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: Complexities of Critical Habitat and Indirect Effects

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Abstract

The Environmental Protection Agency's Office of Pesticide Programs' (OPP's) risk assessment and risk management activities conducted under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) include the assessment of species listed by the Endangered Species Act (ESA). Because a pesticide registration is a national-level "action" under ESA, potential risk to federally listed endangered species must be evaluated. Additional layers of complexity are introduced when ESA's "designated critical habitat" must be evaluated for the ESA standard of protection, or in introducing the ESA "indirect effects" dynamic to the species assessment process. For example, in the screening level risk assessment, if a potential risk to birds is presented for a pesticide under registration for a broad, national use, all listed birds and their designated critical habitat (if any) co-occurring with that use and use sites are evaluated. In addition, indirect effects on food sources or nest areas are also evaluated. Such a geographically widespread evaluation presents many challenges when both FIFRA and ESA endpoints must be addressed. General conclusions that may be relevant to a site-specific evaluation may have uncertainty on a national scale and thus could present an exaggeration of effect. Undue exaggeration introduced by a poorly founded assumption can adversely affect agriculture in a manner that contradicts the intent of Section 1010 of the ESA. Spatially based assessments can also distort conclusions if the spatial data related to designated critical habitat or projected species ranges are utilized without refinement in the assessment process. Examples of how over-prediction of risk can be avoided will be described.

Introduction

To date, EPA's Office of Pesticide Programs (OPP) has completed three national level draft endangered species assessments under Registration Review: clomazone, fomesafen and urea sulfate.

- Components of the assessment that add complexity are evaluations of indirect effects and "adverse modification" of critical habitat as required by the Endangered Species Act (ESA).
- The clomazone and urea sulfate draft endangered species assessments deal broadly with indirect effects and critical habitat; the fomesafen draft assessment touches upon indirect effects but does not address critical habitat.

Indirect effects and critical habitat are complex issues to assess in national screening-level pesticide assessments. As highlighted in the ESA Consultation Handbook (Final ESA Section 7 Consultation Handbook, March 1998, USFWS), indirect effects or critical habitat are derived from a point-specific action, such as building a bridge or housing development. However, a pesticide registration or reregistration action is much more difficult to quantify on a site-specific basis.

This poster explores how these two complex issues might be addressed in refined national level or higher tiered species-specific assessments.

No method currently exists in the national level assessment process to define how an indirect effect should be quantified for analysis or how the principle constituent elements (PCEs) of critical habitat should play a role in the determination of "adverse modification."

Indirect Effects

In a National-Level Assessment, Where does an Indirect Effect Begin – and End?

- The ESA, designed around point-specific "actions," finitely describes an "action area" and contains indirect effects on this local scale.
  - Little guidance is provided for evaluating indirect effects when this procedure is extrapolated to a national level pesticide assessment.
- The initial draft assessments seem to describe what the indirect effect could be without quantifying whether the indirect effect would actually be reasonably expected to occur. This results in a broad characterization of "indirect effects" far removed from the potential use area.
- The indirect effects assessment should be refined using the weight of evidence to determine whether or not an indirect effect is "likely" to occur.

Although it may be technically challenging to assess the likelihood of an indirect effect at the national level as currently assessed in a screening level endangered species approach for pesticide reregistration, national level refinements are possible.

Example of Methods to Refine Indirect Effects Determinations as Guided by National Level Screening Assessments

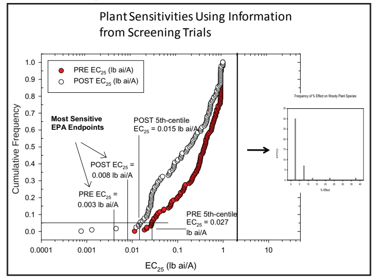
- Screening-level endangered species assessments for herbicides that follow standard USEPA methods frequently conclude potential risk to listed species from indirect effects
  - Potential reduction or elimination of specialized plant communities, such as riparian corridors

When conclusions from screening-level assessments are not refined, further assumptions about indirect effects may be exaggerated beyond the "likely to occur" standard of ESA.

