Cascade Resources
ADVOCACY GROUP

June 3, 2002

VIA CERTIFIED MAIL—RETURN RECEIPT REQUESTED

Honorable Christie Whitman
Administrator
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

The Honorable Donald Evans
Secretary of Commerce
U.S. Department of Commerce
1401 Constitution Avenue, N.W.
Washington, DC 20230

Honorable Gale Norton
Secretary of the Interior
U.S. Department of the Interior
1849 C Street, N.W.
Washington, D.C. 20240

Re: Notice of Violations of the Endangered Species Act for Failing to Consult Regarding the EPA's Pesticide Program, for Failing to Implement a Conservation Plan, for take of endangered or threatened species, and for Violating the Migratory Bird Treaty Act.

Dear Administrator Whitman:

Cascade Resources Advocacy Group represents the Center for Biological Diversity (the "Center") with respect to the following matter. On behalf of the Center, we hereby provide notice, pursuant to section 11(g) of the Endangered Species Act ("ESA"), 16 U.S.C. §1540(g)(2)(A)(i), that the Environmental Protection Agency ("EPA") is in violation of the ESA, 16 U.S.C. § 1521, et seq. Specifically, EPA has failed to satisfy the Section 7 consultation requirements that apply to its pesticide registration program, in its implementation of the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"), 7 U.S.C. § 136-136y; EPA has also failed to satisfy Section 7 consultation requirements for individual pesticide registrations and reregistrations; EPA is in violation of Section 9 of the ESA for the take of listed species which is resultant from pesticide applications; furthermore, EPA has failed to establish a conservation program consistent with section 7(a)(1) of the ESA; and, finally, EPA has violated the Migratory Bird Treaty Act, 16 U.S.C. § 703–712.

BACKGROUND

FIFRA, enacted in 1947, controls the sale and use of pesticides through a pesticide registration program administered by the EPA. Pesticides are widely used and are often not particularly specific for the "target" organism. Consequently, these pesticides can cause significant unintended impact to nontarget organisms. The adverse affect of pesticides on nontarget organisms is well documented and raises concern about the impacts of pesticides on our ecosystems, including impacts to federally listed endangered and threatened species.

EPA, the United States Fish and Wildlife Service ("FWS") and the U.S. Geological Survey ("USGS") have acknowledged the impact of pesticides on our environment. Researchers have also reported ample studies documenting the impact of registered pesticides on the environment. The existing information, discussed below, suggests that EPA has failed in its legal obligations to properly manage and implement the pesticide registration program, which in turn threatens to impose severe impacts upon our ecosystems.

The Pervasiveness of Pesticides:

Over 1 billion pounds of pesticides are used each year in the United States to control weeds, insects and other organisms. U.S. Geological Survey, 1999, Pesticides in Stream Sediment and Aquatic Biota, USGS Fact Sheet 092-00. Agriculture now accounts for 70 to 80 percent of total pesticide use. U.S. Geological Survey, 1999, Quality of Our Nation's Waters, Nutrients and Pesticides, USGS, Circ. 1225. Most of the agricultural pesticides are herbicides, accounting for 60% of the agricultural use. Id. Insecticides, which are generally more toxic to aquatic life, are more commonly attributed to urban use. Id. In a presentation entitled "Pesticides in the Nation's Water Resources," given by Robert J. Gilliom and based on the results found in the USGS Quality of Our Nation's Waters study, Mr. Gilliom stated that "[a]lmost every sample of water and fish from streams and major rivers in all land use settings contained at least one of the pesticides that we measured. This means that, throughout the nation, almost every time and place that you observe a stream or river in a populated area you are looking at water that contains pesticides, inhabited by fish that contain pesticides." U.S.G.S Pesticide National Synthesis Project, 1999, Pesticides in the Nation's Water Resources—Water Environment Federation Briefing Series, March 19, 1999, Capitol Building, Washington, D.C. This is a striking statement and one that should raise significant concern among those in the EPA who register these pesticides.

Pesticide Fate:

Once a pesticide is introduced into the environment it may be influenced by a variety of processes, affecting the pesticide's persistence and movement (referred to as a pesticide's "fate") in the environment which ultimately determine the level of harm the pesticide poses to "non-target" plants and animals. Of greatest concern is the movement of pesticides in water resources because of the significant exposure of the pesticides to nontarget organisms. There are three major fate processes which must be taken into consideration when determining the impact of a pesticide on the environment: (1) adsorption—the binding of pesticides to mineral or soil particles; (2) transfer—the movement of pesticides in the environment; and (3) degradation—the breakdown of pesticides. Adsorption is relevant because the tendency of pesticides to bind to soil particles varies, influencing the ability of a particular pesticide to enter into other biological or chemical pathways. Harrison, S.A., The Fate of Pesticides in the Environment, Agrichemical Factsheet #8, Penn State Cooperative Extension, 1990. Pesticide transfer can occur through volatilization, runoff, leaching, absorption, and physical removal. Water is one of the primary pathways by which pesticides are transported from their application areas to other parts of the environment. USGS, Pesticides in Stream Sediment. Runoff is of particular concern. Movement of pesticides via runoff can occur whether pesticides are dissolved in the water or bound to eroding soil particles. Harrison, The Fate of Pesticides in the Environment. Herbicide runoff can cause direct harm to nontarget plants. Pesticides which are carried into surface waters via runoff can directly and indirectly harm aquatic organisms. When determining the likelihood of harm to nontarget organisms, the cumulative effect of pesticide fate and transport must be considered to adequately address the impact of pesticides on endangered and threatened species.

Pesticide Drift:

Runoff is not the only transfer process of concern regarding pesticide movement. Aerial pesticide applications typically result in a loss of 40% to drift. Cox, C., Pesticide Drift-Indiscriminately from the Skies, Journal of Pesticide Reform, Spring 1995, Vol.15, No.1. The amount of drift has been characterized as "considerable" by the National Research Council and is thought to vary from 5% (under optimal low wind conditions) to 60% (under more typical conditions). National Research Council, Board on Agriculture, Committee on Long-Range Soil and Water Conservation, 1993, Soil and water quality: An agenda for agriculture, Washington, D.C., Natl Academy Press, 323-324. The Office of Technology Assessment estimates that about 40% of an aerial insecticide application leaves the target area and that less than 1% actually reaches the target pest. U.S. Congress, Office of Technology Assessment, 1990, Beneath the bottom line: Agricultural approaches to reduce agrichemical contamination of groundwater, Report No. OTA-4-418, Washington, D.C., U.S. GPO. The typical range for drift is 100 meters to 1600 meters. Cox, Pesticide Drift. However, longer ranges have been documented. For example, drift from orchard applications in Vermont exceeded 2 miles. Id. Pesticides applied to wheat fields in Colorado drifted between 5 and 10 miles. Id. Applications in California drifted 4 miles from an oat field; while drift has been seen 10 to 50 miles from applications in central Washington.

Impacts to wildlife from pesticide drift have also been documented. In a study done by the USGS, pesticide drift from the Central Valley of California was found to impact frog species in the Sierra Nevadas. Sparling, D.W., G.M. Fellers, and L.L. McConnell, 2001, Pesticides and Amphibian Population Declines in California, Envtl Toxicology and Chemistry, Vol.20, No.7, 1591-1595; see also Lenoir, J.S., et al., 1999, Summertime transport of current-use pesticides from California's Central Valley to the Sierra Nevada Mountain Range, Envtl Toxicology and Chemistry, 18:2715. The study found that the most drastic population declines of several frog species (red-legged frog, *Rana aurora*, yellow-legged frog, *Rana boylii*, mountain yellow-legged frog, *Rana muscosa*, and Yosemite toad, *Bufo canorus*) are found in the Sierra Nevadas, downwind from the San Joaquin Valley. In 1998, over 60% of the total pesticide usage in the state of California was sprayed in the San Joaquin Valley. The study found a close correlation between the declining populations of frogs and exposure to agricultural pesticides. Particularly, the study found diazinon, endosulfan, and chlorpyrifos in over half the frogs tested at toxic levels. This study raises significant concerns about the transfer of pesticides and impacts of pesticide use on non-target organisms far away from pesticide application. EPA must also assess drift impacts from pesticide use when assessing the impact of pesticides on listed species.

Pesticide Presence in Stream Sediment and Biota:

Pesticide presence in stream sediment is indicative of whether pesticides are present in the water column. USGS, Pesticides in Stream Sediment. Sediment serves as habitat for benthic biota such as clams and insects, species at the bottom of the foodchain. Sediment is also a source and a removal mechanism for contaminants to and from the stream. Pesticides can move into and out of stream sediment through such processes as sorption by biota, diffusion (during tissue decomposition), mixing, burial, settling, resuspension, sorption and desorption to suspended particles, ingestion by biota and elimination of waste. Id. Pesticides can persist and accumulate in sediment and aquatic biota through the processes described above even when concentrations are too low to be detected using conventional sampling and analytical methods. Id. The USGS reports that 44% of the pesticide targeted (41 of 93) were detected in sediment, and 64% (68 of 106) were detected in aquatic biota. Id. Such currently used pesticides as benfluralin, besulide, dacthal, ethafluralin, 2,4-DB, dicamba, diuron, triallate, and trifluralin, (herbicides) and chlorpyrifos, dicofol, endosulfan, esfenvalerate, fenthion, fenvelaerate, lindane, methoxychlor, permethrin, phorate, and propargite (insecticides) were all detected in stream sediment or biota. The presence of these pesticides in sediment and biota raises concerns about the long-term chronic impacts of pesticides on listed species.

Pesticide Presence in U.S. waters:

The U.S. Geological Survey ("USGS"), after studying water quality for several years, released several reports on the status of the Nation's waters, documenting the presence of pesticides throughout the nation. In those studies, USGS found that the presence of pesticides is pervasive. Larson, S.J. et al, Pesticides in Streams of the U.S.—Initial Results from the National Water-Quality Assessment Program ("NWQA"), USGS Water-Resources Investigation Report 98-4222, 1999. The NAWQ findings indicate that streams and ground water in basins with significant agricultural or urban development, or with a mix of these land uses, almost always contain mixtures of nutrients and pesticides. U.S.G.S., Quality of Our Nation's Waters. At least one pesticide was found in almost every water and fish sample collected. Id. Moreover, individual pesticides seldom occurred alone; almost every sample from streams contained two or more pesticides. Id. The USGS noted a direct correlation between the amounts of pesticides used and the frequency of pesticides found in our surface waters. Extensive herbicide use in agricultural area has resulted in widespread occurrence of herbicides in agricultural streams and shallow ground water. Id. The most heavily used agricultural herbicides, such as atrazine, metolachlor, alachlor, and cyanazine were detected most often in the sampling. Larson, Pesticides in Streams. Concentrations of insecticides were more commonly found in urban streams, with levels frequently exceeding their ALCs. USGS, Quality of Our Nation's Waters. Again, the pervasive presence of pesticides in our waterways raises significant concerns about the chronic and acute affects of pesticides on listed species.

Aquatic Life Criteria:

The USGS noted that aquatic organisms may be more at risk than human health. USGS, Quality of Our Nation's Waters. Evidence of this was drawn from the USGS sampling which found that aquatic life criteria values ("ALCs") were frequently exceeded. Larson, Pesticides in Streams. For example, one or more ALC was exceeded at 39 of the 58 sampling sites. Larson, Pesticides in Streams. Almost every urban stream sampled had concentrations of insecticides that exceeded at least one guideline, and most had concentrations that exceeded a guideline in 10 to 40 percent of samples collected throughout the year. USGS, Quality of Our Nation's Waters. For herbicides, the study found a seasonal pulse of elevated concentrations of pesticides following applications. Larson, Pesticides in Streams. Insecticides were found to persist above ALCs for longer periods of time in both urban and agricultural sites. Id.

ALCs have not been established for all pesticides. In the USGS study of our nation's waters, the USGS refers to ALCs established by three different bodies. In the USGS study, EPA established ALCs were used for six of the target compounds,[1] Canadian values were used for 11 compounds with no EPA-established value,[2] and the Great Lakes Water-Quality Objective established ALC was used for diazinon.[3] No ALCs

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[1] See U.S. Environmental Protection Agency, 1991, Water-quality criteria summary: U.S. EPA, Office of Water, Office of Science and Technology, Health and Ecological Effects Division.
[2] See Canadian Council of Resource and Environment Ministers, 1991, Canadian water quality guidelines: Ottawa, Ontario, Environment Canada, Inland Waters Directorate, Water Quality Branch.
[3] See International Joint Commission, 1977, New and revised Great Lakes water quality objectives, International Joint Commission Canada and United States.

have been established for the remaining 28 target compounds of the USGS study. Larson, Pesticides in Streams. Of the target herbicides in the USGS study, only 9 of the 27 target compounds had an established ALC. For the target insecticides, only 9 of the 19 target insecticides had an established ALC.

The USGS study found that concentrations of one or more compounds exceeded an ALC value in at least one sample from 25 of the 37 agricultural sites, 10 of the 11 urban sites, and 4 of the 10 integrator sites. Larson, Pesticides in Streams. At four of these sites, 6 to 8 compounds were detected at concentrations greater than their ALCs. The herbicides, triallate, trifluralin, metolachlor, atrazine, and cyanazine were all found in levels exceeding their ALCs. Id. The ALCs for atrazine and cyanazine were exceeded more frequently than the other target compounds. For the 9 target insecticides (carbofuran, dieldrin, a-HCH, lindane, parathion, azinphos-methyl, chlorpyrifos, diazinon, and malathion) that have an established ALC, the study found that all of their criteria values were exceeded. The criteria values for azinphos-methyl, chlorpyrifos, diazinon and malathion –all commonly used organophosphates–were frequently exceeded. Id. Concentrations of malathion exceeded its criterion value at 13 sites. Concentrations of azinphos-methyl exceeded its criterion value at 16 sites. Id. Concentrations of chlorpyrifos exceeded its criterion value at 20 sites; 6 of which were urban. Id. These high concentrations were found for longer periods at several sites. Id. Concentrations of diazinon exceed its criterion values at 18 sites. Id. Concentrations in excess of the ALC were found for extended periods of time at 12 of the 18 sites. Id. Concentrations of atrazine exceeded its criterion value at 17 sites, with concentrations remaining in excess of its criterion value for extended periods of time. Id. Concentrations of cyanazine exceeded its criterion value at 10 sites, which also happened to be 10 of the 17 sites were atrazine exceeded its criterion value. Id.

However, ALCs cannot provide certainty about the impacts to aquatic organisms. Several factors contribute to uncertainty regarding the potential effects of the presence of pesticides in our waters. The following factors likely indicate the impact of pesticides is much greater than the ALCs would lead one to believe: (1) ALCs do not address chronic exposure to mixtures, failing to take into account possible additive or synergistic effects of more than one pesticide or combinations of pesticides, or pesticide transformation products; (2) ALCs do not address the prevalence of pesticide breakdown products; (3) ALCs do not address the strong seasonality of concentration patterns (resulting in repeated pulses of high concentrations); (4) ALCs do not address the possibility that some types of biological effects have not been evaluated (e.g. endocrine disruption); and (5) ALCs have not been established for all registered pesticides. U.S.G.S Pesticide National Synthesis Project, Pesticides in the Nation's Water Resources; Larson, S.J., et al. It can be seen from these factors, raised by Robert Gilliom, that sole reliance on whether an ALC is exceeded as a proxy for whether species may or may not be adversely affected would be erroneous.

