

Pest Detection / CAPS Survey Accomplishment Report Template – FY201~~8~~⁹

Year:	2018⁹
State:	Colorado
Cooperative Agreement Name:	Forest Pest Survey
Cooperative Agreement Number:	
Project Funding Period:	3/1/2018-2/28/2019
Project Report:	PD / CAPS Survey Report
Project Document Date:	4/1/2019
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
City/ Address/ Zip:	Broomfield, CO 80021
Telephone:	303-869-9076
E-mail:	Jeanne.ring@state.co.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

Pest Detection / CAPS Survey Accomplishment Report – FY2019

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. If reporting on a combined surveys work plan, report accomplishments by survey. When the output can be quantified, a computation of cost per unit is required when useful.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$34,059	Proposed = 320	Proposed= \$106.43
Actual = \$34,059	Actual = 320	Actual = \$106.43

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Mediterranean pine shoot beetle	<i>Tomicus destruens</i>
	Pine processionary moth	<i>Thaumetopoea pityocampa</i>
	Mediterranean pine engraver	<i>Orthotomicus erosa</i>
	Black fir sawyer	<i>Monochamus urussovii</i>
	Japanese pine sawyer	<i>Monochamus alternatus</i>
	European spruce bark beetle	<i>Ips typographus</i>
	Sixtoothed bark beetle	<i>Ips sexdentatus</i>
	Large pine weevil	<i>Hylobius abietis</i>
	Siberian silk moth	<i>Dendrolimus sibiricus</i>
	Pine tree lappet	<i>Dendrolimus pini</i>
	Sixtoothed spruce bark beetle	<i>Pityogenus chalcographus</i>
	Velvet long horned beetle	<i>Trichoferus campestris</i>

	Proposed	Actual
Sites (Locations):	20	20
Traps:	320	320

Number of Counties:	11
Counties:	Adams, Arapahoe, Boulder, Delta, Denver, Douglas, Jefferson, Mesa, Montrose, Larimer and Weld.

2. Survey dates:

	Proposed	Actual
Survey Dates:	3/01/2018-2/28/2019	3/01/2018-2/28/2019

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	0	320	320

4. Database submissions:

All data has been uploaded into NAPIS

B. If appropriate, explain why objectives were not met.*

All objectives were met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There are no unobligated funds associated with this project.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*

Biocontrol Report

Year:	2018
State:	Colorado
Cooperative Agreement Name:	Assessment of impact and biological control of yellow and Dalmatian toadflaxes (<i>Linaria</i> spp.)
Cooperative Agreement Number:	18-8508-0013-CA POGG1,BPAA,201900002189
Project Funding Period:	March 1, 2018 to February 28, 2019
Project Report:	Final Accomplishment Report: Assessment of impact and biological control of yellow and Dalmatian toadflaxes (<i>Linaria</i> spp.)
Project Document Date:	March 15, 2019
Cooperators Project Coordinator:	John Kaltenbach
Name:	Andrew Norton, Janet Hardin
Agency:	Colorado State University
Address:	Dept. of Bioagricultural Sciences & Pest Management
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Telephone:	(970) 491-7421
E-mail:	Janet.Hardin@colostate.edu

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. When the output can be quantified, a computation of cost per unit is required when useful.

Accomplishments:

Objective 1: Assess the status, establishment and impact of *Rhinusa linariae* and *Mecinus janthinus* released at yellow toadflax sites in 2015, including the establishment of new plots to serve as controls for those release sites. Also visit sites of earlier releases of *M. janthinus* (2011) in the Pike National Forest, as well as yellow toadflax transects established 2005 in the Hayman Burn.

The monitoring plots that we have established at our Douglas County *R. linariae* and *M. janthinus* release sites are modifications of the array of 4 circular plots used in the FIA monitoring system of the U. S. Forest Service. Within each larger plot (microplot) are 3 1-m² square subplots, in which we record % cover of every plant species present and count the number of toadflax stems.

