

**NATURE RESERVE OF ORANGE COUNTY  
EXOTIC PLANT CONTROL PROGRAM  
2005**

**Prepared for:**

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## INTRODUCTION

2005 was the 9<sup>th</sup> year of exotic plant control implemented by the Nature Reserve of Orange County (NROC) in the NCCP coastal sub-region. As in previous years, target weeds included artichoke thistle (*Cynara cardunculus*), veldt grass (*Ehrharta calycina*) Italian thistle (*Carduus pycnocephalus*) and garland chrysanthemum (*Chrysanthemum coronarium*). Exotic plant control treatment areas were prioritized in coordination with NROC and The Nature Conservancy (TNC).

Treatment locations for spring 2005 included Laguna Coast Wilderness Park (Bommer Emerald and Moro ridges, and Big Bend), Aliso & Wood Canyons Wilderness Park (A&WCWP), Buck Gully, University of California Irvine Ecological Reserve (UCI), the City of Irvine Open Space Preserve (Bommer Ridge, Hogback Ridge) and Crystal Cove State Park (CCSP).

NROC allocated a total of \$250,000 for the eradication of exotics in spring 2005; approximately \$175,000 was used for treatment of artichoke thistle, \$5,000 for treatment of garland chrysanthemum and \$70,000 for veldt grass. Treatment began on March 17 and lasted through May 25 for a total of 49 days; 16 days treating veldt grass, 32 days treating artichoke, and one day treating garland chrysanthemum. A total of 797 acres of artichoke thistle and 24 acres of garland chrysanthemum were treated with the herbicides ranger-pro/with Telar and/or rodeo-pro with Telar. Approximately 198 acres of veldt grass were treated with Envoy®. Treatment varied at each site depending on density of exotics, but the total area treated in spring 2005 was approximately 1,019 acres.

NROC contracted Nature's Image to do the weed control and Harmsworth Associates to direct and monitor control activities. Harmsworth Associates biologists coordinated all exotic plant control activities with Natures Image, NROC managers and staff, served as biological monitors, conducted sensitive animal and plant surveys prior to treatment, assessed road conditions and treatment areas, met daily with crew to direct and oversee treatment, mapped treatment areas, and documented observations in all treatment areas.

## METHODS

Working with The Nature Conservancy, site assessments were conducted to determine site schedule based on highest priority areas. Site access was a determining factor since many of the roads within NROC were washed out due to record rainfall in winter and spring 2004/2005. High rainfall and unpredictable weather led to a late start and consistently delayed the schedule in March and early April. Access roads in all Reserves are impassible for 48 hours following a rain of greater than one inch which further delayed treatment.

Treated areas were divided into polygons defined by a work day and/or topography, fence lines or road boundaries. Percent cover, amount and type of chemical used, total acreage

treated, crew size, and total hours were recorded for each day and for each polygon. Photographs were taken of each polygon to assess effectiveness of treatment. A foliar spray application method was used for all herbicides; both the foliage and base of target weeds were sprayed. For maximum uptake and effectiveness of herbicides, weather conditions should be sunny and dry with ambient temperatures at a minimum of 65 F with wind speed at less than five mph. Weather conditions in March and early April often did not meet these criteria; heavy fog, overcast skies, and winds greater than five mph were characteristic of this spring. Treatment was called off for the day if skies were overcast and there was greater than 50% chance of showers. Wind speed exceeded five mph on many sunny days in March and April. Spray crews were relocated to canyon bottoms and sheltered side slopes when wind exceeded five mph; if these areas were too windy for foliar application, treatment was called off.

Veldt grass was treated with the annual/perennial grass selective, post emergent herbicide Envoy®. Envoy® was used on a test plot at Big Bend in Laguna Coast Wilderness Park in 2004 and proved to be more effective at killing veldt grass than Fusillade. 2005 was the first year Envoy® was used on a large scale to control veldt grass. Envoy® was applied at a rate of one gallon per acre (1%).

Artichoke thistle and garland chrysanthemum were both treated with the non-selective glyphosphate Ranger-Pro and/or Rodeo at a rate of three gallons per acre (3%). Rodeo was used within one hundred feet of streams or waterways. Telar was applied with Ranger-Pro and Rodeo at all sites excluding UCI at a rate of 3oz/acre (.025%).

### **SENSITIVE PLANT AND ANIMAL SURVEYS**

Surveys were conducted for California gnatcatcher (*Polioptila californica californica*) and cactus wren (*Campylorhynchus brunneicapillus*) prior to treatment at all locations where Coastal Sage Scrub (CSS) was present. California gnatcatchers were observed at A&WCWP, UCI and LCWP; cactus wrens were observed at UCI. No nests were observed; all gnatcatchers and cactus wrens observed were located away from the treatment areas and were not impacted by weed control activities.

Rare plant surveys were conducted at each location prior to treatment. Rare and sensitive plants were roped off with bright colored flagging and avoided by work crews. Needlegrass grassland was also avoided if the area contained no exotics. Crews were reminded daily to minimize impacts to needlegrass grassland and CSS by staying on one footpath.

