

Straw man proposal for factors to include in an analysis of pesticides to monitor

Background

At Meeting #1 of the Pesticide Evaluation Advisory Workgroup (PEAW), four presentations were made describing processes used by various entities to select the pesticides to include in their monitoring and reporting program. The four programs are the California Rice Commission, Sacramento Valley Water Quality Coalition, Department of Pesticide Regulation Surface Water Monitoring Program, and the Sacramento River Source Water Protection Program. After the presentations it was concluded by the Workgroup that all four programs shared several common elements. Further discussion suggested that any methodology/process developed by the PEAW would likely contain these same elements.

The method by which these elements were incorporated into each decision instrument varied across the four entities. The decision was made to pull together these factors into an initial proposal of the elements to include in the decision process. Michael Johnson volunteered to pull together the initial list of factors. Volunteering to assist were Claus Suverkropp, Jim Markle, Debra Denton, Roberta Firoved, Elissa Callman, and Kelly Moran.

The main factors listed below are used by some or all of the entities in their assessments of pesticides to monitor. They are candidates for the process to be used by the ILRP agricultural coalitions when they develop their list of pesticides to monitor. The list below is not meant to exclude any other potential factors. The list below for the most part, does not include any criteria about when to include the parameter, the scale that is appropriate, or the method by which the parameter should be included in the decision process (e.g., develop a relative toxicity risk metric as is done as part of the process used to guide the selection of pesticides to monitor by the Sac Valley Coalition, or develop a binning process as is done by CDPH to establish toxicity categories used to determine the pesticides to monitor in their Surface Water Protection Program). There is no judgment made with respect to how the combine metrics or work through the decision process. Again, how the factors are used/combined to develop the list of pesticides to monitor is not the issue here. Some potential methods for combining measurements are provided below. However, although these issues are topics for later discussion, they may be critical to the decision about what to include. If the workgroup selects a parameter for which data are not available or there is significant uncertainty associated with the measurement, it may be difficult to adequately incorporate the parameter into the analysis.

Potential factors for use in decision making

- Pesticide applications/use
 - Pounds AI applied
 - Average pounds applied per year (3 year average)
 - Average pounds applied per month (3 year average)
 - Pounds AI applied per acre
 - Acres of application per AI
 - Incorporate environmentally relevant degradation products
 - Lump chemicals with different trade name but same AI
- Pesticide toxicity
 - US EPA OPP Aquatic Life Benchmark OPP Benchmark Equivalents using US EPA Registration Eligibility Decisions, Registration Review from Pesticide Re-evaluation Division, or FOOTPRINT Pesticide Properties Database
 - ECOTOX toxicity
 - Endpoint (chronic or acute)
 - Average of endpoint values for select species
 - Minimum of endpoint values for select species
 - Human health
 - US EPA and CA primary and secondary drinking water standards
 - CA Notification Levels (NLs) or Archived Advisory Levels (AALs)
 - CA Public Health Goals (PHGs) or US EPA Health Advisories (HAs)
 - US EPA Human Health Benchmarks
- Pesticide chemical properties – used to evaluate chemical fate and transport
 - VP – volatility from soil and plants
 - K_{oc} – organic carbon partitioning to determine likelihood of sediment vs. dissolved phase
 - SOL – solubility in water
 - FD – field dissipation half life
 - Henry's constant – volatility from water
 - HLW, HYDRO – water-phase dissipation and hydrolysis
 - HLWD – aquatic system dissipation
 - $\text{Log}[K_{ow}]$ – bioaccumulative potential
- Historical sampling results
 - Concentrations
 - Detections
 - Detections at concentrations above WQOs or trigger limits
 - All detections
 - Minimum number of samples (e.g. > 100 samples) for decision making
 - Potential for toxicity (e.g. 99.9th percentile of monitoring data > lowest benchmark)

- Availability of analytical methods
- Other factors
 - Application method (air blast, ground broadcast, aerial, etc.)
 - Irrigation method used on primary crop(s)
 - Pesticide mode of exposure (systemic vs. contact)

Methods used in the decision process

- Pesticide screening to reduce potential list
 - E.g. solvents, fumigants, adjuvants, pheromones
- Create indices to convert raw data to simple numbers
 - Pesticide use
 - Probability
 - Toxicity
 - DPR 8-class system
- Scaling/standardization
 - Acres treated
 - Pesticide use – pounds AI/acre using DPR's PUR system
 - Joint toxicity – pesticide use
 - Average AI applied/(minimum EC50*total watershed size)
- Weight of Evidence
 - Current and historical monitoring data (may have to use agencies like DPR for newer compounds)

