorado, Idaho, Kansas, Missouri, Montana, New Mexico, Nevada, Oklahoma, Oregon, Texas, Utah, Washington and Wyoming

Active Ingredient:
tebuthiuron: *N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-*N*,*N*'-dimethylurea 40.0%
Inert Ingredients: 60.0%
Contains 20 pounds active ingredient per 50 pound bag

"Graslan"—the registered trademark for Elanco Products tebuthiuron

CAUTION: Keep out of reach of children.
See back panel for additional caution statements.

ACCEPTED

AUG 11 1983

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 1471-119

XPRM-5174

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, IN 46285, U.S.A.

EPA Reg. No. 1471-119

GRASLAN 40P [illegible] [illegible] [illegible] Brush will continue to [illegible] for several months after application. [illegible] single application is normally effective for several years.

GRASLAN 40P may cause slight injury to desirable grasses. If injury to perennial grasses does occur, it will be temporary. Injury can be minimized by applying when grasses are dormant. Forage grass production usually increases as brush competition is reduced. However, increased grass production is also dependent on adequate rainfall and a sound range management program.

Areas treated with GRASLAN 40P may be overseeded. Consult your local Range Management Specialist or other agricultural specialist for details on suitable species, seeding rates, timing and fertilization programs.

Application Rates.

GRASLAN 40P is recommended for control of the following species of undesirable woody plants at the indicated range of application rates.

GRASLAN 40P should be applied at lower dosages within the recommended rate range on coarse textured soils and at higher dosages within the rate range on medium and fine textured soils or when treating deep-rooted plants. Lower rates can be used when partial control is desired.

Woody Plants Controlled				GRASLAN 40P
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**	**Pounds Per Acre**
Catclaw Mimosa (wait-a-minute-bush)	*Mimosa biuncifera*	Sagebrush Big	*Artemisia tridentata*	2.5-5
		Sagebrush Sand	*Artemisia filifolia*	
Cenizo	*Leucophyllum frutescens*	Salvia Shrubby Blue	*Salvia ballotaeflora*	
Creosotebush	*Larrea tridentata*	Whitebrush	*Aloysia lycioides*	
Oak Bigelow	*Quercus durandii*	Tarbush	*Flourensia cernua*	
Oak Mohr	*Quercus mohriana*	Whitethorn	*Acacia constricta*	
Oak Running Live	*Quercus virginiana*	Wolfberry	*Lycium berlandieri*	
Oak Sand Shinnery	*Quercus havardii*			
Acacia Catclaw	*Acacia greggii*	Manzanita	*Arctostaphylos spp*	
Acacia Twisted	*Acacia tortuosa*	Oak Black	*Quercus velutina*	5-10
Blackbrush	*Acacia rigidula*	Oak Blackjack	*Quercus marilandica*	
Blackberry	*Rubus spp*	Oak Bur	*Quercus macrocarpa*	
Bluewood (Brasil)	*Condalia obovata*	Oak Post	*Quercus stellata*	
Buckbrush	*Symphoricarpos orbiculatus*	Oak Southern Red	*Quercus falcata*	
Dogwood Roughleaf	*Cornus drummondii*	Oak Shrub Live	*Quercus turbinella*	
Elm American	*Ulmus americana*	Oak White	*Quercus alba*	
Elm Winged	*Ulmus alata*	Pine Pinon	*Pinus spp*	
Guajillo	*Acacia berlandieri*	Rose Macartney	*Rosa bracteata*	
Hackberry Spiny (Granjeno)	*Celtis pallida*	Rose Multiflora	*Rosa multiflora*	
		Sumac Shining	*Rhus copallina*	
Hackberry Western	*Celtis occidentalis*	Sumac Smooth	*Rhus glabra*	
Hawthorn	*Crataegus spp*	Sumac Staghorn	*Rhus typhina*	
Juniper Utah	*Juniperus osteosperma*	Yaupon	*Ilex vomitoria*	

GRASLAN 40P will provide partial control of the following species of woody plants at the indicated range of application rates. GRASLAN 40P should be applied at lower dosages within the recommended rate range on coarse textured soils and at higher dosages within the rate range on medium or fine textured soils or when treating deep rooted plants.

Woody Plants Partially Controlled				GRASLAN 40P
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**	**Pounds Per Acre**
Mesquite	*Prosopis spp*			2.5-10
Ash Green	*Fraxinus pennsylvanica*	Juniper One-seeded	*Juniperus monosperma*	5-10
Cherry Black	*Prunus serotina*	Leatherstem	*Jatropha dioica*	
Dogwood Flowering	*Cornus florida*	Lotebush (Condalia)	*Condalia obtusifolia*	
Guayacan	*Porlieria angustifolia*	Maple Red	*Acer rubrum*	
Hickory Bitternut	*Carya cordiformis*	Maple Silver	*Acer saccharinum*	
Hickory Black	*Carya texana*	Oak Gambel	*Quercus gambelii*	
Hickory Shagbark	*Carya ovata*	Osage Orange	*Maclura pomifera*	
Huisache	*Acacia farnesiana*	Willow	*Salix spp.*	
Juniper Alligator	*Juniperus deppeana*			

Do not apply more than 5 pounds per acre GRASLAN 40P in areas that receive less than 20 inches annual precipitation.
GRASLAN 40P is not recommended for control of persimmon, prickly pear, or cholla cactus.

Use Precautions:

Do not apply GRASLAN 40P on field crops, near desirable trees or shrubs, or areas into which their roots may extend, or in locations where the chemical may be washed in contact with their roots as injury or death may occur.

Do not apply GRASLAN 40P under conditions which will cause pellet movement to nontarget areas during application.

Do not cut forage grass for hay from GRASLAN-treated areas for ~~two years~~ after application. one year

~~Do not allow lactating dairy cows to graze or consume hay from GRASLAN-treated areas for two years after application.~~

Apply GRASLAN 40P only once per year.

GRASLAN 40P may seriously injure desirable forage legumes such as lespedeza or clover.

Thoroughly clean all traces of GRASLAN 40P from application equipment after use. Residues cleaned from application equipment should not be emptied on areas where they will come into contact with the roots of desirable trees, shrubs, plants, or water source.

PRECAUTIONARY STATEMENTS
HAZARD TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed. Avoid contact with skin, eyes or clothing. In case of contact, flush with water.

ENVIRONMENTAL HAZARD

Keep out of lakes, ponds, or streams. Do not contaminate water by cleaning of equipment or disposal of wastes.

STORAGE AND DISPOSAL

Do not contaminate water, food, feed, other pesticides, fertilizer or seeds. Pesticide or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies and desirable vegetation. Dispose of empty container in an incinerator or landfill approved for pesticide containers, or bury in a safe place away from desirable vegetation. Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

The manufacturer makes no warranties, express or implied, concerning this product or its use which extend beyond the description on the label. All statements made concerning this product apply only when used as directed.

23. Summary of Endangered Species Considerations for Gas Cartridges (fumigant)

1. Product Name/ Common Name/ Chemical Name

Dexol Gasser, Smoke'em, Smoke'em II, Deadly brand rodent destroyers, Gas cartridge, the Giant destroyers/ Gas cartridge/ unknown.

2. Regulatory Action

Label review for the Label Improvement Program (LIP) of seven gas cartridges used in burrow fumigation.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that the use patterns of the seven gas cartridges "...were the same as or very similar to the use patterns of magnesium phosphide and aluminum phosphide." Both of these products had been considered in biological opinions in 1981.

In the LIP review, EEB provided label statements for the protection of the following species:

black-footed ferret	(*Mustela nigripes*)
eastern indigo snake	(*Drymarchon corais couperi*)
San Joaquin kit fox	(*Vulpes macrotis mutica*)
Utah prairie dog	(*Cynomys parvidens*)
blunt-nosed leopard lizard	(*Gambelia silus*)
desert tortoise	(*Gopherus agassizii*)
salt marsh harvest mouse	(*Reithrodontomys raviventris*)
Morro Bay kangaroo rat	(*Dipodomys heermanni morroensis*)

The label statements expressed that the products should not be used within the range or near the habitat of the above endangered species. The black-footed ferret (*M. nigripes*) statement also included instructions to contact the nearest FWS office before using the product so that a survey could be done to insure that no ferrets were present. The label statement also included restrictions of use near dens of the red wolf (*Canis rufus*), gray wolf (*C. lupus*), and the San Joaquin kit fox (*V. macrotis mutica*).(Review dated September 23, 1982)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Fish and Wildlife Service on September 23, 1982.

5. Consultation Administration

Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency

The FWS (FWS/OES EPA-82-8, November 4, 1982) concluded that the use of the seven gas cartridges would likely jeopardize the continued existence of the following endangered species:

black-footed ferret	(*M. nigripes*)
eastern indigo snake	(*Drymarchon corais couperi*)

San Joaquin kit fox (*V. macrotis mutica*)
Utah prairie dog (*C. parvidens*)
blunt-nosed leopard lizard (*Gambelia silus*)
desert tortoise (*Gopherus agassizii*)

It was determined that "...no action was required relative to the Morro Bay kangaroo rats (*Dipodomys heermani morrensis*) and the salt marsh harvest mouse (*R. raviventris*).

The exclusions described in the September 23, 1982 EEB letter to FWS were considered adequate in avoiding jeopardy to the above listed species. These endangered species considerations were incorporated into the label language. An example of the label statements is provided.

(Front Panel)

DEXOL

GOPHER
GASSER(R)

GAS GOPHERS MOLES
GROUND SQUIRRELS

Active Ingredients:	
Potassium Nitrate	45.0%
Sulphur	45.0%
Carbon	8.0%
Dextrin	2.0%
Total:	100.0%

KEEP OUT OF REACH OF CHILDREN
WARNING
See Back Panel for Additional Precautionary Statements

Net Weight 4.5 oz.

ACCEPTED
with COMMENTS
In EPA Letter Dated:

AUG 8 1984

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 192-49

(Back Panel)
DEXOL GOPHER GASSER(R)

DEXOL GOPHER GASSER(R) provides quick, reliable, effective control of pocket gopners and moles in lawns, golf courses, gardens; ground squirrels on lawns, golf courses and rangelands. The toxic gas produced by DEXOL GOPHER GASSER(R) will penetrate the lair and exterminate the pests. DEXOL GOPHER GASSER(R) will not control tree squirrels.

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS & DOMESTIC ANIMALS
WARNING

After ignition, cartridge produces toxic gasses. Fumes may be harmful if inhaled.

STATEMENT OF PRACTICAL TREATMENT

If inhaled and person has poison symptoms (headache, nausea, dizziness, and weakness), transfer victim to fresh air. Have victim lie down and keep warm. If respiration is adequate, recovery will be rapid. If breathing has stopped used artificial respiration. If available, pure oxygen should be given. CALL PHYSICIAN IMMEDIATELY.

ENVIRONMENTAL HAZARDS

This product is highly toxic to wildlife. Check all burrows for signs of nontargets. If present, do not treat burrows. See enclosed "Endangered Species Considerations" insert.

CHEMICAL HAZARDS

Once ignited by the fuse, this cartridge will burn vigorously until completely spent and is capable of causing severe burns to exposed skin and clothes, and of igniting dry grass, leaves and other combustible materials.

STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.
STORAGE: Store in cool, dry place away from fire, heat and direct sunlight.
PESTICIDE DISPOSAL: To dispose of unused cartridges, soak in water, crush and bury at least 6" in loose soil.
CONTAINER DISPOSAL: Place in trash collection.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

SEE INSERT FOR COMPLETE DIRECTIONS FOR USE, USE RESTRICTIONS AND ENDANGERED SPECIES CONSIDERATION

EPA Reg. No. 192-49-AA EPA Est. No. 192-CA-1

Manufactured by
DEXOL INDUSTRIES Made in Taiwan Torrance, CA. 90501

(Labeling Insert)

DEXOL GOPHER GASSER(R)

READ ALL PRECAUTIONS ON BACK SIDE OF PACKAGE BEFORE USING THIS PRODUCT.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

USE RESTRICTIONS: Only use inside of burrows and never inside of buildings.

POCKET GOPHERS and MOLES:

Burrow Preparation - In order for gas producing cartridges to be effective on the pest species, a sufficient concentration of gas over a period of time must be retained in the burrow system. Damp soil tends to retain toxic gasses within a burrow system better than does dry soil, and hence may increase the degree of control.

Pocket gophers and moles produce different types of burrows. Both, however, dig their most used runways (burrows) at a deeper level than the shallow runways (burrows) used for feeding purposes, which may not be reused on a regular basis, if at all. Short lateral runways connecting the deeper burrows with the surface of the ground may also be used for only short periods when soil is being excavated from runways. It is natural for pocket gophers and moles to plug the lateral runways and feeding runways with soil. Such soil plugs preclude the toxic gasses from reaching the animal.

For best results with any toxic gas, it must be released in the deeper, more frequently used runways and in a sufficient number of locations within the burrow system to assure that a lethal concentration of gas reaches the pest animal.

Locating the main runway necessitates the use of a sharpened broom handle or metal probe which can be pushed perpendicularly into the soil somewhere midway between two fresh earth mounds. Connecting runways between mounds generally can be found at depths of 8 to 12 inches below the soil surface and are detectable by the sudden give felt on the probe because of the lack of soil friction as it enters the runway.

With the main runway located, a shovel or trowel may be used to dig down the runway and clear away the loose soil.

Burrow Treatment

Before Lighting Fuse: Insure that cartridge will pass easily into opening and make sure that enough material is on hand to close burrows.

(Insert Copy Cont'd)

Hold a DEXOL GOPHER GASSER(R) cartridge away from your body and light the fuse (minimum fuse burn time is 5 seconds). DO NOT INHALE THE TOXIC FUMES. When lit, carefully insert the cartridge, fuse-end first, into one side of the open runway.

Immediately plug the opening with a board or a shovelful of sod, tamp tightly with soil to prevent gasses from escaping. If smoke is seen escaping from other holes, plug them firmly with soil.

After the first cartridge has burned to completion (approximately 5 minutes), from 1 to 3 additional cartridges should be used following the same procedures as previously described but in different portions of the burrow system. Generally, cartridges need not be inserted closer than 8 feet apart.

Should fresh mounds reappear after approximately 5 days, the gassing process should be repeated. New animals frequently take over vacant burrow systems.

GROUND SQUIRRELS: Collect plenty of dirt and other material for closing burrow openings. Treat each burrow opening by lighting fuse (minimum fuse burn time is 5 seconds) and inserting cartridge fuse end first into hole. (Make sure hole is large enough for easy insertion before lighting fuse). Cover hole immediately, taking care not to smother cartridge with loose dirt. Immediately cover all other openings from which gas excapes. Proceed to the next closest burrow and treat as above.

STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.
STORAGE: Store in cool, dry place away from fire, heat and direct sunlight.
PESTICIDE DISPOSAL: To dispose of unused cartridges, soak in water, crush and bury at least 6" in loose soil.
CONTAINER DISPOSAL: Place in trash collection.

Endangered Species Considerations:

1. Black-Footed Ferret: Do not use this product in the range of the Black-Footed Ferret. Contact the nearest U.S. Fish and Wildlife Service Office (Endangered Species Specialist) before the product is used. The will arrange for a survey of the proposed use site.

2. Utah Prairie Dog: Do not use this product in the range of the Utah Prairie dog, which occurs only in Utah.

(Insert Copy Cont'd)

3. San Joaquin Kit Fox: This pesticide should not be used within 1 mile of active dens of the San Joaquin Kit Fox in the following California counties: Kern, Kings, Fresno, San luis Obispo, Merced, Monterey, Santa Barbara, Ventura, Tulare, and San Benito. Prior to use, contact the California Department of Fish and Game for recommendations.

4. Blunt-Nosed Leopard Lizard; This pesticide should not be used in the range of the Blunt-nosed Leopard Lizard in the following California Counties: Kern, Fresno, Kings, Madera, Merced and Tulare. Prior to use, contact the California Department of Fish and Game for recommendations.

5. Eastern Indigo Snake: Do not use this product in the range of the Eastern Indigo Snake in the following states: Mississippi, Alabama, South Carolina, Georgia and Florida.

6. Desert Tortoise: This pesticide should not be used in the critical habitate of the Beaver Dam slope population of the Desert Tortoise in Utah. This comprises an area extending from the southwest facing slope of the Beaver Dam Mountains, across Highway 91, west along the Arizona border and 10 miles to the Nevada border.

(Wrap-around copy on individual cartridges)

IMPORTANT: SEE PRECAUTIONARY STATEMENTS ON BACK OF PACKAGE AND FOLLOW ENTIRE DIRECTIONS FOR USE ON ENCLOSED INSERT BEFORE USING.

WARNING: After ignition, cartridge produces toxic gasses. Fumes may be harmful if inhaled.

NET WT. 3/4 oz.

MADE IN TAIWAIN
DEXOL INDUSTRIES
Torrance, California 90501

DEXOL

GOPHER GASSER

AID TO RODENT CONTROL

KEEP OUT OF REACH OF CHILDREN

WARNING

Active Ingredients:

Potassium Nitrate ...	45.0%
Sulphur	45.0%
Carbon	8.0%
Dextrin	2.0%
Total:	100.0%

EPA Reg. No. 192-49-AA
EPA Reg. No. 192-CA-1

24. Summary of Endangered Species Considerations for Lindane

1. Product Name/ Common Name/ Chemical Name

Isotox granule/ Lindane/ the gamma isomer of 1,2,3,4,5,6 Benzene hexachloride.

2. Regulatory Action

Proposed emergency exemption use (section 18). Insecticide use requested by the Florida Department of Agriculture and Consumer Services to control white grubs in sugarcane.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded that the Florida Everglade kite (*Rostrhamus sociabilis plumbeus*) would be at "significant risk" from the proposed emergency exemption. The risk would exist because the virtual sole food source of the kites, the apple snail, was considered sensitive to the use of pesticides. Since the habitat of both species is very close to sites where the pesticide would be used, secondary impacts to the kite were expected from eating affected snails. Accordingly, the EEB review determined that it is "...extremely likely that [the] section 18 [emergency use permit] will result in possible significant exposure of the severely stressed Florida Everglade kite (*R. sociabilis plumbeus*) population to residues of Lindane." Based on this assesment it was determined that "...a formal consultation under section 7 of the Endangered Species Act must be initiated immediately." (10/18/82 review)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on October 25, 1982.

5. Consultation Administration

The FWS requested an extension of 60 days to issue the biological opinion. This changed the completion date from February 1 to March 31, 1983.

6. Consultation Conclusions and Environmental Protection Agency Response

The RD communicated to the registrant, letter dated November 29, 1982, that action on the registation of Lindane could not occur until completion of the OES biological opinion. The request was therefore "administratively withdrawn" because "...the use season will have passed once the OES consultation is completed."

Since the south Florida ecosystem supports a variety of threatened and endangered species, the FWS (FWS/OES, February 17, 1983) included the bald eagle (*Haliaeetus leucocephalus*) and the Florida panther (*Felis concolor coryi*), as well as the Everglade kite (*R. sociabilis plumbeus*), in the biological opinion.

The FWS determined "...that granting an emergency exemption for the use of Lindane is likely to jeopardize the continued existence..." of all three of the considered endangered species. The opinion was based "...on the toxicity of Lindane to fish, aquatic invertebrates, and cats; the potential for the bioac-

cumulation of Lindane in the environment; and to the insufficient data and the uncertainity as to the fate of Lindane in the south Florida ecosystem." Since the effects of Lindane are potentially long lasting, "...the FWS strongly opposes the use of this chemical on sugarcane in south Florida." Two "reasonable and prudent" alternatives were offered so that the species would not be jeopardized. The first recommendation was to conduct studies "...to determine the direct and indirect effect of Lindane on [the] species using surrogate species, and their primary food items..." The second alternative was a recommendation to use "...a chemical compound that would not present a serious hazard to these species."

An "additional conservation recommendation" was made concerning the wood stork (Mycteria americana). This species is under status review for listing as an endangered species and, while not protected under the Act as such, the FWS stated that they "... would appreciate any efforts [EPA] might make to avoid adversely impacting them." This species was later added to the list in March of 1984.

On June 30,1983, a telegram was sent from EPA to the registrant to report the findings of the biological opinion. The two alternatives cited in the opinion were addressed in the telegraph. No further action was taken.

25. Summary of Endangered Species Considerations for Bant

1. Product Name/ Common Name/ Chemical Name

Bant/ Nifluridide/ n-(2-amino-3-nitro-5-(trifluoromethyl) phenyl0-2,2,3,3,-tetra fluoropropanamide.

2. Regulatory Action

Proposed registration (full). Insecticide use in non-crop areas to control the imported red fire ant.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

Concluded that the proposed use would provide "for potential hazards to several terrestrial endangered species." EEB stated that until the Office of Endangered Species opinion was received they would not "know how many species may be jeopardized, to what extent, nor what types of mitigating measures need to be taken to protect them..." EEB did state that it would be likely that the use of Bant would be prohibited in the areas where the species occurred.

