



# **CRAM ASSESSMENT OF THE WATSONVILLE SLOUGH FARMS**

**SUBMITTED TO THE LAND TRUST OF SANTA CRUZ COUNTY BY  
THE CENTRAL COAST WETLANDS GROUP**

**DECEMBER, 2013**



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## **PURPOSE**

The objective of this study was to characterize the condition of wetlands at the Watsonville Slough Farms using the California Rapid Assessment Method (CRAM). The Central Coast Wetlands Group (CCWG) performed CRAM assessments at several sites including areas that are slated for future restoration, areas that have been previously restored, areas of the main Watsonville Slough, and multiple assessments at a site before and after restoration. The results of these assessments provide information for managers on the current condition of wetlands at the Farms and also show the success of restoration activities.

## **PROJECT SITE**

The Watsonville Slough Farms property is a complex mosaic of wetlands, uplands, transition zones, and active farmland. The wetlands assessed for this study included a parcel adjacent to the main Watsonville Slough that was recently acquired, called the Bryant-Habert parcel. Parts of this parcel have been farmed in the past but the

**RESTORATION  
SUCCESS**

land is currently fallow. Existing vegetation communities on the Bryant Habert property include low seasonal marsh, high seasonal marsh, ruderal wet meadow, willow scrub, and ruderal grassland habitat. These vegetation communities are largely a factor of surface water conditions, ground water conditions, historic seed bank and distribution of seed from surrounding seed sources (Draft Bryant Habert Vegetation Establishment and Management Plan). The area to be restored will have several ponds excavated and will provide flood relief to Watsonville Slough. It will have a mixture of seasonally inundated areas intermixed with high seasonal marsh that will be seasonally saturated but not inundated. The border of the Watsonville Slough on the north side was previously restored with native plantings in a project known as the “Thumbs” restoration site. This restoration project was assessed to look at the condition of the project after restoration efforts.

This study also included an area under active restoration. The seasonal swale is an upper drainage of Hanson’s Slough, which was graded to create a pond for red-legged frog habitat. The area to be impounded was a very weedy seasonal swale dominated by poison hemlock and invasive mustard. It became saturated during the winter months and conveyed rain flows, but dried out in the summer apart from occasional wetting due to agricultural runoff.

## **METHODS**

### **Assessment Area Establishment**

CRAM evaluates wetland condition at specific sites within defined boundaries in what is termed the Assessment Area, or AA. There are specific guidelines for defining the AA for each CRAM module for different wetland types. For depressional wetlands the recommended size and shape is a 1 hectare circle, but there are many adjustments that can be made depending on the dimensions of the wetland being studied and the purpose of the assessment. For this study the AAs were tailored around where restoration has been or will be taking place.

At the Bryant-Habert parcel the AAs were established in areas where the grading plan shows ponds to be excavated. The area to be graded was leveled for agriculture in the past and has very little relief throughout the parcel although it slopes gently to the north. However, the vegetation is relatively homogenous with a mix of willow scrub and wet meadow habitats. Therefore, the standard 1 hectare circular AA was used and AAs were placed at approximately the areas where the depressions will be excavated. There are four deeper ponds planned for the site, and these four areas were assessed as well as an additional circular AA in an area of mixed willow scrub and wet meadow (Figure 1). The AAs were numbered for tracking purposes.

