

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

**Strategic Removal of Invasive Weed Species
3rd Quarter Report - FY 2018-19: Report #17 for Project**

January 1st, 2019 – March 31st, 2019

Project: County of San Diego, Department of Agriculture, Weights & Measures (AWM),
Integrated Pest Control Program (IPC) –
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:

This quarterly report covers work funded through the SANDAG MOU, which allowed work to occur from January 1st to April 31st 2019.

TASK 1 – Invasive Plant Species Coordinator:

Level of Effort: (25%) of overall contract

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

Coordination with property owners, land managers and AWM crew occurred throughout the quarter. A new Ward's weed site at Crest Reserve, Del Mar required one new ROE agreement with a private residence. The rest of the site is part of Crest Reserve, part of San Diego City Parks (an active ROE is on file).

The coordinator worked on four species at six field sites:

Work tasks included checking field crews, assessing treatment success, and mapping and surveying target plants. Species and sites are presented under task 2 and 3.

Report preparation:

Quarterly report for Q3 FY 2018-19 was prepared. Summary report for the second contract was completed for field seasons 2017 and 2018.

Mapping and occurrence data:

Spatial data was updated (treatment areas and treatment status) for the entire second contract. This data set will be submitted to San Diego Management & Monitoring Program staff.

Work plan:

Work plan was prepared for the third contract cycle covering 2019 and 2020 fiscal years.

TASK 2 – AWM: Invasive Plant Level 1 Management

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

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

Crews surveyed and treated, two invasive weed species (carnation spurge and desert knapweed) at four sites this quarter. Maps for sites now show treated areas (red polygons) and surveyed areas as white lines which track pathways used by crews to survey and control plants. AWM IPC carried out optimal plant control, either hand pulling or using 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 IPC 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 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
<i>Euphorbia terracina</i>	Carnation spurge	3	3.2	1.3	9,750
<i>Volutaria tubliflora</i>	Desert knapweed	1	6.5	1.0	1,545

***Euphorbia terracina* (Carnation spurge):**

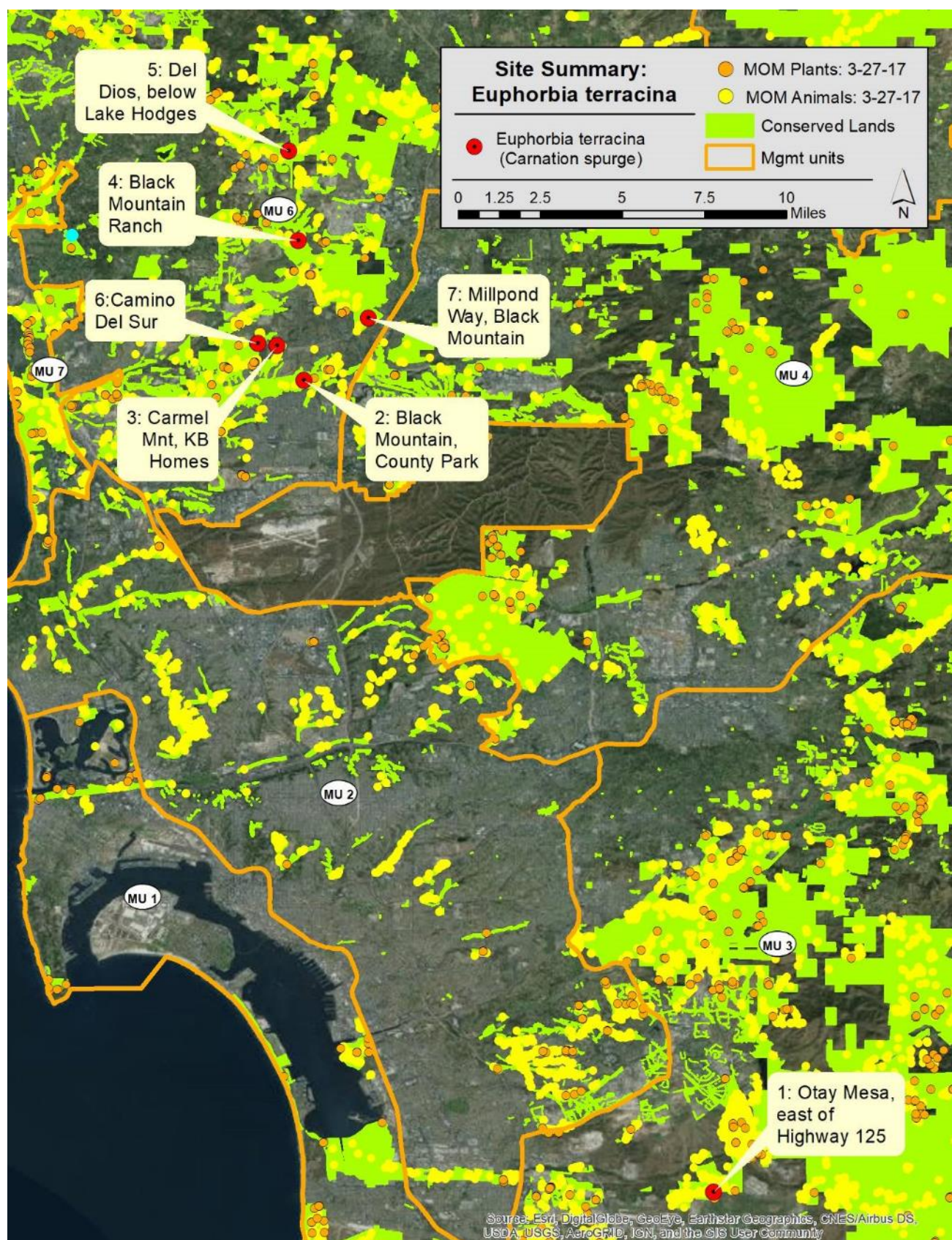


Table 2. Summary of treatments performed by AWM on *Euphorbia terracina* (Carnation spurge).

Work Site	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants Controlled
Site #3, Carmel Mnt	Carnation spurge	1	2.8	1.0	1,430

***Euphorbia terracina* (Carnation spurge): Site #3, Carmel Mnt.**

Many seedlings were foliar treated with glyphosate. A crew of two individuals worked two days on 2-25 and 3-12-2019. There has been a reduction in cover (>80%), but there is an extensive seedbank that continues to generate new seedlings each spring.



