

**Development of a Regional Monitoring Program for Central
California Wetlands**

Funded by EPA region 9

A final report for the EPA section 104 grant program

EPA Award No. CD-96911301

Submitted by the

**Moss Landing Marine Laboratories in partnership with the California Coastal
Commission and the Central Coast Wetland Working Group**

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Signature/Approval Page

Project Name: Development of Regional Monitoring Program
EPA Award No. CD-96911301

Moss Landing Marine Laboratories

| <u>Title</u> | <u>Name</u> | <u>Signature</u> | <u>Date</u> |
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| | |
|-----------------------|---|
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Project Summary:

Federal funds provided for this project have supported the development of a central coast regional component for the California Rapid Assessment Method for wetlands. The work conducted under this grant occurred simultaneously in the San Francisco Bay Area and the Southern California Bight, with project partners from the San Francisco Estuary Institute and the Southern California Coastal Water Research Program. The project was funded and overseen by EPA region 9.

The long-term goal of this inter-regional collaboration is to develop a statewide monitoring program that will track status and trends of wetland quality and condition. This project helped to develop the monitoring tools and infrastructure and to build institutional capacity to assess the extent and condition of the State's wetlands. As such, the regions share a common conceptual approach to monitoring (Level I-II-III as outline in the EPA guidance letter) as well as resources and expertise to develop standardized resource mapping methods, assessment and data management tools. The joint effort among the regional collaborators ensures that the resulting assessment tools are responsive to regional issues while also yielding results that can be interpreted and used within a statewide context.

The project coordinated by Moss Landing Marine Laboratories helped to standardize and expand regional wetland monitoring and has inspired the formation of a group of local agencies and organizations on the Central Coast with an interest in collaborating on wetland assessment and monitoring. Funding of this project has directly or indirectly contributed to the achievement of important milestones in the development of the Monitoring Program:

- Completion of the calibration process for CRAM of estuarine and riverine wetlands
- Presentation of CRAM at the Wetland Monitoring Workshop
- Development of CRAM manual 4.2 and supportive training materials
- Formation of an informal regional monitoring advisory group

The specific project activities that Moss Landing Marine Laboratories conducted under this project were to provide regional assessment data and statistical support for the calibration process, to contribute to the development and authorship of the CRAM manual and support

materials, to collaborate with regional partners on the structure and direction of the monitoring program and to represent the region at statewide coordination meetings. All of the task deliverables for this project were completed and are included either in the report appendices or the associated CD.

Task Completion and Deliverables

TASK 1: Engage in project administration tasks and update quality control documentation

Task 1 description: The purpose of this task is to manage grant reporting requirements and update the quality assurance project plan (QAPP) to govern the collection of assessment and calibration study data, and to accommodate costs associated with project administration.

| | <u>% Complete</u> |
|---|--------------------------|
| • Details necessary to complete Task 1 | |
| Update quality assurance project plan (QAPP) | 100% |
| Produce quarterly reports | 100% |
| • Task Deliverables | |
| ✓ Updated quality assurance project plan (QAPP) | |
| ✓ Quarterly reports on program progress | |
| • Completion of Deliverables | |
| The QAPP outlined procedures for the collection and assessment of data. The QAPP document was approved in May 2005 and is included on the CD that accompanies this report. In addition to this final report seven quarterly reports were completed and submitted to document progress in the completion of task deliverables. | |

TASK 2: Complete development of landscape-context metrics for CRAM and present results to partners.

Task 2 description: The purpose of this task is to identify the components of a landscape-context metric that uses wetland inventory and sources of imagery to arrive at GIS-based measurements of wetland connectivity and rarity within the watershed. Methodology will also be developed to quantify surrounding land use and other landscape-scale indicators of stress on the wetland. Our goal is to have a calibrated version of CRAM, which includes measurements of connectivity and surrounding land use in order to make the method more robust.