Refinement using additional plant sensitivity data

- Most plant communities are composed of a mixture of plant types with varying sensitivities to the herbicide.
- Most herbicidal active ingredients have abundant data available on plant sensitivity (see Figure 1).
- Sensitivity distribution, if considered in the national level, can refine the prediction of an indirect effect on a listed species.

Figure 1. Plant sensitivity distribution curve for a selective herbicide. Inset illustrates that woody plants are relatively insensitive; where such plants dominate a riparian area, no indirect effects to a listed species depending upon that habitat would be expected.

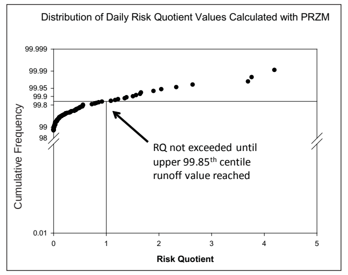


Refinement using standard modeling techniques

The application of higher tier standard models to the national assessment is possible and will better quantify the likelihood of exposure to meet the ESA "reasonably expected to occur" standard.

- The Pesticide Root Zone Model (PRZM) can be used in lieu of TerrPlant to estimate potential concentrations in runoff.
- Figure 2 describes the daily distribution of runoff values for a herbicide as calculated by PRZM over 30 years. Even if a conservative 95th centile exposure value is used in the assessment, the Level of Concern would not be exceeded.

Figure 2. Using the Pesticide Root Zone Model (PRZM) to refine TerrPlant screening level results.



It is necessary to find a balance that allows the national level assessment to predict a likely effect rather than falsely characterize a possible effect as one "likely" to occur.

Critical Habitat

Designated critical habitat is a highly variable, species-specific issue that involves legally described and set-aside areas that require special attention when an action is permitted within or near them. On a national scale, a designation process which is meant to *control actions* within the legally described area does not translate well to evaluating the impact of a *national action* on viable or occupied habitat that is embodied in the legally ascribed "designated critical habitat."

- The complexities of designated critical habitat are many and may not be addressable within the time allotted for a national, screening level assessment.
- In a screening level national assessment, the designated habitat or even the entire county may be treated as if it were all habitat, when in fact only portions of either the county or designated habitat may be of interest to the evaluation.
- The details associated with designated habitat can be addressed, when necessary, in higher tired assessments.

Designated habitat is a legal area that can contain viable and/or occupied habitat but does not necessarily yield itself as a stand-alone assessment area, and if of initial concern in the screening level assessment, should be evaluated using refined techniques in a later process that allows for adequate scientific input and analysis.

[Photo credit: Southwestern willow flycatcher in the White Mountains, AZ Suzanne Langridge, USGS]

Example of the complexity associated with evaluating impact on designated critical habitat: Southwestern Willow Flycatcher (*Empidonax traillii extimus*).

Critical habitat has been established along certain riparian areas in a large and multi-state area of the southwest. Figure 3 details the San Diego Management Unit.

- Habitat ranges from marine to inland environments (Pt 2, below) through rural as well as urban areas, intersected by highways
- Portions of the riparian areas are excluded from designation because they are protected by agreed habitat management plans (black areas on map)
- Other portions are exempt because of the land use (for example, the gray areas on Camp Pendleton Marine Corps Base)
- Some riparian areas are not included because they are fully developed or managed (Pauma Valley Country Club, the area omitting red highlighting, between Pt2 and 3, below)

The details associated with this example highlight the complex nature that can be associated with critical habitat which should be evaluated, if necessary, in a higher-tiered assessment prior to an effects determination.

Figure 3. The San Diego Management unit of the ESA-designated critical habitat for the Southwestern Willow Flycatcher

Map credit: http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/SWWF/CH_Final_Oct05/san_diego_2_CA.jpg

Conclusions

- Assessing the potential for indirect effects is complex, however some refinements are possible and should be incorporated into the screening-level national assessment.
- The complexities of designated critical habitat do not yield themselves to be completed at the national, screening level assessment.
- Clear spatial definition of the critical habitat attributes required for assessment in an effects determination are necessary in order to meet best available standards and meaningfully address impact on PCEs within the designated habitat.
- Quantifying the likelihood of an indirect effect or effect on designated critical habitat is critical to meeting the "reasonably expected to occur" expectation of ESA and the minimization of impacts to agriculture as required by Section 1010 of the act.