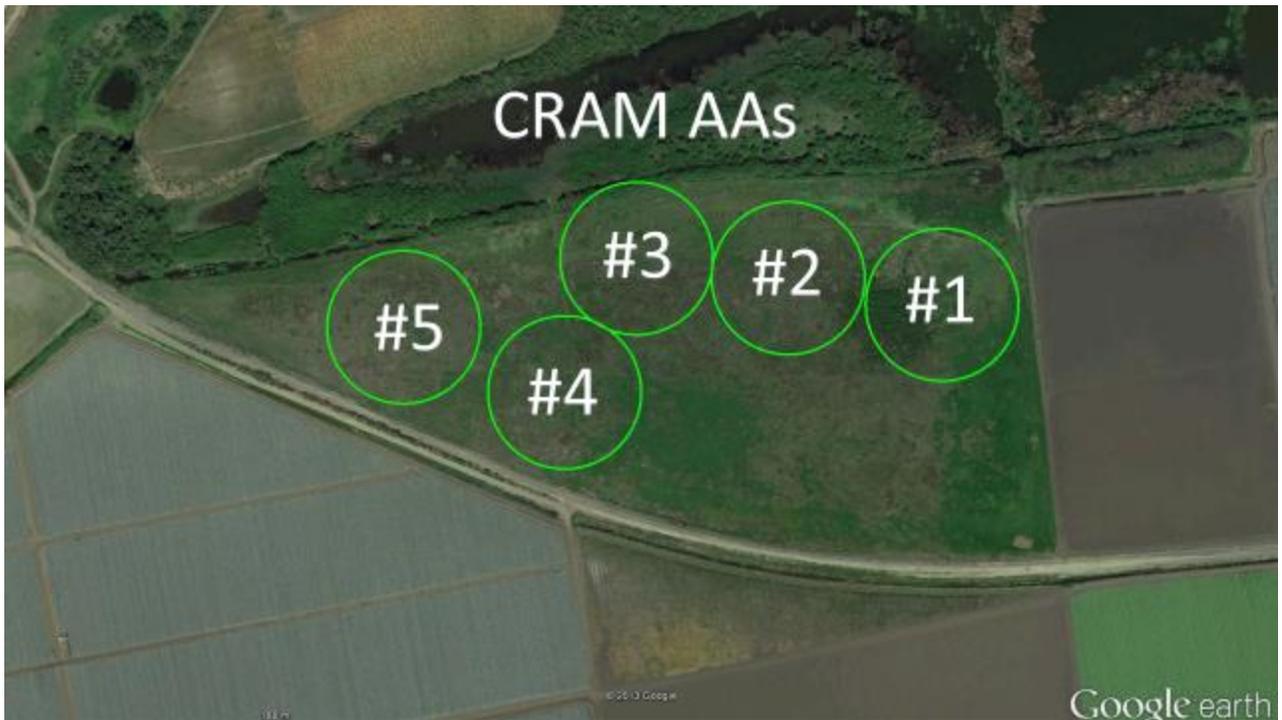


FIGURE 1. ONE HECTARE CIRCULAR AAS AT THE BRYANT-HABERT PARCEL (#1-5)

In addition to the pre-restoration assessments at Bryant-Habert, two assessments were performed in the main Watsonville Slough to assess its current condition and to give context to the pre-restoration assessments (Figure 2). These AAs were placed to encompass the gradient from the lowest elevation of the marsh up through the marsh plain and into the willow scrub. The first row of willows was included in the AA.



FIGURE 2. CRAM AAS IN THE MAIN WATSONVILLE SLOUGH (#6-7)

The “Thumbs” restoration project was also assessed as a demonstration of a post-restoration condition assessment (Figure 3). The AA was defined to include the wetland area that was restored using native plantings, as well as the adjacent wetland down to 10 meters into the unvegetated mudflat, which is the rule for CRAM AAs.



FIGURE 3. CRAM AA AT THE “THUMBS” RESTORATION SITE

At the Upper Hanson Pond site the boundaries of the AA were defined based on the footprint of the pond to be constructed on the site. When we visited the site the location of the earthen berm was staked out and we were able to see where the maximum inundation level would be. The CRAM AA includes the wetland itself and any adjacent riparian area that has vegetation directly overhanging the wetland. At the Upper Hanson Pond site the surrounding vegetation was mowed so there wasn't any overhanging vegetation to include in the AA. Therefore the boundary was narrowly defined as the footprint of the future pond (Figure 4).



