California Rapid Assessment Method for Wetlands and Riparian Areas

(CRAM)

Project and Ambient Assessments

Project Vs. Ambient Assessment

- CRAM can be used probabilistically to identify the overall condition in a wetland class within a particular region; this is ***ambient assessment***.
- CRAM can be used to identify the range in condition within a wetland class (or multiple classes) within an area in which an action is proposed; this is ***project assessment***.

Key Definitions

- Sample Universe:

  A map of all the wetlands of one type within a given area

- Sample Frame:

  A map of all the candidate AAs within the sample universe

Ambient Assessment…

- A probabilistic survey conducted for wetlands in a specific wetland class.
- Requires a “complete” map of all wetlands in the subject class on a watershed or other geographic basis.
- Requires a sampling methodology that relates each sampled point to a wetland area for which the point represents the wetland condition (e.g., GRTS).

For Ambient Assessments of a Wetland Class:

- The Sample Universe is complete map of the wetland class in a watershed or other landscape.
- The Sample Frame is all candidate AAs within the universe from which the sample of AAs will be drawn.

Summary of Ambient Assessment

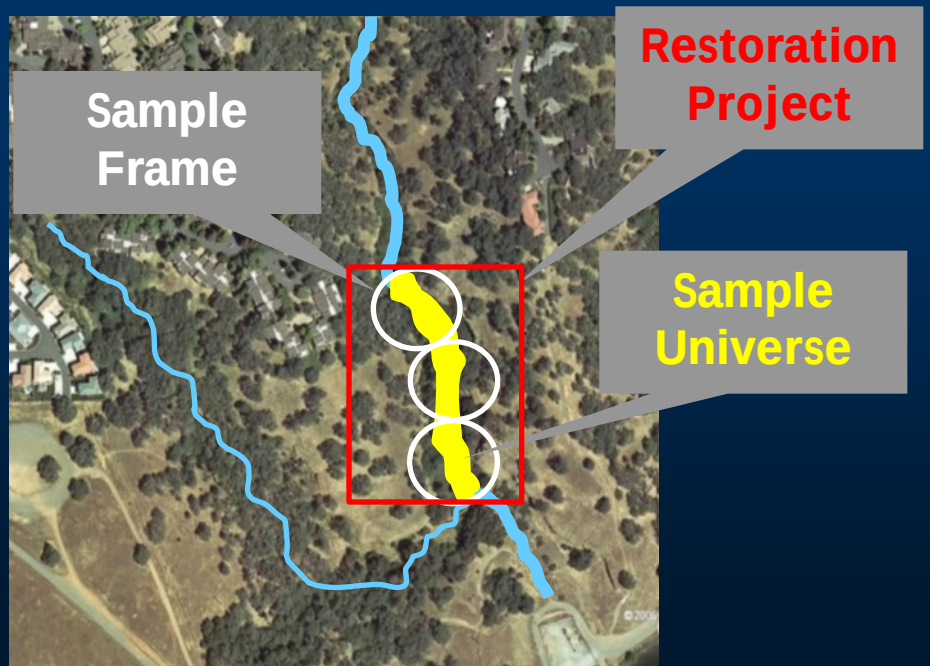
- The *Ambient* Universe is all the wetlands *in a watershed or other landscape* to which the assessment results are expected to pertain.
- The *ambient* Sample Frame consists of all the candidate AAs within an ambient universe.
- The *ambient* sample draw has a fixed sample size; the draw accounts for the different inclusion probabilities of the AAs, which depend on the sizes of their encompassing wetlands.

Project Assessment…

- A structured assessment of wetland condition used to support an application for an approval or permit, an environmental review, an alternatives analysis, a mitigation proposal, or any similar use or action.
- An assessment conducted for monitoring such projects or elements thereof.
- May be conducted by project applicants or by reviewing agencies.

For Project Assessments:

- The Sample Universe is all of the wetlands of one type within the project boundary.
- The Sample Frame is all candidate AAs within the universe from which the sample of AAs will be drawn.



