



# Defining and Assessing Species Impact in National Level Pesticide Assessment in Absence of Species Survey Information

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**Abstract**

The pesticide Registration Review program under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) presents the Environmental Protection Agency's Office of Pesticide Programs (OPP) with the need to also comply with the Endangered Species Act (ESA) by ensuring that its registration action is adequately protective of listed species. As other posters in this series discuss, the national level assessment must consider multiple lines of evidence and refinement techniques in order to be adequately protective of species while also providing data to allow decision making that is minimally disruptive of agriculture. Data supporting the known locations of species, as well as the characteristics of species, are used to refine the assessment. A particular challenge, however, is the refinement of an assessment when the specific locations of species are not known. In such cases, attributes of geographic areas such as soil type, isotherms or land cover can be used to define where a species may or may not be found, thus also allowing a better definition of the potential for risk to the species under evaluation. This presentation will demonstrate how gaps in species surveys and known species locations can be addressed by other analytical data relevant to the distribution of the species, thus confining the assessment and subsequent conclusions about potential risk to only those areas expected to support or contain the listed species under evaluation.

**Introduction**

In support of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) product registration, the FIFRA Endangered Species Task Force (FESTF) has developed data to support a national-level endangered species assessment process, based on evaluation of the co-occurrence of species listed by the Endangered Species Act (ESA) and pesticide use sites (typically crops) at the county-level (McGaughey, 2005). This county-level comparison is done using the FESTF Information Management System (FESTF IMS) which utilizes data from:

- Best available county-level location information on crops from Census of Agriculture (USDA, 1997, 2002, and 2007);
- Best available county incidence of listed species:
  1. EPA OPP (EFED), 2003;
  2. NatureServe Multi-Jurisdictional Database (MJD) (FESTF MJD McGaughey et al. 2007);
  3. U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) species by county presence lists (retrieved and updated yearly).

Access to these datasets produces two types of aggregated species incidence data:

1. Species occurrence at site-specific, mapped locations (point location data, where species actually have been observed or surveyed);
2. Species occurrence at general locations in a county (point location data may or may not be available).

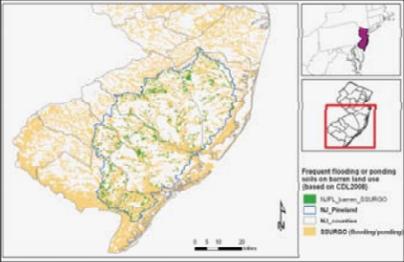
The FESTF MJD does not contain specific locations of every listed species due to data sensitivity, lack of survey data, inaccessibility of survey sites, limited species inventory resources, and other factors. These gaps do not undermine the utility of the county-level data since the gaps can be identified, understood, and in many cases, analyzed using alternate sources of information as discussed in this poster.

**Geographic Area Attributes**

**Soil Type**

Certain listed species are associated only with specific soil characteristics or geologic formations. These species may or may not have mapped point locations. Figure 1 illustrates how a species with no mapped locations, Knieskern's beaked-rush (*Rhynchospora knieskernii*), known to be in New Jersey but not specifically mapped, can be evaluated spatially using data on the habitat and soil characteristics with which it is affiliated (USFWS, 1993).

Figure 1. Potential habitat of Knieskern's beaked-rush (*Rhynchospora knieskernii*) refined with additional spatial analysis on geographic features that limit its distribution.



To produce a spatial prediction of Knieskern's beaked-rush:

- The USDA Soil Survey Geographic Database (SSURGO) soils and remotely sensed imagery were combined to represent diverse combinations of land use and required ecohydrologic regimes required by Knieskern's Beaked-rush;
- Possible habitats were located by combining the barren land use categories from the 2008 USDA Cropland Data Layer (CDL) and USGS 2001 National Land Cover Database (NLCD) dataset to represent the early successional habitat favored by the Beaked-rush with soils matching the required wetland regimes of the hydrophyte;
- If geospatial locations of some of the example natural habitats were available, additional database extractions from SSURGO soils and land use data can be used to further refine habitat locations, especially in relation to potential agricultural land.

**Elevation Differences**

Certain listed species are dependent on a given plant or ecosystem, such as alpine meadows at certain elevations. This information can be translated to spatial data even when few of the species locations have been mapped. Figure 2 illustrates how this approach is applied to a butterfly, Uncompahgre fritillary (*Boloria acrocneema*), based on the habitat descriptors and specific locations in the FESTF MJD.

