U.S. FISH AND WILDLIFE SERVICE BIOLOGICAL OPINION

ON SELETED PESTICIDES:

DATED JUNE 14, 1989

REVISED SEPTEMBER 14, 1989

REVISIONS TO BIOLOGICAL OPINION DATED JUNE 14, 1989

U.S. FISH AND WILDLIFE SERVICE

SEPTEMBER 14, 1989

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

TAKE PRIDE IN AMERICA

In Response Refer To:
FWS/EHC/BFA/EPA-9-89-1

JUN 14 1989

Mr. James W. Akerman
Chief, Ecological Effects Branch
Environmental Fate and Effects
Division (TS-769c)
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear Mr. Akerman:

This responds to the Environmental Protection Agency's (Agency) September 30, 1988, request for reinitiation of formal consultation, in accordance with Section 7 of the Endangered Species Act, on selected portions of five previous "cluster" biological opinions. Those opinions evaluated pesticides for certain crops (corn, cotton, soybeans, sorghum, wheat, barley, oats, and rye), forestry use pesticides, mosquito larvicides, and rangeland and pastureland pesticides. Your September 30, 1988 letter stated that consultation was reinitiated to reevaluate new and existing data, correct certain errors, propose new reasonable and prudent alternatives, and provide more substantive data on certain species and pesticides.

The Agency's request was divided into six parts:

1. Reevaluation of the jeopardy posed to aquatic species by a selected group of pesticides, based on new analyses of their estimated environmental concentrations.

2. Evaluation of pesticides that may affect four bird species listed since the prior opinions were completed.

3. Reassessment of the potential exposure of certain species to selected pesticides, based on biological and toxicological data.

4. Consideration of new reasonable and prudent alternatives to avoid jeopardy to species occurring solely or largely on Federal lands, and for the red-cockaded woodpecker and wood stork.

5. Assessment of the potential for certain pesticides to indirectly harm listed species through their food supply.

6. Consideration of withdrawing or cancelling jeopardy opinions for pesticides that have been cancelled or suspended.

Additional data were provided by the Agency on December 12, 1988. Included were profiles on the nature and toxicity of several chemicals, bioaccumulation and product degradation data, historical data on wildlife kills, and, most significantly, an analysis of the registered uses for most of the chemicals. Because of the extent and importance of this new information, the Fish and Wildlife Service (Service) had to review all of the analyses that had been completed previously for these chemicals. Pursuant to regulations at 50 CFR 402, and with the Agency's January 30, 1989, concurrence, the consultation was restarted effective December 12, 1988.

A draft of this opinion was provided to the Agency on March 9, 1989. At the request of the Agency, copies were provided to the Interagency Technical Group which includes several agencies in the Department of Agriculture (Agriculture). Based on a request from Agriculture, the date for closure of the review period was extended from April 10 to May 17, 1989. Comments received from the Agency and Agriculture have been addressed and incorporated in appropriate sections of the text of this opinion. Some additional data will be provided to the Agency by the Service under separate cover, as noted in the text of this opinion.

CONSULTATION HISTORY

The proposed actions have been examined by the Service in accordance with the Interagency Cooperation Regulations under Section 7 of the Endangered Species Act, as amended (50 CFR 402 and 16 U.S.C. 1531 et seq.).

The Service previously issued biological opinions to the Agency on pesticides registered for the uses identified in the reinitiation request. These opinions are described below. Dates of issuance are in parentheses.

Corn cluster (May 18, 1983): Jeopardy was determined for 21 species from one or more of 39 pesticides considered. Conservation recommendations were made for 7 species subsequently listed.

Small grain cluster (October 12, 1983): Jeopardy was determined for 21 species from one or more of 58 pesticides considered. Conservation recommendations were made for 6 species in addition to the 21 previously mentioned.

Forest cluster (October 25, 1983): Jeopardy was determined for 58 species from one or more of 23 pesticides considered.

Mosquito larvicide cluster (October 25, 1983): Jeopardy was determined for 77 currently listed U.S. species from one or more of 11 pesticides considered.

Rangeland/pastureland cluster (December 11, 1983): Jeopardy was determined for 159 species from one or more of 32 pesticides considered.

Clarifications of issues related to the Agency's implementation of reasonable and prudent alternatives for the above opinions. (January 20, 1987).