FIGURE 4. CRAM AA AT THE UPPER HANSON POND RESTORATION SITE

### Scoring methodology

Each assessment area was evaluated according to the four universal attributes of CRAM (Table 1) using current CRAM Depressional field book (v 6.1). Details on scoring specific metrics of interest are included in the results section below.

TABLE 1. STRUCTURE OF CRAM ATTRIBUTES, METRICS, AND SUB-METRICS

Attribute	Metric (m) or Sub-metric (s)
Buffer and Landscape Context	Landscape Connectivity (m)
	Buffer (m)
	Percent of AA with Buffer (s)
	Average Buffer Width (s)
	Buffer Condition (s)
Hydrology	Water Source (m)
	Hydroperiod (m)
	Hydrologic Connectivity (m)
Physical Structure	Structural Patch Richness (m)
	Topographic Complexity (m)
Biological Structure	Plant Community (m)
	Number of Plant Layers (s)
	Number of Co-dominant Plant Species (s)
	Percent Invasive Plants (s)
	Horizontal Interspersion and Zonation (m)
	Vertical Biotic Structure (m)

## RESULTS

The pre-restoration assessments of the Bryant-Habert parcel show CRAM Index scores ranging from 59 to 68, with a mean of 62 (Figure 5). The highest scoring AA was located on the eastern edge of the property. This AA scored higher on the Landscape Context and Biotic Attributes due to its proximity to a wider part of the main slough and the presence of a large willow thicket, which increased the number of plant layers and dominant species.

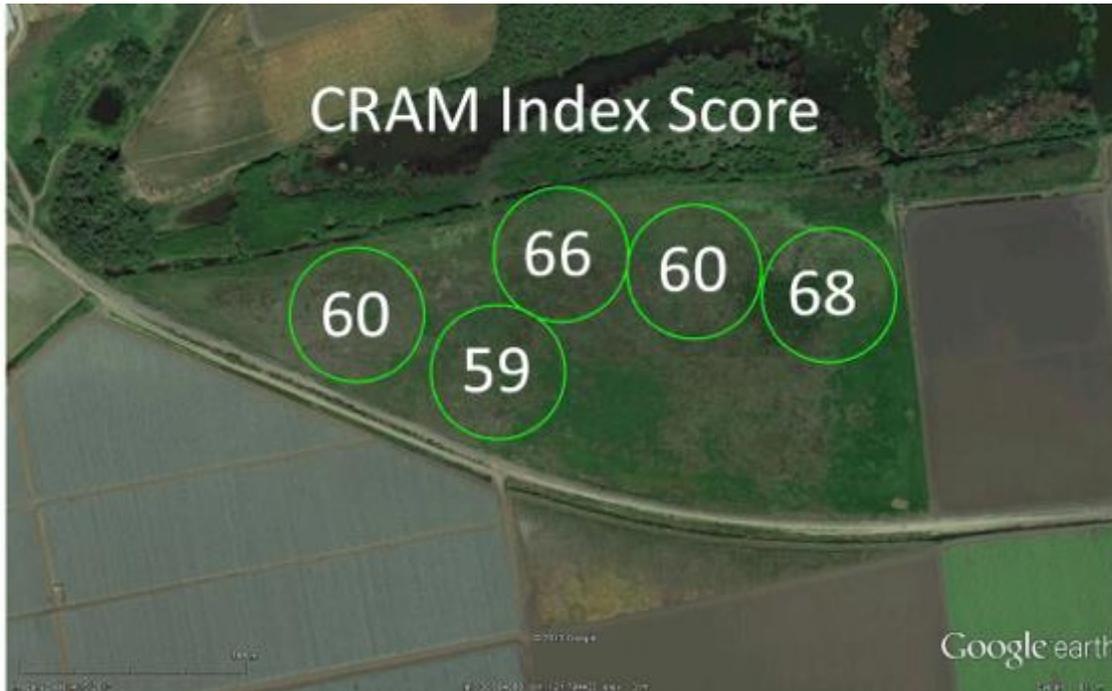


FIGURE 5. PRE-RESTORATION CRAM INDEX SCORES

For the five pre-restoration assessments, the Landscape Context Attributed ranged from 70-83, there was no variation in the Hydrology or Physical Structure Attribute, and the Biotic Attribute ranged from 53-78 (Figure 6).

