San Diego Association of Governments (SANDAG)
Memorandum of Understanding (MOU) #5004552

Strategic Removal of Invasive Weed Species
1st& 2nd Quarter Report - FY 2016-17: Report #8 for Project

July 1, 2016 – December 31, 2016

Project: County of San Diego, Department of Agriculture, Weights & Measures (AWM) – Strategic Removal of Invasive Weed Species

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Project:

Invasive plants are considered one of the biggest threats to endangered species and their habitats. A strategic plan for managing non-native invasive plant species in San Diego County was completed in 2012 through a SANDAG contract to the Conservation Biology Institute (CBI) (http://sdmmp.com). The Invasive Plant Strategic Plan (IPSP) is designed to develop a strategic approach towards the eradication and management of invasive plants in the San Diego region. The IPSP is meant to work in conjunction with the Management Strategic Plan for Conserved Lands in Western San Diego County (MSP) (Management Strategic Plan).

This Scope of Work will require the contractor to focus on the management of invasive plants identified in Levels 1, 2, and 3 of the IPSP. The following tasks have been identified as necessary to implement this effort:

TASK 1 – Invasive Plant Species Coordinator:

Level of Effort: (25%) of overall contract

Right of Entry (ROE) Work and Coordination With Property Owners:

A small amount of work was expended on obtaining ROE agreements and coordinating with property owners this quarter.

The coordinator worked on seven species at 13 field sites:

Work tasks included monitoring field crews, assessing treatment success, hand pulling plants, and mapping and surveying target plants. Maps for these sites are found in the treatment section of the report. Work also occurred on treatment planning and time estimates for Amendment #1.

Carrichtera annua (Ward's weed):

Site #1, Ward's weed at La Costa Greens was visited 11-22-16. Seedlings had not sprouted yet.

Euphorbia terracina (Carnation spurge):

Site #2-#4, Black Mountain area was visited to check on plant status on 7-28-16. A few plants were pulled and disposed of. There were no seedlings.

Site #2, KB Homes area was visited on 11-22-16. Few plants were observed, scattered plants were hand pulled. The site was visited again with the treatment crew on 12-16-16, they treated the site.

Hypericum canariense (Canary Island St. John's wort):

Site #4, Balboa Park was visited on 11-20-16; plants were too dormant to treat.

Limonium duriusculum (European sea lavender):

Site #2, San Elijo Lagoon and Highway 101 was visited with the treatment crew on 11-23-16. San Elijo Conservancy staff will be taking over re-treatment responsibility for this site.

Limonium ramosissimum (Algerian sea lavender):

Site #4 Batiquitos, was visited on 12-14-16 with treatment crew. Areas were surveyed by coordinator and he assisted with hand pulling plants. Site #1 Ocean Terrace was visited on 12-19-16 with San Elijo Conservancy staff who will be taking over re-treatment responsibility on sites #1, 4, and 5 (La Costa).

Retama monosperma (Bridal broom):

Sites #2 Olive Hill, #3 Creekview, and #6 Highyway76 & I-15 were visited on 11-22-16. Crews treated sites #2 and #3, site #6 had no re-sprouts or seedlings

Volutaria tubuliflora (Volutaria sp.):

Site #1, Chula Vista Rice Canyon was visited on 11-28-16, plants had not sprouted from seed yet.

Report preparation:

Quarterly reports were prepared. Some work on the final report also occurred.

GIS data:

Spatial data was updated and will be uploaded onto Calflora's invasive weeds database. Data will be delivered to San Diego Management & Monitoring Program staff in the third quarter of 2016-17.

TASK 2 – AWM: Invasive Plant Level 1 Management

Level of Effort: (<10%) of overall contract.

Level 1 Management Species are Early Detection Rapid Response (EDRR) targets that were not known to occur in the county when the IPSP was written (2012).

Field work resumed on 11-22-16, after the MOU Amendment #1 was received..

Table 1. Summary of treatments performed by AWM on Level 1 species this quarter.