Monitoring plots were reassessed and stem counts made of toadflax stems at the 3 *R. linariae* and *M. janthinus* release sites in Douglas County. Counts at the release points continue to reflect a reduction in the number of stems (Table 1), and observations suggest a reduction in the height of stems as well (although this was not measured). We carefully excavated a few yellow toadflax plants at the two *Rhinusa* release locations, but unfortunately found no galls on the root crowns. This does not necessarily indicate that the weevils are not present. *R. linariae* in British Columbia established only after multiple attempts. DeClerck-Floate and McClay (2013) note that weevils were not found in some years, but were found again in subsequent years, and the British Columbia Ministry of Forests (2012) has noted that weevils have persisted at one site despite fire, excavation, and repeated soil compaction. We intend to conduct more extensive root excavations in 2019 in search of galls.

Table 1. Change in yellow toadflax stem densities at Douglas County release sites. Stems were counted within a 1m² frame centered on the release point.

<u>Site</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Rhinusa 1	48	24	19	6
Rhinusa 2	46	22	3	0
Janthinus	79	76	56	9

We observed evidence of feeding and oviposition by *M. janthinus*, as well as exit holes in old stems, confirming continued establishment of weevils in the immediate area of the Janthinus release.

We also located a site in the area where toadflax was at a density appropriate for performing biocontrol releases, but which lacked biocontrol insects, and established a set of monitoring plots to serve as control sites for comparison to changes observed at the release sites. This will be particularly valuable in future as informal observations of yellow toadflax in this area in 2018 showed toadflax occurring in areas where it had not been seen previously, including interspersed with thickets of snowberry. Also, plant density at the Rhinusa_2 release has varied over the last 3 years, but plants are primarily concentrated under the oaks. This is interesting considering that *Linaria vulgaris* usually tends to occupy open sites.

Composition of the plant community at these sites has remained essentially the same over these first four years of sampling, although there has been a slight decrease in overall species richness in the last two years (2017 and 2018). This is similar to the observations of Wilke and Irwin (2010), who found no difference in total species richness between plots invaded by *Linaria vulgaris* compared to non-invaded sites. Species richness in the macroplots has ranged between 54 to 76 species, with the greatest diversity present in the Rhinusa_1 site. This is likely due to 20-24% of the species at that location being exotic weedy species, located in a site highly disturbed by rodent activity.

We visited 3 locations in the Manitou Experimental Forest (Pike National Forest) where *M. janthinus* was released on *Linaria vulgaris* in 2011. We had previously visited these releases in 2012, 2013, and 2014. In the first year after release, at all three sites, we found minimal evidence of oviposition as well as live larvae and a pupa. Two years later we found no evidence of weevils at any of the release sites. Then in 2014 we found a couple of larvae in stems at the first release location, but not at the other two. This year we collected stems and dissected them to determine whether weevils were present. Adult *M. janthinus* were indeed present in stems at the second of the three release locations, but not at the other two sites. One stem alone enclosed 7 adult weevils. Finding those weevils was very heartening, and is consistent with the general observation that *M. janthinus* has frequently taken much longer to establish than does *M. janthiniformis* on Dalmatian toadflax.



Figure 1. Monitoring site, Manitou Experimental Forest

We also reassessed the circular monitoring plots established at one of those sites (Fig 1. The average percent cover of yellow toadflax in all plots declined from 11.33% in 2011 to 0.93% in 2018, and stems declined in number from 334 to 21. No weevils or evidence of *Mecinus* were found at this particular release site.

Only very recently we have learned that a prescribed burn was conducted in 2017 in the area of our Experimental Forest sites. There had been no evidence of recent fire when we visited the plots. Such a fire might well have killed *Mecinus*, and as of this writing we are investigating the details of this event.

As well, in September we visited two locations of transects set up in 2005 within the perimeter of the 2002 Hayman Burn. These transects were established in infestations of yellow toadflax, in collaboration with the South Platte Ranger District, Pike National Forest. At that time we released what we now know to have been *Mecinus janthiniformis*, the species that is specific to *Linaria dalmatica*. We last visited these locations in 2010, and as might be expected, found no evidence of *M. janthiniformis* on *L. vulgaris*.