### **TREATMENT LOCATIONS**

Treatment locations for spring 2005 included Laguna Coast Wilderness Park (LCWP), Aliso & Wood Canyons Wilderness Park (A&WCWP), Buck Gully, University of California Irvine Ecological Reserve (UCI), the City of Irvine Open Space Preserve

(Bommer Ridge, Hogback Ridge) and Crystal Cove State Park (CCSP) (Tables 1 and 2; Appendices 1-5).

#### Laguna Coast Wilderness Park

Veldt grass was treated in LCWP along Bommer Ridge Road, Emerald Canyon Ridge Road, Moro Ridge Road, Moro Canyon Ridge Road, Big Bend trail, and below the water tower east of Laguna Canyon Road. Small patches of veldt grass along the upper portions of Willow Canyon Road were also treated. A total of 198 acres of veldt grass were treated with Envoy® in LCWP in 2005. High rainfall in winter 2004-2005 likely contributed to increased density of veldt grass since 2004 and its spread down slopes into canyon bottoms where it previously had been undetected. Natures Image crew thoroughly treated all observed veldt grass along ridgelines, canyon bottoms and slopes in LCWP. 2005 was the first year using Envoy® on a large scale. A test plot LCWP at Big Bend was treated with Envoy® in 2004 and proved to be more effective than Fusilade at controlling veldt grass. A total of 30.25 gallons of Envoy® and one gallon Fusilade were used to treat veldt grass in LCWP. A total of 16 days (from March 17-April 8 and April 15) were spent treating veldt grass in LCWP.

California Gnatcatchers were observed at one location along the east side of lower Emerald Canyon Ridge Road. A nest was detected approximately 150 meters away from the treatment area. No veldt grass was located near the nest site and no treatment was conducted in the vicinity of the gnatcatchers.

Spadefoot Toads and their breeding pools were located along Bommer Ridge Road between Moro Ridge Road and Emerald Canyon Road. A 200 foot buffer was flagged off around the pools and no spraying took place in the buffer area until after the pools dried up.

Catalina mariposa lilies were observed in three locations in LCWP south of the 73 toll road; the west side of Emerald Canyon Road (polygons 5 and 7), the north side of Willow Canyon Road (near polygon 15), and along the north east side of Willow Canyon road.

Several small patches of artichoke thistle were observed in needlegrass grassland in LCWP. These areas were not treated due to time and funding constraints but need to be treated in 2006 to prevent further spread.

#### Aliso and Wood Canyons Wilderness Park

Artichoke Thistle, Italian thistle and garland chrysanthemum were treated at AWCWP. Treatment began on April 11, 2005 and lasted through May 13 for a total of 25 days treatment. Greater than 5% of the artichoke thistle had begun to bolt by April 11, so Round-Up with Telar, rather than the preferred broad-leaf selective Transline, was used throughout AWCWP to treat artichoke thistle. Round-Up with Telar was also used on

Italian thistle and garland chrysanthemum. Rodeo with Telar was used within 100 feet of water ways. A total of 30 polygons totaling 315 acres were treated throughout the park. Artichoke thistle was present in each polygon; Italian thistle was present along riparian corridors in the canyon bottoms and had very high density/percent cover in these areas. Garland chrysanthemum was observed and treated in four locations within the park with very small populations in each locality (Polygons 1, 23 and scattered along the ridge road near Polygons 13 and 20). All previously treated locations in the park were treated again this spring; 235 acres of previously untreated acres were also treated.

California gnatcatchers were observed in two different areas within AWCWP but no nest site was located. The first observation point was located approximately 150 meters south of mid-meadows trail. No spraying occurred within 100 meters of the gnatcatchers and no target weeds occurred in the dense CSS where they were located. Another pair was located on the slope to the far north of Meadows trail on a steep slope; no spraying occurred in their vicinity.

Italian thistle has invaded nearly all riparian areas in the park and is spreading into the adjacent CSS in many canyon areas in the park. Treatment of Italian thistle was conducted in several polygons in the park, however, Round-Up may be an inappropriate method to control Italian thistle once it has bolted because it is non-selective. Italian thistle covers 100% of several areas within AWCWP; treating the area with round-up exterminates the native understory as well as the native and exotic seed bank within the treated area. Italian thistle treatment was discontinued at AWCWP on May 6 due to time and budget constraints.

Other major problem weeds at AWCWP include tocolote (*Centaurea melitensis*) which has invaded roadsides and disturbed areas but also competes with CSS along the edges of CSS, black mustard (*Brassica nigra*) which dominates the hillside in the non native grassland south of Meadows Trail, and poison hemlock (*Conium maculatum*) which dominates the riparian corridor through Wood Canyon.

#### Buck Gully

Garland chrysanthemum was treated at Buck Gully with Round-Up with Telar on May 16. Garland chrysanthemum grows only along the access roads and disturbed areas at Buck Gully so the crew was able to finish the entire reserve in one ten hour work day. Some artichoke thistle was also treated at Buck Gully but was not the focus for this spring. Artichoke is spreading up along the north facing hillsides in the south side of the gully toward the housing developments, but is only sparsely scattered and the crew was able to spray most of it. Tocolote has spread along the access roads and is invading the CSS in the south east portion of the reserve. Next spring, treatment of artichoke thistle and tocolote may be required along with treatment of garland chrysanthemum. A total of 23 acres of garland chrysanthemum were treated at Buck Gully in 2005.

