Date: March 29, 2013

To: SWAMP Roundtable Voting Members

CC: SWAMP Data Management Team; The California Wetland Monitoring Workgroup

From: Lori Webber, SWAMP Coordinator, State Water Resources Control Board; SWAMP Quality Assurance Team

Subject: Results of SWAMP Roundtable Vote – SWAMP endorses the California Rapid Assessment Method

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Background

A request was submitted to the SWAMP Coordinator by Craig J. Wilson, co-chair of the California Wetland Monitoring Workgroup, asking SWAMP to endorse the California Rapid Assessment Method (CRAM) for use in SWAMP projects. Following the procedure outlined in SWAMP's Endorsement Review Process of External Methods and Procedures, the SWAMP Coordinator distributed the formal request along with links to the relevant CRAM documents to the SWAMP Regional representatives, Data Management Coordinator, and Quality Assurance Officer on December 20, 2012. The recipients were given the opportunity to review and provide written assessments and comments related to SWAMP endorsement of the method. All submitted assessments supported SWAMP endorsement of CRAM.

These assessments were compiled and reviewed, and a memo detailing the comments was submitted along with a formal request that the SWAMP Roundtable approve CRAM for endorsement by SWAMP. This memo and supporting documents were submitted by the SWAMP Coordinator to SWAMP Roundtable voting members on March 5th via email. Voting members were provided with a March 15th deadline for submitting their vote.

Results of Roundtable Vote

All of the voting members of the SWAMP Roundtable voted in favor of approving endorsement of the California Rapid Assessment Method (CRAM) by SWAMP. This vote was finalized on March 18th, 2013.

Attachments

MEMO-CRAM Evaluation for RT Presentation.pdf

The voting memo submitted the SWAMP Roundtable on March 5th, 2013.

Non-SWAMP Method Endorsement Procedure-Method Assessments-CRAM.pdf

The collected assessments of CRAM performed by SWAMP personnel.

SWAMP
Surface Water Ambient Monitoring Program

Date: March 4, 2013

To: SWAMP Roundtable Voting Members

CC: SWAMP Data Management Team (DMT)

From: Lori Webber – State Water Resources Control Board (State Board), The Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Team (QAT)

Subject: Endorsement of the California Rapid Assessment Method (CRAM) for SWAMP Endorsement **FINAL VOTE**

Background

A request was submitted to the SWAMP Coordinator by Craig J. Wilson, co-chair of the California Wetland Monitoring Workgroup, asking SWAMP to endorse the California Rapid Assessment Method (CRAM) for use in SWAMP projects. Following the procedure outlined in SWAMP's Endorsement Review Process of External Methods and Procedures, the SWAMP Coordinator distributed the formal request along with links to the relevant CRAM documents to the SWAMP Regional representatives, Data Management Coordinator, and Quality Assurance Officer on December 20, 2012. The recipients were given the opportunity to review and provide written assessments and comments related to SWAMP endorsement of the method.

Summary Evaluations

Written assessments of the method have been submitted by SWAMP Regional representatives, DMT, and QAT. These assessments have been included an attachment to this document.

The consensus of the reviewers supports endorsement of CRAM by SWAMP. No comments opposing endorsement were received, however reviewers have submitted a number of follow-up items to be addressed if the SWAMP Roundtable votes to approve endorsement.

Some of the factors supporting endorsement are:

- The development and validation of CRAM has been thoroughly executed and extensively documented.
- CRAM continues to be refined and improved.

- CRAM is currently used within SWAMP, and has been found to be a valuable tool.

The full text of the assessments is available in the attached document *Non-SWAMP Method Endorsement Procedure-Method Assessments-CRAM.pdf*.

Follow-up Items

In order to successfully implement CRAM as a tool, SWAMP personnel will need to engage the CRAM Advisory Group to address questions related to data management and training.