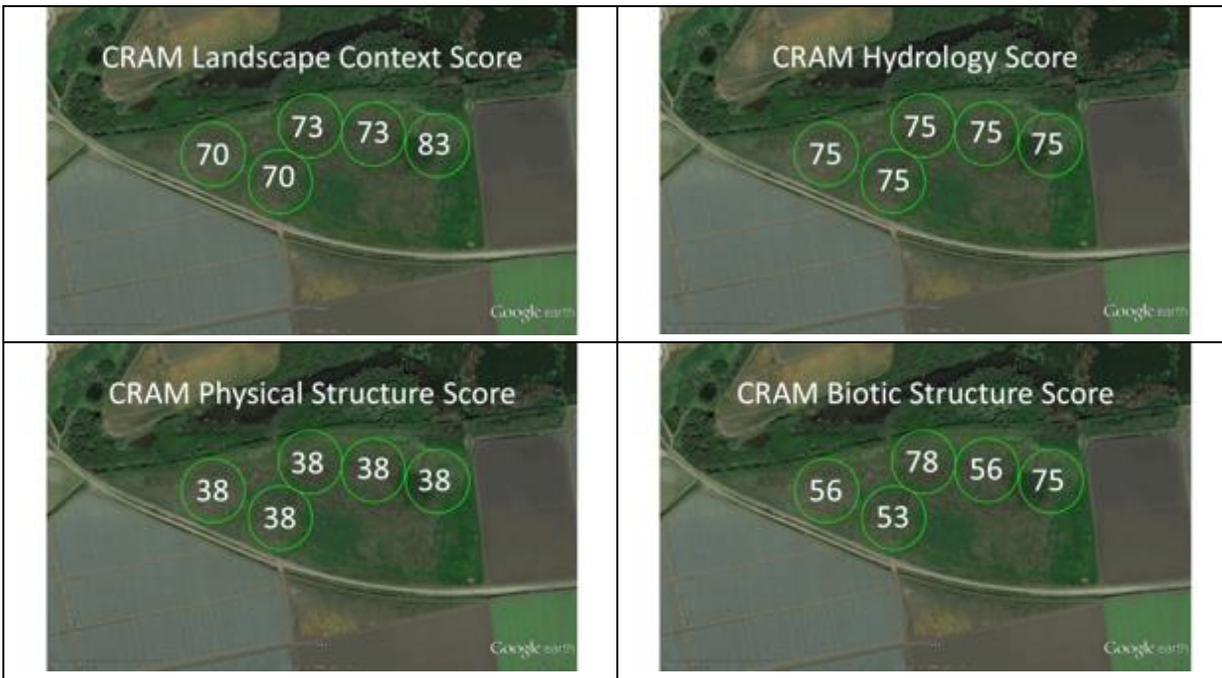


FIGURE 6. PRE-RESTORATION CRAM ATTRIBUTE SCORES

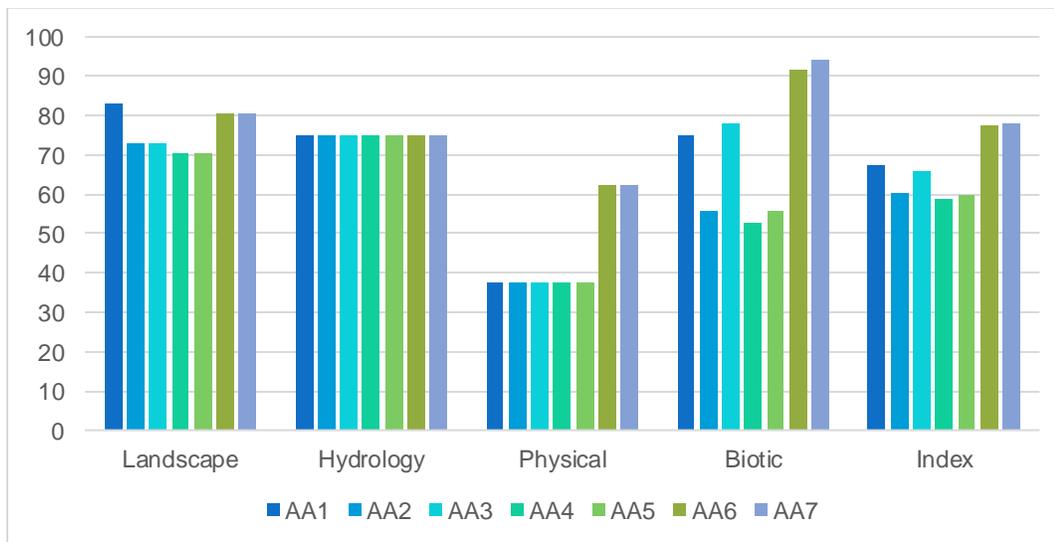


FIGURE 7. PRE-RESTORATION AND MAIN WATSONVILLE SLOUGH CRAM ATTRIBUTE SCORES

The main Watsonville Slough (# 6-7) scored much higher with Index scores of 77 and 78 as a result of higher Physical and Biotic Attribute scores (Figure 7). The main slough has been relatively undisturbed for much longer and has more complex vegetation and physical structure, while the pre-restoration area was disked within the last few years and has more invasive plants and less structural complexity.

Restoration Activities set for 2014 will most likely result in an increase in the Landscape Context (due to an increase in the amount of wetland area), Physical (due to the construction of the ponds) and Biotic (due to native planting and increased complexity in the landscape) Attribute scores.

Results from the Upper Hanson Pond pre- and post-restoration assessments are shown on the spider plot (Figure 8). Pre- and post-restoration are shown in green and red, respectively. The red line shows where the score changed after restoration.

In general, the Landscape metrics remained the same, as the surrounding landscape and buffer hadn't changed significantly. However, there is opportunity for an increase in score through restoration of the grassland buffer to improve cover of natives and reduce disturbance.

