

Monitoring *Apthona* Species for Population Establishment and Impacts to Leafy Spurge in the
Shake Creek Area from Helicopter and Ground Releases

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Introduction

In 1996, Forest Health Protection staff released *Aphthona nigriscutus* at several sites along the South Fork Boise River drainage to manage a growing leafy spurge population. In 1998 and 1999, the Fairfield Ranger District began using helicopters to distribute *Aphthona* beetles for leafy spurge in the area. Those releases were documented using GPS points. In later years, the helicopter releases continued but were not GPS'ed. The helicopter drops have the advantage of distributing the *Aphthona* quickly to many of the leafy spurge infestations that are not easily accessible from the ground. These sites have not been monitored since the release date. The objective of the biological control agent monitoring was to determine the establishment of *Aphthona* from the 1996 Forest Health releases and from 1998 and 1999 helicopter releases. This was an initial effort to prepare for a more complete survey of the area to measure the success rate of the helicopter drops of *Aphthona* beetles. During 1999 and 2000, *Oberea erythrocephala* was also released in the area and was noted when found.

Methods

Monitoring of the release sites was conducted June 29-30, 2004, when the adult *Aphthona* beetles were actively feeding on leafy spurge. Release sites were located using a GeoExplorer 3 GPS unit and maps of the release sites, as recorded in information documented by Andrew Deutscher*.

At each surveyed release site, monitoring crews first conducted a 5-minute visual search for biological control agents. After the 5-minute visual survey, the site was surveyed using a sweep net. If less than 10 biological control agents were found during the 5-minute visual survey, then four areas selected at random within 5 meters from the release site were swept using a sweep net. The sweeping procedure involved making four sweeps and then checking contents for *Aphthona* beetles. The number of insects were tallied and recorded for the 5-minute visual survey and the four-area sweep.

Once established, a population of the *Aphthona* beetles begins to impact leafy spurge plant density and height. This impact is often referred to as the "bomb-blast" effect where the beetles have killed or stunted the leafy spurge plants (Figure 1). Typically, the initial bomb-blast effect is about 1 meter in diameter. The size of the affected area expands outwardly each year as the population of beetles increases. When present, the bomb-blast area at each monitoring site was measured to the nearest meter cross-slope and perpendicular to the cross-slope measurement at the widest spot. The end points for measurement occurred at the transition area between stunted/dead stems and the unaffected live stems of leafy spurge. If there was a bomb-blast effect, the transition zone between the dead/stunted and unaffected live leafy spurge stems was swept. The number of insects were tallied and recorded for the 5-minute visual survey and the four-area sweep.

*Andrew Deutscher was a temporary Forest Service employee who coordinated the *Aphthona* releases in 1998-2000.



Figure 1. Picture of "bomb-blast" effect in leafy spurge patch following an *Aphthona* flea beetle release (USDA Forest Service photo).

The *Aphthona* populations at the helicopter release sites and the Forest Health Protection release sites were evaluated and recorded into one of the following categories:

1. "**None**" was recorded when no *Aphthona* or damage by *Aphthona* on leafy spurge was found.
2. "**Present**" was recorded when one or two *Aphthona* were found, or minimal damage to leafy spurge was found even in the absence of the beetles.
3. "**Established**" was recorded when a small population of breeding adults, typically less than 50 individuals was found at the site and the bomb-blast effect on the leafy spurge was barely noticeable, i.e., less than 2 meters.
4. "**Marginally collectable**" was recorded when a healthy population of breeding *Aphthona* adults, typically about a 100 individuals was found at the site and the bomb-blast effect was greater than 2, but less than 10, meters in diameter.
5. "**Collectable**" population was recorded when hundreds of *Aphthona* beetles were found at the site and the bomb-blast effect had reached a diameter greater than 10 meters.

Results and Discussion

A total of 15 release sites were monitored (Figure 2). *Aphthona* beetles were found at seven of the monitored sites. Four sites were classified as "marginally collectable" populations. At three sites, *Aphthona* populations were classified as "present" level. Minimal or no impacts to the leafy spurge were noted, but adults were found at these three sites. At eight of the monitored sites, no *Aphthona* or insect damage was found.

