# Salinas River Lagoon Marsh Plain Condition Assessment

## *Summary Report*

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# EXECUTIVE SUMMARY

The Central Coast Wetlands Group conducted assessments of the condition of the Salinas River Lagoon marsh plain in 2012 and 2015. The California Rapid Assessment Method for Wetlands (CRAM) was used to conduct the assessments of existing vegetation and habitat at four sites on the marsh plain.

CRAM Index scores ranged from 59 on the channel edge near the mouth to 75 further east along the channel in a more established area of the marsh. The average score for the system is 66. This puts the lagoon in the 33rd percentile of 94 similar bar-built estuaries assessed along the entire California coastline.

Several stressors were identified on the site during the assessments. While not factored into the CRAM scores, stressors can provide more detailed insight about what may be adversely affecting the ecological condition of the river, stream or creek. Stressors that were consistently observed on the site include:

- Non-point sources from agricultural areas
- Nutrients and Pesticides
- Dikes and levees along the river

Photos from the Salinas River Lagoon CRAM assessments.

## 1.0 INTRODUCTION

The Monterey County Water Resources Agency is working through the process to obtain a long-term permit for mechanical breaching of the sandbar at the mouth of the Salinas River lagoon during emergency situations to alleviate flooding. This report can serve as baseline information on the condition of the lagoon and associated marsh plain.

## 2.0 ASSESSMENT METHOD

The California Rapid Assessment Method for Wetlands (CRAM) is a rapid habitat condition assessment. CRAM is a standardized tool for wetland monitoring, developed with support from EPA. It is based on the concept that the structure and complexity of a wetland is indicative of its capacity to provide a range of functions and services. It is designed for assessing ambient conditions within watersheds, regions, and throughout the State. It can also be used to assess the performance of restoration projects. CRAM requires a team of 2-3 trained practitioners less than 3 hours to assess a representative wetland area.

CRAM is composed of four main attributes of condition:

1. **Buffer and Landscape Context** - measured by assessing the quantity and condition of adjacent aquatic areas as well as extent and quality of the buffering environment adjacent to the Assessment Area.
2. **Hydrology** - assesses the sources of water, the hydroperiod of the estuary from evidence of alterations to the mouth of the lagoon, and the hydrologic connectivity of rising flood waters in the estuary
3. **Physical Structure** - measured by counting the number of patch types[1] found within the AA and the topographic complexity of the marsh plain.
4. **Biotic Structure** - measures the site on several factors including the number of plant vertical layers[2], the number of different species that are commonly found in the marsh, the percent of the common species that are invasive, and the horizontal and vertical heterogeneity of the plant communities.

These four attributes are consistent for all wetland modules of CRAM. Each of the four attribute categories is comprised of a number of metrics and submetrics that are evaluated in the field and scored on a scale of (A)12 to (D)3. The metrics that are measured may vary between wetland types. Each of the four attribute categories are then converted to a scale of 25 through 100, and the average of these four scores is the final CRAM index score, also ranging on a scale from 25 (lowest possible) to a maximum of 100.

The scale of condition categories presented in Table 1 is appropriate for the purposes of evenly distributing CRAM results into quartiles.

[1] A patch is a spatially distinct structural element of a wetland system large enough to serve as a habitat for wildlife, or to serve as an indicator of spatial variations in hydrological or edaphic (soil) conditions within a wetland.
[2] Plant layer type definitions include: floating (growing on water surface); short (<0.3 m); medium (0.3 – 1.0 m); tall (1.0 – 3.0 m); and very tall (>3.0 m).

**Table 1.** CRAM condition categories and associated index scoring ranges.

| Condition Category | Total CRAM Index Score Range |
|---|---|
| Excellent | 82-100 |
| Good | 63-81 |
| Fair | 44-62 |
| Poor | 25-43 |

CCWG conducted four CRAM assessments in October 2012 and June 2015 (Figure 1).


**Figure 1.** CRAM Assessment Area locations for the Salinas River lagoon completed in October 2012 (1 & 3) and June 2015 (2 & 4).

## 3.0 ASSESSMENT RESULTS

The Bar-built Estuary CRAM assessment of the Salinas River lagoon showed an average condition score of 66 (Figure 2, Table 2). The Index Scores ranged from 59 to 75, with the higher scores along the main channel in the more established areas of the marsh, away from the natural disturbance of the mouth and dunes. Three of the sites scored in the "good" category and one site scored in the "fair" category.


