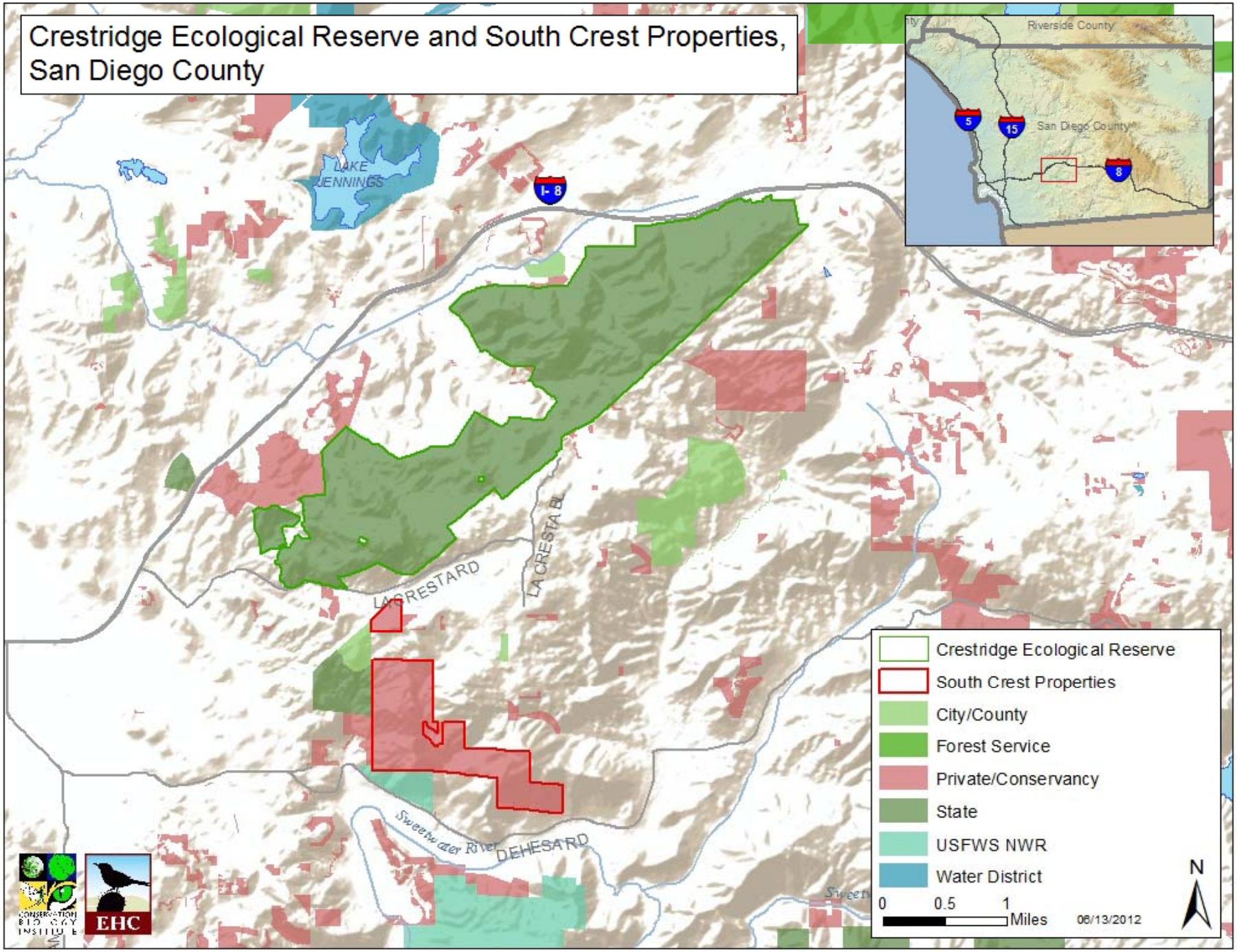
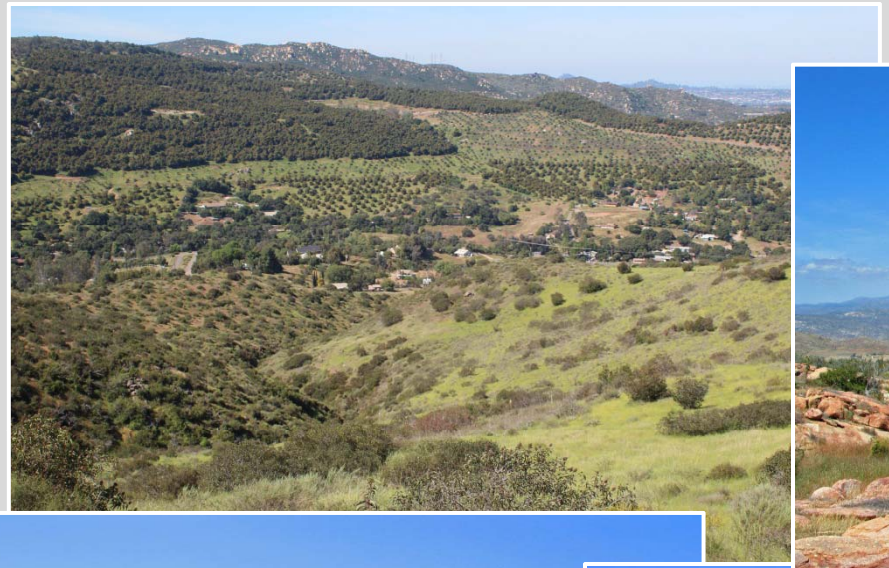
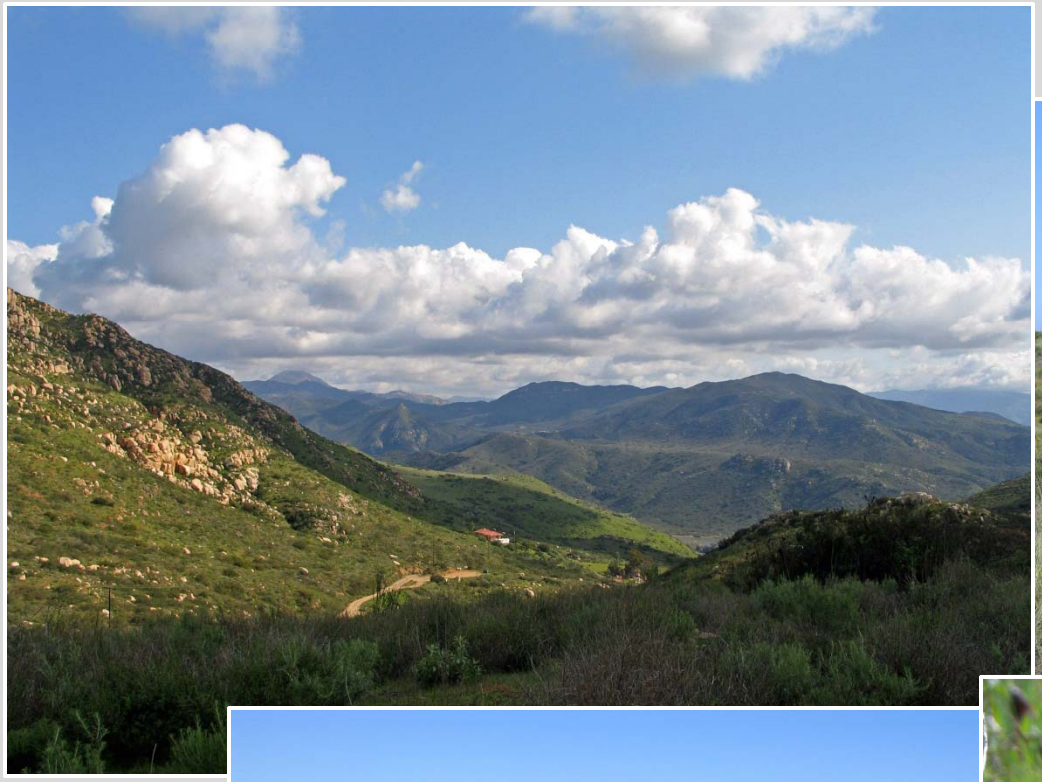
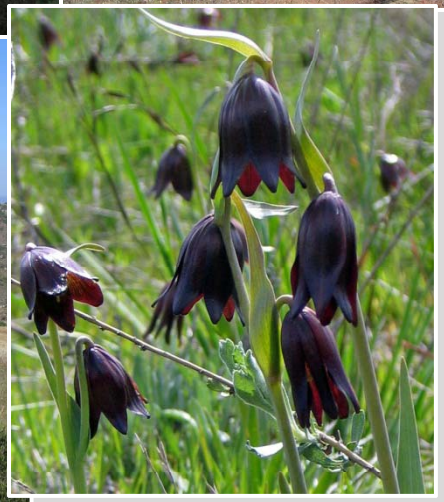
Biological Monitoring and Management Crestridge Ecological Reserve (and South Crest Properties)