The four sites that had "marginally collectable" populations were Little Water 1, Little Water 3, Big Water 3, and Bird Creek 1. The size of the bomb-blast at each of these sites, except Big Water 3, was about 10 meters in diameter. The Big Water 3 site had a bomb blast that measured 45 x 15 meters, but this may be an over estimation due to the influence of trees and shrubs near the site. Big Water 3 also had a significant amount of cheatgrass (*Bromus tectorum*) associated with the site. Regardless of the influence of other factors, these four sites should have sufficient populations of *Aphthona* from which collections can be made and redistributed to other leafy spurge infestations in 2005.

One *Oberea erythrocephala* was noted in the Little Water drainage, away from the monitored release sites. Several *Oberea* were found during the collection/redistribution day near the elk shed in the Big Creek drainage on June 29, 2004. Further monitoring of the area will likely find an established population of *Oberea* in the area between Big Water Creek and Little Water Creek. These insects are quite mobile and will likely disperse without human involvement.

Recommendations

In my estimation, all the release sites near the elk shed should be used to redistribute as many *Aphthona* beetles as possible to leafy spurge infestations in other drainages. Additionally, I recommend, a collection field day in this area where land managers from other Districts, Forests, and agencies can come to collect *Aphthona* beetles for releases on their leafy spurge infestations. Releases that are easily accessible should be monitored annually or biennially to determine if the *Aphthona* population is at collectable levels for redistribution increasing the number of accessible *Aphthona* nursery sites in southern Idaho.

The Little Water drainage has at least two populations of collectable *Aphthona*, Little Water 1 and Little Water 3. These sites could be used to release more insects in the Little Water drainage without going back to the elk shed area for biological control agents. The Bird Creek 1 site should also have a population of biological control agents that could be redistributed into that immediate area.

It appears not all of the helicopter releases were successful in establishing populations. However, some have definitely established and have bomb blast areas greater than 10-meters in diameter. These sites should be noticeable from a low flying helicopter and do not need to receive additional releases. Instead, helicopter releases made this coming summer should be directed at leafy spurge infestations which show no obvious bomb-blast effects from the *Aphthona* beetles.

John Shelly and his staff have done an excellent job redistributing these insects in the drainages around the elk shed. After several years of releasing biological control agents, the benefits are beginning to have noticeable impacts on the leafy spurge population at many of the release sites.