**Figure 2.** CRAM Index scores for each Assessment Area in the Salinas River lagoon. Site 1 scored in the "fair" category, while the remaining sites scored in the "good" category.

**Table 2.** CRAM Metric, Attribute and Index Scores for each Assessment Area. For metric scoring, A=12, B=9, C=6 and D=3.

| Project Name | 2012 BBE CC Ambient Assessment | 2015 BBE State Parks | 2012 BBE CC Ambient Assessment | 2015 BBE State Parks | Salinas Lagoon Average Score |
|---|---|---|---|---|---|
| **Site Name** | 1 | 2 | 3 | 4 | |
| **Date of Assessment** | 10/17/12 | 6/29/15 | 10/17/12 | 6/29/15 | |
| **Assessors** | CC, SSD, Chris Caris | KO, SSD | CC, SSD, Chris Caris | KO, SSD | |
| **Wetland Class** | BBE | BBE | BBE | BBE | |
| **open/closed** | partially open | closed | partially open | closed | |
| | | | | | |
| **CRAM Attribute and Metric Scores** | | | | | |
| **Buffer and Landscape Connectivity** | **81** | **88** | **88** | **88** | **86** |
| **Aquatic Area Abundance Metrics** | 9 | 9 | 9 | 9 | |
| Riverine | 3 | 3 | 3 | 3 | |
| Landscape | 12 | 12 | 12 | 12 | |
| Marine | 12 | 12 | 12 | 12 | |
| **Buffer Metrics** | 10 | 12 | 12 | 12 | |
| % of AA with Buffer | 12 | 12 | 12 | 12 | |
| Average Buffer Width | 12 | 12 | 12 | 12 | |
| Buffer Condition | 9 | 12 | 12 | 12 | |
| | | | | | |
| **Hydrology** | **67** | **67** | **67** | **67** | **67** |
| Water Source | 6 | 6 | 6 | 6 | |
| Hydroperiod | 9 | 9 | 9 | 9 | |
| Hydrologic Connectivity | 9 | 9 | 9 | 9 | |
| | | | | | |
| **Physical Structure** | **38** | **63** | **38** | **38** | **44** |
| Structural Patch Richnes | 3 | 9 | 3 | 3 | |
| Topographic Complexity | 6 | 6 | 6 | 6 | |
| | | | | | |
| **Biotic Structure** | **53** | **83** | **75** | **61** | **68** |
| PC: No. of plant layers | 6 | 6 | 6 | 6 | |
| PC: No. of codominants | 6 | 9 | 9 | 3 | |
| PC: Percent Invasion | 9 | 12 | 12 | 12 | |
| **Plant Community Metrics** | 7 | 9 | 9 | 7 | |
| Interspersion | 3 | 9 | 6 | 3 | |
| Vertical Biotic Structure | 9 | 12 | 12 | 12 | |
| | | | | | |
| **Overall AA Score** | **59** | **75** | **67** | **63** | **66** |

The average Buffer and Landscape Context Attribute score showed an excellent condition score of 86, ranging from 81 to 88 (Figure 3). This was due to the Salinas Lagoon and marsh plain being very large in size, allowing for the assessment areas to have wide buffers of wetland and upland habitat surrounding them. In addition, there is good connectivity with the marine environment, without any impediments to mouth migration or sand transport. This attribute did however score very low for stream corridor continuity due to the lack of a wide riparian corridor upstream of the transition from an estuarine environment to a riverine environment.


**Figure 3.** Buffer and Landscape Attribute scores for each Assessment Area for the Salinas River lagoon.

All four assessment areas received a good condition score of 67 for the Hydrology Attribute (Figure 4). The reason for the lack of variability is due to the design of the metrics and what they assess. All three metrics look at landscape level indicators of condition, so all assessment areas in a system will most often receive the same score. The assessment areas scored low for the water source metric due to the high amount of agricultural land use in the immediate watershed. The Hydroperiod metric, which looks at the breaching pattern of the mouth, received a moderate score. The Hydrologic Connectivity metric also received a moderate score due to the presence of some levees within the system, restricting the spread of rising floodwaters up a natural transition zone from wetland to upland.


**Figure 4.** Hydrology Attribute scores for each Assessment Area for the Salinas River lagoon.

The Physical Structure Attribute received an average score of 44, ranging from 38 to 63. The majority of the sites received a score in the "poor" condition category due to due to a low number of physical patch types observed in the assessment areas and a lack of topographic complexity across the marsh plain.