Crestridge Ecological Reserve and South Crest Properties, San Diego County
Riverside County
San Diego County
5
15
8
I- 8
LAKE JENNINGS
LA CRESTA BL
LAGRESTARD
Sweetwater River
DEHESA RD
Crestridge Ecological Reserve
South Crest Properties
City/County
Forest Service
Private/Conservancy
State
USFWS NWR
Water District
0
0.5
1
Miles
06/13/2012
N
EHC







Monitoring/Management Activities

- MSCP Covered Plant Species
- Invasive Plant Species
- Oak Tree Inventory
- Grassland/CSS Restoration
- Pollinator Studies
- Invertebrate Surveys
- Wildlife Movement/Corridor Studies

Covered Plant Species

Acanthomintha ilicifolia

Quercus engelmannii

Bloomeria clevelandii

Ceanothus cyaneus

Dudleya variegata

Nolina interrata

Tetracoccus dioicus

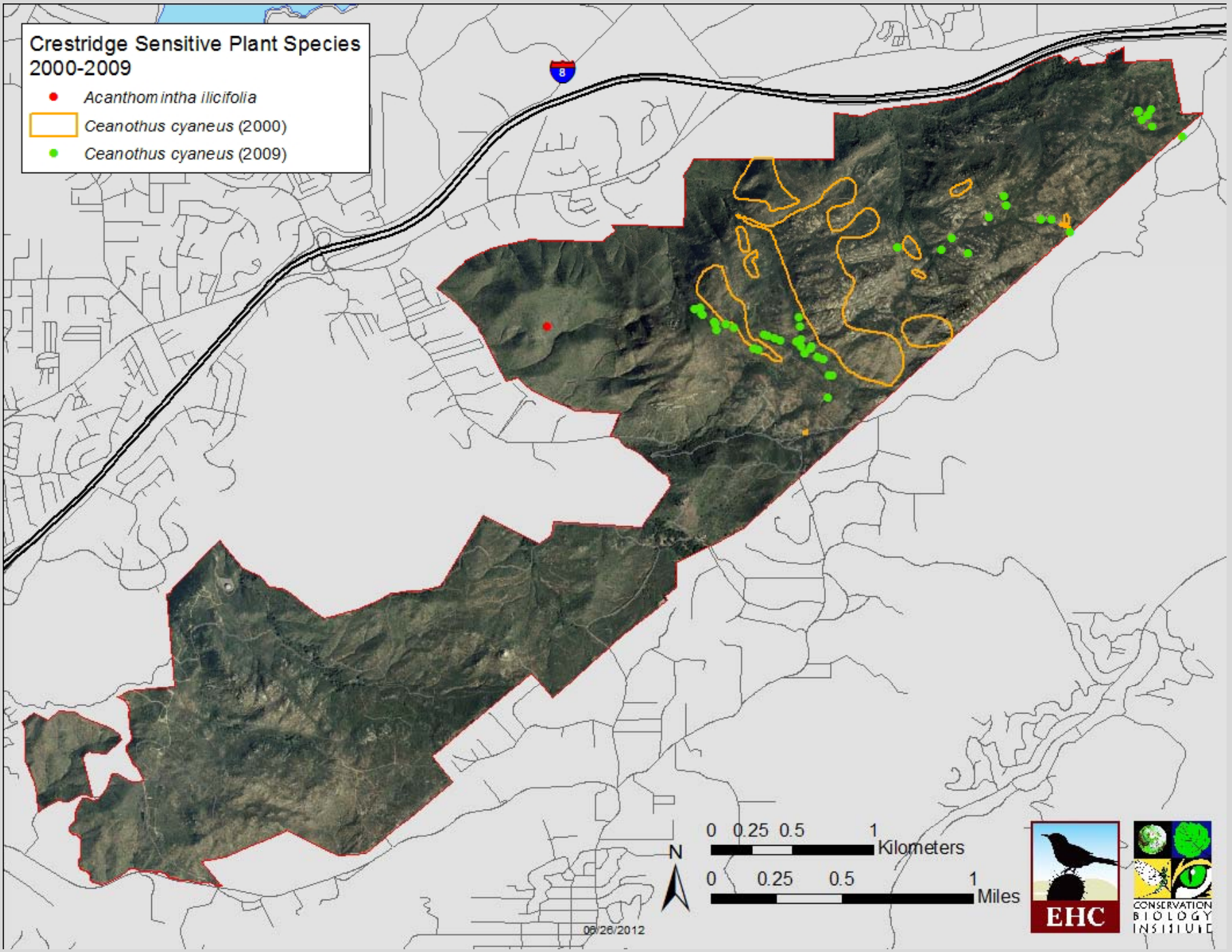
EHC

Covered Species Monitoring

- Monitoring History
  - Crestridge
    - Pre-fire Baseline Surveys (2000)
    - Post-fire Baseline Surveys (2009)
  - South Crest
    - Pre-fire Baseline Surveys (2002-2004) (REC Consulting, Inc.)
    - Post-fire Baseline Surveys (2011-2012)
- Types of Monitoring
  - Core Monitoring – ACIL, DUVA, CECY, NOIN, QUEN, TEDI
    - *Population mapping, counts, habitat characterization, threat assessment, photomonitoring*
  - Core + Monitoring – NOIN
    - *Plant performance, environmental covariates*

Ceanothus cyaneus

- 2009
  - Flowering, pollinators, no disease, few invasives
  - Reduced spatial distribution/population size?


Crestridge Sensitive Plant Species
2000-2009
Acanthomintha ilicifolia
Ceanothus cyaneus (2000)
Ceanothus cyaneus (2009)
8
N
0 0.25 0.5 1 Kilometers
0 0.25 0.5 1 Miles
06/26/2012
EHC
CONSERVATION BIOLOGY INSTITUTE

Threat: Increased Fire Frequency

- Obligate seeder:
  - Regenerates by seed only after fire
  - Depends on sufficient soil seed bank for survival
  - Short fire return intervals (<6 years) can reduce or extirpate obligate seeders
  - Effects can persist for decades

Jacobsen et al. 2004 (Santa Monica Mountains)

Management: Seed Bank

- Preserve genetic diversity/provide a seed source
  - Seed viability/dormancy
  - Source material for researchers
- Rancho Santa Ana Botanic Garden (2010)
  - Conservation collection
  - CDFG MOU
- Institute for Conservation Research (2011)

Sampling Strategy

- Maternal lines
- 2,500 seeds per accession
- 30-50 plants/population, selected randomly and evenly from throughout population
- ≤ 5% per population or per plant (2-5 panicles/plant)