Additionally, biological opinions were issued individually for the following pesticides that are addressed in the current reinitiation:

Aluminum phosphide (July 22, 1981, and November 11, 1984)
Carbofuran (May 1, 1981, and July 2, 1987)
Chlorpyrifos (May 21, 1982)
Diazinon (January 17, 1986)
Dicofol (August 13, 1984, November 14, 1985, March 20, 1986, and July 22, 1987)
Endosulfan (July 30, 1982)
Fenitrothion (May 18, 1981)
Magnesium phosphide (June 19, 1981, and November 4, 1982)
Oxyfluorfen (November 13, 1985)
Strychnine (May 25, 1988)
Tebuthiuron (July 15, 1982, and November 17, 1982)

To the extent that these prior opinions addressed specific uses outlined in this reinitiation request, the opinions have been reviewed and revised as appropriate. All determinations of jeopardy/no jeopardy/no exposure, reasonable and prudent alternatives, reasonable and prudent measures, and other findings of this opinion shall supercede corresponding portions of the prior opinions listed above.

Chemicals and uses not reinitiated in this request have not been reviewed, and all pertinent findings and recommendations of the prior opinions stand.

EVALUATION METHODOLOGY

Aquatic Endangered Species/Pesticide Risk Assessment Model

A pesticide consultation team consisting of representatives from each of the Fish and Wildlife Service regions in the conterminous United States was established to prepare this biological opinion. Each team member was responsible for evaluating species within his/her jurisdiction for pesticide impacts. To promote consistent and systematic evaluation of the potential impact of pesticides on listed aquatic species, the Service developed a conceptual model which directs the user to consider certain factors in formulating a biological opinion. These factors include: 1) potential for exposure of the listed species to the pesticide; 2) information on chemical toxicity relative to estimated environmental concentration; 3) potential for secondary impacts; and 4) special concerns not specifically addressed above or unique to the situation being evaluated. The conceptual model requires the user to address each variable based on available data. Variables are described in greater detail below.

1. Exposure: The determination of exposure potential was based on the nature of land use in the area of species' occurrence and the registered

use(s) of each pesticide. For example, a species associated with forest habitats was evaluated for the impacts of those chemicals registered for use on forests. This variable also estimated the extent of exposure relative to species' total habitat or population.

2. Toxicity: This variable takes into consideration the direct toxicity of a chemical to a listed species based on the most appropriate hazard ratio model for the taxon most closely related to the listed species. This variable was based on the toxicity to the most vulnerable life stage exposed to the chemical, as well as information on pesticide persistence and the anticipated frequency of pesticide application, when available.

Since laboratory toxicity data for endangered species are generally not available, data for closely related taxa were used to estimate values for listed species. For example, freshwater fish data were considered directly applicable for endangered fish; such data also were used for amphibians, when more specific data were unavailable. For invertebrates, data from the most closely related invertebrate taxon were usually selected. However, for freshwater mussels, toxicity data were unavailable for closely related freshwater species. In these cases, data for the freshwater invertebrates Daphnia and Gammarus were used because such data are widely available and these species are highly sensitive to toxic chemicals.

For the most part, estimates of toxicity were based on the hazard ratio models provided by the Agency in its consultation request. However, considering only the hazard ratio for the species itself was sometimes insufficient as a measure of effect as the chemical may cause harm to the species through its food supply or other significant feature of its supporting habitat.

The Service selected a specific model (direct application, drift, runoff, etc.), or combination of models, according to the species' habitat, pesticide profile, proximity of potential pesticide use to species' habitat, and local drainage patterns. Although the Agency provided several models to determine hazard ratios, frequently no model was applicable or data were lacking within the appropriate model for some chemicals. In these cases, the Service used the model which in its opinion most closely approximated pesticide transport in the species' habitat.

3. Consideration of secondary impacts from pesticides included:

a) Poisoning and bioaccumulation: The potential for poisoning was estimated from documented case histories of such occurrences to similar species and by examining known or estimated bioaccumulation potential of the chemical and the species' food habits.

b) Toxicity to food items: This is especially critical when a species' diet is so restrictive that the loss of a class of organisms, such as aquatic arthropods, from the food chain could have significant adverse effects on the listed species. Considered in this variable are both the dietary selectivity of the species and the expected hazard ratio of the chemical relative to the species' food supply.

c) Interference with habitat, symbiotic or other special relationships: This covers a wide range of factors, including habitat requirements (e.g. vegetation cover), and life stage requirements (e.g. host fish for freshwater mussel larvae). This variable required consideration of chemical toxicity to such critical species'needs.

d) Physical disturbances: This variable accounts for the effects of physical disturbance on the species due to the particular method used to apply a chemical. Factors such as noise from low-flying aircraft or direct physical effects on species or habitat by ground application equipment were considered.