% Complete

- **Details necessary to complete Task 2**

| | |
|---|------|
| Complete development of landscape context metrics | 100% |
|---|------|

- **Deliverables**

- ✓ CRAM Version 4.0 (the calibrated version) which includes landscape context metrics and a stressor checklist with measurements of surrounding land use and other landscape-scale indicators of stress.

- **Completion of Deliverables**

As a deliverable for this task two important components of the CRAM protocol were developed. The landscape and buffer metrics assess the wetlands position within its watershed and its connectivity to other wetland systems. Although the original intention was to use GIS data to make this metric more robust it has proven to be technically challenging. Among other reasons, we have not been able to locate statewide data of sufficient quality that we can conduct consistent interpretations. The landscape metrics will continue to evolve beyond the timeframe of this grant to more accurately reflect their intended goals. Nonetheless landscape metrics that do not depend on GIS technology have been developed and tested. These metrics are included in the CRAM 4.0 manual. The stressor checklist provides a tool to relate wetland condition as it is assessed by CRAM to anthropogenic disturbance. The landscape metrics and stressor checklist were completed and released along with the rest of the calibrated CRAM Version 4.0 in May 2006. A more recent version of the manual (4.2) can be found at www.cramwetlands.org and is also included on the CD associated with this final report.

TASK 3: Complete calibration/refinement of CRAM for at least two wetland classes (riverine, estuarine, depressional).

Task 3 description: The purpose of Task 3 is to coordinate CRAM calibration in, at a minimum 2 of the 3 central coast priority wetland classes (riverine, depressional and estuarine). Activities associated with CRAM calibration include: 1) identification of calibration sites, 2) identification of existing data sources, 3) completion of CRAM surveys for selected wetlands, 4) collection of new data as necessary, 5) Systematic and statistical analysis of calibration data to determine metric scaling and weighting for sites.

| | <u>% Complete</u> |
|---|-------------------|
| <ul style="list-style-type: none"> • Details necessary to complete task | |
| Complete CRAM surveys for two wetland classes | 100% |
| Analyze calibration data and determine metric scaling, weighting, and combination rules for wetland attributes | 100% |
| <ul style="list-style-type: none"> • Deliverables | |
| Task 3 deliverables will include the following items or data: | |
| ✓ a) lists of calibration sites and existing data sources that were used for calibration, | |
| ✓ b) list of finalized field indicators of wetland condition, | |
| ✓ c) CRAM calibration database and, | |
| ✓ d) a report documenting methodology and results of the calibration studies and how they were used to finalize CRAM metric scaling and combine metrics into attributes. | |
| <ul style="list-style-type: none"> • Completion of Deliverables | |
| The list of finalized field indicators consists of 7 submetrics, 11 metrics and 4 attributes. The Central Coast Team completed a total of 57 assessments in both Northern and Central California as part of the calibration exercise. The exercise was successful in that it provided the core team with valuable information to adjust and improve the CRAM methodology. All Task 3 deliverables have been completed. See Appendix 3 for a statewide map and a regional list of calibration sites, a complete list of field indicators and a report outlining the steps of the calibration exercise and its results. | |

TASK 4: Complete documentation for CRAM, including a user's manual and training material.

Task 4 description: The purpose of this task is to collaborate regional partners on the completion of a single user's manual, and training materials for conducting CRAM. Training materials will include tools to support outreach to agencies to facilitate their incorporation of CRAM into their programs (e.g. PowerPoint presentations, photo libraries of reference wetlands across a gradient of quality, and photos depicting the various indicators of wetland condition).