Seed Collecting Results

2010	CECY-1	CECY-2	Total
Plants (n)	50	30	80
# Seed	52,387	26,526	78,913
Viability	>95%	>95%	>95%

- USDA National Center for Genetic Resource Preservation, Ft. Collins, CO – 8,000 seeds
- Testing, propagation (RSA) – 6,000 seeds

Ceanothus cyaneus Status

- Permanent conservation collection
  - Stock collection to generate material for restoration/recovery
- Population monitoring
- Photomonitoring
- Invasives control

Invasive Plant Species

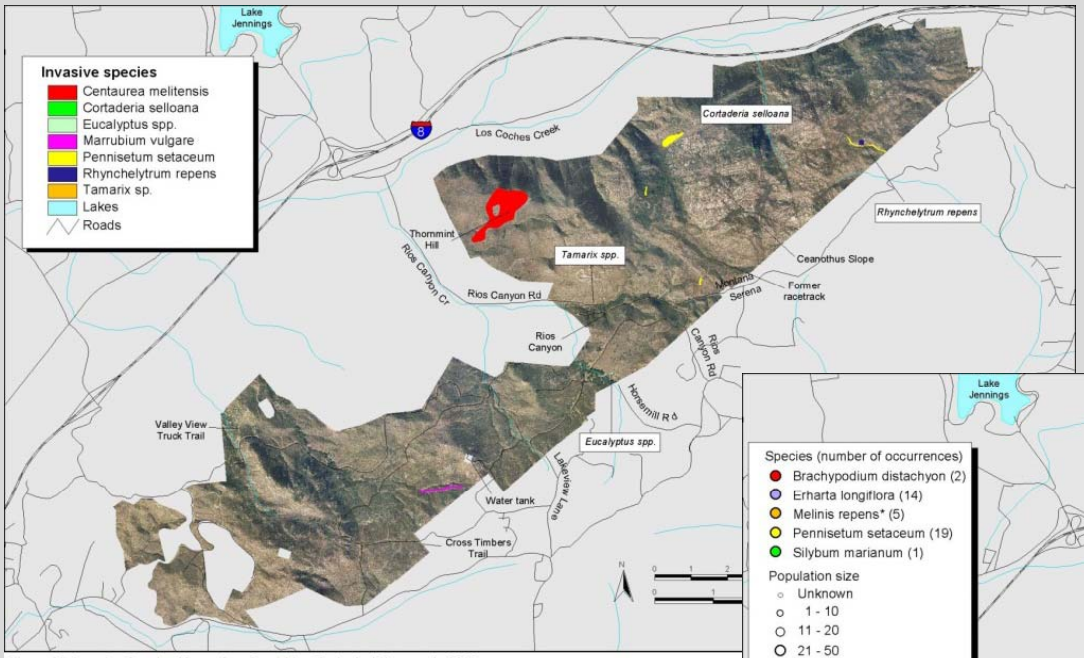


Figure 10. Invasive Species Mapped on Crestridge Ecological Reserve in 2000.