7/24/14

Recommendation for Use of Drinking Water Standards and Health Levels in Pesticides Prioritization for Monitoring¹

Use lowest applicable standard, health advisory, or health level in order of priority shown below:

1. First priority: use federal or state primary and secondary drinking water standard: maximum contaminant levels (MCL)

See the following for Federal and California Drinking Water Standards:

<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/DWdocuments/MCLsEPAvsDWP-2014-07-01.pdf>

2. If drinking water standard is not available, use CA Notification Levels (NL) or Archived Advisory Levels (AAL)

See the following for CA NLs:

<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Notificationlevels/NotificationLevels.pdf>

See the following for CA AALs:

<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Notificationlevels/archivedadvisorylevels.pdf>

See the following for more information on NLs and AALs:

<http://www.cdph.ca.gov/certlic/drinkingwater/Pages/NotificationLevels.aspx>

3. If NL or AAL is not available, use CA Public Health Goal (if PHG is available and MCL is not yet available) or EPA Health Advisory (HA). (Note: If there isn't an MCL, NL, or AAL, then there will likely not be a PHG available)

See the following for CA PHGs:

<http://www.oehha.org/water/phg/allphgs.html>

See the following for the 2012 Edition of the Drinking Water Standards and Health Advisories:

<http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf>

See the following for additional information on Health Advisories:

<http://water.epa.gov/drink/standards/hascience.cfm>

4. If HA is used, consider both non-cancer risk and cancer risk, and select more protective (lower) number. For the purpose of the monitoring prioritization, use the following HAs: Lifetime (non-cancer) and Cancer Risk (Use 10^{-4} Cancer Risk column divided by 100 to arrive at 10^{-6} cancer risk. This level is recommended for comparability with OEHHA methodology for PHGs).

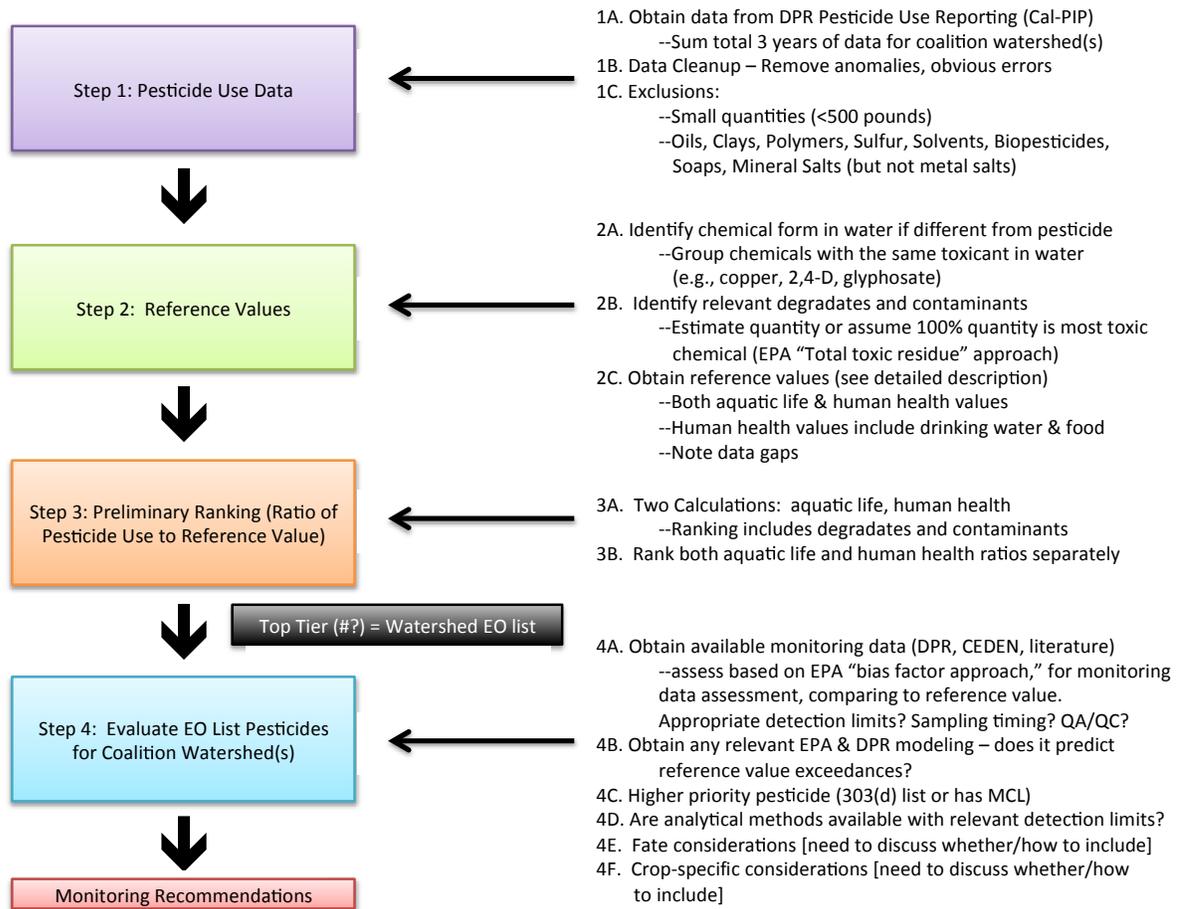
5. If HA is not available, use EPA Human Health Benchmark for Pesticides (HHBP). Consider non-cancer risk and cancer risk, and select more protective (lower) number. For the purpose of the monitoring prioritization, use the following HHBPs: Chronic or Lifetime HHBP (non-cancer) and Carcinogenic HHBP (Use 10^{-6} Cancer Risk).