| | <u>% Complete</u> |
|---|-------------------------|
| <ul style="list-style-type: none"> • Details necessary to complete task <ul style="list-style-type: none"> Complete CRAM Version 4.0 user's manual Develop training materials | <p>100%</p> <p>100%</p> |
| <ul style="list-style-type: none"> • Deliverables <ul style="list-style-type: none"> ✓ CRAM Version 4.0 user's manual ✓ Training materials | |
| <ul style="list-style-type: none"> • Completion of Deliverables <p>CRAM Version 4.0 was released in May at the California Wetland Monitoring Workshop. The manual can be found at www.cramwetlands.org. Training materials were developed, including a PowerPoint training presentation, a field manual and a field and digital photo patch dictionary. The training presentation and the field and digital reference library have been updated to reflect changes to the methodology. The initial effort at consolidating the manual into a field manual was replaced by <u>CRAM manual Volume 2</u> which contains in one place all of the tables and diagrams needed to conduct an assessment. The CRAM manual and the training materials included on the CD associated with this report provide guidance to CRAM practitioners in the proper use of the assessment method.</p> | |

TASK 5: Identify and develop user groups to demonstrate CRAM for regulatory, planning, and management purposes.

Task 5 Description: The purpose of this task is to identify and develop user groups to demonstrate CRAM for regulatory, planning and management purposes. A critical part of this task is to identify key needs of the user groups that should be considered in future steps of CRAM implementation.

| | <u>% Complete</u> |
|--|-------------------|
| <ul style="list-style-type: none"> • Details necessary to complete task | |
| Identify and develop user groups | 100% |
| <ul style="list-style-type: none"> • Deliverables | |
| ✓ A list of potential user groups and a summary of key needs to consider in the implementation of CRAM. | |
| <ul style="list-style-type: none"> • Completion of Deliverables | |
| Throughout the course of the grant period the Central Coast team has been in conversation with representatives from various state and local agencies. As a result of these conversations we compiled a list of potential Central Coast partners. In addition we sent out a questionnaire to potential CRAM users to determine what issues needed to be addressed for their agencies to adopt CRAM into their monitoring programs. A list of potential users and a synopsis of key issues is included as a deliverable for this report in Appendix 5. | |

TASK 6: Demonstrate the use of CRAM and the Level I-II-III assessment approach in one or more watersheds and present results to partners.

Task 6: This task will demonstrate the use of CRAM for a variety of different applications such as regional ambient assessment, land use planning, as well as monitoring associated with regulatory programs. The Central Coast Wetland Working Group will work with user groups identified in task 5 to develop internal guidance for how CRAM should be used in a particular application and present results to project partners.

| | <u>% Complete</u> |
|--|-------------------|
| <ul style="list-style-type: none"> • Details necessary to complete task | |
| Work with user groups to develop internal guidance on CRAM use for a particular application | 100% |
| Present results to project partners | 100% |
| <ul style="list-style-type: none"> • Deliverables | |
| A report outlining next steps to partner use of CRAM for current regulatory and management programs. | |
| <ul style="list-style-type: none"> • Completion of Deliverables | |
| As an extension of the questionnaire that was sent to local and state agencies we had more in depth communication with key stakeholders to understand their position on various topics regarding next steps to partner use of CRAM. Themes evolved around particular issues which we tried to capture in a brief report. Each of these themes will need to be addressed in order to institutionalize CRAM. The report is included as appendix 6. | |

Task Balance Sheet

| Task | Subtask | EPA Costs | % Complete | Subtask Cost | Task Invoice Amount |
|----------------------|--|------------------|-------------|--------------|---------------------|
| Task 1 Totals | | \$5000 | | | \$5000 |
| Task 1 | Update quality assurance project plan | \$0 | 100% | \$0 | |
| Task 1 | Quarterly Reports | \$5000 | 100% | \$5000 | |
| Task 2 Totals | | \$5000 | | | \$5000 |
| Task 2 | Complete development of landscape context metrics | \$5000 | 100% | \$5000 | |
| Task 3 Totals | | \$95,000 | | | \$95,000 |
| Task 3A | Complete CRAM Surveys and collect any necessary new-data for two wetland classes | \$70,000 | 100% | \$70,000 | |
| Task 3B | Analyze calibration data and determine metric scaling, weighting, and combination rules for wetland attributes | \$25,000 | 100% | \$25,000 | |
| Task 4 Totals | | \$25,000 | | | \$25,000 |
| Task 4a | Complete CRAM Version 4.0 User's Manual | \$0 | 100% | \$0 | |
| Task 4b | Develop training materials | \$25,000 | 100% | \$25,000 | |
| Task 5 Totals | | \$10,000 | | | \$10,000 |
| Task 5 | Identify and develop user groups | \$10,000 | 100% | \$10,000 | |
| Task 6 Totals | | \$0 | | | \$0 |
| Task 6A | Work with user groups to develop internal guidance on CRAM use for a particular application | \$0 | 100% | \$0 | |
| Task 6B | Present results to project partners | \$0 | 100% | \$0 | |
| Total | | \$140,000 | 100% | | \$140,000 |