Scientific Name	Common Name	# of Sites Worked	Acres Surveyed	Acres Treated	Plants Controlled
Euphorbia terracina	Carnation spurge	3	2.45	0.52	825

Table 2. Summary of treatments performed by AWM on *Euphorbia terracina* (carnation spurge).

Scientific Name	Common Name	Work Site	Acres Surveyed	Acres Treated	Plants Controlled
Euphorbia terracina	Carnation spurge	#2, KB Homes	0.5	0.12	750
Euphorbia terracina	Carnation spurge	#3, Black Mnt, County Park	0.95	0.4	75
Euphorbia terracina	Carnation spurge	#4, Black Mnt Ranch	1	-	-

***Euphorbia terracina* (Carnation spurge): Site #2, KB Homes**

Mature plants were pulled, bagged, and disposed of in a landfill. Seedlings were foliar spot sprayed. A crew of two individuals worked on 11-29-16 and 11-30-16. There has been a large reduction in cover (>90%), but there is an extensive seedbank.

KB Homes site: Yellow: areas surveyed; Red: areas treated

***Euphorbia terracina* (Carnation spurge): Site #3, Black Mnt County Park**

Mature plants were pulled, bagged, and disposed of in a landfill. A crew of two individuals worked on 11-30-16. There has been a large reduction in cover (>95%), but there is a seedbank.

Black Mountain County Park site: Yellow: areas surveyed; Red: areas treated

***Euphorbia terracina* (carnation spurge): Site #4, Black Mnt Ranch**

A crew of two individuals worked on 12-19-16. The crew met and surveyed the site with a private contractor and member of the SDWMA, Mike Kelly of Kelly & Associates, who found this site. Steep roads were too wet to reach the site for rest of quarter so treatment has not been initiated.

TASK 3 – AWM: Invasive Plant Level 2 Management.

Level of Effort: (>40%) of overall contract

Level 2 Management Species are EDRR targets that were of limited distribution in the county when the IPSP was written (2012).

Field work resumed on 11-22-16, after a MOU Amendment #1 was received.

Crews surveyed and treated, three invasive weed species at seven sites this quarter: European sea lavender, Algerian sea lavender, and bridal broom. AWM technicians made optimal pesticide applications, protected the natural environment by preventing off-site movement of pesticides, and utilized Best Management Practices (BMPs) that prevented unintentional discharges to surface waters. For each site, AWM technicians followed the following procedures:

1. Identified the pest species to be treated.
2. Reviewed site conditions, such as soil texture, slope, standing water, irrigation or storm drains.
3. Identified and avoided streamside management areas and surface waters to prevent drift and application of pesticides not labeled for aquatic use onto surface waters.
4. Identified most appropriate method of control based on integrated pest management methods,

designed to minimize the scale and number of pesticide applications.

5. Applied the least persistent and least toxic pesticide that effectively mitigates the target pest.

Table 3. Summary of treatments performed by AWM on Level 2 species this quarter.

Scientific Name	Common Name	# of Sites Worked	Acres Surveyed	Acres Treated	Plants Controlled
Limonium duriusculum	European sea lavender	1	1.5	0.6	1,075
Limonium ramosissimum	Algerian sea lavender	2	11	1.5	3,665
Retama monosperma	Bridal broom	3	9.5	2.2	4,680

***Limonium duriusculum*, European sea lavender: Site #2 San Elijo Lagoon**

Table 4. Summary of treatments performed by AWM on *Limonium duriusculum* (European sea lavender).

Site Name	Common Name	# of Visits	Acres Surveyed	Acres Treated	Plants treated
Site #2: San Elijo Lagoon, West Basin	European sea lavender	1	0.7	0.2	75
Site #2: Highway 101, Solana Beach	European sea lavender	1	0.8	0.4	1,000

Mature plants were pulled, bagged, and disposed of in a landfill. A crew of two individuals worked on 11-23-16. The West basin site is nearly fully controlled (>95% control). The landscaping areas along

highway 101 has a significant seedbank, plants sprayed were seedlings, but there are many. Cover is greatly reduced (>90% cover reduction), but there were over 1,000 seedlings.