USGS also acknowledges that several degradation products were commonly detected and were found at higher levels and can persist much longer than the parent compounds. Larson, S.J. et al citing Goolsby et al, Persistence of herbicides in selected reservoirs in the Midwestern United States, 1993; Kalkhoff et al., Degradation of chloroacetanilide herbicides, Envtal Science and Tech., v.32, no.11, 1998. For example, total herbicide breakdown products were frequently found at more than 10 times the concentration of the parent compounds over a two-year period. U.S.G.S Pesticide National Synthesis Project, Pesticides in the Nation's Water Resources. Failure to incorporate this pertinent fact into an analysis of pesticide impacts on aquatic biota would erroneously raise the bar of acceptable concentrations of pesticides for aquatic biota in our surface waters.

The mere fact that ALCs do not address the cumulative effect of the presence of multiple pesticides is enough to indicate that any determination of no adverse effects on aquatic biota based solely on ALC exceedances would be inadequate. The presence of multiple pesticides with concentrations greater than their ALCs was "widespread," occurring at 29 sites. Larson, Pesticides in Streams. On average, about 20 of the target compounds were detected at each site regardless of land-use setting and basin size, and an average of 6 to 7 of the target compounds were detected in each individual sample. Id. Gilliom also noted that pesticides almost always occur as mixtures. U.S.G.S Pesticide National Synthesis Project, Pesticides in the Nation's Water Resources. For example, in the San Joaquin River and the Willamette River basins, concentrations of two or more insecticides often exceeded criteria values in the same sample or during the same period. In Oregon, concentrations of several insecticides, including azinphos-methyl, carbofuran, chlorpyrifos, diazinon, and malathion, as well as the herbicide atrazine, were higher than or near criteria values at various times throughout 1993 and 1994, often in the same samples. Larson, Pesticides in Streams. The multiple presence of pesticides can be found in urban streams as well. About 80 percent of samples from urban and mixed land use streams contained more than 4 pesticides. U.S.G.S Pesticide National Synthesis Project, Pesticides in the Nation's Water Resources. About 15 percent of all stream samples contained more than 10 pesticides. With such pervasive presence of multiple pesticides any determination of effects made on a pesticide by pesticide basis will clearly fall short of truly recognizing the impact the pesticide is having, in combination with other pesticides, on aquatic listed species. Rather, the exceedance of ALCs is an indicator that aquatic listed species may be affected. ALC exceedances stress the importance of assessing the cumulative effect of the presence of multiple pesticides on listed species.

Endocrine Disruption and Other Biological Impacts of Pesticides:

Endocrine disruptors are synthetic chemicals that mimic natural hormones, disrupting natural processes by sending false messages, blocking real messages, preventing synthesis of the body's own hormones, and accelerating the breakdown and excretion of hormones. Endocrine disruption effects how an organism develops and functions. Reproductive disorders, immune system dysfunction, thyroid disorders, types of cancer, birth defects and neurological effects have all been linked to endocrine disruption. Endocrine disruption plays a significant role during critical development of organisms. The Center for Bioenvironmental Research of Tulane and Xavier Universities list the following pesticides as endocrine disruptors: o,p'-DDT, endosulfan, dieldrin, methoxychlor, kepone, dicofol, toxaphene, chlordane, alachlor, atrazine, nitrofen, benomyl, mancozeb, tributyltin, aldicarb, and dibromochloropropane.

Endocrine disruptors often impact wildlife at critical developmental stages. Center for Bioenvironmental Research, Environmental Estrogens, Wildlife and Human Health Effects, <www.som.tulane.edu/ecme/eehome/basics/eeeffects/> (visited April 24, 2002). Offspring of those affected by endocrine disruptors may also suffer from lifelong health and reproductive abnormalities including reduced fertility, altered sexual behavior, lowered immunity, and cancer. Id. Recognizing endocrine disruption in the registration of pesticides is critical because over 60% of the poundage of all agricultural herbicides applied in the United States have the potential to disrupt endocrine and/or reproductive systems of humans and wildlife. Short, P. and Colborn, T., 1999, Pesticide Use in the U.S. and Policy Implications: A Focus on Herbicides, Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 240-275. Due to the pervasive presence of herbicides in the United States and the startling figure that over half of those herbicides have the potential to disrupt endocrine and/or reproductive systems, EPA's failure to address this issue reflects EPA's continuing neglect to adequately consider the impact registration of pesticides are having on wildlife, including listed species. Numerous studies have observed the significant impacts of pesticides on hormonal and reproductive systems of wildlife.

For example, scientists have documented endocrine disruption from pesticide concentrations at low levels; levels commonly found in the environment. Interference with reproduction in red-spotted newts, *Notopthalmus viridescens* from exposure of endosulfan, a commonly-used pesticide, at extremely low levels was recently documented. Park, D, SC Hempleman, and CR Propper, 2001, Endosulfan exposure disrupts pheremonal systems in the red-spotted newt: A mechanism for subtle effects of environmental chemicals, Envtal Health Perspectives 109:669-673. The study noted that endosulfan disrupted the development of glands that synthesize a pheromone used in female communication. This disrupted development then lead to lower mating success. Specifically, the study revealed an impact at 5 parts per billion ("ppb"), the lowest concentration used in the study. This concentration is well within the range of endosulfan contamination regularly encountered in the real world. EPA's recommendation for acceptable concentrations of endosulfan in surface waters is 74 ppb, almost 15 times higher than the level reported by Park's study. Park's study identifies a new mechanism by which low-level contamination can cause adverse effects in wildlife populations. Another study suggests that a new and growing class of herbicides can affect nontarget plants and microorganisms at levels so low that they cannot be detected.

Whitcomb, C.E. 1999, An Introduction to ALS-Inhibiting Herbicides, Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 231-239.

Another study recently found that amphibians are likely to be far more sensitive to pesticides in the real world than traditional laboratory tests used to establish regulatory standards would indicate. Reyle, R.A. and N. Mills, 2002, Predator-induced stress makes the pesticide carbaryl more deadly to gray treefrog tadpoles, *Hyla versicolor*, Proceedings of the National Academy of Sciences, Feb. 2001.The study found that low contamination levels of carbaryl cause significant mortality due to the length of exposure. Long-term exposure to low levels of carbaryl in combination with added biological stressors, such as the presence of predators, dramatically increased mortality. The study suggests that it is highly likely that the current regulatory science has dramatically underestimated the impacts of many pesticides.

Most recently, the herbicide atrazine was found to disrupt sexual development of frogs at concentrations 30 times lower than levels allowed by EPA. Hayes, T.B., et al., 2002, Hermaphroditic, demasculinized frogs after exposure to the herbicide atrazine at low ecologically relevant doses, Proc. Natl. Acad. Sci., April 16, 2002, Vol.99, Issue 8, 5476-5480. Atrazine is the most commonly used herbicide in the United States. This study exposed frogs to low levels of atrazine, levels which can often be found in the environment. Results showed that these low levels of atrazine demasculinized male frogs, preventing male characteristics from fully forming. Hayes noted that due to the pervasive nature of atrazine at levels that can disrupt sexual development, aquatic environments are at risk. EPA's newly drafted criteria for atrazine for the protection of aquatic life is 12 ppb. Hayes found hermaphroditism in frogs at exposure levels as low as 0.1 ppb, far below the level established by EPA as safe for aquatic organisms. The effective doses demonstrate the sensitivity of amphibians to the presence of pesticides in the environment. Hayes noted that amphibians are at great risk because the highest atrazine levels coincide with the breeding season for amphibians. Additionally, the low-dose endocrine-disrupting effects are of great concern because the described effects are all internal and may go unnoticed by researchers. Thus, "exposed populations could decline or go extinct without any recognition of the developmental effects on individuals."

The impact of pesticides on frogs was also recently analyzed in a Canadian study. The findings have received peer-review and will be published in a research journal later this year. The study found that frogs given trace amounts of DDT and other pesticides experience a near-total collapse in their immune systems. The researchers exposed northern leopard frogs with small doses of DDT, dieldrin, or malathion. The study found that it took frogs 20 weeks of living in a pesticide-free environment to have their immune systems return to normal.

In a study focusing on the effect of methoxychlor, a substitute for DDT, scientist found that pesticide presence in pregnant mice changed the structure of the male offspring's prostrate. Welshons, W.V., et al., 1999, Low-dose bioactivity of xenoestrogens in animals: fetal exposure to low doses of methoxychlor and other estrogens increases adult prostrate size in mice, Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 12-25. This study was done using doses that are encountered in the environment.

Endocrine disruptors have been found to affect sexual development of salmonids. Nagler, J.J., et al., 2001, High Incidence of a Male-Specific Genetic Marker in Phenotypic Female Chinook Salmon from the Columbia River, Envtal Health Perspectives 109:67-69. Investigating the sex reversal in salmonids, this study postulated that the 84% of phenotypic females which tested positive for the male genetic marker, or more plainly put, the feminization of developing males may be attributed to endocrine disrupting compounds, such as pesticides.

Pesticides have been documented as compounds which affect reproduction. A Study on the impacts of pesticides on the expected sex ration of turtle eggs found that the sex ration was altered by each of the pesticides used (a PCB mixture, trans-nonachlor, and chlordane). Willingham, E.T., et al., 2000, Embryonic Treatment with Xenobiotics Dsirupts Steroid Hormone Profiles in Hatchling Red-Eared Slider Turtles (*Trachemys scripta elegans*), Envtal Health Perspectives 108(4): 329-332. Specifically, the study found that the chlordane suppressed testosterone levels in hatchling males and progesterone levels in hatchling females, indicating that chlordane's impact on sex ration is a result of anti-androgenic activity. Trans-nonachlor worked as an estrogen mimic, while alachlor suppressed testosterone levels but not progesterone levels. The study concluded that the results are important because the illustrate that different hormone disrupting compounds can achieve similar end results via different biochemical mechanisms. Sex ratio disruption was also documented in a study of male water fleas. Dodson, S.I., et al., Dieldrin Reduces Male Production and Sex Ratio in Daphnia (*Galeata mendotae*), Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 192-199. In Dodson's study, dieldrin reduced the number of male Daphnia. Such results are of concern because insects serve as the bottom of the food chain, serving as a food source for many higher life forms including fish. Consequently, this study has implications for wildlife throughout the food web. A third study focusing on the reproductive system of frogs (the northern leopard frog, *Rana pipiens* and green frog, *Rana clamitans*) tested frogs from eight breeding sites, four of which were situated in apple orchards. Harris, M., et al., Apple Orchard Insecticide and Fungicide Effects on Ranid Populations in Ontario, University of Guelph, Ontario, abstract found at <www.pmac.net/ranid.htm>. Embryos and larvae were subjected to *in-situ* and ambient pond water (laboratory) assays and to toxicity tests of pesticides used in orchards. The *in-situ* embryos and larvae suffered high mortality at some of the orchard sites, while high hatching success was found in the reference sites, indicating that mortality in orchard ponds was probably due to stressful environmental conditions. Toxicity tests revealed that the pesticide diazinon (a commonly used pesticide) and the formulations Dithane DG, Gunthion 50WP, and Thiodan 50WP cause mortality, deformities, and/or growth inhibition in embryos and tadpoles. Residues of three of these compounds were detected at the *in-situ* sites.

Another study investigating hormone disruption on amphibians found that the breakdown products of methoprene interfered with the retinoid hormone system. La Clair, J.J., J.A. Bantle and J. Dumont, 1998, Photoproducts and metabolites of a common insect growth regulator produce developmental deformities in *Xenopus*, Envtal Science and Technology, 32: 1453-1461. Lab experiments with the toad, *Xenopus laevis*, show that S-methoprene (a commonly used pesticide in the U.S.) itself poses little risks to toads at commonly encountered levels in the environment. However, when the toad is exposed to methoprene's breakdown products, the exposure results in dramatic interference with normal amphibian development. This study confirms that studies of contamination must be carried out in ways that reflect the real world. Important effects were only evident once the experiment focused on the breakdown products of the active ingredient—a concern EPA acknowledges that they have not adequately addressed as all EPA REDs focus solely on the parent compound without any investigation into the deleterious impacts the breakdown products may reek on wildlife.

A delay in puberty and reduction in the fertility of rats was found as a result of exposure to methoxychlor. Gray, L.E., et al., The estrogenic and antiandrogenic pesticide methoxychlor alters the reproductive tract and behavior without affecting pituitary size or LH and prolactin secretion in male rats, Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 37-47. Gray also documented the antiandrogenic effects of other commonly used pesticides. The study found that exposure to these pesticides produced diverse reproductive malformations in male rats, including undescended testes, hypospadias, vaginal pouches, and permanent nipples. Gray also documented reproductive effects from exposure of low-levels of the fungicide vinclozilin. Gray raises concern that some of the antiandrogen effects may have no threshold; that they may be initiated through the slightest increase in antiandrogenic pesticides.

Interactive effects of multiple contaminants, when no effects were found if rodents were exposed to one chemical alone, were found resulting in endocrine, immune and behavioral changes. Porter, W.P., et al., Endocrine, Immune, and Behavioral Effects of Aldicarb (Carbamate), Atrazine (Triazine) and Nitrate (Fertilizer) Mixtures at Groundwater Concentrations, Toxicology and Industrial Health: An International Journal, Jan-March 1999, Vol.15, Nos. 1&2, 133-150. The study exposed rodents to concentrations of atrazine, aldicarb and nitrate (all commonly found in the environment) at levels actually found in the environment.

Experts from a wide variety of disciplines were convened in 1998 to jointly review evidence and assess hazards of endocrine disruption. Colborn T, Vom Saal F, Short, P, eds., Environment Endocrine-Disrupting Chemicals: Neural, Endocrine, and Behavioral Effects, Princeton, N.J.: Princeton Scientific Publishing, 1998; 1-9. The outcome of these convened meetings have been "consensus statements" detailing their conclusions about the state of science regarding endocrine disruption. Those convened included: Dr. Enrico Alleva, Head, Behavioral Pathophysiology Section Lab. Fisiopatologia di Organo e di Sistema, Instituto Superiore di Sanita, Rome, Italy; Dr. John Brock, Chief - PCBs and Pesticides Laboratory, Center for Environmental Health, Centers for Disease Control, Atlanta, GA; Dr. Abraham Brouwer, Associate Professor and Toxicology and Research Coordinator, Agricultural University, Wageningen, The Netherlands; Dr. Theo Colborn, Senior Program Scientist, Wildlife and Contaminants Project, World Wildlife Fund, Washington, DC; Dr. M. Cristina Fossi, Professor, Dept. of Environmental Biology, University of Siena, Siena, Italy; Dr. Earl Gray, Section Chief, Developmental and Reproductive Toxicology Section, U.S. EPA, Research Triangle Park, NC; Dr. Louis Guillette, Professor, Dept. of Zoology, University of Florida, Gainesville, FL; Peter Hauser, MD, Chief of Psychiatry, Psychiatry Service (116A), Baltimore VAMC, 10 North Greene Street, Baltimore, MD; Dr. John Leatherland, Professor, Chair, Dept. of Biomedical Sciences, Ontario Veterinary College, University of Guelph, Ontario, Canada; Dr. Neil MacLusky, Professor, Director Basic Research, Div. of Reproductive Science, Toronto Hospital, Ontario, Canada; Dr. Antonio Mutti, Professor, Laboratory of Industrial Toxicology, University of Parma Medical School, Parma, Italy; Dr. Paola Palanza, Researcher, Dept. of Biology and Physiology, University of Parma, Parma, Italy; Dr. Stefano Parmigiani, Professor, Dept. of Evolutionary and Functional Biology, University of Parma, Parma, Italy; Dr. Susan Porterfield, Professor and Associate Dean of Curriculum, Medical College of Georgia, Augusta, GA; Dr. Risto Santti, Associate Professor, Department of Anatomy, Institute of Biomedicine, University of Turku, Turku, Finland; Dr. Stuart A. Stein, Associate Professor of Neurology, Medicine, Pediatrics, Obstetrics-Gynecology, and Molecular and Cellular Pharmacology, University of Miami School of Medicine Miami, FL, US and Chief of Neurology, Children's Hospital of Orange County, Orange, CA; Dr. Frederick vom Saal, Professor, Division of Biological Sciences, University of Missouri Columbia, MO; and Dr. Bernard Weiss, Professor, Dept. of Environmental Medicine, University of Rochester, School of Medicine and Dentistry, Rochester, NY.

