Early Detection and Rapid Response (EDRR) Education and Implementation Results in Nevada

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Introduction

Traditionally, new weed invasions are not detected or addressed until they are so dense and widespread that eradication is not feasible. Early Detection and Rapid Response (EDRR) is an approach to weed control that emphasizes controlling new, invading weeds while the populations are localized and small enough to be contained or eradicated. Costs for EDRR are typically far less than the cost of containing and managing a well-established large population of weeds. If you and your neighboring farmers, ranchers and land managers are all looking for new weeds, weeds can be detected and treated very early and inexpensively.

Early detection of new weed species involves diligent monitoring for new invasions, and requires the ability to correctly identify existing weeds and potential invaders. Once a new, high priority weed has been detected in an area, eradication (complete elimination with no weeds persisting in the area) of the weed is the goal. Research indicates that eradication efforts are most successful for infestations less than 1 hectare (2.47 acres) in size. If the weed is not likely to be eradicated due to a constant source of weed invasion, containment and reduction of spread of the weed can reduce the damage caused using an integrated pest management (IPM) strategy specific to the weed.

A comprehensive statewide weed survey was conducted in Nevada to determine the known presence, distribution or abundance of high-impact weeds across the state, followed by dissemination of the knowledge gained by this research for use in implementing the EDRR strategy across the state.

The EDRR Program in Nevada

The concept of EDRR is based on weed population behavior, weed detection thresholds, and weed control or eradication cost. There is an inherent lag time caused by the nature of weed population growth that causes weeds to be present in low numbers for a period of time before the population explodes. The term “lag” refers to the duration of initial, relatively slow rates of population densities and geographical spread.

Causes for plant population lags include:

1. inherent lags in exponential growth (not all plant reproductive parts can produce new plants because not all parts reach reproductive maturity)
2. intrinsic population factors (factors caused by the reproductive rate or other biological traits of the plant, plants that produce more seeds have more potential to reproduce, statistically)

3. climatic shifts

4. habitat availability

5. the time it takes for the population to develop mutations that are favorable for further colonization

An invasive species can suddenly start to reproduce and spread when some aspect of the environment is altered, and often these alterations are caused by human activities. The new condition of the site allows the weed to become a successful invader. Additionally a change in habitat quality – for example through a flooding event or a change in rainfall patterns– may permit an invasive population to explode. A survey of exotic weed invasions that have been successfully eradicated in California found that 13 of the 14 successful eradications had a gross acreage of 24 acres or less. In fact, during the time of detection, most of these species were found on less than 1 acre. When attempting to eradicate invaders, it is best to act at the earliest possible stage of invasion when population densities are still low.

Unless there is a mechanism in place to detect new weed invasions, the general public often does not see new weeds until they are too abundant and widespread for eradication to be feasible. As time passes, acres infested and control costs both increase exponentially. Detection ability increases with training and knowledge of potential new weed invaders, so education is important in reducing detection time. The longer a weed is present and the larger the infestation, the greater the cost to control or eradicate the weed. By utilizing early detection, cost to combat the weed infestation is reduced, and complete eradication may be possible in the right conditions, which would further reduce cost.

EDRR is implemented in the following steps:

1. Routine monitoring for early detection and reporting of new species
2. Identification, vouchering and verification of new records
3. Assessment of infestations
4. Appropriate rapid response
5. Follow-up monitoring and subsequent action if needed

The most important step is to identify new and potentially dangerous noxious weed species before they become established over a large area. If you see something new or suspicious, stop and collect a specimen of plants with different flower colors that appear larger, have a different stem structure, grow in a thick mass, or display any other unusual characteristics from plants you notice in your daily routine. The samples can then be submitted to an individual trained in weed identification. Collecting a plant and pressing it is important and allows it to be used to reference the location and date, and to serve as a record of the weed collection. If weeds are known to be in an area, efforts can be taken to prevent the spread of the weed and to guide weed management practices.