No special status birds or plant species were observed near the treatment areas in Buck Gully.

University of California Irvine Ecological Reserve

Artichoke thistle was treated at UC Irvine on May 17 and 18 with Ranger-Pro; no Telar was used by request from Peter Bowler. A total of 64 acres of artichoke thistle were treated at UC Irvine this spring. Percent cover was very high in patches along the western boundary and in the southern portion along the drainage. Most of these areas had been treated in past years but density was still very high. Artichoke density in adjacent property to the west is very high and it is likely that wind blown seed from this untreated area will make total eradication within the reserve difficult.

One cactus wren, and one California gnatcatcher were observed within the reserve. Their foraging was restricted to areas within CSS and Cactus Scrub in the south west portion of the reserve to the east of the artichoke thistle. No spraying occurred within CSS in this area.

City Of Irvine Open Space Preserve

Artichoke thistle was treated along Bommer and Hogback Ridges within the City of Irvine Open Space Preserve. Bommer ridge is located to the west of Bommer Canyon and north of the 73 toll road. Hogback Ridge connects to Bommer Ridge on its west end and parallels the 73 toll road. Bommer Ridge and Hogback ridge had not been treated since 2002 and some areas along the northern portion of the ridgeline had never been treated. Artichoke thistle was treated at Bommer/Hogback Ridge from May 19-25 (five days total) with Ranger-pro and Telar. A tractor was used which increased access and efficiency since most of the artichoke was located to the far north and down steep slopes. Percent cover varied greatly along the ridgeline; the southern portion of the ridge closer to the toll road had been treated in previous years and had a lower density than the previously untreated northern portion which had up to 95% cover in some areas. A total of 109 acres of artichoke thistle were treated along Bommer and Hogback Ridges.

Needlegrass grassland and non-native annual grassland dominate the top of Bommer ridge bordered by CSS on all sides. Artichoke thistle has reached the outer edges of the CSS at the grassland edge where it competes with CSS; once the artichoke thistle is eradicated, these grassland areas will be taken over by CSS. Along Hogback Ridge, treated areas contained small needlegrass patches bordered by CSS. Small patches of artichoke thistle above the turtle pond had been treated in previous years and were treated again in 2005.

No special status birds or plant species were observed along Bommer Ridge or Hogback Ridge near the treatment areas.

### Crystal Cove State Park

Harmsworth Associates did not oversee or monitor weed control activities in CCSP. CCSP resource management staff conducted the weed control monitoring and both the CCSP resource management staff and Natures Image conducted the weed treatment. CCSP resource management staff treated 130 acres of artichoke thistle with Ranger-Pro between December 4, 2004 and May 19, 2005 and Natures Image treated 189 acres of artichoke thistle from April 12 through May 4 totaling 319 acres of treatment at CCSP.

### **PROBLEM ISSUES**

Italian thistle thrives in riparian zones at AWCWP and competes with oak and sycamore seedlings; to control further spread in areas with low cover either hand pull (labor intensive) or carefully spray each individual in the rosette stage. Polygons 7 and 9 had 100% cover of Italian thistle in many areas; these areas were treated with non-selective Ranger-Pro and Rodeo near the creek. The probability of any native plant recruitment is very low in these areas. Weed-wacking Italian thistle just before flowering may be a more effective method of control than herbicides, although this method can require many years to deplete the seed bank in heavily infested areas (Bossard 2000).

Spring rain prevented treatment from beginning prior to the start date, March 17. Several heavy rains in March and April slowed progress considerably. Access roads in all Reserves are impassible for 48 hours following a rain of >1 inch.

During and after treatment at UCI, many complaints were made by the public. Earlier contact with Peter Bowler with exact treatment dates and signs posted along the trails for the public prior to and during treatment may reduce public complaints in 2006.

The majority of Nature's Image work crew and both the foreman (Ramone and Leo) were reliable and hard working. However, on many occasions this spring, new crew members were added while others who had been working on the NROC treatment were transferred by Nature's Image to other job sites. This presented Harmsworth Associates biologist's the task of keeping track of which crewmen were new to the job and daily teaching new crew members which grasses/herbs/shrubs to avoid and which to treat. On several occasions Harmsworth Associates biologists found treated needlegrass (*Nassella pulchra*) or coast melic (*Melica imperfecta*) in the veldt grass areas; this was always associated with a new crew member. The weed control contractors for 2006 should use the same crew for the entire project and inform the biologist if any crew changes have been made.

## **RECOMMENDATIONS**

1. Assess 2005 treatments effectiveness, review potential control areas, and organize 2006 control efforts earlier.
2. Coordinate weed control contractor earlier in the season.
3. Initiate artichoke thistle and Italian thistle treatment earlier in the season prior to bolting using broadleaf selective Transline instead of non-selective glyphosphates.
4. Treat other broadleaf weeds in treatment areas while treating artichoke thistle.
5. Demand two large crews to treat both veldt grass and artichoke thistle simultaneously in early spring. Natures Image often had difficulty providing large enough crews to efficiently cover the treatment areas. If the weeding contractor cannot consistently provide large enough crews with experienced workers then consideration should be given to hiring an alternative contractor, or splitting the work between two contractors.
6. Coordinate with UCI earlier and provide definite treatment dates to Peter Bowler.
7. See Table two for site specific recommendations.

