Pesticide Impacts to Aquatic Species

Pesticide Use in Northwestern California

Forestry herbicides are sprayed to eliminate plants that compete with conifer seedlings. Tanoak, madrone, and other hardwoods are specifically targeted for spraying, as in this clearcut near Maple Creek, CA.

In 1999 and 2000, over 20,000 acres were sprayed on Humboldt County timberlands, where there are currently no riparian buffer zones to protect aquatic species from the effects of pesticides.

Invasive non-native plants, also called noxious weeds, invade sensitive habitats such as wetlands and grasslands, and can threaten native plant diversity or damage rangelands used by livestock ranchers.

Right: Marlahan mustard, or dyer's woad (*Isatis tinctoria*) above the Klamath River. Photo courtesy of the Salmon River Restoration Council, Sawyer's Bar.

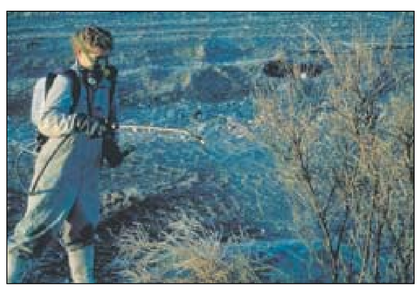
The Klamath National Forest's Noxious Weed Plan proposes spraying around trailheads, streambanks, river bars, roads, campgrounds, and intensely burned areas on nearly 3,000 acres. Although the plan claims to be an Integrated Pest Management (IPM) approach, herbicides will be used on all weed infestations over 25 plants except within 10 feet of surface water. A genuine IPM plan would incorporate manual removal, biological controls, and prescribed burning where appropriate.

Herbicides proposed for use in the Klamath National Forest:

- ***Garlon (triclopyr):*** Garlon 4 is highly toxic to fish, including coho salmon. According to the U.S. EPA, "levels of concern" for aquatic endangered species are exceeded in typical forestry applications. Triclopyr's breakdown product is persistent in aquatic environments. California law has not established limits for triclopyr in drinking water.

- ***Rodeo and Roundup (glyphosate):*** Glyphosate is acutely toxic to fish, and the formulation called Roundup contains an additional chemical that is also extremely toxic to fish. Glyphosate can persist for 3 years.

- ***Nonyl phenol*** is a surfactant (it increases the activity of the active ingredient). Although classified as an "inert" ingredient, nonyl phenol is highly toxic to fish. It is an endocrine disruptor and bioaccumates, meaning that it is concentrated in fish tissue at much higher levels than it is found in the surrounding water.



Spraying vegetation near streams can result in erosion and sedimentation, which negatively impacts aquatic species.

Herbicides often bind to the soil particles, ending up in streams when erosion occurs. Contamination and sedimentation of aquatic habitats both impact fish and other aquatic species.

Threatened, endangered and sensitive fishes of Northwestern California:

- coho salmon
- steelhead
- spring chinook salmon
- shortnose sucker
- coastal cutthroat trout

Candidates for listing:

- green sturgeon
- lamprey

Other Aquatic Species of Concern:

- western pond turtle
- tailed frog
- Northern red-legged frog
- yellow legged frog
- southern torrent salamander
- Del Norte salamander
- Siskiyou Mtns. Salamander
- clouded salamander

The USGS found more than 95% of river and stream samples nationwide contained at least one pesticide.

In Oregon, Washington, California and Idaho, 15 pesticides were found at or above levels set to protect aquatic life.

The Salmon River Restoration Council has been actively controlling spotted knapweed since 1997, mostly through hard work done by volunteers who hope to keep herbicides out of the pristine Salmon River watershed. To volunteer, visit http://www.srrc.org/ or call 530-462-4665.

Year:	# of plants dug:
1997	245
1998	87,841
1999	199,806
2000	65,642
2001	22,069
2002	10,508
2003	5,667

Spotted knapweed (*Centaurea maculosa*) invades river bars and grasslands, where it can reduce native plant diversity and decrease forage for deer, elk, and livestock.

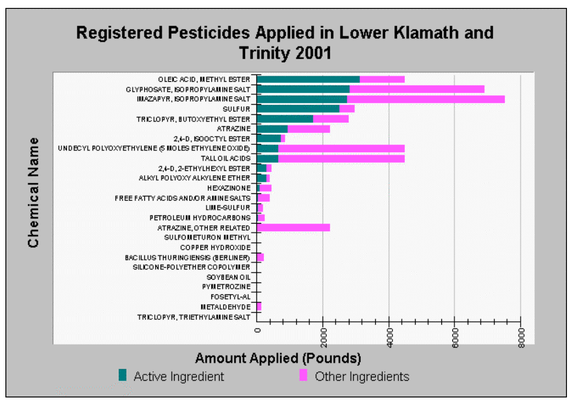
Pesticide Impacts to Aquatic Species

Direct impacts include:

- Death of adults, larvae, or eggs
- Impaired growth & development
- Altered predator evasion behavior

Indirect impacts include:

- Reduced food supply
- Elimination of vegetative cover, leading to:
  - Increased water temperature
  - Increased erosion and sedimentation



From KRIS--Klamath Resource Information System
http://www.krisweb.com/

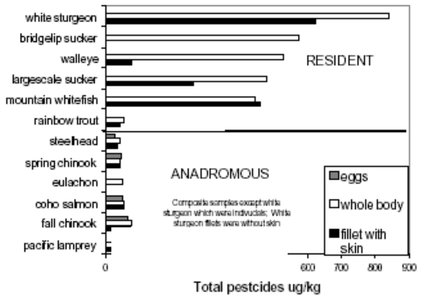
...But aren't there laws to protect the environment?

Pesticide registration system is not adequate because...

- **No testing is done on combinations, other chemicals included in pesticide formulations, or breakdown products.** Toxicity tests are only conducted on single active ingredients.

- **Tests are not done on sublethal exposure** that is likely to occur in the environment. Acute toxicity is the standard by which safety is determined (I.e., how much of the chemical can be ingested before death of the animal).

- **Aquatic life criteria have not been established for most pesticides**, and do not include bioaccumulation, synergism, or sublethal effects such as endocrine disruption.



Pesticides accumulate in fish tissue. High rates of fish consumption can lead to increases in cancer risk, which is of particular concern to American Indians, who eat fish more than 30 times a month on average.

Left: Average total pesticide concentrations in fish from the Columbia River Basin. From the U.S. EPA's Columbia River Basin Fish Contaminant Survey, 1996-98.