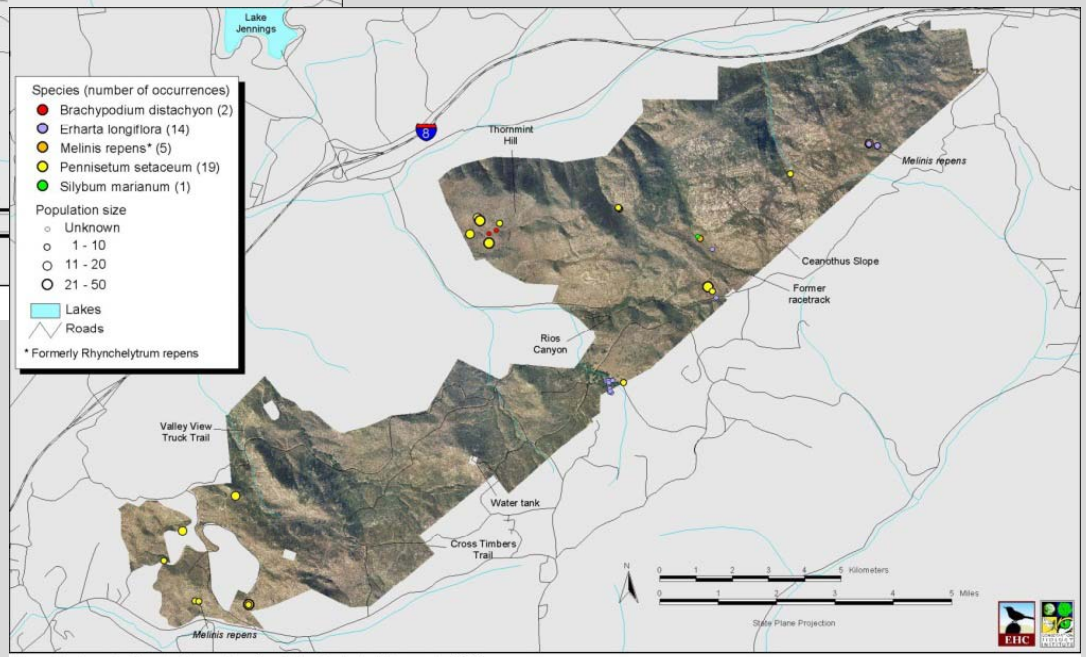
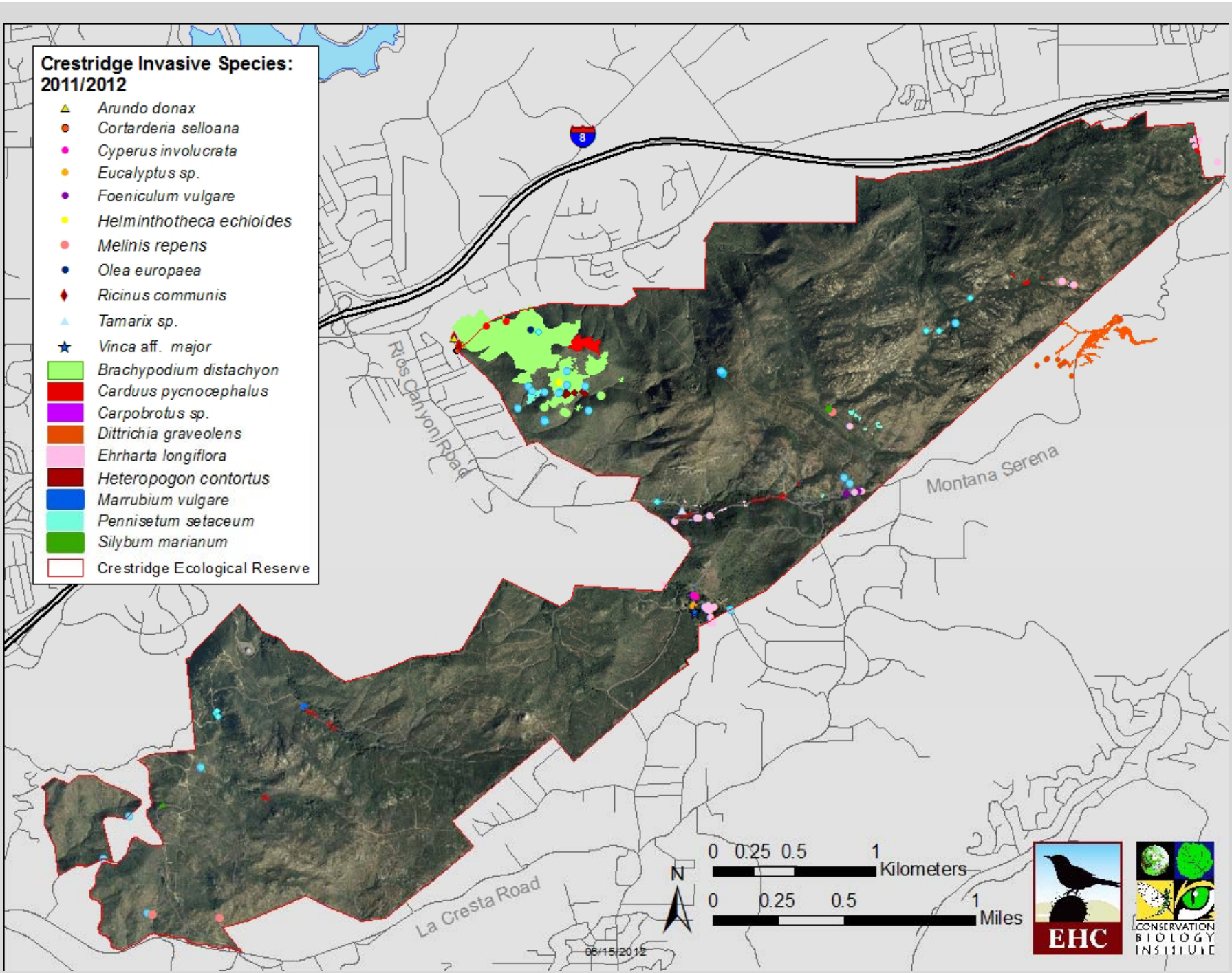