The following terrestrial endangered species were listed as occuring within the range of the imported fire ant infestation:

- gray bat (*Myotis grisescens*)
- Indiana bat (*Myotis sodalis*)
- Florida panther (*Felis concolor coryi*)
- eastern cougar (*Felis concolor cougar*)
- whooping crane (*Grus americana*)
- Eskimo curlew (*Numenius borealis*)
- brown pelican (*Pelecanus occidentalis*)
- Mississippi sandhill crane (*Grus canadensis pulla*)
- American peregrine falcon (*Falco peregrinus anatum*)
- Florida everglade kite (*Rostrhamus sociabilis plumbeus*)
- red-cockaded woodpecker (*Picoides borealis*)
- Kirtland's warbler (*Dendroica kirtlandii*)
- Bachman's warbler (*Vermivora bachmanii*)
- Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*)
- Cape Sable sparrow (*Ammospiza maritima mirabilis*)
- Dusky seaside sparrow (*Ammospiza maritima nigrescens*)
- Houston toad (*Bufo houstonensis*)
- Red Hills salamander (*Phaeognathus hubrichti*)

Of the above list, the following species were considered to be potentially affected and were included in a consulation request:

- Eskimo curlew (*N. borealis*)
- Kirtland's warbler (*D. kirtlandii*)
- Backman's warbler (*V. bachmanii*)
- Attwater's greater prairie (*T. cupido attwateri*)
- Cape Sable sparrow (*A. maritima mirabilis*)
- Houston toad (*B. houstonensis*)
- Red Hills salamander (*P. hubrichti*)
- Dusky seaside sparrow (*A. maritima nigrescens*)

Review dated 11/2/82.

4. Consultation Initiation

Initiated by Hazard Evaluation Division, (Ecological Effects

Branch) to the Office of Endangered Species on November 22, 1982. Another consulation relative to the first consultation was made on March 16, 1983 to "...respectively request a reconsideration of the Febuary 2, 1983 biological opinion."

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

In a January 20,1983 letter to RD, the registrant requested withdrawal of the Bant application since they were discontinuing all research and development efforts on the product.

The FWS consultation (EPA-83-1, February 2, 1983) reviewed "those species listed by EEB as potentially affected, excluding the dusky seaside sparrow (A. maritima nigrescens), since it is no longer found in the wild, and the Eskimo curlew(N. borealis), but including the Mississippi sandhill crane (G. canadensis pulla) and the red-cockaded woodpecker (P. borealis). The consultation also reviewed the effect of Bant on the critical habitat of the Cape Sable seasice sparrow (A. maritima mirabilis), the Mississippi sandhill crane (G. canadensis pulla), and the Houston toad (B. houstonensis). The FWS concluded that the use of Bant would be "likely to jeopardize the continued existence of the Houston toad [B. houstonensis] and the Attwater's greater prairie chicken [T. cupido attwateri] and could "result in the destruction or adverse modification of Houston toad [B. houstonensis] critical habitat." The FWS stated that the other species cited in the consultation would not be affected by the use of Bant nor would it "result in the destruction or adverse modification of Cape Sable seaside sparrow [A. maritima mirabilis] or Mississippi sandhill crane [G. canadensis pulla] critical habitat.

So that jeopardy might be avoided and "to aid the EPA" label statements were "suggested". The statements expressed that "Bant should not be applied in the specific habitats where these species are known to occur without first contacting the [FWS] ." FWS mentioned that the EPA might want to use the recommendations concerning Bant on a trial basis with county extension agents. This was made in reference to discussions concerning the use of these agents to disseminate information about "the use of pesticides and their impacts on listed species."

In a peer group memo to the chief of EEB, two points of contention concerning the February 2,1983 consultation were made. The first point was that a prediction of how many treated ants it would take to kill a small bird was determined to be suspect. The peer group suggested, after confirming the error with the reviewer, that the changes in the review and the opinion should be made. This error, and change, was duely noted by FWS in a subsequent consultation latter (EPA-83-1, amendment).

The second point raised by the memo was a request for "more information on the OES decision that the Red Hills salamander [P. hubrichti] is not in jeopardy. They further stated that the FWS "...rationale on this species could be incorporated into our files to improve future reviews or, if found unconvincing, could

be formally questioned "(peer group memo, 3/4/83). The consultation request letter, March 16, 1983, conveyed the ant error to OES, but did not mention questions concerning the Red Hills salamander (*P. hubrichti*).

A second request for consultation was made to OES on March 16, 1983 to convey that errors were found in the EEB review and to ask if such findings might warrent a reconsideration of the biological opinion. In their reply (April 5,1983), the FWS stated that the corrected information sent by EEB would not alter the jeopardy determination. The correction was made in the analysis of the biological opinion.

26. Summary of Endangered Species Considerations for 1080 (Single lethal baits) (second of five consultations involving 1080)

1. Product Name/ Common Name/ Chemical Name
1080/ Sodium monofluoroacetate/ unknown.

2. Regulatory Action
Proposed amendment to experimental use permit to allow an increase of 1080 in baits from 3.0 to 5.0 mg and six additional counties as potential testing areas.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB expressed that the lack of pertinent information and adequate toxicity data could hamper an assessment of impacts to non-target organisms. EEB found it reasonable that increases in the concentration of 1080 would increase potential hazard to some species, but believed that the absence of the data and information would preclude an adequate evaluation. However, the impacts of 1080 on non-target species were considered insignificant because the test sites were relatively small in acreage. (review dated 3/22/83)

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Efects Branch) to the Office of Endangered Species on January 31, 1983.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FWS/OES EPA-82-5R, March 21, 1983) concluded that endangered species would not be affected by the proposed changes in the experimental use permit. Formal consultation was not required.

27. Summary of Endangered Species Considerations for 1080 (toxic collar) (third of five consultations involving 1080)

1. Product Name/ Common Name/ Chemical Name
1080/ Sodium monofluoroacetate/ unknown.

2. Regulatory Action
Request for an extension of a experimental use permit that would evaluate the potential impacts of toxic collars on endangered and threatened species.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB considered that the only danger of using 1080 in toxic collars was if nontarget wildlife came into contact with a punctured collar. Such contact could result in secondary hazards to animals scavenging on the remains of target coyotes, from scavenging on vomitus of target coyotes, and from primary hazards to animals scavenging on collared livestock carcasses.
EEB believed that the proposed studies would not pose a significant hazard to nontarget wildlife species, except for endangered species. Few hazards were believed to exist because the studies would be conducted with few collars, by a small number of tests, and in a relatively small area. The following endangered species were considered at risk by the use of 1080 toxic collars:

grizzly bear	(*Ursus arctos horribilis*)
gray wolf	(*Canis lupus*)
black-footed ferret	(*Mustela nigripes*)
northern swift fox	(*Vulpes velox hebes*)
ocelot	(*Felis pardalis*)
bald eagle	(*Haliaeetus leucocephalus*)
red wolf	(*Canis rufus*)
Jaguarundi	(*Felis jagouaroundi cacomitli*)

EEB concluded that jeopardy to these species could "...be avoided by prohibiting the use of 1080 collars in the range of these species."

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Efects Branch) to the Office of Endangered Species on November 15, 1983.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FWS/OES EPA-84-3, March 23, 1984) determined that the following endangered species could be impacted by the use of toxic collars:

bald eagles	(*Haliaeetus leucocephalus*)
black-footed ferret	(*Mustela nigripes*)

northern rocky mountain
wolf (*Canis lupus irremotus*)

The Service concluded that, due to the small size of the test program and the frequency of monitoring, "...few individuals of any of the three endangered species are expected to come into contact with punctured collars or poisoned animals." Based on the distribution and feeding habits of the above three species, none would be jeopardized by the issuance of the experimental use permit. Since negative impacts could occur to these species if 1080 collars were used in their ranges, restrictions were suggested for conducting the tests. These included restricting the area and time that the tests were to be conducted in the habitat of the bald eagle (*H. leucocephalus*) and northern mountain wolf (*C. lupus*) and contacting FWS personnel before conducting tests in the habitat of the black-footed ferret (*M. nigripes*).

EEB, in a review dated 4/24/84, concluded that the tests would not significantly impact nontarget organisms provided certain restrictions be imposed. These restrictions included those recommended by the Service and others that prohibited the tests in specific counties.

28. Summary of Endangered Species Considerations for Oust

1. Product Name/ Common Name/ Chemical Name

Oust weed killer/ Sulfometuron Methyl/ Methyl 2-[[[[4,6-dimethyl-2pyrimidinyl)amino] -carbonyl] sulfonyl] benzoate.

2. Regulatory Action

Proposed conditional registration. Herbicide for general weed control on noncropland areas and for weed control for bermudagrass release in noncropland areas. An additional use for weed control in drainage ditch banks was made at a later date.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

While reviewing the proposal for use on noncropland areas, EEB determined that "...[b]ased on available toxicity data and application rate information, an acute hazard to endangered/threatened animal species, if exposed, could not be predicted." On the other hand, endangered/threatened plant species "...would be expected to be as susceptible to the herbicide as the target species." The following list of endangered and threatened species that could be adversly affected by the use of herbicides was included in the review:

Species occuring near rights-of-way

Brady pincushion cactus	(*Pediocactus bradii*)
mesa verde cactus	(*Sclerocactus mesae-verdae*)
dwarf bear-poppy	(*Arctomecon humilis*)
Phacelia	(*Phacelia argillacea*)
bunched arrowhead	(*Saxittaria fasciculata*)
Contra Costa wallflower	(*Erysimum capitatum* var. *angustatum*)
Solano grass	(*Orcuttia mucronata*)
salt march bird's beak	(*Cordylanthus maritimus* ssp. *maritimus*)
San Diego mesa mint	(*Pogogyne abramsii*)
Wright's fishhook cactus	(*Sclerocactus wrightiae*)
Uinta Basin hookless cactus	(*Sclerocactus glaucus*)
Chapman rhododendron hookless cactus	(*Rhododendron chapmanii*)

Species that are aquatic or grown near water

bunched arrowhead	(*Saxittaria fasciculata*)
Truckee barberry	(*Berberis sonnei*)
San Diego mesa mint	(*Pogogyne abramsii*)
Solano grass	(*Orcuttia mucronata*)
Salt marsh bird's beak	(*Cordylanthus maritimus* ssp. *maritimus*)
Furbish lousewort	(*Pedicularis furbishiae*)
Texas wild-rice	(*Zizania texana*)
Tobusch fishhook cactus	(*Ancistrocactus tobuschii*)
Knowlton cactus	(*Pediocactus knowltonii*)
Macfarlane's four o'clock	(*Mirabilis macfarlanei*)

green pitcher plant (Sarracenia oreophila)

The review noted that label statements to "...mitigate hazard to federally-listed endangered/threatened species found in or near railroad rights-of-way..." was being evaluated by EEB and RD. This review was considered applicable to the use of Oust. EEB was not able to determine if a formal consultation would be necessary. (review dated 11/12/81)

EEB considered a conditional registration of drainage ditch banks in a review dated 4/22/83. The Branch concluded that the use of Oust would have potentially adverse effects to endangered and threatened plant species. The previous 1/12/81 review was cited, as well as, a OES biological opinion for railroad rights-of-way as evidence of the potential harm. (see Metalochlor summary) A formal consultation with OES was to be initiated "...to determine the extent of potential hazard (and ways to mitigate such potential hazard) for the noncropland use of Oust, including ditch ditch banks."

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on May 2, 1983.

5. Consultaton Administration

Requests for additional time and/ or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The registration of Oust for noncropland uses was accepted by RD on February 8, 1982. (label included) Since this acceptance was made prior to the consultation initiation, endangered species concerns were not addressed in the labeling statements.

The FWS (FWS/OES EPA-83-5, June 30, 1983) determined that the use of Oust could jeopardize 25 plant species and the critical habitats of four plant species in 38 counties of 14 states. The FWS considered the following species as being jeopardized:

Brady pinchusion cactus	(Pediocactus bradyi)
Mesa Verde cactus	(Sclerocactus mesae-verdae)
Peebles Navajo cactus	(Pediocactus peeblesianus var. peeblesianus)
Wright fishhook cactus	(S. wrightiae)
Kuenzler hedgehog cactus	(Echinocereus kuenzleri)
Lloyd's hedgehog cactus	(E. lloydii)
Sneed pinchusion cactus	(Coryphantha sneedii var. sneedii)
Chapman rhododendron	(Rhododendron chapmanii)
Rydberg milk-vetch	(Astragalus perianus)
Harper's beauty	(Harperocallis flava)
dwarf bear-poppy	(Arctomecon humilis)
Macfarlane's four-o'clock	(Mirabilis macfarlanei)
northern wild monkshood	(Aconitum noveboracense)
gypsum wild buckwheat	(Eriogonum gypsophilum)
Texas poppy-mallow	(Callirhoe scabriuscula)
hairy rattleweed	(Baptisia arachnifera)

Malheur wire-lettuce	(*Stephanomeria malheurensis*)
phacelia	(*Phacelia argillacea*)
bunched arrowhead	(*Sagittaria fasciculata*)
San Diego mesa mint	(*Pogogyne abramsii*)
Solano grass	(*Orcuttia mucronata*)
salt marsh bird's beak	(*Cordylanthus maritimus* ssp. *maritimus*)
Uinta Basin hookless cactus	(*Sclerocactus glaucus*)
Contra Costa wallflower	(*Erysimum capitatum* var. *angustatum*)
Antioch Dunes evening-primrose	(*Oenothera deltoides* ssp. *howellii*)

The FWS determined that exposure to Oust would cause mortality in the above plants and "[b]ecause of the limited population size of many of these plant species, a local spraying program could virtually destroy the entire species."

It was suggested that a reasonable and prudent alternative would be prohibition of the use of Oust on specified rights-of-way within 38 counties of 14 states.

The OES opinion was transmitted to RD on July 12, 1983. In an accompaning memorandum, EEB noted that "...alternatives for protection of the cited endangered/threatened plants will likely apply to all herbicides..." that would be used on sites where endangered plant species occur.

As of July 30, 1984, the registration of the product for use in drainage ditches was awaiting "scientific review and evaluation" and the label statements for previously approved uses still lacked any mention of endangered species concerns.

Oust

WEED KILLER
DRY FLOWABLE

ACTIVE INGREDIENT:
Methyl 2-[[[[(4,6-dimethyl-2-pyrimidinyl)amino]-carbonyl]amino]sulfonyl]benzoate.....75%
INERT INGREDIENTS 25%
U.S. Patent Pending EPA Est 352-WV-1

KEEP OUT OF REACH OF CHILDREN
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

CAUTION: MAY IRRITATE EYES, NOSE THROAT, AND SKIN

Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. If in eyes, immediately flush with plenty of water and get medical attention. If on skin, immediately flush with plenty of water and get medical attention if irritation persists.

ENVIRONMENTAL HAZARDS

Do not apply directly to wetlands or any body of water. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 32 OUNCES

E. I. du Pont de Nemours and Co. (Inc.), Biochemicals Department, Wilmington, Delaware

352-401

NOTICE OF WARRANTY

Du Pont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Du Pont. In no case shall Du Pont be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. DU PONT MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

29. Summary of Endangered Species Considerations for 1080 (grain bait) (fourth of five consultations involving 1080)

1. Product Name/ Common Name/ Chemical Name
   1080/ Sodium monofluoroacetate/ unknown.

2. Regulatory Action
   Request by the Nebraska National Forest and the Rock Mountain Forest and Range Experiment Station for an experimental use permit to evaluate the efficacy of 1080 in grain bait for the control of black-footed prairie dogs. The proposed study was to occur in southwestern South Dakota.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
   EEB determined that two endangered species, the black-footed ferret (*Mustela nigripes*) and northern swift fox (*Vulpes velox hebes*), could be impacted from the proposed study. These impacts would be caused by secondary poisoning and would occur only if the range of the two species overlapped with the proposed test sites. The use of pre-control surveys to avoid impacts was considered as a viable option. (review dated 7/25/83)

4. Consultation Initiation
   Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on July 29, 1983.

5. Consultation Administration
   Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
   The FWS (FWS/OES August 23, 1983) considered that only the black-footed ferret (*M. nigripes*) should be considered in a biological opinion since the northern swift fox (*V. velox hebes*) is listed for Canada and not in the United states. The Service determined that the proposed study would not likely jeopardize the continued existence of the black-footed ferret (*M. nigripes*). This determination was based on the remoteness of hazards occuring since the study area was very small and intensive ferret surveys were to be conducted . As means of conservation, the Service suggested conducting spotlight ferret surveys and other survey techniques and removing dead carcasses from the test area.

30. Summary of Endangered Species Considerations for CGA-12223

1. Product Name/ Common Name/ Chemical Name

CGA-12223/ none/ O-(s-chloro)-1-[methylethyl]-1H-1,2,4-triazol-3-yl)O,O-diethyl-phosphorothioate.

2. Regulatory Action

Proposed conditional registration. Insecticide use to control grubs on golf courses and commercial turf farms.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that 40 endangered species would be found in or near turf. EEB was unable to verify if the use of the product would occur in areas where endangered species are found. Since endangered species triggers were exceeded, the product was considered capable of adverse effects. A consultation was to be requested.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on November 10,1983.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusion and Environmental Protection Agency Response

The FWS (FWS/OES EPA-84-1, January 10, 1984) determined that, based on the information available, endangered species would not be significantly exposing to the product. The Service therefore concluded that the use of CGA-12223 would not jeopardize the continued existence of any listed species or modify any designated critical habitat.

31. Summary of Endangered Species Considerations for Sonar

1. Product Name/ Common Name/ Chemical Name

Sonar/ Fluridone/ 1-methyl-3-phenyl-5-3-(trifluoromethyl) phenyl-4-(1H)-pyridinone.

2. Regulatory Action

Conditional registration for direct application of the product to any freshwater area. Sonar is to be used in fresh water ponds, lakes, reservoirs, drainage canals, irrigation canals, and rivers to kill a broad spectrum of aquatic vegetation.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB concluded (review dated 9/24/82) that the use of Sonar would have "...the potential for serious acute and chronic effects to aquatic organisms in ponds, lakes and reservoirs." The data also suggested a "...restricted use classification of the product." It was determined that the product's use would not affect any federally listed endangered/threatened plant species. Sonar could, on the other hand, pose a "potential hazard" for fish. Based on conversations with OES staff, the following list of endangered/threatened fish was determined to be potentially at risk if exposed to "...an aquatic application of a chemical to ponds, lakes, and reservoirs."

Pahranagat bonytail	(*Gila robusta jordani*)
Alabama cavefish	(*Speoplatyrhinus poulsoni*)
bonytail chub	(*G. elegans*)
Cui-ui	(*Chasmistes cujus*)
Moapa dace	(*Moapa coriacea*)
fountain darter	(*Etheostoma fonticola*)
Okaloosa darter	(*E. okaloosae*)
Big Bend gambusia	(*Gambusia gaigei*)
Clear Creek gambusia	(*G. heterochir*)
Pecos gambusia	(*G. nobilis*)
pahrump killifish	(*Empetrichthys latos*)
Comanche Springs pupfish	(*Cyprinodon elegans*)
Leon springs pupfish	(*C. bovinus*)
Owens River pupfish	(*C. radiosus*)
Warm Springs pupfish	(*C. nevadensis pectoralis*)
unarmoured threespine stickleback	(*Gasterosteus aculeatus williamsoni*)
gila topminnow	(*Poeciliopsis occidentalis*)
Lahontan cutthroat trout	(*Salmo clarki henshawi*)
Borax lake chub	(*Gila boraxobius*)

The fish triggers were also said to "indicate hazard to amphibians." The endangered Houston toad (*Bufo houstonensis*) and the Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) were cited as examples. It was determined that aquatic invertebrates would not be exposed to the product. Although consultation with OES was to be initiated, EEB delayed the process because the registrant was making label modifications, informal consultation was occuring and another, more extensive,

review was to be conducted.

In a second review dated 11/7/83, EEB again concluded that "...available data support a restricted use classification..." for Sonar. The EEB review cited four endangered plant species, bunched arrowhead (Sagittaria fasciculata), San Diego mesa mint (Pogogyne abramsii), Solano grass (Orcuttia mucronata), Texas wild-rice (Zizania texana), that are found in areas where Sonar might be used. The conclusions concerning endangered animal species were drawn from the adverse effects to non-target organisms section (104.2) of the review. Very broadly and not relating specifically to endangered species, mammals and avian species were not considered affected by Sonar, while aquatic species were considered sensitive to its use. Invertebrate species inhabiting shallow areas in ponds were most likly to "...receive the worst effects."Both fish and invertebrates "...could be impacted..." in lakes, canals, and rivers. In the endangered species considerations section (104.3) of the review lethal concentrations to aquatic species were used to "...exemplify the potential acute toxicity to endangered/threatened freshwater aquatic organisms should populations be exposed..." It was noted that the fish data indicated hazards from toxic effects to amphibians. The Houston toad (Bufo houstonensis) and the long-toed salamander(Ambystoma macrodactylum croceum) were considered as being potentially affected. It was also noted that "...[i]n addition to toxic effects incurred from use of Sonar, effects of habitat manipulation (vegetative changes, etc.) from herbicidal action may also have to be considered in a consulation with the Office of Endangered Species." Review dated 11/7/83.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on November 16,1983.

5. Consulation Administration

Requests for additional materials and/or time were not made.