San Elijo Lagoon, West Basin site: Yellow: areas surveyed; Red: areas treated

San Elijo Lagoon along Highway 101 site: Yellow: areas surveyed; Red: areas treated

***Limonium ramosissimum*, Algerian sea lavender:**

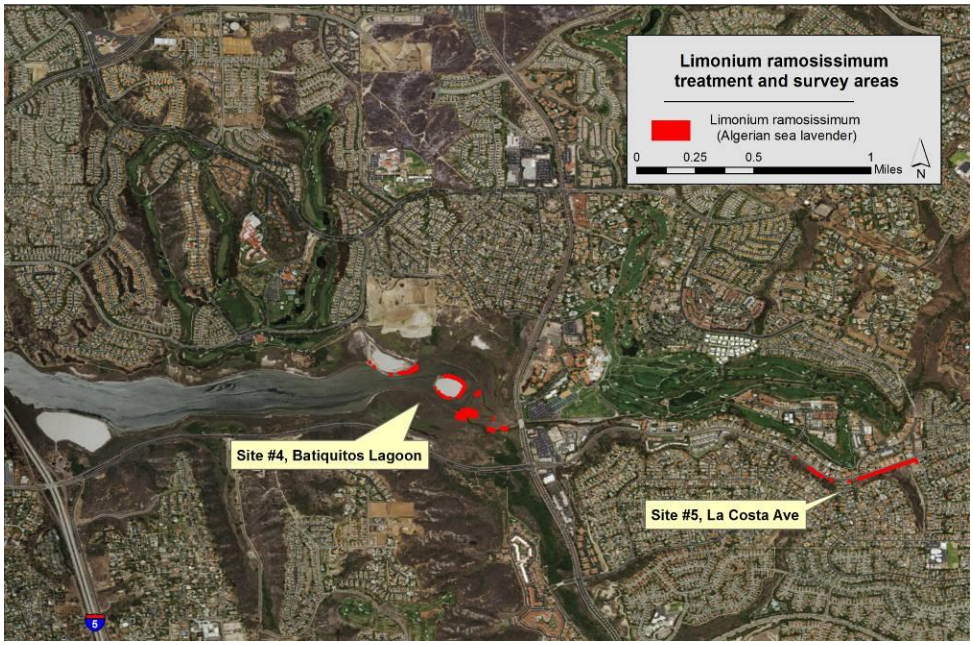
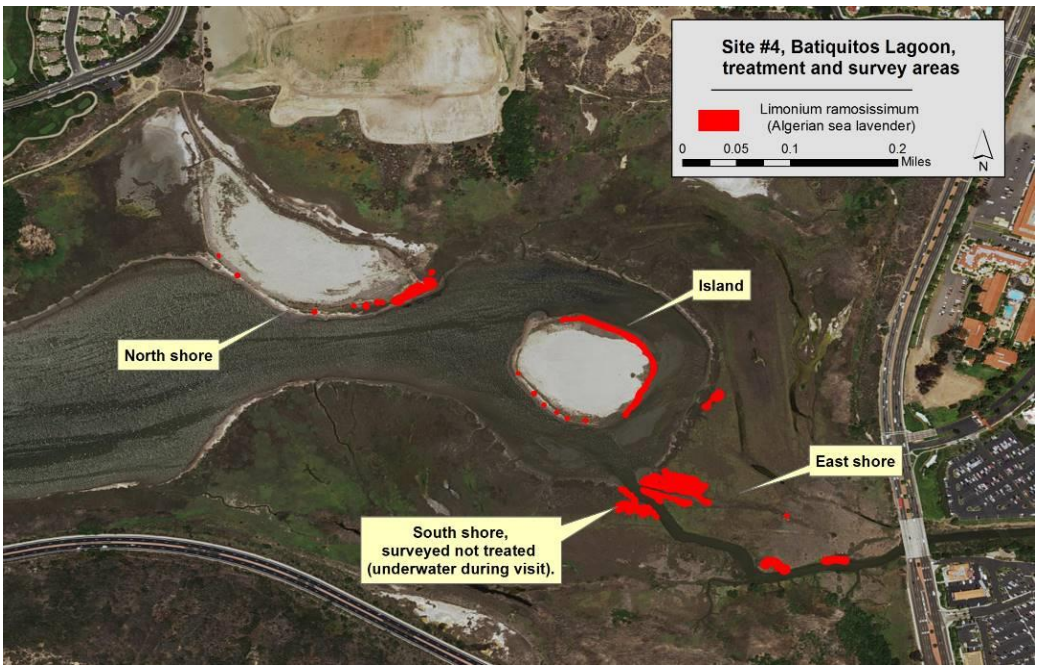