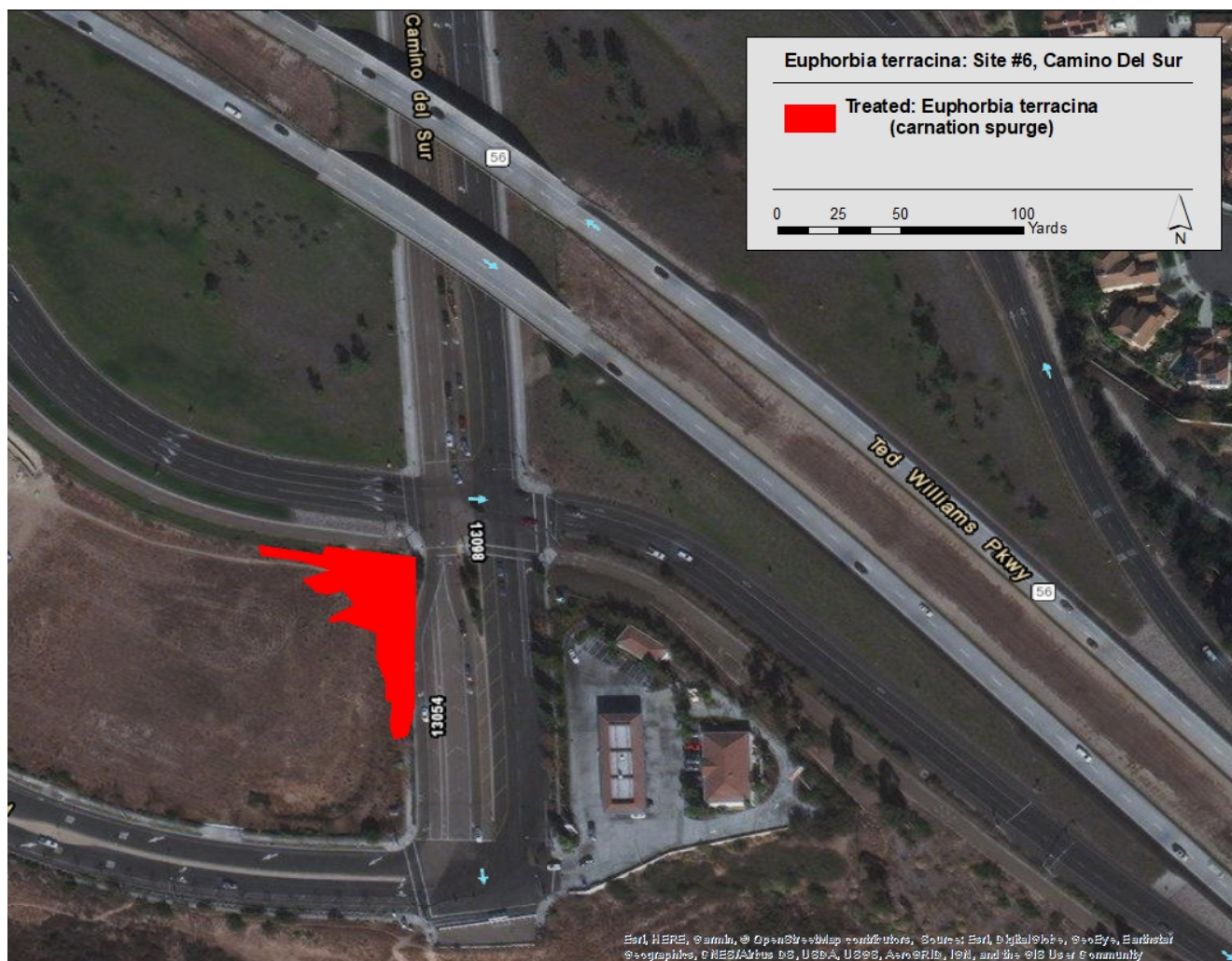
Site #3: Treatments for Carnation spurge plants.

Table 3. Summary of treatments performed by AWM on *Euphorbia terracina* (Carnation spurge).

Work Site	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants Controlled
Site #6, Camino Del Sur	Carnation spurge	1	0.4	0.3	8,350

***Euphorbia terracina* (Carnation spurge): Site #6, Camino Del Sur**

Many seedlings were hand pulled. A crew of two individuals worked seven days on March 1,4-8,11-2019. There has been some reduction in cover (>50%), but there is an extensive seedbank that continues to generate new seedlings each spring, particularly this year with heavy rains.