6. Consulation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-84-2, February 21, 1984) concluded that the proposed use of Sonar would likely "...jeopardize the continued existence of all listed U.S. freshwater aquatic species including plants, fishes, reptiles, amphibians, and invertebrates (principally mussels) and is likely to destroy or adversely modify all aquatic designated critical habitat."

The FWS recommended, as an alternative to preclude jeopardy. "...that the use of this product be excluded from the habitat of all listed freshwater aquatic species.

In a memorandum to the Registation Division dated February 29, 1984, EEB, while conferring with the OES staff, decided that the use of Sonar and other similiar products would be considered by the cluster approach. Until such action was finalized, EEB requested additional labeling "...to ensure that listed species are not exposed to ... Sonar products." The proposed addition is as follows: "This product is toxic to all federally protected endangered/threatened aquatic species. The use of this product

must be excluded from the habitat of all listed freshwater aquatic species. Contact your local U.S. fish and Wildlife Service representatives (endangered species specialists) to ensure that there are no listed aquatic species in the areas of proposed treatment."

In addressing additions to the Sonar label, the PM responsible for Sonar (note to EEB endangered species coordinator dated May 31, 1984) stated that RD was "...attempting to compromise between OES recommendations and [the registrant's] concern that Sonar not be singled out unfairly compared with [other] registered aquatic herbicides. In a March 29,1984 memorandum to EEB, RD stated that they would require the following label statement on Sonar:

"Follow directions carefully so as to minimize adverse effects on non-target organisms. Consult your state fish and game agency or the FWS if you have questions concerning aquatic resources in your area."

As of August 21, 1984, the registration of Sonar was pending on the completion of a number of toxicology tests by the registrant.

32. Summary of Endangered Species Considerations for Endrin

1. Product Name/ Common Name/ Chemical Name

Endrin/ Hexadrin, Mendrin/ 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-5,8-dimethanonaphthalene.

2. Regulatory Action

Evaluation of use patterns on cotton, small grains, sugarcane, apple orchards, conifer seed, and bird roosts/perches, Insecticide use for control of pesticides, rodents, and birds. Only a small percentage of U.S. crops are now treated with Endrin.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

Endrin had been scrutinized for endangered species problems in the past. EEB had considered proceeding with a registration standard for Endrin, but reconsidered when the product was to be pulled from the market. Prior to this decision, EEB requested that the Office of Endangered Species initiate a biological opinion to review the impacts of Endrin on endangered species.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on February 6, 1984.

5. Consultation Administration

The FWS requested an extension of 30 days.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-84-4, June 22, 1984) determined that the product's use on sugarcane could have potentially adverse affects on the Everglade kite (*Rostrhamus sociabilis plumbeus*) and the wood stork (*Mycteria americana*).

The former species was believed to be threatened by a reduction of its sole food item and /or secondary poisoning. Because of this possibility, the Service concluded that the kite would likely be jeopardized by the use of Endrin. Jeopardy could be precluded if additional information was to "...be developed which demonstrates that..." Endrin residues in the environment are not sufficient enough to cause mortality to apple snails, and not high enough in apple snails to cause secondary poisoning to the kite.

The Service was unable to determine whether the wood stork (*M. americana*) would be jeopardized by the use of Endrin. The Service did, however, "emphasize" their concern regarding the use of endrin and "the potential for adverse impacts on the wood stork."

The Service also reaffirmed a previously done biological opinion (October 12, cluster review) that stated that the use of Endrin on small grains would likely jeopardized the following species:

Attwater's greater prairie chicken (Tympanuchus cupido attwateri)
Aleutian Canada goose (Branta canadensis leucopareia)
slackwater darter (Etheostoma boschungi)
woundfin (Plagopterus argentissimus)
Alabama lamp pearly mussel (Lampsilis virescens)
Appalachian monkey-face pearly mussel (Quadrula sparsa)
Cumberland monkey-face pearly mussel (Q. intermedia)
birdwing pearly mussel (Conradilla caelata)
green-blossom pearly mussel (Epioblasma torulosa gubernaculum)
turgid-blossom pearly mussel (E. turgidula)
tan riffle shell (E. walkeri)
pale lilliput pearly mussel (Toxolasma cylindrella)
fine-rayed pigtoe (Fusconaia cuneolus)
shiny pigtoe (F. edgariana)
Cumberland bean pearly mussel (Villosa trabalis)
Valley elderberry longhorn beetle (Desmocerus californicus dimorphus)
Delta green ground beetle (Elaphrus viridis)
Kern primrose sphinx moth (Euproserpinus euterpe)

The resonable and prudent alternatives to preclude jeopardy for these species remained unchanged from the October 12, 1983 biological opinion. These alternatives recommended prohibiting the use of pesticides within the range, and within a buffer zone around each range, of the above species.

The Service also determined that no listed species would be jeopardized by the use of Endrin on cotton (west of interstate highway 35), apple orchards, conifer seeds, and bird perches.

As of this writing, EPA is still attempting to cancel the uses of Endrin.

33. Summary of Endangered Species Considerations for Dicofol (special review)

1. Product Name/ Common Name/ Chemical Name

Acarin, Carbox, Decofol, Kelthane, Mibol, Mitigan/ Dicofol/ 1,1-bis(chlorophenyl)-2,2,2-trichloro-ethanol.

2. Regulatory Action

Special review (Rebuttable Presumption Against Registration) of the pesticide Dicofol. The product is registered as a miticide for use on cotton, citrus, and a variety of other crops.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

As part of a program to review all pesticide active ingredients registered before January 1, 1977, a guidance package for the reregistration of products containing Dicofol was published on December 30, 1983. Some of the determinations that were cited in the package are as follows:

1) that risk criterion (40 CFR 162.11) regarding an adverse wildlife effort had been met by certain uses of Dicofol and that a special review would therefore be initiated,

2) that new registrations for Dicofol products intended for outdoor use would not be issued,

3) existing registration would have to be supported by submission of additional data by the registrants,

and

4) existing registrations would have to be supported by submission of data regarding the composition of the product, particularly the concentration of DDTr contaminants.

The agency determined that the risk criterion for unreasonable adverse effects was met because the product is contaminanted with DDTr "...at levels which have unreasonable adverse effects on the environment."

In a position document (PD 2/3/84) describing regulatory actions to reduce potential adverse effects, the agency made assessments as to the impacts of Dicofol on a number of endangered species.

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to Office of Endangered Species on March 28, 1984.

5. Consultation Administration

Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES EPA-84-7, August 13, 1984) considered that the continued use of Dicofol could potentially affect the following species:

American peregrine falcon	(*Falco peregrinus anatum*)
Artic peregrine falcon	(*F. peregrinus tundrius*)
bald eagle	(*Haliaeetus leucocephalus*)
California condor	(*Gymnogyps californianus*)

brown pelican (*Pelecanus occidentalis*)
wood stork (*Mycteria americana*)

The FWS determined that the use of Kelthane would be "...likely to jeopardize the continued existence of the two listed peregrine falcons" (*F. peregrinus anatum*) and (*F. peregrinus tundrius*). Since DDTr contaminants would always be present at different levels in Kelthane, the FWS concluded that "...there are no reasonable and prudent alternatives." The Service recommended that the product should be cancelled for all uses.

It was further determined that the continued use of Dicofol would not likely jeopardize the bald eagle (*H. leucocephalus*), brown pelican (*P. occidentalis*), California condor (*G. californianus*), or wood stork (*M. americana*). Although a jeopardy opinion was not warranted for these species, the service "...remained opposed to adding significant amounts of DDT to the environment since this is the single most destructive pesticide to avian species."

The status of Dicofol is still pending.

34. Summary of Endangered Species Considerations for Orthene

1. Product Name/ Common Name/ Chemical Name

Orthene 75 S/ Orthene, Acephate/ Acephate (O,S-Dimethylacetylphosphoramidothioate.

2. Regulatory Action

Proposed conditional registration for use against thrips on macadamia nut trees. The proposal was later determined to be a state registration.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) occurs in the vicinity of macadamia orchards. The use of Orthene could threaten the bats "...with both risk of acute toxicity and chronic hazard." These risks could result from "inhalation of acephate, dermal exposure, and ingestion of contaminated insects." Based on this information EEB concluded that the proposed use "may effect" the Hawaiian hoary bat (*L. cinereus semotus*). A formal consultation with OES was to be initiated. (review 5/21/84)

4. Consultation Initiation

Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on May 18, 1984.

5. Consultation Administration

Requests for additional material and/or time were not made.

6. Consultation Conclusion and Environmental Protection Agency Response

The FWS (August 22, 1984) concluded that "...the action of registering Orthene and , therefore, permitting its use as a pesticide in macadamia nut orchards in the state of Hawaii... is likely to jeopardize the continued existence of the Hawaiian hoary bat [*L. cinereus semotus*]." The following stipulations regarding the use of Orthene were given as "reasonable and prudent alternatives":

"1. To decrease the chances of bats coming into direct contact with the Orthene spray, spraying from the ground should be conducted at night, when bats would least likely be found roosting in macadamia nut trees. Spraying from the air should be timed to pose as little threat to flying bats as possible. It may be advisable to spray from the air during the day.

2. Attempts to scare bats from the orchards prior to spraying should be made.

3. Applicators should be advised to cease spraying when bats are observed in the macadamia nut trees until the animals have been flushed.

4. The product label should have a prominent warning regarding its toxicity to bats and other wildlife with admonitions on use in the presence of these animals."

The biological opinion also included the following "terms and conditions" on incidental taking; those actions incidental to

and not intended by the use of Orthene:

"1. The EPA shall incorporate as part of the registration and/ or labelling the stipulation that if any individual of any of the listed species discussed in this opinion is killed as a result of the use of Orthene, the applicator, the orchard owner, or other person involved with the orchard or the spraying shall require that the causative action of such taking cease immediately, and that the EPA shall then re-initiate formal consultation and/or seek authorization under Section 10(a)1(B) prior to proceeding with the action.

[2.] All listed species which are injured or killed as a result of the subject action shall be retrieved and shall be turned over to this service at our Honolulu address ...or to the State of Hawaii Division of Forestry and Wildlife in Hilo, Hawaii immediately.

[3.] If EPA learns of bats killed as a result of Orthene use, you shall immediately prepare a written report which shall include the date, location , and circumstances surrounding the taking and the disposition of the individual(s) taken." A FWS address and phone number were included.

In a September 12, 1984 memorandum to RD, EEB proposed modifications on each of the OES alternatives would not "...adequately protect the endangered bat from the pesticide." Each stipulation was criticized for not adequately minimizing the threat to the bat. EEB found that the stipulations could lead to the bats' exposure to the pesticide and, because the bats would be forced to expend energy if disturbed, could make them less tolerant to natural forces. EEB suggested that Orthene "...be prohibited in the presence of the bat." They also strongly recommended that , if Orthene was permitted, "...that application be restricted to certified applicators and day spraying only, with mandatory intensive searches for bats prior to spraying and mandatory subsequent flushing of all bats prior to application of Orthene. If bats remain in the area, then Orthene may not be applied."

The RD, in a September 25, 1984 letter, informed the registrant of the consultation findings and recommended, since the use involved the state of Hawaii only, that a state (section 24(c)) registration be pursued. A label restriction was made that closely mimicked the EEB recommendation to restrict the application to certified applicators, require flushing, and not apply the product if bats were present. The registration of the product has not been pursued by the state of Hawaii. No further action was taken.

35. Summary of Endangered Species Considerations for Prairie Dog Toxicants

1. Toxicants
   strychnine
   compound 1080
   gas cartridge
   magnesium phosphide
   aluminum phosphide

2. Regulatory Action
   Reevaluation of hazards posed to the black-footed ferret (*Mustela nigripes*) from the use of pesticides that control prairie dogs.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
   While preparing for hearings on the secondary impacts of strychnine on the black-footed ferret (*M. nigripes*), EEB raised concern about discrepancies in the opinions on prairie dog toxicants. This concern centered on whether a ferret survey would adequately safeguard the species and on OES's inconsistent stance on the matter. Since the circumstances had changed from the time the opinions were made and new information was available, EEB was to request a new biological opinion to reevaluate the hazards to the ferret.

4. Consultation Initiation
   Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Fish and Wildlife Service on May 31, 1984.

5. Consultation Administration
   Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
   The FWS (FWS/OES EPA-84-9, November 9, 1984) determined that verification of the presence of ferrets was possible and that such a survey could adequately protect the species if conducted "strictly in accordance with currently approved methods." It was also determined that if ferrets were present when any of the prairie dog toxicants were used, primary and secondary poisoning could occur. The Service therefore concluded that the use of any of the considered toxicants could jeopardize the continued existence of the black-footed ferret (*M. nigripes*)
   As a reasonable and prudent alternative, the Service recommended conducting a precontrol survey to ensure ferrets were not in areas that were to be treated.

36. Summary of Endangered Species Considerations for volid

1. Product Name/ Common Name/ Chemical Name
   Volid/ Brodifacoum/ unknown.

2. Regulatory Action
   Proposed conditional registration. Rodenticide use to control pine and meadow mice in apple orchards in nine states.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
   EEB was concerned about the toxicity of the product to both non-target, non-endangered and endangered species. EEB determined that "...if endangered mammals and/or avian species occur in proximity to or would feed or scavenge in an orchard, then we concluded that any endangered species that would utilize an apple orchard area could come in contact with the product. The exposure could occur at any time of the year and could occur as a primary or secondary impact.

4. Consultation Initiation
   Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on June 7, 1984.

5. Consultation Administration
   The FWS (August 28, 1984) requested field test results to assess the potential primary and secondary affects of Brodifacoum on listed species.

6. Consultation Conclusions and Environmental Protection Agency Response
   The FWS (November 2, 1984) determined that the only endangered species that "...might be affected in treated areas [was] the peregrine falcon (*Falco peregrinus*)." Although the Service determined that secondary poisoning might occur, this possibility was considered remote because falcon nesting aeries are not found in "apple country", bait placement occurs when falcons are absent, and migration routes are not near apple growing regions. Based on the above facts, the Service concluded that the "...registration of Volid [would] not jeopardize the continued existence of the peregrine falcon [*F. peregrinus*]."

37. Summary of Endangered Species Considerations for Tilt

1. Product Name/ Common Name/ Chemical Name

Tilt/ Tilt/ 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxalin-2-yl-methyl]-1H-1,2,4-triazole.

2. Regulatory Action

Proposed conditional registration. Fungicide use on pecans for the control of certain diseases.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species

EEB determined that "numerous aquatic endangered species occur in areas in which pecans are grown." The branch therefore considered that the use of Tilt could result in an unreasonable hazard to aquatic endangered and threatened species (review dated 3/21/84). After more extensive study, EEB concluded that the proposal would provide for a "...minimal hazard to non-endangered, nontarget organisms, but does provide for potentially serious hazards to endangered species of freshwater mussels." A formal consultation was "anticipated". (EEB memorandum to RD dated July 31, 1984)

4. Consultation Initiation

Initiated by Hazard Evaluation Division, (Ecological Effects Branch) to the Fish and Wildlife Service on July 31, 1984.

5. Consultation Administration

The consultation was diverted to the endangered species field station in Asheville, North Carolina. Requests for additional material and/or time were not made.

6. Consultation Conclusions and Environmental Protection Agency Response

The FWS (FWS/OES, November 20, 1984) concluded that the registration of Tilt would likely jeopardize the following endangered mussels:

Alabama lamp pearly mussel (*Lampsilis virescens*)
birdwing pearly mussel (*Conradilla caelata*)
Cumberland monkeyface pearly mussel (*Quadrula intermedia*)
fat pocketbook (*Potamilus capax*)
fine-rayed pigtoe (*Fusconaia cuneolus*)
orange-footed pearly mussel (*Plethobasus cooperianus*)
pale lilliput pearly mussel (*Toxolasma cylindrella*)
pink mucket pearly mussel (*L. orbiculata*)
rough pigtoe (*Pleurobema plenum*)
shiny pigtoe (*Fusconaia edgariana*)
white wartyback pearly mussel (*Plethobasus cicatricosus*)

The FWS recommended that, as a reasonable and prudent alternative, the use of Tilt be prohibited in areas in which endangered mussels occur. A list of these areas was provided. The FWS also recommended the prohibition of the product's use in areas where candidate species are located. These candidate

species were under status review at the time and included Pleurobema curtum, P. marshalli, P. tairianum, Quadrula stapes, and Epioblasma tenuis.

According to a April 8, 1985 letter from SD to the registrant, final action on the registration of Tilt for use on pecans was awaiting completion of a risk assessment.

38. Summary of Endangered Species Considerations for 1080 (single dose bait) (fifth of five consultations involving 1080)

1. Product Name/ Common Name/ Chemical Name
1080/ Sodium monofluoroacetate/ unknown.

2. Regulatory Action
Request by the Denver Wildlife Research Center for an extension of an EUP involving the efficacy and environmental hazards of single lethal dose 1080 baits. This request would modify the permit by increasing the area of the original Idaho site from 59,000 to 145,000 acres and by adding a new site in Utah. The site in Montana would remain the same.

3. Hazard Evaluation Division (Ecological Effects Branch) Action Concerning Endangered Species
EEB determined that a consultation was necessary since slight modifications were to be made and more counties were to be added.

4. Consultation Initiation
Initiated by Hazard Evaluation Division (Ecological Effects Branch) to the Office of Endangered Species on November 6, 1984.

5. Consultation Administration
Requests for additional time and/or material were not made.

6. Consultation Conclusions and Environmental Protection Agency Response
The FWS (FA/SE/EPA-informal) concluded that if the conditions described by EEB were "all adhered to, including finding and picking up carcasses," a "no effect" situation would exist. The Service therefore determined that a formal consultation would not be required.

STANDARD OPERATING PROCEDURE

Number 3065.1 (Revised) Date Issued:
Revises #3065.1 dated 3/17/80

PROTECTION OF ENDANGERED OR THREATENED SPECIES DURING PESTICIDE REGISTRATION ACTIVITIES

PURPOSE:

The purpose of this document is to prescribe procedures for addressing endangered or threatened (listed) species considerations during Registration Division(RD) and Hazard Evaluation Division (HED) activities and for soliciting formal consultation requests with the Office of Endangered Species, Fish and Wildlife Service, Department of the Interior (referred to as OES) and the National Marine Fisheries Services, Department of Commerce (referred to as NMFS), as mandated by the Endangered Species Act of 1973 (Public Law 93-250; U.S.C.1531-1543).

SCOPE:

This procedure applies to all regulatory activities conducted under FIFRA by the Registration and Hazard Evaluation Divisions, including, but not limited to:

a. Registration of pesticides and related amendments under Section 3.

b. Experimental use permits under Section 5.

c. Emergency exemptions under Section 18.

d. Special local need state registrations under Section 24(c).

Data (to be supplied by the registrant) necessary to make the risk assessment are the same data used to make the risk assessments for non-target organisms. There are no additional data requirements specific to listed species.

BACKGROUND:

A. Definitions

The Endangered Species Act of 1973 (the Act) defines the term endangered species as, "any species which is in danger of extinction throughout all or a significant portion of its range", while the term "threatened species" means, "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." A listed species means "any species of fish, wildlife, or plant which is designated as endangered or threatened under the Act". As required by regulation, this list is published in the Federal Register. Critical habitat refers to "any air, land, or water area (exclusive of those existing man-made structures or settlements not necessary to the recovery and survival of a listed species), the loss of which would appreciably decrease the likelihood of the survival and recovery of a listed species or a distinct segment of its population".

B. Act Interpretation

The Act has as one of its stated purposes the conservation of ecosystems and habitats upon which endangered and threatened species depend for their existence. It is further stated that it is the policy of the Congress that all Federal departments and agencies shall seek to conserve endangered and threatened species and utilize their authorities to further the purpose of the Act.

Section 7 of the Act directs all Federal departments and agencies to ensure that actions authorized, carried out, or funded by them do not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat which is determined to be critical to these species.

Joint regulations by the OES and the NMFS (50 CFR, Chapter IV, Part 402) describe procedures for implementing Section 7 of the Act. These regulations were published in the Federal Register January 4, 1978. (43 FR, 870). New regulations incorporating subsequent amendments to the Act are expected to be proposed in the near future.

C. Act Interpretation Relevant to the Pesticide Program

Highlights of the regulation relevant to the ~~Registration~~ Office of Pesticide Programs ~~Division~~ include the following:

1. Informal consultation with field offices and other sources is authorized, but does not substitute for formal consultation.

2. If it is determined that listed species or their habitats will not be affected by a regulatory action, no consultation is required unless recommended by OES or NMFS. The establishment of criteria for this determination will be made by HED.

3. If it is determined that a problem may exist, HED must submit to the Director or his designee of either OES or NMFS a formal request for consultation, accompanied by supporting data. The purpose of the consultation is to identify problem areas where proposed programs would be in conflict with listed species or their habitat. This early warning process would enable OPP to modify its programs or activities to eliminate possible adverse action.

4. see rewrite.

5. If there is insufficient information to assess the impact, OES or NMFS may ask for more information and, by mutual consent, extend the consultation period. HED will promptly inform the respective PM of any extension of time agreed upon.

6. If any program modifications or new information relevant to the activity are submitted (such as a resubmission), RD/HED is obligated to reopen the consultation.

