

Dead Weeds or Healthy Ecosystems

Setting and achieving goals the ecological way

By Tim Seastedt, Ph.D.



Tim Seastedt, Ph.D. is a professor in the Department of Environmental, Population and Organismic Biology at the University of Colorado, Boulder.

The problems with ecological and environmental costs of invasive species or weed control have been summarized very well. Here we have to address one environmental problem

without contributing to the problems of excessive pesticides in the environment. There does exist a body of knowledge that can be used to address the problem if we could just get folks to realize it is out there and get them to use it.

For the last 20 years, a number of ecologists from across the country and I have had the delightful job of finding out how ecosystems work. Our job has been to explain why invasive species are out there and how they respond to environmental change and human insults. This group has been among those who have noticed a change in the landscape.

Certainly, most of the threats to our native species have to do with simple habitat destruction. Second, invasive species are out there. This group of ecologists has begun to consider the why and wherefore of this transformation in the landscape. Turns out there is no one simple generalization you can give. But there is a tendency for many if not most of these invasive species to be associated with changes related to human impact, even though those changes may be indirect to some changes on our natural landscape. Indeed, in the West, during the last 150 years since the Europeans have taken over the area, the European flora was lonely at home and wanted to come to join us. It is dealing with this reality and the causes that is essential in addressing these problems.

Four concerns for ecological weed management

I got involved directly in trying to manage invasive species, the actual on the ground management, in 1997. I contacted folks around the country, other ecologists, saying, what should I expect and what should I know. This bit of advice showed up that I want to emphasize.

1. Managers, for the most part, are trained to kill weeds, and this, they are quite convinced, is management. A local example is a quote from the *Camera*, a local Boulder newspaper, from a weed manager saying, "Without the herbicide component we would have to multiply our staff force

by more than 15 times." I think the implicit analysis is that this individual sees their main job as weed kill. Ironically, in this particular case, there may have been some data to suggest that weed kill was not necessary.

2. **Weed management has evolved from agronomy not from ecology.** Agronomists say it was a simple job: you killed your weed and grew your plant. There were no concerns about the non-target organism out there. There essentially were not any non-target organisms except what you were going to put out on the landscape. That rule simply does not apply in natural ecosystems. And to be honest, we do not know what these herbicides do to our native species in terms of the complete list of what is sensitive to them and what the mutagenic effects of these chemicals are.

The message must be:

- **Dead weeds do not define success**
- **A successful program is one that produces healthy ecosystems**
- **Few argue about what's healthy, everybody argues about how to get there**

3. You are either for killing weeds or you are un-American. That really is the aura that exists in this.

To use another quote from the local paper, a county commissioner said, "Certainly we cannot stand by while our native grass lands are destroyed by foreign weeds."

4. I think what may be the most unsettling of the advice I received is that science has not been brought and applied to this issue the way it potentially should have been. It is more your tenancy than your technique if you want to deal with these issues, implying that if indeed you opt for non-chemical methods than you stick with it. Such methods are very feasible.

ECONOMIC AND ECOLOGICAL COSTS OF WEED CONTROL

Criteria for success: killing versus preserving

I honestly believe weed managers are very dedicated people and they do what they do to be successful. But the question is where are they getting their criteria for success. This is where we need to intervene. The message that the ecosystem scientists, ecologists, and the stakeholders certainly need to exude is that we are not looking to kill something, we are looking to preserve something. The idea is that restoration ecology emphasizes enhancement of the desirable components. Certainly, weed management has in its body of knowledge techniques to do the same.

As I mentioned, weed management certainly evolved through agronomy. Coming from the field of biology and ecology is the concept of ecosystem management, and ecosystem management subsumes integrated pest management. Under the context of ecosystem management, the program we developed has three components: (i) minimize the risk to human health; (ii) minimize the risk to native species; and, (iii) realistic implementation.

Weed Management Within Context of Eco-system Management

A program that:

- **Minimizes human health risks,**
- **Minimizes risks to other species, and**
- **Has realistic and acceptable economic costs.**

Identifying goals

A booklet by Reed Noss, *A Citizens Guide to Ecosystem Management* (1999. Biodiversity Legal Foundation. Boulder, CO), is an excellent manual, if followed, for invasive species management. Because of the techniques and requirements of the program, it simply defaults to a minimal chemical use approach. Essentially, the scientists are employed to assist in getting from point 'a' to point 'b.' The stakeholders need to weigh in to select the goals.

It is very important to realize that our world is changing outside of the changes we have been talking about here. We are going to use management techniques that are not necessarily traditional or that did not necessarily work 20 years ago. This seems fairly simplistic, but if this minimum requisite is used in developing control procedures for invasive species or weed management, good things happen. You recognize that the world is site specific. Noxious

Minimum Requirements for Management

- 1. Site specific goals identified & agreed upon by stakeholders**
- 2. Written management plan to obtain goals**
- 3. Monitor results to evaluate management activities**

The message is simple. What we want is not necessarily dead weeds, we want healthy ecosystems. Healthy ecosystems provide those essential ecological services, maintain and enhance biological diversity and the quality of human life.

lethal species in Montana are not necessarily the lethal species in Colorado. It may need control in some areas; it may not need control in others. By putting things in writing and putting things up front, you can actually see where you can monitor and see if you are actually getting there. If these three goals are followed, I sincerely believe that pesticide use would be significantly reduced in the weed management arena.

Local case in point, I believe this procedure was followed by the City of Boulder, Colorado recently with some weed control issues, but was not followed by another component of local government. The City chose to not use chemicals and the other component did use chemicals. So, the battle out there does continue.

The message is simple. What we want is not necessarily dead weeds, we want healthy ecosystems. Healthy ecosystems provide those essential ecological services, maintain and enhance biological diversity and the quality of human life. The management activities must be consistent and compatible with these goals. We need to get the public to buy in on these procedures.

For more information, contact Dr. Tim Seastedt, Professor of EPO Biology, INSTAAR, CB 450, University of Colorado, Boulder, CO 80309-0450, (303) 492-3302 phone, (303) 492-6388 fax, timothy.seastedt@colorado.edu.