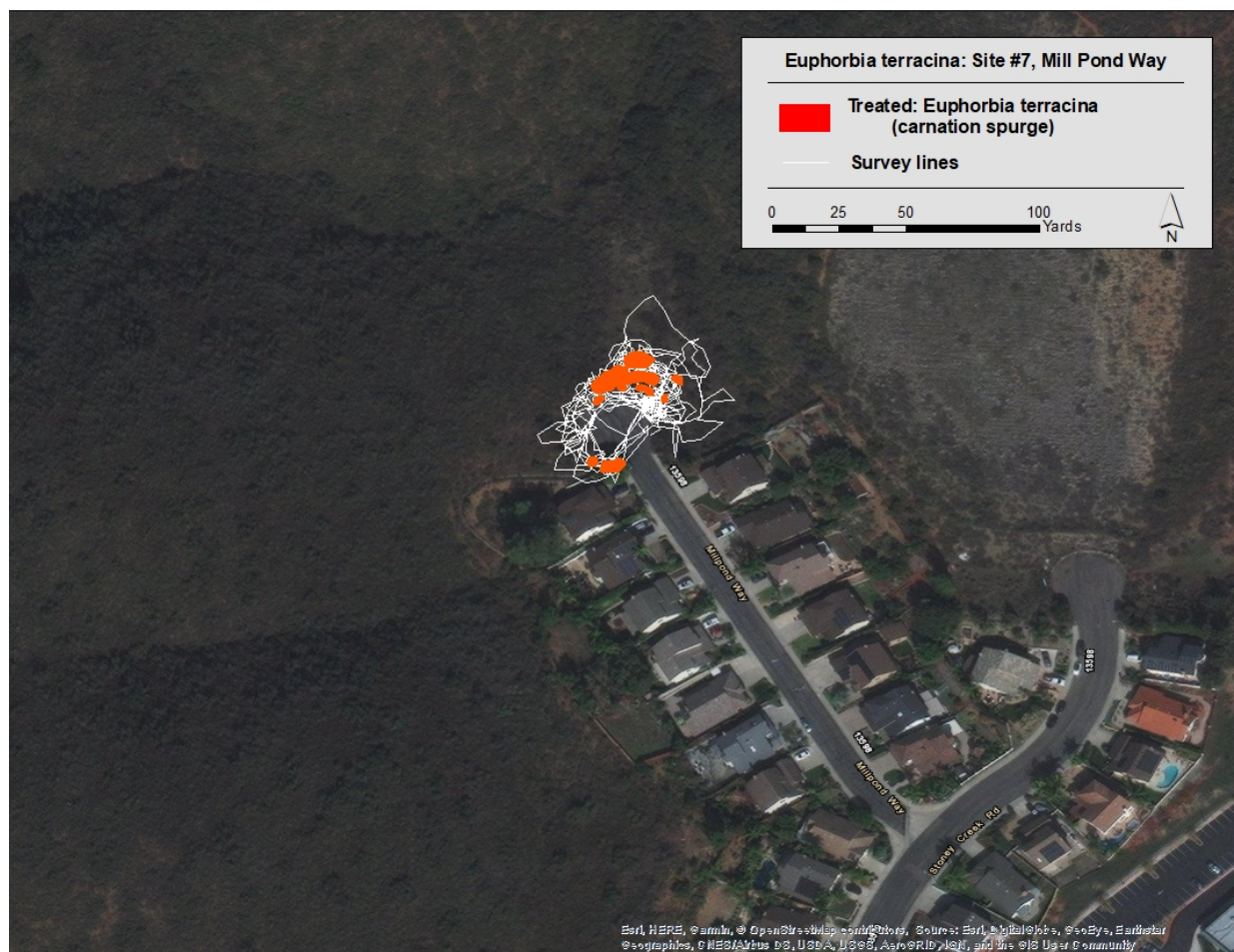
Site #6: Treatments for Carnation spurge plants.

Table 4. Summary of treatments performed by AWM on *Euphorbia terracina* (Carnation spurge).

Work Site	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants Controlled
Site #7, Mill Pond Way	Carnation spurge	1	0.8	0.3	450

***Euphorbia terracina* (Carnation spurge): Site #7 Mill Pond Way**

Seedlings were foliar treated. A crew of two individuals worked one day 3-12-2019. There has been significant reduction in cover (>80%), but there is an extensive seedbank that continues to generate new seedlings each spring.



Site #7: Treatments for Carnation spurge plants.

Treated site: 1

Site Summary:
Volutaria tubuliflora

- MOM Plants: 3-27-17
- MOM Animals: 3-27-17
- Conserved Lands
- Mgmt units

Volutaria tubuliflora
(Desert knapweed)

0 1.25 2.5 5 7.5 10 Miles

N

MU 7 MU 6 MU 4 MU 3 MU 2 MU 1

2: Point Loma, DoD

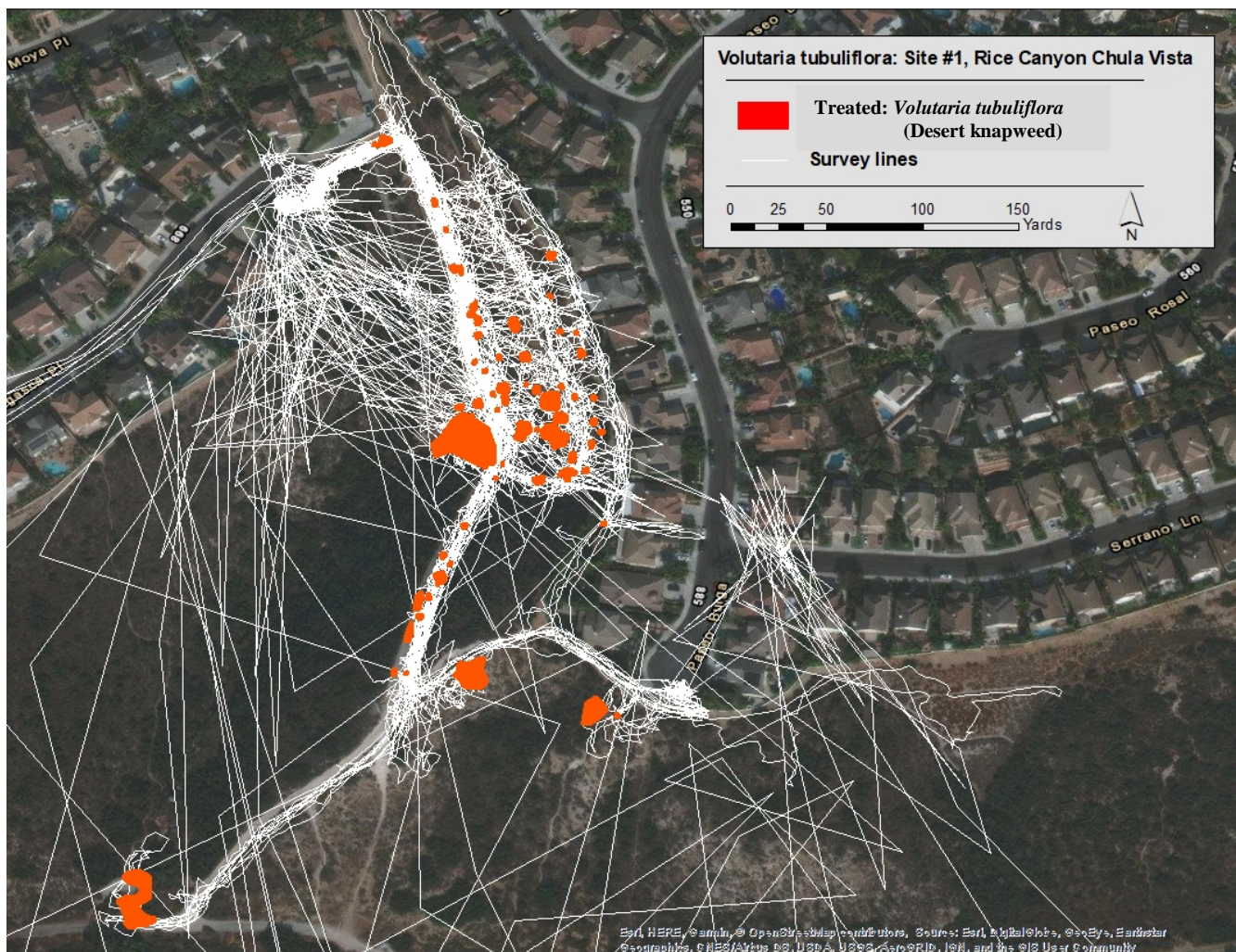
1: Rice Canyon, Chula Vista

Sources: Earl, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus photo, USDA, AeroGRID, IGN, and the GIS User Community

Table 5. Summary of treatments performed by AWM on *Volutaria tubuliflora* (Desert knapweed).