4. Special concerns are those factors for which no other category of variable was appropriate. Species rarity or limited geographical distribution, extremely high chemical toxicity, and species sensitivity to certain chemicals are examples of special concerns.

The conceptual model was applied to each species/chemical interaction to help assist the biological opinion and reasonable and prudent alternatives. Occasionally, species with similar geographical distribution, biological or ecological characteristics were analyzed together for a chemical or class of chemicals with similar properties.

The Service relied on available data to the extent possible, but also made certain assumptions (see Section I below) and judgments in its determinations, including extrapolation of data from related species. Furthermore, patterns and extent of crop cultivation and other land use practices near the listed species, both of which were important for evaluating exposure in this opinion, were identified but could change in the future. Consequently, patterns of pesticide use and exposure could change.

Data were sometimes lacking on species population status and pesticide impacts to critical life stages or habitat components, such as the host species of freshwater mussel larvae. Where data were lacking, the Service used the best available information and applied scientific judgment to formulate decisions of jeopardy/no jeopardy. The Service recognizes that there are provisions for reinitiation of consultation when new data become available.

FORMAT OF THIS OPINION

This opinion responds in a consolidated manner to the many questions raised in the Agency's request. This biological opinion is organized as follows:

Section I - lists the assumptions the Service used in developing this opinion.

Section II - presents determinations of the effects of 112 pesticides on one or more of 165 listed species, with the appropriate reasonable and prudent alternatives to preclude jeopardy, and actions required to minimize the likelihood of incidental take.

Section III - presents profiles of affected species, including their potential for exposure to pesticides, the resulting biological opinion, and incidental take statements with their accompanying reasonable and prudent measures. Additional information requested by the Agency (May 17, 1989) about the factor(s) affected by each chemical (species, food, symbiont or other habitat feature) will be provided under separate cover.

Section IV - lists those species for which maps or location descriptions were provided separately, as requested by the Agency.

Section V - presents chemical data sheets which, with hazard data provided in the request, assisted the evaluation of the potential for exposure and effect on listed species.

Thus, for example, to determine the response to questions raised on the Scioto madtom in Parts 1 (chemical effect), 3 (continued existence of the species), and 5 (food habit considerations) of the Agency's request, the Service has consolidated the current biology of the species in Section III of this opinion, and identified the current jeopardy/no jeopardy determinations and required actions in Section II.

Generic questions raised by the Agency on the use of memoranda of understanding as a reasonable and prudent alternative, and the Agency's request to withdraw jeopardy calls on cancelled or suspended chemicals are addressed below.

GENERIC QUESTIONS

1. Federal agency memoranda of understanding:

Part 4 of the request proposed that memoranda of understanding be developed between the Agency and Federal land managing agencies and that the Service view this proposal as a reasonable and prudent alternative for precluding jeopardy to species that occur largely or entirely on Federal lands. The Service cannot accept the Agency's proposal as a reasonable and prudent alternative for the following reasons:

a. No determination of the extent to which such an approach would protect listed species can be made until the actual terms of an executed document are presented to the Service. This would require a future joint consultation between the Service, the Agency, and the action Federal agency.

b. Other Federal, State, or local agencies, beside the actual Federal land managers, could conduct programs on Federal lands that could affect listed species (e.g., the Animal and Plant Health Inspection Service sprays for grasshoppers on public lands). It is not clear how these memoranda would cover these other Federal and non-Federal entities.

c. The necessity for such memoranda is not clear as the Service has an understanding with the Agency (and other Federal agencies) that the terms of any individual biological opinion issued to another Federal agency for a particular pesticide application would become an agency-specific alternative to the generic opinion on the registration and use of that pesticide.

d. For some of the species listed as examples in the Agency's request, the potential area of pesticide application that affects the species extends beyond lands in actual Federal ownership. Thus label restrictions to avoid jeopardy to listed species off Federal lands would still have to be developed and reviewed. To segregate restrictions based on land ownership alone would be needlessly confusing to users.

