

# **Flaming:**

## **A New Tool for**

### **Wildland Weed Control**

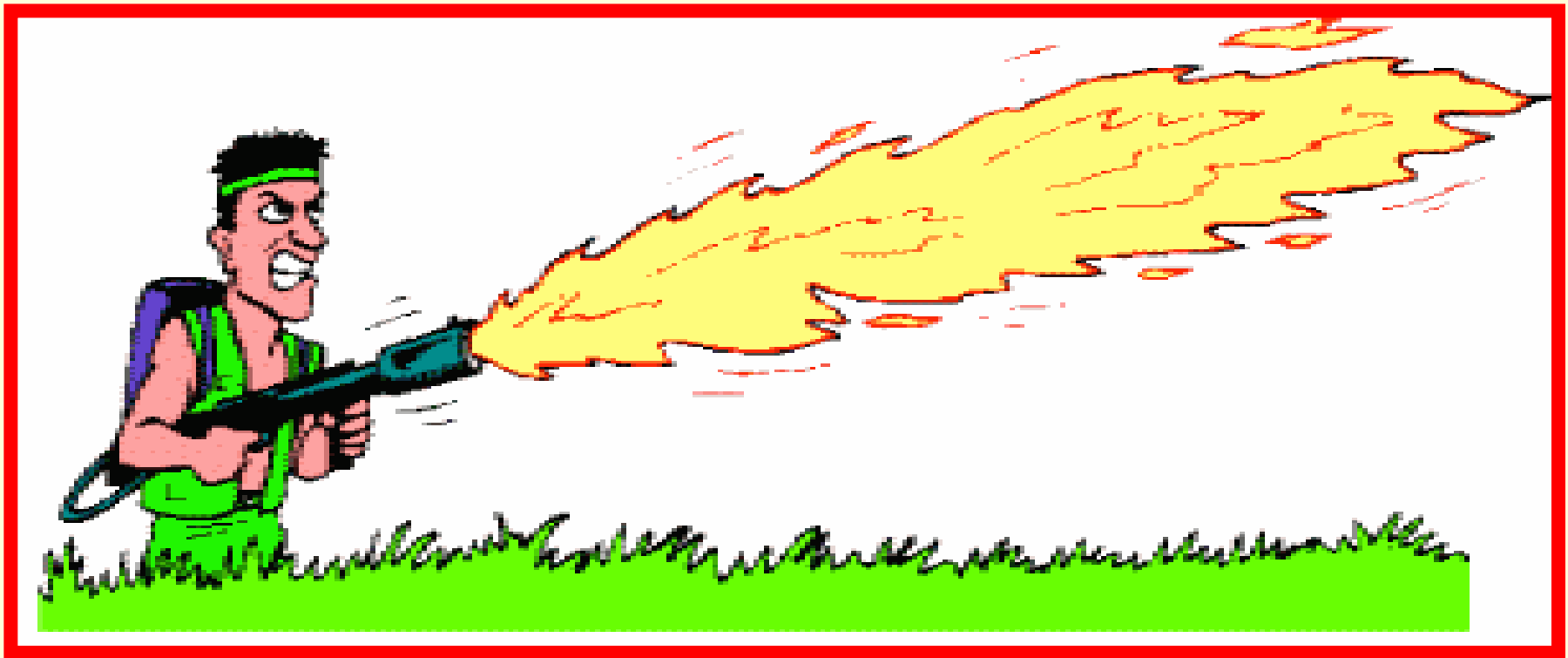
***Ken Moore***

***Wildlands Restoration Team***

# What is Flaming?

Flaming is a method of killing weeds with a brief application of heat.

Plants are *not* actually burned.





Flame weeding is **most effective** on young annual and perennial weeds no taller than **one to two inches**...the fragile root system is killed along with the top growth.

When flamed at this stage, many weeds quickly succumb.

For unknown reasons, some annual weeds also readily die at *later* stages of growth with a single pass of the flamer.

(*From* McGill University Ecological Agriculture Projects,  
<http://www.eap.mcgill.ca/MagRack/BAH/BAH%205.htm>)











# *Single-Pass Flaming*

Flaming can be an effective means of controlling many species when they are in the SEEDLING STAGE,

*and*

when the site is too WET to support fire.

# *Single-Pass Flaming*

## **Advantages of Flaming**

- Minimizes ground disturbance.
- Costs are comparable to herbicide use.
- Plants are killed when very small: no dead vegetation remains on site to hinder follow-up efforts.
- Optimal conditions for use are in the rain—when other field methods are not feasible, or are disagreeable.
- Flaming is more selective than spraying, and there is no spray drift.
- Easier to train and use than herbicides. Licensing is not required.

# *Single-Pass Flaming*

## **Limitations**

- Slower than spraying (but more precise).
- May not be effective when plants have grown significantly beyond seedling stage.
- Not effective for weeds with protected growing points, prostrate growth habit, extensive roots, or rhizome systems.



# ***Repeat Flaming***

Flaming kills annual weeds completely, but it doesn't kill the roots of perennial weeds. These will send up new shoots within a week or so after flaming. Additional treatments 2 to 3 weeks apart eventually deplete the roots' stored energy, and the weeds will die.

(*From* McGill University Ecological Agriculture Projects,  
<http://www.eap.mcgill.ca/MagRack/BAH/BAH%205.htm>)

# *Repeat Flaming*

## **Limitations**

- Number of repeat treatments needed may require considerable time and energy.
- Timing is critical for each treatment.
- Mortality may need to be achieved within one flaming season to be effective.
- The uncertainty of suitable flaming weather may prevent completion in some years.
- The number and timing of treatments may vary by species, and must be determined by trial and error.