Summary of Project Assessment

- The *Project* Universe is all the wetlands *in a project* to which the assessment results are expected to pertain.
- The *project* Sample Frame consists of all the candidate AAs within the project universe.
- The *project* sample draw requires that all AAs have the same inclusion probability; sample size is not fixed, but depends on the variability in wetland condition throughout the project.

Practical Considerations for Project Assessment

- Sufficient sampling is required to cover the range of variability within the project (i.e., this may differ depending on whether a site is homogeneous or not).
- The required number and placement of AAs can be determined by probabilistic methods (random sampling; stratification for complex sites, etc.), by Best Professional Judgement, or by negotiation.
- The level of effort should be commensurate with impacts that may be associated with the project.

Project-Related Uses of CRAM

- Sampling the full range of wetland condition at an impact site, which can assist with impact identification, avoidance, and minimization.
- Identifying mitigation requirements.
- Identifying reference conditions and reference sites for the project and for mitigation sites.
- Characterizing existing condition in aquatic resources proposed for enhancement or rehabilitation.

Application of CRAM to 2012 USACE Mitigation Ratio Procedure (BAMI)

Functions/conditions	$Impact_{Before}$	$Impact_{After}$	$Impact_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$
4.1 Buffer and Landscape Context						
4.1.1 Landscape Connectivity	9	3	-6	6	6	0
4.1.2 Percent of AA with Buffer	12	6	-6	3	9	6
4.1.3 Average Buffer Width	3	3	0	3	9	6
4.1.4 Buffer Condition	6	6	0	3	9	6
RAW SCORE	15.0	8.0	-7	9.0	33.0	24
FINAL SCORE	62.5	33.6	-29	37.5	75.0	38
4.2 Attribute 2: Hydrology						
4.2.1 Water Source	6	6	0	6	12	6
4.2.2 Hydroperiod or Channel Stability	6	6	0	3	9	6
4.2.3 Hydrologic Connectivity	6	6	0	3	12	9
RAW SCORE	18.0	18.0	0	12.0	33.0	21
FINAL SCORE	50.0	50.0	0	33.4	91.7	42
4.3 Attribute 3: Physical Structure						
4.3.1 Structural Patch Richness	6	3	-3	6	12	6
4.3.2 Topographic Complexity	6	3	-3	6	12	6
RAW SCORE	12.0	6.0	-6	12.0	24.0	12
FINAL SCORE	50.0	25.0	-25	50.0	100.0	50
4.4 Attribute 4: Biotic Structure						
4.4.1 Number of Plant Layers	12	9	-3	6	9	3
4.4.2 Plant Species Composition	6	6	0	6	12	6
4.4.3 Percent Invasion	6	9	3	6	9	3
4.4.4 Ecological Succession	9	3	-6	3	9	6
4.4.5 Vertical Structure	6	3	-3	3	6	3
RAW SCORE	23	14	-9	12.0	24.0	12
FINAL SCORE	63.9	38.9	-25	30.6	72.3	42
OVERALL SCORE	65.0	46.0	-19	32.0	70.0	38

Assess at project (impact) site

Develop projection of future conditions at impact site, or measure conditions at comparable (impacted) site

Assess at the mitigation (bank) site, or identify comparable reference site and assess conditions there

Identify reference site for pre-construction conditions at mitigation site and assess; or assess actual conditions at mitigation site before construction; or obtain from mitigation bank operator

Where can these kinds of CRAM data be obtained?

Future Project Uses for CRAM?

- Impact/Mitigation Performance Standards?
  - Limit degradation below baseline CRAM metric scores in "good" sites to less than one condition class (e.g., no score degrades more than from 9 to 6 or from 6 to 3).
  - For selected CRAM metrics (based on statistical assessment of CRAM data for impact site), improve mitigation site metric scores above baseline (e.g., CRAM score increases from 3 to 6 or 9, or from 6 to 9 or 12) in 75% of assessment areas within a given time frame.
- Mitigation planning based on assessment of specific factors underlying CRAM scores?
  - e.g., improve specific conditions affecting "Buffer Condition" or "Horizontal Interspersion" metrics.

Thank you