

## **The unique challenges of long-term follow-up monitoring**

**Moderator:** Sue Hubbard (Bureau of Land Management)

**Attendees:** Mike Bell (UC Riverside), Athena Demetry (Sequoia National Park), Rich Thiel (Sequoia National Park), Tessa Christensen (Pinnacles National Monument), Russell Jones (Pinnacles National Monument), Ken Moore (Wildlands Restoration Team)

### **Topics Discussed:**

- Introduction/definitions.
- What should your goal be?
- When do you decide to stop working a site?
- Keeping Staff/Volunteers Trained and Motivated for Long Term Monitoring
- Should you plant natives after removing invasive weeds?
- How do you keep track of sites
- New tools

### **Introduction/definitions**

Sue:

#### **Definitions:**

Eradication – completely remove the species, including seedbank, from an area where there is no seed source that can reinfest the area is the definition I am using but many other definitions exist.

Eliminate – remove the species from your property, but species exists in the surrounding area close enough that the area could be infested.

Control – limit the spread of the invasion.

When do you know you are in follow up stage?: Maybe less area needs to be treated in following years or else the same area is covered, but the exotics are less dense. Also may be dealing with younger stages of the plant.

It is important to determine what the goal is of your treatment. It isn't always to eradicate or eliminate.

Athena: Bull thistle is hard to locally eradicate. If you miss one plant, it can disseminate 10,000 seeds which restocks the seedbank.

Questions whether it is a better management strategy to persist at one population and knock it back completely, or else to move on to a new population the following year. Therefore cycling through populations to keep each at a low level.

### **What should your goal be?**

- Russell: It is important to develop goals for individual programs.
- Rich: Another option is using a technique such as grazing mowing or spraying for a year or two. This reduces weeds for a few years, before they come back and force you to repeat. This technique only gives you control.
- Ken: Bull thistle has a short invasive cycle. It has a very high initial disturbance, but is naturally thinned to manageable levels in about 7 years. It's important to know each species invasion cycle, and plan management accordingly.

- Sue: At my sites a lot of iceplant comes in after fire or other disturbance. I am not going for eradication but if I stop the above ground expression the shrubs will grow back and likely remain there for many years before the iceplant gets another chance to grow back.

### **When do you decide to stop working a site?**

- Russell: To ensure that the seedbank has completely grown out, 3 years appears to be the standard time to go without seeing a plant at a site before saying it is gone.
- Sue: I have two small yellow starthistle sites that had no recruitment for two years, but found plants in the third year. Spotted knapweed has a seedbank that may survive for up to 18 years. Is 3 years sufficient to be sure a plant has gone?
- Ken: Knowing the seed cycle of a plant is key to planning management. The seedbank life can be variable. Broom was not seen in a restored area for 15 years, and then a Monterey Pine fell down and the broom came back anew.
- Russell: Need to initially monitor a site to know the full extent of the invasion, then hit it hard.
- Some species are harder to hit back than others, such as bull thistle. You miss a few each year, because they are still in rosette form while others are already seeding.
- Rich: Bull thistle likes moisture, and Sequoia NP has been getting extra monsoonal moisture recently. Changing climate can change propensity to invasion.

### **Keeping staff/volunteers trained and motivated for long-term monitoring**

- Russell: When plants have rosettes and mature plants at the same time it increases the time required for proper management. Must revisit the site multiple times, and bring tools to attack at multiple phases. Will often have to cut off seeding heads.
- Ken: It gets harder to manage an exotic population each year. The community shifts from non-native dominated to native dominated. It is harder for volunteers to find individual plants when they are hidden in a sea of natives. This makes new volunteers less valuable, because they aren't familiar with the location and aren't tuned into what the plant looks like in real life. It's also difficult because there may only be a few individuals and each may be at a different stage of progression. This phase can be more mentally exhaustive than physically.
- Sue: When you don't see things in the field, it can be hard to stay focused, even if you are invested in the project. This makes it even harder for new staff volunteers to stay focused since they haven't invested as much of their energy into the project.
- Russell: It's important to keep trained volunteers for a long period of time to be successful. Then have newer volunteers complete simpler tasks to stay productive and motivated.
- Athena: Conceptually, it would be great to have volunteers adopt a watershed. That way they could continue working in the same area, and take pride in it. This is hard, because it's hard to find people who will commit long term. But if you can, people will feel ownership over the land and may stay focused on the overall goal.
- Russell: Pinnacles is looking to start an adopt a campsite. Have a local boy scout or community group adopt a site and see the progression over time. This can suffer from the same problems as keeping long term volunteers because of turnover in groups.