7. The consultation process is one of seeking advice or information only. OES and NMFS have no veto power over Agency actions. HED, ~~within the Office of Pesticide Programs~~ (OPP) is obliged to consult, and having done so, determines the appropriate regulatory action. The action taken should be consistent with the Congressional intent, that is, that agencies shall seek to conserve endangered or threatened species.

8. Consultation and supporting data releasable to the public under FOI procedures, and the biological opinion containing non-confidential material are a matter of public record.

9. OPP, OES and/or NMFS may develop joint regulations relative to the Agency's specific programs; if this is done, these regulations would supersede those published by OES and NMFS on January 4, 1978.

Because the Ecological Effects Branch (EEB) of HED has the responsibility to assess the impact of pesticidal applications upon non-target organisms including endangered or threatened species, it is appropriate that this Branch serve as the liaison with OES and NMFS. The decision as to which agency to contact depends on the species and/or environmental situation in question. Generally, marine organisms and related habitat are under NMFS' jurisdiction while fresh water and terrestrial organisms and related habitat are under OES' jurisdiction. Most of our actions will generally fall under the OES' jurisdiction.

PROCEDURE:

A. Registration Division (RD)

1. Registrations Under Section 3 of FIFRA

Certain of the Section 3 applications for registrations will require a listed species risk assessment. New chemicals intended for outdoor use will require reviews by EEB, HED. As part of the EEB disciplinary review, each application for registration of a new chemical for outdoor use will be screened for possible effects on listed species. New chemicals intended for indoor use will not require an EEB review.

All new uses of previously registered products will not automatically receive a listed species review. However, most new uses (outdoor) will be routed to EEB for review. During the evaluation the Product Manager will consider the use patterns when deciding if the new use requires an incremental risk assessment from HED. The incremental risk review assessment by EEB will include an assessment of risk to listed species.

The "me too" and supplemental registration (distributors) and the "me-too" minor changes amendments to product registration will rarely require a listed species review. These types of registrations are not expected to result in adverse effects to listed species because the risks from the above actions should be no greater than risks posed by currently registered products. However, there are certain pesticides and use patterns that should be considered as exceptions. Minor changes in products intended for use as mosquito larvicides, aquatic herbicides, piscicides or for forest uses should have an assessment of risk to listed species. Included in the list would be minor formulation changes for pesticides aerially applied to forests and all product minor changes for rodent (non-domestic uses) and predator control.

In order to ease identification of minor product changes, RD and HED will develop a screening process to establish criteria for determining product/uses requiring listed species review.

2. Experimental Use Permits

All experimental use permits (EUPs) for new chemicals will require a review by EEB. As part of that review, EEB will make the necessary risk assessment for listed species. EUPs for the purposes of gathering data to support an additional use(s) for a previously registered pesticide will be screened by the Product Manager to determine if the application needs to be reviewed by EEB. As a rule of thumb, any application the Product Manager decides would require an ecological effects assessment will also require an assessment for listed species.

3. Requests for Emergency Exemptions

Evaluations of emergency requests for specific exemptions will proceed expeditiously following currently prescribed guidelines. Included in this evaluation are concerns for whether the emergency request will impact adversely on listed species. Moreover, the states are obliged to include information on listed species as part of their submission.

Following its initial review, the Emergency Response Team will determine whether an EEB review is required. Generally these requests for review would be for use patterns which have not previously been reviewed by EEB. However, because of the emergency nature of this program which may sometimes require an immediate response (e.g. crisis situation), HED will be expected to give priority considerations to these types of requests. It is anticipated that these types of situations will be the exception rather than the rule.

4. Special Local Need (SLN)

All SLN registration requests are reviewed by the Product Managers to determine if the registration poses a potential threat to a listed species. RD expects the states to be informed of this requirement and, therefore, should have submitted appropriate data with which to make this type of review. A screening process to identify the types of SLNs for review may be developed jointly by RD and HED in conjunction with the screening activities under No. 1 above.

B. Hazard Evaluation Division (HED)

The four types of registration requests are submitted to EEB, each with its own due date for completion of the evaluation. The Experimental Use Permits and SLN requests have statutory deadlines of 120 days and 90 days, respectively, and therefore, must have reviews completed within the assigned RD due dates. Emergency exemption requests must also be handled within a very short time frame, and thus, the need for HED to expedite its decision on these actions as quickly as possible.

The EEB has developed a step-by-step procedure for evaluating pesticidal hazard to listed species. This procedure is essentially similar whether addressing Section 3, 5 or 18, or 24(c) actions. (A flowchart depicting this procedure is found on page 9 of this SOP).

Incorporated into each EEB review format is a section entitled "Endangered Species Considerations". EEB maintains reference materials for use by reviewers in researching information on listed species. These materials include the following:

1. OES Federal Register Notices on the status of endangered species.
2. General information on listed species.
3. Recovery team progress reports.
4. Recovery plans (as they are completed for the various species).
5. Endangered species technical bulletins.
6. Distribution maps for many endangered species.
7. Federally listed species by State.
8. Liaison Conservation Directory for Endangered and Threatened Species.
9. Atlantic Coast Ecological Inventory (31 maps).
10. Pacific Coast Ecological Inventory (30 maps).

In addition to reviewing published documents on listed species, EEB reviewers make direct contact with key persons in the field regarding the status of a particular species, the likelihood of pesticidal exposure and other pertinent information. These contacts may be personnel with state fish and game or agriculture departments, Federal Fish & Wildlife programs, U.S. Department of Agriculutre, county agents, university or other private researchers. The name of the individuals contacted and their affiliation is incorporated into the review. Reviewers collect information from as many sources as seem practicable (including the applicant) to assist in making a hazard assessment statement relative to any impact the pesticidal use may have upon a listed species.

On page 9 the flow chart and explanation has been modified to show the steps involved within the EEB in addressing listed species concerns. Use of this chart enables reviewers to "screen out" those use patterns that do not present a hazard to listed species. The scheme is structured so that decisions concerning hazards to a particular species for the most obvious no-hazard use patterns can

be made quickly without a lot of justification. The more difficult use patterns must undergo further scrutiny. Use of this flow chart employs two major considerations in determining whether or not a proposed use poses any hazard to a listed species. They are: (1) whether or not the species is likely to be exposed to the chemical and (2) whether or not such exposure will have any effect on the organism or its environment. In order for a hazard to exist, both criteria must be satisfied simultaneously as one without the other does not constitute a hazardous situation.

C. Governmental Liaision

In the process of making a registration review, EEB may make telephone contacts with OES or NMFS staff to solicit information on species distribution, and status. This contact constitutes "informal consultation". If there is a "no effect" determination, this is incorporated into the EEB/HED review.

Position

When, in the judgment of a Branch reviewer and his supervisors there may be pesticidal impact upon a listed species, a request for formal consultation and a copy of the completed EEB review, [whether a Section 3, 5, 18 or 24 (c)], will be transmitted to the appropriate agency. Upon receipt of a formal request for consultation, OES or NMFS will proceed through the consultation process and issue a biological opinion within 90 days unless an extension of time is agreed upon. Initiation of the formal consultation will include the following steps:

1. When an EEB reviewer has, with the EEB Peer Group concurrence, determined that a pesticide proposed for use in any regulatory action will pose a hazard to a listed species, with his Section Head and Endangered Species Coordinator, he/she prepares a transmittal letter formally requesting consultation for the Branch Chief's signature. A copy of this letter is sent to the Product Manager in RD informing him of this action.

2. Such consultation will be sought by EEB as early as possible in the review process, and to that end, Product Managers are to provide EEB reviewers with necessary data and information in a timely manner to avoid undue delays. OES and NMFS are authorized 90 days for review: this 90-day clock would start on the date of receipt and acknowledgement of the request for consultation. After consultation is initiated, EEB is expected to renegotiate with RD (via Process Coordination Branch) a new completion date for the EEB review.

3. The letter will be directed normally to the OES or NMFS in Washington, D.C., for activities spanning the entire United States or which overlap OES or NMFS regional lines. For limited scope programs, such as Section 18 exemptions or SLN actions, the request shall be directed to the appropriate FWS or Department of Commerce region

by HED after mutual agreement with the OES or NMFS/ Washington, D.C. When regional offices of FWS or NMFS are formally consulted, copies of any correspondence shall be sent to the respective Washington, D.C. office.

4. When a request for formal consultation is imminent, EEB reviewers should alert Product Managers in RD. This is especially true for emergency exemption requests.

Each request to OES or NMFS will contain the following types of information:

1. A formal request paragraph.

2. A brief indication of the particular hazard of concern--pesticide, toxicity, use pattern, etc.

3. An indication of the supporting data which accompany the request. If confidential information must be included, procedures estalbished in the OPP Security Manual must be followed.

4. A list of the particular endangered or threatened species which the RD or HED believes may be affected. If lengthy, the list may be appended to the letter, rather than included in the body of the letter.

5. Any specific considerations or problems which RD or HED believes should be addressed in the consultation process.

6. Names of EEB personnel to contact in case there are questions.

The EEB reviewer shall provide as much information as possible to the OES or NMFS, including acute and chronic toxicity data, chemistry and environmental chemistry studies relating to bio-accumulation, persistence, and degradation of the pesticide residue profiles and/or estimated environmental concentration, and any other studies deemed to be relevant to their review.

All data must be carefully screened by EEB to ensure that confidential data, if necessary to the review, are clearly marked. If not necessary, the data should not be forwarded. Note: Without specific indication to the contrary, all data become part of the administrative record, and, as such, are available for public inspection.

After signature, EEB forwards copies of the memorandum to the RD Product Manager for the record. EEB shall retain a copy and will maintain adequate files and records to track future responses by OES or NMFS.

The consultation package (letter and supporting data) shall be forwarded to OES or NMFS by EEB who will also notifiy respective personnel by phone of the forwarding consultation request.

D. Post-Consultation Activities in RD and HED

Within 90 days after receipt, the OES or NMFS will send EEB, a biological opinion concerning the impact, if any, of the pesticide on the listed species. The EEB reviewer and Peer Group will consider the findings of the opinion. "Further consultation" may be necessary to clarify statements within the opinion. If the opinion indicates no jeopardy to the species from use of the pesticides, the reviewer will proceed with the normal review of the application and subsequent notification to the RD Product Manager. OES and NMFS will forward copies of biological opinions to respective regional offices so that Endangered Species Specialists in the field are fully appraised of actions taken.

Once RD receives the HED review which indicates that a listed species may be jeopardized by the use of the pesticide, a number of regulatory options are available to the Product Manager:

1. Geographical, timing, frequency, or other labeling restrictions may be imposed on the registration, EUP, or emergency exemption. In the case of SLN registrations, disapproval of the registration may be recommended, and if so, the state should be notified immediately by telephone.

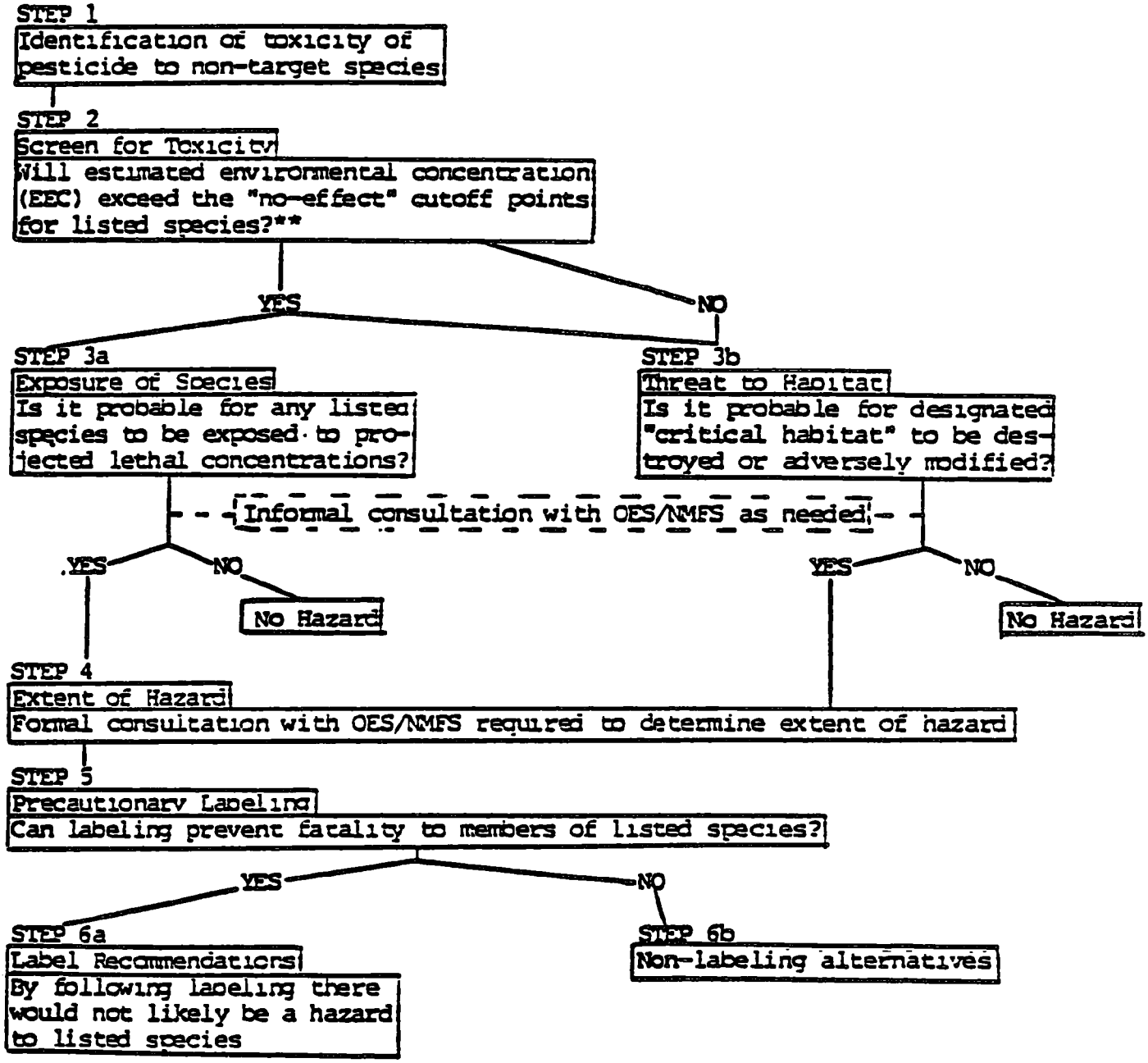
2. Classification as a Restricted Use Pesticide.

3. Initiation of an RPAR procedure. If this is the choice, the Product Manager will refer the product as an RPAR candidate and will attach a copy of the consultation opinion with EEB's recommendation establishing the basis for RPAR. This avoids duplication of effort by SPRD personnel who will not have to refer the action for formal consultation again.

If further information is required which is not available within RD files, or has not been submitted by the applicant, the application shall be considered deficient. Based on the HED review, the Product Manager will notify the registrant or applicant of the need for additional data and, when received, shall submit the additional information to HED for another review. The process proceeds as previously described. If additional information bearing on the previous action is submitted to the Agency, via Section 6(a)(2) requirements or in a subsequent application for regulatory action, these procedures must be followed when reopening the consultation process.

EVALUATING RISK TO ENDANGERED/THREATENED* SPECIES FROM PESTICIDE REGISTRATION ACTIONS

(See attached written explanation for each step)



*also referred to as listed species

** 1/5th the lowest mammalian acute oral LD_{10} or LC_{10}; 1/5th the lowest avian subacute dietary LC_{10} or LD_{10}; 1/10th the lowest aquatic acute LC_{10}. Where LC_{10}, or LD_{10} are not available, 1/10th the mammalian LD_{50} or LC_{50}, 1/10th the avian LC_{50} or LD_{50} or 1/20th the aquatic LC_{50}.

RD shall supply HED (EEB) a copy of the final finished labeling for products which have jeopardy opinions to one or more listed species.

E. IMPLEMENTATION

Implementation of this procedure is effective immediately.

F. FUTURE MODIFICATIONS

In the event that some aspect of this procedure is in need of modification, this document may be adjusted at anytime by the Registration Division upon mutual agreemnt between the implementors and the Registration Division.

Step 1

Identification of toxicity of pesticide to nontarget species

From test data submitted or referenced by the registrant, the toxicological impact, if any upon nontarget species is determined. Extrapolations are made from the results of basic required fish and wildlife studies and other validated test data .

Step 2

Screen for toxicity

The question is asked, " will the estimated environmental concentrations (EEC) exceed the 'no-effect' cutoff points for listed species? "

Likelihood of hazard

Fish and wildlife are constantly being exposed to many naturally occurring compounds that would cause mortality or ecological disturbance if present at high enough concentrations. Therefore, even though the chemical is toxic to the organism and there is the likelihood of exposure to the organism, sufficient concentrations of the pesticide must be available to constitute a hazard. The obvious question: "How does one go about determining what is a sufficient concentration?"

Since it is impossible to obtain LC_{50} or LD_{50} data for listed species, we must assume that the sensitivity of these species is similar to that of indicator organisms used in current test protocols. Although this may or may not be the case, it would seem appropriate, when using these data for assessing hazard to listed species, that some "safety factor" be built into the evaluation process. Since even the loss of one individual of listed species may be unacceptable, some might argue that all hazard evaluations should be based on LC_1 (i.e., lethal concentration required to kill one percent of the population). However, due to the difficulty in actually determining an LC_1, it is proposed that the more reliable LC_{10} be used. The following risk criteria for establishing "no-effect" cut off points would be:

1. Mammals - Occurs as a residue immediately following application in or on the feed of a mammalian listed species likely to be exposed to such feed in amounts equivalent to the average daily intake of said species, at levels less than 1/5 the acute oral LD_{10}, or LC_{10}, measured in mammalian test animals as specified in the Registration Guidelines.

2. Birds - Occurs as a residue immediately following application in or on the feed of an avian listed species likely to be exposed to such feed in amounts equivalent to the average daily intake of said species, at levels less than 1/5 the subacute dietary LC_{10} or LD_{10} measured in avian test animals as specified in the Registration Guidelines.

3. Aquatic Organisms - Results in a maximum calculated concentration in (a) or (b) below of less than 1/10 the acute LC_{10} for aquatic organisms likely to be exposed as measured in test animals specified in the Registration Guidelines:

   (a) following direct application to a 6-inch layer of water or;

   (b) in the habitat(s) of concern (habitats of listed species).

4. Chronic Effects - There are no known reproductive or other chronic effects to indicator species at levels expected in the habitat(s) of concern.

Step 3a

Exposure of species

If the answer to 2 above is "yes", proceed to step 3a Exposure of Species where the question is asked, "Is it possible for any listed species to be exposed to projected lethal concentrations?" A search is made of Branch records and other available sources of information to identify listed species within proposed treatment areas. Branch reviewers may informally consult with OES and other persons knowledgeable of current listed species distribuation. Based on the criteria indicated in Step 2, a determination is made whether or not that use of the pesticide product, as proposed, may affect any listed species.

If the answer to Step 2 above is "no", proceed to Step 3b - Threat to Habitat, and answer the question, "Is it possible for designated critical habitat to be destroyed or adversely modified?" Again, as needed, informal consultation may be made with OES and other pertinent sources to solicit the most current information on critical habitat. If there is a "No" answer to the questions asked in Steps 3a and 3b, a "No hazard" determination is made.

Step 4

Extent of Hazard

If "Yes" is answered to Steps 3a or 3b, then a formal consultation, as required within the Endangered Species Act, is initiated by EEB. This consists of a letter of request to the Chief, Office of Endangered Species, accompanied by a copy of the Branch review of the pesticide product and other supporting documentation (i.e., wildlife, fish kills attributable to use of the pesticide).

OES or NMFS, upon acknowledgement of the consultation request, prepares a written "biological opinion" within 90 days. They may request clarification or more data to facilitate the preparation of the written opinion. On occasions they may request an extension of time beyond the 90 days.

Their written opinions summarize the nature of the request (pesticide toxicological properties, use patterns, listed species considered and listed species for which there is a jeopardy and no jeopardy opinion.

Step 5

Precautionary Labeling

When there is a jeopardy opinion the question is asked, "Can labeling prevent fatality to members of listed species?". If "Yes" proceed to Step 6a - Label Recommendations with appropriate labeling to avert jeopardy to the species identified within the "biological opinion".

If "No", non-labeling alternatives must be investigated. These include, but are not limited to, the following: clarification of the reasonable and prudent alternatives with OES, involvement of the registrant to seek means to avert exposure of listed species (which may suggest an alteration in the use pattern, restriction of the pesticide to specific sites only and/or use by certified applicators only), suggest field studies to demonstrate safe usage at prescribed label rates exposing species most representative of listed species of concern, refer for RPAR.

