Evaluating Lines of Evidence in National Level Pesticide Endangered Species Assessments

Spatial Data | Biological Data | Critical Habitat and Indirect Effects | Refined Species Assessment | Dealing with Data Gaps

National Level Pesticide Endangered Species Assessment: Use of Spatial and Biological Data

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Abstract

The Environmental Protection Agency's Office of Pesticide Programs' Registration and Registration Review process has entered the early phases of national level endangered species assessment for pesticide active ingredients. While many aspects of this evaluation process are yet to be fully developed, it is clear that the efficient use of all reliable types of information relevant to species location, biology and habitat is important in refining our understanding of how or if a species listed by the Endangered Species Act may be exposed to a pesticide, and whether that exposure presents a risk as described under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Endangered Species Act (ESA). The FIFRA Endangered Species Task Force (FESTF), composed of pesticide registrants assembled to meet endangered species data requirements, has investigated numerous data sources that are useful in the evaluation of the relationships between endangered species and the locations where registered pesticide products might be used. In assessments conducted to date, typically about 60% of the intersections of a crop, species and use are addressed by non-spatial lines of evidence, such as details related to the biological characteristics of the species and the restrictions in exposure that may be introduced by species habitat requirements. This poster addresses the value of the use of multiple lines of evidence in the national level endangered species assessment process, where such data can be efficiently applied in the national level process, and how these data might be arrayed for efficient and repeated use in subsequent evaluations.

Introduction

The 1973 Endangered Species Act (ESA) requires that threatened and endangered ("listed") species be protected from "take" or adverse impact when projects managed, sponsored or permitted by the Federal Government have the potential to harm listed species or impair their designated critical habitat. The Environmental Protection Agency's (EPA) Office of Pesticide Programs' Registration and Registration Review process has entered the early phases of national level endangered species assessment for pesticide active ingredients, a federal permitting action that requires ESA evaluations. Providing access to and utilizing all reliable types of information relevant to species location, biology and habitat is important in refining understanding of how or if a species listed by the ESA may be exposed to a pesticide, and whether that exposure presents a risk as described under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the ESA.

Utilizing multiple lines of evidence in determining the potential for a species to be exposed to a pesticide use is illustrated in an endangered species assessment pilot study for the Registration Review of clomazone conducted by the FIFRA Endangered Species Task Force (FESTF), EPA, and the registrant (FMC). The purpose of the assessment was to provide the EPA with information on

- The location of listed species,
- Their proximity to sites where clomazone might be used, and
- Other site-specific and species-specific factors that may influence potential exposure of listed species to clomazone.

Spatial data were available for only a fraction of species and species populations in the clomazone pilot study. In fact, spatial data provided decision support to the EPA for only 20% of the county-level species/crop co-occurrences. Additional lines of evidence provided decision support for an additional 60% of these intersections.

Efficient use of all reliable types of information relevant to species location, biology and habitat is important in a national level endangered species assessment. Using these data has the potential to reduce the number of more refined species- and site-specific assessments required, and thus reduce the need for multiple consultations based on a single registration action. This poster addresses the value of multiple lines of evidence in the national level endangered species assessment process, where such data can be efficiently applied and how these data might be arrayed for efficient and repeated use in subsequent evaluations.

Multiple Lines of Evidence

Spatial Data

Spatial data files containing specific species locations and land cover representing potential pesticide uses can be used to calculate the distance between species locations and potential use sites (see "National Level Pesticide Endangered Species Assessment: Relationship of Crop to Known Species Location" in this poster series for more information). The distance needed to preclude exposure is determined by EPA based on the fate and transport properties of the product in question in various environmental media, but the topography and vegetation between the species location and use site may also play a role in mitigating exposure.

Occurrence Confirmation

Some species location data come from museum specimens and/or historical observations. Confirmation of the source and status of occurrence data can be used to determine if the species currently (as opposed to strictly historically) occurs in a particular location. Evidence for determination of a species location as "historical" in a given county can be verified through

- Records in the FESTF Multi-Jurisdictional Database (MJD, a database provided to FESTF under license from NatureServe) that indicate a particular species has not been seen in a particular county in the past 30 years,
- Confirmation from U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS) staff, or other species experts, or
- Notation of historical/extirpated occurrences on the most recent FWS or NMFS endangered species presence list for that state (Figure 1).

Figure 1. U.S. Fish and Wildlife Service's listed species in Forsyth County, North Carolina

Retrieved from http://www.fws.gov/nc-es/cntylist/forsyth.html

For example, this line of evidence was used in a letter posted to the clomazone docket stating that "despite extensive search efforts, the last black footed ferret sighting in North Dakota was in 1970" (Orr, 2009). In such instances, it can be concluded that there is no potential for exposure.

Habitat

Habitat characteristics of some species may preclude their being present near potential use sites. Following are examples.