**Figure 5.** Physical Structure Attribute scores for each Assessment Area for the Salinas River lagoon.

The Biotic Structure Attribute received an average condition score of 78, ranging from 53 to 83, and falling in the "good" category. Three out of the four sites received the maximum score for lack of invasive plant species and biotic vertical structure, which looks at the density of the canopy of the marsh vegetation. Most of the sites received low to moderate scores for the number of plant layers, number of co-dominant plant species and the interspersion of plant zones across the marsh plain.


**Figure 6.** Biotic Structure Attribute scores for each Assessment Area for the Salinas River lagoon.

In general, the Salinas River Lagoon falls in the lower end of what is considered a "good" condition estuary in California according to CRAM. Figure 7 provides context on how this lagoon compares to lagoons throughout California. The Salinas River lagoon falls in the 33rd percentile of 94 bar-built estuaries, a.k.a. lagoons, in California. Two-thirds of the estuaries assessed had higher scores than the Salinas River lagoon, while one-third of sites had lower scores (Figure 7). The sites assessed are representative of the entire coastline and a wide range of sizes of estuaries.

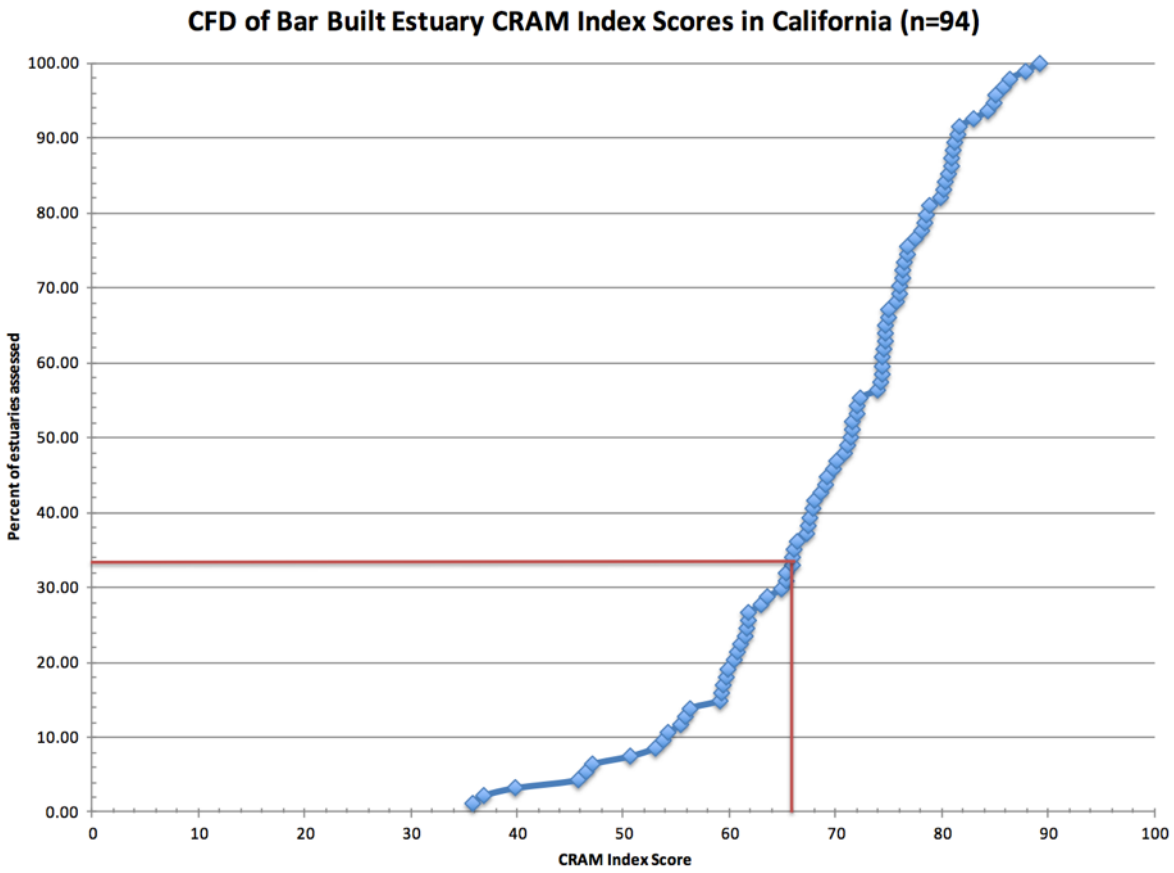


**Figure 7.** Cumulative Frequency Distribution graph of CRAM Index Scores from 94 bar-built estuaries in California. The red line represents the Salinas River lagoon.