Summary of endangered species considerations for cluster reviews

Summary of Endangered Species Considerations for the Corn Cluster Review

1. Description of Ecological Effects Branch Review

The EEB considered the following pesticides that are used on field corn:

Selected pesticides used or proposed for use on field corn - those exceeding a listed species trigger. *

Kelthane	Mancozeb	Phosdrin	Oftanol
Propachor	Disyston	Dasanit	
Methoxychlor	Dimethoate	Trifluralin	
Dinoseb	Ethoprop	Dyfonate	
EPN	Methyl Parathion	Carbaryl	
Phorate	Ethyl Parathion	Malathion	
Diazinon	Trichlorfon	Guthion	
Carbophenothion	Ethion	Chlorpyrifos	
Piperonyl Butoxide	Pyrethrin	Rotenone	
Endosulfan	Toxaphene	Carbofuran	
Propargite	Terbufos	Oxyfluorfen	

* These chemicals exceeded 1/10th the mammalian LD50 or LC50, 1/10th the avian LD50 or LC50, or 1/20th aquatic LD50or LC50. For granular pesticides, the trigger for avian species is the number of granules required to reach 1/10th LD50. However, these triggers are not considered serious if the number of granules required to reach 1/10 LD50 is more than an avian species would conceivably ingest.

Pesticides registered on field corn - chemicals with low order toxicity or exposure.

BHC	Lindane	Dalapo
Dicamba	Chloramben	1-3-Dichloropropene
2-4-D	Diuron	Linuron
Busan	CDEC	EPTC
Vernam	Butylate	Maleic hydrazide
Trichlorfon	Metasystox-R	Imidan
2-phenylphenol	Paraquat	Hexachlorobenzene
Cube resins	Avitrol	Alkyl dimethyl benzyl ammonium Chloride
Cryolite	Sulfur	Sulfaquinoxaline
Diallate	Thiram	Ametryn
Atrazine	Simazine	Captan
Chloropicrin	Captafol	Methomyl
Alachlor	Benomyl	Cyanazine
Mesurol	Metribuzin	Mesurol
Metribuzin	Glyphosate	Ethioate
Bentazon	Bifenox	Pendimethalin
Metolachlor	Isofenphos	

Pesticides registered on field corn - chemicals with little or no information.

Ethanol	Maneb	Calcium arsenate
Zineb	CDAA	Trichlorbenzyl chloride
Copper	ammonium	Sabadilla alkaloids
Cyclohexanone	Butonate	copper salts
Alkanolamine	Triethanolamine	Tetrasodium ethylenediamine tetracetate
essential oils	Acetic acid	Isopropanol
Metaldehyde	Bufencarb	N-Octyl bicycloheptene dicarboximide
Pine oil	Hyanodine	Halazone
Chlorbromuron	Cyprazine	Landrin

2-Benzyl-4-chlorophenol
4-chlor-2-phenylphenol
6-chloro-2-phenylphenol
4-tert-amylphenol
4-chloro-2-cyclopentyl
N,N-Bis(2-hydroxyethyl)lauramide
Trethanolamine dodecylbenzene sulfonate

EEB determined that listed mammals, insects, and reptiles would not be exposed to pesticides used on corn. Listed plants were found to be unaffected by their use since they are not associated with cultivated areas. A number of avian and molluscan species and one amphibian were found to have a "may affect" status.

The consultation on this cluster was initiated on December 2, 1982.

2. Consultation Conclusion

The FWS (FWS/OES EPA-83-2, May 18,1983) determined that the use of certain pesticides on corn "would likely jeopardize the continued existence of the following species":

peregrine falcon (Falco peregrinus)

The FWS concluded that the use of Kelthane, or any other product with high levels of a DDT compound, would likely affect this species. The opinion reflected the extensive documentation of reproductive failure in raptors caused by DDT and its principal metabolites. It was noted that Kelthane in corn alone would not necessarly create a jeopardy situation; however because it is used on other crops a cumulative effect might result and the species could be threatened. So that jeopardy could be avoided, the Service recommended that Kelthane should be manufactured to eliminate the DDT component or a substitute should be used.

Attwater's greater prairie chicken (Tympanuchus cupido attwateri)

Corn fields are used by this species between May and September for foraging and cover. These birds were considered to be "potentially exposed" to granular and liquid pesticides during this period. Although the range of the chicken overlaps corn areas in only two counties, these areas represent 41 percent of the total population. As a reasonable and prudent alternative, the Service recommended that pesticides that are toxic to avian species should not be used within 1/4 mile of the range of the Attwater's greater prairie chicken (T. cupido attwateri) in the

two counties mentioned above.

Aleutian Canada goose (Branta canadensis leucopareia)

Poisoning of this species could occur as a result of ingesting contaminated insects, browsing of emerging corn plants, or picking up concentrated pesticide granules. To avoid jeopardy, the FWS recommended that the use of non-granular formulations be prohibited between August 30 and mid-May in portions of California and Oregon. A recommendation was made that granular formulations should be prohibited totally in the closure areas cited in the opinion.

Everglade kite (Rostrhamus sociabilis plumbeus)

The principal threat to the kite from the use of pesticides on corn would be the possible reduction of their main food supply, the apple snail. The Service recommended that aerial applications of "implicated pesticides" be eliminated or that a buffer zone of 1/4 mile between aerially treated areas and areas draining into the known habitat be provided, and/or prohibit ground application of "implicated pesticides" closer than 100 yards from known habitats.

slackwater darter (Etheostoma boschungi)

This fish is threatened with "degradation of surface and ground water caused by the intrusion of toxins, pesticides, and fertilizers, as well as in industrial and domestic wastes..." Farming is the principal industry surrounding the darter's habitat. The event of a small chemical spill could be devasting for a breeding population since breeding habitat is so limited. The Service recommended that aerial application be eliminated or provide a buffer zone of 1/4 mile, and/or prohibit use of "implicated pesticides" by ground application closer then 100 yards from aquatic habitats of this species.

Alabama lamp pearly mussel (Lampsilis virescens)
Appalachian monkey-face pearly mussel (Quadrula sparsa)
Cumberland monkey-face pearly mussel (Q. intermedia)
dromedary pearly mussel (Dromus dromas)
birdwing pearly mussel (Conradilia caelata)
green-blossom pearly mussel (Epioblasma torulosa gubernaculum)
turgid-blossom pearly mussel (E. turgidula)
tan riffle shell (E. walkeri)
pale lilliput pearly mussel (Toxolasma cylindrella)
fine-rayed pigtoe (Fusconaia cuneolus)
shiny pigtoe (F. edgariana)
Cumberland bean pearly mussel (Villosa trabalis)

The major concern regarding the impact of pesticides on mussels was focused on the toxic affect on the larval glochidia and on-host fish. Larval mussels attach themselves to the surface of a host fish shortly after being released from the adult female mussel. Since many of the pesticides used on corn are toxic to fish and/or aquatic invertebrate species, the potential exists for these pesticides to be a detriment to either the larval forms or host fish. To avoid jeopardy, the Service recommended, regard-

ing implicated pesticides, elimination of aerial application or to provide a buffer zone of 1/4 mile around aquatic habitat, and/or prohibit the use of ground application closer than 100 yards from the habitat. It was suggested that studies be initiated to "...produce data regarding the toxicity of certain pesticides to freshwater mussels and on actual EEC values in the habitat of Cumberlandian mussels."

woundfin (Plagopterus argentissimus)

Fifty percent of the woundfin (P. argentissimus) population is found in areas where irrigation water is returned to the river. One serious threat then, is contamination of this water with pesticides toxic to fish. Since corn is grown in close proximity to woundfin habitat, there is the potential of exposure to pesticides that are used on corn. Jeopardy to this fish would be precluded if those chemicals toxic to fish were not used "...in the Virgin River drainage 40 miles either side of the Virgin Narrows..."

valley elderberry Longhorn beetle (Desmocerus californicus dimorphus)

One of two beetles found in agricultural areas, this insect is only susceptible during its adult stage from late April to mid-May. The Service recommended restricting the use of insecticides during this time with special precautions to be taken to protect the elderberry tree, in which it spends most of its life.

delta green ground beetle (Elaphrus viridis)

Since part of this beetle's habitat has been converted to agriculture, pesticides use is a serious threat to the species. The Service recommended prohibition of "any pesticide toxic to carabid insects" within Solano county, California.

Solano grass (Orcuttia mucronata)

This species could be threatened by herbicides use, either from aerial spraying or runoff. The greatest danger was from those chemicals that hinder germination. As a precaution to guard against jeopardy, the Service recommended that the use of any herbicide toxic to graminoides should be prohibited within sections of Solano county, California.

The FWS considered that for the following species, there would be "some degree of adverse impact" , but that it was not serious enough to jeopardize their existence:

gray bat (Myotis grisescens)
Indiana bat (Myotis sodalis)

The threat to these bats is ingesting insects which have been exposed to pesticides. Since many insects are consumed in a feeding period, the potential for bioaccumulation is high. It was noted in the opinion that "[r]ecent studies have documented mortality and probable population decline in gray bats [Myotis grisescens] resulting from routine pesticide usage." The Service suggested a monitering program be established to test for the top

eight insecticides in bat guano.

whooping crane (Grus americana)
The Service determined that "...[w]hile a number of corn pesticides are know to be toxic to birds, it is not believed that they are likely to cause any significant adverse effect on whooping cranes (G. americana).

Cape Sable seaside sparrow (Ammospiza maritima mirabilis)
The principal threat to these species from pesticides is contamination of their food sources. Unless land use patterns and agricultural and water manangement patterns change radically, this threat is considered unlikely since most of the impact of pesticides are dampened by the buffering effects of wetlands.

Blunt-nosed leopard lizard (Gambelia silus)
The Service determined that pest control in agricultural areas would be detrimental to populations of this species. The most serious threat would come from a reduction in its food source or ingestion of poisoned prey. The use of pesticides in the range of the lizard was considered insufficient grounds "to support jeopardy", even though adverse impacts could occur.

pine barrens treefrog (Hyla andersonii)
The contamination of prey insect species and water quality degradation of tadpole habitat were cited as the principal threats to the species as a result of pesticide use on corn. The Service recommended that pesticides known to be hazardous to aquatic organisms "...be used only after consultation with a county extension agent who will recommend their use concerning location, form, and rate to prevent aquatic contamination in watersheds within..." the habitat of the treefrog.

Houston toad (Bufo houstonensis)
This species was considered not likely to come in contact with corn pesticides.

Colorado River squawfish (Ptychocheilus lucius)
This species was considered unlikely to be seriously harmed because contamination would be quickly diluted and the species is relatively widespread.

Alabama cavefish (Speoplatyrhinus poulsoni)
The opinion cited that the one threat to the species would be be groundwater contamination as a result of pesticides pollution. So that the species would be conserved, the Service recommended that "pesticides toxic to fish should not be used with in the watershed affecting key cave."

slender chub (Hybopsis cahni)
spotfin chub (H. monacha)
Bayou darter (Etheostoma rubrum)
yellowfish madtom (Noturus flavipinnis)
snail darter (Percina tanasi)

These species are threatened by a number of factors, some of which are related to pesticide use. So that the conservation of these species would be furthered, the Service recommended that aerial application of "implicated pesticides" be eliminated or a buffer zone of 1/4 mile be provided between aerially treated areas and the aquatic habitat of these species, and/or prohibit the use of "implicated pesticides" by ground application closer than 100 yards from their habitats.

salt marsh bird's beak (Cordylanthus maritimus ssp. maritimus)
evening-primrose (Oenothera deltoides ssp. howellii)

The habitat of these two species is close to corn growing areas and therefore "both may be vulnerable to the use of corn pesticides." However, since the habitat buffers the species from most harm, the impact from pesticides was considered negligible. The accumulated effect of many different pesticides was considered a potentially harmful impact. The Service recommended contacting county extension agents regarding the use of pesticides in or near the habitat of these plant species.

On November 2, 1983, a letter was sent from OES to EEB to address modifications of some of the conclusions in the corn cluster biological opinion. These changes were that 1) the effects of DDT in Kelthane would be determined on a case-by-case basis instead of considering contamination levels of less than one percent as insignificant, 2)the area where pesticide use was to be restricted to protect the Aleutian Canada goose (Branta canadensis leucopareia) was greatly reduced, and 3)the buffer zones prescribed for aerial application and ground application were reduced to 100 yards and 20 yards respectively.

Summary of Endangered Species Considerations for the Cluster Review for cotton, soybean, sorghum, and small grains (wheat, barley, oats, and rye)

1. Description of Ecological Effects Branch Review

The EEB review of each of these crop clusters was done individually, and then considered together as one consultation.

cotton

The EEB considered the following pesticides that are used on cotton:

Selected pesticides used or proposed for use on field cotton - those exceeding a listed species trigger. *

Kelthane	Disulfoton	Dasanit
Naled	Dimethoate	Trifluralin
Dinoseb	Endrin	EPN
Methyl parathion	Carbaryl	Phorate
Parathion	Malathion	Diazinon
Dipterex	Azinphos methyl	Carbophenothion
Ethion	Chloropyrifos	Imidan
DEF	Toxaphene	Captan
Methomyl	Aldicarb	Methidathion
Fenamiphos	Diflubenzuron	Pydrin
Permethrin	Curacron	Thiodicarb
Payoff		

Pesticides registered on field cotton - chemicals with low order toxicity or exposure.

arsenic acid	Lindane	Fumazone
Cacodylic acid	Sodium cacodylate	DSMA
MSMA	EBDC	Maneb
EBDC	Chloropropham	Chloroneb
Sodium dalapon	1,3-Dichloropropene	1,2-Dichloropropene
Dichloran	Perthane	Dexon
Ferbam	Dicrotophos	Floumeturon
Diuron	Linuron	Busan 30
Diphenamid	Dioxathion	Endothal
Eptam	Giberellic acid	1-Naphthaleneactic acid
Demeton	Metasystox-R	Pentachloronitrobenzene
Azodrin	Chlodimeform	Hexachlorobenzene
Piperonyl butoxide	Aluminum phosphide	Paraquat dichloride
Pyrethrins	Nitrapyrin	methyl isothiocyanate
Rotenone	Cryolite	Sulfur
Tetradifon	Thiram	Atrazine
Prometryn	Chloropicrin	Captafol
Chlorothalonil	Dichlorvos	Terrazole
Xylene	Carboxin	Alachlor
Carbofuran	Bladex	Dinitramine
Acephate	Glyphosate	Oryzalin

Dipropetryn	Norflurazon	Methazole
Perfluidone	Pendimethalin	Fluchloralin
Metolachlor	Moepiquat chloride	Morpafos
Luretape	Metalaxyl	Gossyplure HF
Hexadecanal	Tetradecanal	Methyl alpha-eleostearate octadecatrienoic acid
2,11-Hexadecanal	2,9-Tetradecanal	2,11-Hexadecanal
2,7-Hexadecanal	2,9-Hexadecanal	Fluazifop-butyl

Pesticides registered on field cotton - chemicals with little or no information.

Lanstan	MAMA	Bacillus thuringiensis
Zineb	Copper(metallic)	4-chloro-3,5-xylenol
Dibutyl phthalate	Chlorobenzilate	Aromatic petroleum distillate
cottonseed oil	Butonate	Heavy aromatic naphtha
Norea	Planavin	Alkanol amine dinoseb
Ethylene	Ethylene dibromide	Ethylene glycol bis
Hydrocyanic acid	Methyl bromide	Indole-3-butyric acid
Morpholine	Morpholine	Methylated nahthalenes
Kerosene	Sodium chorate	xylene range aromatic solvent
Folex	Sulfuric acid	Zinc 2-pryidinethiol 1- oxide
Dacthal	Butralin	Magnesium phosphide

Monosodium 2,2'-methylenebis (3,4,6-trichlorophenate)
Methylated aromatic petroleum derivatives
2-methyl-1-naphthaleneacetic acid
2-methyl-1-naphthaleneacetamide
N-octyl bicycloheptene dicarboximide
Chlordimeform hydrochloride
Petroleum distillate
Polypropylene glycol
cube resins other than rotenone

soybean

The EEB considered the following pesticides that are used on soybeans:

Pesticides registered on soybeans - those exceeding a listed species trigger.*

Propachlor	Cuprous Oxide	Basic Copper sulfate
Disyston	Dasanit	Methoxychlor
Naled	Dimethoate	Dicrotophos
Trifluralin	Dinoseb	Ethoprop
EPN	Methyl Parathion	Carbaryl
Phorate	Parathion	Malathion
Diazinon	Trichlorfon	Carbophenothion
Guthion	Chlorpyrifos	Endosulfan
Toxaphene	Methomyl	Carbofuran
Propargite	Aldicarb	Nemacur
Topsin	Dimilin	Fluchloralin
Thiodicarb		

Pesticides registered on soybeans - chemicals with low order

toxicity or exposure.

Lindane	Maneb	1,3-Dichloropropene
Zineb	Copper sulfate	Chloroxuron
Chloroneb	Sodium dalapon	Sodium chloramben
Diquat dibromide	Ferbam	Diuron
Linuron	Diphenemid	CDEC
Vernam	PCNB	Thiabendazole
Aluminum phosphide	Paraquat bis	Hexachlorobenzene
Sulfur	Diallate	Thiram
Captan	Chloropicrin	Chlorothalonil
DDVP	Terrazole	Xylene
Carboxin	Alachlor	Benomyl
Metribuzin	Acephate	Roundup
Oryzalin	Bifenox	Norflurazon
Metolachlor	Hoelon	Pendimethalin
Oxyfluorfen	Mefluidide	Sodium acifluorfen

Isopropyl N-(3-chlorophenyl) carbamate
2-Chloro-N-isopropylacetanilide
Alkanolamine 2,4-dichlorphenoxyacetate
Sodium N-1-naphthylphthalamate
Hypophosphorous 2-(4-thiazolyl)benzimidazole

Pesticides registered on soybeans -chemicals with little or no information.

Chevron 100	Barban	streptomycin sulfate
Copper (metallic)	Copper hydroxide	Copper (ammonia complex)
Dibutylphthalate	Magnesium dalapon	Copper ammonium carbonate
Norea	Sodium dinoseb	Bacillus thuringiensis
Planavin	Ethylene	Heavy aromatic naphtha
Ethylene dibromide	Methyl bromide	Ammonium chloramben
Paraquat bis	Kerosene	Piperonyl butoxide
Cube resins	sodium chlorate	Methylated naphthalines
Dacthal	Fluorodifen	4-Chloro-3,5-xylenol
Chlorbromuron	Butralin	Triethanolamine dinoseb
Magneium phosphide	Cytokinins	Alkanolamine dionseb

Aromatic petroleum derivative solvent
Dimethylamine 2,3,5-triiodobenzoate
N.N Diallyl-2-chloroacetamide
Dimethylamine 4-(2,4-dichlorophenoxy) butyrate
Copper from cuprous and cuprous oxide
Aliphatic petroleum hydrocarbons

sorghum

The EEB considered the following pesticides that are used on sorghum:

Selected pesticides used or proposed for use on sorghum - those exceeding a listed species trigger. *

Propachlor	Disyston	Dasanit
Dimethoate	Trifluralin	Fonofos
M. Parathion	Carbaryl	Phorate
Parathion	Demeton	Diazinon

Carbophenothion	Ethion	Chorpyrifos
Toxaphene	Atrazine	Carbofuran
Aldicarb	Cyanazine	Methidathion
Bifenox	Terbufos	

Pesticides registered on sorghum - chemicals with low order toxicity or exposure.

Lindane	Mancozeb	Zineb
Phosdrin	Sodium dalapon	Magnesium dalapon
sodium MCPA	2,4-D	salts and esters of 2,4-D
Diquat dibromide	Methoxychlor	1,3-Dichloropropene
Fenaminosulf	Diuron	Dimethylamine decamba
Linuron	Heptachlor	Malathion
Metasystox R	Hexachlorobenzene	Paraquat
aluminum phosphide	Piperonyl butoxide	Pyrethrins
Nitrapyrin	Rotenone	Sulfur
Propionic acid	Thiram	Propazine
Terbutryn	Captan	Chloropicrin
Captafol	Terrazole	Methomyl
Isobutyric acid	Glyphosate	Ammonium isobytyrate
Metolachlor		
Pentachloronitrobenzene		

Pesticides registered on sorghum - chemicals with little or no information.

Chevron 100	Benzoic	Bacillus thuringiensis
Polyram	Carbon disulfide	Heavy aromatic naphtha
Copper carbonate	Dibutyl phthalate	Carbon tetrachloride
Magnesium dalapon	Sodium dicamba	Ethylene dibromide
Ferbam	Busan	Ethylene dichloride
ethylene	Norea	Formaldehyde
Acetic acid	sodium diacetate	Isopropanol
Methyl bromide	Kerosene	Methylated naphthalenes
Mineral oil	Cube resins	Phenyl mercuric acetate
Silicon dioxide	Sodium chlorate	Calcium cyanide
Sulfur	Sulfur dioxide	sulfuric acid
Xylene	Pentane	4-Chloro-3,5-xylenol
Magnesium Phosphide		
Aromatic petroleum derivative solvent		
N,N-Diallyl-2-chloroacetamide		
Sodium dimethyl dithiocarbamate		
Sodium-2-mercaptobenzothiazole		
Aliphatic petroleum hydrocarbons		
Xylene range aromatic solvent		

<u>small grains</u>

The EEB considered the following pesticides that are used on small grains (wheat, barley, oats, and rye).