The listed fern, *Elaphoglossum serpens,* is known from only one site in the forest of the summit (at about 1,300 meters) of Cerro Punta in Puerto Rico (USFWS, 1994). Crop protection products would not be used at this elevation nor would they be expected to be transported to this elevation and habitat.

http://www.cielitosur.com/imagenes/Cerro%20Punta.jpg

Troglobitic beetles, such as the one pictured to the right, occur in subterranean caves that would not be exposed to pesticide spray drift or runoff. Also, any effects on surface plants would typically not result in significantly reduced nutrient conditions within the cave environment.

Photograph by Dr. Jean Krejca obtained from www.edwardsaquifer.net/species.htm

Topographic Separation From Potential Use Sites

The Cypress gowen is restricted to two areas in Monterey County in the Coast Range of central and northwestern California (Esser, 1994). The Coast Range separates this species from potential rice growing areas in Monterey and adjacent counties, and prevents pesticide transport via drift or surface runoff from use sites to the species locations.

Temporal Separation From Pesticide Use

Species may be dormant or absent from a particular county when the product is applied. For example, a migratory species may be present in a county only at a time when the product is not in use (Figure 2).

Supporting documentation may include Federal Register Notices, Recovery Plans, NatureServe, species experts, and open literature.

Figure 2. Range map for the whooping crane in the U.S.

Data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - CABS, World Wildlife Fund - US, and Environment Canada -WILDSPACE.

Diet

Some species may be excluded from pesticide risk based on their diet. For example, pesticide residues typically are lower on fruits than on grasses, and exposure to fruit-eating herbivores may be below EPA's Level of Concern. In other cases, broad taxonomic groups may be initially considered liable to indirect effects caused by reductions in their food supply, but particular listed species within those taxonomic groups may readily switch to alternative food sources and thereby avoid such indirect effects.

Existing Protections and Mitigations

The Federal Government is required by the ESA, FIFRA, and various appropriation bills to prevent "take" of listed species found on federally owned or controlled land. Most Federal reserves are protected and managed to protect and enhance listed species' habitat. Also, many state and local governments as well as private conservatories follow guidelines to protect and enhance listed species' habitat. The likelihood of pesticide exposure is low for listed species that occur entirely on protected lands. Protected lands include:

- National Wildlife Refuges,
- National Parks,
- National Forests and Rangelands,
- National Monuments,
- Military Bases, Installations, and Ranges, and
- Indian Nation and Tribal Lands.

For example, Lange's metalmark butterfly is only found on the Antioch Dunes National Wildlife Refuge in remnant sand dune habitat; this species and its host plant (naked-stem buckwheat) are closely managed and protected (UC Berkeley, undated).

Lange's Metalmark Butterfly, Photographed by Jerry Powell, Courtesy U.S. Fish & Wildlife Service

Cooperative non-regulatory approaches such as outreach and voluntary measures can mitigate the risk of pesticides to various species. For example, the North Dakota Parks and Recreation Department with the cooperation of their local FWS field office has successfully used voluntary measures to mitigate risk to the western prairie fringed orchid in North Dakota (Orr, 2009).

The Role of the FESTF IMS

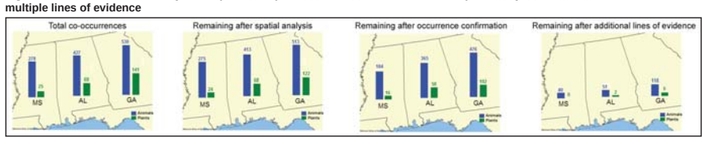
The FESTF Information Management System (FESTF IMS; McGaughey *et al.* 2005) is a tool for storing, managing, and retrieving data relevant to endangered species assessments. It allows county-level comparisons of listed species locations, pesticide use locations, and any existing management decisions.

Supporting documentation and analyses utilizing multiple lines of evidence can be

- Generated outside of the FESTF IMS,
- Stored in the FESTF IMS, and
- Associated within the FESTF IMS with specific co-occurrences of species locations and use sites.

The information can then be retrieved by the EPA to support their final determination of what species locations can be eliminated from concern based on their distance from a labeled crop, habitat characteristics, existing management decisions, or other reasons that would preclude exposure. Multiple lines of evidence, as stored and associated with co-occurrences in the FESTF IMS, can be applied in a national level assessment to provide decision support for typically up to 80% of species locations (Figure 3).

Figure 3. Initial number of county-level species/crop co-occurrences in the clomazone pilot study before and after consideration of multiple lines of evidence



Conclusion

Efficient use of all reliable types of information relevant to species location, biology and habitat is important in refining understanding of how or if a species listed by the ESA may be exposed to a pesticide, and whether that exposure presents a risk as described under FIFRA and the ESA. Using these data in the national level species assessment has the potential to reduce the number of more refined species- and site-specific assessments required, and thus reduce the need for multiple consultations based on a single registration action.

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