Two of the Hydrology metrics (Hydroperiod and Hydrologic Connectivity) had reduced scores. CRAM is measured against a reference standard of a natural wetland, and wetlands that have anthropogenic manipulation will score lower on these Hydrology metrics.

The Physical Structure metrics both improved, with more Physical Patch Richness and more Topographic Complexity. Four patches were added to the pre-restoration list of patches, which originally included abundant wrack and swales. The post-restoration list included: animal mounds, cobbles or boulders (these can be anthropogenic), non-vegetated flats, and swales. The Topographic Complexity score increased because the grading of the pond created a "bench", or relatively flat surface above the bottom zone of the pond that can accommodate rising water and provide a gradual moisture gradient.

The score for the number of plant layers decreased because the restoration plantings hadn't yet been established and the remaining vegetation in situ was generally senescent. Most other scores remained the same, but there is more opportunity for improvement in the Biotic Structure scores as the restoration matures. The Plant Community, Interspersion, and Vertical Biotic Structure metrics will all likely see improvement over time.

The blue line on the chart represents the nearby California Red-legged Frog Pond, which was assessed in 2011 and can be viewed as a reference site target for the restoration of the Upper Hanson Pond. Both Percent Invasion and Vertical Biotic Structure were higher at the CRLF Pond, and it is likely that the condition at Upper Hanson will gradually increase over time.