Selected pesticides used on small grains - those exceeding a listed species trigger.*

Trifluralin	Dinoseb	2,4-D(Isooctyl ester)

Endrin	Carbaryl	Methyl Parathion
Phorate	Malathion	Parathion
Guthion	Trichlorfon	Endosulfan
Toxaphene	Carbofuran	Disyston

Pesticides registered on small grains - chemicals with low order toxicity or exposure.

Lindane	Nabam	Basic Copper Sulfate
Dithane	Maneb	Zineb
Metiram	Phosdrin	Copper carbonate
Copper sulfate	Sodium dalapon	1,3- dichloropropene
Dicamba	Sodium dicamba	Dimethylamine dicamba
2,4-D	MCPP	MCPA
Methoxychlor	Ferbam	SDDC
Linuron	Diuron	Bromoxynil Butyrate
Busan	Butonate	Ethylene dichloride
Formaldehyde	Acetic acid	Sodium diacetate
PCNB	Diazinon	Thiabendazole
Pyrethrins	Piperonyl butoxide	Hexachlorobenzene
Nitrapyrin	Sulfur	Paraquat dichloride
Propionic acid	Triallate	Thiram
Atrazine	Terbutryn	Chloropicrin
Captan	Terrazole	Carboxin
Pentane	Cyanazine	Glyphosate
Avenge	Hoelon	Chlorsulfuron

Metribuzin
Trans-1,2, Bis(propylsulfonyl) ethene

Pesticides registered on small grains - chemicals with little or no information.

Benzoic acid	Carbon disulfide	Bascillus thuringiensis
Barban	Chloroform	Carbon tetrachloride
Copper (metallic)	Copper hydroxide	Dibutyl phthalate
Dimethylamine MCPP	Cottonseed oil	Ethylene dibromide
Methylene chloride	Hydrocyanic acid	Metaldehyde
Methyl bromide	Kerosene	Methyl naphthalenes
Propylene glycol	Aluminum phosphide	Silicon dioxide
Sodium hydroxide	Sulfur dioxide	Sulfuric acid
Ottasept	Xylene	Xylene range aromatic solvent
Chlorbromuron	Isobutyric acid	Magnesium phosphide
Cytokinins	Methyl aromatic	Heavy aromatic naphtha

Aromatic petroleum derivative solvent
Aromatic petroleum distillate
Sodium 2-mercaptobenzothiazolate
Aliphatic petroleum hydrocarbons

* These chemicals exceeded 1/10th the mammalian LD50 or LC50, 1/10th the avian LD50 or LC50, or 1/20th aquatic LD50or LC50. For granular pesticides, the trigger for avian species is the number of granules required to reach 1/10th LD50. However, these triggers are not considered serious if the number of granules required to reach 1/10 LD50 is more than an avian species would conceivably ingest.

EEB determined that listed mammals, insects, and reptiles

would not be exposed to pesticides used on cotton, soybeans, sorghum, and small grains. Listed plants were found to be unaffected by their use since they are not associated with cultivated areas. A number of avian and molluscan species and two amphibians were found to have a "may affect" status.

The consultation of each crop was initiated on the following dates:

cotton - January 26, 1983
soybean - February 28, 1983
sorghum - June 1, 1983
small grains - June 10, 1983

2. Consultation Conclusion

The FWS (FWS/OES EPA-83-3, October 12,1983) determined "that the use of certain pesticides on cotton, soybeans, sorghum, and small grains (wheat, barley, oats, and rye) "would likely jeopardize the continued existence of the following species":

peregrine falcon (*Falco peregrinus*)

The FWS concluded that the use of Kelthane, or any other product with high levels of a DDT compound, would likely affect this species. The opinion reflected the extensive documentation of reproductive failure in raptors caused by DDT and its principal metabolites. It was noted that Kelthane in cotton alone would not necessarily create a jeopardy situation; however because it is used on other crops a cumulative effect might result and the species could be threatened. So that jeopardy could be avoided, the Service recommended that Kelthane should be manufactured to eliminate the DDT component or a substitute should be used.

Attwater's greater prairie chicken (*Tympanuchus cupido attwateri*)

The Service determined that all of the considered crops are grown within the range of this species. "Soybeans fields are utilized primarily from July through September, sorghum from February through August, and wheat and barley from October through March. Cotton fields are not utilized to any significant degree." As reasonable and prudent alternatives, the Service recommended that pesticides that are toxic to avian species should not be used within 1/4 mile of the range of the Attwater's greater prairie chicken (*T. cupido attwateri*) in the two counties mentioned above.

Aleutian Canada goose (*Branta canadensis leucopareia*)

Poisoning of this species could occur as a result of ingesting contaminated insects, browsing on emerging green wheat and barley plants, or picking up concentrated pesticide granules. To avoid jeopardy, the FWS recommended that the use of non-granular formulations be prohibited between August 30 and mid-May in portions of the Central Valley. A recommendation was made that granular formulations should be prohibited totally in those same areas. The exposure of granular phorate in wheat and barley was considered of particular concern.

slackwater darter (Etheostoma boschungi)

This fish is threatened with "degradation of surface and ground water caused by the intrusion of toxins, pesticides, and fertilizers, as well as in industrial and domestic wastes..." Farming is the principal industry surrounding the darter's habitat, with wheat, soybeans, and cotton being important in the area. A minor amount of sorghum is also grown. The event of a small chemical spill could be devasting for a breeding population since breeding habitat is so limited. The Service recommended that aerial application be eliminated or provide a buffer zone of 100 yards, and/or prohibit use of "implicated pesticides" by ground application closer than 20 yards from aquatic habitats of this species.

Alabama lamp pearly mussel (Lampsilis virescens)
Appalachian monkey-face pearly mussel (Quadrula sparsa)
Cumberland monkey-face pearly mussel (Q. intermedia)
dromedary pearly mussel (Dromus dromas)
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pale lilliput pearly mussel (Toxolasma cylindrella)
fine-rayed pigtoe (Fusconaia cuneolus)
shiny pigtoe (F. edgariana)
Cumberland bean pearly mussel (Villosa trabalis)

The major focus regarding the impact of pesticides on mussels was on the toxic affect on the larval glochidia and on host fish. Larval mussels attach themselves to the surface of a host fish shortly after being released from the adult female mussel. Since many of the pesticides used are toxic to fish and/or aquatic invertebrate species, the potential exists for these pesticides to be a detriment to either the larval forms or host fish. To avoid jeopardy, the Service recommended, regarding implicated pesticides, elimination of aerial application or to provide a buffer zone of 100 yards around aquatic habitat, and/or prohibit the use of ground application closer than 20 yards from the habitat. It was suggested that studies be initiated to "...produce data regarding the toxicity of certain pesticides to freshwater mussels and on actual EEC values in the habitat of Cumberlandian mussels."

woundfin (Plagopterus argentissimus)

Fifty percent of the woundfin (P. argentissimus) population is found in areas where irrigation water is returned to the river. One serious threat then, is contamination of this water with pesticides toxic to fish. Since sorghum and small grains are grown in close proximity to woundfin habitat, there is the potential of exposure to pesticides that are used on corn. Jeopardy to this fish would be precluded if those chemicals toxic to fish were not used "...in the Virgin River drainage 40 miles either side of the Virgin Narrows..."

valley elderberry Longhorn beetle (Desmocerus californicus dimorphus)

As one of two beetles found in agricultural areas, this insect is only susceptible during its adult stage from late April to mid-May. The Service recommended restricting the use of insecticides during this time with special precautions to be taken to protect the elderberry tree, in which it spends most of its life.

delta green ground beetle (Elaphrus viridis)

Since part of this beetle's habitat has been converted to agriculture, pesticide use is a serious threat to the species. The Service recommended prohibition of "any pesticide toxic to carabid insects" within Solano county, California.

Kern Primrose sphinx Moth (Euproserpinus euterpe)

The FWS determined that the larvae of this species could be threatened if pesticides use on small grains croplands contaminated their host plant. Herbicides retarding the growth of the host plant and insecticides causing mortality of pupae was also considered a serious threat. To avoid jeopardy, the Service recommended that small grain pesticides be prohibited within 100 yards of the habitat of this species.

Solano grass (Orcuttia mucronata)

This species could be threatened by herbicides use, either from aerial spraying or runoff. The greatest danger was from those chemicals that hinder germination. As a precaution to guard against jeopardy, the Service recommended that the use of any herbicide toxic to graminoides should be prohibited within sections of Solano county, California.

The FWS considered that for the following species, there would be "some degree of adverse impact" , but that it was not serious enough to jeopardize their existence:

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Indiana bat (Myotis sodalis)

The threat to these bats is from ingesting insects which have been exposed to pesticides. Since many insects are consumed in a feeding period, the potential for bioaccumulation is high. It was noted in the opinion that "[r]ecent studies have documented mortality and probable population decline in gray bats [Myotis grisescens] resulting from routine pesticide usage." The Service suggested a monitering program be established to test for the top eight insecticides in bat guano.

whooping crane (Grus americana)

The Service determined that "...[w]hile a number pesticides are known to be toxic to birds, it is not believed that they are likely to cause any significant adverse effect on whooping cranes (G. americana).

Blunt-nosed leopard lizard (Gambelia silus)

The Service determined that pest control in agricultural areas would be detrimental to populations of this species. The

most serious threat would come from a reduction in its food source or ingestion of poisoned prey. The use of pesticides in the range of the lizard was considered insufficient grounds "to support jeopardy", even though adverse impacts could occur.

pine barrens treefrog (Hyla andersonii)

The contamination of prey insect species and water quality degradation of tadpole habitat were cited as the principal threats to the species as a result of pesticide use on corn. The Service recommended that pesticides known to be hazardous to aquatic organisms "...be used only after consultation with a county extension agent who will recommend their use concerning location, form, and rate to prevent aquatic contamination in watersheds within..." the habitat of the treefrog.

Colorado River squawfish (Ptychocheilus lucius)

This species was considered unlikely to be seriously harmed because contamination would be quickly diluted and the species is relatively widespread.

Alabama cavefish (Speoplatyrhinus poulsoni)

The opinion cited that the one threat to the species would be groundwater contamination as a result of pesticides pollution. So that the species would be conserved, the Service recommended that "pesticides toxic to fish should not be used with in the watershed affecting key cave."

slender chub (Hybopsis cahni)
Bayou darter (Etheostoma rubrum)
yellowfish madtom (Noturus flavipinnis)
snail darter (Percina tanasi)

These species are threatened by a number of factors, some of which are related to pesticide use. So that the conservation of these species would be furthered, the Service recommended that aerial application of "implicated pesticides" be eliminated or a buffer zone of 100 yards be provided between aerially treated areas and the aquatic habitat of these species, and/or prohibit the use of "implicated pesticides" by ground application closer than 20 yards from their habitats.

Summary of Endangered Species Considerations for the Forest Cluster Review

1. Description of Ecological Effects Branch Review

The EEB considered the following pesticides that are used on forest areas:

Selected pesticides registered for forestry use that exceed a avian listed species trigger. *

Matacil
Methyl Parathion
Trichlorfon
Acephate
Fenitrothion

Selected pesticides registered for forestry use that exceed a aquatic listed species trigger.*

2,4-DP
Matacil
Methyl Parathion
Carbaryl
Trichlorfon
Fenitrothion
Diflubenzuron

Selected pesticides registered for forestry use that exceed a plant listed species trigger.*

Amitrol
Picloram
Ammonium Sulfamate
Cacodylic acid
Dichlobenil
Dalapon
2,4-DP
Mylone
Diphenamid
EPTC
Paraquat
Atrazine
Simazine
Glyphosate
Fosamine ammonium
Hexazinone

* These chemicals exceeded 1/10th the mammalian LD50 or LC50, 1/10th the avian LD50 or LC50, or 1/20th aquatic LD50 or LC50. For granular pesticides, the trigger for avian species is the number of granules required to reach 1/10th LD50. However, these triggers are not considered serious if the number of granules required to reach 1/10th LD50 is more that an avian species would conceivably ingest.

Pesticides registered for forestry use with low order toxicity or exposure.

Amitrol	Pyrethrins
Picloram	Sodium cyanide
Ammonium Sulfamate	Sulfur
Bacillus thuringiensis	Atrazine
Borax	Simazine
Cacodylic acid	Chloropicrin
Sodium arsenit	Benomyl
MSMA	Glyphosate
Dalapon	Fosamine Ammonium
2,4-D	Hexazinone
Methoxychlor	Polyhedral inclusion bodies NPV
Mylone	Polyhedral inclusion bodies of N. sertifer
diphenamid	Displalure
Mexacarbate	Triclopyr
1-Naphthalene acetic acid	(E) + (Z)-9-dodecenyl acetate
Paraquat	Chlorphacinone
Piperonil butoxide	Diphacinone

Pesticides registered for forestry use with little or no information.

Aromatic petroleum derivative solvent
Chevron
Benzene hexachloride
Cresylic acid, coal tar acids
Cyclohexanone
Dichlobenil
Dibutyl phthalate
1,2-dichloropropane
Ziram, cyclohexylamine complex
Methyl bromide
Kerosene
Mineral oil
Aliphatic petroleum hydrocarbon
Pyridine
4-chloro-3,5-xylenol
Xylene
Xylene range aromatic solvent
Asulam

EEB determined that a number of endangered fish, mollusks, birds, and plants could be potentially affected by the use of pesticides in forest regions.

The consultation on this cluster was initiated on March 9, 1984.

2. Consultation Conclusions

The FWS (FWS/OES EPA-84-6, October 25, 1984) determined that the use of certain pesticides on forest areas would likely jeopardize the "continued existence of the following species and result in the destruction or adverse modification of designated critical habitat if such use occurs within or adjacent to the

occupied range of these species.":

Kirtland's warbler (Dendroica kirtlandii)
red-cockaded woodpecker (Picoides borealis)

These two avian species were the only endangered birds with "significant potential for exposure." As a reasonable and prudent alternative to preclude jeopardy, the Service recommended that those chemicals which exceeded the avian triggers should not be used within the habitat of these species.

Apache trout (Salmo apache)
Gila trout (S. gilae)
greenback cutthroat trout (S. clarki stomias)
Lahontan cutthroat trout (S. clarki henshawi)
little kern golden trout (S. aguabonita whitei)
Paiute cutthroat trout (S. clarki seleniris)
bonytail chub (Gila elegans)
humpback chub (G. cypha)
spotfin chub (Hybopsis monacha)
slender chub (H. cahni)
leopard darter (Percina pantherina)
Maryland darter (Etheostoma sellare)
Okaloosa darter (E. okaloosae)
slackwater darter (E. boschungi)
snail darter (Percina tanasi)
yellowfin madtom (Noturus flavipinnis)
scioto madtom (N. trautmani)
Colorado river squawfish (Ptychocheilus lucius)

The use of those chemicals which exceeded the aquatic triggers were considered likely to jeopardize the above species. These chemicals "...would adversely affect the fishes directly and/or destroy their invertebrates prey species." So that jeopardy would be precluded, the Service recommended that those chemicals mentioned above "...not be used within or adjacent to the habitat of these fish species."

Chittenango ovate amber snail (Succinea chittenangoensis)
flat-spined three-toothed snail (Triodopsis platysayoides)
Iowa Pleistocene snail (Discus macclintocki)
noonday snail (Mesodon clarki nantahala)
painted snake coiled forest snail (Anguispira picta)
Virginia fringed mountain snail (Polygyriscus virginianus)
Alabama lamp pearly mussel (Lampsilis virescens)
Appalachian monkeyface pearly mussel (Quadrula sparsa)
birdwing pearly mussel (Conradilla caelata)
Cumberland bean pearly mussel (Villosa trabalis)
Cumberland monkeyface pearly mussel (Q. intermedia)
Curtis' pearly mussel (Epioblasma florentina curtisi)
dromedary pearly mussel (Dromus dromus)
green-blossom pearly mussel (E. torulosa gubernaculum)
Higgin's eye pearly mussel (Lampsilis higginsi)
orange-footed pearly mussel (Plethobasus cooperianus)
pale lilliput pearly mussel (Toxolasma cylindrella)

pink mucket pearly mussel (E. orbiculata)
tubercled-blossom pearly mussel (E. torulosa torulosa)
white cat's paw pearly mussel (E. sulcata delicata)
white wartyback pearly mussel (Pleurobema cicatricosum)
yellow-blossom pearly mussel (E. florentina florentina)
fine-rayed pigtoe (Fusconaia cuneolus)
rough pigtoe (Pleurobema plenum)
shiny pigtoe (E. edgariana)
fat pocketbook (Potamilus capax)
tan riffleshell (E. walkeri)

These mollusks were considered likely to be jeopardized by those chemicals exceeding the aquatic triggers. As a reasonable and prudent alternative to preclude jeopardy, the indicated chemicals should not be used within or adjacent to the habitat of the above mollusks.

chapman rhododendrin (Rhododendron chapmanii)
hairy rattleweed (Baptisia arachnifera)
persistent trillium (Trillium persistens)
green pitcher plant (Sarracenia oreophila)
Virginia round-leaf birch (Betula uber)
small whorled pogonia (Isotria medeoloides)
nothern wild monkshood (Aconitum noveboracense)
Furbish lousewort (Pedicularis furbishiae)
Florida torreya (?)
mountain golden heather (Hudsonia montana)

These plant species would likely be jeopardized by those chemicals exceeding plant triggers. As a reasonable and prudent alternative, the Service recommended that these chemicals not be used within or adjacent to the habitat of the above plant species.

The Service also recommended that the forest herbicides not be used in the habitat of the Flagstaff pennyroyal. This species was proposed for listing as a threatened species on June 29,1983.

Summary of Endangered Species Considerations for the Cluster Review for Mosquito Larvicide

1. Description of Ecological Effects Branch Review

The EEB considered the following pesticides that are used as mosquito larvicide:

Pesticides used as mosquito larvicides which exceed an endangered species trigger.

Methoxychlor
Naled
O-ethyl-o-(p-nitrophenyl) phenylphosphonothioate (EPN)
Fenthion
Methyl parathion
Ethyl parathion
Malathion
Temephos
Chlorpyrifos
Methoprene

Pesticides used as mosquito larvicides which exceed a fish/aquatic invertebrate trigger.

Methoxychlor
Naled
EPN
Fenthion
Methyl parathion
Ethyl parathion
Malthion
Temephos
Chlorpyrifos
Pyrethrins
Methoprene

Pesticides used as mosquito larvicide which exceeds an avian dietary trigger.

Methoxychlor
Naled
EPN
Fenthion
Methyl parathion
Ethyl parathion
Malathion
Temephos
Chlorpyrifos
Pyrethrins
Methoprene

Pesticides used as mosquito larvicides with low toxicity or exposure.

Allethrin

Lindane
Paracichlorobenzene
2,2-Dichlorovinyl dimethyl phosphate
Resmethrin

Pesticides used as mosquito larvicides with little or no information.

d-Trans-allethrin
6-Butoxy-6'-thiocyano diethyl ether
6-Thiocyanoethyl esters of mixed fatty acids
2-Butoxyethanol
Cresylic acid
Coal tar neutral oils
Sodium oleate
Dimethrin
Isobomyl thiocyanoacetate
Bacillus thuringensis
Aromatic petroleum derivative solvent
chevron 100
Heavy aromatic naphtha
Methylated napthalines
N-octyl biycloheptene dicarboximide
1-1'-Methylenedi-2-naphthol monosodium salt of squaxin
Orthodichlorobenzene
bentachlorobenzene
Keresene
Mineral oil
aliphatic petroleum hydrocarbon
Phenol
Biperonyl butoxide ether
Tetrachloroethylene
Isooctyl phenoxy polyethoxy ethanol
soap
4-Chloro3,5-eylenol
Xylene
Xylene range aromatic solvent
Tert-alkyl amine (100% c18-c22)
Propoxon

The EEB determined that the use of mosquito larvicide would involve "...extensive acreage and varied types of habitat..." and that "...many endangered species could be exposed to [this type of pesticide]." Since several mosquito larvicides are toxic to wildlife, EEB concluded that their use "...could cause adverse effects to endangered invertebrates, fish, mammal, and/or birds."
The consultation was initiated on March 9, 1984.

2. Consultation Conclusion

The FWS (FWS/OES EPA-84-5, October 25, 1984) determined "...that the use of certain mosquito larvicide [would] likely..." jeopardize the continued existence of the following listed species and result in the destruction or adverse modifications of designated critical habitat:

gray bat (Myotis grisescens)
Indiana bat (M. sodalis)
Hawaiian hoary bat (Lasiurus cinereus semotus)
Ozark big-eared bat (Plecotus townsendii ingens)
Virginia big-eared bat (P. townsendii virginianus)

The Service determined that these bat species would be jeopardized by the use of mosquito larvicide. The critical habitat of the Virginia big-eared bat (P. townsendii virginianus) and the Indiana bat (M. sodalis) was considered likely to be adversely modified by the use of mosquito larvicide. The principle hazards for these bats are active poisoning due to consumption of affected insects and decreasing food supplies. The Service was unable to delineate areas where these pesticides should not be used since they "...are already registered and many have been in use for a long time, and because bats have broad geographical distribution." As a prudent and reasonable alternative, the FWS recommended establishing a monitering program to ascertain if bats are being affected by those products listed as exceeding the endangered species triggers.

salt marsh harvest mouse (Reithrodontomys raviventris)

This species would likely be jeopardized by the use of Fenthion and Ethyl parathion. The only alternative was to avoid the usage of these two chemicals within its habitat.