2. Cancelled and suspended chemicals:

In Part 6 of the request, the Agency asked the Service to consider withdrawing jeopardy calls for pesticides for which registration is presently "cancelled" or "suspended". On November 22, 1988, the Service asked that the Agency provide detailed information on the significance of each of these terms as it relates to continued exposure of listed species to these chemicals.

The reasons for suspension and potential future uses of "suspended" chemicals were not provided by the Agency, except for dinoseb, where the Service understands that the Agency is in the process of purchasing the existing stock because of its threat to human health. As the Service understands, "cancelled" means the manufacturer can no longer distribute the chemical for use in the United States, but existing stocks remain on the market until exhausted.

Part 4 of the request also asked that jeopardy calls be dropped for strychnine on the basis that its above-ground use is currently suspended by court action.

After considering the information provided, the Service is not convinced that cancelling or suspending registration(s) eliminates the potential jeopardy posed by these pesticides until existing stocks have been removed from the market or assurance can be given that they will not be used within the species' habitat. Of the chemicals listed in the request, only dinoseb appears close to meeting these provisions.

There was no way of assessing the amount and extent of continued exposure of listed species to cancelled chemicals when existing stocks may continue to be used. Thus, the Service cannot withdraw its jeopardy opinions for these chemicals. Existing biological opinions remain in place for suspended chemicals, including those evaluating strychnine effects on the grizzly bear and gray wolf.

The Service recommends further, that in order to preclude jeopardy to or minimize the likelihood of incidental take of listed species that could

result from the continued availability and use of these compounds, the Agency provide notice, in its County bulletins, of the appropriate reasonable and prudent alternative or measure identified in Section II. This notice should be carried for a period of 10 years from the date of cancellation of registration or until the Agency provides substantive data that these chemicals no longer pose actual threats to these species and the Service concurs.

REASONABLE AND PRUDENT ALTERNATIVES

Regulations implementing Section 7 define reasonable and prudent alternatives as alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Service believes would avoid the likelihood of jeopardizing the continued existence of listed species or avoid the destruction or adverse modification of critical habitat.

Reasonable and prudent alternatives for each chemical for which jeopardy to a species or adverse modification of critical habitat were determined are recorded in Section II of this opinion. These alternatives represent the Service's best professional judgement of the measures necessary to provide the appropriate level of protection to the species given the data currently available. An effort was made in this consultation to develop a standard set of alternatives applicable to aquatic species to facilitate Agency implementation and user understanding.

The Agency is required to notify the Service of its final decision on the registration or reregistration of the chemicals found to jeopardize and which reasonable and prudent alternative(s) the Agency will implement if that chemical is so registered.

CONSERVATION RECOMMENDATIONS

1. Section 1010(a) of the 1988 amendments to the Endangered Species Act directs the Agency, in cooperation with the Departments of Agriculture and Interior, to promptly conduct a program to inform and fully educate agricultural commodity producers of the the Agency's compliance requirements under that Act. In addition to current multiagency efforts to provide information on the program to general pesticide users, the Service recommends that the Agency promptly incorporate endangered species protection techniques into State pesticide certification programs.

2. The Service strongly recommends that the Agency conduct (or require pesticide manufacturers to conduct) thorough pesticide toxicity studies on freshwater mussels. Such data are essential to the development of accurate hazard assessments for this group. The Agency-funded study by KBN Engineering ("Early Life Stage Protocols for the Assessment of Pesticide Effects to Freshwater Mussels") is an excellent first step in this

direction. Although LC-50 data produced by this study are too preliminary to allow any firm conclusions to be drawn, they do give an indication that for some products, such as carbaryl, toxicity to freshwater mussels may be orders of magnitude less than for Daphnia. On the other hand, for nitrapyrin, toxicity on larval oysters indicates an EC-50 twenty times that for Daphnia. This latter finding resulted in the Service's current determination that incidental take of freshwater mussels will occur from use of nitrapyrin. The Agency should continue its research to refine mussel LC-50 test protocols and see that tests are run on freshwater mussels for a significant number of the pesticides used in the range of listed mussel species.