Assessment of the weed infestations will determine the type of response that is needed to manage the new weed. By practicing methods to prevent the weeds from spreading and taking quick action to remove the new weed by the best practice for that weed, additional damage can be reduced or prevented. Finally, the area will continue to be monitored. While monitoring may need to be continued indefinitely, it is inexpensive and should be part of any good land management practice. If the weed
returns, proper management response is already known and can quickly be implemented on any reoccurring weed patches.

**How to report unusual weeds**

Bring a sample of the weeds to your nearest Cooperative Extension, Bureau of Land Management, Natural Resources Conservation Service, U.S. Forest Service or Nevada Department of Agriculture office, or email your local Extension educator a series of high-quality photographs of the weeds. Include details of flowers, leaves, stems, roots, date and location of the weed (GPS locations are the best). If you cannot take a fresh sample, preserve a plant by pressing it in an old phone book or newspaper and placing a flat heavy object on it. Include the date, address, who collected the weed, GPS data if available, and your contact information with the plant, so you can be contacted when the weed is identified. Usually the local professional is able to identify most weeds, but if the weed is unusual, it will be submitted to an expert. If the weed is unusual or has not been previously recorded in the area, it can then be preserved in the state herbarium as a record for the weed in that county.

**EDDR implementation and successes**

The basic principles of EDDR weed eradication have been implemented across the state. Below are three case studies that had various degrees of success in eradication or preventing weed establishment.

**Yellow starthistle**

Yellow starthistle was first noticed by volunteers along the Carson River and brought to Carson City Weed Coalition Coordinator who was able to identify the weed. Based on the density of the infestation and the annual life cycle of the plant, the coordinator determined that the weeds could be effectively eradicated by hand pulling and bagging the flower heads to prevent seed germination. Volunteers remove the weeds during an annual local weed day and continue to monitor and remove plants as they appear along the waterway. This is preventing the spread of the weed along the river and establishment of the weed in other local areas. Continued monitoring and action at this site will be necessary to continue to prevent the establishment and spread of weeds along the river. Eradication is not feasible due to the continued reinfestation of the area from seeds dispersing from upstream. However, continue monitoring and removing yellow starthistles that sprout up will prevent the establishment of large seed banks in the area and slow the dispersal of the weed downstream.

**Rush skeletonweed**

Rush skeletonweed was detected growing along U.S. 395 by an employee of the Douglas County Weed Control Division. He was familiar with the principles of EDRR and noticed a small group of yellow-flowered plants growing where he had not seen any previously. More importantly, he took action by stopping to examine the plants. On closer inspection, he identified the plants as rush skeleton weed. He immediately implemented an eradication and monitoring program recommended specifically for rush skeletonweed using an IPM strategy. He continues to monitor the site yearly. His efforts were successful, and to date, monitoring has detected no further populations of this dangerous weed.

**African rue and Syrian beancaper**

African rue and Syrian beancaper were first documented in Churchill County in the mid-1960s and were thought to have been eradicated in the small localized area where they had been found. Over time, that record was buried in the archives of the Nevada Department of Agriculture, and no specimens were sent to the state herbarium
In early 2000, an Extension faculty member in the Churchill County office located several specimens of both species while working on a related land management project. He contacted the manager of Churchill County Weed Control Board and they began a joint research and control project targeted on these species. Further investigations revealed that the weeds were scattered over more than 500 acres and also occurred in Mineral County near the town of Hawthorne.

The eradication program is continuing, and the population of both species has been greatly reduced. However, the size and scattered nature of the population has made eradication difficult. This case shows the need to implement and complete eradication and monitoring programs, as the weeds have spread widely outside their original area of infestation. It also highlights the need for collection and vouchering of new weed specimens. In addition to a more permanent record of the infestation, the specimen can be used to identify the weed if it appears or re-appears in the future.

EDRR: Why and how to do it

Why should you implement EDRR? You will save money and time managing weeds by targeting new weeds before they are large infestations that cannot be easily contained, suppressed or eradicated. How do you practice EDRR techniques? Regularly scout your property for new or unusual plants, identify them, and take quick action whenever a new weed is identified. This is an instance where “an ounce of prevention is worth a pound of cure”, and you will save time and money by quickly managing new weeds.

References


