

WEEDS IN PARADISE: THE VIEW FROM THE ROAD
or
“Rates, Radicals, and Resistance”

Scott A. Johnson
Wilbur-Ellis Company
P.O. Box 15289
Sacramento, CA 95851-0289
sjohnson@wilbur-ellis.com

Summarizing the changes I have seen in California vegetation management over the past thirty or so years is a challenging assignment. After speaking with CWSS Program chairman Carl Bell, we agreed that this would be more of a philosophical retrospective than a technical presentation. Thus, I decided to subtitle my talk, “Rates, Radicals, and Resistance” — a convenient mnemonic of some of the major changes I have experienced in my professional work. I will delve more into these terms later in this paper. Suffice to say for now that herbicide rates have generally decreased; concerned citizen involvement has increased; and herbicide resistance has emerged as a significant issue to be considered when designing our vegetation management programs. These issues have definitely affected how we manage “Weeds in Paradise”. I will start by discussing what we name our weed work, as well as where and why we do it.

What Do We Call This?

One of the first things that has obviously changed is the name we give to what we do. When I started in the early 1970’s we called this work “**Industrial Weed Control**” and our tools were “**Sterilants and Weedkillers**”. I would say, looking back, that this term reflected an inwardly focused management objective that had little or no consideration of off-target or long-term effects of our work to the site or the environment.

In the late 1970’s and early 1980’s we started using the term “**Non-Crop Weed Control**”. This term meant that we acknowledged that our work could impinge on the health of nearby crops. One of my suppliers told me his philosophy had become “Non-Crop is All-Crop”. This may have happened after one of his clients mis-applied a soil-active herbicide along a county road that damaged multiple crops. The concept of product stewardship and drift management started to appear at this time, in crop agriculture, as well as non-crop settings.

In the 1990’s professionals switched from term “Non-Crop Weed Control” to “**Non-Crop Vegetation Management**”. This change reflected the reality that we really were not killing all the weeds on any given site. Additionally, management objectives has switched from having a bare ground result to variable objectives, including invasive weed management, native grass release, erosion control and slope stabilization, fuels management, type conversion, and storm

water management. Our goals now often included encouraging certain plant species after the removal of the undesired species, Thus we were no longer only doing “weed control”.

Since the mid-1990’s some of my utility, right-of way, and wildland clients have used the terms “**Integrated Vegetation Management**” and “**Habitat Restoration**”. These terms reflect a more holistic view of weed management that uses multiple tools and tactics to achieve goals that are often landscape (watershed-scale) in scope. One multiple-stakeholder project I have advised on for the past several years encompasses two major creek systems in three counties. Management objectives include removal of invasive brush and forbs, type conversion to native species (including Native American basket-weaving plant materials), and slope stabilization to reduce streambed sedimentation for the possible return of historical salmon spawning. This is not your old-fashioned weed control.

Where Do We Do This?

While Carl Bell asked me to give “The View From the Road”, there are many more places where we do vegetation management. Using the “Three R’s” device again, I will group our major work areas into “**Roads, Rangeland, and Rivers**”.

Roads

When I speak to my crop agriculture Pest Control Adviser colleagues, they often think that I just do weed control on roads and highways. This certainly is a major part of our work. There are, though, many fine gradations of this term. “Rights-of-ways” or “easements” are often a more accurate description for where we work. Utility power lines are the major example of sites where a client’s need to manage unwanted plants on land that the utility does not own. The utility’s objective of service reliability may clash with the adjacent landowner’s objective of having a privacy screen made up of conifers that could fall into the power line, or a walnut grower who want to plant trees under the wires. Maintaining roadbed integrity, site access, and fire prevention are major objectives on these sites.

Rangeland, as well as...

Rangeland managers have an increasing number of management objectives. On our ranch in the Glenn County foothills of 1960, we sprayed the brush with 2,4,5-T, burned it, and planted grass for cattle feed. Today, ranchers still do this, albeit without their favorite tool, which took on the name Agent Orange in Vietnam, and was eliminated from their toolbox. Range managers, especially on government-owned land, have added the objectives of invasive weed control, native species establishment, habitat restoration, and environmental mitigation banking.