Deliverables List:

| Task | Deliverable | Documents included in final report appendices | Documents included on DVD |
|--------|---|---|---------------------------|
| Task 1 | -Updated quality assurance project plan -Quarterly reports on program progress | ✓ ✓ | |
| Task 2 | -CRAM Version 4.0 with landscape context metric | ✓ | |
| Task 3 | -Lists of calibration sites -List of finalized field indicators of wetland condition -CRAM calibration database -A report documenting methodology and results of the calibration studies | ✓ (map and list of calibration sites) ✓ ✓ ✓ | |
| Task 4 | -CRAM Version 4.0 user's manual -Training materials | ✓ ✓ (Draft of photo dictionary website and field guide) ✓ (copy of training presentation) | |
| Task 5 | -A list of potential user groups and a summary of key needs to consider in the implementation of CRAM. | ✓ | |
| Task 6 | -A report outlining next steps to partner use of CRAM for current regulatory and management programs. | ✓ | |

Appendices

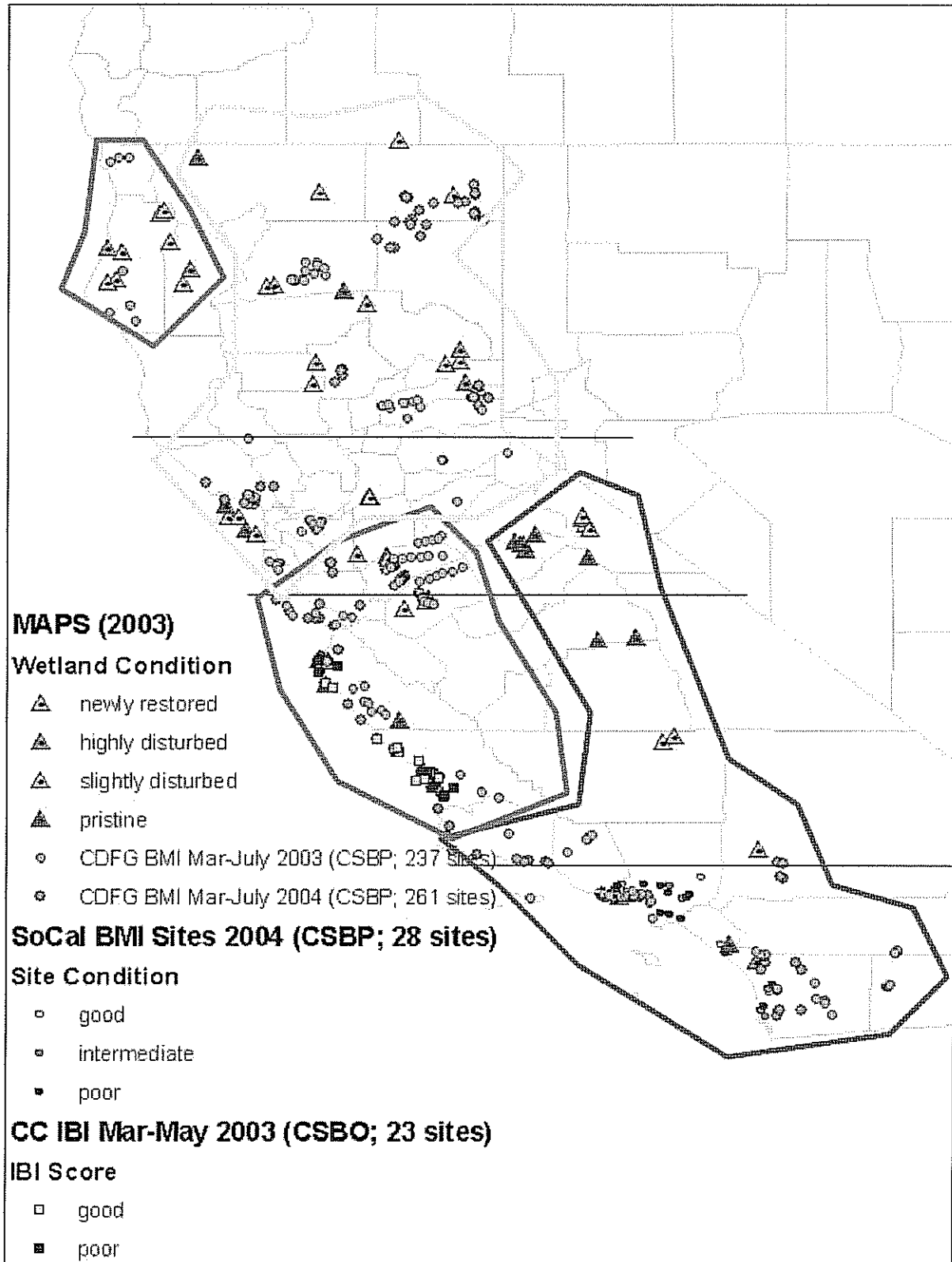
Appendix 3a- All calibration list

| SOURCE | WATER_BODY | COUNTY | Reg | LAT | LONG | Type |
|-----------|----------------------|-----------------|-----|----------|------------|-----------|
| CDFG 2003 | Carmel River | Monterey | CC | 36.53638 | -121.91168 | Riverine |
| CDFG 2003 | Carmel River | Monterey | CC | 36.52552 | -121.83057 | Riverine |
| CDFG 2003 | Garrapata Creek | Monterey | CC | 36.41553 | -121.91040 | Riverine |
| CDFG 2003 | Big Sur River | Monterey | CC | 36.28659 | -121.84305 | Riverine |
| CDFG 2003 | Big Sur River | Monterey | CC | 36.24579 | -121.77222 | Riverine |
| CDFG 2003 | Arroyo De La Cruz | San Luis Obispo | CC | 35.70834 | -121.30350 | Riverine |
| CDFG 2003 | San Simeon Creek | San Luis Obispo | CC | 35.60888 | -121.07663 | Riverine |
| CDFG 2003 | San Simeon Creek | San Luis Obispo | CC | 35.59454 | -121.12102 | Riverine |
| CDFG 2003 | Santa Rosa Creek | San Luis Obispo | CC | 35.56800 | -121.06404 | Riverine |
| CDFG 2003 | Santa Rosa Creek | San Luis Obispo | CC | 35.56799 | -121.10320 | Riverine |
| CDFG 2003 | Old Creek | San Luis Obispo | CC | 35.47167 | -120.85895 | Riverine |
