APPENDIX 1-3. Clothianidin Scenario Development for Aquatic Modeling

The purpose of this Appendix is to provide supporting information for the aquatic modeling work.

The use sites simulated for clothianidin are documented in **APPENDIX 3-1**. Agricultural modeling simulations are summarized in **Table 2** and nonagricultural modeling simulations are summarized in **Table 3**. In **Tables 2 and 3**, the use data layer (UDL) was obtained from information provided in **APPENDIX 3-1**. The PWC scenario simulated was determined based on the UDLs used in mapping. Unless otherwise noted, aquatic modeling for a HUC2 was simulated when the 2012 National Agricultural Statistics Service (NASS) Census Data indicated that a crop was grown in that region. Limited data were available with regards to Puerto Rico, Alaska, and Hawaii and some assumptions were made in those areas based on best available information. Most crops were assumed to be grown in these areas when information was not available; however, some crops were assumed not to be grown in HUC-02 region 20 or HUC-02 region 21. For example, tobacco was assumed not to be grown in HUC-02 region 20 and HUC-02 region 21. See **Chapter 3** for additional details on the aquatic modeling.

In selecting application dates for aquatic modeling, EPA considered many factors. Label directions are considered, such as treatment timing (*e.g*., preemergence, postemergence, post-harvest). Selection of application dates included an analysis of weather files to determine the time of year most likely to produce the greatest off-site transport. The meteorological information is considered as pesticide loading to surface water may be directly affected by precipitation events. The wettest month (*i.e*., the month with the highest average daily precipitation) within each HUC2 was identified (**Table 1**), and a random date (*i.e.*, the 15th of each month) was considered to maintain the probability of the distribution of environmental exposure concentrations generated. In cases when the application window is narrowed to a certain time of year (*e.g*., fall to late winter), the application date is the 15th day of the wettest month within a reasonable application window. The 15th of the given application month was arbitrarily selected and consistently used as the random date selection. Preharvest intervals and other restrictions specified on labels were also considered, so that applications were not modeled to occur within restricted timeframes.

In HUC2 regions with differing amounts of rainfall across the region, an additional location was selected with substantially different meteorological conditions to represent the range of conditions across the HUC2 region (**Table 1**)**.** These HUC2 regions with differing conditions are 10, 11, 12, 15, 16, 17, 18, 19, and 20.

Table 1. Month with highest total precipitation in each 30-year weather file in each HUC2

| **HUC2** | **City, State** | **Meteorological File** | **Average Wettest Month**  **in 30 Years of Data** |
| --- | --- | --- | --- |
| 1 | Hartford, CT | w14740 | May |
| 2 | Lynchburg, VA | w13733 | July |
| 3 | Atlanta, GA | w13874 | March |
| 4 | Milwaukee, WI | w14839 | August |
| 5 | Covington, KY | w93814 | May |
| 6 | Knoxville, TN | w13891 | March |
| 7 | Des Moines, IA | w14933 | June |
| 8 | Fort Smith, AR | w13970 | July |
| 9 | Fargo, ND | w14914 | June |
| 10a | Grand Island, NE | w14935 | June |
| 10b | Sheridan, WY | w24029 | May |
| 11a | Fort Smith, AR | w13964 | May |
| 11b | Amarillo, TX | w23047 | June |
| 12a | Fort Worth, TX | w03927 | May |
| 12b | Abilene, TX | w13962 | September |
| 13 | El Paso, TX | w23044 | September |
| 14 | Rock Springs, WY | w24027 | May |
| 15a | Flagstaff, AZ | w03103 | July |
| 15b | Phoenix, AZ | w23183 | December |
| 16a | Salt Lake City, UT | w24127 | April |
| 16b | Winnemucca, NV | w24128 | November |
| 17a | Eugene, OR | w24221 | December |
| 17b | Pocatello, ID | w24156 | May |
| 18a | Sacramento, CA | w23232 | January |
| 18b | San Diego, CA | w23188 | January |
| 19a | Big Delta, AK | w26415 | July |
| 19b | Talkeetna, AK | W26528 | August |
| 20a | Hilo, HI | w21504 | November |
| 20b | Honolulu, HI | w22521 | December |
| 21 | Puerto Rico | w11641 | May |

# Use Scenarios

**Tables 2 and 3** provide a listing of the clothianidin uses that were modeled in this BE, along with the maximum single application rate, number of applications, and retreatment interval. More information on the assumptions used in aquatic modeling and which HUC2 regions were modeled for each use pattern is available in **APPENDIX 3-2**.

