

November 1, 2010

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**Subject:** Quarterly Report for project entitled: "Coastal Cactus Wren Habitat Enhancement in San Pasqual Valley.

**Dates of Report:** 7/19/2010 thru 10/10/2010.

**Project Summary.** Project continues to proceed according to plan in an efficient and effective manner.

### **Progress by task for this Quarter**

#### **Task #1: Creating a Cacti Propagation and Salvage Center**

In this quarter, construction began on the new shadehouse that will serve as additional space for a container plant nursery for both cacti propagated on-site and for salvaged cacti collected as part of new, upcoming regulations established by the County of San Diego and the City of San Diego that would require salvage of cacti as part of mitigation for development projects. The shadehouse measures 60 feet x 60 feet and has sufficient room surrounding it for holding salvaged cacti and succulents (see photo).

#### *Deliverables:*

- External structure of shade house constructed.

- Benches have been assembled and await installation.



*Figure 1: Cactus and Succulent Propagation and Salvage Center as of October 10, 2010. Located adjacent to the Institute for Conservation Research, this facility will support the conservation and restoration of native species and habitats for years to come.*

## **Task #: 2: Cacti Propagation**

A total of 2,100 *Opuntia littoralis* pads are being cared for and will be planted in restoration and enhancement sites this winter. The pads are healthy with great root systems and new pads are forming.

### *Deliverables:*

- 2,100 cacti in our container nursery which will be planted this winter.

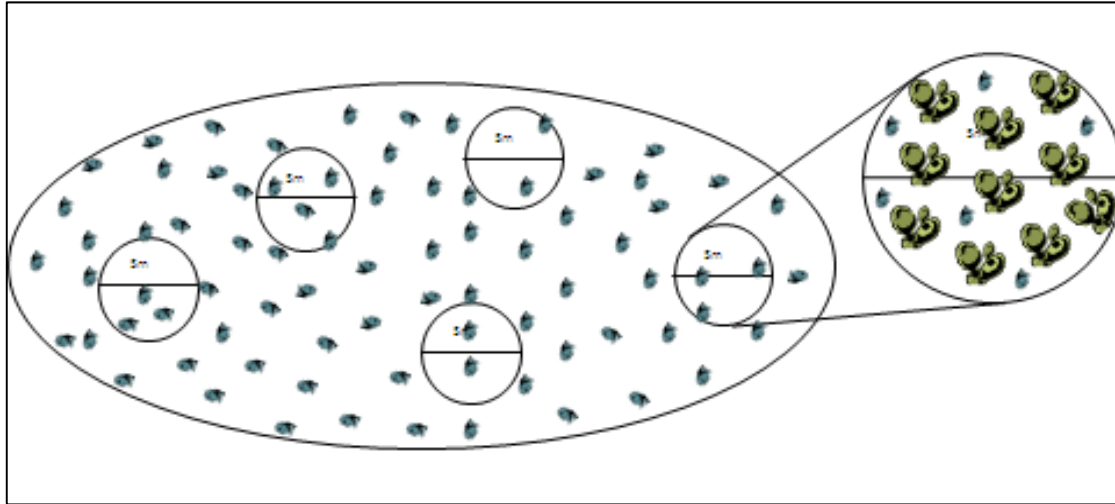


*Figure 2. Cacti awaiting outplanting. These plants are approximately 5 months old and many of them have 2-3 new pads.*

### **Task #3: Restoration and Enhancement Planting**

Our restoration and enhancement plan is complete, and 45 acres have been identified for our activities (see Figure 3). Forty-five one-acre cactus enhancement areas were selected based on restoration need, accessibility, and topography. Restoration need was determined based on percent cover of native shrubs and cactus and percent cover of invasive species data that was gathered during vegetation surveys conducted in the spring of 2010 across the MSCP reserve. Where possible, enhancement areas are located within 50 meters of roads to maximize feasibility of management actions such as planting, watering, and monitoring. Since cactus generally grows on south facing slopes, all restoration areas are confined to southward facing slopes (90-270°) or areas where cactus was known to exist prior to the 2007 fires (based on photographic evidence).

Within each enhancement area, there will be 5 circular plots, or “islands” measuring 5 meters in diameter. Each island will be planted with approximately 10-11 propagated (larger) cacti. The exact number of cacti planted within each subplot will be determined based on the restoration need of the plot. For example: a plot that has existing native shrubs and/or cactus would require fewer cactus plantings than plots without native shrubs/cactus. One hundred cactus pads will also be directly planted throughout each enhancement area both within and around the “islands.” By using this planting design we hope to create a mosaic of tall cactus patches that will establish relatively quickly surrounded by smaller cacti that will take a longer time to reach suitable nesting height but still may help to deter predators and link habitat patches.