At the time of the 2005 releases, in Schoonover Gulch and near Fourmile Creek, we established two monitoring transects. In 2018, while we knew that *Mecinus* would not be present or have had any impact at those locations, we visited the sites reassess the density of toadflax in the absence of biological control herbivory. With the intention of comparing the current infestation with that of 2005, transects were set up and reassessed in Schoonover Gulch. Unfortunately, it was later discovered that (because of an error in entering gps coordinates) the transects were placed 186 m south of the proper site. The terrain appears to be the same at both locations. Nevertheless, a comparison of toadflax recorded along both sets of transects showed an average percent cover of 9.56% and 5.38% on the 2005 transects, compared to 3.10% and 2.19% along the 2018 transects, suggesting an overall decrease in the level of toadflax infestation 16 years after the fire. Anecdotally, common mullein (*Verbascum Thapsus*) had markedly decreased in abundance, and native perennial grasses (*Muhlenbergia montana*) were much more dominant on the postfire landscape.

Summary of Objective 1 Accomplishments: We verified the continued presence of *Mecinus janthinus* at locations where it was released on *Linaria vulgaris* in 2015 and 2011. Thus far, *Rhinusa linariae* has not become verifiably established; however, observations of populations in Canada suggest that establishment may be as slow and variable as most observers have seen with *M. janthinus*. Stem densities at release sites have decreased since beetles were released. Future monitoring at all of these sites will be necessary to track the status of biocontrol insect populations as well as changes in infestations of yellow toadflax in the absence of biological control insects.

Objective 2: Assess the status of *M. janthiniformis* released at new sites in 2013-2015 (including sites with dramatic decreases in toadflax density) and determine whether there has been a measurable change in Dalmatian toadflax density at those sites.

Circular monitoring plots at these Dalmatian toadflax sites are of the same design as those described above for the yellow toadflax sites. Our overall observations show that Dalmatian toadflax remains at lower densities than in previous years (Table 2). *Mecinus janthiniformis* is persisting at all sites, concomitant with a decline in toadflax infestations. At two 2013 release locations, also assessed in 2017, toadflax density and stem counts have increased slightly over the last year but remain significantly lower than 5 years ago. We also revisited two monitoring plots established in 2015 when weevils were released on private land (Will's Gulch) and noted a similar decrease in toadflax and a persistence of the weevils. At the first of those two releases toadflax had completely disappeared from the dense patch where beetles were actually released.

The first four sites listed in Table 2 were burned in the 2012 Hewlett Fire and 2012 High Park Fire in Larimer County. As at our yellow toadflax sites in the 2002 Hayman Burn (which included a portion of the Manitou Experimental Forest), wildfire may have facilitated an initial increase in the toadflax populations (Zouhar et al. 2008). Factors generally believed to achieve this include: a flush of nutrients into the soil from burned plant materials; removal of competing plants; removal of litter and other exposures of soil that can serve as germination sites for seeds; subsoil seed banks; and the survival underground of rhizomes or roots that can re-sprout readily, especially following a major disturbance event such as fire.

Table 2. Change in Dalmatian toadflax populations in circular monitoring plots

Site	Avg. % cover	Avg. % cover	Total # stems	Total # stems
(Baseline date)	<u>Baseline</u>	<u>2018</u>	<u>Baseline</u>	<u>2018</u>
Hewlett 2013 (2013)	2.58	1.36	75	43
HG-J#1 (2014)	10.84	0.09	198	3
HG-J#2 (2014)	1.94	0.09	29	2
Seaman Res. (2013)	7.33	0.61	202	25
Will's Gulch #1 (2015)	2.69	0.22	40	0
Will's Gulch #2 (2015)	4.35	0.01	151	2