The group of convened scientists reached the following consensus statements:

1. *We are certain of the following:*

● Endocrine-disrupting chemicals can undermine neurological and behavioral development and subsequent potential of individuals exposed in the womb or, in fish, amphibians, reptiles, and birds, the egg. This loss of potential in humans and wildlife is expressed as behavioral and physical abnormalities. It may be expressed as reduced intellectual capacity and social adaptability, as impaired responsiveness to environmental demands, or in a variety of other functional guises. Widespread loss of this nature can change the character of human societies or destabilize wildlife populations. Because profound economic and social consequences emerge from small shifts in functional potential at the population level, it is imperative to monitor levels of contaminants in humans, animals, and the environment that are associated with disruption of the nervous and endocrine systems and reduce their production and release.

• Because the endocrine system is sensitive to perturbation, it is a likely target for disturbance. In contrast to natural hormones found in animals and plants, some of the components and by-products of many manufactured organic compounds that interfere with the endocrine system are persistent and undergo biomagnification in the food web, which makes them of greater concern as endocrine disruptors.

• Man-made endocrine-disrupting chemicals range across all continents and oceans. They are found in native populations from the Arctic to the tropics, and, because of their persistence in the body, can be passed from generation to generation. The seriousness of the problem is exacerbated by the extremely low levels of hormones produced naturally by the endocrine system which are needed to modulate and induce appropriate responses. In contrast, many endocrine-disrupting contaminants, even if less potent than the natural products, are present in living tissue at concentrations millions of times higher than the natural hormones. Wildlife, laboratory animals, and humans exhibit adverse health effects at contemporary environmental concentrations of man-made chemicals that act as endocrine disruptors. New technology has revealed that some man-made chemicals are present in tissue at concentrations previously not possible to measure with conventional analytical methods, but at concentrations which are biologically active.

• Gestational exposure to persistent man-made chemicals reflects the lifetime of exposure of females before they become pregnant. Hence, the transfer of contaminants to the developing embryo and fetus during pregnancy and to the newborn during lactation is not simply a function of recent maternal exposure. For some egg laying species, the body-burden of the females just prior to ovulation is the most critical period. For mammals, exposure to endocrine disruptors occurs during all of prenatal and early postnatal development because they are stored in the mother.

• The developing brain exhibits specific and often narrow windows during which exposure to endocrine disruptors can produce permanent changes in its structure and function. The timing of exposure is crucial during early developmental stages, particularly during fetal development when a fixed sequence of structural change is occurring and before protective mechanisms have developed. A variety of chemical challenges in humans and animals early in life can lead to profound and irreversible abnormalities in brain development at exposure levels that do not produce permanent effects in an adult.

• Thyroid hormones are essential for normal brain function throughout life. Interference with thyroid hormone function during development leads to abnormalities in brain and behavioral development. The eventual results of moderate to severe alterations of thyroid hormone concentrations, particularly during fetal life, are motor dysfunction of varying severity including cerebral palsy, mental retardation, learning disability, attention deficit hyperactivity disorder, hydrocephalus, seizures and other permanent neurological abnormalities. Similarly, exposure to man-made chemicals during early development can impair motor function, spatial perception, learning, memory, auditory development, fine motor coordination, balance, and attentional processes; in severe cases, mental retardation may result.

• Sexual development of the brain is under the influence of estrogenic (female) and androgenic (male) hormones. Not all endocrine disruptors are estrogenic or anti-estrogenic. For example, new data reveal that DDE, a breakdown product of DDT, found in almost all living tissue, is an anti-androgen in mammals. Man-made chemicals that interfere with sex hormones have the potential to disturb normal brain sexual development. Wildlife studies of gulls, terns, fishes, whales, porpoises, alligators, and turtles link environmental contaminants with disturbances in sex hormone production and/or action. These effects have been associated with exposure to sewage and industrial effluents, pesticides, ambient ocean and freshwater contamination, and the aquatic food web.

• Commonalities across species in the hormonal mechanisms controlling brain development and function mean that adverse effects observed in wildlife and in laboratory animals may also occur in humans, although specific effects may differ from species to species. Most important, the same man-made chemicals that have shown these effects in mechanistic studies in laboratory animals also have a high exposure potential for humans.

• The full range of substances interfering with natural endocrine modulation of neural and behavioral development cannot be entirely defined at present. However, compounds shown to have endocrine effects include dioxins, PCBs, phenolics, phthalates, and many pesticides. Any compounds mimicking or antagonizing actions of, or altering levels of, neurotransmitters, hormones, and growth factors in the developing brain are potentially in this group.

2. *We estimate with confidence that:*

• There may not be definable thresholds for responses to endocrine disruptors. In addition, for naturally occurring hormones, too much can be as severe a problem as too little. Consequently, simple (monotonic) dose-response curves for toxicity do not necessarily apply to the effects of endocrine disruptors.

• [M]any pesticides affect thyroid function and, therefore, may have [neurological abnormalities].

• Some endocrine disruptors or their break-down products are nearly equipotent to natural hormones. Even weak endocrine disruptors may exert potent effects because they can bypass the natural protection of blood binding proteins for endogenous hormones.

Some disruptors also have a substantially longer biological half-life than naturally produced hormones because they are not readily metabolized, and as a result are stored in the body and accumulate to concentrations of concern."

Colborn T, Vom Saal F, Short, P, eds., Environment Endocrine-Disrupting Chemicals: Neural, Endocrine, and Behavioral Effects, Princeton, N.J.: Princeton Scientific Publishing, 1998; 1-9.

Exposures to pesticides at levels which exist in the environment have demonstrable effects. Endocrine disruption is not limited to interference with natural estrogen levels; it includes androgen blockers, progesterone blockers and compounds that interfere with the thyroid. The current information available on pesticides and their endocrine-disrupting affects raises significant and grave concerns regarding the chronic cumulative impact of pesticides on listed species.

Other Pesticide-Wildlife Impacts:

Beyond impacting wildlife through endocrine and/or reproductive disruption, pesticides may adversely affect wildlife through direct toxicity or indirectly by modifying the availability of food or cover. In a series of factsheets documenting the impact of pesticides used for crops and wildlife, researchers documented direct and indirect harm.

Studying the impact of pesticides used for corn, researchers noted both direct and indirect impacts. Palmer, W.E. P.T. Bromely, and J.R. Anderson, Jr., Wildlife and Pesticides—Corn, North Carolina Cooperative Extension Service AG-463-2. Direct impacts were observed in quail, where more than 30% of the quail tested were made sick by one aerial insecticide application. Once sick, wild birds may neglect their young, abandon their nests, and become more susceptible to predators and disease. Indirect effects to birds included reduction in food supply (reduction in insects and plants from insecticides and herbicides) and vegetative cover (which provides brooding cover). The Factsheet also noted the toxicity of herbicides used on corn. Carbofuran, chlorpyrifos, ethoprop, methomyl, methyl parathion, and terbufos are highly toxic to birds. Chlorpyrifos, fonofos, methomyl, methyl parathion, and terbufos are highly toxic to mammals. Chlorpyrifos, fenvalerate, malathion, permithrin, and terbufos are extremely toxic to fish while chlorpyrifos, ethoprop, methomyl, and methyl parathion are highly toxic to fish. For insecticides used on corn, the factsheet noted that carbofuran (furadan), methyl parathion, chlorpyrifos have a high wildlife hazard, with reported wildlife deaths due to use of these insecticides.

Direct and indirect impacts were also found with cotton production. Palmer, W.E. P.T. Bromely, and J.R. Anderson, Jr., Wildlife and Pesticides—Cotton, North Carolina Cooperative Extension Service AG-463-4. Researches found 60% of tested quail with insecticides in their bodies. The Factsheet noted that aldicarb, dicofol, dicrotophos, dimethoate, disulfotan, fenamiphos, methidathion, methomyl, methylparathion, oxydemeton-methyl, phorate, phosphamidon and sulprofos are highly toxic to birds. Aldicarb, disulfoton, feamiphos, methomyl, methyl parathion, phorate, phosphamidon, and thiodicarb are highly toxic to mammals. Cyfluthrin, chlorpyrifos, cypermethrin, esfenvalerate, fenamiphos, lambda cyhalophrin, methidathion, permithrin, phorate, profenofos and tralomethen ere extremely toxic to fish, while aldicarb, dicofol, disulfotan, methomyl, propargite, sulprofos, and thiodicarb are highly toxic to fish. For insecticides used on cotton, the factsheet noted that dimethoate, phosphamidon, and dicrotophos have a high wildlife hazard, with reported wildlife deaths due to use of these insecticides.

Direct and indirect effects of herbicides and insecticides used for small grains were also documented. Palmer, W.E. P.T. Bromely, and J.R. Anderson, Jr., Wildlife and Pesticides—Small grains, North Carolina Cooperative Extension Service. Wildlife that are in fields soon after an insecticide has been sprayed are exposed when they inhale vapor or when insecticides come in direct contact of skin or eyes. Researches found that 60% of quail tested had insecticides in their bodies. Pesticides used on small grains which are highly toxic to wildlife include azinphos-methyl, carbofuran, chlorpyrifos, dimethoate, disulfotan, malathion, methomyl, and methyl parathion. Azinphos-methyl, disulfotan and dimethoate were found to be high wildlife hazards and responsible for direct wildlife deaths.

Pesticides used for orchards also result in direct and indirect impacts to wildlife. Palmer, W.E. P.T. Bromely, and J.R. Anderson, Jr., Wildlife and Pesticides—Fruit Trees, North Carolina Cooperative Extension Service. Pesticides used for orchards that are toxic to wildlife include azinphos-methyl, carbaryl, chlorpyrifos, diazinon, dicofol, dimethoate, dinocap, endosulfan, esfenvalerate, formetanate, fenbutatin-oxide, malathion, methidathion, methomyl, methyl parathion, oxamyl, oxythioquinox, permethrin, phosmet, and propargite. The application of dimethoate, phosphamidon, and methyl parathion for orchards was found to result in wildlife deaths. The documentation of these direct and indirect effects from use of herbicides and insecticides on crops indicates the actual adverse impact pesticides have on wildlife.

In 1999, the Pesticide Action Network North America ("PANNA") released a report, Disrupting the Balance: Ecological Impacts of Pesticides in California, which documented the impact of organophosphate and carbamate pesticides on wildlife. Kegley, S, L. Neumeister, and T. Martin, Disrupting the Balance: Ecological Impacts of Pesticides in California, available at <www.panna.org/panna/resources/documents/ disruptingSum.dv.html>. The report found that multiple pesticides are often found in California waters and sediments at concentrations that exceed levels that are lethal to zooplankton, the primary food source for young fish. The report also observed the routine occurrence of toxic pulses of diazinon and chlorpyrifos in California streams during critical stages in fish development. Additionally, the report documents that carbofuran and diazinon are responsible for the majority of bird kills in California, affecting songbirds, waterfowl, and raptors. The report notes that the application of carbofuran to crops has resulted in as many as 17 bird kills for every 5 acres treated. The report also documents the adverse impact pesticides have on the balance between pest and predator insects, where pesticides destroy nontarget predator insects, which in turn allows for a resurgence in the pest insects.

The impact of pesticides on pollinators also raises significant concern. The U.S. Department of Agriculture stated that we are facing an "impending pollinator crisis," in which both wild and managed pollinators are disappearing at alarming rates. Ingram, M., G.P. Nabhan, S. Buchmann, 1996, Our Forgotten Pollinators: Protecting the Birds and Bees, Global Pesticide Campaigner, Vol.6, No.4, Dec. 1996, PANNA, <www.pmac.net/birdbee.htm>. These crises have been attributed, in part, to pesticides. Nabhan, G.P., 1996, Pollinator Redbook, Volume One: Global list of threatened vertebrate wildlife, wildlife species serving as pollinators for crops and wild plants, <www.desertmuseum.org/conservation/fp/redbook.html>; and Kearns, C.A., D.W. Inouye, and N.M. Waser, 1998, Endangered mutualisms: the conservation of plant-pollinator interactions, Annu. Rev. Ecol. Syst., 29: 83-112. Pollinators that are listed as federally endangered or threatened species include the Sanborn's lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Mexican or big long-nosed bat (*Leptonycteris nivalis*), Kirtland's warbler (*Dendroica kirtlandii*), Golden-cheeked warbler (*Dendroica chrysoparia*), Nukupu'u (honeycreeper) (*Hemignathus lucidus*), Hawaii Akepa (honeycreeper) (*Loxops coccineus coccineus*), Maui Akepa (honeycreeper) (*L.c. ochraceus*), Po'ouli (honeycreeper) (*Melamprosops phaeosoma*), O'u (honeycreeper) (*Psttirostra psittacea*), Kauai Oo (*Moho braccatus*), Palila (*Loxioides bailleui*), Maui parrotbill (*Pseudonestor xanthophyrs*), Laysan finch (*Telespiza cantans*), Niho finch (*T. ultima*), and Hawaiian crow (*Corvus hawaiiensis*). Pollinator list from Nabhan, 1996.

The adverse impact of pesticides on wildlife is well documented. Numerous studies have linked pesticides to a variety of adverse effects to wildlife, indicating that pesticides may affect listed species. Wildlife mortality has also been increasingly attributable to pesticides such as OPs and carbamates. <u>See</u> Glaser, L.C., Wildlife Mortality Attributed to Organophosphorus and Carbamate Pesticides, National Biological Service, U.S. Geological Survey, available at <biology.usgs.gov/s+t/noframe/u216.htm>. The fact that despite these findings EPA continues to violate the ESA by failing to initiate consultation is alarming.