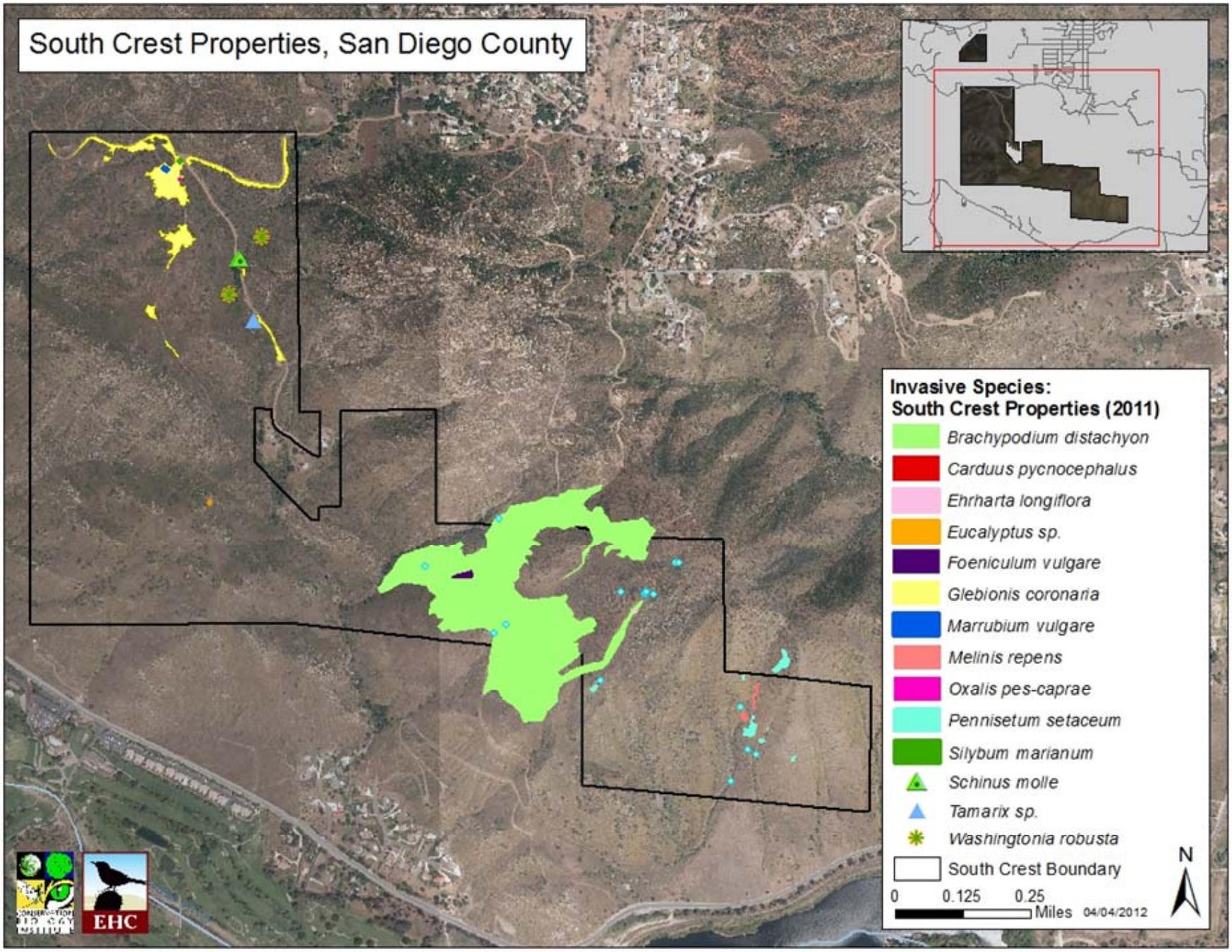