Hawaiian coot (Fulica americana alai)
Hawaiian stilt (Himantopus himantopus knudseni)
Hawaiian duck (Anas wyvilliana)
Hawaiian gallinule (Gallinula chloropus sandvicensis)
Marianas mallard (Anas oustaletz)
light-footed clapper rail (Rallus longirostris levipes)
California clapper rail (R. longirostris obsoletus)
Yuma clapper rail (R. longirostris yumanensis)
Aleutian Canada goose (Branta canadensis leucopareia)
Mississippi sandhill crane (Grus canadensis pulla)
whooping crane (G. americana)
Everglade kite (Rostrhamus sociabilis plumbeus)
California least tern (Sterna antillarum browni)

These avian species were considered threatened by Fenthion, Methyl parathion, and temephos. The Service determined that the critical habitat of the Mississippi sandhill crane (G. canadensis pulla), whooping crane (G. americana), and the Everglade kite (R. sociabilis plumbeus) woudl likely be adversly modified by the use of these three chemicals. These findings were based on toxicity to avian species and destruction of aquatic prey species. As a reasonable and prudent alternative, the Service recommended that these chemicals should not be used in or near the aquatic habitat of these species.

Alabama cavefish (Speoplatyrhinus poulsoni)
Mohave tui chub (Gila bicolor mohavensis)
slender chub (Hybopsis cahni)
spotfin chub (H. monacha)

ash meadows speckled dace (Rhinichthys osculus nevadensis)
kendall warm springs dace (R. osculus thermalis)
Moapa dace (Moapa coriacea)
bayou dace (Etheostoma rubrum)
foutain darter (E. fonticola)
leopard darter (Percina pantherina)
Maryland darter (E. sellare)
Okaloosa darter (E. okaloosae)
slackwater darter (E. boschungi)
snail darter (Percina tanasi)
watercress darter (E. nuchale)
big bend gambusia (Gambusia gaigei)
clear creek gambusia (G. heterochir)
amistad gambusia (G. amistadensis)
Pecos gambusia (G. nobilis)
San Marcos gambusia (G. georgei)
Pahrump killifish (Empetrichthys latos)
Scioto madtom (Noturus trautmani)
yellowfish madtom (N. flavipinnis)
ash meadows amargosa pupfish (Cyprinodon nevadensis mionectes)
Comanche springs pupfish (C. elegans)
devel's hole pupfish (C. diabolis)
Leon springs pupfish (C. bovinus)
Owens river pupfish (C. radiosus)
warm springs pupfish (C. nevadensis pectoralis)
unarmored threespine stickleback (Gasterosteus aculeatus williamsoni)
gila topminnow (Poeciliopsis occidentalis)
woundfin (Plagopterus argentissimus)

These fish species would be affected by those chemicals listed as exceeding fish/aquatic invertebrates triggers. This threat would be mainly from the loss of food sources upon which the fish depend. To avoid jeopardy, the Service recommended prohibiting the use of these products in the habitat of the above fish species.

Alabama lamp pearly mussel (Lampsilis virescens)
Appalachian monkeyface pearly mussel (Quadrula sparsa)
birdwing pearly mussel (Conradilla caelata)
cumberland bean pearly mussel (Villosa trabalis)
Curtis' pearly mussel (Epioblasma florentina curtisi)
dromedary pearly mussel (Dromus dromus)
green-blossom pearly mussel (E. torulosa)
Higgin's pearly mussel (L. higginsi)
Nicklin's pearly mussel (Megalonaias nicklineana)
orange-footed pearly mussel (Plethobasus cooperianus)
pale lilliput pearly mussel (Toxolasma cylindrella)
pink mucket pearly mussel (L. orbiculata)
Tampico pearly mussel (Cyrtonaias tampicoensis tecomatensis)
tubercled-blossom pearly

mussel	(*E. torulosa torulosa*)
turgid-blossom pearly mussel	(*E. turgidula*)
white cat's paw pearly mussel	(*E. sulcata delicata*)
white wartyback pearly mussel	(*Pleurobema cicatricosum*)
yellow-blossom pearly mussel	(*E. florentina florentina*)
fine-rayed pigtoe	(*Fusconaia cuneolus*)
rough pigtoe	(*Pleurobema plenum*)
shiny pigtoe	(*E. edgariana*)
fat pocketback	(*Potamilus capax*)
tan riffle shell	(*E. walkeri*)
hay's spring amphipod	(*Stygobromus hayi*)
Madison cave isopod	(*Antrolana lira*)
Soccorro isopod	(*Thermosphaeroma thermophilus*)
Kentucky cave shrimp	(?)

The above species would likely be jeopardized by the use of those chemicals that exceeded the trigger for aquatic invertebrates. As a reasonable and prudent alternative, these chemicals should not be used in the habitat of the above species.

Summaries of pesticide poisoning incidents involving endangered species

PESTICIDE POISONING INCIDENT REPORT

GRAY BAT

DATE OF INCIDENT: 23 June, 1980
14 July, 1981

LOCATION OF INCIDENT: Hunter Cave, Boone County, Missouri
Devil's Icebox Cave, Boone County, Missouri

SPECIES: Gray Bat (*Myotis grisescens*)

STATUS: Endangered

PESTICIDE: Dieldrin, Heptachlor

Summary of Incidents

In 1980 and 1981, six endangered gray bats were poisoned by the pesticide dieldrin (Clark et al. 1983). Following analysis for organochlorine residues, researchers reported that the lowest concentration of this insecticide in the brains of the six bats exceeded the minimum lethal level observed in experimentally poisoned laboratory rats, dogs and shrews. Four of the six dead bats also contained brain levels of the pesticide heptachlor epoxide in excess of the minimum lethal level which has been measured experimentally in birds.

Three of the six poisoned bats were found in June, 1980 in Hunter Cave. These bats were part of a group of 18 dead individuals found on the cave floor. Hunter Cave was revisited in July, 1981. No mortality was observed.

The second group of bats was collected on July 14, 1981 from a group of twenty-four dead gray bats in Devil's Icebox Cave Twenty-five decomposed bats had been found in the cave in September, 1980. Due to their state of decay none were collected for analysis.

While it is certain that the bats died from dieldrin poisoning, it is more difficult to determine the source of exposure. Clark et al. (1983) hypothesized that the bats were exposed to a heavily contaminated feeding site after a change in feeding locality. Devil's Icebox Cave is a substantial distance (120 km) from a third cave where bat mortality from dieldrin poisoning had occurred in 1976-78 (Fleming et al. 1983). Since travel between bat colonies is exceedingly rare, the authors concluded that the sources of contamination are geographically distinct. Further, based on the distance between caves where dieldrin poisoning occurred, dieldrin contamination may exist

across larger areas than was previously believed (Clark et al. 1983).

Use of aldrin and heptachlor in Missouri

Clark et al. (1983) theorize that aldrin and heptachlor were the sources of observed dieldrin residues. Aldrin (dieldrin's parent compound), was applied to Missouri cornfields to control cutworms until 1974 when EPA suspended registrations for most uses and prohibited further production of aldrin and dieldrin. This action resulted from EPA's determination that aldrin and dieldrin posed a cancer risk to humans; environmental effects of these pesticides were given little atten-tion in the suspension proceedings. The sale and use of existing stocks of these pesticides was, however, permitted.

With the suspension of aldrin's registration, the state of Missouri recommended heptachlor as a substitute. Although EPA acted in 1978 to cancel most registrations of this pesticide, its use was "phased out" in Missouri. Heptachlor use stopped throughout the state in 1981 (Clark et al. 1983). There is no evidence that EPA considered the risks to bats in association with this action or in association with the three-year lag in cessation of heptachlor use.

All uses of aldrin, dieldrin and heptachlor have now been cancelled with the exception of subsurface ground insertion for termite control (EPA 1985).

Previous accounts of pesticide residues in bats

According to Clark (1981), the first bat deaths directly attributable to chemical contaminants in the environment occurred in 1949 and 1950 (Benton 1951, Dalquest 1953) when DDT was applied directly to bats or their roosts. Surveys which measured residues of organochlorines in free-living bats were conducted throughout the 1970's, and provided strong evidence that bat populations may experience major mortality due to organochlorine insecticides. Exposure could come about through agricultural application of such insecticides or through the food chain (Geluso et al. 1976, Clark et al. 1978).

In addition to the 1980 and 1981 poisonings, gray bat mortalities due to dieldrin poisoning have been reported in Franklin County, Missouri in 1976, 1977 and 1978 (Clark et al. 1983). Estimated numbers of bats in the affected colonies totaled 1800 in 1976 and 1978. No bats were found in these caves in 1979.

Relative vulnerability of bats to organochlorines

Organochlorines are highly soluble in fat and are quickly

taken up by this substance shortly after entering the bloodstream. If the animal is in good condition with fat reserves, and pesticides are not consumed in abnormally large amounts, pesticide levels which might be lethal to individuals with low body fat can be metabolized.

When fat is metabolized during periods of increased activity, residues concentrate remaining amounts of this substance. The level of fat in the brain, however, is independent of changes in body fat and remains stable as body fat is changing. During periods of stress when body fat is decreasing, residues may build to lethal levels in the brain. Also, the affinity of these substances for fat results in heavy pesticide excretions in the milk of mammals. Organochlorine residues are thus passed through to the young (Clark 1981).

Bats do not seem to be extraordinarily more sensitive to pesticides than do other mammals, as was once thought (Clark 1981). However, the life history of these mammals may make them vulnerable to organochlorines. For instance, bats encounter more of these pesticides through the food chain than do herbivores. Because these animals are active at night, and some pesticide-application regulations permit spraying only at night, bats may be exposed to greater levels of pesticides. High metabolic rates and energy output demand that bats consume comparatively more food for their body size and weight than do other animals. Bats are at further risk because of the regular periods of build up of body fat and relatively rapid depletion of fat reserves during migration, or slow but extreme depletion during hibernation. Since the young are nourished with milk, their exposure is increased. Further, the bat's long life span and low reproductive rate not only increase exposure but prevent rapid recovery of depleted populations (Clark 1981).

It is not as yet known what effects pesticides may be having on the reproductive capacity of bats, acoustic behavior or hibernation metabolism. Devastating effects on these aspects of bat physiology are certainly possible (Clark 1981), and thus could impede or prevent the recovery of the gray bat.

Lack of responsive action by EPA

Although production of dieldren was prohibited by EPA in 1974 with the exception of some minor uses, dieldren has been implicated in gray bat mortality in 1976, 1977, 1980 and 1981, up to seven years after cancellation of major uses of this pesticide. Potentially dangerous concentrations of heptachlor, the pesticide which was used in place of dieldrin in Missouri until 1981, have been found in gray bats (Clark et al. 1983). There is no evidence that EPA knew of these mortalities prior to the publication of

scientific articles on this subject or, once aware of the problem, investigated the manner in which bats were exposed to these pesticides after their cancellation.

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PESTICIDE POISONING INCIDENT REPORT

BALD EAGLE

DATE OF INCIDENT: 20 March 1984
3 April 1984

LOCATION OF INCIDENT: Section 12, Washington Township, Jackson County, Iowa

SPECIES: Bald Eagle (*Haliaeetus leucocephalus*)

STATUS: Endangered

PESTICIDE: Fenthion

Summary of Incident

A dead eagle was found on March 20, 1984 on a farm in north central Section 12, Washington Township. On April 3, 1984, four dead eagles were found under a known roost tree on a farm in the northwest corner of Section 12, Washington Township, Jackson County, Iowa. According to the FWS, these five bald eagles were poisoned by the pesticide fenthion.

These poisonings were the result of ingestion of a pig which had been treated with fenthion. This pesticide is registered for use on swine for the control of ectoparasites. The treated pig had been discarded in a field frequented by eagles sometime after its treatment and subsequent death due to unknown causes. Pig remains were found alongside the four eagles and also in each of the eagle stomachs. (per. comm. from Walter Kocal, FWS region 3)

The five eagles that died from exposure to fenthion exhibited inhibition of cholinesterase activity ranging from 80 to 92 percent ($\bar{x}$ = 87). A 50-percent inhibition in cholinesterase activity in the brain is considered to be indicative of potentially lethal exposure to an anticholinesterase agent. Fenthion was found in the stomach contents of all five eagles (FWS analytical report- dated May 25, 1984).

Current status of fenthion

Fenthion is not a restricted use pesticide; it can be purchased and used by the general public. Precautionary statements on the label state that "(t)his product is toxic to fish, birds, and other wildlife. 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 this label."

Further label precautions prohibit treatment of sick, convalescent or stressed animals and treatment of swine within 14 days prior to slaughter.

Conclusions

There is no evidence that EPA investigated the poisoning incidents. Since the fatality of an endangered species is one criterion for triggering the Special Review process, the death of the eagles should have triggered a review of Fenthion. At the same time, the agency should have initiated a consultation with the OES.

PESTICIDE POISONING INCIDENT REPORT

CALIFORNIA CONDOR

DATE OF INCIDENT: Carcass found November 23, 1984

LOCATION OF INCIDENT: Snedden Ranch, Kern County, California

SPECIES: California Condor (*Gymnogyps californianus*)

STATUS: Endangered

PESTICIDE: Sodium Cyanide

Summary of Incident

On November 23, 1984, a dead juvenile female condor was found on the Snedden Ranch, Kern County, in Southern California (letter of Associate Director of the FWS, January 31, 1984). The body was located 1/2 to 3/4 of a mile from a discharged M-44, a spring-loaded coyote control device designed to discharge sodium cyanide into the mouth.

The body was sent to the Office of the County Veterinarian at the San Diego County Operations Center for analysis. An additional examination was conducted at the San Diego Zoo. The carcass was examined for the presence of yellow flourescent particles derived from yellow tracerite, a component of the M-44. These particles were observed in samples from the condor's mouth and from the tongue-larynx-hyoid bone complex.

The Service has concluded that the condor was killed by the M-44. Placement of the M-44 in condor range was in violation of use restrictions on this device.

Changes in M-44 Use in California

While investigating the cause of death and any potential hazards of M-44 to condors, the Fish and Wildlife Service removed all such devices from the ranch where the condor was found. The Service now requires that M-44's be placed at ground level under materials to decrease their visibility to condors, that all carcasses of animals killed by M-44's be removed from condor range, and that M-44's be deployed singly to reduce the possibility of condor exposure.

Conclusions

The use of M-44s in condor range is in direct conflict with one of the use restrictions for this device as established by EPA:

> The M-44 device shall not be used in areas where threatened or endangered species might be adversely affected (EPA Registration No. 6704-75, May 21, 1976).

There is no evidence that the Environmental Protection Agency investigated the circumstances in the condor's death, nor reevaluated the use restrictions of M-44 use for which they are responsible. EPA was involved in subsequent consultations to reexamine M-44 use within condor range.

PESTICIDE POISONING INCIDENT REPORT

BROWN PELICAN

DATE OF INCIDENT: 1982, 1983,1984

LOCATION OF INCIDENT: Teresa Lagoon, Puerto Rico

SPECIES: Brown Pelican (*Pelecanus occidentalis*)

STATUS: Endangered

PESTICIDE: Lindane, Diazinone (suspect)

Summary of Incidents

A preliminary diagnosis of seven brown pelicans undertaken in June, 1982, revealed that five of the birds may have died from consumption of toxic chemicals (letter to Agustin Valido, from Richard Stroud. 10 June 1982). Diazanon or toxaphene were suspect in one of the birds. In a second 1982 incident, three brown pelicans were preliminarily diagnosed as having ingested toxic chemicals which resulted in their death (National Wildlife Health Laboratory - Necropsy Report. 26 Nov. 1982). All of the pelicans were collected from a golf course in Teresa Lagoon, Humacao, Puerto Rico, on 16 November 1982. The 3 birds were part of a group of 23 pelicans found dead or dying from 8 November to 16 November. Egrets and blue herons were also found dying in the same area.

The deaths occurred following application of the insecticides diazinone and lindane. A period of rain the morning after treatment may have concentrated the pesticides in the water of the lagoon. There are records of past spills of heavy metals and pesticides in this area (Telephone report. Don Schulles. 17 Nov. 1982).

In 1983, six pelicans were found dead in the same area as the 1982 mortalities (NWHL Contact Report. Don Schulles. 6 June 1983).

An estimated seventy to one hundred pelicans were found sick or dead in the same area from late March to early July, 1984 (memo from Felix Lopez of 31 July, 1984). Most of the birds were juveniles.

Discussion

A firm conclusion as to the cause or causes of death of the pelicans is difficult to draw, since the available

evidence is in part circumstantial. However, pesticides should not be ruled out as a factor in the die-off.

Two of the three pelicans comprising the second 1982 group tested positive for type C botulism, (Letter of Richard Stroud, Director, PWRC. 17 Jan 1983). Since there is some evidence that botulism toxin is an anti-cholinesterase (Letter of Richard Stroud, Laboratory Diagnostician, NWHL. 5 Sept 1984), the use of cholinesterase inhibition as an indicator of pesticide contamination is weakened. The conclusion as to the cause of death is therefore uncertain.

Conclusions

The Environmental Protection Agency investigated other problems of contamination on the island of Puerto Rico, and knew of the pelican mortalities. Despite this, there was no investigative or remedial action by EPA.

PESTICIDE POISONING INCIDENT REPORT

MANATEE

DATE OF INCIDENT: Poisoning potential exists

LOCATION OF INCIDENT: Throughout range of manatee in U.S.

SPECIES: West Indian Manatee (*Trichechus manatus*)

STATUS: Endangered

PESTICIDE: Komeen (copper salts)

Summary of Potential Risk

Copper concentrations have been detected in livers of the West Indian manatee. Affected individuals were found in areas of high copper herbicide use (O'Shea et al. 1984). These concentrations were at levels which have been associated with toxic effects in some domestic animals and, in some cases, exceeded all previously reported concentrations found in any species of wild mammals from free-ranging populations.

Tissue samples were obtained from dead manatees found throughout Florida from October 1977 through January 1981 (O'Shea et al. 1984) While concentrations of copper in other wild mammals generally exhibit narrower ranges and relatively low variation, copper concentrations in the livers of manatees were found to be variable. Maximum concentrations in other wild mammals have been well below those of Florida manatees. According to O'Shea et al. (1984), there is some evidence that manatees may be inefficient in maintaining copper homeostasis concurrent with a dietary excess of this element; this could produce toxic effects (Denton et al. 1980).

Use and impact of copper herbicides on Florida manatees

Copper is used in Florida to control aquatic weeds. Due to its high toxicity to fish and aquatic invertebrates, copper is usually applied at concentrations of 1.0 parts per million or less. Even at these levels, fish and invertebrate mortality can occur (NAS 1977).

Aquatic vegetation takes up very high amounts of copper during weed control operations (O'Shea 1983). Laboratory and field studies have shown that vegetation commonly eaten by manatees can contain up to 5000ppm of copper for two to three weeks before plant dealth and disintegration.

Such effects have been measured in Florida following approved treatment methods.

The use of copper as a means of aquatic weed control could therefore have harmful effects on this endangered species (O'Shea 1984). For instance, when the capacity of the liver to store and excrete copper is exceeded, gross liver damage occurs. In one to several days following maximum copper metabolism by the liver, large amounts of copper are released into the bloodstream, hemolysis of erythroucytes occurs and death ensues.

Repeated treatments of aquatic vegetation, particularly during the winter months when manatees are experiencing elevated levels of stress, prolong the potential for chronic exposure (O'Shea 1983). This researcher has stated that "it is prudent to suggest that less toxic and less persistent alternative herbicides be used for control of aquatic weeds in areas of high manatee population density."

Conclusions

Despite references to possible herbicide impacts in the recovery plan for this species, and in light of evidence that copper herbicides may be impacting this endangered mammal, there is no evidence that the Environmental Protection Agency has taken steps to investigate the use of copper herbicides in manatee range.