- Repeat volunteers want to see that their work matters. They put a long term investment into the land and have a sense of ownership in it.
- Ken: It's hard to keep long term volunteers because their lives change. When you can find long term volunteers that are committed, they want to eradicate a site.
  - If a group has large turnover, initial removal is a great project, but loss of information over time makes it harder to follow-up, and keep an effective group working in less invaded areas.
  - His experience has determined that over 50% of people who volunteer never come back.
  - Everyone loves seeing visible, dramatic progress, so it is harder to keep people around for long term care because not much changes from year to year.
  - Ideally we could create a traveling entity that moves to different areas. Kind of a watchdog group for an area that will constantly search and destroy invasives. It would be like a Federal Exotic Plant Management Team, but for public and private land. A team of experts.
- Rich: Best case scenario would be unlimited funds, and housing. Then success would be obtainable.
  - Long term follow-up is tedious work, and new volunteers can get frustrated. By taking them to mass infestations, it will give them an idea of what the land used to look like.
- Sue: I find that in order to locate scattered/hidden plants I need to work when they are in bloom and most visible. This means I am often pushing the time when they go to seed. This often results in having to clip seed heads at the same time I am killing the plant. This is time consuming but better than missing the plant because you were at the site too early to see it.
  - Some invasives such as Jubata grass will grow a new seed head 2 weeks after the old one has been clipped off.
- Athena: When dealing with long term projects sometimes it turns into perpetual maintenance and gardening. It is important to get the idea out to staff that this project might not end. It is especially important for upper management to understand the true timetable of the project. Not the ideal time table.
- Ken: It's important to get management to buy into perpetual maintenance. While it doesn't look sexy, it is necessary sometimes. After 20 years, some sites are actually complete. When dealing with French Broom, there still may be seeds in the seedbank, but since the perennial vegetation grows in, the seeds don't germinate, although, local disturbance could cause new germination. If monitoring has completely stopped, this could lead to a secondary invasion. As Paula noted in an earlier talk, rodents at some sites can completely turn over the soil in just 15 years.
- Sue: Removing mature jubata grass makes for a visible change for visitors, but must get people to understand that the job is not done.
- Russell: It's also important to make sure people understand that following up on these sites is still the same project. If you forgo monitoring you are wasting the early work done on a site, and therefore wasting money. It's a Lose-Lose situation because the invasives come back, and the original volunteers are demoralized.

### Should you plant natives after removing invasive weeds?

- Ken: It's a two sided coin. Some revegetation that is properly maintained gives the site an advantage, although maintenance is tough. Most of the time a lot of money is spent but not much success is attained. Different sites need different types of restoration, so it will be very site specific.
- Athena: With Reed Canary Grass, you need to revegetate afterwards, because too much thatch is present on the ground for natural vegetation to grow.
- Ken: Generally speaking, a natural seedbank is there and it will come up in time.
- Sue: We had a disturbed site with poor soil that was covered with yellow star thistle that I thought would need revegetation. However there was a little nassella growing at the edge of the site and it is moving into the rest of the site on its own. I no longer think revegetation will be necessary.

### How do you keep track of sites?

- Sue: I have over 100 klamath weed sites. I print out a list of all sites to visit each year and attach maps on 8.5/11" paper behind that. It is small enough to be manageable in the field and I can write notes on it as I go.
- Ken: Uses PDA with GPS capabilities. It has 7.5" quads loaded into it, and he is capable of making notes on the screen. It is small and very handy.
  - This has historically been a problem with getting a GPS reading in some locations, but the new chips are much better. The SIRF3 chip can get readings in steep, forested terrain. If you are having problems, you can look at satellite positions online, and then plan your field day by the angle of the canyon and the location of the satellites.
- Ken: Often past people have left a physical description of the site. This is hard to pass to future workers, and the site may undergo changes over time.
  - It is a good idea to have satellite photos of the site, so that you can see landmarks around the area. If you need to make exact measurements as far as which trees invasives are near, then you should bring flagging, and mark the trees. It is important to bring it back each year, just incase the original flagging is falling apart.
  - Even return visits by the same person aren't going to be exact. When you have a lot of sites, some plants might be missed. It is important though, to make sure that your data logging allows someone else to reproduce your assessment in following years. Have a site specific description associated with the GPS points. Under which bush is the population? What type of tree is it growing near?
- Athena: Keeping good data can also help motivate employees/volunteers. Having a map of the change in exotic population over time can provide proof of effectiveness.

### New tools?

- Ken: I am looking at using model radio controlled model planes with cameras and then fly over the area with GPS attached to find new invasives.
  - In Hawaii, they are using herbicide in paintballs and then using them to attack plants. With this technology, you could create war games against invasives.
  - There was a poster being displayed of an Iphone application that allows the user to record the location of an invasive plant when they find it, and it uploads the

location to a main database. Users can score points for uploading the most locations.