THE SAFE AND EFFECTIVE APPLICATION OF AQUATIC HERBICIDES

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OVERVIEW

LAWS AND REGULATIONS

NON-TARGET TOXICITY CHARACTERIZATION

FIELD TRIALS / STUDIES
SPOILER ALERT!

1. Must use aquatic herbicides at aquatic sites
2. Waters of the US = NPDES
3. There are herbicide options that are among the safest AND most effective
WHEN DO I NEED TO USE AN AQUATIC HERBICIDE?

• "Aquatic habitat" means bodies of water, such as lakes, reservoirs, rivers, perennial and intermittent streams, wetlands, or ponds, sloughs, and estuaries.*

• In situations where there is direct surface water runoff from treatment sites to aquatic habitat, apply only those chemicals formulated for aquatic or wetland use.**

*Source: California Code of Regulations (Title 3. Food and Agriculture) Division 6. Pesticides and Pest Control Operations

**Source: California Pesticide Management Plan for Water Quality - An Implementation Plan for the Management Agency Agreement between The Department of Pesticide Regulation and The State Water Resources Control Board
SURFACE WATER APPLICATIONS

- **If:** Application may result in discharges to waters of the United States
- **Then:** National Pollutant Discharge Elimination System (NPDES) – General Permit.
SURFACE WATER APPLICATIONS

require surface water sampling!
UPDATED DEFINITION
“WATERS OF THE U.S.”
Source: shutterstock.com
NEW “WATERS OF THE U.S.” DEFINITION – JUNE 2020 STILL INCLUDES

- Territorial seas and traditional navigable waters
- Perennial and intermittent tributaries that contribute surface water flow to such waters
- Certain lakes, ponds, and impoundments of jurisdictional waters
- Wetlands adjacent to other jurisdictional waters
NEW “WATERS OF THE U.S.” DEFINITION – JUNE 2020
DOES NOT INCLUDE

• Some ditches
• Prior converted cropland
• Areas dependent on artificial irrigation
• Some artificial lakes and ponds
• Most stormwater control features

For more information, refer to:
Federal Register / Vol. 85, No. 77 / Tuesday, April 21, 2020 / Rules and Regulations
AQUATIC PESTICIDES AND THEIR SAFETY
AQUATIC HERBICIDES REGISTRATION – MUST EVALUATE:

• potential residue in potable water, fish, shellfish, and crops that may be irrigated
• environmental fate
• how the compound breaks down
• whether or not it is absorbed by test animals
• short-term or acute toxicity to test animals
• whether or not it causes birth defects, tumors, or other abnormalities after long-term exposure
• toxicity to aquatic organisms such as waterfowl, fish, or invertebrates
ENVIRONMENTAL PROTECTION AGENCY
TOXICITY CATEGORIES

<table>
<thead>
<tr>
<th>Toxicity Category</th>
<th>Aquatic Organisms: Acute (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>practically nontoxic</td>
<td>&gt;100</td>
</tr>
<tr>
<td>slightly toxic</td>
<td>&gt;10 - 100</td>
</tr>
<tr>
<td>moderately toxic</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>highly toxic</td>
<td>0.1 - 1</td>
</tr>
<tr>
<td>very highly toxic</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Active Ingredient</td>
<td>Toxicity Category</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>Fish (ppm)</td>
</tr>
<tr>
<td>imazamox (Clearcast)</td>
<td>&gt;100</td>
</tr>
<tr>
<td>triclopyr triethylamine (Garlon 3A)</td>
<td>&gt;100</td>
</tr>
<tr>
<td>imazapyr (Habitat, Polaris)</td>
<td>&gt;100</td>
</tr>
<tr>
<td>fluridone (Sonar)</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>flumioxazin (Clipper, Propeller)</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>carfentrazone (Stingray)$^b$</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>glyphosate (Roundup Custom, Rodeo)</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>endothall (Aquathol K)</td>
<td>0.1 - 1</td>
</tr>
<tr>
<td>diquat (Reward)</td>
<td>&gt;1 - 10</td>
</tr>
<tr>
<td>2,4-D$^c$</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>acrolein (Magnacide)$^c$</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>copper (Harpoon)</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>nonylphenol (R-11, Activator 90, No Foam A)</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>

Source: USEPA ECOTOX Database (https://cfpub.epa.gov/ecotox/)
IS IT A NONYLPHENOL ADJUVANT?

CHECK THE LABEL FOR “ALKYLPHENOL ETHOXYLATE”

R-11®
SPREADER ACTIVATOR - NONIONIC SURFACTANT

PRINCIPAL FUNCTIONING AGENTS
Alkylphenol ethoxylate, butyl alcohol, Dimethylpolysiloxane

% BY WT.  90%

CONSTITUENTS INEFFECTIVE AS SPRAY ADJUVANTS

10%
Total.........................................................100%

Surfactant Content.....80%

WA Reg. No. 2935-50142

KEEP OUT OF REACH OF CHILDREN

WARNING
A Crop Oil Concentrate

*PRINCIPAL FUNCTIONING AGENTS:
Heavy range paraffinic oil, Polyol fatty acid esters, and
Polyethoxylated derivatives thereof ........................................... 99.0%
CONSTITUENTS INEFFECTIVE AS SPRAY ADJUVANTS ...................... 1.0%
TOTAL ........................................................................... 100.0%

Surfactant Content: ........................................... 17.0%
Unsulfonated Oil Residue (UR) Value ................. 95.0% minimum

*All ingredients are accepted for use under CFR 40, 180.
CONTAINS PETROLEUM DISTILLATES

KEEP OUT OF REACH OF CHILDREN
WARNING
May be harmful if swallowed
May be harmful in contact with skin
Harmful if inhaled
Causes mild skin irritation
Eye irritation

COMPETITOR®
MODIFIED VEGETABLE OIL

PRINCIPAL FUNCTIONING AGENTS:
Ethyl Oleate, Trichloroalkylpolyoxyethylene Ester, Distearol Polyoxyethylene Glycol
CONSTITUENTS INEFFECTIVE AS SPRAY ADJUVANT ............. 2.0%
TOTAL ........................................................................... 100.0%

KEEP OUT OF REACH OF CHILDREN
PRECAUTIONARY STATEMENTS
Avoid breathing mist or spray

NONYLPHENOL ADJUVANT ALTERNATIVES
EFFICACY

Submersed (submerged)

Floating

Emergent
Parrot Feather (*Myriophyllum aquaticum*)
Percent Control 6 Weeks Post-Treatment

Source: Madsen et al. 2010
Water Primrose (Ludwigia peploides) Biomass at 12 Weeks Post-Treatment

Source: Sartain et al. 2015
Common Reed (*Phragmites australis*)
Biomass at 12 Weeks Post-Treatment

Source: Cheshier et al. 2012 (note: bar graph is an approximation of data, not quantitative)
SUMMARY

- Must use aquatic herbicides at aquatic sites
- Waters of the U.S. = NPDES
- Opt for herbicides that safe AND effective

Contact: Krista.Hoffmann@Wildlife.ca.gov (two f’s, two n’s)