Site Name	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants treated
Site #1: Rice Canyon, Chula Vista	Desert knapweed	2	6.5	1.0	1,545

This is the third year of treating this site and the third year of applying pre-emergent. Rains this year were early and heavy. Pre-emergent (Milestone) was applied in early winter at selected areas by a crew of two individuals on three days 1-22,23,25-2019. There were 525 plants at basal stage at this time (treated, as Milestone also is a post emergent). In March the site was re-treated by crews that hand pulled mature plants. Crews pulled 1,020 plants scattered over the site over three days of work 3-14,18,19-2019. Although plant numbers are down significantly, pre-emergent should be applied next winter over the entire site to further reduce seed germination. Scattered plants are still being missed, and/or the seedbank is still being expressed after the wet winter.



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).

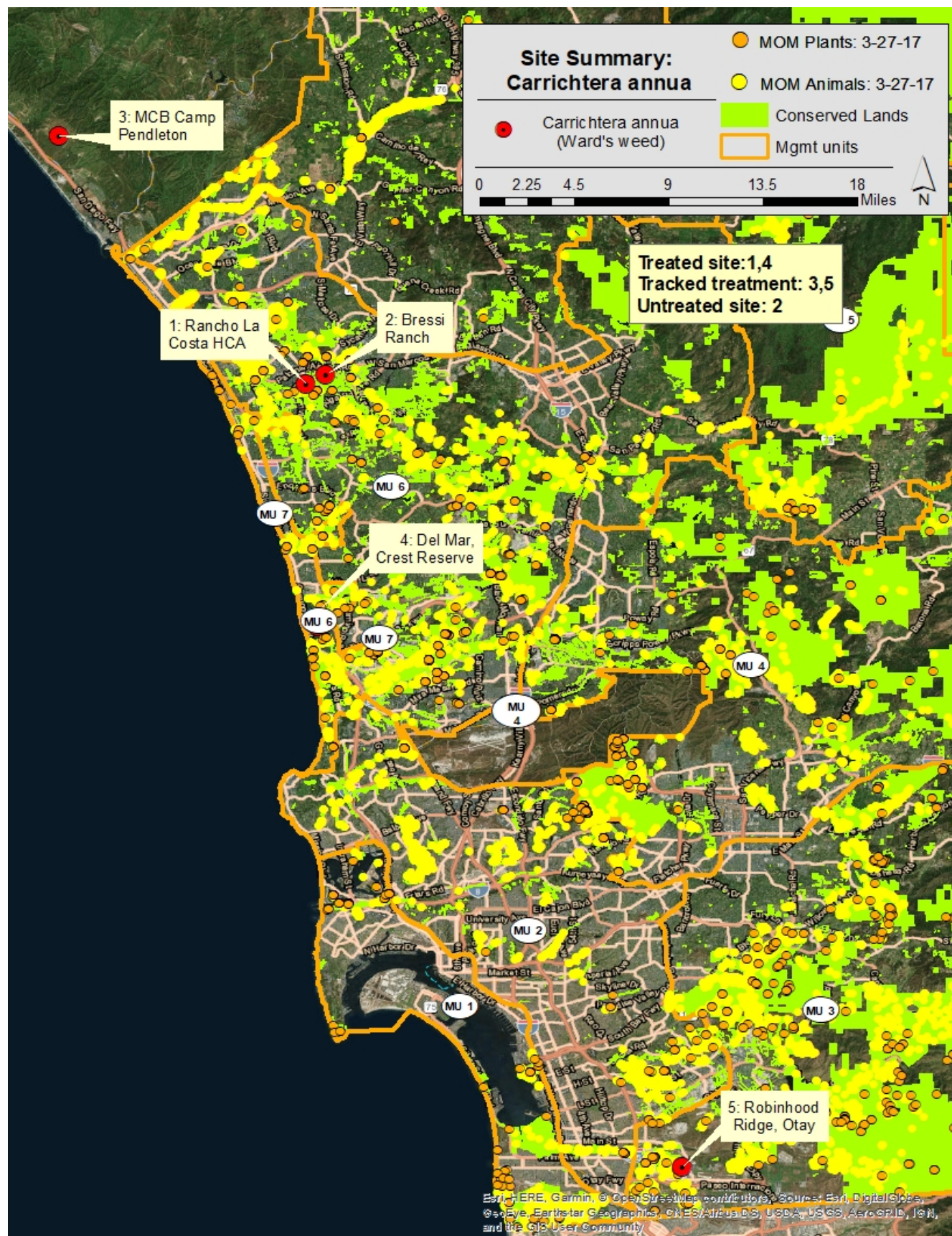
Crews surveyed and treated two invasive weed species (Ward's weed and Spotted knapweed) at three sites this quarter. AWM IPC made optimal pesticide applications, protected the natural environment by preventing off-site movement of pesticides, and utilized BMPs that prevented unintentional discharges to surface waters. For each site, AWM IPC 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 6. 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
<i>Carrichtera annua</i>	Ward's weed	2	2.5	2.5	Pre-emergent
<i>Centaurea stoebe ssp. micranthos</i>	Spotted knapweed	1	1.5	1.5	Pre-emergent