To produce a spatial prediction of Uncompahgre fritillary butterfly (*Boloria acrocneema*):

- Point location data for three counties in Colorado were available in the FESTF MJD. However, the butterfly is reported to be present in 13 counties;
- Habitat descriptors were evaluated: moist alpine slopes above 12,000 feet, with extensive snow willow (*Salix nivalis*) patches which serve as the larval food plant (NatureServe, 2009);
- Elevations above 12,000 ft in those counties were mapped for potential spatial distribution and this distribution was overlaid with potential pesticide use sites, as represented by NLCD class 82 data (cultivated crops);
- These data can be used to assess whether potential exposure to a pesticide could occur.

**Land Cover**

Certain listed species are often associated with unique ecosystems that may be spatially examined by using NLCD or other land cover data. The occurrence of those locations can then be compared with those of cultivated crops (Figure 3).

To produce a spatial prediction of Louisiana quillwort (*Isoetes louisianensis*) in relation to rice cultivation:

- Habitat descriptors associated with this species (riparian woodlands in pine flatwood forests) were used to associate certain land cover types (NLCD 2001 evergreen forests, mixed forests, and woody wetlands);
- Rice cultivation areas were obtained from the CDL;
- The proximity of potential habitat for the Louisiana quillwort and potential pesticide use on rice in Evangeline Parish county can then be evaluated further.

When these spatial relationships are accompanied by expert opinions from regional Services offices with regard to local conditions or other local specialized knowledge about species distribution, evaluations similar to these examples can provide support to species and potential pesticide use evaluations.

Figure 2. Potential habitat for the Uncompahgre fritillary butterfly (*Boloria acrocneema*) in Chaffee county, Colorado determined using known county-level species presence, elevation data related to species habitat requirements (> 12,000 ft), and NLCD class 82 (cultivated crops).

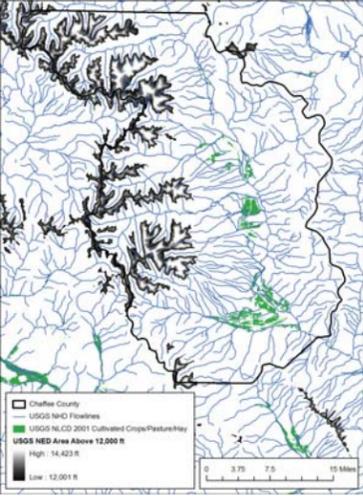
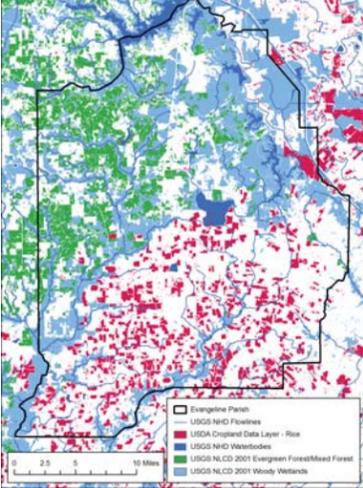


Figure 3. Determination of the relationship between Louisiana quillwort (*Isoetes louisianensis*) presence and rice cultivation in Evangeline Parish county, LA, according to species habitat (forests and woody wetlands) and rice field locations, (NLCD Class 82, cultivated crops, and CDL rice data).



**Data Obtained from Species Experts**

In addition to the species location data available in the FESTF MJD (point-specific data) and FESTF IMS (county-level data), USFWS, and the NMFS staff will often have significant information on the locations of listed species. While these data are not nationally aggregated, they are available for certain species.

Examples of information obtained from species and other experts, some of which can be "translated" to spatial data include:

- Confirmation that all observations of a species in a particular county are historical or extirpated;
- Spatial information for the species in the county (either shapefiles or textual explanations of spatial coordinates);
- An indication that the species is only found on state park land, such as within a given park where the species is protected;
- An indication that the species is located away from cropland, backed by the detailed explanation of why this conclusion can be reached; and
- More specific habitat information.

**Conclusion**

While point location data and specific survey information may not be available for all species, spatial relationships of a species to a pesticide use site can be portrayed and evaluated using other species or crop attributes. In this way, what initially appear to be data gaps are filled by best available data, supported by spatial relationships and in some cases expert opinion on species characteristics and habitat requirements.

**References**

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