Item 1: Addressing the following general questions will help initiate communication between the groups:

- Do the current methods of storing and accessing CRAM scores work well alongside the SWAMP database?
- Is all of the SWAMP-funded CRAM data as accessible as the data in the SWAMP database?

Item 2: The importance of proper training in CRAM and the critical need to follow the method as written is communicated several times in the CRAM manual. In order to further stress these points, the CRAM website should place a link to the QAPP near the field manuals.

Item 3: The DMT have provided a detailed list of database specifics to resolve. This list is included with the DMT assessment included in the attached document *Non-SWAMP Method Endorsement Procedure-Method Assessments-CRAM.pdf*.

Impacts of SWAMP endorsement of CRAM

As noted in the procedure for endorsement of non-SWAMP methods, endorsement of CRAM does not require SWAMP projects use CRAM for projects performing rapid assessments of wetlands or streams. Endorsement implies that the method has been reviewed and approved for use in SWAMP projects. Project managers may elect to use an alternate method for rapid assessment of wetlands or streams, however additional resources may be required to review this method's quality assurance and data management procedures.

Ballot

<u>Proposition:</u> Should the the California Rapid Assessment Method (CRAM) be endorsed by SWAMP?*

Check one of the following boxes to register your vote.

	Yes, SWAMP should endorse CRAM.
	No, SWAMP should not endorse CRAM.

Date:	
Name:	
Organization:	
Phone:	
Email:	

*Endorsement as defined in the document *Endorsement Review Process of External Methods and Procedures* (SWAMP_Process_Method_and_SOP_Endorsement_121712.pdf)

SWAMP Endorsement Review Process of External Methods and Procedures Assessment of the California Rapid Assessment Method (CRAM)

Introduction

The following contains assessments of the California Rapid Assessment Method (CRAM) conducted as part of SWMAP's Endorsement Review Process of External Methods and Procedures.

CRAM Assessment-Management Aspects

Staff-1 Assessment

(I have) assessed the CRAM protocol and finds it a useful tool for stream and wetland assessments and recommends SWAMP to peruse the endorsement process. SWAMP currently uses CRAM to assess stream condition during the PSA so SWAMP has a history of working with this method. The method is relatively new, but has gone through many stages of development including peer-review by the Water Board. The association between CRAM scores and bioassessment data from streams monitored under the PSA demonstrates the method is providing relatively accurate information about condition, at least where level 3 data are available.

Data from rapid assessments such as CRAM can be extremely valuable when needing to determine ecological condition at many waterbodies in a short period of time, a scenario that would be hard to accomplish using a level 3 indicator such as the SWAMP bioassessment protocol. CRAM continues to be refined and updated as it is used in more regions and habitat types. An active group (Level 2 Committee of the CWMW) is tasked with overseeing revisions and managing the method. The L2 committee also sets training standards, which is important for a method that quantifies qualitative data.

The Quality Assurance Project Plan is comprehensive and provides important information to ensure data are of known and documented quality. However, I recommend SWAMP ask the web manager of the CRAM site to highlight the need for all CRAM practitioners to follow the QAPP and put the link to the QAPP in a more obvious location. I understand that changes are happening to the CRAM website so suggestions such as this could be folded into future web changes.

In terms of data management, SWAMP will probably not need to get too involved because all CRAM data are entered directly into a database called eCRAM, even SWAMP collected data. However, SWAMP should have a discussion with CEDEN staff to discuss how CEDEN might display CRAM data or link to an external site that displays CRAM data. Wetland Tracker (managed by SFEI http://www.cramwetlands.org/cramdisplay), currently displays CRAM scores across California, but a new web site is being developed to display such CRAM and other wetland data. I believe the plan is for CRAM data to be presented through the My Water Quality wetland portal, but I cannot recall if this website will take over wetland tracker or both will exist. As a part of the SWAMP review, it would be useful to have an up-front conversation about the coordination between CEDEN and other web portals that will display CRAM data.