<u>VIOLATIONS</u>

1. EPA is in violation of 7(a)(2) for failing to consult regarding its pesticide registration program under FIFRA.

EPA has implemented its pesticide registration program without consultation under Section 7 of the ESA. The obligations imposed by the ESA on federal agencies is clear: "Each Federal agency, shall, in consultation with and with the assistance of the Secretary, insure 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 [critical] habitat …." 16 U.S.C. § 1536(a)(2). An agency's duty to consult is triggered when it has determined that its actions "may affect" a threatened or endangered species. 16 U.S.C. § 1536(a)(3); 50 C.F.R. § 402.14.

The implementation of the pesticide registration program is a final agency action. See Defenders of Wildlife v. Administration, 882 F.2d 1294 (8th Cir. 1989) (where the 8th Circuit affirmed section 7's application to EPA's registration of pesticides). Furthermore, the program as a whole unquestionably results in impacts to listed species. The scientific evidence clearly establishes that use of pesticides that have been registered have a negative impact on both listed species and critical habitat. The science also indicates that there are cumulative impacts occurring from the use of multiple pesticides and that analysis of single pesticides does not adequately address the actual impact to species in wildlife. Consequently, EPA must undertake programmatic consultation to assess how the FIFRA registration program affects listed species. This program-level analysis is necessary to assess the broad aggregated incremental effects of each pesticide registration on listed species. Absent a programmatic consultation on the effect of the FIFRA pesticide registration program, EPA will continue to be in violation of section 7 of the ESA.

2. **EPA has failed to reinitiate consultation for pesticides previously reviewed by FWS, and it has failed to initially consult on pesticides during the registration process.**

Since 1993, EPA has not sought any consultations for the registration of pesticides. For those pesticides that EPA has consulted on prior to 1993, EPA has failed to reinitiate consultation to address newly listed species. See Attachment A. For all pesticides registered since 1993, EPA has failed to consult at all. EPA's failure to consult has collectively impacted numerous species listed in Attachments A, B and C. Attachments A, B and C include but are not limited to endangered and threatened species that may be affected by pesticides and therefore should be addressed by EPA in the consultation process. EPA has demonstrated a systemic failure to consult on newly listed species. Additionally, for species previously addressed in consultations, EPA has failed to reinitiate consultation based on new information regarding the impact of pesticides on those species.

Section 7 requires that the action agency reinitiate formal consultation whenever a new species is listed or new critical habitat is designated that may be adversely affected by an action previously subject to consultation. 50 C.F.R. § 402.16. This requirement exists for all ongoing actions where the agency retains discretionary involvement. Pacific Rivers v. Thomas, 20 F.3d 1050, 1054-55 (9th Cir. 1994). Under FIFRA, EPA retains the authority to withdraw, modify or condition pesticide registrations, giving it ongoing discretion to make any decision regarding the sale and use of pesticides. See 7 U.S.C. § 136a(c)(7).

EPA's last consultation on pesticide registrations was in 1993. Hundreds of species have been listed since then. Numerous listings since that time have recognized the possibility of adverse impacts from pesticides. See Attachment D. The following species are examples of cases where FWS or others have indicated that the species may be affected by pesticides. For example, the listing designation for the Buena Vista Lake Shrew states that due to the close proximity of shrew habitat to an otherwise agriculturally dominated landscape, the shrew may be "directly exposed to lethal and sublethal concentrations of pesticides from drift or direct spraying of crops, canals and ditch banks, wetland or riparian edges, and roadsides where shrews might exist." Endangered Status for the Buena Vista Lake Shrew, March 6, 2002, 67 FR 10101-01. The listing designation also noted that "[r]educed reproduction in Buena Vista Lake Shrew s could be directly caused by pesticides through grooming, and secondarily from feeding on contaminated insects." Id. citing Sheffield and Lochmiller 2001. The listing also acknowledged the endocrine-disrupting effects of carbamates and organophosphates, noting that "laboratory experiments have shown that behavioral activities such as rearing, exploring for food, and sniffing can be depressed for up to 6 hours in the common shrew from environmental and dietary exposure to subleathal doses of a widely used insecticide, dimethoate. Id. citing Dell'Omo et al. 1999. Such depression in behavioral activities could make the shrews more vulnerable to predation and starvation. Id. Furthermore, shrews may have higher concentrations of pesticides in their system than would normally be available because they may feed heavily on intoxicated arthropods after pesticide applications. Id. citing Stehn et al. 1976; Schauber et al. 1997; and Sheffield and Lochmiller 2001. Finally, the listing notes that Fresno, Kern, and Tulare counties are the three highest users of pesticides in California. Id. This is sufficient information to establish that application of pesticides may affect the Buena Vista Lake Shrew.

FWS stated that the surviving population of the vermillion darter is currently threatened by pesticides that wash into the streams from runoff. Final Rule to List the Vermillion Darter as Endangered, Nov. 28, 2001, 66 FR 59367-01. FWS cited to a recent study (Swann 2000) that attributed a past fish kill to pesticide runoff from urban use. FWS also stated that pesticide registration was one of several federal activities that could impact the darter. Id.

For the Carolina heelsplitter and the Appalachian Elktoe, FWS recognized that pesticides threaten the remaining populations. Proposed Designation of Critical Habitat for the Carolina Heelsplitter, July 11, 2001, 66 FR 36229, 36230; Proposed Designation of Critical Habitat for the Appalachian Elktoe, Feb. 8, 2001, 66 FR 9540, 9546. FWS stated that "pesticide/herbicide applications … have the potential to jeopardize the continued existence of the Carolina heelsplitter, and Federal agencies are already required to consult with us on these types of activities, or any other activity, that may affect the species." Carolina Heelsplitter at 36236. FWS made the same statement for the Elktoe.

Appalachian Elktoe at 9546. Yet despite the fact that FWS has stated that EPA must consult regarding pesticide application for both of these species, it has yet to do so.

The exposure of certain cylcodienes (endosulfan, endrin, toxaphene, and dieldrin) and organophosphates (parathion, malathion, and diazinon) were cited as a threat to the Barton Springs salamander. Final Rule to List the Barton Springs Salamander as Endangered, April 30, 1997, 62 FR 23377, 23386-91. FWS noted that "[s]ince the salamander is fully aquatic, there is no possibility for escape from contamination." Id. at 23389. FWS not only cited direct exposure as a threat but also indirect effects such as the impact pesticides have on the quality and quantity of amphibian food. Id. at 23390. FWS also noted that pesticides may affect the Santa Barbara County DPS of the California tiger salamander. The State of California and USGS conducted studies in Santa Barbara County sampling well and ground water at 156 locations throughout the range of the tiger salamander. Final Rule to List the Santa Barbara County Distinct Population Segment of the California Tiger Salamander as Endangered, Sept. 21, 2000, 65 FR 57242, 57259. More than 2.2 million pounds of agricultural chemicals were used in 1994 alone on the five major crop types grown on or near tiger salamander sites. Id. Among those chemicals were chlorpyrifos, acephate, Fenamiphos, malathion, and endosulfan. Id. However, FWS noted that the identified pesticides provide only a sample of the actual and potential threats. FWS also highlighter certain pesticides such as chlorpyrifos because amphibians, with their permeable skins, readily absorb the chemical, especially when migrating through recently treated fields. Id. FWS also noted that the use of azinphos-methyl in the vicinity of the tiger salamander could affect recruitment and survival directly, or affect the food supply. Id. Finally, FWS cited to studies by Berril et al. 1998, which reported severe toxicity to amphibians from exposure to endosulfan, including extensive paralysis, delayed metamorphosis and high death rates. FWS noted that "[I]t is apparent that endosulfan is extremely toxic at low concentrations to amphibians." Id. FWS concluded that "[f]ive of the six metapopulations of California tiger salamanders breeding sites in Santa Barbara County may be directly or indirectly affected by toxic agricultural chemical contaminants because there is intensive agriculture within their drainage basins." Id. Additionally, FWS stated that "[e]ven if toxic or detectable amounts of pesticides are not found in the breeding ponds or groundwater, salamanders may still be directly affected, particularly when chemicals are applied during the migration and dispersal seasons." Id.

Surface run-off of pesticides was noted as an "app[arent] … contributing factor[] in the degradation of [the Scaleshell mussel's habitat]." Determination of Endangered Status for the Scaleshell Mussel, Oct. 9, 2001, 66 FR 51322, 51334 . FWS went on to state that "[i]n summary, many of the same threats that caused the extirpation of historical populations of scaleshell mussels still exists and continue to threaten extant populations." Id. FWS acknowledges that pesticide registration is a federal activity that could occur and impact the scaleshell mussel. Id. at 51388.

FWS recognized indirect affects of pesticides on Holmgren milk-vetch and Shivwits milk-vetch. Determination of Endangered Status for *Astragalus holmgreniorum* (Holgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch), Sept. 28, 2001, 66 FR 49560, 49564. Pollination for these species was identified as a long-term concern. FWS identified acknowledged that increased pesticide use may affect pollinators which in turn would impact both milk-vetch species. Id.

In designating critical habitat for the Spruce-fir Moss spider, FWS noted that the species was "extremely vulnerable to extirpation from a single event or activity such as … pesticide/herbicide application. Designation of Critical Habitat for the Spruce-fir Moss Spider, July 6, 2001, 66 FR 35547, 3550. FWS also identified pesticide applications as an activity which may also jeopardize the continued existence of the species. Id. at 35557.

For the Arroyo toad, which is found in agricultural fields, FWS noted that such habitat is probably a sink over the long term due to pesticide applications, among other things. Designation of Critical Habitat for the Arroyo Toad, Feb. 7, 2001, 66 FR 9414, 9415. FWS went on to state that the use of pesticides and herbicides within or adjacent to arroyo toad habitat may cause adverse impacts. Id.

FWS identified pesticides as a threat to the Armored snail and the Slender Campeloma because their habitat is dominated by agricultural use. Endangered Status for the Armored Snail and Slender Campeloma, Feb. 25, 2000, 65 FR 10033, 10036. Specifically, FWS identified three drainages, habitat for both species, which were susceptible to pesticide contamination because of the agricultural use in these drainages. Id. FWS noted that pesticides were found in two of the three drainages during a site visit in 1997. However, despite a request from FWS to federal agencies (including the EPA) that may have programs that might adversely affect the species, FWS did not receive any responses. Id. It is startling that despite the fact that FWS highlighted pesticides as a threat to both species and found pesticides present in the species' habitat that EPA did not respond to FWS's request.

Due to a lack of riparian vegetation buffer strips, FWS stated that pesticide application for agricultural purposes has the potential to impact the Topeka shiner, particularly through runoff following heavy participation events. Final Rule to List the Topeka Shiner as Endangered, Dec. 15, 1998, 63 FR 69008, 69014. FWS noted that "there are presently numerous areas along streams without buffers that may impact the species." Id.

Water contamination from pesticides has been listed as a concern for the cylindrical lioplax, flat pebble snail, painted rocksnail, plicate rocksnail, round rocksnail, lacy elimia, Peck's cave amphipod, Comal Springs riffle beetle, Comal Springs dryopid beetle, Idaho springsnail, Utah valvata snail, Snake River physa snail, Banbury springs lanx, and Bliss rapids snail. Endangered Status for Three Aquatic Snails, and Threatened

Status for Three Aquatic Snails in the Mobil River Basin of Alabama, Oct. 28, 1998, 63 FR 57610, 57616; Final Rule to List Three Aquatic Invertebrates in Comal and Hays Counties, TX, as Endangered, Dec. 18, 1997, 62 FR 66295, 66300; Determination of Endangered Status or Threatened Status for Five Aquatic Snails in South Central Idaho, Dec. 14, 1992, 57 FR 59244, 59252.

FWS noted that Ventura marsh milk-vetch and the Otay tarplant both have small fragmented ranges, making them especially vulnerable to anthropogenic events such as nearby use of pesticides. Proposed Designation of Critical Habitat for *Deinandra conjugens* (Otay tarplant), June 13, 2001, 66 FR 32052, 32056; Final Rule for Endangered Status for *Astragalus pycnostachyus var. lanosissimus* (Ventura marsh milk-vetch), May 21, 2001; 66 FR 27901, 27904. For the Ventura marsh milk-vetch, FWS also noted that future suburban and urban uses within proximity of the vetch's preserve can bring expected increases in uses of herbicides and pesticides in proximity of the vetch and that such increases could harm the milk-vetch directly, or alter pollinator or plant associations upon which it depends. Ventura marsh milk-vetch, Proposed Designation at 27904. FWS noted that the proximity of the Southwestern Willow Flycatcher to agricultural areas indicates a potential threat from pesticides. Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher, Feb. 27, 1995, 60 FR 10694, 10713. FWS noted that pesticides may potentially affect the flycatcher through direct toxicity or effects on their insect food base. Id.

The use of insecticides would threaten the callippe silverspot and Behren's silverspot butterflys if use occurred in proximity to occupied habitat. Determination of Endangered Status for the Callippe Silverspot Butterfly and the Behren's Silverspot Butterfly and Threatened Status for Alameda Whipsnake, Dec. 5, 1997, 62 FR 64306, 64314. FWS noted that Silverspot butterfly larvae are extremely sensitive to pesticides and even the accumulation of runoff in the soil after spraying has proven lethal to the larvae of members of the genus Speyeria. Id. Due to the proximity of Hine's emerald dragonfly habitat to apple and cherry orchards, pesticide drift and runoff was identified as potential threat. Determination of Endangered Status for the Hine's Emerald Dragonfly (*Somatochlora hineana*), Jan. 26, 1995, 60 FR 5267, 5270.

FWS noted that pesticides and herbicides have an indirect effect on Rough Popcornflower because the plant relies on pollinators to reproduce and these insect pollinators are vulnerable to pesticides. Endangered Status for the Plant *Plagiobothrys hirtus* (Rough Popcornflower), Jan. 25, 2000, 65 FR 3866, 3871. FWS also noted that pesticides have a direct effect on the plant when sprayed in the spring and summer by "reducing seed set, which negatively affects populations of the species." Id. FWS also acknowledged that Howell's spectacular thelypody is "particularly vulnerable to herbicide use" as herbicides may impact pollinator populations. Threatened Status for the Plant *Thelypodium howellii ssp. spectabilis* (Howell's spectacular thelypody), May 26, 1999, 64 FR 28393, 28395. The likelihood of herbicide use in Howell's spectacular thelypody habitat was supported by the invasion of noxious weeds into Howell's spectacular thelypody habitat.

The use of pesticides for golf courses was identified as a threat to two cave species, the Kauai cave wolf spider and the Kauai cave amphipod. Final Rule to List Two Cave Animals from Kauai, Hawaii, Jan. 14, 2000, 65 FR 2348, 2353. Golf courses exist on, or are proposed for, the land directly above or adjacent to both populations of the spider and all but one population of the amphipod. Id. FWS identified that at least 30 different pesticides are used on golf courses in Hawaii. Id. FWS cited to a study by Croft, 1990, that found that predators, such as the Kauai cave wolf spider, are generally more susceptible to insecticides than the target pests. Id. FWS noted that chronic effects, such as reduced fecundity, reduced lifespan, slowed development rate, and impaired mobility and feeding efficiency are all associated with pesticides. Furthermore, FWS stated that pesticide usage on residential property also poses a "serious threat." Id.