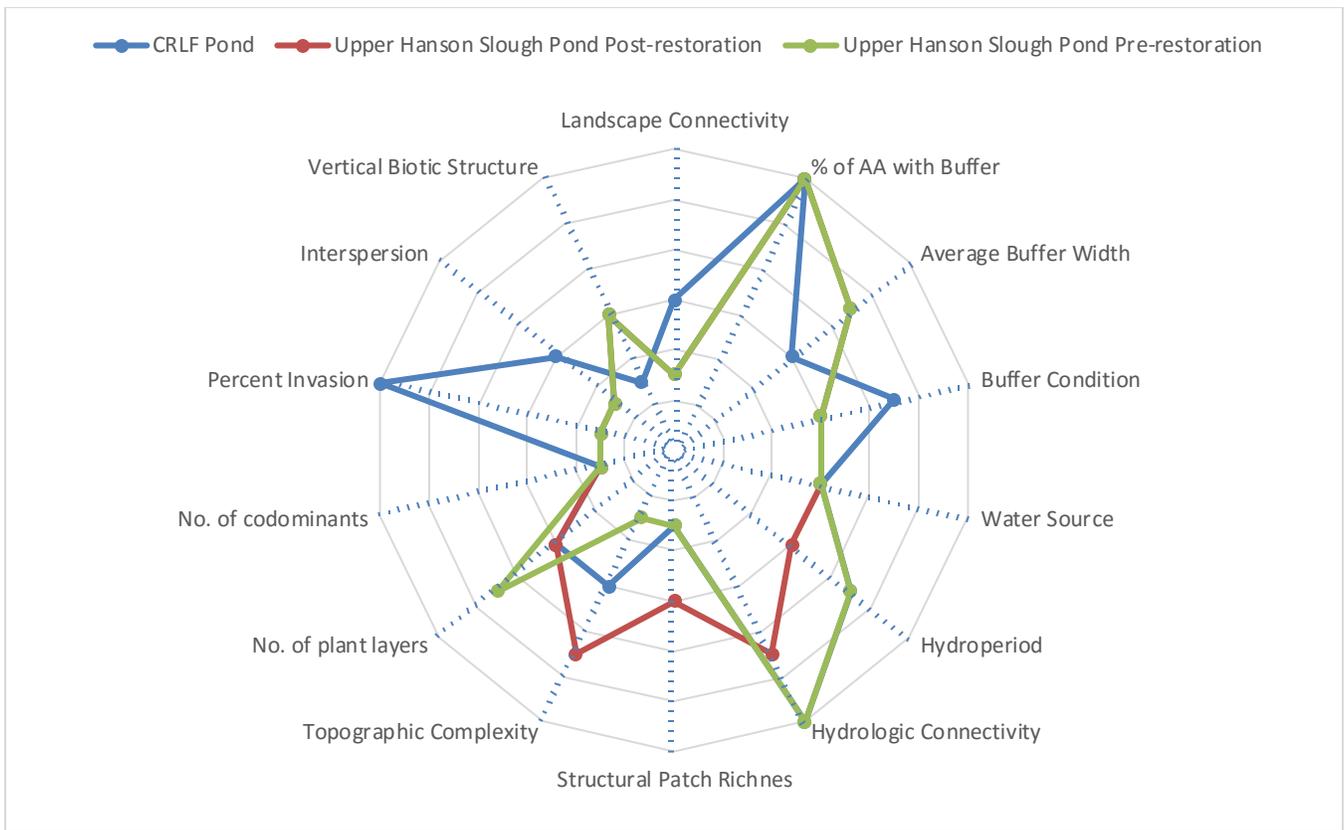


FIGURE 8. SPIDER PLOT OF UPPER HANSON SLOUGH POND PRE- AND POST-RESTORATION, WHERE EACH SPOKE OF THE WHEEL REPRESENTS A METRIC AND THE DISTANCE FROM THE CENTER INDICATES THE MAGNITUDE OF THE SCORE.

## CONCLUSIONS

CRAM surveys of wetlands at the Watsonville Slough Farms show that the area has a range of habitat values and types. Scores ranged from 46 (Upper Hanson Pre-restoration) to 78 (Main Watsonville Slough). The areas to be restored at the Bryant-Habert parcel show great potential for improvement as measured through CRAM. In particular the Physical and Biotic Structure are currently scoring relatively low, so there is room for improvement through implementation of the restoration plan.