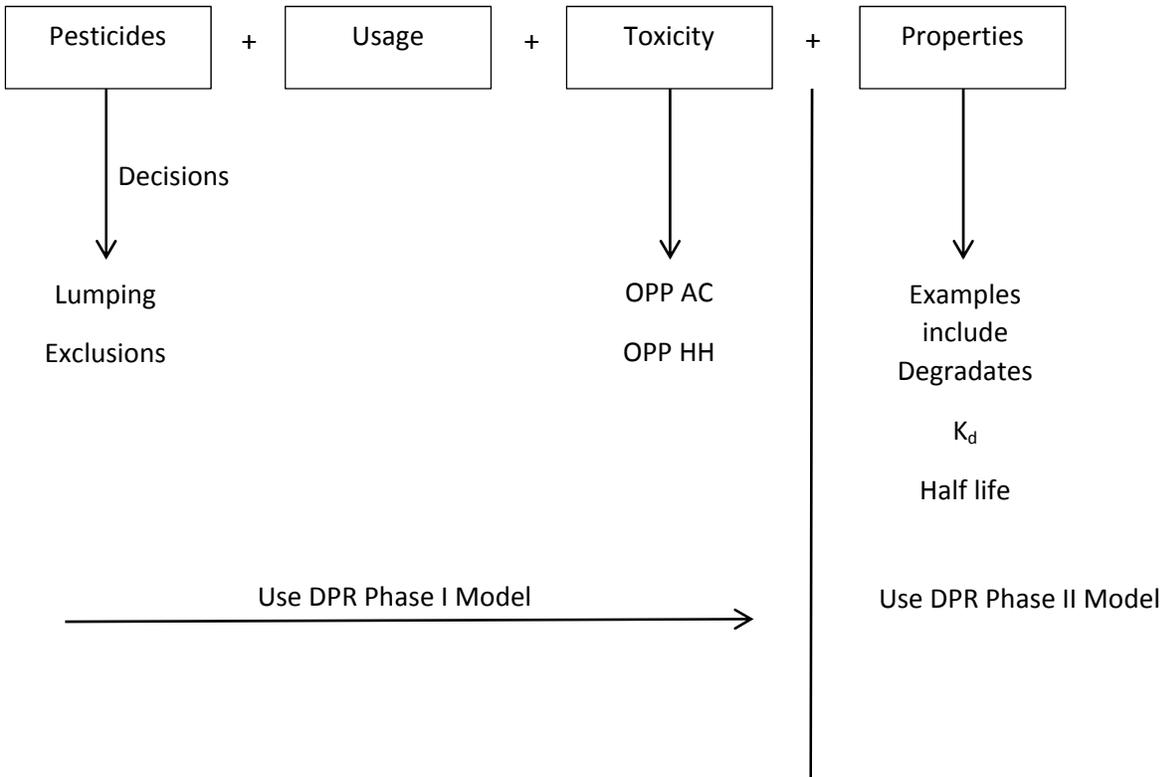
See the following for EPA HHBPs:

<http://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home>

Note: the links provided in items 1 and 2 will need to be updated in the near future; the State Drinking Water Program has moved to the State Water Resource Control Board as of July 1, 2014, and their website will be transitioning soon.

Straw Man Process to Catalyze Discussion





Limitations/Issues

Analytical → use Acute/Chronic Toxicity

Appropriate resolution on timing/spatial

Time gap of using DPR PUR database → perhaps use data directly from County Agricultural Commissioners

Field factors