| CDFG 2003 | Chorro Creek | San Luis Obispo | CC | 35.35423 | -120.82694 | Riverine |
| CDFG 2003 | San Luis Obispo C | San Luis Obispo | CC | 35.29419 | -120.64142 | Riverine |
| CDFG 2003 | Stenner Creek | San Luis Obispo | CC | 35.28046 | -120.66691 | Riverine |
| CDFG 2003 | Coon Creek | San Luis Obispo | CC | 35.25476 | -120.88549 | Riverine |
| CDFG 2003 | San Luis Obispo C | San Luis Obispo | CC | 35.24312 | -120.68015 | Riverine |
| CDFG 2003 | Arroyo Grande Cre | San Luis Obispo | CC | 35.18510 | -120.49867 | Riverine |
| CDFG 2003 | San Luis Obispo C | San Luis Obispo | CC | 35.18832 | -120.71792 | Riverine |
| CDFG 2003 | Arroyo Grande Cre | San Luis Obispo | CC | 35.11261 | -120.58627 | Riverine |
| CDFG 2003 | Arroyo Grande | San Luis Obispo | CC | 35.09521 | -120.60625 | Riverine |
| CDFG 2003 | Queseria Creek | Santa Cruz | CC | 37.04331 | -122.22138 | Riverine |
| CDFG 2003 | Queseria Creek | Santa Cruz | CC | 37.04390 | -122.22187 | Riverine |
| EMAP 2002 | Elkhorn Slough | Monterey | CC | 36.83168 | -121.74454 | Estuarine |
| EMAP 2002 | Elkhorn Slough | Monterey | CC | 36.82817 | -121.74884 | Estuarine |
| EMAP 2002 | Chorro Creek | San Luis Obispo | CC | 35.34553 | -120.83629 | Estuarine |
| EMAP 2002 | Chorro Creek | San Luis Obispo | CC | 35.34430 | -120.83168 | Estuarine |
| EMAP 2002 | Los Osos Creek | San Luis Obispo | CC | 35.33418 | -120.83638 | Estuarine |
| MAPS 2003 | San Joaquin River | Merced | CC | 37.17778 | -120.76111 | Riverine |
| MAPS 2003 | Salt Slough | Merced | CC | 37.15944 | -120.79361 | Riverine |
| MAPS 2003 | | Merced | CC | 37.08000 | -121.02222 | Riverine |
| MAPS 2003 | trib to Carmel River | Monterey | CC | 36.54389 | -121.89972 | Riverine |
| MAPS 2003 | Carmel River | Monterey | CC | 36.53833 | -121.92222 | Riverine |
| MAPS 2003 | Carmel River | Monterey | CC | 36.53667 | -121.87111 | Riverine |
| MAPS 2003 | Carmel River | Monterey | CC | 36.52500 | -121.83056 | Riverine |
| MAPS 2003 | Carmel River | Monterey | CC | 36.52278 | -121.81750 | Riverine |
| MAPS 2003 | Big Sur River | Monterey | CC | 36.28333 | -121.84139 | Riverine |
| MAPS 2003 | San Antonio River | Monterey | CC | 35.89417 | -121.07361 | Riverine |