Burn severity maps indicate that all of the four wildfire sites experienced fairly low severity fire, although the actual variability of burning between sites is unknown. Plant community composition and species richness at these Dalmatian toadflax sites was similarly variable-yet-consistent as observed at the yellow toadflax sites in Douglas County. Species richness in the burned sites declined in 2018, perhaps due to variations in the timing or amount of precipitation. Exotic species composition has ranged between 13-17% at the Hewlett Gulch

2013 site, 14.5-22% at the HG-J sites, and 21-26% at the Seaman Reservoir site. Our observation of relatively stable species richness in the monitoring plots is consistent with those of other researchers (including Fornwalt 2009, Fornwalt et al. 2010, Weed and Schwarzländer 2014). The high percentage of exotic species could in part be due to an extended history of invasion and disturbance in these sites – e.g., homesteading began in Hewlett Gulch in the 1870's. Also, a portion of Hewlett Gulch was burned in another wildfire in 2002, ten years prior to the High Park Fire. Fornwalt's (2009) research was conducted in the Hayman Burn, where she sampled plots annually for five years after the fire. She compared vegetation in those plots with that recorded 5-6 years prior to the fire. Similar to our results, she found that, in lightly burned areas, the species composition varied from year to year, yet exotic species richness remained relatively consistent. 18% of the exotics recorded post-fire were what she termed "legacy species" which had also occurred in the plots before the fire (including yellow toadflax, the focus of our work in the Manitou Experimental Forest and Hayman burn).

Summary of Objective 2 Accomplishments: *Mecinus janthiniformis* is indeed still present and having a visible impact on Dalmatian toadflax stems at the 2013-2015 release sites described above. While toadflax remains at all of these release locations, it has declined in coverage and density, indicative of the role biological control can have in reducing the impact of noxious weeds on the native plant community. Continued monitoring, particularly in the wildfire sites, will provide additional insight into the interactions between noxious weeds, biological control, and site disturbances.



Figure 2. View to the north from the 2013 Seaman Reservoir *M. janthiniformis* release location. Photo on the left taken 19 June 2013; photo on the right taken 3 June 2018.

Objective 3: Revisit transects established in 2014 at *M. janthiniformis* releases on Dalmatian toadflax at the CSU Maxwell Ranch to assess status of the weevil population and changes in toadflax density at those sites.

Weevils were released in 2010 at 14 locations on the ranch. In 2014 we established a set of two 50m x 2m belt transects, centered on each of twelve of the release sites. Transects were set up so that the first ran through the densest portion of the infestation and the second was set at a 90° angle to the first. The mid points of both transects were centered on the release location, forming an “X.” Along each transect we counted the number of old toadflax stems (from the previous year), number of green stems (current year’s growth), and the number of toadflax seedlings. We avoided double-counting stems in the area where both belts crossed, resulting in a total area of 196 m² sampled at each site.

In 2017 we resampled those transects, and in 2018 we were again able to resample ten of them. The situation is interesting and varies from one location to another (see Table 3). At 2-3 release sites Dalmatian toadflax has virtually disappeared. In 2017 three locations showed an increase in density of green stems compared with 2014, while at all others the percent decreases exceeded -20 %. While 7 of the 10 sites visited in 2018 still reflect decreases in stem density, two showed significant increases. Although browsing by ungulates (elk or deer, pronghorn, cattle) was apparent at every site, green stems almost universally showed signs of weevil damage from feeding and/or oviposition. Despite being browsed to an average height of 23 cm, old stems from 2017 were collected for dissection and showed extensive evidence of mining by weevil larvae and emergence of adults.

It is puzzling that toadflax density has increased so much at Releases 1 and 2 in contrast to the other sites. Release #1 is on the south side of a snow fence where snow accumulates in winter and thus persists longer than elsewhere. Germination of Dalmatian toadflax tends to increase with precipitation (Blumenthal et al. 2008, Weed and Schwarzländer 2014). Release #2 is in a slight swale near the base of Sheep Mountain, where snow may similarly persist longer before melting. Both sites regularly experience grazing by cattle. It is possible that the combination of increased moisture (leading to higher germination rates of toadflax seed) as well as ungulate consumption of weevils in stems may partially explain the difference.