*Figure 4: Each 1 acre enhancement area will contain 100 cactus pads planted directly into the soil, and five "islands" containing propagated cacti.*

Each year, 15 enhancement areas will be randomly selected to undergo enhancement. Enhancement plantings will occur in December of each year to allow the winter rains to aid establishment. During the first year, a subset of plantings will be the subjects of pilot studies testing different methods of increasing cactus establishment and growth. Treatments may include supplemental watering after winter rains have subsided, caging to prevent predation by herbivores, and/or application of fertilizer supplements. Based on the results of these pilot studies, larger scale experiments will be conducted on subsets of both the year 2 and year 3 plantings to evaluate cost-effective techniques for cactus wren habitat enhancement. We will also select a number of plots to monitor in existing high quality cactus habitat to be used as reference stands. Those areas are not displayed in Figure 3, but have been identified.

#### *Deliverables:*

- Clear plan for enhancement activities, set to begin in December 2010.

#### **Task # 4: Monitoring and Applied Research**

In this quarter both cactus wren habitat and cactus wrens were monitored. Results indicate approximately 25 active cactus wren nests on site. Habitat quality varies considerably, from high (large cacti, abundant native shrubs, open bare ground) to low (few cacti or native shrubs, dominated by exotic grasses). This work helped us develop our plan for Task #3 (above). See Figures 5 and 6. We have also noticed that herbivory by small mammals may be a concern for our restoration plan. As such, we are developing approaches (cages, use of predator urine) to dissuade wood rats and rabbits from browsing on freshly planted cacti. We do expect herbivory pressure to be lower in the winter when water is not as limiting on the site (it appears the pads are being browsed the most during the hottest and driest months of the year- July-October).

*Deliverables:*

- Cactus wren monitoring and identification of nest locations on property.
- Refinement of planting protocols to enhance establishment rates.

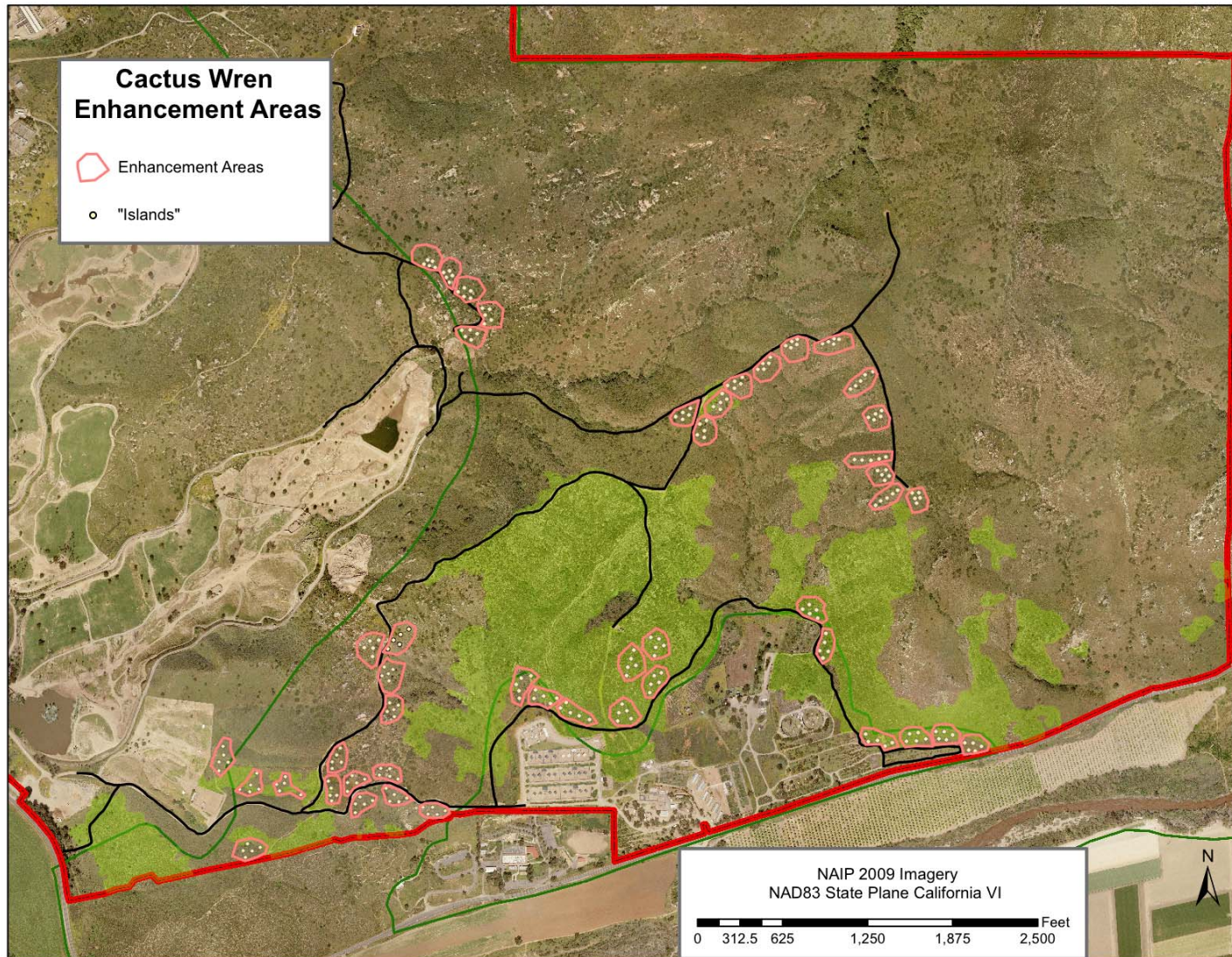
Please let me know if you have any questions.