Appendix 3a- All calibration list (continued)

| SOURCE | WATER BODY | COUNTY | Reg | LAT | LONG | Type |
|-----------|-----------------------|-----------------|-----|----------|------------|-----------|
| MAPS 2003 | Chorro Creek | San Luis Obispo | CC | 35.36111 | -120.81806 | Riverine |
| CDFG 2003 | Coldwater Creek | Del Norte | NC | 41.84611 | -124.02750 | Riverine |
| CDFG 2003 | Clarks Creek | Del Norte | NC | 41.80861 | -124.11667 | Riverine |
| CDFG 2003 | Blue Creek | Humboldt | NC | 41.44262 | -123.90951 | Riverine |
| CDFG 2003 | Fern Canyon Creek | Humboldt | NC | 41.40000 | -124.05806 | Riverine |
| CDFG 2003 | Horse Linto Creek | Humboldt | NC | 41.00861 | -123.60081 | Riverine |
| CDFG 2003 | Canoe Creek | Humboldt | NC | 40.29556 | -123.90361 | Riverine |
| EMAP 2002 | | Del Norte | NC | 41.93659 | -124.19655 | Estuarine |
| EMAP 2002 | Mad River | Humboldt | NC | 40.93619 | -124.13041 | Estuarine |
| EMAP 2002 | Mad River Slough | Humboldt | NC | 40.87940 | -124.14162 | Estuarine |
| EMAP 2002 | Arcata Bay | Humboldt | NC | 40.83865 | -124.08321 | Estuarine |
| EMAP 2002 | | Humboldt | NC | 40.66352 | -124.28878 | Estuarine |
| MAPS 2003 | Klamath River | Humboldt | NC | 41.25972 | -123.60528 | Riverine |
| MAPS 2003 | Grove's Prairie Creek | Humboldt | NC | 40.95667 | -123.48528 | Riverine |
| MAPS 2003 | Mad River | Humboldt | NC | 40.84778 | -123.98694 | Riverine |
| MAPS 2003 | Yager Creek | Humboldt | NC | 40.56000 | -124.05611 | Riverine |
| MAPS 2003 | Van Duzen River | Humboldt | NC | 40.53944 | -124.14194 | Riverine |
| MAPS 2003 | Whites Bar | Trinity | NC | 40.67472 | -123.28389 | Riverine |
| CDFG 2003 | Redwood Creek | Humboldt | NC | 40.12250 | -123.84220 | Riverine |