3. Appropriate scenarios for the Forest Service's spray models, using worst case criteria, should be developed to assist in the identification of spray drift patterns over various endangered and threatened species' habitats. Resulting data could be used to tailor buffer zones to local conditions. The Forest Service has indicated a willingness to work with the Agency and the Service in developing such scenarios.

INCIDENTAL TAKE

Section 9 of the Act, as amended, prohibits any taking (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species without a special exemption. Under the terms of Section 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be a prohibited taking provided that such taking is in compliance with the terms and conditions specified in the incidental take statement provided in a biological opinion. If the specified level of incidental take is exceeded formal consultation must be reinitiated immediately.

For many species considered in this consultation, the Service expects that use of pesticides that otherwise do not pose jeopardy, are likely to result in incidental take because of the acute toxicity of some of these compounds and their expected environmental concentrations (as reflected in the hazard ratios). Because of the inherent biological characteristics of many aquatic species, the likelihood of discovering an individual death attributable to pesticides is very small. For example, small size, behavioral modifications before death, the presence of aquatic vegetation, natural and man-made structures or obstructions, stream flow, and rapid rates of decomposition make finding an incidentally taken animal extremely unlikely. Also difficult to recover are species with wide-ranging habits. Therefore, even though the Service expects incidental take to occur from the use of pesticides in the range of these species, the best scientific and commercial data available are not sufficient to enable the Service to estimate a specific amount of incidental take. In instances such as these, the Service has designated the expected level of incidental take as unquantifiable. This biological opinion provides reasonable and prudent measures that are expected to reduce the likelihood of such take.

Similarily the Service cannot determine the extent of species' habitat that will be affected by each or all chemicals. To do so would require accurate, up-to-date information on all land use activities occurring within the range of a particular endangered species, first-hand knowledge of the type, amount and timing of all pesticides used on the above lands, and an accurate population estimate of the particular species at the time of application.

In most cases, there are little or no data available on the toxicity of particular chemicals to an endangered species. Most of the information is extrapolated from studies done on taxonomically similar species. However, in the event that the remains of a listed species are found, it is imperative that they be examined to provide insight into the cause of death. If death is attributable to pesticide exposure, this information would be valuable in developing future biological opinions. Therefore, if an individual of a listed species is found and its death can be attributed to a particular chemical or groups of chemicals, the Service believes this would represent new information on the effects of this action that would require reinitiation of formal consultation under the terms of 50 CFR 420.16(b).

It is possible to estimate incidental take for some species. These species are most often larger terrestrial species for which there is information on distribution and population numbers, a species restricted to a very small range that is regularly monitored, or a species with a history of mortalities as a result of the use of pesticides. In this opinion, the expected amount and extent of incidental take from the use of pesticides is presented for each species in the individual accounts in Section III.

Specific reasonable and prudent measures that the Service considers necessary and appropriate to minimize incidental take and the terms and conditions to implement such measures are listed for each species in the pesticide profiles in Section II. In order for registrants and users to be exempt from the taking prohibition in Section 9 of the Act, the Agency, upon receipt of this opinion, must initiate compliance with the terms and conditions for implementation of the individual reasonable and prudent measures for each species. In addition to species specific actions, the following generic terms and conditions apply to all affected species:

a. The Agency shall implement a labeling program to notify users of the actions needed to protect listed species.

b. The Agency shall monitor incidental take to ensure compliance with anticipated take levels as required by 50 CFR Part 402.14(i)(3). Buildling upon an Agency suggestion (comments of May 17, 1989), the Service believes that a label or bulletin requirement to immediately report any dead or sick listed species found in or adjacent to pesticide use areas would assist the Agency in meeting this requirement. Such a requirement would provide incentive to the user to report such incidents in order to remain exempt from Section 9 taking provisions. However, the Service also believes that the Agency should strenghthen its information gathering base by obtaining assistance from State or Federal wildlife or plant agencies, the Extension Service, Department of

Agriculture cooperatives or educational and private organizations in reporting possible listed species take from pesticides.

c. The U.S. Fish and Wildlife Service, in the Region of the species' occurrence, is to be notified by the Agency within 3 working days of any dead or sick listed species found in or adjacent to pesticide treatment areas. Cause of death or illness, if known, should also be conveyed to those offices. The Agency shall provide information to:

Region 1 (CA,HI,ID,NV,OR,WA)
Fish and Wildlife Enhancement
U.S. Fish and Wildlife Service
1002 NE Holliday Street
Portland, OR 97232 Tel: (503) 231-6150/FTS: 429-6150