## **REFERENCES**

Weinberg Amanda. June 2004. Annual Exotic Plant Control Program Report. The Nature Conservancy. Irvine, California

Bossard, Randall, and Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press. Berkely and Los Angeles, California

**TABLE 1: SUMMARY AND RECOMMENDATIONS**

Treatment Area	Target Weeds/Herbicide	Time Spent/Total acreage	Treatment Area	Recommendations:
LCWP Bommer Ridge Road (South of the 73 toll road)	Veldtgrass Envoy with Telar	March 17- April 8 & April 15 Total 16 days/ 198 Acres	7 <sup>th</sup> year of treatment. Treated areas included Bommer Ridgeline, Emerald Canyon ridge road, Moro ridge road, Moro Canyon ridge road, Big Bend trail, and around the water tower east of Laguna Canyon road. Mostly CSS, small needlegrass grasslands in polygons 5, 7, 15. Several patches of artichoke thistle occur in these areas; these were marked on the map but not treated. Treated small patch of garland chrysanthemum at the end of the westernmost fork of Laguna Bowl Road.	Priority = prevent spread in areas with very little veldt grass. Crew must treat canyon bottoms and areas with difficult access to prevent further spread. Focus on edges of polygons. Veldt grass difficult to see in canyon bottoms; biologist/crew must scout the lower edges of polygons to look for scattered individuals. Stop large scale infestations by controlling new invasions. Treat new populations of artichoke thistle in Emerald Canyon and south facing slope of Moro Ridge.
A&WCWP	Artichoke thistle and Italian thistle Ranger-Pro+Telar	April 11- May 13 Total 25 days/ 314 Acres	5 <sup>th</sup> year of treatment. Artichoke has invaded many small areas of needlegrass grassland throughout the park. Many are difficult to find and to access.	Begin treatment earlier; Over 10% of artichoke had begun to bolt by April 11. Do not treat Italian thistle with round-up, begin in early spring before <i>any</i> bolting and spray only broad-leaf selective Transline. For artichoke, top priority polygons are 3-15, 18, 28 and 29. Top priority polygons for Italian thistle are edges of 7, 9, lower 15 and 17. Did not treat small patches of artichoke along Rock-It trail; access was very difficult.
Buck Gully	Garland chrysanthemum and artichoke thistle	May 16/ 23 acres	Fire and access roads through thick CSS. G.C. only invading disturbed areas along roadsides. Scattered distribution in lower south side of gully-crew treated all the artichoke visible from the roads but did not go looking for it	Watch artichoke thistle, starting to spread. Tocolote has invaded roadsides throughout the gully. Spray tocolote in the gully along with G.C and artichoke. Treat G.C. outside of reserve boundaries along San Joaquin Road as well. Can complete entire site in one day with large crew. 2005 had 15 crew for 10 hours to finish

**TABLE 1:** Continued

<b>Treatment Area</b>	<b>Target Weeds/Herbicide</b>	<b>Time Spent/Total acreage</b>	<b>Treatment Area</b>	<b>Recommendations:</b>
UCI	Artichoke thistle	May 17, 18/ 64 Acres	CSS and cactus scrub 4 <sup>th</sup> year of treatment.	Give Peter Bowler advanced notice and precise treatment dates. Post signs at UCI trailheads to inform the public prior to and during treatment. Adjacent property to the west of UCI reserve has high density artichoke cover. Eradicate neighboring artichoke to eliminate seed transfer to reserve; wasted effort unless doing so.
City of Irvine Open Space Preserve: Bommer/Hogback Ridges (North of the 73)	Artichoke thistle	May 19-25 Total 5 days/ 109 Acres	Extensive needlegrass grassland in some areas. Last treated in 2002	Artichoke rapidly spreading into canyons and down slope along ridgeline. Some populations were missed in the northernmost portion of Bommer Ridge-it may take some scouting to locate all populations along both Bommer and Hogback ridges. This area should be high priority for 2006 to prevent eastward spread. Maintain previously treated areas yearly. Tractor required for this site-much more efficient. Check patches of artichoke along Serrano Ridge Road as well.
CCSP	Artichoke thistle	Natures Image April 12 to May 4 188 Acres  Parks- Dec 04 to May 19, 05 130 acres	Moro Canyon bottom, flanks to the east, Moro Ridge, behind reservoir, The Bowl	Contract work on most concentrated sections of thistle where densities were medium to high. Park management work was mop-up of low cover areas. Spray work needs to start much earlier in the season (Jan-Feb) to be most effective, otherwise mustard gets too high to locate, and thistle seedlings are missed under adult canopy. Access was blocked to Center Peak due to blown culvert crossings and landslides.