Appendix 3a Map of Calibration Sites



Appendix 3b Finalized Field Indicators

| Attributes | | Metrics | Sub-Metric | |
|------------------------------|---------------------------|----------------------------------|--|--|
| Buffer and Landscape Context | | Landscape Connectivity | | |
| | | Buffer | Percent of AA with Buffer | |
| | | | Average Width of Buffer | |
| | | | Buffer Condition | |
| Hydrology | | Water Source | | |
| | | Hydroperiod or Channel Stability | | |
| | | Hydrologic Connectivity | | |
| Structure | Physical | Structural Patch Richness | | |
| | | Topographic Complexity | | |
| | Biotic | Organic Matter Accumulation | | |
| | | Interspersion and Zonation | | |
| | | Plant Species | Number of Plant Layers Present | |
| | | | Percent of Layers Dominated by Non-native Species | |
| | | | Number of Co-dominant Species | |
| | | | Percent of Co-dominant Species that are Non-native | |
| | Vertical Biotic Structure | | | |

Appendix 3c CRAM Calibration Database

Refer to associated CD: file 3c_calibration_database

Appendix 3d Testing CRAM team precision

Refer to associated CD: file 3d_testing CRAM precision V1
3d_testing CRAM precision V2

Appendix 4a. CRAM Version 4.2 User's Manual:

Version 4.2 of the user's manual can be found online at:

www.cramwetlands.org

or associated CD file: 4a_CRAM 4.2_Vol1_v3

Appendix 4b. Training materials

The PowerPoint training presentation is on the attached CD:

Folder: 4b_riverine_training

The digital patch type photo dictionary can be found at:

<http://media.mlml.calstate.edu/index.php?cat=10>

or associated CD file:

Folder:4b_riverine_training

Appendix 5: Regional user's group and key needs

Central Coast Monitoring Program Regional Questionnaire

Notes from regional meeting during CRAM visit to Morro Bay, July 23-26. These notes were compiled from field meetings with numerous potential collaborators.

Agency staff present:

Bill Hoffman Central Coast Water Quality Control Board (regional board 3)

Dan Berman Morro Bay National Estuary Reserve Program

Annie Gillespie Morro Bay National Estuary Reserve Program

Brian Stark San Luis Obispo Land Conservancy

Ross Clark California Coastal Commission

Adam Wiskind Moss Landing Marine Laboratories

Other potential regional users (not present):

Elkhorn Slough National Estuary Reserve Program

Santa Cruz County

Monterey County RCD

1. How will these tools be useful to your organization? What would make them more useful?

Tracker- To track projects, as a project reference library, to learn about the history of a project site.

CRAM- To document the success of restoration efforts

- To compare restoration areas among each other and to ambient condition of watershed. Determine where to concentrate restoration efforts.
- To evaluate condition of wetlands within conservation areas.

More Useful

- If we had pre- and post- activity CRAM scores to demonstrate differences.
- If we had an understanding of ambient condition of wetlands in region.
- If we had trained staff and support materials.

2. What steps need to be taken in order for your organization to incorporate these tools into your program (ie. presentation, training, meeting).