Region 2 (AZ,NM,OK,TX)
Endangered Species Division
U.S. Fish and Wildlife Service
P.O. Box 1306
500 Gold Avenue SW
Albuquerque, NM 87103 Tel: (505) 766-3972/FTS: 474-3972

Region 3 (IA,IL,IN,MI,MN,MO,OH,WI)
Division of Endangered Species
U.S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, MN 55111 Tel: (612) 725-3276/FTS: 725-3276

Region 4 (AL,AR,FL,GA,KY,LA,MS,NC,PR,SC,TN,VI)
Division of Endangered Species
U.S. Fish and Wildlife Service
Richard B. Russell Federal Building
75 Spring Street, Suite 1276
Atlanta, GA 30303 Tel: (404) 331-3580/FTS: 242-3580

Region 5 (CT,DC,DE,MA,ME,NH,NJ,NY,PA,RI,VA,VT,WV)
Assistant Regional Director - FWE
U.S. Fish and Wildlife Service
One Gateway Center, Suite 700
Newton Corner, MA 02158 Tel: (617) 965-9217/FTS: 829-9217

Region 6 (CO,KS,MT,ND,NE,SD,UT,WY)
Federal Activities and Special Projects
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225 Tel: (303) 236-8186/FTS: 776-8186

Region 7 (AK)
Ecological Services/ Endangered Species
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, AK 99503 Tel: (907) 786-3431/FTS: Same

d. To determine the success of the reasonable and prudent measures outlined in this opinion, an annual report of all Agency-known pesticide-related take of listed species shall be submitted by the Agency to the Director, U.S. Fish and Wildlife Service, with copies to each of the Regional Directors of the Service. This report shall be submitted by January 31 of each year.

PROCEDURES FOR HANDLING OR DISPOSING OF LISTED SPECIES

As requested in the Agency's comments of May 17, 1989, the Service will provide a protocol, under separate cover, for handling dead, injured or ill listed species for pesticide analysis. In the event that the Agency suspects that a species has been taken in violation of label restrictions, such situation shall be reported to the U.S. Fish and Wildlife Service, Division of Law Enforcement or their designee in the Region in which the species is found. Instructions for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. The contacts for each Region are:

Region 1 (CA,HI,ID,NV,OR,WA)
See individual species accounts for local contacts and handling instructions.

Region 2 (AZ,NM,OK,TX)
Assistant Regional Director, Law Enforcement
U.S. Fish and Wildlife Service
P.O. Box 329
123 4th Street, Room 332
Albuquerque, NM 87103 Tel: (505) 766-2091/FTS: 474-2091

Region 3 (IA,IL,IN,MI,MN,MO,OH,WI)
Assistant Regional Director, Law Enforcement
U.S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, MN 55111 Tel: (612) 725-3530/FTS: 725-3530

Region 4 (AL,AR,FL,GA,KY,LA,MS,NC,PR,SC,TN,VI)
Assistant Regional Director, Law Enforcement (ALE)
U.S. Fish and Wildlife Service
Richard B. Russell Federal Building
75 Spring Street, Suite 1218
Atlanta, GA 30303 Tel: (404) 331-5872/FTS: 242-5872

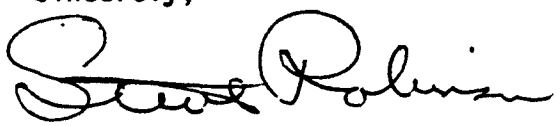
Region 5 (CT,DC,DE,MA,ME,NH,NJ,NY,PA,RI,VA,VT,WV)
Regional Director (Special Agent in Charge)
U.S. Fish and Wildlife Service
One Gateway Center, Suite 700
Newton Corner, MA 02158 Tel: (617) 965-5100/FTS: 829-9254

Region 6 (CO,KS,MT,ND,NE,SD,UT,WY)
Division of Law Enforcement
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225 Tel: (303) 236-7540/FTS: 776-7540

Region 7 (AK)
Assistant Director, Refuges and Wildlife (LE)
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, AK 99503 Tel: (907) 786-3311/FTS: Same

This letter, and the biological opinion it transmits, conclude formal consultation on the actions outlined in the reinitiation request. As required by 50 CFR 402.16, further reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals that the Agency's actions may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, if the Agency's actions are subsequently modified in a manner that cause an effect to listed species or critical habitat that was not considered in this opinion, and/or as new species are listed or critical habitat designated that may be affected by the actions.