# Summary

- Flaming is effective for controlling many weed species, if done when plants are small.
- Less-susceptible species require repeat applications, timed to exhaust the plants' reserves.
- Flaming is safe only when site is too wet to support fire—limiting its potential in drier areas and years.
- Flaming is a new technique for controlling wildland weeds. Not much information is available regarding on which species it is effective.

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**FLAMERS NEEDED!**

**Will train!**

\* \* \* \* \*



## Think Heat—An introduction to flaming as a weed control tool in wildlands (Part 1 of 2)

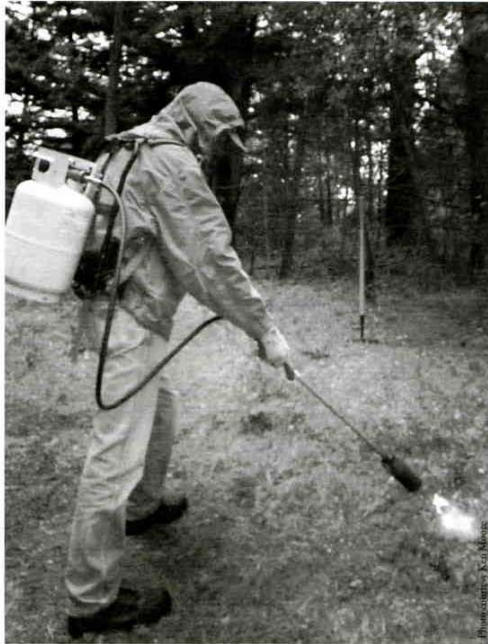
by Ken Moore, Founder, Wildlands Restoration Team, Santa Cruz, CA

*Editor's Note: The second installment in Think Heat, including results from research plots established by Ken Moore and Carla Bossard, will be published in an upcoming edition of the Cal-IPC News.*

It was a sight to drive fear into the heart of even an old veteran weed warrior like me. Using volunteers, I had begun the initial removal of French broom in state parks in the Santa Cruz mountains, and now a vast green carpet of broom seedlings, triggered by removing the cover of those parent plants, was rising from the ground like a tidal wave. As the number of cleared sites mounted, I began to wonder if we could hold the ground we had gained. Watching workers who had enthusiastically pulled large plants for hours fade fast when faced with this seemingly endless carpet of seedlings, I knew I was in trouble. I needed a new approach—and if I was to prevent seed set on these hard won sites, I needed it quickly.

I had read that flaming was an old technique used to control weed seedlings in row crops using tractor mounted equipment, and the idea of using a hand held torch to control invasive species in wildlands intrigued me. I was skeptical, but I was also desperate. Spraying wasn't an option with my volunteers, and the broom was coming up everywhere—and fast. Results of an initial trial with a borrowed torch were encouraging, so I researched the range of equipment being made and bought my first flaming gear.

I soon realized I was on to something. With only a little practice, I was getting well over 90% kill in one application. Flaming was reasonably fast, and very effective. The equipment required little maintenance and was not expensive. I soon bought more equipment, established some safety rules, and trained a few of my best helpers. They were enthusiastic, and they quickly learned the technique. Bingo. Seed set was prevented, and thousands of hours of previous hard work was not squandered.



Moore 'green flaming' French broom seedlings.

Flaming has been a key component of my broom control strategy ever since. I would not have been able to prevent seed set from re-occurring on many of my sites without it. Because I now had such an effective follow-up tool, I had the confidence to undertake the removal of all the remaining broom I found in my work area, which

is scattered over some 40,000 acres in six state parks in the Santa Cruz Mountains.

I am giving flaming workshops with increasing frequency, and have now trained many people in several other agencies in this area. Many of these people are experimenting with flaming other species, and I am looking forward to getting their feedback.

St. Mary's College of California professor and former Cal-IPC president Carla Bossard has set up research plots on some of my sites to document the effectiveness of flaming on French broom, and to determine how this relatively light application of heat produces mortality without actually burning the plant. In an upcoming article, we will jointly present her conclusions with the anecdotal information I am gathering from practitioners elsewhere and my own trials, which I am now beginning on other species here. (If any of you have used this technique, contact

me soon so we can include your findings as well.)

Our article will also describe the variety of flaming equipment that can be used for wildland weed control, the technique, safety protocols, and other considerations. Based on Carla's findings and the information I am gathering, we will try to synthesize guidelines on the types of plants flaming might be expected to be effective on here in California, some which it may not be effective on, and why.

For now, here is some basic information about flaming:

### 'Green' Flaming

Flaming, sometimes called boiling, wilting, or blanching, can probably be used to control many as yet untested broadleaf species

# “Think Heat” part 1 of 2

## Cal-IPC News

# Spring 2004

How the flaming technique  
was accidentally  
discovered...



The part that he had given a “**good job**” of **heavy burning** seemed to have been **stimulated by the treatment** and the growth was heavier and ranker than before.

The part that he had given the “**poor job**” of **light searing** of the top foliage was **thinned** by at least half and the remaining plants were sickly and weak.

*(from Corkins and Elledge, Reclamation Era, May 1940)*



# *Repeat Flaming*

## **Potential Applications**

Mature stands of perennial weeds such as johnson grass, Canada thistle, and even wild morning glory also succumb to flaming, but only after a number of treatments. One pass of the flamer may kill the tops of perennial weeds, but new growth will regenerate from the below-ground roots. However, **repeated flaming eventually starves the roots and kills the weed.**

(*From McGill University Ecological Agriculture Projects,*  
<http://www.eap.mcgill.ca/MagRack/BAH/BAH%205.htm>)