Table 5. Summary of treatments performed by AWM on *Limonium ramosissimum* (Algerian sea lavender).

Site Name	Common Name	# of Visits	Acres Surveyed	Acres Treated	Plants treated
Site #4: Batiquitos Lagoon	Algerian sea lavender	1	10	1.2	3,500
Site #5: La Costa Ave	Algerian sea lavender	1	1	0.3	165

***Limonium ramosissimum*, Algerian sea lavender: Site #4 Batiquitos Lagoon**



This site required coordinating with California Department of Fish & Wildlife who provided boat access. Island area: Scattered mature plants and plants in water were pulled, bagged, and disposed of in a landfill, plants in patches were foliar sprayed. A few plants were too deeply under water to pull, these will be pulled or treated at a later date. The Island can only be reached during high tides due to mud flats surrounding the island. South shore: patches of plants above water were foliar sprayed, most plants were below water, these will be treated at a later date. Crew of three individuals worked on 12-14-16. East and north shores were treated by foliar spraying plants. Crew of two worked on 12-15-16 and 12-19-16. The north and east shores are nearly controlled (>90% of plants killed). The island and south shore were initial treatments and there were areas under water that could not be treated, so additional work is needed in these areas.

***Limonium ramosissimum*, Algerian sea lavender: Site #5 La Costa**

Yellow: areas surveyed; Red: areas treated

Plants were foliar sprayed. A crew of two worked on 12-1-16. This site is nearly fully controlled (99% control).