Table 3. Number of green (2018) stems counted along Dalmatian toadflax belt transects, Maxwell Ranch.

<u>Release Site</u>	<u>2014</u>	<u>2017</u>	<u>2018</u>
1	273	489	662
2	243	830	1,332
3	620	243	251
8	311	193	128
9	307	474	389
10	952	204	40
11	601	0	0
12	155	15	4
13	846	0	1
14	778	73	95

Summary of Objective 3 Accomplishments: *Mecinus janthiniformis* appears to continue having a significant impact on Dalmatian toadflax at nearly all of the release sites on the Maxwell Ranch. Revisiting these transects in future may provide further insight into the potential interactions between biological control insect herbivory, microsite differences in weed locations, and perhaps herbivory by mammalian herbivores.

Project Summary: We conducted monitoring of biological control releases at 3 yellow toadflax sites in Douglas County and established new control plots in an area nearby where biological control insects are not present. We also visited monitoring plots in the Pike National Forest and locations where we set up transects in the Hayman Burn in 2005. *Mecinus janthinus* has successfully established at two of the 4 sites where it has been released, and may indeed be present at the other two as well. Continued monitoring will be necessary to track the rather slow progress of *M. janthinus* at these sites, as well as following the potential establishment of *Rhinusa linariae* in Douglas County. We visited 6 Dalmatian toadflax monitoring sites and 10 monitoring transects to assess the impact of *Mecinus janthiniformis*, and found it to persist at all release locations, and toadflax infestations are in marked decline overall.

Literature Cited

- Blumenthal, D., R. A. Chimner, J. M. Welker and J. A. Morgan. 2008. Increased snow facilitates plant invasions in mixedgrass prairie. *New Phytol.* 179(2): 440-448
- British Columbia Ministry of Forests and Natural Resource Operations. 2012. *Rhinusa linariae*: https://www.for.gov.bc.ca/hra/plants/biocontrol/detailed_bioagent_pages/rhinusa_linariae.htm

DeClerck-Floate, R. A. and A. S. McClay. 2013. *Linaria vulgaris* Mill., yellow toadflax (Plantaginaceae). Chapter 53 In: Mason, P.G. and D.R. Gillespie, et al. Biological Control Programmes in Canada. CABI. Pgs. 354-362

Fornwalt, P. J. 2009. Disturbance impacts on understory plant communities of the Colorado Front Range. PhD dissertation, Colorado State University, Fort Collins, CO. 188 p.

Fornwalt, P. J., M. R. Kaufmann, and T. J. Stohlgren. 2010. Impacts of mixed-severity wildfire on exotic plants in a Colorado ponderosa pine — Douglas-fir forest. *Biol. Invasions* 12: 2683-2695

Weed, A. S. and M. Schwarzländer. 2014. Density dependence, precipitation and biological control agent herbivory influence landscape-scale dynamics of the invasive Eurasian plant *Linaria dalmatica*. *J. Appl. Ecol.* 51: 825-834

Wilke, Brooke J. and Rebecca E. Irwin. 2010. Variation in the phenology and abundance of flowering by native and exotic plants in subalpine meadows. *Biol. Invasions* 12: 2363-2372.

Zouhar, K., J. Kapler-Smith, and S. Sutherland. 2008. Chapter 2. Effects of fire on nonnative invasive plants and invasibility of wildland ecosystems. Pgs. 7-31 in: Zouhar, K., J. Kapler-Smith, S. Sutherland and M. L. Brooks, eds. Wildland fire in ecosystems: Fire and nonnative invasive plants. USDA Forest Service Rocky Mountain Research Station, RMRS-GTR-42, vol. 6.

Benefits and results of work:

In the course of researching these biological control agents we have documented persistence of biological control insects and worked in cooperation with private landowners, personnel at the Colorado Department of Agriculture insectary, and county and National Forest weed managers.