Table 2. Modeled Agricultural Uses with Maximum Single Application Rate, Application Types, and Application Timing and/or Target

| **Crop/Use Site** | **Use Data Layer** | **PWC scenario** | **HUC2s** | **Specific crops included in this group** | **Max. Single App. Rate**  **(kg a.i./ha),**  **Max. Annual Rate**  **(kg a.i./ha),**  **No. of Apps, Minimum Retreatment Interval (days)** | **Application**  **Type** | **Application Timing** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Citrus | Citrus | Citrus | 03  *for use in Florida* | Citrus, Other; Grapefruit; Kumquats; Lemons; Limes; Oranges; Tangelos; Tangerines; Citrus hybrids other than tangelo, Pummelo (shaddock), Calamondin | 0.22, 0.44, 2, 42 | Soil | Not specified |
| Cotton | Cotton | Cotton | 02, 03, 05-08, 10-13, 15, 18 | cotton | 0.093, 0.093, 1, na | Foliar | Outside of harvest. |
| Grapes | Grapes | Grapes | 1-20 | Grapes, Raisin/Table/Wine | 0.11, 0.22, 2, 14 | Foliar | Between harvest and early spring |
| 0.22, 0.22, 1, na | Soil | Between harvest and early spring |
| Pome Fruit | Other Orchard | Orchard | 1-20 | Apple; Crabapple; loquat; Mayhaw; Quince; Pear; Pear, Asian | 0.11, 0.22, 2, 10 | Soil | Not specified |
| Apple; Pear | 0.22, 0.22, 1, na | Foliar | Not specified |
| Tree Nut | 1-18, 20 | Almond; Beechnut; Brazil Nut; Butter nut; Cashew; Chinquapin; Hickory Nut; Chestnut; Hazelnut; Macadamia Nut; Pecan; Pistachio; Walnut | 0.45, 0.45, 1, na | Soil | After final grove preparation |
| Almonds; Filberts (Hazelnuts); Pecans; Pistachios; Walnuts | 0.11, 0.22, 2, 10 | Foliar | After final grove preparation |
| Stone Fruit | 1-18, 20 | Peaches | 0.11, 0.22, 2, 10 | Foliar | After final grove preparation |
| Fig | 2, 3, 5, 6, 8, 10-18, 20 | Fig | 0.11, 0.22, 2, 14 | Foliar | Not specified |
| Pomegranate | 2, 3, 5, 6, 8, 10-18, 20 | Pomegranate | 0.11, 0.22, 2, 7 | Soil | Not specified |
| 0.11, 0.22, 2, 14 | Foliar | Not specified |
| Tobacco | Other Row Crop | OtherRow | 1-8, 10, 11 | Tobacco | 0.074, 0.22, 3, 7 | Foliar | Not specified |
| 0.11, 0.22, 2, ns | Soil |  |
| Soybean | Soybeans | Soybean | 1-14, 16-18, 20 | Soybean | 0.11, 0.22, 2, 7 | Foliar | Apply in spring or fall and 30 days before harvest |
| Vegetables | Vegetables and Ground Fruit | Vegetable | 1-20 | Amaranth, Chinese Celery; Cress, Garden; Cress, Upland; Dandelion; Dock (Sorrel); Endive (Escarole); Lettuce; Orach (Mountain Spinach); Parsley; Purslane, Garden; Purslane, Winter; Radicchio; Roquette (Arugula); Spinach; Spinach, New Zealand; Broccoli; Brussels sprouts; Cabbage; Cauliflower; Eggplant; Peppers; Tomatoes; Cantaloupes; Cucumbers; Honeydew Melon;Pumpkins; Squash; Watermelons; Blueberry; Cranberry | 0.11, 0.22, 2, 7 | Foliar | Spring or fall |
| 1-21 | Arracacia (Persian Carrot); Arrowroot; Artichoke, Chinese; Artichoke (excluding Jerusalem); Artichoke, Jerusalem; Canna (Edible); Chayote (Root); Chufa (Ground Almond); Ginger; Leren; Manioc (Cassava); Potatoes; Sweet Potato; Tanier; Taro; Turmeric; Yam; Yautia; Amaranth, Chinese; Celery; Cress, Garden; Cress, Upland; Dandelion; Dock (Sorrel); Endive (Escarole); Lettuce; Orach (Mountain Spinach); Parsley; Purslane, Garden; Purslane, Winter; Radicchio; Roquette (Arugula); Spinach; Spinach, New Zealand; Other Leafy Vegetables; Broccoli; Brussels sprouts; Cabbage; Cauliflower; Other Brassica (Cole) Vegetables; Cantaloupes; Cucumbers; Honeydew Melon; Pumpkins Squash; Watermelons; Other Cucurbit Vegetables; Blueberry; Cranberry; Other Low Growing Berries; Eggplant; Peppers; Tomatoes | 0.22, 0.22, 1, na | Soil | Pre-emergence to weeds and corn, preplant. |
| 1-21 | Arracacia (Persian Carrot); Arrowroot; Artichoke, Chinese; Artichoke (excluding Jerusalem); Artichoke, Jerusalem; Canna (Edible); Chayote (Root); Chufa (Ground Almond); Ginger; Leren; Manioc (Cassava); Potatoes; Sweet Potato; Tanier; Taro; Turmeric; Yam; Yautia; | 0.056, 0.22, 4, 7 | Foliar | Pre-emergence to weeds and corn, preplant. |