Figure 11. Invasive Species Mapped on Crestridge Ecological Reserve in 2009.


Crestridge Invasive Species: 2011/2012
Arundo donax
Cortarderia selloana
Cyperus involucrata
Eucalyptus sp.
Foeniculum vulgare
Helminthotheca echioides
Melinis repens
Olea europaea
Ricinus communis
Tamarix sp.
Vinca aff. major
Brachypodium distachyon
Carduus pycnocephalus
Carpobrotus sp.
Dittrichia graveolens
Ehrharta longiflora
Heteropogon contortus
Marrubium vulgare
Pennisetum setaceum
Silybum marianum
Crestridge Ecological Reserve
8
Rios Canyon Road
Montana Serena
La Cresta Road
N
0 0.25 0.5 1 Kilometers
0 0.25 0.5 1 Miles
EHC
CONSERVATION BIOLOGY INSTITUTE
06/15/2012


South Crest Properties, San Diego County
Invasive Species:
South Crest Properties (2011)
Brachypodium distachyon
Carduus pycnocephalus
Ehrharta longiflora
Eucalyptus sp.
Foeniculum vulgare
Glebionis coronaria
Marrubium vulgare
Melinis repens
Oxalis pes-caprae
Pennisetum setaceum
Silybum marianum
Schinus molle
Tamarix sp.
Washingtonia robusta
South Crest Boundary
0 0.125 0.25
Miles
04/04/2012
N
EHC

Heteropogon contortus (Tanglehead)

Management Strategies & Priorities

- Management Category
  - Surveillance
  - Eradication
  - Control/Eradication
  - Containment
  - Suppression
- Management Priorities
  - Impact (regional or state PAFs)
  - Extent (site-specific)
  - Threat to conservation targets (site-specific)

Early Detection Plan

- Target list of species for surveillance
- Surveillance team (including training and education)
- Map of priority surveillance locations
- Species-specific schedule for surveillance activities
- Reporting procedures
- Rapid response protocols (decision-tree)

Brachypodium distachyon

- Clay & gabbro soils
  - *Acanthomintha ilicifolia* (CER, SC)
  - *Nolina interrata* (SC)
  - *Dudleya variegata* (SC)
  - *Tetracoccus dioicus* (SC)

- Rapid post-fire spread; copious seed production; high seed viability, low dormancy
- Displaces other species

Potential Ecosystem Impacts

- Grass-fire cycle (fine fuel layer)
- Carbon and nitrogen storage pools in soil
- Ground-dwelling arthropods
- Soil moisture – (short-term) benefit to shrubs and geophytes
- Prevents recruitment/may alter population structure over time