***Carrichtera annua*, Ward's weed:**

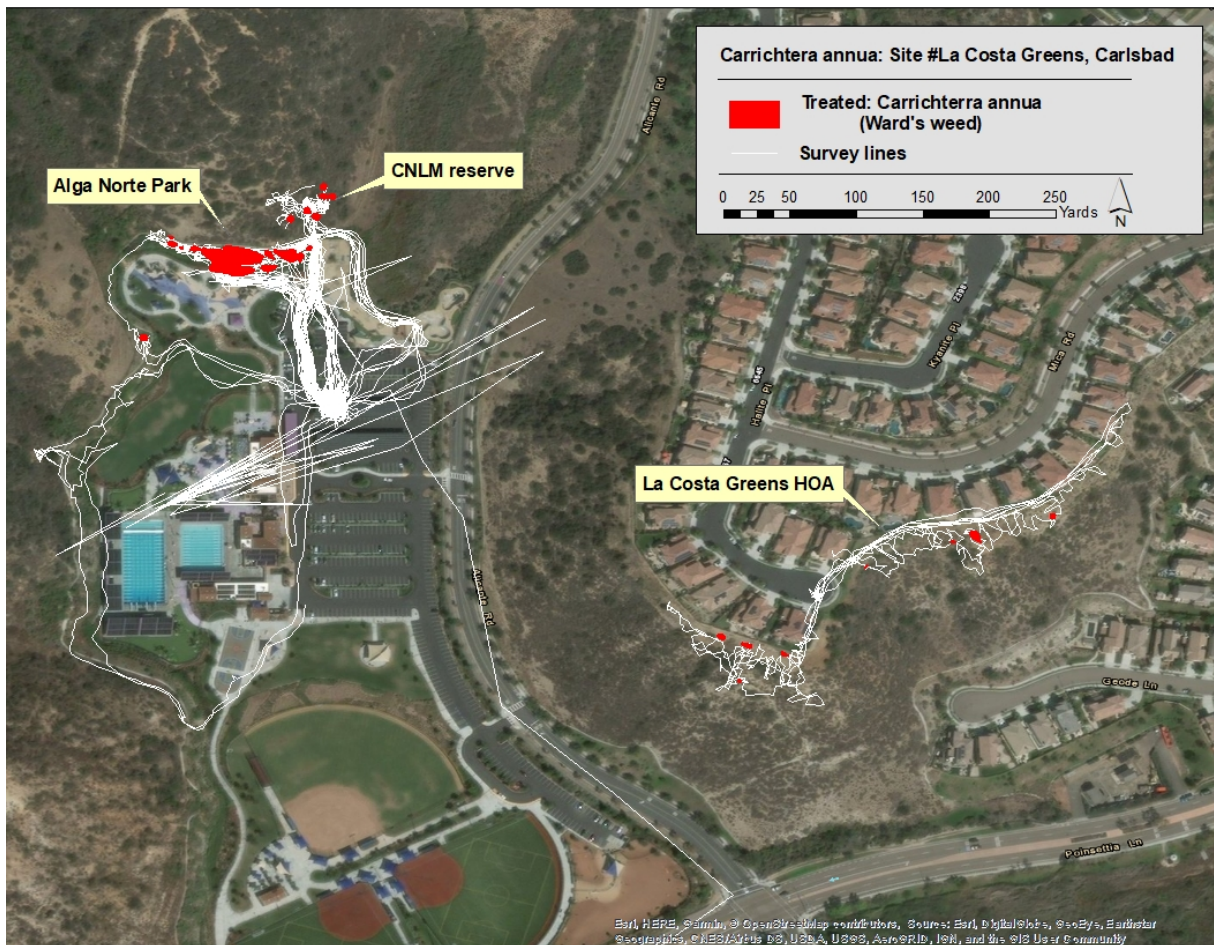


Carrichtera annua, Ward's weed, Site #1 Rancho La Costa Greens

Table 7. Summary of treatments performed by AWM on *Carrichtera annua*, Ward's Weed.

Site Name	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants treated
Site #1 La Costa Greens, Carlsbad	Wards weed	1	4.3	1.4	5,110

Three sub areas were worked on within the La Costa Greens area. On Center for Natural Land Management (CNLM) property: two days were spent manually removing 1,300 plants on 2-11,12-2019. On City of Carlsbad's Alga Norte Park, five days were spent hand removing 3,780 plants. On La Costa Greens HOA one day was spent spot treating 130 plants on 2-8-2019. The La Costa Greens has very few seedlings, demonstrating the effectiveness of Gallery SC as a pre-emergent. The CNLM area has scattered patches of plants. The County AWM work was a small part of the control work that occurred there, more was done by CNLM. CNLM plans on applying Gallery SC at this site to control Ward's weed winter 2019/2020. Crews were not able to apply Gallery SC in Alga Norte Park, as the herbicide cannot be staged or used in Alga Norte Park. Alga Norte Park has persistent seedlings sprouting in landscaped areas. It is challenging pulling all plants. City of Carlsbad park staff are using an 'organic' herbicide (Scythe) to control seedlings, following the County AWM hand removal.