Funding Amount
Proposed = \$15,766
Actual = \$15,766

	Proposed	Actual
Sites (Locations):	Not enumerated	NA

B. If appropriate, explain why objectives were not met.*

All objectives have been met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There were no cost overruns and all funds were obligated.

****indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51***

Approved and signed by

Les Owen, Div. Dir. Conservation Svcs.

Date: _____

Pat McPherran, ADODR

Date: _____

CAPS Survey Accomplishment Report Template

CAPS Survey Report

Year:	2018
State:	Colorado
Cooperative Agreement Name:	Commodity Bundled Survey
Cooperative Agreement Number:	
Project Funding Period:	March 1, 2018 – February 28,2019
Project Report:	CAPS Survey Report
Project Document Date:	May, 30, 2019
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
City/ Address/ Zip:	Broomfield, CO 80021
Telephone:	303-869-9076
E-mail:	jeanne.ring@state.co.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. If reporting on a combined surveys work plan, report accomplishments by survey. When the output can be quantified, a computation of cost per unit is required when useful.*

This survey was carried out in the Arkansas Valley, focusing on four commodities, tomatoes, onions, peppers and melons. Trap installation began in May and traps were serviced every two weeks through September. Samples were sent to Colorado State University to be screened by Boris Kondrtieff, Professor of Entomology. No target material was found.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$26,004	Proposed = 100	Proposed= \$260
Actual =\$26,004	Actual =68	Actual =\$382

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Cucurbit beetle	Diabrotica speciosa
	Old world bollworm	Helicoverpa armigera
	Tomato fruit borer	Neoleucinodes elegantalis
	Tomato leafminer	Tuta absoluta
	Allium leaf miner	Phytomyza gymnostoma
	Bacterial wilt; Southern bacterial wilt	Ralstonia solanacearum race 3 biovar 2
	Cucumber green mottle mosaic (CGMMV)	Tobamovirus Cucumber Green Mottle Mosaic Virus
	Cotton cutworm	Spodoptera litura
	Egyptian cottonworm	Spodoptera littoralis

	Proposed	Actual
Sites (Locations):	40	20
Traps:	40	68

Number of Counties:	2
Counties:	Pueblo, Otero

2. Survey dates:

	Proposed	Actual
Survey Dates:	May-October	May-September

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	0	68	68

4. Database submissions:

Data has been submitted in NAPIS

- B.** If appropriate, explain why objectives were not met.*
We had difficulty identifying enough onion fields this year.
- C.** Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *
There are no unobligated funds associated with this project.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*

Pest Detection / CAPS Survey Accomplishment Report Template – FY201~~8~~⁹

Year:	2018⁹
State:	Colorado
Cooperative Agreement Name:	Forest Pest Survey
Cooperative Agreement Number:	
Project Funding Period:	3/1/2018-2/28/2019
Project Report:	PD / CAPS Survey Report
Project Document Date:	4/1/2019
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
City/ Address/ Zip:	Broomfield, CO 80021
Telephone:	303-869-9076
E-mail:	Jeanne.ring@state.co.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

Pest Detection / CAPS Survey Accomplishment Report – FY2019

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. If reporting on a combined surveys work plan, report accomplishments by survey. When the output can be quantified, a computation of cost per unit is required when useful.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$34,059	Proposed = 320	Proposed= \$106.43
Actual = \$34,059	Actual = 320	Actual = \$106.43

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Mediterranean pine shoot beetle	<i>Tomicus destruens</i>
	Pine processionary moth	<i>Thaumetopoea pityocampa</i>
	Mediterranean pine engraver	<i>Orthotomicus erosa</i>
	Black fir sawyer	<i>Monochamus urussovii</i>
	Japanese pine sawyer	<i>Monochamus alternatus</i>
	European spruce bark beetle	<i>Ips typographus</i>
	Sixtoothed bark beetle	<i>Ips sexdentatus</i>
	Large pine weevil	<i>Hylobius abietis</i>
	Siberian silk moth	<i>Dendrolimus sibiricus</i>
	Pine tree lappet	<i>Dendrolimus pini</i>
	Sixtoothed spruce bark beetle	<i>Pityogenus chalcographus</i>
	Velvet long horned beetle	<i>Trichoferus campestris</i>

	Proposed	Actual
Sites (Locations):	20	20
Traps:	320	320

Number of Counties:	11
Counties:	Adams, Arapahoe, Boulder, Delta, Denver, Douglas, Jefferson, Mesa, Montrose, Larimer and Weld.