Table 3. Modeled Non-Agricultural Uses with Maximum Single Application Rate, Application Types, and Application Timing and/or Target

| **Crop/Use Site** | **Use Data Layer** | **PWC scenario** | **HUC2s** | **Specific crops included in this group** | **Max. Single App. Rate**  **(kg a.i./ha)** | **Application**  **Type** | **Application Timing** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Poultry Litter | Corn | Corn | 1-18, 20-21 (Vegetable; HUC 19) | Horse Stables, Livestock Areas, Poultry Feedlots | 0.024 - 0.55 | Ground (no drift) | 10 days prior to crop emergence |
| Commercial/ Industrial | Developed | Developed | 1 - 21 | Commercial/Industrial Premises (Outdoor) | 0.45 | Ground | Not specified |
| Residential | Developed | Residential | 1 - 21 | Residential (Outdoor) | 0.45 | Ground | Not specified |
| Ornamentals | Developed, Open Space | DevelopedOS | 1 - 21 | Ornamentals (except Trees) – Landscape, Ornamental Lawns and Turf, Turf / Recreational Areas, Interior Plantscapes | 0.45 | Ground | Not specified |
| Sod Farms | Other Crops | OtherCrop | 1 - 20 | Sod Farms | 0.45 | Ground | Not specified |
| Trees | Developed, Open Space | OtherTree | 1 - 21 | Ornamental and/or Shade Trees | 0.45 | Ground | Not specified |
| Orchard | Other Orchards | Orchard | 1 - 21 | Fruit & Nut Trees (Nonbearing) | 0.45 | Ground | Not specified |
| Residential Pome Fruit | Developed | Developed | 1 - 21 | Residential Apple, Residential Crabapple, Residential Pear | 0.45 | Ground | Not specified |
| Golf | Developed, Open Space | DevelopedOS | 1 - 21 | Golf Courses | 0.45 | Ground | Not specified |