Need to address the following questions: Do the current methods of storing and accessing CRAM scores work well alongside the SWAMP database? Is all of the SWAMP-funded CRAM data as accessible as the data in the SWAMP database?

The importance of proper training in CRAM and the critical need to follow the method as written is communicated several times in the CRAM manual. In order to further stress these points, the CRAM website should place a link to the QAPP near the field manuals (contact Cristina Grosso to discuss suggestions for the CRAM website).

Staff-2 Assessment

I have talked extensively with the SWAMP QA team about this before voting on the endorsement memo. It is still not clear to me what the Regional Board should do for review/assessment process.

I don't really have the expertise to review the method. However, I think the team that put the method together has a great reputation, the method has undergone several reviews, and is used in many statewide projects; therefore I vote for the endorsement of CRAM by SWAMP.

CRAM Assessment-Quality Assurance

***QAT** Assessment*

Based on a formal review of the QC procedures detailed in CRAM, the SWAMP QAT recommends the endorsement of CRAM for SWAMP projects. The development and validation of CRAM has been extensively documented. The QA/QC protocols do not conflict with any

current SWAMP QA policy; therefore, CRAM could be used as part of a larger SWAMP project without conflicts.

The information generated by performing CRAM can be uploaded to a database designed to store CRAM data. Consequently, changes to the SWAMP database would not be required in order to accommodate these results. The CRAM database has developed internal methods for ensuring accurate data entry and processing. In order to successfully implement CRAM for SWAMP projects, it is critical that the personnel involved be trained in the proper application of CRAM. This training requirement applies not only the field crews directly performing CRAM on a site, but also to the project managers and other involved in executing CRAM.

This endorsement is based solely on a review of QA and QC criterion. The decision of whether or not to endorse this method must also take into account the review conducted by the SWAMP Data Management Team and the review conducted by the SWAMP Roundtable for aspects of the method's beyond their QA and QC.

Discussion

The QAT reviewed version 6.0 of CRAM, in addition to a number of supporting documents related to the development and validation of the method.

Method Development and Maintenance

CRAM was designed as part of an effort to increase California's capacity to monitor its wetlands. The impetus for this effort was the introduction of the Environmental Protection Agency's (EPA's) three-level framework for surface water monitoring and assessment. The process of drafting and revising the method has been extensively documented. The method has gone through a process of review and revision to help clarify the procedures and improve comparability of results across different sampling teams. This process of method improvement is ongoing.

The method and its supporting documentation are well maintained and regularly updated.

Precision

The precision of results generated by CRAM has been evaluated through a validation procedure conducted during method development. The precision achievable by the proper use of CRAM is

addressed in a several CRAM documents. The following passage has been drafted for inclusion in the next round of CRAM document revisions:

> *A repeatability analysis conducted during the CRAM verification/validation process for stream systems and estuarine wetlands revealed that that the precision of CRAM Index scores is +/- 6 CRAM points, and +/-10 points for the final Attribute scores. Differences in index scores of 6 CRAM points or less are within the error of the method and therefore should not be considered to represent differences in overall condition. Similarly, two final scores for the same Attribute that differ by less than 10 points should not be regarded as representing differences in condition. Higher precision at the overall score level results from the internal redundancies and "smoothing" of variability associated with combining attributes into an overall score. However, as with any multimetric assessment, a specific overall score can result from various combinations of attribute scores, and likewise for attribute scores resulting from various metric combinations.*

This limit has been generated through a series of well-documented validation exercises. The information gathered during these exercises was used to improve the precision achievable with CRAM. This process of validation and adjustments to the method is ongoing.

Accuracy

In order to test the accuracy of the results generated by CRAM, reference sites are being established. The results generated by the field crew can be compared to the CRAM scores generated by other crews at the reference site. While these reference sites are still being selected and developed, their assessment by the SWAMP project's CRAM field crew would be a valuable part of the project's QA Project Plan.