The Illinois cave amphipod is also threatened from pesticide use. Final Rule to List the Illinois Cave Amphipod as Endangered, Sept. 3, 1998, 63 FR 46900, 46903. Particular concern is raised during spring and summer rainstorms when demonstrated peal levels are much higher than acceptable limits and may be lethal to the species. Id. Additionally, FWS noted that groundwater contamination, including pesticides, affects the amphipod's habitat. Id. at 46904. The Illinois State Geological Survey analyzed water samples from 9 springs, 1 cave stream, and 33 wells. Id. at 46905. The study detected atrazine and/or alachlor in 83% of the samples taken from springs in the study area. Id. Atrazine is one of the most commonly used herbicides in Monroe County. The levels found in these samples often exceeded the EPA maximum contaminant levels of 2.0 ppb and 3.0 ppb, respectively, during and following spring rainfalls. Id. Atrazine samples in spring samples were found as high as 98 ppb. Id. The maximum level found in the Illinois Caverns was 1.38 ppb. However, Macek et al., 1976, observed acute toxicity to amphipods from a 48-hour exposure to atrazine at 2.4 parts per million (ppm). Furthermore, the study reported reproductive effects and impaired survival of offspring from concentrations as low as 0.14 ppm. Id. Another study, by Mayer and Ellersieck, 1986, reported that Gammaridae were most sensitive to the five insecticides carbaryl, DDT, endrin, malathion, and methoxychlor and postulated that pesticide pulses characterisitics of karst springs could have major impacts on biota such as amphipods. Id. Malathion and carbaryl were noted by FWS among the most commonly used insecticides in the region. Id. FWS concluded that "[w]hile direct mortality cannot be conclusively attributed to such agricultural chemicals as atrazine, carbaryl, DDT, or malathion, … the presence of such contaminants in the amphipod's environment constitutes strong circumstantial evidence that the deterioration of water quality is the primary cause of the decrease in the species' range and the number of extant populations." Id. at 4906.

Pesticides were considered as a threat to the pygmy-owl where it occurs in floodplains that are now largely agricultural. Determination of Endangered Status for the Cactus Ferruginous Pygmy-Owl in Arizona, March 10, 1997, 62 FR 10730, 10744. FWS noted that over 100 pesticides are used year round on agricultural crops throughout the lower Rio Grande Valley. Id. Additionally, FWS noted that "[p]esticide contamination is described as 'widespread' throughout the inland waters of the lower Rio Grande Valley. FWS concluded that "[w]ithout appropriate precautions, these agents may potentially affect pygmy-owls through direct toxicity or effects on their food base." Id. However, despite the acknowledged threat of pesticides, EPA has not consulted on the impact of pesticide registration on the pygmy-owl.

For Ohlone tiger beetles, FWS stated that "pesticides could pose a threat to the Ohlone tiger beetle." Endangered Status for the Ohlone Tiger Beetle, Oct. 3, 2001, 66 FR 50340, 50348. Specifically, FWS noted that the beetle could be killed from aerial drift or runoff into Ohlone habitat. FWS went on to state that as development increases, "negative impacts from pesticides may become more frequent," and that although the significance of pesticide effects is unknown, "they are recognized as a substantial potential threat to the species." Id. FWS concluded that "pesticides … imperil the continued existence of this species." Id.

The impacts of pesticides on the Sacramento splittail were also well documented in its listing determination. Determination of Threatened Status for the Sacramento Splittail, Feb. 8, 1999, 64 FR 5963, 5974-80. Specifically, FWS cited poor water quality as a factor in the splittail's decline. Id. at 5974. Pesticide application, such as chlorpyrifos, carbofuran, and diazinon, ends up in streams from runoff and aerial drift. This resulting "poor water quality … may adversely affect splittail, though direct exposure to toxins, which increases the vulnerability to disease …, and depletion of zooplankton and invertebrate food sources. All major rivers that are tributary (sic) to the Estuary are exposed to large volumes of agricultural and industrial chemicals that are applied in the Central Valley watershed….Recently, high concentrations of organophosphates and carbamate pesticides from agricultural uses have been documented entering the Estuary…. The periods of pesticide use coincide with the timing of migration, spawning and early development of splittail. During rainfall runoff events, acutely toxic pulses of pesticides move down the rivers and through the Estuary with remarkable persistence and relatively little dilution." Id. at 5976. Despite this specific documentation of the presence and adverse impact of registered pesticides on the splittail, EPA has yet to seek consultation.

In designating the Mississippi Gopher Frog Distinct Population Segment of the Dusky Gopher Frog as Endangered, the FWS recognized that pesticides may affect the Gopher Frog. Final Rule to List the Mississippi Gopher Frog Distinct Population Segment of the Dusky Gopher Frog as Endangered, Dec. 4, 2001, 66 FR 62993-01. FWS cited studies such as Duellman and Trueb 1986, Bishop 1992, Berrill et al. 1997, Bridges 1999, Bridges and Semlitsch 2000 in recognizing the multiple impacts pesticides have on frogs throughout their life cycle. Id.

The above mentioned species are only a sample of listed species that may be affected by pesticide use. It is evident from these listings that FWS recognizes that pesticides pose a threat to the existence of endangered and threatened species. FWS and NMFS have acknowledged that pesticides pose a threat to fish, insects, aquatic invertebrates, mollusks, crustaceans, mammals, birds, amphibians, reptiles, and plants. See Attachment A, B, and C for a list of species that may be affected by pesticide use. Yet despite the acknowledgment by FWS that pesticides pose a threat to these species EPA has yet to reinitiate or initiate consultation, as it is required to do under the ESA, to determine the impact of its actions on these listed species.

Additionally, in its reregistrations of several pesticides (see text below for list of pesticides), EPA, itself, has acknowledged that the previous consultations and the findings expressed in those opinions are based on old labels and application methods, and less refined risk assessment procedures. EPA, therefore, must reinitiate consultation on all of the pesticides listed below that they have previously sought consultation on. For all pesticides registered since 1993, EPA is in clear violation of section 7 by failing to consult on the registration.

In the registration and reregistration process, EPA conducts an ecological risk assessment, which evaluates the likelihood that exposure to the pesticide may cause harmful ecological effects. Specifically, EPA uses the quotient method to evaluate potential risk to nontarget organisms. Applying this method, risk quotients (RQs) are calculated by dividing the estimated concentrations of a pesticide in the environment by results from ecotoxicity studies in various organisms. A risk results when an RQ exceeds a Level of Concern (LOC). An LOC is a value calculated based on the category of nontarget organism and category of concern. When an LOC is exceeded EPA presumes a risk of concern to that particular category. Consequently, when an LOC is exceeded it is fair to infer that that species may be affected by that pesticide. EPA further characterizes ecological risk based on any reported aquatic or terrestrial incidents to nontarget organisms in the field. Based on this information, EPA evaluates the risk posed by the pesticide to nontarget organisms including endangered and threatened species. EPA documents its evaluations in its reregistration analysis.

The following is a review of EPA reregistration analyses of pesticides currently in use that pose risks to nontarget organisms including listed species. EPA must either: (1) reinitiate consultation for those pesticides that have been previously consulted, or (2) initiate consultation for those pesticides that have yet to be reviewed under the consultative process.

A. Non-OPs and Non-Carbamates:

Amitraz

Amitraz is an insecticide used primarily on Oregon pear crops and also on cotton crops. It is highly toxic to fish and even more lethal for aquatic invertebrates. Adverse affects to avian reproduction were listed as a chronic effect, while the general chronic toxicity of amitraz's degradates was listed as a concern. Amitraz and its two degradates, BTS-27271 and BTS 27919, may pose an acute risk to nontarget avian and mammalian species. In Amitraz's Reregistration Eligibility Decision ("RED"), EPA stated that "[it] has concerns about the exposure of threatened and endangered animal species to amitraz." Amitraz RED, 03/1995, p. 56. It noted that FWS had developed a BiOp for cotton (10/12/83) but that amitraz was not one of the pesticides considered in that consultation. It also noted that consultation with FWS concerning pesticide use on pear orchards has not been pursued. Yet, despite these acknowledgments, EPA has not consulted with FWS regarding the use of amitraz.

Amitrole

Amitrole is an herbicide for non-agricultural purposes. The risk assessment for amitrole indicates that its use may affect endangered mammals and plants. Amitrole RED, 09/1996, p. 54. Amitrole may be hazardous to mammalian reproduction in localized areas. Id. at 56. Amitrole causes small mammals to produce small litters and deformed young. Id. Amitrole affected fetal development in rabbits with only 12 days of exposure to pregnant rabbits. Id. The estimated residues on mammalian food items exceeded the normal observed effect level and for small herbivores and insectivores exceeded the lowest observed effect level. Id. However, despite concern for the effects of amitrole on endangered mammals EPA states it will not impose any limitations on its use or initiate consultation until the Endangered Species Protection Program ("ESPP" or "Program") is finalized.

Atrazine

Atrazine is a widely used triazine herbicide which is used on major food crops as well as non-crop areas across the U.S. Atrazine is both persistent and mobile in surface and ground water. Atrazine, Reregistration Eligibility Science Chapter, Environmental Fate and Effects Chapter, April 22, 2002 ("Atrazine RED"). The EPA has found that there is "widespread environmental exposure that (1) has resulted in direct acute effects on many terrestrial plant species at both maximum and typical use rates, (2) may have caused direct effects on aquatic non-vascular plants which in turn could have caused reductions in primary productivity, (3) may have caused reductions in populations of aquatic macrophytes, invertebrates, and fish, (4) may have caused indirect effects on aquatic communities due to loss of species sensitive to atrazine and resulting in changes in structure and functional characteristics of the affected communities." Atrazine RED, p.2. The ecological risk assessment found exceeded levels of concern for direct chronic effects on mammals, birds, fish, aquatic invertebrates and direct acute effects on nontarget terrestrial and aquatic plants. Atrazine may persist at concentrations in excess of LOCs for months. Id. at p.3. EPA also stated that LOCs for endangered species are exceeded for terrestrial plants, vascular aquatic plants, fish, and aquatic invertebrates. Id. at 94. EPA also noted that although direct effects of atrazine use on birds, mammals, and beneficial insects was not anticipated, indirect effects were. Indirect effects of atrazine from vegetation losses in areas that may have significant effects on the suitability of these areas as habitat and food sources may impair reproduction and survival of offspring. Id. Despite these concerns, EPA has not requested consultation regarding the reregistration of atrazine.

Captan

Captan is a fungicide used for food (predominately fruit) and feed crops, seed treatments and ornamental sites. Acute endangered species LOCs were exceeded for mammals and freshwater fish and invertebrates. Captan RED, 09/1999, p.53 and 56-57. Although EPA identifies that Captan poses a risk to endangered species, it will wait for the Program to be finalized before it identifies all pesticides whose use may cause adverse impacts on endangered and threatened species. Id. at 58.

Endosulfan

Endosulfan is a highly toxic insecticide used on crops. An estimated 1.4 million to 2.2 million pounds of endosulfan are applied annually. Endosulfan produces neurotoxicty effects. Endosulfan EFED Risk Assessment for the Reregistration Eligibility Decision for Endosulfan (Thiodan), 04/2001, at Endosulfan Summary (hereinafter "Endosulfan RED"). Additionally, incident data has confirmed toxicity to both birds and fish. Id. Outside of incidents associated with organophosphates and carbofuran, endosulfan-related incidents account for the greatest percentage of nontarget mortality reported in EPA's Ecological Incident Information System. EPA also acknowledges that endosulfan is an endocrine disruptor. EPA Memorandum, Dec. 11, 2000, Endosulfan: Evaluation of Registrant Submission *Endosulfan: Evaluation of Possible Endocrine Effects in Mammalian Species*, US EPA, Office of Prevention, Pesticides and Toxic Substances; Endosulfan RED, p. 30.

EPA's ecological assessment indicates the endosulfan is "very highly toxic to both terrestrial and aquatic organisms." Endosulfan RED, p. 2. Endosulfan is likely to result in acute and chronic risk to both terrestrial and aquatic organisms. Id. at 24. Mortality to nontarget fish is probable; there is a 90% probability that roughly 60% of all aquatic species will suffer 50% mortality for the most vulnerable uses." Id. Current endosulfan use rates on 88% of the crops modeled will exceed acute high risk LOCs more than 99% of the time. Id. at 25. Additionally, given the reproductive and developmental effects of endosulfan coupled with the chemical's ability to bind to the human estrogen receptor, these chronic effects could have a considerable impact on nontarget organisms. Id.

EPA states in the RED that "[a]lthough the [FWS] issued a biological opinion on endosulfan in 1989 many additional species have been federally listed since that time and determination of jeopardy to these newly listed species has not been assessed. Additionally, the 1989 biological opinion did not consider endangered insects." Endosulfan RED, at cover page; see also p.31. Furthermore, EPA states that at current application rates, endosulfan use is likely to result in both acute and chronic risks to endangered/threatened species. Id. at p.31. However, despite EPA's determination that the registration of this pesticide may affect endangered species, it has not reinitiated consultation with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Ethafluralin

Ethafluralin is a selective herbicide used for pre-emergence control of annual grasses and broadleaf weeds in crop areas. The ecological assessment in ethafluralin's RED found that endangered species LOCs were exceeded for freshwater organisms and estuarine/marine invertebrates. Ethafluralin RED, 12/1994. EPA stated that "[it] has concerns about the exposure of threatened and endangered plant and animal species to ethafluralin." Ethafluralin RED, p. 55. However, despite EPA's recognition that ethafluralin may affect endangered species, it has not initiated consultation with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Folpet

Folpet is a fungicide used for avocado crops in Florida and for wood protection treatment to forest products. EPA has concerns about the exposure of threatened and endangered species to folpet. Folpet RED, 09/1999, p. 66. "LOCs are expected to be exceeded for aquatic organisms exposed to single or multiple applications." Id. EPA notes that there are a number of endangered species in Dade County, Florida, one of only two counties in Florida known for commercial avocado production. These species include the Everglades snail kite. EPA notes that the reported high toxicity of folpet to aquatic invertebrates requires measures to reduce the risk of folpet reaching bodies of water. EPA states that since the Everglades are 3 miles from the treated avocado groves, spray drift is the most likely route of exposure but that such drift is unquantifiable at this time. As discussed in the Background section, spray drift is known to carry up to 60% of the pesticide off the target area and can travel for miles. Consequently, spray drift is a realistic route of exposure for the snail kite. EPA goes on to note that the Program will implement mitigation measures that will eliminate adverse impacts to endangered and threatened species. Until that time, the voluntary label advisories are the only measure that aims to protect listed species from pesticide use. However, EPA states that "it is not imposing label modifications at the this time through the RED. Rather, any requirements for product use modification will occur in the future under the Endangered Species Protection Program." Id. Given EPA's knowledge of listed species within exposure range of this pesticide's application and the toxicity of the species to this pesticide it is disturbing that EPA has not consulted to determine the impact of its registration of this use and more startling that it acknowledges that the label is the only measure it has at this time to protect the species yet for no apparent reason is not using this means to take measures to protect the snail kite.