Forest vegetation management is a major aspect of growing conifers, just up the mountain from the rangeland areas. Many research studies have proved that proper site preparation of conifer plantation and early release from weed and brush competition allow pines, firs, cedars,

and redwood to grow faster and achieve a merchantable size earlier than without weed management.

Parks are increasingly targeted for conversion from large tracts of invasive non-native species, to native plant species. This land may be under city, county, state, or federal ownership. These projects often incorporate a significant public education component, which will hopefully lead to voter support of this type of restoration project.

“Wildland” is a term that includes any other land not mentioned above. Wildlife areas and games refuges, as well as desert preserves are included in this land base. The usual vegetation management objective is, again, either invasive plant control or wildlife habitat restoration.

Rivers

Aquatic vegetation management is a better name for this topic area. It does include rivers, but also creeks, marshes, swamps, bogs, lakes, ponds, and any other imaginable body of water. The biology and ecology of this type of weed control is quite different from terrestrial vegetation management. This has been especially problematic over the past few years, if the water is contiguous with “the Water of the United States”, where an NPDES permit to apply aquatic pesticides is often required to do work. That permit is the subject of a completely different laws and regulation presentation, but there is hope that the NPDES issue may be cleared up in the next few years.

Riparian areas, or those areas along or immediately adjacent to water, are a sort of hybrid or cross-over area that may or may not have regulatory challenges to vegetation managers. My impression is that many riparian management restrictions are self-imposed by overly cautious agency land managers. My view is that if you are not aiming for the water, it is a terrestrial application. My recommendations in riparian areas, though, often include numerous mitigation measures to keep herbicides out of the water.

Rates — The First “R”

Generally, herbicide rates have gone down over the past thirty years, as new active ingredients have replaced old ones. Liquid rates have gone from gallons to quarts to pints to ounces per acre. Dow AgroSciences’ pyridine herbicides, clopyralid and aminopyralid, are good examples of this trend. Dry formulation rates have gone from many pounds to few pounds to one or two pounds to a few dry ounces per acre. DuPont’s sulfonyleurea herbicides are, of course, major examples of this change.

Impacts of Lower Rates in “Paradise”

The trend to lower herbicide use rates has had both positive and negative impacts — some real, but some perceived. A major positive is that there is less chemical put into the environment.

A logistical positive is that there is less material to store, ship, and mix, as well as fewer containers to dispose of or recycle.

Unfortunately these lower herbicide rates have resulted, in some concerned citizens, the perception of greater toxicity. They say, “That’s all it takes?!?! It must be too toxic to use safely”. I once had to replace 20 pounds of a sulfonylurea herbicide with over 400 pounds of an old triazine herbicide in order for a North Coast conifer release project to proceed.

This low-rate technology also places a greater stewardship responsibility on applicators, PCAs, and land managers. Since these products are active at low rates, there is a greater potential for off-target plant damage if they are improperly mixed, mis-calibrated, spilled, or drifted. These risks are different from the perceived hazards mention in the paragraph above.

Shotgun vs. Rifle

Changing technology has led to an increasing use of selective herbicides, especially in sensitive sites. The old “shotgun” is still good, e.g., Roundup/glyphosate for many weed management objectives. There are now, though, “rifles”, that is selective herbicides, that have been added to our arsenal for specific uses. Broadleaf products for invasive weeds, e. g., Dow pyridines (triclopyr, clopyralid, aminopyralid) are now major tools for woody plant or thistle control. Grass herbicides, e.g., “fops” and “dims”, are excellent for management of many grass weeds.

Woody plant control in forestry and habitat restoration sites is a sort of hybrid between the two approaches. Some herbicide generally thought of as non-selective may be selective on woody species. Imazapyr controls oaks, but not rubus or legumes. Triclopyr controls rubus and poison oak, but not redwood. One glyphosate formulation, with a particular surfactant, can be applied aerially over the top of hardened off pines in the late summer to selectively control ceanothus, manzanita, and even some oak (*quercus*) species. These properties allow for customized wildlife habitat restoration

Hammer vs. Scalpel

We see a similar trend with pre-emergent herbicides. When I first started doing “Industrial Weed Control”, we always wanted the “Hammer”, i.e., non-selective herbicides for bare ground site establishment and maintenance, fire safety, and access. While we still often need bare ground control, we also need a “Scalpel” for selective for sensitive sites and some habitats.