**TABLE 2: 2005 EXOTIC PLANT CONTROL FINAL PROGRAM SCHEDULE**

Area	Start/End Dates	No. of Treatment Days	Target Weed(s)	Treated in Previous Years?	App Acres	% Weed Cover / Cover Type	Habitat Type	Herbicide	Crew Size
LCWP Bommer Ridge Road (South of the 73 toll road)	March 17- April 8 & April 15	16	Veldtgrass	Yes; annually since 1999	198	10%-100% Cover Scattered/ patchy distribution in most areas. Polygons 1, 2, 3, 6 had 100% cover in some areas.	CSS	Envoy 1st day Fusillade	Average 10 Ranged from 6-14 guys
A&WCWP	April 11- May 13	25	Artichoke Thistle and Italian Thistle	Yes and No	314	Artichoke averaged around 50% Italian thistle 100% cover in Polygons 7, 9. Italian thistle covers 100% of area it invades	Artichoke in CSS and Grassland. I.T. in CSS, riparian, & grassland	Ranger-Pro and/or Rodeo with Telar	Average 11 Ranged from 18 to 6 guys
Buck Gully	May 15-20	1	Garland chrysanthemum and artichoke	Yes: 3+ years	23	G.C. dense cover along roadsides only. Artichoke 2% very scattered cover.	G.C. disturbed Truck trails. Artichoke in CSS	Ranger-Pro plus Telar	15
UCI	May 17, 18	2	Artichoke Thistle	Yes	64	15-90% cover. Western fenceline 90%. Adjacent land to west has 100% cover. Patchy distribution overall.	NNG/CSS /Cactus scrub	Ranger-Pro <b>No Telar</b>	15

**TABLE 2:** Continued

Area	Start/End Dates	No. of Treatment Days	Target Weed(s)	Treated in Previous Years?	App Acres	% Weed Cover / Cover Type	Habitat Type	Herbicide	Crew Size
City of Irvine Open Space Preserve: Bommer/Hogback Ridges (North of the 73)	May 19-25	5	Artichoke Thistle	Yes and No	109	10-80% cover; Patchy distribution	Grassland Both native and exotic	Ranger-Pro plus Telar	Average 12 Ranged from 9 to 20 guys
CCSP	April 12-May 4	16	Artichoke Thistle	yes	188	Dense and patchy distribution with some scattered individuals	CSS/ native grassland/ non-native grassland	Ranger- Pro plus Telar	7

**APPENDICES**

**APPENDIX 1: LCWP Bommer Ridge Veldt Grass**

POLYGON	DATE	ACREAGE	% COVER	CHEMICAL	AMOUNT	CREW/HOURS	NOTES
1	3/17/2005	1.29	100%	Hand cut & bagged	0	7 / 5 hours	Too windy for spraying, needed to get started so crew just cut seed by hand then bagged it and disposed of it.
2	3/18/2005	1.61	100%	Fusilade	100 gal	6 / 8 hours	
3	3/21/2005	5.83	100%	Envoy	200 gal	10 / 8 hours	
	3/22/2005	RAIN				0	
	3/23/2005	RAIN				0	
4	3/28/2005	4.34	30%	Envoy	75 gal	10 / 2.5 hours	Rain by late morning. Spadefoot Toad Pool in road adjacent to P- 4
5	3/29/2005	15.17	30%	Envoy	300 gal	11 / 8 hours	Six C. catalinae individuals found in needlegrass patches in P-5. Artichoke thistle in grassland along road-did not treat.
6	3/30-31/2005	20.24	30-100%	Envoy	400 gal	12 / 8 hours	100% cover in northwest portion of P-6
7	3/31/2005	21.89	75-80%	Envoy	300 gal	11 / 8 hours	California Gnatcatchers and nest detected approx 150M east of Polygon 7. 12 C. catalinae individuals found in needlegrass patches in P-7
8	4/1/2005	4.94	15%	Envoy	300 gal	11 / 8 hours	Spadefoot Toad Pool in road adjacent to P- 8
9	4/4-5/2005	11.5	30%	Envoy	50 gal	12 / 2 hours	Rain by late morning
10	4/5-6/2005	11.59	40-75%	Envoy	350 gal	11 / 8 hours	P-10 veldt grass all the way to bottom of ravine. Very steep, more veldt grass then expected. Took longer then expected. Spadefoot pool dried up; added water.
11	4/7/2005	15.28	40%	Envoy	300 gal	12 / 8 hours	
12	4/8/2005	23.69	40%	Envoy	400 gal	14 / 9 hours	

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POLYGON	DATE	ACREAGE	% COVER	CHEMICAL	AMOUNT	CREW/HOURS	NOTES
13	4/8/2005	25.01	25%	Envoy			P-13 has patches of 90% cover but overall total % cover is low.
							Untreated artichoke at bottom of P-13
14	4/8/2005	8.78	35%	Envoy			
17	4/8/2005	4.14	15%	Envoy			
15	4/15/2005	0.25	5%	Hand cut & Envoy	100 gal	5 / 8 hours	Very small patch. Hand cut seed then sprayed with Envoy. 11 <i>C. catalinae</i> individuals found in needlegrass grassland near P-15. Artichoke thistle in grassland-not treated
16	4/15/2005	5.1	75%	Envoy			Finished all Bommer Ridge area 4/15
18	4/15/2005	3.4	5%	Envoy			P-18 has just a few scattered individuals
19	4/15/2005	12.93	20-30%	Envoy			Below Water Tower
<b>Total Acreage treated</b>		<b>197.88</b>					

California Gnatcatchers were observed at one location along the east side of lower Emerald Canyon Ridge Road (East of Polygon 7). A nest was detected approx 150 meters away from the treatment area. No veldt grass was located near the nest site and no treatment was conducted in the vicinity of the gnatcatchers.