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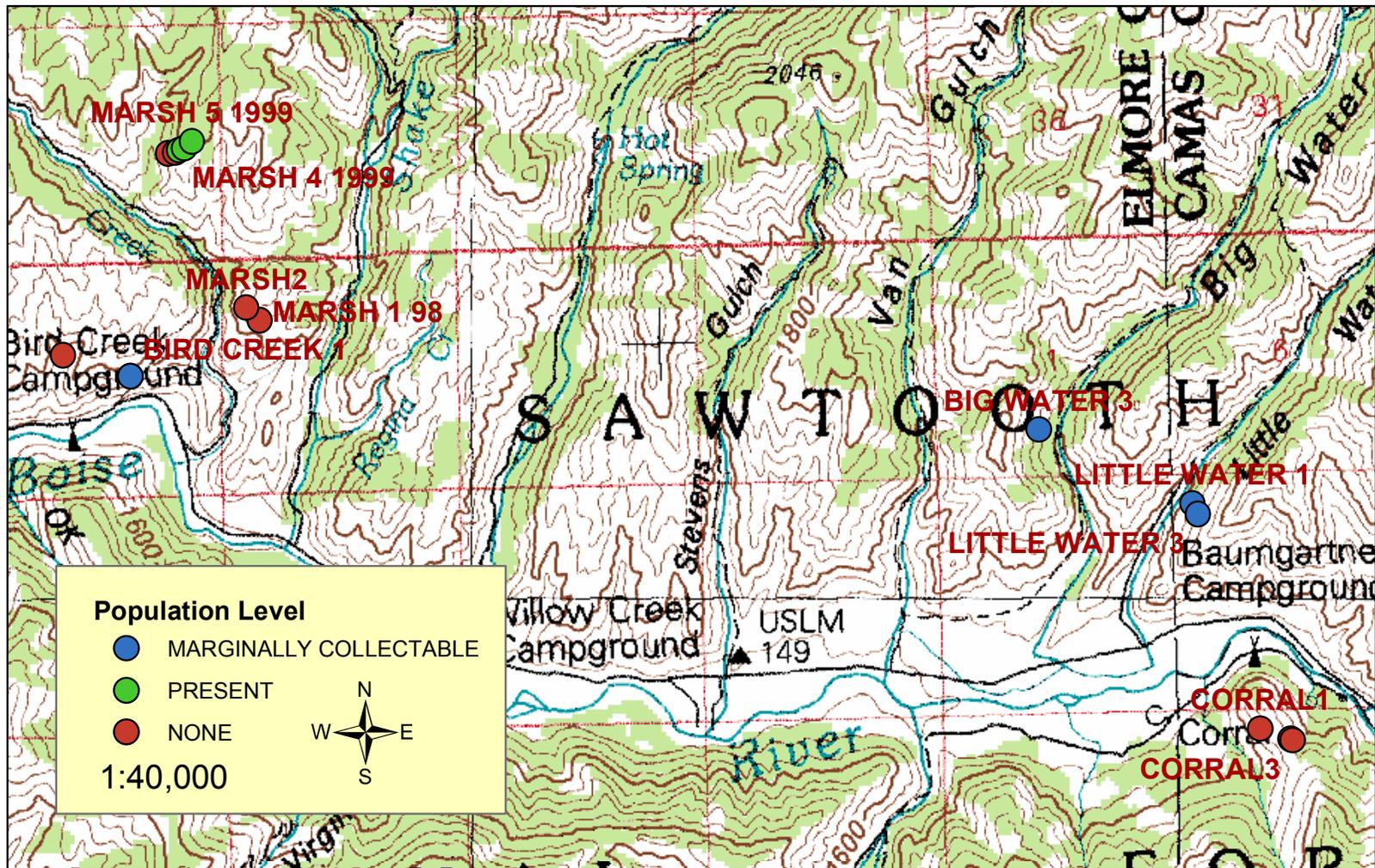


Figure 2. Population level and location of monitored *Aphthona nigricutis* release sites during June 28-30, 2004. (Corral 2 and Corral 3 overlap on the Map)

Appendix 1. Summary Table of Monitoring for *Apthona nigriscutis* at the release sites, June 28-30, 2004

| SITE_NAME | WEATHER | AIR_TEMP | | Percent of Weed Stage | | | | Weed Patch | | No. of Agents |
|----------------|---------------|--------------|-------|-----------------------|------|-----|--------|------------|------------------|---------------|
| | | (Fahrenheit) | WIND | Seed | Bolt | Bud | Flower | (Acres) | Population Level | |
| MARSH 1 1998 | CLEAR | <60 | LIGHT | 0 | 0 | 30 | 70 | 1-10 | NONE | 0 |
| MARSH 2 1998 | CLEAR | 71-80 | LIGHT | 0 | 0 | 20 | 80 | 1-10 | NONE | 0 |
| MARSH 4 1998 | PARTLY CLOUDY | 71-80 | CALM | 0 | 20 | 20 | 60 | 1-10 | NONE | 0 |
| MARSH 3 1999 | CLEAR | 71-80 | CALM | 0 | 0 | 30 | 70 | 1-10 | NONE | 0 |
| MARSH 4 1999 | PARTLY CLOUDY | 80-90 | CALM | 0 | 10 | 40 | 50 | 1-10 | PRESENT | 10 |
| UNKNOWN MARSH | PARTLY CLOUDY | 71-80 | LIGHT | 0 | 30 | 20 | 50 | 1-10 | PRESENT | 1 |
| MARSH 5 1999 | CLEAR | 80-90 | CALM | 0 | 20 | 30 | 50 | 0.25-1 | PRESENT | 11 |
| BIRD CREEK 2 | PARTLY CLOUDY | 71-80 | LIGHT | 0 | 0 | 50 | 70 | 1-10 | NONE | 0 |
| CORRAL1 | CLEAR | 71-80 | LIGHT | 0 | 20 | 20 | 60 | 0.25-1 | NONE | 0 |
| CORRAL 2 | CLEAR | 71-80 | LIGHT | 0 | 30 | 30 | 40 | 1-10 | NONE | 0 |
| CORRAL3 | CLEAR | 71-80 | CALM | 0 | 30 | 30 | 60 | 1-10 | NONE | 0 |
| LITTLE WATER 1 | PARTLY CLOUDY | 71-80 | LIGHT | 0 | 20 | 20 | 60 | >10 | MARG COLLECTABLE | 1 |
| LITTLE WATER 3 | PARTLY CLOUDY | 71-80 | CALM | 0 | 30 | 30 | 40 | >10 | MARG COLLECTABLE | 1 |
| BIG WATER 3 | PARTLY CLOUDY | 80-90 | LIGHT | 0 | 20 | 30 | 50 | 1-10 | MARG COLLECTABLE | 0 |
| BIRD CREEK 1 | CLOUDY | 61-70 | LIGHT | 10 | 10 | 20 | 60 | 1-10 | MARG COLLECTABLE | 124 |

