

Benchmarks Update

SFIREG

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What is a Benchmark?

- Estimates of the concentrations below which pesticides are not expected to harm aquatic life
There are two different benchmarks for pesticides:
 - Human Health (i.e., drinking water)
 - Ecological Effect (i.e., aquatic)
- Aquatic life and human health benchmarks are derived using OPP data
- Both aquatic life and human health benchmarks are non regulatory values have been used by states as reference values for comparison with monitoring data

Aquatic Benchmark Project History

- OPP initiated the aquatic life benchmark project in 2005 in response to a SFIREG recommendation
 - Early requests sent from States to OPP
 - Pesticides of concern (POC) identified by states were prioritized
 - As of 2017 a total of 580 benchmarks have been posted including most pesticides of interest (POI)
 - Several outstanding POI requests for degradate benchmarks have stalled because degradates tend to be data-poor
- OPP developed a SOP/QAPP and implemented a systematic approach to develop new benchmarks; it is aligned with Public Process

Benchmark Development

- New pesticide registrations:
 - All new chemicals
 - First food use
 - First outdoor use
 - First residential use
 - Other actions of significant interest
- OPP reviews multiple new pesticide registrations and “first” uses (e.g. first food use) per year that go through public comment
- Registration Review Problem Formulation and Risk Assessments
- Each process includes posting risk assessment for public comment

Aquatic Benchmark Derivation

Risk Presumptions for Aquatic Animals Aquatic Animals

Risk Presumption	RQ	LOC
Acute High Risk	EEC/LC ₅₀ or EC ₅₀	0.5
Acute Restricted Use	EEC/LC ₅₀ or EC ₅₀	0.1
Acute Endangered Species	EEC/LC ₅₀ or EC ₅₀	0.05
Chronic Risk	EEC/NOAEC	1.0

Risk Presumptions for Plants Aquatic Plants

Risk Presumption	RQ	LOC
Acute High Risk	EEC/EC ₅₀	1.0
Acute Endangered Species	EEC/EC ₀₅ or NOEC	1.0

Aquatic Benchmark Example

OPP Aquatic Life Benchmarks ($\mu\text{g} / \text{L}$)
(freshwater)

Pesticide	CAS number	Fish		Invertebrates		Nonvascular Plants	Vascular Plants	Office of Water Aquatic Life Criteria	
		Acute ¹	Chronic ²	Acute ³	Chronic ⁴	Acute ⁵	Acute ⁶	Maximum Concentration (CMC)	Continuous Concentration (CCC)
Acephate ⁹	30560-19-1	416,000	5,760	550	150	> 50,000	—	—	—
Acequinocyl	57960-19-7	33,500	520	1.2	0.98	960	—	—	—
Acetochlor	34256-82-1	190	130	4,100.0	22.10	1.43	3.4	—	—
Acetochlor degradate Ethanesulfonic acid (ESA) ⁹	187022-11-3	> 90,000	—	> 62,500	—	9,900	—	—	—
Acifluorfen (Sodium)	62476-59-9	8,500	< 1,500	14,050	—	> 265	378	—	—
Acrolein ^{10, 13}	107-02-8	7	11.4	< 15.5	7.1	28	72	3	3
Alachlor	15972-60-8	900	187	1,250	110	1.64	2.3	—	—
Alachlor degradate Ethane sulfonic acid	--	52,000	—	52,000	—	—	—	—	—
Alachlor degradate Oxanilic acid	--	50,000	—	47,500	—	—	—	—	—
Aldicarb ⁹	116-06-3	26	0.46	10	1	> 5,000	—	—	—
Aldicarb sulfone	1646-88-4	21,000	—	140	—	—	—	—	—
Aldicarb sulfoxide	1646-87-3	3,570	—	21.5	—	—	—	—	—
Aliphatic Oils VHVI-4		> 38,000	—	< 450	—	—	—	—	—

Aquatic Benchmark Example

- <https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-pesticide-registration>

Pesticide	Year Updated	Fish ($\mu\text{g/L}$)		Invertebrates ($\mu\text{g/L}$)		Nonvascular Plants ($\mu\text{g/L}$)	Vascular Plants ($\mu\text{g/L}$)
		Acute	Chronic	Acute	Chronic		
Fluroxypyr-MHE	2015	>315	NA	>300	60.5	56	1400
NA Not available							