Spadefoot Toads and their breeding pools were located along Bommer Ridge Road between Moro Ridge Road and Emerald Canyon Road. A 200 foot buffer was flagged off around the pools and no spraying took place in the buffer area until after the pools dried up.

Catalina mariposa lilies were observed in three locations in the Bommer Ridge area; the west side of Emerald Canyon Road (polygons 5 and 7), the north side of Willow Canyon Road (near polygon 15), and along the north east side of Willow Canyon road.

Several small patches of artichoke thistle were observed in needlegrass grassland in LCWP. These areas were not treated due to time and funding constraints but will need to be treated next year .

**APPENDIX 2: Aliso and Woods Canyon Wilderness Park Data Sheets**

Aliso & Woods Canyon Wilderness Park										
Treatment for Artichoke, Italian thistle and garland chrysanthemum 2005										
Treated A&W from Monday April 11-Friday May 13, 2005										
Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
11-Apr	1	Patchy distribution artichoke thistle in CSS/mulefat scrub. Patchy distribution Italian thistle: high density within patches a few scattered bunches of garland chrysanthemum confined to disturbed area near water facility treated only south/east side of dirt road to avoid riparian/creek. >10 % artichoke beginning to bolt	14.57	5%	artichoke; ranger-pro with telar*	400+	11	9		*2 crews spraying different polygons w/ different chemical
				20%	Italian thistle; ranger-pro, no telar		2	8		Riparian area on north side of dirt road
				5%	garland chrysanthemum; ranger-pro		5	6	145	No treatment exotics near riparian b/c using ranger-pro
12-Apr	2	Needlegrass grassland with high concentrations Italian thistle in patches throughout polygon. >95 % Artichoke still in rosette stage	43.22	25%	artichoke; Transline	80 oz.	12	9	97	Sprayed Italian thistle patches from truck with hose
				40%	Italian thistle; ranger-pro, no telar					**Discontinued work on sheep hill for higher priority areas. Finished P-2 on last day of spraying A&W
						6.25 gal				Riparian area avoided. Crew stayed 100ft from pools
13-Apr	3	Upper Mathis trail; Nice needlegrass grassland bordered by CSS. Tons of wildflowers. 25% artichoke bolting	4.54	85%	artichoke; ranger-pro		11	9	99	

Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
	4	Upper Mathis trail	5.4	25-50%	artichoke; ranger-pro					
	5	Mid Mathis trail	2.96	75%	artichoke; ranger-pro					
14-Apr	6	Mid Mathis trail. Nice needlegrass grassland bordered by CSS. Tons of wildflowers!	2.57	80%	artichoke; ranger-pro		11	9	99	
	7	Lower Mathis. Needlegrass grassland with high % weedy grasses. Patchy distribution Italian thistle-high density within patches. Scattered distribution of artichoke with varying density. Lower portion of polygon reaches small drainage with Juncus species and 100% non-native annual grassland.	3.91	25%  50%	artichoke; ranger-pro  Italian thistle; ranger-pro					Nice wildflower area among Italian thistle in rosette stage-must be first year for Italian thistle in this area. All other plants will die too.
	8	Lower Mathis. Native grassland with scattered scrub. Small area with scattered artichoke	4.07	25%	artichoke; ranger-pro					Avoided treating several large artichokes because birds nest with eggs found in giant thistle.
15,16-Apr	9	Lower Mathis and bottom of Oak grove trail. Non-native annual grassland bordered by riparian habitat along flowing creek. Very large patches and high % cover Italian thistle beneath Oaks and sycamores	4.59	10%	artichoke; ranger-pro	5 gal	11	8	88	16-Apr 2 crews working; one crew at A&W, and one at Bommer Ridge to finish veldt grass.
				50-100%	Italian thistle; ranger-pro					*Italian thistle covers 100% of patches but total cover within a polygon is less. Stopped treating b/c %cover too high-we will never finish. Also too much chemical to dump in drainage area (even though >then 100 ft from creek)
		Completed some missed patches of veldt grass along Bommer Ridge road with a separate crew.		10-50%	Veldt grass; Envoy	1 gal				

Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
18-Apr	10	native grassland surrounded by CSS just below ridge road south of water tanks	1.36	75%	artichoke; ranger-pro	12.5 gal	11	9	99	
	11	ruderal disturbed area merges with native and non-native grassland/south of water tanks. scrub-ecotone	4.25	75%	artichoke; ranger-pro					Centaurea melitensis invading areas along roadside
19-Apr	13	Top of Rock-It trail; disturbed areas along road and trail in CSS	8.81	15%	artichoke; ranger-pro		11	9	99	C. melitensis invading along roadside
	14	Native grassland on north-east facing slope. area difficult to access with high % cover	4.65	90%	artichoke; ranger-pro					
20-Apr	12	Upper Rock-it trail. Disturbed area bisected by power lines in CSS	4.38	50%	artichoke; ranger-pro		10	9	90	
21-Apr	15	Upper Lynx trail- needlegrass (~10%) and exotic annual grassland bordered by CSS. Very large area with high density artichoke. Italian thistle very high density at bottom of Cholla trail; doesn't spread far away from the road or go up-slope. Just starting to invade CSS	9.03	30-50%	artichoke; ranger-pro	10 gal	11	9	99	
				75%	Italian thistle; ranger-pro					
22-Apr	16	Oat/needlegrass grassland bordered by riparian/coast live oak with high density artichoke along riparian edges and lower density throughout grassland.	6.6	30-90%	artichoke; ranger-pro	7.5	11	9	99	Some of this polygon is outside of the reserve boundary
25-Apr	17	native and non-native grassland on the north facing hill east of creek along wood canyon road below water tower (across from cholla trail). Italian thistle dominates roadside and oak understory	12.96	25%	artichoke; ranger-pro	12.5	13	10	130	
26-Apr	16,17					12.5	13	10	130	

Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
27-Apr	18	Mid-Meadows Trail. Nice needlegrass grassland in some areas; exotics have invaded the lower and upper portions of the trail but the middle is really nice grassland and CSS with moderate to high density artichoke. Star thistle, mustard, Italian thistle becoming a problem on the lower reaches of this polygon.	9.26	25-60%	artichoke; ranger-pro	10 gal	12	10	120	Observed California gnatcatchers. They are several hundred feet away from treatment area on the south side of Mid-Meadows trail
				15%	Italian thistle; ranger-pro					Lower meadows only
28-Apr		1.5 inches rain								
29-Apr	19	East of Alta Laguna and just north of upper meadows trail. High density artichoke in marginal native grassland/scrub border.	4.74	80%	artichoke; ranger-pro	12.5	12	10	120	
2-May	20	Top of Meadows trail. Needlegrass/exotic annual grassland with high density artichoke. Small patch garland chrysanthemum to the south west in disturbed area along roadside.	4.75	90%	artichoke; ranger-pro	10	12	10	120	
				5%	garland chrysanthemum; ranger-pro					
3-May	21	Huge polygon meets bottom of P-18. High density artichoke and Italian	41.09	25-50%	artichoke; ranger-pro	12.5 gal	11	10	110	Artichoke only in upper portions (north-west) of polygon. Large meadow is basically free from both artichoke and Italian thistle
4-May	21					10 gal	9	10	90	

Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
5-May	21	Thistle in north-west portions of polygon. Variety of veg types include needlegrass grassland, exotic annual grassland (large meadow), CSS and ruderal (mustard/Italian thistle fields).		50-90%	Italian thistle; ranger-pro	2.5	10	2	20	Rain by noon. Stopped spraying early-too damp. Italian thistle has invaded scrub in upper portions of this polygon; 100% cover understory in fields of black mustard. Crew sprayed this entire area with ranger-pro. Very few natives in this area but still high impacts due to large herbicide application
										May 9-we are no longer spraying Italian thistle-takes too much time plus high impact on natives. Artichoke only from now on.
6-May		1.5 inches rain. NO work								
9-May	21					7.5 gal	10	8	80	
10-May	22	Scattered distribution artichoke along roadside south of Meadows trail all the way to water facility. Some areas west of road have high % cover	12.13	25-75%	artichoke; ranger-pro	7.5 gal	8	8	64	All riparian areas along wood canyon are heavily infested with Italian thistle. milk thistle, hemlock, fennel and star thistle are also concentrated heavily along riparian corridor. Herbicides do not appear to be an appropriate control method for these species, at least at these population densities. Manual removal seems to be the only solution for removal and control of Italian thistle in riparian understory-plant is too small for careful spot treatment with herbicide. 25% on slope in NW end, 80% on road cut in southern area

Date	Poly	Polygon Description	Acres	% Cover	Exotic	Amount	Crew	Hours	Total hours	Notes
	23	small disturbed area past the gate leading to water facility- low density garland chrysanthemum. A few scattered artichokes just north of the gate in CSS west side of road.	4.49	3%	artichoke; ranger-pro					North of gate only
				10%	garland chrysanthemum; ranger-pro					South of gate only
10-May continued	24	Low density artichoke cover in exotic annual grassland bordering riparian. Very scattered individuals. High % Italian thistle along riparian.	14.29	2%	artichoke; ranger-pro					
	25	Low density, scattered individuals. Exotic annual grassland bordered by CSS.	5.63	5%	artichoke; ranger-pro					
11-May	26	Mixed native/non-native grassland with moderate cover artichoke at	8.41	35%	artichoke; ranger-pro	12.5 gal	13	8	104	
	27	Large polygon with high artichoke density on east side of wood canyon road. Largest concentrations near Alewuit trail on slope below houses. Very low % cover in most of the polygon with only a few scattered individuals.	62	5-80%	artichoke; ranger-pro					80% cover on slope near Alewuit only-the rest of the polygon < 5%. Italian thistle very prevalent throughout; dominates roadside.
12-May	28	Grassland area at confluence of coyote run and Rock-it trail. Moderate artichoke cover-difficult to access-far from roads	6.62	25%	artichoke; ranger-pro	12.4	14	8	112	
	29	Needlegrass grassland on west side of creek at confluence of Coyote run trail and nature loop trail. Difficult to access-tough creek crossing or a far walk.	2	55%	artichoke; ranger-pro					
13-May	2	Final day spraying A&W-budget complete				12.5	15	8	120	

A&WCWP Treatment Summary	
TOTAL ACREAGE	313.3
TOTAL HOURS	2,339
Crew	2,113
foreman	226
TOTAL CHEMICAL	
Ranger-Pro	222 gallons
Telar	230 ounces
Dye	
*with telar unless noted otherwise	
Notes: California gnatcatchers not affected by artichoke spraying because weed infestations occur mostly in disturbed and or grassland areas and at the edges of CSS thus far..	
Italian thistle beginning to spread into CSS, artichoke only spreads in clearings.	