***Retama monosperma* (Bridal broom):**

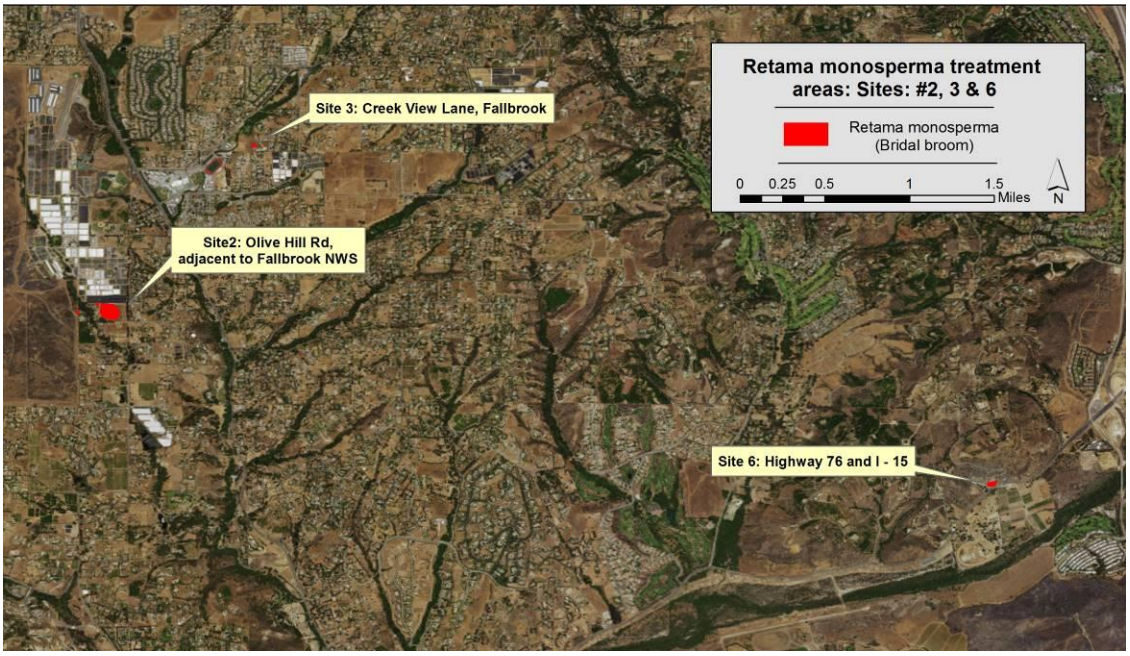


Table 6. Summary of treatments performed by AWM on *Retama monosperma* (Bridal broom).

Site Name	Common Name	# of Visits	Acres Surveyed	Acres Treated	Plants treated
Site #2: Olive Hill Rd, Fallbrook	Bridal broom	1	6.4	2.0	100 re-sprouts 4,500 seedling
Site #3: Creekview Lane, Fallbrook	Bridal broom	1	3.1	0.2	10 re-sprouts 70 seedlings
Site #6: Highway 76 and I-15	Bridal broom	1			No seedlings

***Retama monosperma* (Bridal broom): Site #2 Olive Hill Rd**

Yellow: areas surveyed; Red: areas treated

4,500 Seedlings and 100 re-sprouting plants were treated by a two person crew on 11-22-16. Red areas were treated, yellow areas were surveyed. There has been a substantial reduction in cover (>99%), but the seed bank is large and persistent for broom species. Multiple years of control and monitoring of treatment site will be required to achieve eradication.

***Retama monosperma* (Bridal broom): Site #3 Creekview Lane**

Yellow: areas surveyed; Red: areas treated

70 seedlings and 10 re-sprouting plants were treated by a two person crew on 12-1-16. Red areas were treated, yellow areas were surveyed. There has been a substantial reduction in cover (>99%), but the seed bank is large and persistent for broom species. Multiple years of control and monitoring of treatment site will be required to achieve eradication.

***Retama monosperma* (Bridal broom): Site #6 Highway 76 and I -15**

The site was visited on 11-22-16, no seedlings or re-sprouts were observed.

TASK 4 – AWM: Invasive Plant Level 3 Management.

Level of Effort: (<20%) of overall contract

- No charges during this quarter.

TASK 5 – Coordinator: Tracking and Updating Invasive Species for Priority Removal.

Level of Effort: (5%) of overall contract

- The San Diego County Weed Management Area (SDWMA) steering committee met on 12-14-16. University of California Cooperative Extension Advisor Chris McDonald led the meeting. The County of San Diego AWM is supporting the SDWMA by providing meeting space and web site support. EDRR materials are available at the web site (SDWMA.org). An EDRR project update was given at the meeting by Jason Giessow.
- Volutaria (*Volutaria tubuliflora*) has now been identified at a new location in San Diego County. This new location is located in the Chula Vista, Rice Canyon area. This plant occurs in Anza Borrego (Borrego Springs) and Orange County (Newport Bay). Coordination with these regions on mapping, ID and treatment approaches occurred.
- San Diego Plant Assessment Forms (PAFs) are being prepared for up to twelve EDRR species (see below), so that the Invasives Strategic Plan can be updated to include them. The literature review was completed and assessment will start next quarter (Table 7).
- Plant ID sheets are also being prepared for nine species (Table 8).

Table 7: Species that are being reviewed for San Diego Plant Assessment Form (SDPAF).

