Performing a National Threatened and Endangered Species Risk assessment for each pesticide registration action is daunting. The scale, both geographically, temporally, and the sheer number of species, presents a challenge. Add to this the fact that data sets and approaches will be refined moving forward, but current registration efforts cannot be delayed. To effectively perform Proximity Analyses at Step 1, a process which is computationally efficient, technically accurate for the scale, and robust enough to handle changing data sets must be developed. This poster demonstrates an approach to address these challenges. Using authoritative geospatial data from government sources, a National Potential Pesticide Use Site Layer is generated which can be easily updated as new data are released annually. The potential pesticide use site layer is used in a framework that allows for Flexible Action Area Definition and subsequent National Proximity Analysis of 100's of Species at a Time. Furthermore, Downstream Transport must be accounted for when calculating proximity to Aquatic Species. By using existing Automation and Scripting methods within ArcGIS and SQL Server, the framework can be re-applied as needed (such as availability of newer data), and also provides a source of documentation at each step of the approach. This poster illustrates an approach to Implementing National-Scale Proximity Analyses with Efficiency & Reliability and Results.

**Define Potential Pesticide Use Sites**

- Figure 1: Aggregating individual NASS Cropland Data Layer CDL crops into 13 broad crop categories like “Vegetables/Ground Fruit” improves the certainty in the crop classification. However, using a single year of CDL may not sufficiently account for agriculture rotation and potential expansion through years.

- Figure 2: Combining multiple years of CDL expands the crop footprint to ensure that the evolving agricultural landscape is consistently represented.

- Figure 3: Further conservatism can be applied in areas where the multiple years of CDL do not fully account for acreage reported in the Census of Agriculture. A distance raster calculated outwards from multi-year CDL crop locations, into only other agriculture, provides a framework for Selectively Expanding the base crop footprint by accumulating adjacent crop pixels until the crop footprint meets or exceeds the acreage reported in the Census of Agriculture.

- Figure 4: The ‘Vegetables/Ground Fruit’ pesticide use site layer was expanded 270 meters into adjacent agriculture in order to meet the Census of Agriculture acreage reported for Monterey County.

- Figure 5: The national distribution of counties with their acreage of “Vegetable/ Ground Fruit” crops before & after Selectively Expanding the footprint to meet the Census of Agriculture reported acreage.

**Conduct National Screening Level Proximity Assessment**

- Figure 6: The ‘Vegetables/Ground Fruit’ pesticide use site layer was expanded 270 meters into adjacent agriculture in order to meet the Census of Agriculture acreage reported for Monterey County.

- Figure 7: Distribution of Orchards/Vineyards in relation to FWS Critical Habitats for all species with spatial data.

- Figure 8: Euclidean Distance raster is used to measure the distance outward from every potential pesticide use site pixel.

- Figure 9: Standard automation tools in ArcGIS are used to calculate proximity between every Endangered Species Location (ESL) and potential pesticide use sites. Operations are conducted in raster at 10-meter resolution at the ESL/County intersection level.

- Figure 10: Effects of rasterizing ESL’s that are natively vector to 10 meters are negligible when considered from the perspective of a screening level assessment with thousands of measurements.

- Figure 11: ESL’s overlaid with Orchard/Vineyard Use Site Euclidean Distance Raster highlights the range of potential proximity distances between the two datasets.

- Figure 12: Map highlights that distributions of proximity distances are calculated for every unique ESL polygon /county intersection. In this way, it’s possible to generate a distribution of proximity distances for every ESL, adding further insight into the potential for interaction.

**Summarize and Interpret Proximity Assessment Results**

- Figure 13: The proximity results tables store the distance between each ESL polygon /county intersection and the potential pesticide use site. The Nearest distance, as well as “Percentile”, are recorded using the ArcGIS model in Fig 9.

- Figure 14: The proximity results can be summarized to present the number of species in each Taxa within specific proximity distances to potential pesticide use sites, enabling the risk manager to quickly garner the magnitude of potential interaction.

**Aquatic Endangered Species Screening Level Proximity Assessment**

- Figure 15: Proximity results can be presented as charts.

- Figure 16: NHDPlus Aquatopix analyzes the stream network to find places, downstream from potential pesticide use site, where the chemical’s impact no longer exceeds a specific Level of Concern using a dilution approach for estimating pesticide transport.