Appendix 1. Continued

| SITE_NAME | Weed Canopy Height (cm) | Percent Canopy Cover | | | | | | | COMMENTS | Release Year |
|----------------|-------------------------|----------------------|------|-------|-------|---------|--------|-------------|-------------------------|--------------|
| | | Weed | Tree | Shrub | Forbs | Grasses | Litter | Bare Ground | | |
| MARSH 1 1998 | 40 | 40 | 0 | 20 | 20 | 10 | 5 | 5 | NEW RELEASE NEEDED | 1998 |
| MARSH 2 1998 | 40 | 20 | 0 | 30 | 20 | 15 | 10 | 5 | NO INSECTS | 1998 |
| MARSH 4 1998 | 41 | 40 | 10 | 20 | 10 | 20 | 0 | 0 | SOME DAMAGE PRESENT | 1998 |
| MARSH 3 1999 | 40 | 30 | 10 | 20 | 20 | 10 | 5 | 5 | NOT MUCH DAMAGE | 1999 |
| MARSH 4 1999 | 45 | 30 | 10 | 20 | 25 | 10 | 5 | 0 | DAMAGE PRESENT | 1999 |
| UNKNOWN MARSH | 31 | 20 | 40 | 30 | 10 | 0 | 0 | 0 | POSSIBLE RELEASE | ? |
| MARSH 5 1999 | 21 | 30 | 15 | 15 | 10 | 20 | 10 | 0 | | 1999 |
| BIRD CREEK 2 | 40 | 30 | 15 | 10 | 15 | 10 | 15 | 5 | | 1996 |
| CORRAL 1 | 30 | 40 | 0 | 20 | 10 | 20 | 5 | 5 | NO INSECT DAMAGE | 1999 |
| CORRAL 2 | 35 | 80 | 5 | 5 | 0 | 5 | 0 | 0 | NO APATHONA PRESENT | 1999 |
| CORRAL 3 | 40 | 70 | 10 | 5 | 5 | 10 | 0 | 0 | | 1999 |
| LITTLE WATER 1 | 43 | 40 | 5 | 10 | 0 | 40 | 5 | 5 | BOMB BLAST 15x12 M | 1996 |
| LITTLE WATER 3 | 35 | 60 | 10 | 10 | 0 | 10 | 5 | 5 | BOMB BLAST 14x 8 M | 1996 |
| BIG WATER 3 | 40 | 60 | 10 | 10 | 5 | 0 | 10 | 5 | BOMB BLAST 45 x 15 M | 1996 |
| BIRD CREEK 1 | 50 | 60 | 5 | 5 | 5 | 10 | 5 | 5 | NOT SURE WHERE DROP WAS | 1996 |