Scientific name	Common name	Notes	Existing Cal-IPC PAF
Arctotheca calendula	Capeweed	Uplands (shrub & grass), dunes	**Yes**
Chrysanthemoides monilifera	Bitou bush	Uplands (shrub & grass), dunes	**No**
Enchylaena tomentosa	Ruby saltbush	Uplands (shrub & grass)	**No**
Euphorbia virgata	Leafy spurge	Uplands, riparian	**Yes**
Heliotropium supinum	-	Vernal pools	**No**
Limonium duriusculum	European sea lavender	Wetlands (salt & fresh) & uplands	**No**
Limonium ramosissimum	Algerian sea lavender	Wetlands (salt & fresh) & uplands	**Yes**
Myoporum acuminatum	Acuminatum	Uplands (shrub & grass), woodlands (Torrey pine)	**No**
Senecio quadrdentatus	Cotton burnweed	Grasslands	**No**
Sesbania punicea	Rattlebox	Wetlands (fresh)	**Yes**
Stipa (Nassella) tenuissima	Mexican feather grass	Uplands (shrub & grass)	**No**
Volutaria tubuliflora	Volutaria	Uplands (shrub & grass)	**No**

Table 8. Primary EDRR targets for program with status of SDPAF and weed ID sheets noted.

Scientific name	Common name	Growth form	Habitat	SD ID Sheet
Aegilops triuncialis	Barbed goat grass	Annual grass	Grassland	Started
Ageratina adenophora	Eupatory	Perennial forb	Riparian	Yes
Carrichtera annua	Ward's weed	Annual forb	Uplands (shrub & grass)	Started
Centaurea solstitialis	Yellow star thistle	Annual forb	Grassland	Started
Elymus caput-medusae	Medusahead	Annual grass	Grassland	Started
Euphorbia terracina	Carnation spurge	Annual forb	Uplands	Started
Euphorbia virgata	Leafy spurge	Annual forb	Uplands	Started
Genista monspessulana	French broom	Perennial shrub	Riparian or uplands	Yes
Hypericum canariense	Canary Island St. John's wort	Perennial shrub	Shrublands	Started
Limonium duriusculum	European sea lavender	Perennial forb	Wetlands (salt & fresh) & uplands	Yes
Limonium ramosissimum	Algerian sea lavender	Perennial forb	Wetlands (salt & fresh) & uplands	Yes
Lythrum salicaria	Purple loosestrife	Perennial forb	Wetlands (fresh)	Yes
Retama monosperma	Bridal broom	Perennial shrub	Uplands (shrub & grass)	Started
Sesbania punicea	Rattlebox	Perennial shrub	Wetlands (fresh)	Yes
Volutaria tubuliflora	Volutaria sp.	Annual forb	Uplands (shrub & grass)	Started

Work Anticipated for 3rd Quarter Period, January 1, 2017 thru March 31, 2017 pending approval of 2nd amendment. 1st amendment expires on February 28, 2017:

Task 1 – Invasive Plant Species Coordinator:

- Update work plan if needed.
- Coordinate ROE work with AWM, update database.
- Monitor and coordinate with AWM during implementation.

- Survey and map sites as needed.
- Prepare quarterly and annual report.
- Submit GIS data for target EDRR species.

Task 2 – AWM: Invasive Plant Level 1 Management.

- Survey, map, and treat any reported sightings of target Level 1 plants.
- Supervision of staff, provide training, guidance, and preparation for field work.
- Collect GIS points of targeted weeds, if found.

Task 3 – AWM: Invasive Plant Level 2 Management.

- Re-treatment of sites.
- Supervision of staff, provide training, guidance, and preparation for field work.
- Coordinate and finalize tracking methods for work completed.
- Initiate and continue work outlined in work plan.
- Obtain signed ROEs.
- Collect GIS points of targeted weeds.

Task 4 – AWM: Invasive Plant Level 3 Management.

- No work planned.

Task 5 – Coordinator: Tracking and Updating Invasive Species for Priority Removal.

- Continue coordination with Department of Defense, California Department of Parks and Recreation, SDWMA, California Native Plant Society - Orange County Chapter, and EDRR invasive groups.
- Continue to aggregate data and track new prospective EDRR target species.
- Develop 12 San Diego PAFs for EDRR species (Table 7), so the IPSP can be updated to include them.
- Develop nine EDRR identification sheets for priority species for land managers and regional biologists. (Table 8).