Lindane

Lindane is a persistent and moderately mobile organochlorine used for seed treatment. EFED RED Chapter for Lindane, 08/2001. It is a potential endocrine disruptor in birds, mammals, and possibly fish. Id. at 11. EPA modeling studies shave shown that lindane concentrations in surface and ground water may reach environmentally significant levels, even when lindane is restricted to seed-treatment uses only. Id. at cover page. Seed treatment uses present acute and chronic risk to birds and mammals. Id. Endangered species LOCs are exceeded for freshwater fish and estuarine/marine invertebrates. Id. at p.2. Endangered birds and small mammals that eat a large daily portion of seeds may be at risk from the proposed seed treatment use. Id. at p.3. However, despite EPA's recognition that lindane may affect endangered species, it has not initiated consultation with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Linuron

Linuron is an herbicide used to control germinating and newly emerging grasses and broad-leafed weeds. Linuron's risk assessment found that endangered species LOCs are exceeded in some instances for acute effects to birds, wild mammals, aquatic organisms and nontarget plants. Linuron RED, 12/1994, p.56. Endangered species LOCs are exceeded for chronic effects to birds, wild mammals, and aquatic organisms. Id. EPA acknowledged that limitations on the use of linuron will be required to protect endangered and threatened species but these limitations have not yet been defined. Id. However, despite EPA's recognition that linuron may affect endangered species and that limitations will be required, it has not initiated consultation with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Metolachlor

Metolachlor is a broad spectrum herbicide used for general weed control in many agricultural food and feed crops (primarily corn, soybeans, and sorghum), and on lawns and turf, ornamental plants, trees, shrubs and vines, rights of way, fencerows and hedgerows, and in forestry. It is the second most widely used herbicide in the United States. Acute as well as chronic exposures to nontarget organisms can result from direct applications, spray drift and runoff. The LOC for acute and chronic effects to endangered avian species eating short grass is exceeded at an application rate of 6 lbs/acre. Metolachlor RED, 12/1994, p. 37. The endangered species LOC is exceeded for small mammals eating short grass at an application rate of 2 lbs/acre. Id. Endangered species LOC is exceeded for freshwater fish in shallow water bodies. Id. Metalochlor has been found to adversely affect the growth and development of juvenile fish at low level concentrations. This is of concern given the fact that it is among the top five pesticides detected in surface water in the Midwest. Despite EPA's recognition that metolachlor may affect endangered species, it has not initiated consultation with FWS.

Norflurazon

Norflurazon is a selective preemergent herbicide used to control germinating annual grasses and broadleaf weeds in fruits, vegetables, nuts, cotton, soybeans, and various nonagricultural and industrial areas. Endangered species LOC have been exceeded for chronic effects on birds and mammals, and aquatic, semi-aquatic and terrestrial plants. Norflurazon RED, 06/1996, p.68. Limitations on the use of norflurazon may be required to protect endangered and threatened species. Id. Despite EPA's recognition that norflurazon may affect endangered species, it has not initiated consultation with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Oxyfluorfen

Oxyfluorfen is a broad spectrum pre- and post-emergent herbicide used on tree and vine crops, annual and perennial crops. It is also used in non-crop uses to control broadleaf and grassy weeds. The preliminary assessment for endangered species indicates that oxyfluorfen exceeds the endangered species LOCs for terrestrial plants for all uses; avian chronic for all applications with rates greater than 0.5 lb/acre (such as apples, walnuts, grapes); mammalian chronic for all applications with rates greater than 2 lbs/acre (such as apples, walnuts, grapes); freshwater fish and invertebrates. Revised EFED Preliminary Risk Assessment for the Oxyfluorfen Reregistraiton Eligibility Decision Document, 12, 2001, p.13.

EPA consulted with FWS in 1985 on oxyfluorfen regarding its use on non-crop areas. FWS found jeopardy for 76 species of endangered plants, 54 species of endangered fish, 23 species of endangered mussels, two species of snails, eleven species of endangered insects, four endangered amphibians and one endangered bird. Id. at p.14. Oxyfluorfen was also included in the corn cluster consultation in 1983 and its uses on crops and forests were also included in the reinitiation of clusters in 1988. The resulting 1989 opinion found jeopardy for one amphibian, five fish species, two species of crustacean and one bird species. EPA acknowledges that many additional species, especially aquatic species, have been listed since the 1989 opinion was issued. Id. In addition, EPA notes that endangered plants which were considered in the 1985 and 1986 opinions but not in the 1989 opinion need to be addressed. Id. Furthermore, EPA acknowledges that new information, such as information regarding spray drift, are now available that did not exist in 1989. However, EPA has not sought consultation for the reregistration of oxyfluorfen. EPA relies on a Conservation Review that will clarify processes for endangered species risk assessments and consultations.

Trifluralin

Trifluralin is a preemergent herbicide used to control annual grasses and broadleaf weeds on a variety of food crops and residential use sites. EPA is concerned about the exposure of threatened and endangered plant and animal species to trifluralin. Trifluralin RED, 09/1995, p. 72. Endangered species LOCs are exceeded for birds, mammals, and semi-aquatic and aquatic plants. Id. Despite EPA's concerns for endangered species from the use of trifluralin, it has not sought consultation with FWS.

B. Carbamates:

Carbamates are a group of related pesticides that affect the functioning of the nervous system. Specifically, they inhibit cholinesterase enzymes that are vital for transmitting nerve impulses, which can lead to respiratory failure among other things.

Chlorothalonil

Chlorothalonil is a broad-spectrum fungicide used on field crops, such as peanuts, vegetables and fruit, and on turf. In chorothalonil's RED, EPA documented several fish kills associated with the pesticide. Chlorothalonil RED, 09/1998. EPA also stated that "[t]he registered uses of chlorothalonil may adversely affect endangered species of birds (chronically), mammals (chronically), freshwater fish (acutely and chronically), freshwater invertebrates (acutely) and aquatic plants." Chlorothalonil RED, p. 153. However, despite EPA's determination that the registration of this pesticide may affect endangered species, it has not consulted with FWS, relying on the anticipated consultation that is to be conducted in accordance with the species-based priority approach described in the Program.

Methiocarb

Methiocarb, an insecticide, acaricide and molluscicide, may pose a hazard to many listed birds, mammals, insects and aquatic organisms. Methiocarb RED, p.28. EPA states that FWS will be consulted to identify endangered species which may utilize areas where methiocarb is used. However, EPA has not followed through with consultation on methiocarb's impact to listed species.

Methomyl

Methomyl is an insecticide used on field, vegetable and orchard crops, turf, livestock quarters, commercial premises, and refuse containers used throughout the country. Methomyl factsheet, p. 1. Methomyl, which can contaminate surface waters as a result of spray drift or runoff, poses acute risks to birds and mammals that feed on short and tall grasses, broadleaf plants, and small insects. Id. at p.5-6. The major concerns for nontarget organisms are chronic risks to nontarget mammalian and freshwater invertebrate organisms. Id. at p.6. Risks to aquatic invertebrates is likely to occur wherever methomyl is used. Id. EPA acknowledges that limitations may be necessary to protect endangered and threatened species and anticipates that consultation with FWS may be conducted in accordance with the Program. Methomyl RED, 03/1998, p. 95. However, EPA has yet to initiate consultation on methomyl.

Molinate

Molinate is a thiocarbamate herbicide used on rice for grass weed control. Molinate, a likely endocrine disruptor, poses a risk to mammalian and avian reproduction. Molinate Summary, p.3; EFED for molinate RED, 02/2001, p. 3. In California, molinate also poses a chronic risk to freshwater invertebrates and fish and may also impair reproduction in fish as it does in mammals. Id. In the Southern region, molinate poses an acute risk to fish, amphibians, and aquatic invertebrates. Id. at p. 4. It also poses a chronic risk to fish and aquatic invertebrates. Id. Despite these adverse impacts, EPA has not consulted with FWS.

Oxamyl

Oxamyl is used on vegetables, fruits and non-food items. It is acutely toxic to birds and mammals Oxamyl IRED, 12/2000, p. 28-29. It poses chronic risks to birds, affecting reproduction, including reduction in egg production and egg fertility. Id. at 29. It poses chronic risks to mammalian species from unincorporated spray applications. Id. Acute and chronic risks are possible for avian and mammalian endangered species from oxamyl use. Id. at 30. Results from field studies suggest that endangered/threatened amphibians may also be at risk. Id. EPA consulted on oxamyl's use as part of the corn cluster assessment in 1981. Oxamyl was found to jeopardize the continued existence of two bird species and three insect species. Oxamyl was also included in the reinitiation of clusters in 1988. The 1989 opinion found jeopardy to the Wyoming toad, four fish species, and four bird species. EPA acknowledges that many additional species have been listed since the 1989 opinion was written. Id. at 31. Additionally, the 1989 opinion did not consider endanger insects. Id. EPA also acknowledges that the RPMs from the 1989 opinion may need to be reassessed and modified based on new information. Id. However, EPA states that this will not occur until its Program is finalized and in place. Id.

C. Organophosphates:

OPs also exhibit high acute toxicity due to irreversible inhibition of cholinesterase enzymes. Exposure of wildlife to cholinesterase inhibiting pesticides disrupts normal neuromuscular control. Death can occur rapidly due primarily to respiratory failure. Organophosphate exposure can result in chronic effects in animals such as reproduction impairment and delayed neuropathy.

In a 5-year study, as part of the National Water-Quality Assessment and part of the National Stream Quality Accounting Network, USGS analyzed the presence of organophosphates in our environment. Hopkins, E.H. et al., 2000, Organophosphorous pesticide ("OP") occurrence and distribution in surface and ground water of the United States, 1992–97, U.S.G.S. Open-file report 00-187. Specifically, 11 organophosphates were studied—azinphos-methyl, chlorpyrifos, diazinon, ethoprop, ethyl-parathion (parathion), fonofos, malathion, methyl-parathion, phorate, and terbufos. Over thirty-five OPs registered by EPA are used extensively for agricultural purposes. Ten or more OPs are used in appreciable quantities on cropland in the irrigated valleys of the western United States (Sacramento, San Joaquin, Willamette, and Methow valleys), the lower Mississippi River valley, and parts of the Southeastern Coastal Plain. Of the OPs studied, chlorpyrifos, malathion, and diazinon were detected in the greatest percentage of samples and at the highest concentrations . Id. Chlorpyrifos, which has more pounds of active ingredient applied to cropland than any other OP, was the most widely distributed OP in surface water. Id. Diazinon was the most commonly detected OP in urban streams. Id. Chlorpyrifos, malathion, azinphos-methyl, parathion, and diazinon were all found in concentrations above their aquatic-life criteria ("ALC"). Id. These five OPs were the only OPs studied with established ALCs. The mere pervasive presence of these pesticides should be enough to raise concern about their impact on listed species. The following is a list of OPs that EPA has recognized impact endangered and threatened species.

Acephate

Acephate is an insecticide used for field, fruit and vegetable crops. Endangered LOCs except for fish (estuarine and freshwater) and estuarine invertebrates are exceeded for all uses of acephate. Acephate IRED, 09/2001, p. 43. In addition, LOCs are exceeded for endangered species of mammals, amphibians, reptiles, insects, and freshwater invertebrates for the degradate methamidophos formed from all uses of acephate. EPA consulted with FWS on the use of acephate on corn in the corn cluster assessment in 1983, forest use in the forest cluster assessment in 1984, rangeland/pastureland uses in the cluster analysis in 1984, and on several agricultural uses of acephate in the reinitiation of the cluster assessments in 1988. EPA acknowledges that these consultations are based on old labels, uses and application methods. Id. EPA's current assessment of ecological risks uses more refined methods and new data. EPA, concludes that "[t]herefore, the Reasonable and Prudent Measures in the Biological Opinion(s) may need to be reassessed and modified based on these new approaches." Id. at 44. However, EPA has not sought consultation for the reregistration of acephate. EPA relies on a Conservation Review that will clarify processes for endangered species risk assessments and consultations.

Azinphos-methyl

Azinphos-methyl is an insecticide widely used in agriculture. Apples alone represent 40% of azinphos-methyl's total use. Apples, cotton, almonds, pears, peaces, walnuts, potatoes, sugarcane, blueberries, plums, and cranberries account for 91% of azinphos-methyl's total usage. High use locations include central Washington, the Central Valley of California, Texas, Mississippi Delta, the Blue Ridge mountains and Michigan. The use of azinphos-methyl has significant acute ecological risks. Azinphos-methyl is very highly toxic to freshwater and marine fish and to invertebrates. Azinphos-methyl IRED, 10/2001, p. viii. Potential exposure from spray drift and surface residues places birds and mammals at risk. Id. Azinphos-methyl exceeds acute and chronic LOCs for aquatic and terrestrial organisms at all use sites. Azinphos-methyl revised EFED, 06/1999, p. 92. Chronic LOCs were exceeded up to 47-fold for birds and as much as 99-gold for small mammals, strongly suggesting that adverse reproductive effects are likely from chronic exposure. Id. at 94. There is considerable documentation that azinphos-methyl kills aquatic organisms when applied at registered use sites. Id. at 92. The EFED Incident Data Base System has recorded at least 131 incidents over which thousands of fish were killed. Id. Incidents involving birds, mammals and reptiles have also been documented. Id. EPA states that "[w]hen azinphos-methyl usage covers a large proportion of a watershed catastrophic fish kills *will* occur." Id. at 93. Reproductive effects to birds and mammals is highly likely when these species are exposed to repeated subleathal doses. Id. at 92.

Despite the acknowledgment by EPA that azinphos-methyl is highly toxic to wildlife, EPA has not reinitiated consultation. EPA consulted with FWS on the effects of azinphos-methyl on endangered and threatened species three times. However, these opinions are based on old labels, application methods, and less refined risk assessment procedures. Additionally, EPA cites new data, including aquatic levels that are of particular concern, which need to be incorporated into any new assessments for endangered and threatened species. Yet, despite new listings and new information, EPA continues to rely on its Conservation Review with FWS, which will clarify processes for consultation, as a satisfactory response to the requirements of the ESA.

Bensulide

Bensulide is an herbicide used on grasses and weeds in food crops. The most significant risk from bensulide use is chronic avian risk due to eggshell thinning. Bensulide IRED, 09/2000, p. 30. Bensulide also poses chronic risk to mammals through residues on wildlife food items. Id. at 31. Acute levels of concern are exceeded for freshwater fish, including those for threatened and endangered species and for freshwater invertebrates. Id. Despite concern regarding the use of bensulide, EPA has not initiated consultation. Instead, EPA relies on its yet to be finalized Program to address endangered and threatened species impacts of bensulide.

Chlorpyrifos

Chlorpyrifos is the most widely used insecticide with both agricultural and urban uses. Chlorpyrifos was found to cause 80% mortality to 17 of 23 beneficial insects tested by the International Organization for Biological Control. Hassan, S.A., et al., 1988 Results of the fourth joint pesticide testing program carried out by the IOBC/WPRS-Working Group, "Pesticides and Beneficial Organisms," J. Appl. Ent. 105:321-329. Bioconcentration of chlorpyrifos in ponds and estuarine areas may pose acute and/or reproductive risks to aquatic birds and mammals feeding adjacent to treated areas. Chlorpyrifos IRED, 09/2001, p. 52. Additionally, synergistic interactions between chlorpyrifos and a variety of other chemicals have been observed–enhancing the potency of chlorpyrifos. Cox, C., Insecticide Factsheet, Chlorpyrifos, Part 3: Ecological Effects, Journal of Pesticide Reform, Summer 1995, Vol.15, No.2, p. 17. Endangered species LOCs are exceeded for small mammals, birds, freshwater fish and invertebrates, and estuarine fish and invertebrates for most chlorpyrifos uses. EPA has consulted with FWS five times on potential effects of chlorpyrifos for various uses on endangered and threatened species. However, EPA acknowledges that these consultations and the findings expressed in the opinions are based on old labels and application methods, and less refined risk assessment procedures. Id. at 53. However EPA has not reinitiated consultation, relying on its Conservation Review with FWS before EPA reassess the potential effects of chlorpyrifos uses to listed species. Such a delay is inconsistent with the requirements of section 7.