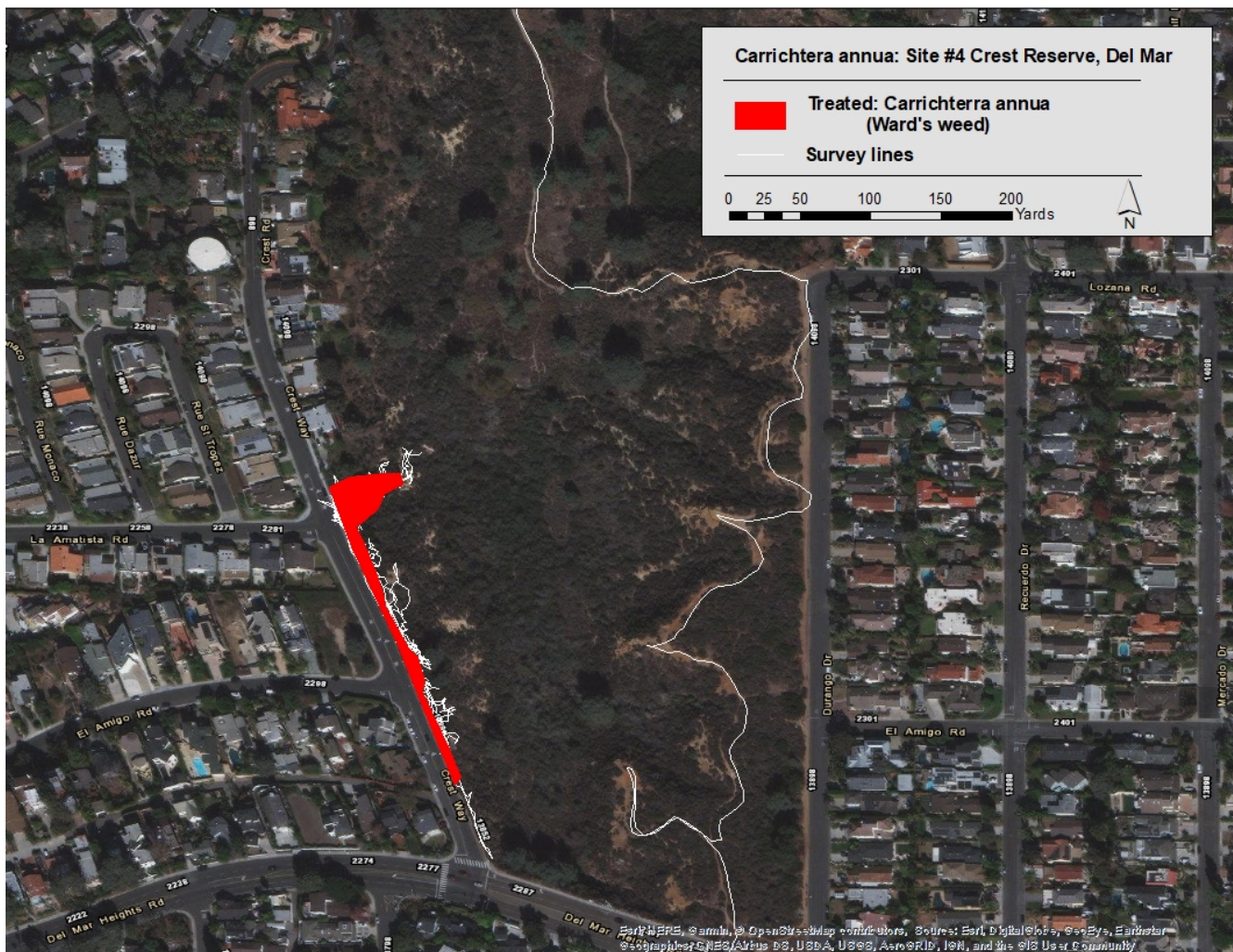
Site #1: Treatments for Ward's weed plants (treatment red).

Carrichtera annua, Ward's weed, Site #1 Rancho La Costa Greens

Table 8. Summary of treatments performed by AWM on *Carrichtera annua*, Ward's weed.

Site Name	Common Name	# of Work Cycles	Acres Surveyed	Acres Treated	Plants treated
Site #4: Crest Reserve, Del Mar	Wards weed	1	10	0.4	6,200

Ward's weed was reported at this site via iNaturalist. After confirmation and ROE completion the site was treated with a post emergent, glyphosate, to control mature plants and seedlings. A crew of two spent three days treating the site 2-26,27,28-2019. The site will be treated with Gallery SC pre-emergent in winter 2019/20. Follow-up treatments will control any seedlings that sprout.



Site #4: Treatments for Ward's weed plants (treatment red).