Brachypodium - Crestridge

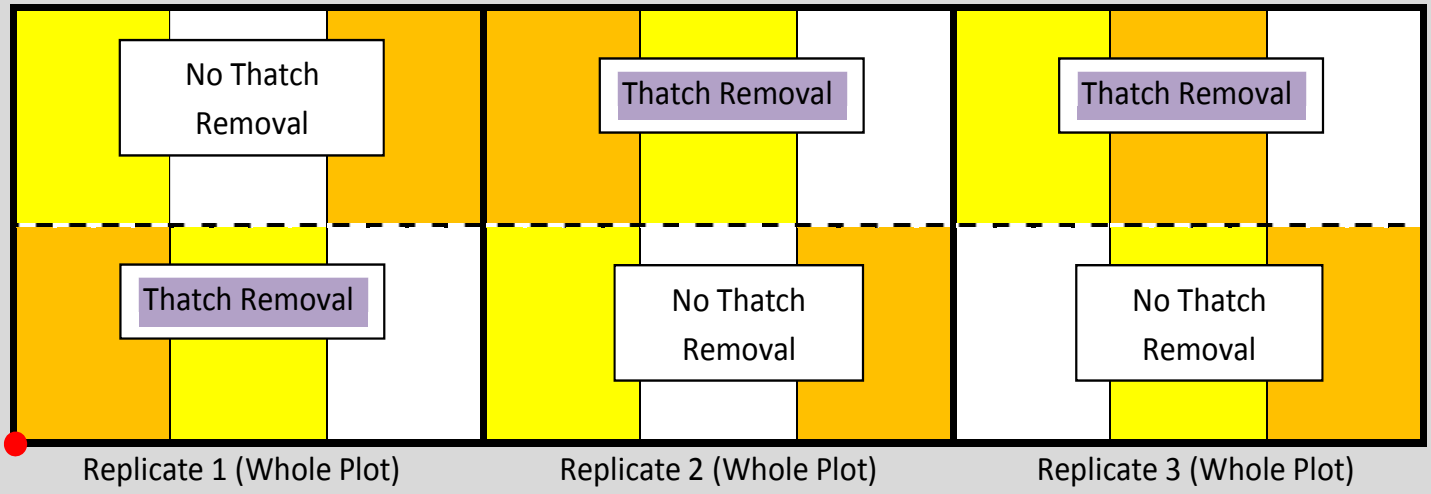
Brachypodium – South Crest

Experimental Pilot Program

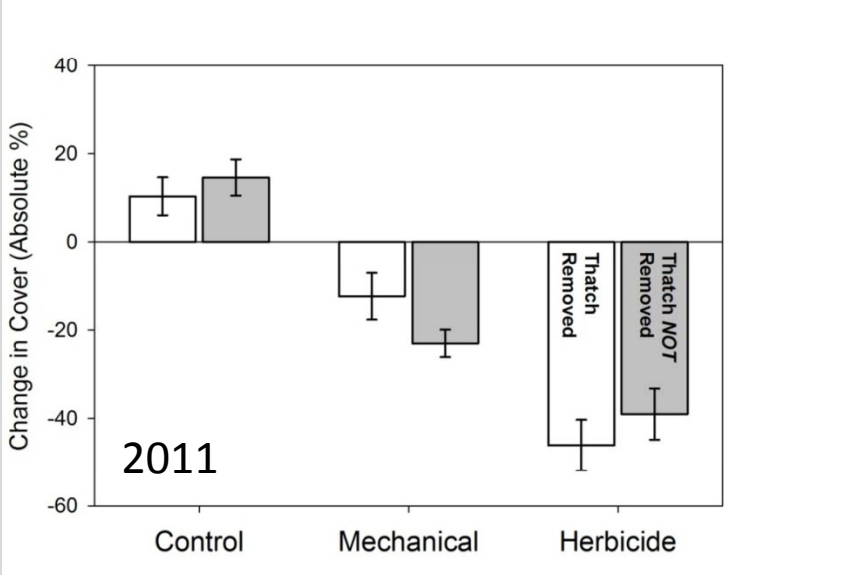
- Effects of different treatments in reducing cover of *Brachypodium*
  - Control, herbicide (Fusilade II), mechanical
- Does thatch removal improve treatment effectiveness
- Effects of different treatments on species richness

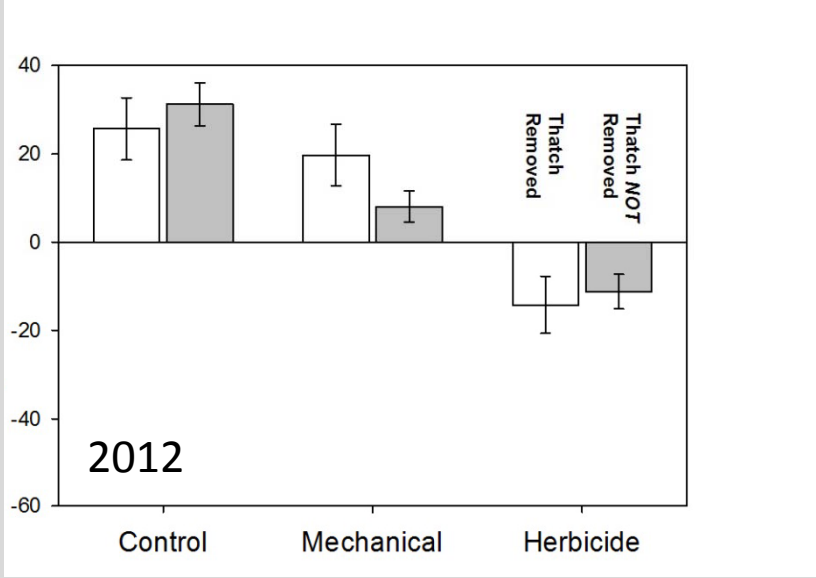
Experimental Design

- Split Plot Design
  - Tests the effects of two treatments
    - Whole plot factor/subplot factor