DDVP (dichlorvos)

Dichlorvos is an insecticide used in controlling flies, mosquitos, gnats, cockroaches, fleas, and other insect pests. The endangered species LOC is exceeded for aquatic invertebrates, birds and mammals. DDVP Preliminary Risk Assessment-Ecological Effects, 10/2000, p. 23. However, EPA has not consulted with FWS regarding the impacts of DDVP, relying on the unfinalized Program to ensure that endangered and threatened species are protected.

Diazinon

Diazinon is an insecticide used for indoor, commercial property, lawn/ornamental, animal treatments, rangeland, and multiple food/feed uses. Approximately 6 million pounds are applied annually. 70% of diazinon is applied for urban uses. Diazinon is very highly toxic to birds, mammals, beneficial insects, and freshwater, estuarine and marine animals. EFED RED Chapter for Diazinon, 05/1999, p. 4. Acute and chronic LOCs are exceeded for all uses for freshwater and estuarine/marine fish, terrestrial animals, and aquatic invertebrates. Id. Endangered species LOCs are exceeded for wildlife, aquatic life and terrestrial plants. Id. The primary environmental concerns associated with diazinon use are bird kills, contamination of surface water, and impacts on aquatic species. Id. at 1. Urban use, which is prone to runoff, is resulting in widespread contamination of surface water. Id. Approximately 300 incidents of wildlife mortality, mostly birds, have been attributed to diazinon use. Id at 2. Based on this information, diazinon has caused the second largest number of total known incidents of bird mortality of any pesticide, exceeded only by carbofuran. Id. at 144. However, the documented kills is believed to be a very small fraction of the total mortality caused by this pesticide. Id. However, despite the "major and extremely significant concerns" regarding diazinon's impacts, EPA has not consulted with FWS. Instead, EPA is relying on its Program to satisfy ESA obligations. Id. at 1 and 143.

Dicrotophos

Dicrotophos is an insecticide used for cotton. Dicrotophos is extremely toxic to birds, mammals and aquatic invertebrates. Use of dicrotophos on cotton poses a risk to threatened and endangered species of birds, mammals, reptiles, amphibians, and aquatic invertebrates. Dicrotophos Preliminary Risk Assessment 10/1999, p. 40. Birds and mammals may be at risk from the tree-injection use of dicrotophos in fruit and nut trees. Id. However, EPA has not consulted on the use of dicrotophos and instead waits for modifications that will occur in the future under the Program to protect listed species.

Dimethoate

Dimethoate is a systemic organophosphate insecticide primarily used on a variety of field and orchard agricultural crops, and ornamentals. Endangered species acute LOCs are exceeded for birds, mammals and aquatic invertebrates. Dimethoate Revised EFED RED 12/1999, p. 60. EPA has not consulted with FWS regarding the use of dimethoate and instead is relying upon limitations that will be put in place when the Program is finalized and consultation takes place.

Disulfoton

Disulfoton is an insecticide and acaricide primarily used on a variety of field grown agricultural crops, fruit and nut trees, ornamentals, and Christmas trees. Endangered species LOCs have been exceeded for birds, mammals, freshwater fish, freshwater invertebrates, marine/estuarine fish, and marine/estuarine invertebrates. Disulfoton Revised EFEA, 03/2000, p. 58. Endangered terrestrial, semi-aquatic and aquatic plants may also be affected. Id. EPA acknowledges that limitations will be required to protect endangered species, but that these limitations will not be defined until the Program is finalized. Id.

Ethion

Ethion is an insecticide and acaricide used to control leaf-feeding insects and flies and ticks on cattle. Ethion is highly toxic to small mammals and bees on an acute basis. Ethion RED, 04/2001, See Envtl Risk Assessment section. Acute risk quotients for terrestrial species exceed endangered species LOC. Id. Ethion displays very high toxicity to most aquatic organisms tested. Id. Acute risk quotients exceed levels of concern for aquatic invertebrates and some fish species while chronic risk quotients exceed levels of concern for fish. Id. EPA consulted with FWS in 1989. FWS found the potential for jeopardy to a number of invertebrate, amphibian and fish species. However, effects to endangered birds and mammals were not assessed. During the phase-out period risks are being mitigated by new and old measures. EPA has concluded that even though many additional species have been listed since the 1989 opinion, the risk reduction measures are sufficient to protect listed species and "will not affect any additional species not covered by the 1989 biological opinion." Id. at Endangered Species Statement. However, EPA has not had its "not affect" opinion approved by the FWS. Consequently, EPA continues to be in violation of the ESA with respect to Ethion.

Ethoprop

Ethoprop is a fairly persistent insecticide, nematicide, fungicide used on agricultural crops and golf-course turf. Ethoprop is a known cholinesterase inhibitor that is very highly toxic to avian species and causes reproductive effects. EFED RED for Ethoprop, 10/1998, p.47. Ethoprop is applied on a wide variety of crops during critical periods for avian and mammalian species in the spring resulting in high acute and chronic (reproductive) risk from ingestion of granules or contaminated food. Errata for endangered species, ecological incident summary and risk characterization sections of the RED Chapter for Ethoprop, 08/1999. Endangered species LOC are exceeded for single broadcast applications of granular and nongranular products at registered maximum application rates for birds. Ethoprop RED, p.34 and 36. Endangered species LOC are exceeded for all feed items other than seeds and granular products at registered maximum application rates for mammals. Id. at 38 and 40. Endangered species LOC are exceeded for freshwater fish and invertebrates and estuarine fish and invertebrates for all uses except golf-course silt use. Id. at 43 and 44. The likelihood of adverse effects on aquatic organisms is increased by the fact that Ethoprop can contaminate surface water via runoff for up to several months after application. Id. at 48.

Despite Ethoprop's known toxicity to endangered and threatened species, EPA has not reinitiated consultation with FWS. Ethoprop was evaluated in 1983 under the corn cluster and soybean consultation. Ethoprop was also evaluated in a case-by-case consultation in 1987 and in the 1989 reinitiation consultation for crops. However, EPA has not reinitiated consultation since completing its most recent environmental assessments of Ethoprop. Instead, EPA is waiting for the Program to be finalized before any consultation takes place.

Ethyl-parathion

Ethyl parathion is an insecticide and miticide registered for use on nine agricultural crops: alfalfa, barley, corn, cotton, canola, sorghum, soybean, sunflower, and wheat. It is a restricted-use pesticide due to high acute toxicity. About one-half million pounds are applied annually, about 60% of which is applied to wheat and alfalfa. Ethyl parathion is very highly toxic to fish, birds, aquatic invertebrates, small mammals, and pollinating insects. Ethyl-parathion Revised Envtl Risk Assessment, 03/2000, cover page. It also poses a high reproductive and ecological chronic risk to birds. Id. Endangered species LOCs are exceeded for birds, mammals, fish and invertebrates. Id. at 66. Despite these concerns EPA has not reinitiated consultation, waiting for the Program to be finalized before any requirements for product use modification are imposed.

Fenamiphos

Fenamiphos is an insecticide/nematicide predominately applied pre-plant, at seeding, pre-emergent, pre-transplant, post-transplant, or post-harvest. It is used on food crops (apples, asparagus, bananas, beets, Brussels sprouts, cabbage, Chinese cabbage, cherries, cotton, eggplant, garlic, grapes, grapefruit, kiwi fruit, lemons, limes, oranges, peppers, okra, peaches, peanuts, pineapple, raspberries, strawberries, tangerines,), non-food crops (*e.g.*, tobacco), ornamentals, and turf (*e.g.*, golf courses, turf farms). Approximately 1 million pounds are used annually over 300,000 acres. At current registered rates and uses, endangered species LOCs are exceeded for all terrestrial and aquatic organisms for all current uses. Fenamiphos Envtl Risk Assessment, 09/2001, p. 63. EPA has stated that "[it] has concerns about the risks posed to endangered aquatic and terrestrial animal species exposed to Fenamiphos under current use practices and application methods. Fenamiphos Envtl Risk Assessment, 08/1999, p.113. However, despite these concerns EPA has not consulted with FWS, relying on modifications that will be imposed when the Program is finalized.

Fenitrothion

Fenitrothion is an insecticide use for commercial greenhouses and outdoor ornamentals. It is highly toxic to birds and aquatic organisms. Chronic effects for birds include reduced egg reproduction. High acute and chronic risk is expected for birds consuming grass, seed and insects following single as well as multiple applications of Fenitrothion. Endangered species LOCs are exceeded for acute effects to aquatic invertebrates and in some instances to birds and wild mammals, as well as chronic effects to birds and aquatic invertebrates. Fenitrothion RED Factsheet, p. 5. EPA acknowledges that limitations on fenitrothion's use may be required to protect listed species but will not consult with FWS until the Program is finalized.

Fenthion

Fenthion is an insecticide used for livestock direct animal treatments and for wide area mosquito control. Endangered species LOCs are exceeded for freshwater invertebrates, some estuarine/marine invertebrates and birds. Fenthion Revised Envtl Fate and Effects Assessment for Fenthion RED, 10/1999, p. 4. EPA states that limitations on fenthion will be required to protect endangered and threatened species but these limitations will not be defined until the Program is finalized. Id.

Malathion

Malathion is an insecticide used on a variety of agricultural food and feed crops. There are also nonagricultural uses on commodities such as Christmas trees and agricultural premises. Malathion has registered residential uses on lawns, gardens, and ornamental trees, shrubs, and plants. Malathion is applied by many methods, such as aircraft (fixed wing), duster, fogger, helicopter, irrigation, shaker can, shovel, sprayer, and spreader. Approximately 16.7 million pounds of active ingredient are used annually, most of which is applied to cotton in the Boll Weevil Eradication Program (11.2 million pounds). Drift from ultra low volume (ULV) applications and the fate of the degradate malaoxon in the environment are of concern. Endangered species LOCs are exceeded for acute hazard to endangered fish, aquatic invertebrates, and insects. Malathion Revised Risk Assessment, 11/2000, p. 96. Chronic hazard LOCs to threatened birds, mammals, amphibians and reptiles are potentially exceeded for certain uses. Id. Chronic hazard LOCs for endangered fish and invertebrates are exceeded by most uses. Id. The magnitude of malathion use and the numbers of potentially exposed endangered species will require more extensive analysis. However, despite the pervasive use of malathion and its adverse effects on listed species, and EPA's acknowledgement that limitations will be required to protect listed species, EPA has not sought consultation and states that it will not seek consultation until its Program is finalized. Id.

Methamidophos

Methamidophos is a restricted use insecticide/acaricide used on cotton, potatoes and tomatoes. 591,000 lbs active ingredient (on average) is applied annually in the U.S. (31,000 lbs to cotton; 390,000 to potatoes; 170,000 to tomatoes). Methamidophos is highly toxic to pollinators, exposed to direct treatment on blooming crops. Endangered species LOCs are exceeded for birds, mammals, reptiles, amphibians, and freshwater and estuarine invertebrates. Methamidophos Revised Envtl Fate and Effects Assessment, 01/2000, p. 41. However, despite EPA's concerns about this pesticide's impacts on birds, beneficial insects, freshwater and estuarine invertebrate aquatic species, birds, and mammals, EPA has not sought consultation and states that it will not seek consultation until its Program is finalized. Id.

Methidathion

Methidathion is a non-systemic insecticide/acaricide used to control a broad spectrum of agricultural insects on various crops; predominately alfalfa, citrus and cotton. All uses of methidathion exceed the endangered species LOC for all forms of endangered animal species: avian acute and chronic; mammalian acute and chronic; freshwater fish acute and chronic; freshwater invertebrate acute and chronic; and estuarine/marine fish acute and chronic. Methidathion IRED, 09/2001, p. 31. Despite the pervasive affect of this pesticide on listed species, EPA has not sought consultation and states that it will not seek consultation until its Program is finalized.

Methyl-parathion

Methyl-parathion is a restricted use insecticide and acaricide used to control boll weevils and other insect pests of agricultural crops. Methyl-parathion use is heaviest in southern United States and California (cotton growing areas). At currently proposed rates, endangered species LOCs are exceeded for all species groups except plants. Methyl-parathion Revised Envtl Fate and Effect Assessment, 08/1999, p. 61. EFED concludes that, with a great deal of certainty, the use of methyl-parathion poses significant risk to nontarget organisms in terrestrial and aquatic environments. Id. Acute and chronic effects on birds, mammals, bees, and aquatic invertebrates are likely to occur as a result of its application. Id. However, despite EPA's concerns about this pesticide's impacts, EPA has not sought consultation and states that it will not seek consultation until its Program is finalized. Id.

Naled

Naled is an insecticide/acaricide primarily used to control adult mosquito and blackfly populations. Naled is also used on food and feed crops, in greenhouses and in pet flea collars. Approximately 1.0 million pounds are used annually. On average, 70% is used for mosquito/blackfly control, 28% is used on agricultural crops, and 2% is used for pet flea collars. For mosquito/blackfly control, approximately 98% is used to control mosquitos with 95% of the mosquito use being applied aerially. Applied using ground and aerial spray equipment, hot plate/pan for greenhouses, and impregnated in pet flea collars. Naled poses acute and chronic risk to endangered birds, mammals and aquatic organisms. Naled Revised Envtl Fate and Effects Assessment, 10/1999, p. 37-38. Although EPA acknowledges that limitations on the use of naled may be necessary to protect listed species but states that these limitations will not be defined until the Program is finalized.

Oxydemeton-methyl (ODM)

ODM is a restricted use pesticide used on the following crops: Field Crops (cotton, peppermint, spearmint, and sugar beets), Seed Field Crops (alfalfa, clover), Non-Bearing Fruits (apples, apricots, cherries, crab apples, grapes, nectarines, peaches, plums, prunes, quinces), Vegetables (beans-lima, broccoli, Brussels sprouts, cauliflower, cabbage, cucumber, eggplant, head lettuce, peppers, pumpkin, squash), Melons (muskmelon, watermelon), and Nuts (filberts, walnuts). In addition, ODM is registered for application on Christmas tree plantations, seed orchard trees, ornamental flowering plants, woody shrubs, and various ornamental and shade trees. The following uses are registered but not marketed: citrus, field corn, popcorn, onions, pears, safflower, snap beans, sorghum, and turnips. ODM use on citrus is permitted under a Special Local Need in Florida only. Annual usage of ODM is approximately 200,000 pounds and is applied aerially (fixed wing or helicopter), by airblast sprayers, by groundboom sprayers, by bark treatment (e.g., brush-on or tree injection), chemigation, and by soil injection. Application rates vary from 0.375 - 1.125 lbs/ai/A, 1-3 times per season. Endangered species LOCs are exceeded for birds, mammals, estuarine shrimp, and freshwater fish and invertebrates. ODM Envtl Fate and Effects Preliminary Risk Assessment, 12/1999, p. 37. Although EPA states that limitations will be required, it states that consultation will not take place until the Program is finalized.