Someone to search our records for data on projects

Another meeting to discuss details

Funding

Have staff be trained in CRAM

Have support with conducting CRAM on current projects

Have conditions provided for some current permit applications

Support for the integration of CRAM with other ambient monitoring tools (IBI, water quality, toxicity).

3. What are the barriers to incorporating these tools into your organization's monitoring program?

Tracker-

Not enough time to input projects,
duplicative effort with other databases,
For regional boards record of projects only kept 5 years
Privacy concerns
Funding to populate and manage tracker

CRAM-

Insufficient funds or structure to conduct training of staff.
Need a clearer link between results of CRAM and management actions.
Need to develop standards of acceptability, what do CRAM scores mean?

4. Are there specific people within your organization or other organizations that should be contacted regarding the incorporation of these tools into your monitoring program?

Mary Adams Region 3
California State Parks and Recreation
San Luis Obispo County

5. Any other comments about CRAM or Wetland Tracker?

Generally positive feedback on the tools.
Interest in seeing results of assessments.

Appendix 6: Outlining next steps to partner use of CRAM

This task will demonstrate the use of CRAM for a variety of different applications such as regional ambient assessment, land use planning, as well as monitoring associated with regulatory programs. The Central Coast Wetland Working Group will work with user groups identified in task 5 to develop internal guidance for how CRAM should be used in a particular application and present results to project partners.

In order for CRAM to be accepted as a component of the statewide wetland monitoring toolbox it must be regionally institutionalized. There are a number of Central Coast regional organizations that have expressed interest in learning more about CRAM and possibly adapting it into their monitoring programs:

Santa Cruz Resource Conservation District
Elkhorn Slough Foundation
Elkhorn Slough National Estuarine Reserve
Water resources Control Board Region 3
Morro Bay National Estuary Program
California Coastal Conservancy
California Coastal Commission Santa Cruz office

However, in conversation with organization staff it became apparent that additional guidance and support will be needed before CRAM can fully serve the needs of the organizations. Some of the key needs to consider in the implementation of CRAM are as follows:

Ambient condition for watersheds and estuaries along the coast - CRAM will become increasingly useful to managers and scientists as a catalog of CRAM scores is generated within the region and the state. Two current efforts are underway that will start to provide an overall picture of wetland condition throughout the state and the region. One of these is a statewide ambient assessment of estuarine wetlands. The other is an ambient assessment of the Morro Bay, Napa Valley and San Gabriel watersheds. In addition to reporting on wetland condition

trends these assessment projects will allow managers to compare the condition of their projects to ambient condition. It will be important to continue to implant these ambient assessments in order to follow trends and remain current.

CRAM training - One of the keys to institutionalizing CRAM is to teach people how to use it. We have developed some tools and are working on developing a comprehensive training program. Some of the training material that we are developing in addition to the manual is a field manual and a photographic dictionary. Our focus at this point is conduct trainings for non-regulatory organization staff. This population of professionals can take CRAM into the field and use it within their research, use it to monitor their own projects or at least be able to interpret CRAM assessments.

Regional reference network - Regional reference sites will be necessary as we develop ambient condition assessments throughout the state. They will be useful for training and for interpretation of assessment results. The sites will be public access and will be stratified to demonstrate the full range of wetland condition. A reference site guide will be created for each reference site in the network so that individuals can visit the sites independently.

Institutional requirements to use CRAM within the regulatory framework - CRAM was designed to be a monitoring tool that could be required of consultants and project managers that were applying for Regional Board or Fish and Game permits. We are in conversation with some of these agencies to get CRAM integrated into their permitting systems. We have gotten some interest but will need to continue to work in this direction.

Guidance on the interpretation of CRAM data - As organizations begin to assess sites and generate data sets it will be important to provide some suggestions about the appropriate use of CRAM data. There is some information on this topic in the manual. However, further refinement is needed regarding how CRAM scores can be utilized in monitoring program or interpreted to prioritize management activities. The CRAM website and trainings provides a further opportunity to communicate lessons as they are learned. A white paper is currently being written on this subject.