***Centaurea stoebe*, Spotted knapweed:**

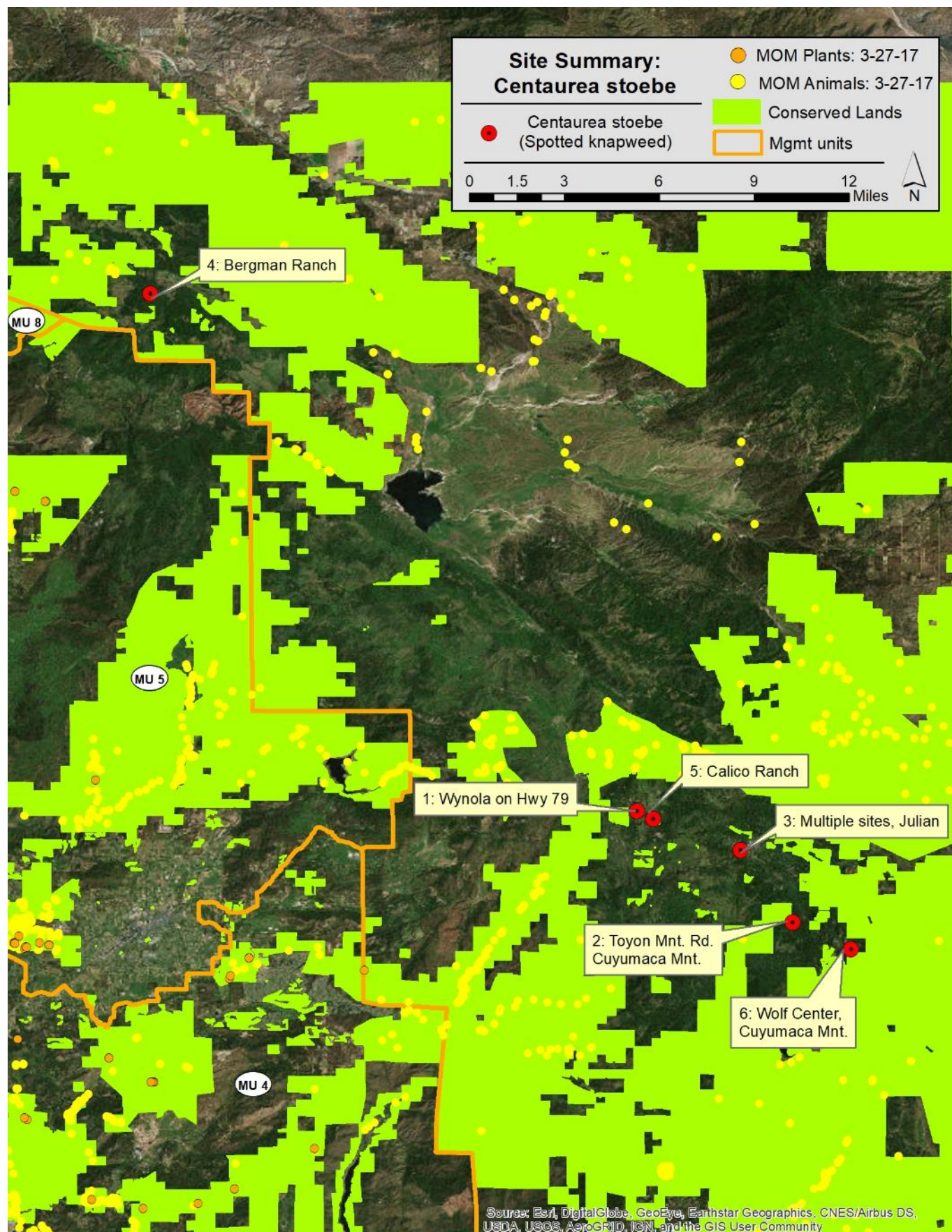
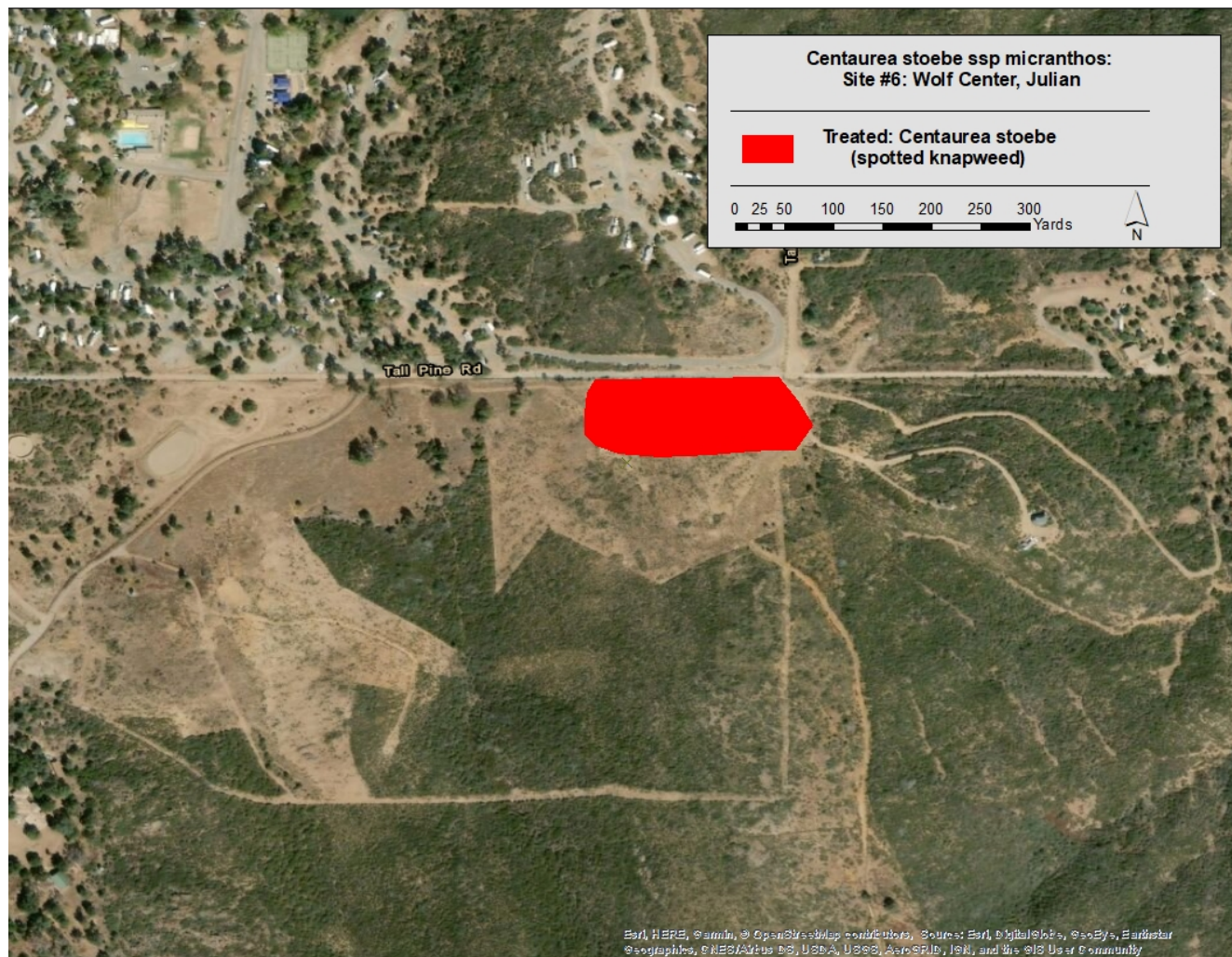


Table 9. Summary of treatments performed by AWM on *Centaurea stoebe ssp micranthos* (Spotted knapweed).

Site Name	Common Name	# of Visits	Acres Surveyed	Acres Treated	Plants treated
Site #6, Wolf Center	Spotted knapweed	1	1.5	1.5	-

The site was treated by a crew of two over three days, on 1-28,29 and 2-1-2019. Milestone pre-emergent was applied to suppress the seedbank. This EDRR treatment work was funded by California Department of Food and Agriculture(CDFA), but is reported here as the species is a Level 2 EDRR target.



Site #6: Treatments for Spotted knap weed plants (treatment red).