Phorate

Phorate is an insecticide/nematicide used to control various insects such as the Mexican bean beetle, corn rootworm, mites, European corn borers, wireworms, white grubs, cornleaf aphids, seedcorn beetles, leafminers, thrips, black cutworms, leafhoppers, white flies, nematodes, southern corn rootworm, flea beetle larvae, psyllids, wireworms, Colorado potato beetle, lygus, chinchbug nymphs, Banks grass mites, seedcorn maggots, sugar beet root maggot, sugar beet leafhopper, grasshoppers, and Hessian Fly. Phorate is used on potatoes, corn (fresh, sweet, field)), peanuts, cotton, sugarcane, wheat (spring/winter), soybeans, beans, sorghum, sugar beets, lilies (field grown), daffodils, and radishes grown for seed. An estimated 3 million pounds of phorate are produced annually. Crops with the highest usage with reference to pounds produced are corn (46%), potatoes (21%) and cotton (13%). Almost 2.5 million acres are treated annually. Crops with the highest percentage of acres treated include potatoes (20%), fresh sweet corn (10%) and peanuts (9%). Most of the usage is in FL, WI, CA, GA, MS, AL, TX, ID, MT, and MI. All terrestrial and aquatic endangered species LOCs are exceeded for phorate use. Phorate Revised Envtl Fate and Effect Assessment, 09/1999, p. 43. EPA states that modifications will not be imposed on the use of phorate until the Program is finalized.

Phosmet

Phosmet is a broad-spectrum insecticide and acaricide that is used for control of a variety of pests including the alfalfa weevil, boil weevil, codling moth, leafrollers, plum curculio, grape berrymoth, and the oriental fruit moth. Phosmet is applied to terrestrial food areas as a delayed dormant spray or foliar application with aerial and ground equipment. Over 95% of phosmet usage is for insect control on commercial tree and vine fruit. Approximately 80% of this usage is applied to apples throughout the northeastern and western states. Collected data suggests that on certain crops where there is a high application rate and frequency of application, expected environmental concentrations can lead to acute and chronic risk to both terrestrial and aquatic species. Phosmet Envtl Fate and Effects Risk Assessment, 03/2000, cover page. Chronic and acute risks to birds and mammals exist through residues which result from application rates. Id. at Phosmet summary. The chronic reproductive effects to mammals, especially those found in orchards, is very likely. Id. Phosmet has very high acute toxicity to freshwater fish and freshwater and estuarine/marine invertebrates. Id. Phosmet is also very highly toxic to bees and displays extended residual toxicity. Id. EPA released its Interim Reregistration Eligibility Decision for phosmet in 2001, which included a determination to voluntarily cancel certain uses, continue registered uses with additional risk reduction, or continue uses under time-limited registrations with interim risk mitigation. However, EPA has not consulted with FWS regarding phosmet and instead awaits the finalization of the Program to address endangered species concerns.

Profenofos

Profenofos is an insecticide/miticide used only on cotton (up to 10% of U.S. cotton crop is treated). It is sprayed aerially and by ground equipment up to six times per season. About 775 thousand pounds are used annually; 81% of the usage is in the cotton-growing states of Arizona, Texas, Georgia, Mississippi, and Louisiana. Profenofos is highly toxic to freshwater fish and aquatic invertebrates, on both an acute and chronic basis. Profenofos Revised Envtl Fate and Effects Assessment, 12/1998, p.8. It is very highly toxic to estuarine and marine organisms on an acute basis. Id. Fish kill incidents are attributable to profenofos. Id. at 9. The incident data indicate that, even when used according to label directions under normal agricultural practices, profenofos can reach fish-bearing waters in sufficient concentrations to result in large fish kills. Id. Fish kills have occurred since the product labels were last revised, indicating that existing label recommendations are inadequate to protect aquatic organisms. Id. Endangered species LOCs are exceeded for birds and small mammals for the use of a single application. Id. at 15. Endangered species LOCs are also exceeded for freshwater fish and invertebrates and estuarine/marine fish and invertebrates when profenofos is applied at maximum label rates. Id. However, despite concerns for endangered species and label inadequacies to protect aquatic organisms, EPA has not consulted with FWS.

Terbufos

Terbufos is an insecticide-nematicide used to control a variety of insect pests on corn, sugar beets and sorghum. Approximately 7.5 million pounds of active ingredient are used annually. Ecological risks to terrestrial and aquatic organisms are of concern to the EPA. Terbufos IRED, executive summary, p.2. EPA's concern about potential adverse effects to terrestrial and aquatic organisms is based on the Agency's assessment and fish kills associated with the use of terbufos on corn. Id. Aquatic incidents indicate terbufos is the leading cause of fish kills among pesticides applied to corn and is fourth in causing fish kills for any pesticide applied to any crop. Id. at 29. These incidents appear to be associated with normal use. Terbufos presents high acute and chronic risks to nontarget terrestrial species. Id. at 28. Acute and chronic LOCs are exceeded for aquatic organisms. EPA has initiated three consultations with FWS on the effects of terbufos application to corn crops on listed species. However, EPA acknowledges that these consultations and the findings expressed in the opinions are based on old labels and application methods and less refined risk assessment procedures. EPA also notes that the RPMs may need to be reassessed and modified. Yet EPA states that it will not consult on terbufos' impacts until its Conservation Review is completed. Id. at 31.

Tribufos

Tribufos is a defoliant used for cotton crops. Approximately 4,500,000 pounds of active ingredient applied annually to between 4 and 5 million acres. Endangered species may be affected both acutely and chronically. Tribufos IRED, 12/2000, p. 24. Endangered species LOCs are exceeded for birds (single and multiple applications), mammals (single and multiple applications), freshwater fish, freshwater invertebrates, and estuarine/marine fish and invertebrates. However, EPA will not address any modifications or seek consultation until its Program is finalized. Id. at 41.

Trichlorfon

Trichlorfon is an insecticide primarily used on ornamentals, golf courses and residential turf, and for agricultural farm premise sites, (only in places inaccessible to animals), in nurseries, and as a mound treatment to control ants. Trichlorfon is applied through groundboom sprayers, hand-held sprayers, chemigation, pre-packaged bait (for harvester ant mounds), by shaker and sprinkling cans, and by hand. Use has increased over the last 3 years. Currently, about 1 million pounds of active ingredient are used annually. Acute and chronic LOCs are exceeded for terrestrial endangered species. Acute LOCs are exceeded for endangered aquatic species. Trichlorfon RED, 09/1997, p. 37. However, EPA will not address any modifications or seek consultation until its Program is finalized. Id. at 46.

D. Conclusion

EPA has failed to satisfy its duties under the ESA by failing to initiate consultation for these pesticides. These pesticides pose a threat to nontarget organisms including endangered and threatened species. Consequently, the sale and use of these pesticides "may affect" listed species, triggering EPA's duty to consult with FWS and/or NMFS. For the above listed pesticides, EPA must either: (1) reinitiate consultation for those pesticides that have been previously consulted, or (2) initiate consultation for those pesticides that have yet to be reviewed under the consultative process.

3. EPA has failed to satisfy the requirements of Section 7(a)(1) by not utilizing its authority under the Pesticides Program to further the conservation of threatened and endangered species.

Section 7(a)(1) of the ESA requires that all federal agencies shall, "in consultation with the Secretary, utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species." 16 U.S.C. § 1536(a)(1). The Supreme Court stated in TVA v. Hill that section 7(a)(1) is no less than "stringent mandatory language [that] reveals an explicit congressional decision to require agencies to afford first priority to the declared national policy of saving endangered species." TVA v. Hill, 437 U.S. 153, 183 and 185 (1978). EPA has failed to satisfy this duty. EPA relies on its ESPP, yet the ESPP has not been finalized in over 12 years. EPA in its reregistration of pesticides discusses how "in the future" the Program will impose necessary measures to protect listed species. However, until this program is finalized, EPA has done nothing in way of utilizing its authority to protect listed species.

4. EPA's registration of pesticides has resulted in the illegal "take" of listed species.

Section 9 of the ESA prohibits any person, including federal agencies, from taking any endangered or threatened species. 16 U.S.C. § 1538(a)(1)(B); 50 C.F.R. § 17.21(c). The term "take" is defined broadly to include "harass, harm, pursue, hunt, shoot, wound, trap, kill, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19); 50 C.F.R § 17.3. "Harm" is further defined as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3. Thus, an action which indirectly (e.g. habitat modification) or directly causes a decline in the population of an endangered species harms that species. Additionally, any action that precludes the recovery of an endangered species also falls within the meaning of harm.

Federal agencies may be limitedly exempt from the take prohibition through the issuance of an Incidental Take Statement ("ITS") as part of a Biological Opinion. 16 U.S.C. § 1536(o)(2); 50 C.F.R. § 402.14(i)(5). The ITS must identify the expected impacts of the authorized take, the reasonable and prudent measures necessary to minimize those impacts, and the terms and conditions that the agency must comply with to adequately implement those measures. 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i)(1)(i)-(v).

Registration of pesticides is a federal action that can cause the take of listed species. Defenders of Wildlife, 882 F.2d at 1300. Consequently, EPA must have written authorization from FWS and/or NMFS in the form of an ITS when authorizing the sale and use, or permitting the ongoing sale and use of pesticides when those pesticides result in incidental take.

Mortality is the primary documented effect on wildlife from OP and carbamate pesticides. Grue, C.E. et al. 1983. Assessing hazards of organophosphate pesticides to wildlife. Pages 200-220 *in* Transactions of the 48th North American Wildlife and Natural Resources Conference. The Wildlife Management Institute, Washington, D.C. As discussed above, these pesticides primarily affect the nervous system by inhibiting acetylcholinesterase enzyme activity. The respiratory muscles are the most critical muscle group affected, and respiratory paralysis is often the immediate cause of death. Glaser, L.C., Wildlife Mortality Attributed to Organophos-phorous and Carbamate Pesticides, National Biological Survey, USGS. Glaser identified the following pesticides for wildlife mortality incidents: carbofuran, methiocarb, oxamyl, aldicarb (all carbamates), chlorpyrifos, diazinon, dicrotophos, dimethoate, disulfoton, famphur, fenamiphos, fensulfothion, fenthion, fonofos, methamidophos, monocrotophos, parathion, phorate, and phosphamidon. Id. Other pesticides have also been attributed for die-offs of birds: acephate, azinphos-methyl, bendiocarb, brodifacoum, bromethalin, diclorvos, diphacinone, diuron, ethoprop, fenitrothion, heptachlor, imidacloprid, lindane, metalaxyl, methomyl, methyl parathion, metolachlor, mevinphos,oxydemeton-methyl, pendamethalin, pentachlophenol, phoxim, polybutane, propoxur, temephos, and terbufos. See Wildlife Incident Data, compiled by Linda Lyon, Division of Refuges, US FWS, available at <www.abcbirds.org/pesticides/IncidentData.htm>. Carbofuran, alone has been estimated to kill one to two million birds annually. Cox, C., Pesticides and Birds: From DDT to Today's Poisons, Journal of Pesticide Reform, Winter 1991, Vol.11, No.4 citing U.S. EPA, Office of Pesticides and Toxic Substances, 1989, Carbofuran: A special review technical support document, Washington, D.C..

EPA's registration of pesticides has resulted in take of listed species. As discussed above, several of the pesticides registered by the EPA are toxic to endangered species and have been found in the environment at acutely toxic and chronic levels. Although EPA has recognized that the use of pesticides results in mortality incidents, it has failed to complete consultation processes with FWS and/or NMFS in order to attain the necessary ITS for any take attributed to the use of the registered pesticides.

5. EPA is in violation of the Migratory Bird Treaty Act by registering pesticides that result in the take of migratory birds.

Section 703 of the Migratory Bird Treaty Act ("MBTA") prohibits the take of migratory birds, making it unlawful for anyone "at anytime, by any means or in any manner … to take … any migratory bird, [or] any part, nest, egg of any such bird." 16 U.S.C. § 703. Section 703 of the MBTA, which applies to federal agencies, includes poisoning of migratory birds from registered pesticides. See The Humane Society of the United States v. Glickman, 217 F.3d 882 (D.C.Cir. 2000) and United States v. Corbin

Farm Service, 444 F.Supp. 510 (E.D.Cal. 1978) *aff'd* United States v. Corbin Farm Service, 578 F.2d 259 (9th Cir. 1978).

EPA, through its reregistration of pesticides has documented and acknowledged that pesticide use results in bird kills. The Fish and Wildlife Service has tracked bird kill incidents attributable to pesticide use and has provided such data to the EPA for its ecological assessments of these pesticides. EPA's wildlife mortality incident database has also tracked and attributed bird deaths to pesticide use. EPA has attributed over 1100 incidents of bird kills–many including hundreds of birds–attributed to pesticide use. Although the numbers of bird kills attributed to pesticides is alarming (thousands of bird deaths have resulted from the use of registered pesticides at allowed rates), it is only a fraction of the number of actual bird incidents attributable to pesticides. See Cox, C., Pesticides and Birds, Journal of Pesticide Reform, Winter 1991, Vol.11, No. 4; see also Glaser, L.C., National Biological Service, Wildlife Mortality Attributed to Organophosphorous and Carbamate Pesticides, USGS, <biology.usgs.gov/s+t/noframe/ u216.htm>. For instance, in 2001, FWS attributed a 1998 bird kill incident near Lake Apopka to pesticides. FWS estimates that 672 million birds are directly exposed each year by pesticides on farms alone and that 10% of these, or roughly 67 million birds, die. FWS, Office of Migratory Bird Management, Pesticides and Birds, March 2000. The Ecological Incident Information System ("EIIS") indicates that a few pesticides are associated with the majority of bird incidents. Carbofuran, a carbamate, and diazinon, an organophosphate, are associated with 55% of all avian incidents reported to EPA. EIIS, March 1999; and Mastrota, F.N., 1999, Wildlife mortality incidents caused by pesticides: An analysis of the EIIS database. However, FWS notes that about 40 pesticides are known to kill birds even when applied according to prescribed application rates and methods. FWS, Pesticides and Birds. EPA's registration of these pesticides, which have been documented as the cause for numerous bird deaths, is a violation of the MBTA.

CONCLUSION

Contamination from pesticide use continues to adversely affect listed species. Pesticides are responsible for acute, chronic, secondary and indirect poisoning of wildlife. The science is out. Pesticides are having a dramatic effect on our environment, and chronic impacts may be more deleterious than currently suspected.

EPA has acknowledged that numerous pesticides that are in current use may affect listed species. EPA, however, has failed to engage in a programmatic consultation of its pesticide registration program, has failed in its clear duties to consult and reinitiate consultation on individual pesticides; and has failed to establish a conservation program. Unless EPA takes immediate steps initiate all of the required consultations, we will be forced to file suit 60 days from the date of this letter. Please contact me if you want to discuss these issues in greater detail.

Sincerely,

Brian Litmans
Cascade Resources Advocacy Group
1238 W. 15th Ave.
Anchorage, Alaska 99501
brian@crag.org
907.646.9286