Sincerely,

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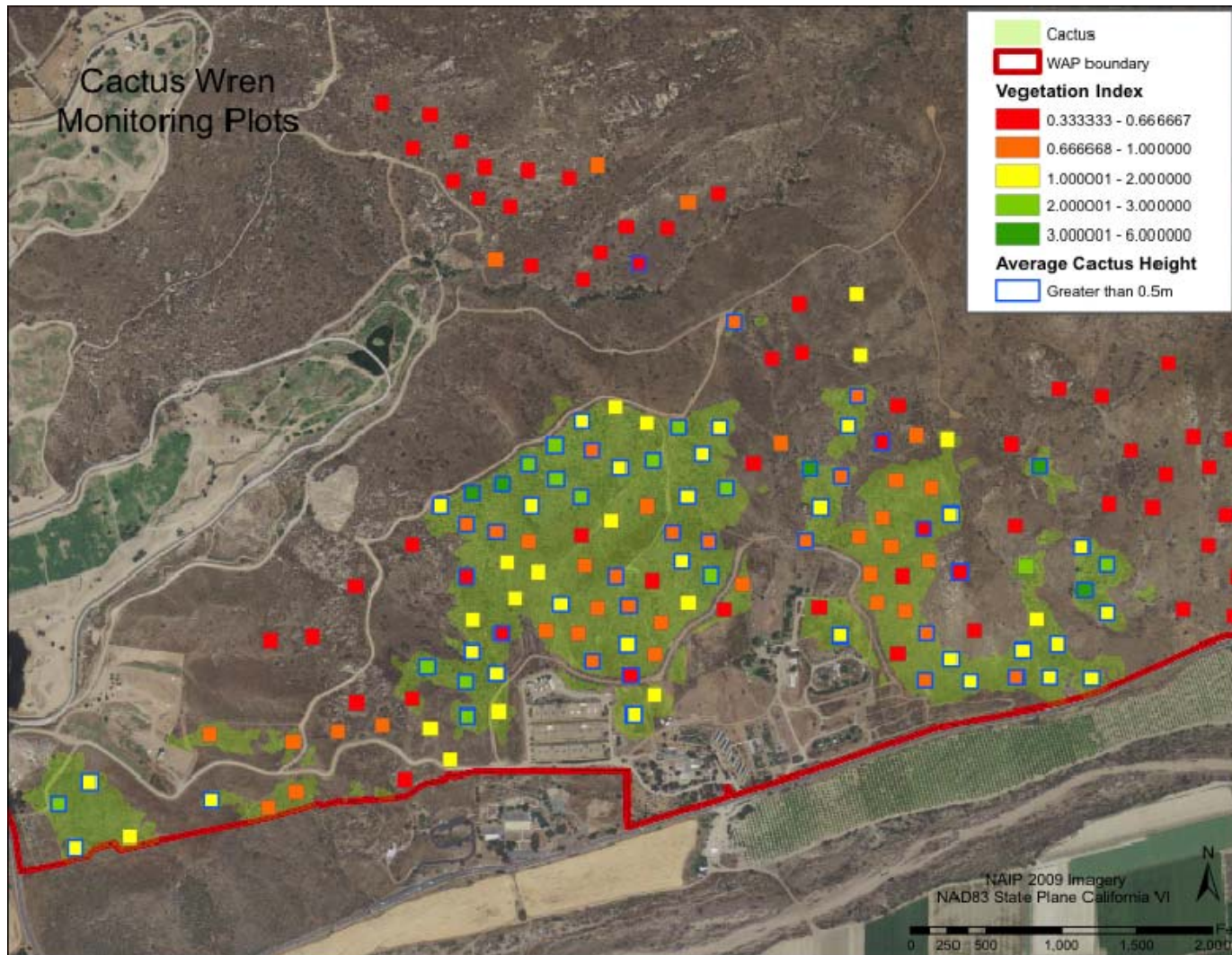
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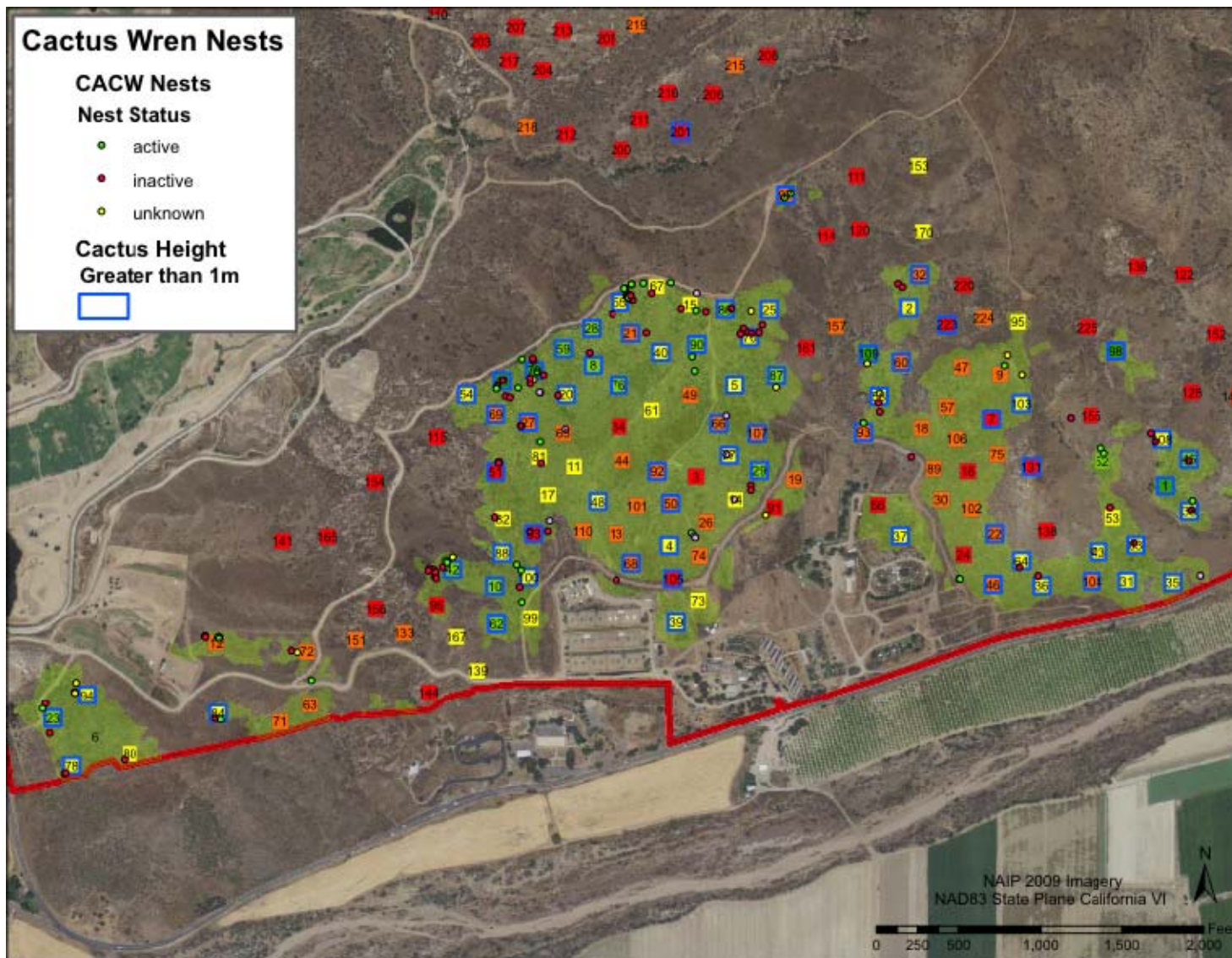
*Figure 3. Location of enhancement and restoration areas. The green area on the map represents the main areas of existing cactus scrub.*





**Figure 5 Habitat Assessment.** In 2010, 150 30x30 plots were randomly placed within the cactus scrub habitat and were surveyed for cactus wren nests (when found we GPS the location) and several vegetation/habitat variables were measured including cactus abundance, shrub abundance and species composition, exotic grass/forb abundance, presence of perching structures, height of cactus, evidence of burned cacti from 2007, etc. Presented here is an index of 'habitat quality'- the greater the value, the better the habitat quality. Values below 1 are dominated by exotic species and are targeted for restoration. The plots sampled outside of the cactus habitat area areas that were cactus scrub in the past, but have been degraded. They are optimal areas for future restoration.





**Figure 6.** Map of known cactus wren locations on our property. This is a bit messy, but shows map locations within the context of our habitat assessment plots, habitat quality (color like previous map), and cactus height (blue box with larger cacti >1m; i.e. suitable for nesting).