**APPENDIX 3: Buck Gully**

BUCK GULLY: Garland Chrysanthemum
Completed spraying in 1 day. Did not divide into Polygons. Garland Chrysanthemum was concentrated along fire road. Some scattered artichoke thistle was also present and was treated.
14 crew, 1 foreman, 10 hours
Razor -Pro 12.5 gallons Telar 15 ounces Dye 2.5 gallons
Total acres treated = 22.09
Artichoke thistle beginning to spread along road and slopes in lower gully. Artichoke thistle within close proximity to road and easily accessible to crew was treated. Not all artichoke thistle onsite was treated due to limited time and limited funding. Tocolote ( <i>Centaurea melitensis</i> ) has higher % cover than Garland Chrysanthemum along the road in the lower gully. Tocolote is beginning to spread into the CSS and already dominates the roadsides in the lower half of the gully. % cover garland Chrysanthemum varied along fire roads. 100% cover along edge of the 2 westernmost access roads. Eastern access road averaged around 50% G.C. and 50% star thistle along roadside. Western access roads were lined with Garland Chrysanthemum for the entire length of the roads. Some GC along San Joaquin road outside reserve boundary.
Hot sunny weather, no wind. No rare animals or plants detected. Tons of wildflowers in small grassland patches in lower gully.

**APPENDIX 4: University of California Irvine Ecological Reserve**

UCI Artichoke Thistle Treatment					
Divided UCI Reserve into 2 areas-it took 2 days to complete the spraying.					
Area 1 is the South half of the reserve, split at the main trail that cuts through the center at the west end of the site.					
Area 2 is the North half of the reserve.					
<b>AREA</b>	<b>DATE</b>	<b>ACREAGE</b>	<b>% COVER</b>	<b>TREATMENT</b>	<b>CREW</b>
1	17-May-05	28.23	Percent cover varied from 5-95%. Areas along western fence line and to the east of the hill top averaged around 75-95%cover. Areas in CSS had very low cover <5%; hill top and west facing slope, and easternmost section of project site < 10%. Average total cover for area 1 is approximately 40%.	Ranger-Pro 15 gall No Telar	14 crew 1 foreman 8 hours
2	18-May-05	35.615	Varied from 10-100% cover. Hill-top to the eastern fence line had <10 cover. Western fence line and to the west of the project boundary had up to 100% cover. Dense patches of thistle throughout area 2. Average total cover for area 2 is approximately 50%.	Ranger-Pro 15 gall No Telar	14 crew 1 foreman 8 hours
<b>Total Acreage</b>		<b>63.85</b>			
One cactus wren, and one California gnatcatcher were observed within the reserve (both in area 2). Their foraging was restricted to areas within CSS in the south west portion of the reserve to the east of the artichoke. No spraying occurred within CSS in this area.					

**APPENDIX 5: City of Irvine Open Space Preserve Bommer/Hogback Ridges**

<b>POLYGON</b>	<b>DATE</b>	<b>ACREAGE</b>	<b>% COVER</b>	<b>POLYGON DESCRIPTION</b>	<b>TREATMENT</b>	<b>CREW</b>
1	19-May-05	7.65	80%	High density artichoke in all grassland areas along the north half of ridgeline. Spreading down into gullies and down steep slopes. Hot, sunny weather.	Razor-Pro 10 gallons dye 2 gallons	9 crew, 1 foreman, 8 hours, Tractor with spray rig
2	20-May-05	19.44	45-80%	Very dense artichoke in mixed native and exotic grassland. Very dense in most of polygon. Hot, sunny weather.	Razor-Pro 15 gallons dye 3 gallons	18 crew, 2 foreman, 8hours, 2 tractors with spray rigs
3	23-May-05	27.22	15-85%	Top of ridge has low density artichoke; The eastern slope and northern edges of scrub have higher density. Hot, sunny weather.	Razor-Pro 10 gallons dye 2 gallons	14 crew, 1 foreman, 8 hours, Tractor with spray rig
4	24-May-05	40.58	5-85%	Top of ridge has low density artichoke. The eastern slope and northern edges of scrub have higher density. Hot, sunny weather.	Razor-Pro 10 gallons dye 2 gallons	9 crew, 1 foreman, 8 hours, Tractor with spray rig
5	25-May-05	8.36	10%	Scattered individuals in openings in CSS. Morning fog.	Razor-Pro 10 gallons dye 2 gallons Telar 12 ounces	8 crew, 1 foreman, 8 hours, Tractor with spray rig
6		1.51	10%	Scattered individuals in openings in CSS. Morning fog.		
7		0.87	90%	Very dense patch in needlegrass grassland. Morning fog.		
8		3.05	20%	Scattered individuals in openings in CSS. Hot, sunny weather		
<b>Total Acreage</b>		<b>108.68</b>				
Treatment for 5 days from Thursday, May 19 to Wednesday May 25, 2005						
No sensitive plant or animal species were detected within the polygons.						