Representativeness

CRAM has developed a number of technical definitions for different wetland types. The ability of the field technician to accurately and consistently select the most appropriate type has been evaluated and improved by the group developing CRAM. As the method is revised further, continued improvement is expected.

Comparability

The information generated by CRAM does not include any parameters currently on the SWAMP parameter list. As a result, there are no concerns regarding the comparability of CRAM results with data generated for SWAMP. The comparability of CRAM results across a wide set of data collected by different field crews has been investigated during the development of the method. Part of this has been improved by revisions and clarifications made to CRAM.

It is also critical that personnel performing CRAM are properly and consistently trained prior to project initiation.

Sensitivity

With respect to a method such as CRAM, a more appropriate term would be "responsiveness". Using the definition provided in a validation study conducted on CRAM (Stein et al.), responsiveness is:

> *A measure of the ability of the method to discern good vs. poor condition.*

This same validation study goes on to conclude

> *CRAM is an effective tool for assessing general wetland condition based on field indicators of a wetland's ability to support characteristic flora and fauna.*

The method is therefore sufficiently responsive for conducting rapid assessments.

Implementation of CRAM in the SWAMP QA Program

CRAM currently provides a list of *Recommended Topics of Initial QA/QC*; however, the method does not contain a set of formal QA requirements. If the use of CRAM within SWAMP projects becomes widespread, some clarification of the SWAMP QA requirements for CRAM may be needed. The discussion can begin with the list provided in the method (Table 3.12, page 38), however other related topics include:

- Should SWAMP projects implementing CRAM be required to draft a project-specific QA project plan (QAPP)?

- As the CRAM database is currently set up, it is only accessible to registered users, and they can only access and edit their own data. All results can be viewed and downloaded by the public through interactive maps at the CRAM web site. The program should discuss issues surrounding the use and access of data.

- Because CRAM involves the training of involved personnel, training documentation will be an important part of any QAPP developed for a SWAMP-project using CRAM.

CRAM Assessment-Data Management

DMT Assessment

In order to successfully implement CRAM as a tool, SWAMP data management personnel will need to engage the CRAM Advisory Group to address questions related to data management and training. The DMT have generated a list of specific questions related to data entry of CRAM scores, and will work with the eCRAM personnel to address these as well as other data management topics.

1. There does not appear to be a standard set of LookUp lists available to users for fields such as SiteCode and Project Code/Name. Comparability can be improved by providing a standard list maintained within CRAM and matched with the most current CEDEN LookUp list values.

2. It appears SiteCode and Project are not required to be populated in the online data entry forms. Making these fields required and matched to LookUp lists will improve comparability across and within projects.

3. One suggestion is to record ProtocolCode to document what protocol (e.g., riverine, depressional, estuarine) and version was used at the time of sampling. CRAM provides documentation on how each version changes through time but the specific protocol and version is not recorded in the database so users know what data types to expect for a given piece of data.

4. The Sample Information on the hard copy data sheets is not the same for each protocol. For example, the Depressional field sheets does not have boxes to record CRAM Site ID, Project Site ID, and Project Name while the data sheets for the other protocols do. It would help to have consistent sample information recorded for each protocol so the data sheets should be standardized for this portion.

References

California Wetlands Monitoring Workgroup (CWMW). 2012. *California Rapid Assessment Method (CRAM) for Wetlands and Riparian Areas,* Version 6.0 pp. 95

California Wetlands Monitoring Workgroup (CWMW). 2009. *Using CRAM (California Rapid Assessment Method) to Assess Wetland Projects as an Element of Regulatory and Management Programs*. 46 pp.

Validation of a Wetland Rapid Assessment Method: Use of EPA's Level 1-2-3 Framework for Method Testing and Refinement. Stein E.D. , A.E. Fetscher, R.P. Clark, A. Wiskind, J.L. Grenier, M. Sutula, J.N. Collins, C. Grosso. Wetlands 29(2):648-665. 2009