Sincerely,



Acting Director

SECTION 1 - ASSUMPTIONS

Sections II and III of this opinion record or discuss the effect of pesticides named in parts 1 through 5 of the reinitiation request (request) on species listed as threatened or endangered (listed species). In addressing these pesticides the following assumptions or parameters were adopted:

1. This opinion addresses only those pesticides listed on Table 1 (pages 7,8, and 9) in request part 1; those listed for four bird species (pages 48 and 49) in part 2; those associated with the Scioto madtom, freshwater mussels, and snails (pages 71-74) in part 3; those associated with the Hays Spring amphipod and freshwater fish (pages 76 and 77) in part 4; and those addressed in part 5 (pages 84 and 85). Not all pesticides or species addressed in the original cluster opinions were covered in this opinion. Thus, unless modified herein, prior opinions remain in effect.

2. Based on the nature of the hazard data provided by the Agency, the term "aquatic species", as used in this opinion, is restricted to fish, aquatic invertebrates, and those amphibians that have fully aquatic larval stages. This opinion addresses all aquatic species listed as of May 1, 1989.

3. The possible effects of pesticides are considered individually. The Service was not provided data with which to evaluate the potential effects or toxicity of the hundreds of combinations of these chemicals as they may be used on crops, forests, pastures/rangelands, or as mosquito larvicides. Similarily, no analysis could be made of the effect of the inert ingredients in pesticides or their carriers, like oil, that may affect the species or their habitat.

4. The opinion assumes that all label instructions will be followed and that application rates will be at the levels indicated in the tables in parts 1 and 2 of the request.

5. Following review, the modelling techniques and the tabular results presented by the Agency in the request were adopted as the "best available data". However, the Service selected the particular model that best fit the biology of each species. Where more than one application model applied to a species, the scenario that posed the greatest hazard was selected in the interest of ensuring minimum affect on that species.

6. As used in this opinion, the term "crops" refers to most or all of the following: corn, cotton, soybeans, sorghum, wheat, barley, oats, and rye.

7. Based on the application rate for each chemical (in the tables in part 1 of the request) and an uncertainty on the current registered uses for several chemicals, the assumption was made that if a pesticide was used on any one of the agricultural crops (corn, cotton, soybeans, sorghum, wheat, oats, barley, or rye), it could be used on all. A

distinction was made if the chemical was known to be registered for only one or two of these crops (e.g. cotton). Thus, in this opinion, a jeopardy or no jeopardy call for any use of the pesticide on one crop assumes the same call for all other crops that may be grown in the vicinity of a given species.

8. If a jeopardy call is made for any one use of a given pesticide within the occupied habitat of a species, it was assumed that any similar application rate or method for other uses of the chemical poses the same likelihood of jeopardy within that area. Thus the call will be jeopardy for that chemical, although the reasonable and prudent alternatives will address only those particular uses that pose the jeopardy.

> Examples: If use of the pesticide on crops poses no jeopardy, while its use on forests poses jeopardy, the call for that pesticide is jeopardy, although the reasonable and prudent alternatives will address only its use on forests.
>
> Only if the pesticide poses no jeopardy for all uses under consideration in this request will the final call be no jeopardy for those uses.

9. The following species, addressed in prior opinions, were not addressed in this opinion as they have been delisted or do not occur in the United States: Pine Barrens treefrog, Amstead gambusia, Nicklin's pearly mussel, Sampson's pearly mussel, Tampico pearly mussel and Palos Verdes blue butterfly. Additionally, the Pahranagat bonytail, addressed in this and prior opinions, is now called the Pahranagat roundtail chub.

10. The invertebrate species, Cambarus zophonastes, has no official common name, but is called the [cave] crayfish in this opinion for convenience.

11. Aquatic species under the administration of the National Marine Fisheries Service are not addressed in this opinion, although the short-nosed sturgeon has been found to be jeopardized by at least one chemical, endosulfan, in prior opinions.

12. Incidental take statements provided in this opinion address the anticipated take from all pesticide uses that may affect listed species. It was not considered reasonable to attempt to anticipate incidental take for individual chemicals, combinations of these chemicals, or all of their registered uses.