**APPENDIX 4-6. Analysis Method and Results for Downstream Monitoring**

After a species has been classified as an No Effect or Not Likely to Adversely Affect, EPA conducted a final analysis to ensure that no sources upstream of a species range or critical habitat would affect the species. To do this, evaluated the monitoring data with regards to the location to the species range/critical habitat (e.g., upstream or downstream) to determine if any detections of the pesticide had occurred.

To do this analysis, EPA first used Esri ArcGIS tools to identify streams (NHDPlus Version 2[[1]](#footnote-2)) that crossed the boundary of the species range/critical habitat. EPA then used the latitude and longitude data for monitoring sites obtained from the Water Quality Portal (<https://www.waterqualitydata.us/portal/>) to index the sites to NHDPlus stream segments. EPA developed Python scripts that utilize NHDPlus to identify monitoring sites that hydrologically connected to each species range/critical habitat and provide a corresponding upstream/downstream distance and hydrologic travel time between the monitoring site and the range/critical habitat. EPA then categorized the connected monitoring sites into three areas: those sites that occurred within the borders of the species range/critical habitat; those sites that occurred within 68 -stream miles upstream of the species range/critical habitat; and those sites that occurred greater than 68- stream miles upstream of the species range/critical habitat. The 68-stream mile limit was initially used to identify those sites that were within a 1-day travel time of the species range/critical habitat. Only upstream locations were categorized for the analysis as there is uncertainty in the downstream monitoring sites as to where the pesticide originated. Given the chemical’s persistence, it would also be important to evaluate sites beyond this distance, as the pesticide still might reach the species range/critical habitat.

Results of the analysis for propazine for species ranges and critical habitats are provided in **Tables 1** and **2**, respectively. For species ranges, six species with an NE determination and one species with an NLAA determination had samples collected in or upstream of the species range. Two of these species (one NE and one NLAA) had samples collected in or upstream of their range but they were all non-detect. Therefore, these species remained NE and NLAA for their range. Five species had monitoring samples either in or upstream of the range that were detectable. These species, which included two birds (Entity IDs 135 and 136), two aquatic invertebrates (Entity IDs 338 and 341) and one terrestrial invertebrate (Entity ID 4910) were reclassified as LAA, weakest evidence, based on potential impacts to PPHD vectors. For species critical habitat, one species with an NE determination (Entity ID 482) had samples collected in or upstream of the species critical habitat. However, these samples were all non-detect and therefore, this species remained NE for critical habitat.

**Table 1. Summary of Monitoring Data Findings for NE/NLAA Species, Range**

| **Entity ID / Common Name** | **Were there sites in range?** | **Were there detections in range?** | **Summary** | **Were there sites w/i 68 mi upstream of range?** | **Were there detections w/i 68 mi upstream of range?** | **Summary** | **Were there sites > 68 mi upstream of range?** | **Were there detections at > 68 mi upstream of range?** | **Summary** | **Distance Info** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 135  Roseate tern | No | No |  | Yes | Yes | There were 49 sites w/i 68 stream miles upstream of the species range, with a detection frequency of 3% (n=656), collected between 1993 and 2020. Concentrations ranged from 0 to 0.0137 ug/L, with a time of travel ranging from < 1 and 1 days. | Yes | Yes | There were 97 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 5% (n=1224), collected between 1986 and 2020. Concentrations ranged from 0 to 0.036 ug/L, with a time of travel ranging from < 1 and 1 days | Distances for monitoring sites were from 68 to 413 stream miles upstream of the species range. |
| 136  Roseate tern | No | No |  | Yes | No | There were 2 sites w/i 68 stream miles upstream of the species range, with a detection frequency of 0% (n=2), collected between 1994 and 2013. All samples were ND. | Yes | Yes | There were 56 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 0% (n=606), collected between 2007 and 2018. Concentrations ranged from 0 to 0.011 ug/L, with a time of travel ranging from < 1 and 4 days | Distances for monitoring sites were from 145 to 1151 stream miles upstream of the species range. |
| 309  Rio Grande Silvery Minnow | No | No |  | No | No |  | Yes | No | There were 42 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 0% (n=238), collected between 1987 and 2019. All samples were ND. | Distances for monitoring sites were from 1047 to 1748 stream miles upstream of the species range. |
| 312  Santa Ana sucker | No | No |  | Yes | No | There were 1 sites w/i 68 stream miles upstream of the species range, with a detection frequency of 0% (n=129), collected between 2012 and 2020. All samples were ND. | No | No |  |  |
| 338  Rough pigtoe | No | No |  | Yes | Yes | There were 4 sites w/i 68 stream miles upstream of the species range, with a detection frequency of 36% (n=192), collected between 1991 and 2019. Concentrations ranged from 0 to 0.194 ug/L, with a time of travel ranging from < 1 and 1 days. | Yes | Yes | There were 2123 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 5% (n=25906), collected between 1980 and 2020. Concentrations ranged from 0 to 2 ug/L, with a time of travel ranging from < 1 and 38 days. | Distances for monitoring sites were from 84 to 1346 stream miles upstream of the species range. |
| 341  Ring pink (mussel) | No | No |  | Yes | Yes | There were 4 sites w/i 68 stream miles upstream of the species range, with a detection frequency of 36% (n=192), collected between 1991 and 2019. Concentrations ranged from 0 to 0.194 ug/L, with a time of travel ranging from < 1 and 1 days. | Yes | Yes | There were 2125 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 5% (n=25906), collected between 1980 and 2020. Concentrations ranged from 0 to 2 ug/L, with a time of travel ranging from < 1 and 38 days. | Distances for monitoring sites were from 95 to 1346 stream miles upstream of the species range. |
| 4910  Salt Creek Tiger beetle | No | No |  | No | No |  | Yes | Yes | There were 128 sites greater than 68 stream mi upstream of the species range, with a detection frequency of 23% (n=1669), collected between 1982 and 2020. Concentrations ranged from 0 to 1.22 ug/L, with a time of travel ranging from < 1 and 15 days. | Distances for monitoring sites were from 617 to 1288 stream miles upstream of the species range. |

**Table 2. Summary of Monitoring Data Findings for NE/NLAA Species, Critical Habitat**

| **Entity ID / Common Name** | **Were there sites in range?** | **Were there detections in range?** | **Summary** | **Were there sites w/i 68 mi upstream of range?** | **Were there detections w/i 68 mi upstream of range?** | **Summary** | **Were there sites > 68 mi upstream of range?** | **Were there detections at > 68 mi upstream of range?** | **Summary** | **Distance Info** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 482  Kentucky cave shrimp | No | No |  | No | No |  | Yes | No | There was 1 site greater than 68 stream mi upstream of the species critical habitat, with a detection frequency of 0% (n=2), collected between 1995 and 1997. All samples were ND. | Distances for monitoring sites were from 252 to 252 stream miles upstream of the species CH. |

1. U.S. Geological Survey, 2011, National Hydrography Dataset (ver. NHDPlusV2), now maintained at  URL <https://www.epa.gov/waterdata/nhdplus-national-hydrography-dataset-plus>  [↑](#footnote-ref-2)