2. Survey dates:

	Proposed	Actual
Survey Dates:	3/01/2018-2/28/2019	3/01/2018-2/28/2019

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	0	320	320

4. Database submissions:

All data has been uploaded into NAPIS

B. If appropriate, explain why objectives were not met.*

All objectives were met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There are no unobligated funds associated with this project.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*

Pest Detection / CAPS Survey Accomplishment Report Template – FY201~~8~~⁹

Year:	2018⁹
State:	Colorado
Cooperative Agreement Name:	Small Grains Corn Bundled Survey
Cooperative Agreement Number:	
Project Funding Period:	3/1/2018-2/28/2019
Project Report:	PD / CAPS Survey Report
Project Document Date:	4/1/2019
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
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E-mail:	Jeanne.ring@state.co.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

Pest Detection / CAPS Survey Accomplishment Report – FY2019

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. If reporting on a combined surveys work plan, report accomplishments by survey. When the output can be quantified, a computation of cost per unit is required when useful.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$10,766	Proposed = 125	Proposed= \$86.12
Actual =\$10,766	Actual =125	Actual = \$86.12

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Old World Boll Worm	<i>Helicoverpa armigera</i>
	Snails, no common name	<i>Chochicella spp</i>
	Sunn pest	<i>Eurygaster integriceps</i>
	Egyptian Cottonworm	<i>Spodoptera littoralis</i>
	Cotton Cutworm	<i>Spotdoptera litura</i>
	Silver Y moth	<i>Autographa gamma</i>
	False Codling moth	<i>Thaumatotibia leucotreta</i>
	Cucurbit beetle	<i>Diabrotica speciosa</i>

	Proposed	Actual
Sites (Locations):	25	25
Traps:	125	125

Number of Counties:	3
Counties:	<i>Kit Carson, Yuma, Washington</i>

2. Survey dates:

	Proposed	Actual
Survey Dates:	3/01/2018-2/28/2019	3/01/2018-2/28/2019

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	0	125	125

4. Database submissions:

All data has been uploaded into NAPIS

- B. If appropriate, explain why objectives were not met.*

All objectives were met.

- C.** Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There are no unobligated funds associated with this project.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*

Farm Bill Survey Accomplishment Report Template

Farm Bill Survey Report

Year:	2018
State:	Colorado
Cooperative Agreement Name:	Stone Fruit Commodity Survey
Cooperative Agreement Number:	
Project Funding Period:	7/07/2018 – 7/06/2019
Project Report:	Farm Bill Survey Report
Project Document Date:	9/23/2019
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
City/ Address/ Zip:	Broomfield, CO 80021
Telephone:	303-869-9076
E-mail:	jeanne.ring@state.co.us

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. When the output can be quantified, a computation of cost per unit is required when useful.

Insect monitoring traps were set out in stone fruit orchards from June 8 to Nov 1 (weather caused a delay in removing traps at the end of the season). Traps were monitored and maintained at various intervals throughout the season and removed after fruit harvest. Visual surveys were done at each site beginning May 8. None of the target pest species were detected via CAPS approved methods.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = \$34,000	Proposed = 155	Proposed= 219.35
Actual =\$ 34,000`	Actual = 155	Actual = 219.35

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	Pear leaf blister moth	Leucoptera malifoliella
	European cherry fruit fly	Rhagoletis cerasi
	Cherry bark tortrix	Enarmonia formosana
	Light brown apple moth	Epiphyas postvittana
	Plum curculio	Conotrachelus nenuphar
	Apple maggot	Rhagoletis pomonella
	Velvet long horned beetle	Trichoferus campestris
	PPV	Potyvirus plum pox virus