*2011 and 2012 Cover**

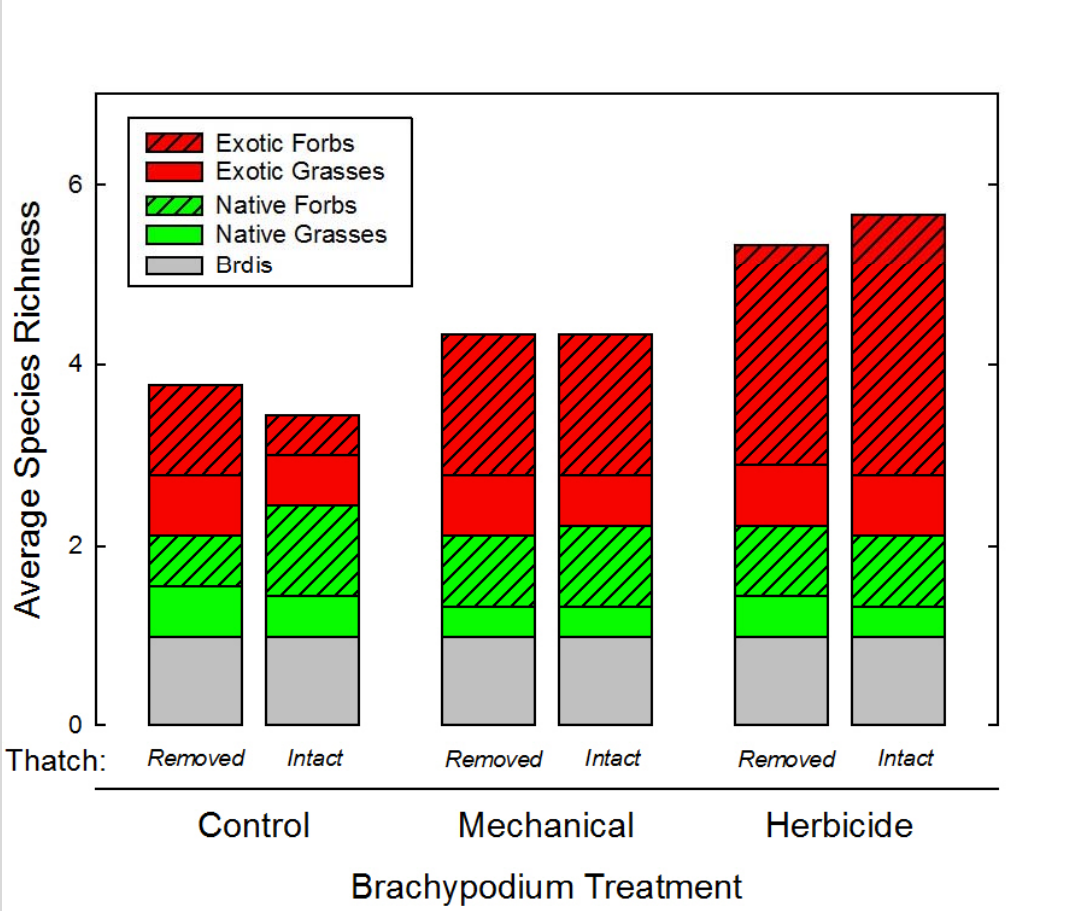




- Only treatments had significant effects; no interaction effects
- Herbicide most effective in reducing *Brachypodium* cover
- Mechanical treatment somewhat better than control; may be more effective when thatch is not removed

*All data analyses conducted by Dr. Douglas Deutschmann, IEMM

2012 Species Richness



- Herbicide - significant increase in exotic forbs
- Mechanical - significant (but smaller) increase in exotic forbs *with* thatch intact

*All data analyses conducted by Dr. Douglas Deutschmann, IEMM

Summary

- Herbicide - most effective; greatest increase in species diversity (primarily exotic forbs).
- Mechanical - better than control; effect may be enhanced when thatch is left in place.
- Thatch removal - does not appear to increase treatment effectiveness.

Next Steps

- Larger-scale treatments; experimental component
- Seed germination experiments
  - Seed viability, longevity, germination rates
- BRDIS/NOIN interactions
- City of San Diego
  - Habitat assessment data
- Develop conceptual models

Future Monitoring

- Covered Species Monitoring
- Invasives Control
- Vegetation Map Refinement
- Animal Surveys
  - California gnatcatcher
  - Hermes copper butterfly
  - Quino checkerspot butterfly??

Partners

- California Department of Fish and Game
- Endangered Habitats Conservancy
- Earth Discovery Institute
- Soil Ecology and Restoration Group (SERG)
- San Diego State University, Institute for Ecological Monitoring and Management