- Search by chemical name

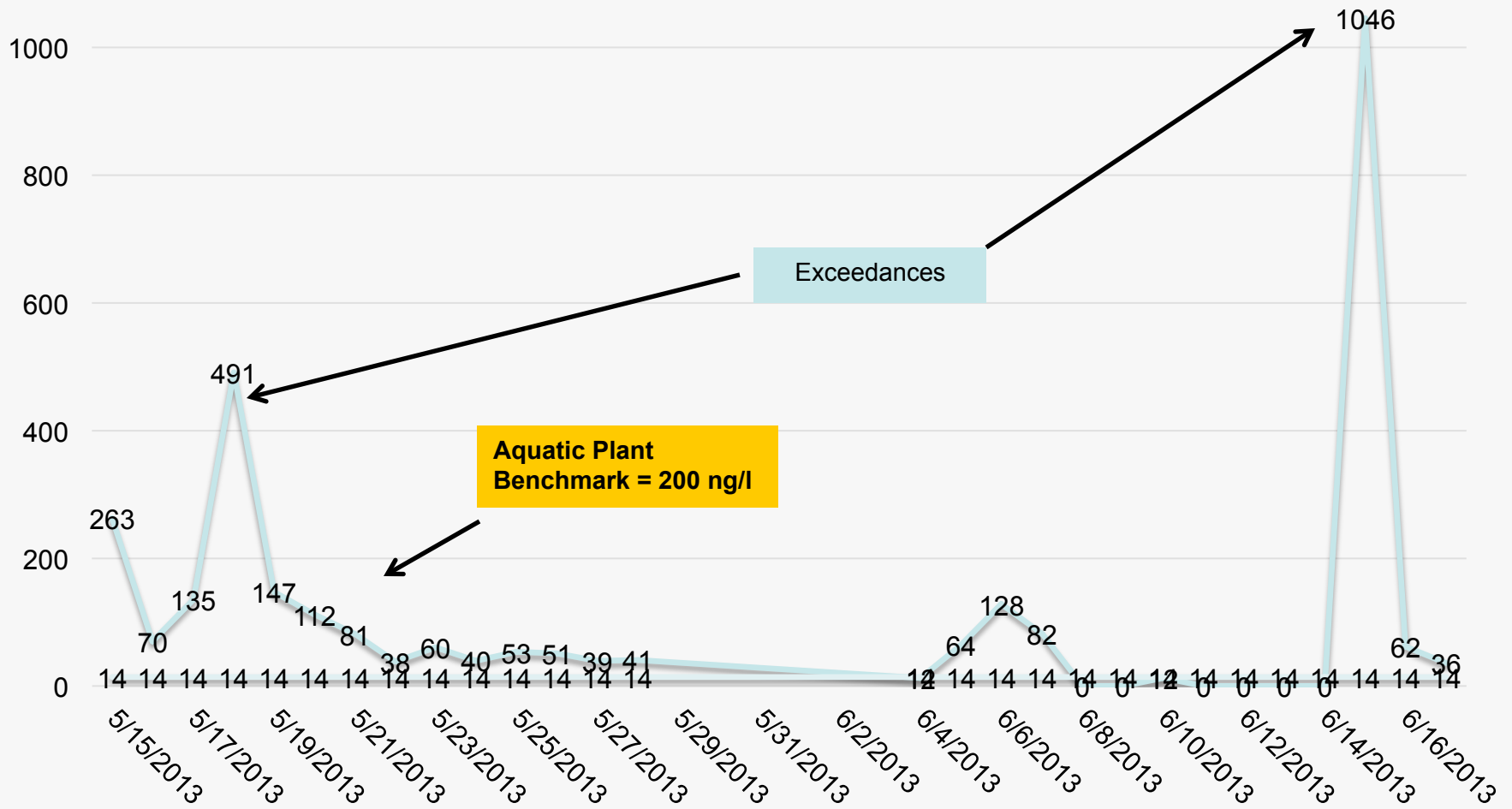
Aquatic Benchmark: Source Document

- Hotlink in Pesticide Name takes user to source document
- Typically a Risk Assessment or Problem Formulation

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Aliphatic Oils VHVI-4		> 38,000	—	< 450	—	—	—	—	—

Example Comparison of Monitoring for Chemical X Relative to Aquatic Benchmark





QUESTIONS?

Human Health Benchmarks for Pesticides (HHBP)

Developed out of EPA's March 2010 Drinking Water Strategy

- Implements one of the four principles in this strategy:
- Use the authority of multiple statutes to help protect drinking water

HHBP values:

- Derived using health effects data submitted under FIFRA and FFDCA as amended by FQPA; and
- Typical methods used to develop Health Advisories under SDWA
- Are not legally enforceable federal standards

Human Health Benchmarks

- Uses acute and chronic reference dose (RfD) from OPP Pesticide risk assessments
- Provides for most sensitive population
- Table linked to common name
- Provides link to reference document
- Only for pesticides without a MCL or HA
- Use standard assumptions for HA method
- For the acute benchmark, the entire exposure is assumed to occur from drinking water (100%).
- For the chronic benchmark, EPA applied a default relative drinking water source contribution (20%), assuming additional exposure may arise from other sources (e.g., food, air, contact)

Sample Human Health Benchmarks for Pesticides (HHBP) Table

Common Name and Reference Document	Acute or One Day PAD (RfD) (mg/kg/day)	^a Acute or One Day HHBPs (ppb)	Acute HHBP Sensitive Lifestage/ Population	Chronic or Lifetime PAD (rfd) (mg/kg/day)	^b Chronic or Lifetime HHBPs (ppb)	Chronic HHBP Sensitive Lifestage/Population	^c Cancer Quantification (Q1) Values(CSF) (mg/kg/per day) ⁻¹	^d Carcinogenic HHBP (E-6 to E-4) (ppb)
Amicarbazone	0.1	700	Children	0.023	150	General Population	--	--
Aminocyclopyrachlor	--	--	--	2.79	17900	General Population	--	--
Aminopyralid	--	--	--	0.5	3000	General Population	--	--
Amisulbrom	2	10000	Children	0.54	3500	General Population	--	--
Amitraz	0.00125	8.33	Children	--	--	--	--	--
Aquashade	--	--	--	5	30000	General Population	--	--
Asulam	--	--	--	0.036	230	General Population	--	--
Azinphos-methyl	0.003	20	Children	0.0015	9.6	General Population	--	--
Azoxytobin	0.67	4500	Children	0.18	1200	General Population	--	--
Benalaxyl-M	--	--	--	0.02	100	General Population	0.0059	5.4-54
Benfluralin	--	--	--	0.005	30	General Population	--	--
Benomyl	0.025	170	Children	0.013	83	General Population	0.00239	13.4-1340
Bensulfuron methyl	--	--	--	0.2	1000	General Population	--	--
Bensulide	0.15	1000	Children	0.005	30	General Population	--	--

For additional information, the link to the most recent Fact Sheet and Technical Document :

<https://www.epa.gov/dwstandardsregulations/human-health-benchmarks-pesticides-drinking-water>