	Proposed	Actual
Sites (Locations):	35	35
Traps:	155	155

Number of Counties:	3
Counties:	Delta, Mesa, Montrose

2. Survey dates:

	Proposed	Actual
Survey Dates:	7/07/2018 - 7/6/2019	7/07/2019 - 7/06/2019

3. Benefits and results of survey:

	Positive	Negative	Total Number
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Traps	0	155	155
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4. Database submissions:

Data has been uploaded into NAPIS

B. If appropriate, explain why objectives were not met. *

1 velvet long-horned beetle traps was destroyed by weather and disposed of, therefore only 4 traps were set out. Weather also caused a delay in trap removal. All other objectives were met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There are no unobligated funds or cost overruns associated with this survey.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*

Farm Bill Survey Accomplishment Report Template

Farm Bill Survey Report

Year:	2018
State:	Colorado
Cooperative Agreement Name:	Stone Fruit Survey 2018
Cooperative Agreement Number:	
Project Funding Period:	7/7/2018 - 07/06/2019
Project Report:	Farm Bill Survey Report
Project Document Date:	01/23/2018
Cooperators Project Coordinator:	Jeanne Ring
Name:	Jeanne Ring
Agency:	Colorado Department of Agriculture
Address:	305 Interlocken Parkway
City/ Address/ Zip:	Broomfield, CO 80138
Telephone:	303-869-9076
E-mail:	j_kimpel@hotmail.com

Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. When the output can be quantified, a computation of cost per unit is required when useful.

Insect monitoring traps were set out in vineyards from mid to late June to late October/early November (weather caused a delay in removing traps at the end of the season). Traps were monitored and maintained at various intervals throughout the season and removed after harvest. Virus surveys were done June 24 (Mesa Co.), Aug. 1 (Delta Co.) Aug. 22 (Montrose Co.), samples were collected and sent to the plant pathology lab at Oklahoma State University. None of the target pest species were detected via recommended survey practices during the monitoring season.

Funding Amount	Total Number of Traps	Cost Per Unit
Proposed = 17,000	Proposed = 72	Proposed= \$236
Actual = 17,000	Actual =72	Actual = \$236

1. Survey methodology (trapping protocol):

	Common Name	Scientific Name
Pest:	European grapevine moth	<i>Lobesia botrana</i>
	Egyptian cottonworm	<i>Spodoptera littoralis</i>
	Cotton cutworm	<i>Spodoptera litura</i>
	Honeydew moth	<i>Cryptoblabes gnidiella</i>
	False codling moth	<i>Thaumatotibia leucotreta</i>
	Australian grapevine yellows	<i>Candidatus Phytoplasma vitis 16SrXII-B</i>
	Flavescence doree	<i>Candidatus Phytoplasma vitis 16-SrV-C</i>
	Rotbrenner	<i>Pseudopezicula tracheiphila</i>
	Silver Y moth	<i>Autographa gamma</i>
	Stolbur disease	<i>Candidatus Phytoplasma solani 16SrXII-A</i>
	Light brown apple moth	<i>Epiphyas postvittana</i>
	European grape berry moth	<i>Eupoecilia ambiguella</i>
	Spotted lantern fly	<i>Lycorma delicatula</i>
	Black maize beetle	<i>Heteronychus arator</i>

	Proposed	Actual
Sites (Locations):	9	9
Traps:	72	72

Number of Counties:	
Counties:	Delta, Montrose, Mesa

2. Survey dates:

	Proposed	Actual
Survey Dates:	7/07/2018 - 07/06/2019	7/07/2019 - 7/06/2019

3. Benefits and results of survey:

	Positive	Negative	Total Number
Traps	0	72	72

4. Database submissions:

Data has been uploaded into NAPIS

B. If appropriate, explain why objectives were not met.*

All objectives are being met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. *

There are currently no unobligated funds or cost overruns associated with this project.

**indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.51*