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Table 1. Summary of OPP/OES Case-by-case Endangered Species Consultation from 1980 through 1984

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
Matacil	conditional registration	4/80	jeopardy to: Chitteango ovate snail	- exclude metacil from critical watershed; or - provide additional data	?/no	yes
Lasso	label amendment	8/80	no jeopardy		—	no
note: not in compliance because registration was completed before consultation						
Zinc Phosphide	label amendment	9/80	jeopardy to: salt marsh harvest mouse Morro Bay kangaroo rat Utah prairie dog Puerto Rican plain pigeon yellow shouldered blackbird Attwaters greater prairie chicken (AGPC) Aleutian Canada goose Whooping crane Laysan finch Nihoa finch	- prohibit use in habitat	yes/yes	yes
note: the FWS determined later that the two finches were not jeopardized by this action						
Furadan	conditional registration	1/81	jeopardy to: AGPC Aleutian Canada goose Kern primrose sphinx moth	- prohibit use in habitat	yes/yes	yes

PROCEDURAL COMPLIANCE: indicates when the registration actions followed the standard operating procedures

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
Chlor-pyrifos	conditional registration	7/80	jeopardy to 110 species	-restrict application method -buffer zones -geographic restrictions	yes/no	no
note: not in compliance because registration was accepted before completion of consultation						
Chlor-pyrifos	conditional registration	1/82	jeopardy to 38 species	- restrict application method - buffer zones - geographic restrictions	?/no	no
note: not in compliance because registration was accepted before completion of consultation and recommendatons were not included on label.						
Bolero	conditional registration	12/80	jeopardy to: fat pocket pearly mussel	- do not issue action - further testing - no emergency exmp.	yes/no	no
note: not in compliance because OES recommendations were not included on label						
Lontrel	conditional registration	2/81	no jeopardy	- none - EPA insisted on strong label language	action not granted because of label gaps	yes
Graslan/ Tebuth-iuron	conditional registration	2/81	jeopardy to: 19 plant species	- geographic restrictions - more data	yes/no	no
note: not in compliance because registration was accepted before completion of consultation						
Sumithion	conditional registration	3/81	no jeopardy	- restricted use - geographic limits	yes/yes	yes

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
Mg Phosphide	conditional registration	4/81	jeopardy to: black-footed ferret eastern indigo snake San Joaquin kit fox Utah prairie dog blunt nosed leopard lizzard desert tortoise	- geographic limits - pre-application survey for ferrets	yes/yes	yes
Zinc Phosphide	Registration Standard	5/81	jeopardy to: salt marsh harvest mouse Morro Bay kangaroo rat Utah prairie dog Puerto Rican plain pigeon yellow-shouldered blackbird AGPC Aleutian Canada goose whooping crane	labeling to remain the same	yes/yes	yes
Velpar	conditional registration Product has never been used commercially	2/82	not completed			no
note: Not in compliance because registration accepted without a consultation						
Aluminum Phosphide	conditional registration	7/81	jeopardy to: same as Mg Phosphide	same as Mg Phosphide	yes/yes	yes

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
Metolachlor	conditional registration	8/80	jeopardy to: 9 plant species and red hills salamander	- additional studies - buffer zone - geographic restrictions	yes/no	no
note: not in compliance because endangered species considerations were absent from label						
Phorate	conditional registration	8/81	jeopardy to: AGPC Aleutian Canada goose Kern primrose sphinx moth	- seasonal restrictions - geographic restrictions	yes/no	no
note: not in compliance because endangered species considerations were absent from label						
Sodium Nitrate	conditional registration	10/81	no jeopardy	- restrictions from previous biological opinion	yes/yes	yes
Chlorphacinone (Rozol)	conditional registration	11/81	jeopardy to: black-footed ferret San Joaquin kit fox	- critical habitat restrictions	yes/yes	yes
Temik	conditional registration	10/81	jeopardy to: AGPC	- critical habitat restrictions	yes/yes	yes
Endosulfan	registration standard	2/82	jeopardy to: listed insects Hawaiian hoary bat Aleutian Canada goose AGPC Pine Barrens tree frog Houston toad Santa Cruz long-toed salamander listed fish and mussels	- limit use rates - geographic limits	no action taken pending completion of cluster approach	no
note: not in compliance because the registration standard was completed before the consultation						

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
1080	experimental use permit	5/82	no jeopardy			yes
cuprous oxide	conditional registration	7/82	jeopardy to: Comanche Springs pupfish Moapa dace Gila topminnow	- restrict use in critical habitats	yes/no	no
note: not in compliance because endangered species considerations were not included on label						
Graslan Tebuth-iuron	conditional registration	9/82	jeopardy to: 11 plant species	- contact FWS before applying in critical habitat	yes/no	no
note: not in compliance because endangered species considerations were not included on label						
Gas Cartridges	label review	9/82	jeopardy to: black footed ferret eastern indigo snake San Joaquin kit fox Utah prairie dog blunt-nosed leopard lizard desert tortoise	- geographic restrictions	yes/yes	yes
Lindane	emergency exemption use	10/82	jeopardy to: Florida panther bald eagle Everglade kite	- further testing - use of alternative chemicals	exemption request withdrawn	yes
Nifluridid/ Bant	registration	11/82	jeopardy to: AGPC Houston toad	- geographic restrictions	registration withdrawn	yes

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
1080	expermental use permit	1/83	no jeopardy			yes
1080	experimental use (toxic collar)	11/83	no jeopardy			yes
Oust	conditional registration	5/83	jeopardy to: 25 plant species	restrict use in plant habitats	yes/no	no
note: not in compliance because registration accepted before completion of consultation						
1080	experimental use	7/83	no jeopardy			yes
CGA-12223	conditional registration	11/83	no jeopardy			yes
Fluridone/ Sonar	conditional registration	11/83	jeopardy to: all listed U.S. aquatic species	- exclude use in all habitats of listed species	registration pending	yes
Endrin	evaluation of use patterns	2/84	jeopardy to: 19 species	- prohibit use of endrin within critical habitat plus buffer zone	product cancelled	yes

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES	ADOPTED EEB/RD	PROCEDURAL COMPLIANCE
Dicofol	special review	3/84	jeopardy to: peregrin falcon	- no reasonable and prudent alternatives available - cancellation recommended for all uses.	pending	yes
note: to be in compliance product should be cancelled or a new consultation must be initiated if product modifications are made.						
Acephate/ Orthene	conditional registration	5/84	jeopardy to: Hawaiian hoary bat	- night spraying - scare bats from orchard - label warning - do not use if bats are present	yes/yes	yes
Prairie Dog toxicants	reevaluation of secondary impacts	5/84	jeopardy to: black footed ferret	- prior to use check for ferrets	?	yes
Brodi-facon/ Volid	conditional registration	6/84	no jeopardy			yes
Tilt	conditional registration	7/84	jeopardy to: 11 mussel species	- geographic restrictions	pending	yes
1080 single lethal dose baits	experimental use permit	11/84	no formal consultation required			yes

Table 2. Results of Cluster Analysis Consultations

PRODUCT	REGULATORY ACTION	CONSULTATION INITIATED	CONSULTATION RESULTS	REASONABLE & PRUDENT ALTERNATIVES
Carbofenothion Carbofuran Carbaryl Chlorpyrifos Dasanit Diazinon Dimethoate Dinoseb Disyston Dyfonate EPN Endosulfan Ethion Ethoprop Ethyl parathion Guthion Kelthane Malathion Mancozeb Methoxychlor Methyl Parathion Phorate Phosdrin Piperonyl Butoxide Propargite Propachlor Pyrethrin Oftanol Oxyfluofen Rotenone Terbufos Toxaphene Trifluralin Trichlorofon	corn cluster analysis	December 1982	jeopardy opinions: o peregrine falcon o Attwaters Greater Prairie Chicken o Aleutian Canada goose o Everglade kite o slackwater darter o 12 mussel species o woundfin o solano grass o valley elderberry grass beetle o Delta green ground beetle	- cancel Kelthane - geographic limits - geographic limits on Granular - prohibit use of non-Granular during Aug and May in portions of CA and OR - eliminate aerial application - prohibit ground application closer than 20 yards to habitat - eliminate aerial application w/n buffer zone - limit ground application - buffer zone limitations - require more data - restrict use in Virginia drainage 40 miles either side of Virginia narrows - prohibit herbicide use in habitat - restrict use in habitat during April to mid-May - restrict use in Solano Co.

Results of Cluster Analysis Consultation
Cotton, Soybeans, Sorghum, and small grains (wheat, barley, oates, rye)

PRODUCT				REGULATORY ACTION	CONSULTATION INITIATED
cotton	soybeans	sorghum	small grains		
Aldicarb	Aldicarb	Aldicarb	2,4D	cluster analysis	cotton/Jan 1983
Azinphohos m.	Basic Copper	Atrazine	Carbaryl	for cotton, soy	soybeans/Feb 1983
Captan	Sulfate	Bifenox	Carbofuran	beans, sorghum	sorghum/June 1983
Carbaryl	Carbaryl	Carbaryl	Dinoseb	and small grains	small grains/June 1983
Carbophenothion	Carbofenothion	Carbofenothion	Disyston		
Chlorpyrifos	Carbofuran	Carbofuran	Endosulfan		
Curacron	Chlorpyrifos	Chlorpyrifos	Endrin		
Desanit	Cuprous Oxide	Cyanazine	Guthion		
Diflubenzuron	Dasanit	Dasanit	Malathion		
Dinoseb	Diazinion	Demeton	M. Parathion		
Diptirex	Dicrotophos	Diazinon	Parathion		
Dimethoate	Dimethoate	Dimethoate	Phorate		
Disulfoton	Dimilin	Disyston	Toxaphene		
Endrin	Dinoseb	Ethion	Trichlorfon		
EPN	Disyston	Fonophos			
Ethion	Endosulfan	Methidathion			
Fenamphos	EPN	M. Parathion			
Imidan	Ethoprop	Parathion			
Kelthane	Fluchloralin	Phorate			
Malathion	Guthion	Propachlor			
Methidathion	Malathion	Terbufos			
Methomyl	Methonyl	Toxaphene			
M. parathion	Methoxychlor	Trifluralin			
Naled	Naled				
Parathion	Parathion				
Payoff	Propachlor				
Phorate	Propargite				
Pydrin	Terbufos				
Thiodicarb	Thiodicarb				
Toxaphene	Topsin				
Trifluralin	Toxaphene				
	Trichlorfon				
	Trifluralin				

Cotton, Soybeans, Sorghum, and small grains
(cont.)

RESULTS OF CONSULTATION	REASONABLE AND PRUDENT ALTERNATIVES
Jeopardy to:	
o peregrine falcon	- cancel Kelthane
o AGPC	- Pesticides toxic to avian species should not be used within 1/4 mile of AGPC range - not concerned about cotton
o Aleutian Canada goose	- Ngs prohibited in range Sept. through mid-May - totally prohibit Gs - particular concern about phorate's use on wheat and barley
o woundfin	- prohibit pesticides use in areas that drain into Virginia narrows
o 12 freshwater mussels	- eliminate aerial application of implicated pesticides in mussel habitat - restrict ground application in and around aquatic habitat
o Solano grass	- prohibit herbicides toxic to Solano grass in Solano Co.

Cotton, Soybeans, Sorghum and Small Grains Cluster Analysis
(cont.)

RESULTS OF CONSULTATION	REASONABLE AND PRUDENT ALTERNATIVES
o valley elderberry longhorn beetle	- restrict pesticides use in habitat during late April to mid-May
o Delta green ground beetle	- restrict implicated pesticides in Solano Co.
o Kern primrose sphinx moth	- small grain pesticides should be prohibited within 100 yards of the habitat of this species
o slackwater darter	- eliminate aerial application or provide a buffer zone; prohibit ground application closer than 20 yards from aquatic habitat of species

Forestry Cluster Analysis Consultation

PESTICIDE	CONSULTATION INITIATED	RESULTS	REASONABLE AND PRUDENT ALTERNATIVES
Acephate Fenitrothion Matacil M. Parathion Trichlorfon	1984	jeopardy to: kirtland's warbler redcockaded woodpecker	- chemicals should not be used in habitats of these species
Carbaryl Diflubenzuron Fenitrothion M. Parathion Maticil Trichlorofon 2,4D	1984	jeopardy to: Apache trout Gila trout greenback cutthroat trout Lahontan cutthroat little kern golden trout Paiute cutthroat bonytail chub humpback chub spotfin chub slender chub leopard darter Maryland darter Okalossa darter slackwater darter snail darter yellowfin madtom scioto madtom Colorado River squawfish Chittenango ovate amber snail flat-spined three-toothed snail Iowa Pleistocene snail noonday snail painted snake coiled forest snail Virginia fringed mountain snail	- chemicals should not used wihtin or adjacent to critical habitats of these species

Forestry Cluster Analysis Consultation
(cont.)

PESTICIDE	CONSULTATION INITIATED	RESULTS	REASONABLE AND PRUDENT ALTERNATIVES
		Alabama lamp pearly mussel Applachian monkeyface pearly mussel birdwing pearly mussel Cumberland monkeyface pearly mussel Curtis pearly mussel dromedary pearly mussel green-blossom pearly mussel Higgins eye pearly mussel orange-footed pearly mussel pale liliput pearly mussel pink mucket pearly mussel tubercled-blossom pearly mussel white cat's paw pearly mussel white wartyback pearly mussel yellow-blossom pearly mussel fine-rayed pigtoe rough pigtoe shiny pigtoe fat pocketbook tan riffleshell	
2,4D Amitrol Ammonium sulfate Atrazine Cacodylic acid Dalapon Dichlorbenil Diphenamid EPTC Fosamine Glyphosate Hexazinone Mylone Paraquat Pichloram Simazine		jeopardy to: chapman rhododendrin hairy rattleweed persistent trillium green pitcher plant Virginia round-leaf birch small whorled pogonia northern wild monkshod Furbish lousewort Florida Torreya mountain golden heather	- implicated pesticides should not be used within or adjacent to the habitats of these species

Results of Mosquito Larvicide Cluster Consultation

PESTICIDE	CONSULTATION INITIATED	RESULTS	REASONABLE AND PRUDENT ALTERNATIVES
Chlorpyrifos E. Parathion EPN Fenthion Malathion Methylparathion Methoprene Methoxyclor Naled Temephos	1984	jeopardy to: gray bay Indiana bat Hawaiian hoary bat Ozark big-eared bat Virginia big-eared bat	- establish monitoring program to ascertain if bats are actually being affected by these products
Fenthion E. Parathion		jeopardy to: salt marsh harvest mouse	- avoid use of these two chemicals within the habitat of these species
Fenthion M. Parathion Temephos		jeopardy to: Hawaiian coot Hawaiian stilt Hawaiian duck Hawaiian gallinide Marianas mallard light-footed clapper rail California clapper rail Yuma clapper rail Aleutian Canada goose Mississippi sandhill crane whooping crane Everglade kite California least tern	

PESTICIDE	CONSULTATION INITIATED	RESULTS	REASONABLE AND PRUDENT ALTERNATIVES
Chlorpyrifos EPN Ethyl parathion Methyl parathion Methoprene Methoxychlor M. Parathion pyrethrins Naled Temephos		jeopardy to: Alabama cavefish Mohave tui chub slender chub spotfin chub Ash Meadow speckled dace Kendall Warm Springs dace Moapa dace bayou darter fountain darter leopard darter Maryland darter Okaloosa darter snail darter watercress darter Big Bend gambusia Amistad gambusia Pecos gambusia Clear Creek gambusia San Marcos gambusia Pahrump killifish Scioto madtom yellowfish madtom Ashmeadow Amargosa pupfish Comanche Springs pupfish Devils Hole pupfish Leon Springs pupfish Owens River pupfish Warmsprings pupfish unarmored threespine stickleback Gila topminnow slackwater darter	(cont.) Alabama lamp pearly mussel Applachian monkeyface pearly mussel birdwing pearly mussel cumberland bean pearly mussel Curtis' pearly mussel dromedary pearly mussel green-blossom pearly mussel Higgin's pearly mussel Nicklin's pearly mussel orange-footed pearly mussel pale lilliput pearly mussel pink mucket pearly mussel Tampico pearly mussel tubercled-blossom pearly mussel turgid-blossom pearly mussel white cat's paw pearly mussel white wartyback pearly mussel yellow-blossom pearly mussel fine-rayed pigtoe rough pigtoe shiny pigtoe fat pocketbook tan riffle shell hay's spring amphipod Madison cave isopod Soccorro isopod Kentucky cave shrimp

Cluster Reviews

The following chart summarizes which pesticide products were considered likely to jeopardize or affect an endangered species when used on the specified crop

PESTICIDE PRODUCTS	CORN	COTTON	SOYBEANS	SORGHUM	SMALL GRAINS	FORESTRY	MOSQUITO LARVACIDE
Acephate						xxx	
Aldicarb		xxx	xxx	xxx			
Amitrole						xxx	
Ammonium Sulfate						xxx	
Atazine			xxx	xxx		xxx	
Azinophos		xxx					
Bifenox			xxx	xxx			
Cacodylic acid						xxx	
Captan		xxx					
Carbaryl	xxx	xxx		xxx	xxx	xxx	
Carbofenothion	xxx	xxx		xxx			
Carbofuran	xxx			xxx	xxx		
Chlorpyrifos	xxx	xxx	xxx	xxx			xxx
Cucuran		xxx					
Cyanazine			xxx	xxx			
DEP							
Dalapon						xxx	
Dasanit	xxx	xxx	xxx	xxx			

PESTICIDE PRODUCTS	CORN	COTTON	SOYBEANS	SORGHUM	SMALL GRAINS	FORESTRY	MOSQUITO LARVACIDE
DEF		xxx					
Diazinon	xxx	xxx	xxx	xxx			
Demeton			xxx	xxx			
Dichlorbenil						xxx	
Diflubenzuron		xxx				xxx	
Dimethoate	xxx	xxx	xxx	xxx			
Dinoseb	xxx	xxx			xxx		
Diphenamid						xxx	
Dipterex		xxx					
Disyston	xxx	xxx	xxx	xxx	xxx		
Dyfonate	xxx						
EPN	xxx						xxx
EPTC						xxx	
Endosulfan	xxx				xxx		
Endrin		xxx			xxx		
Ethion	xxx	xxx	xxx	xxx			
Ethoprop	xxx						
E.parathion	xxx	xxx		xxx			xxx
Fenamphos		xxx					

PESTICIDE PRODUCTS	CORN	COTTON	SOYBEANS	SORGHUM	SMALL GRAINS	FORESTRY	MOSQUITO LARVACIDE
Fenthion						xxx	xxx
Fonophos			xxx	xxx			
Fosamin						xxx	
Glyphosate						xxx	
Guthion	xxx				xxx		
Mexazinone						xxx	
Imidan		xxx					
Kelthane	xxx	xxx					
Malathion	xxx	xxx			xxx		xxx
Mancozeb	xxx						
Matacil						xxx	
Methidathion		xxx	xxx	xxx			
Methonyl		xxx					
Methoprene							xxx
Methoxyclor	xxx						xxx
M. parathion	xxx	xxx	xxx	xxx	xxx	xxx	
Mylone						xxx	
Naled		xxx					xxx
Paraquat						xxx	

PESTICIDE PRODUCTS	CORN	COTTON	SOYBEANS	SORGHUM	SMALL GRAINS	FORESTRY	MOSQUITO LARVACIDE
Payoff		xxx					
Pethrin		xxx					
Phorate	xxx	xxx	xxx	xxx			
Phosdrin	xxx						
Pichloram						xxx	
Pipernyl butoxide	xxx						
Propargite	xxx						
Propachlor	xxx		xxx	xxx			
Pydrin		xxx					
Pyrethrin	xxx						
Oftanol	xxx						
Oxyflurofen	xxx						
Rotenone	xxx						
Simazine						xxx	
Temephos						xxx	
Terbufos	xxx		xxx	xxx			
Thiodicarb		xxx					
Toxaphene	xxx	xxx	xxx	xxx	xxx		
Trichlorophon	xxx				xxx	xxx	
Trifluralin		xxx	xxx	xxx	xxx		
2,4D					xxx	xxx	

Summary of cluster review pesticides that were considered in jeopardy opinions

- Total number of pesticides contained in jeopardy opinions covered under the cluster analysis = 77

- Pesticides contained in 4 or more jeopardy opinions covered under the cluster approach = 12

carbaryl	ethyl parathion
chlorpyrifos	methyl parathion
dasanit	phorate
diazinion	malathion
dimethoate	toxaphene
disyston	trifluralon

- Pesticides contained in 3 jeopardy opinions covered under the cluster analysis = 8

aldicarb	dinosib
atrazine	methidathion
carbophenothion	propachlor
carbofuran	terbufos

- Pesticides contained in 2 jeopardy opinions covered under the cluster analysis = 14

bifinox	fenthion
cyanazine	fonophos
demeton	guthion
diflubenzuron	kelthane
EPN	methoxychlor
endosulfan	naled
endrin	2,4D

- Pesticides contained in one jeopardy opinions = 43

Table 3: Summary of Pesticide Poisoning Incidents Involving Endangered Species

INCIDENT	PESTICIDE INVOLVED	CONSULTATION INITIATED	CONCLUSIONS
Pesticide poisoning death of grey bats	Dieldrin Heptachlor	EPA was aware of poisonings; did not respond with consultation	poisonings occurred after cancellation
Pesticide poisoning fatality to 5 bald eagles from secondary poisoning from eating a poisoned pig in March and April 1984	Fenthion	No evidence that EPA was aware of poisonings; should have initiated consultation for use on swine	Special review should have been triggered
Deaths of Brown Pelicans in Terasa Lagoon, Puerto Rico in 1983, 1983, 1984 approximately 100 birds died	Diazinion or Toxaphone implicated	no consultation initiated	EPA was aware of the problem, but did not investigate or take remedial action
Poisoning potential exists throughout the range of the Manatee in the U.S.	Recovery plans indicate that Cu herbicides may be affecting this species		EPA has not investigated Cu herbicides in this area
Death of California Condor Nov. 23, 1984 in Kern County, CA	Sodium Cyanide M-44 spring loaded coyote control device	EPA was involved in subsequent consultation to re-examine M-44 use within the condor range	Poisoning resulted from an illegal use; no evidence that EPA investigated the incident or that the use restrictions of the M-44 device were re-evaluated