Native grass safety is available with selective broadleaf herbicides, such as Telar (chlorsulfuron) and Gallery (isoxaben). We also can get woody plant safety with products like Dimension (dithiopyr) and GoalTender (oxyfluorfen).

Registration

No California Pest Control Adviser can discuss his or her career without at least some mention of the impact of government laws and regulation on the availability of pesticides and govern their use. We are well-used to “ABC” (Anywhere But California) or “49er” registrations. Registration of pesticide in the Golden State is tedious, but thorough. There are over 120 tests for safety and efficacy done on each formulation. It can be difficult. California has often required California-generated data, in addition to USEPA-required data. It is expensive, costing from 120 to 180 million dollars to pay for the process. It is also lengthy, taking 7 to 10 years from synthesis to market.

Regulations

We have always dealt with many regulations in California from the California Department of Pesticide Regulation, and its predecessor, the California Department of Food and Agriculture. We are now dealing with many additional agencies getting into the business of telling us what to do and how to do it — or not do it.

The many areas of regulation include various topics, including licensing, use enforcement, worker safety, and environmental monitoring and groundwater rules. The laws include acronyms, such as NEPA, CEQA, CWA, ESA, FAC, and CCR.

The many agencies, in addition to CDPR and Ag Commissioners, include state, federal, local water boards, as well as multi-acronym wildlife agencies, such as , CDF&G, USFWS, NOAA Fisheries/NMFS, etc.

Radicals — The Second “R”

The word “Radicals” is my politically incorrect name for the more correct (and accurate) term “Concerned Citizens”. The fact is, as it should be, that all citizens have a right to comment on something that affects their lives, whether perceived or real. This is especially true if a project is planned on public property. While some of these folks have caused frustration to me and my clients over the past thirty years, I have to say that their efforts have made me become a better listener and better communicator.

No vs. Know Why — Reason vs. Religion

In the past, people opposed to herbicide project often adopted the anti-drug motto, “Just Say No!”. These people just didn’t like chemicals. They opposed their use on “principle”. There was little science involved and a lot of emotion.

Now, most project opponents know “why” they are appealing a project. They know the system, especially the federal NEPA process and California CEQA. Process, NEPA is the

National Environmental Policy Act and CEQA is the California Environmental Quality Act. These appeal document purport to use “science” to appeal pesticide projects. My experience is, though, that it is often bad science, unsupported by more than anecdotal reports. The unfortunate results is that even if the appeal is denied, the biological treatment window has passed. This often results in the delay or cancellation of the project.

The following comment is totally personal on my part. I often call dialog with anti-herbicide folks as cases of “Reason vs. Religion”. While they are frustrating to deal with, I have come to realized that we can never stop communicating with them and trying to build trusting relationships.

Resistance — The Third “R”

Herbicide resistance, the third “R” in this paper, is not my areas of expertise. As a practitioner of weed science, though, I have seen it increase over the past thirty years. Other more qualified people will speak on resistance at this and other meetings. I just know that it must be considered when developing vegetation management plans. It must be considered everywhere, even if there is no past evidence of resistance on a particular site. We must do this to maintain all tools in tool box. Research shows that using rates that are too low, or applying at the wrong time, are some of the causes of weed resistance to herbicides.

Summary: Relationships — The Fourth “R”

In closing, I wish to mention that relationships are an essential part of successfully managing “Weeds in Paradise”, that is in California. There is now a third party involved in the process. In the past we have had a two-party relationship between the regulators and the regulated. The regulators are CDPR and the county agricultural commissioners. The regulated are growers, foresters, wildland and habitat managers, other public agencies that use pesticides, farm workers, applicators, and PCAs. The third party in this relationship is now the “radicals”, that is the concerned citizens I discussed earlier. They have a right to be involved — get used to it and keep talking!

Things have changed a lot in the last thirty-some years I have worked in California vegetation management. We have gained some tools and lost some tools. Herbicide rates are lower. The public is more involved in decisions. Herbicide resistance is growing. Vegetation management is a challenge, but it can be done!