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

- Co-ordination with County AWM EDRR program to apply for CDFA WMA funding. Three proposals were submitted for work on four EDRR targets: barbed goat grass (in Cuyamaca), Ward's weed (in Carlsbad), Spotted knapweed (in Palomar/Julian), and Desert knapweed (in Borrego springs). All three proposals were selected for funding by CDFA.. Contracts have a start date of June 30, 2019. Work will occur from June 30,2019 through March 31,2021.
- Coordination with the 'Ward's weed control team' in Carlsbad at Bressi Ranch continued. Significant progress has been made outlining a strategy to initiate Ward's weed control at Bressi Ranch, the largest invaded site in North America. Carlsbad, San Elijo Lagoon Conservancy (SELC), CNLM, City of Carlsbad, and County AWM are the primary team members. County AWM has secured funding to start work, the City is pursuing \$100k, and SELC will direct \$100k in current Wildlife Conservation Board funding to the site. Additional funding may also be sought by SELC (about \$200k). The long term goal is to eradicate Ward's weed from the site.
- A Ward's weed meeting was held at SDMMMP offices to strategize a response to the two new populations that were discovered in spring 2019 at Del Mar Crest Reserve and Robinhood Hollow, in Otay Mesa (City of SD). Both sites were treated with post emergent herbicide (County AWM and City SD respectively). Handouts were created and widely distributed to land managers. To date, no additional reports have occurred.
- Coordination for controlling Desert knapweed in Southern CA has occurred. CDFA Noxious Weed Funding 2019 was secured to continue baseline work along roads and selected properties. A larger funding source is needed for the Borrego Springs population. The population is expanding and being detected at new locations, both along the edge of the original population, as well as new outliers further away (Salton Sea). The species is unfortunately moving from an eradication target to a containment program. Western San Diego should continue to control all sightings of the plant, as there have still only been two reports to date: Point Loma (eradicated) and Rice Canyon (under treatment).
- An update to the San Diego Weed Management Area stakeholders occurred at their quarterly meeting. An update on the EDRR program will be given at the annual meeting on June 6th, 2019 where over 100 regional managers typically attend.
- Outreach materials were updated to include three additional species: *Enchylaena tomentosa* (Ruby salt bush), *Myoporum acuminatum* (Waterbush) and *Centarea stoebe ssp micranthos* (Spotted knapweed). All nineteen EDRR targets and species being assessed now have ID handouts (table 1).

- Nine San Diego Plant Assessment Forms were prepared (table 2). This information was used to update the strategic plan: 'Management Priorities for Invasive Non-native Plants, A Strategy for Regional Implementation, San Diego County, CA'.
- Updates to the strategic plan: 'Management Priorities for Invasive Non-native Plants, A Strategy for Regional Implementation, San Diego County, CA' were initiated.

Table 1: EDRR targets and status of ID sheets/handouts. All species now have handouts to aid land management and monitoring personnel.

	Scientific name	Common name	Growth form	Habitat	Status	Populations (eradicated)	ID Sheet
1	<i>Ageratina adenophora</i>	Eupatory	Perennial forb	Riparian	Active EDRR target	4	Yes
2	<i>Aegilops triuncialis</i>	Barbed goat grass	Annual grass	Grasslands	Active EDRR target	2	Yes
3	<i>Carrichtera annua</i>	Ward's weed	Annual forb	Uplands	Active EDRR target	5	Yes
4	<i>Centaurea solstitialis</i>	Yellow star thistle	Annual forb	Grasslands	Active EDRR target	8 (12)	Yes
5	<i>Centaurea stoebe</i>	Spotted knapweed	Annual forb	Uplands	Active EDRR target	3 (3)	Yes
6	<i>Cytisus scoparius</i>	Scotch broom	Perennial shrub	Uplands	Eradicated: monitoring	(1)	Yes
7	<i>Elymus caput-medusae</i>	Medusahead	Annual grass	Grasslands	Active EDRR target	7	Yes
8	<i>Enchylaena tomentosa</i>	Ruby saltbush	Perennial sub-shrub	Uplands	Assessing	1 (1)	Yes
9	<i>Euphorbia terracina</i>	Carnation spurge	Annual forb	Uplands	Active EDRR target	6	Yes
10	<i>Euphorbia virgata</i>	Leafy spurge	Annual forb	Uplands	Active EDRR target	1 (1)	Yes
11	<i>Genista monosperma</i>	Bridal broom	Perennial shrub	Uplands	Active EDRR target	3 (1), +3 groves	Yes
12	<i>Genista monspessulana</i>	French broom	Perennial shrub	Riparian and uplands	Active EDRR target	5	Yes
13	<i>Hypericum canariense</i>	Canary Island St. John's wort	Perennial shrub	Shrublands	Active EDRR target	12	Yes
14	<i>Limonium duriusculum</i>	European sea lavender	Perennial forb	Wetlands (saline & fresh) & uplands	Active EDRR target	8+	Yes
15	<i>Limonium ramosissimum</i>	Algerian sea lavender	Perennial forb	Wetlands (saline & fresh) & uplands	Active EDRR target	16+	Yes
16	<i>Lythrum salicaria</i>	Purple loosestrife	Perennial forb	Wetlands (fresh)	Active EDRR target	2	Yes
17	<i>Myoporum acuminatum</i>	Waterbush	Perennial shrub	Riparian and uplands	Assessing	2	Yes
18	<i>Sesbania punicea</i>	Rattlebox	Perennial shrub	Wetlands (fresh)	Active EDRR target	1	Yes
19	<i>Volutaria tubuliflora</i>	Desert knapweed	Annual forb	Uplands	Active EDRR target	1 (1), + Borrego Springs	Yes

Table 2: New San Diego Plant Assessment Forms (SDPAFs)

Scientific name	Common name	Existing Cal-IPC PAF	Existing SDPAF	Plant Right PRE
<i>Arctotheca calendula</i>	Capeweed	Yes	No	Yes
<i>Chrysanthemoides monilifera</i>	Boneseed	Yes	No	Yes
<i>Enchylaena tomentosa</i>	Ruby saltbush	No	No	Yes
<i>Euphorbia virgata</i>	Leafy spurge	Yes	No	No
<i>Limonium duriusculum</i>	European sea lavender	Yes	No	Yes
<i>Limonium ramosissimum</i>	Algerian sea lavender	Yes	No	No
<i>Myoporum acuminatum</i>	Waterbush	No	No	Yes
<i>Sesbania punicea</i>	Rattlebox	Yes	No	No
<i>Nassella tenuissima</i>	Mexican feather grass	No	No	Yes
<i>Volutaria tubuliflora</i>	Desert knapweed	Yes	No	Yes

Work Anticipated for 4th Quarter Period, April 1st – June 30th 2019:

Task 1 – Invasive Plant Species Coordinator:

- Coordinate ROE work with AWM, update database.
- Monitor and coordinate with AWM during implementation.
- Survey and map sites as needed.
- Prepare quarterly report and second work cycle report.

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 treatment polygons and survey routes (lines) of targeted weeds.

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 treatment polygons and survey routes (lines) 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, San Diego Weed Management Area and California Native Plant Society, Orange County Chapter EDRR invasive group.
- Present on EDRR program at June 6th 2019 Annual San Diego Weed Management Area meeting.
- Continue to aggregate data and track new prospective EDRR target species.
- Attend SDMMMP land manager, working group and other meetings as requested.