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From: The SWAMP Quality Assurance Team (QAT), SWAMP Data Management Team (DMT), Marco Sigala, and Lilian Busse

Subject: Chlorophyll a and Ash-Free Dry Mass (AFDM) Field Duplicates Associated with Bioassessment Sampling

Cc: Gail Cho, Adam Ballard

Background

Recently, the SWAMP QAT was alerted to an issue involving chlorophyll a and AFDM field duplicates with out of control relative percent differences (RPDs). Field duplicates are collected when stream algae assemblages for ambient bioassessment are sampled. According to the standard operating procedure (SOP) *Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California* (Fetscher et al. 2009), the field duplicates are taken in different areas in the same transects (page 13, Figure 2).

In general, field duplicates help quantify variability associated with sampling activities and spatial variability in the field. However, it is impossible to distinguish if differences between the samples and the duplicates are due to the sampling activities or due to the natural spatial heterogeneity. The natural spatial heterogeneity of biological samples is usually high, and the main focus of collecting field duplicates for biological samples is to measure the spatial variability in the field. In SWAMP, field duplicates associated with bioassessment sampling are collected at a frequency of 10% of all sampling sites of a project. All other duplicates are collected at a rate of 5% of the total project sample count.

Update

For chlorophyll a and AFDM field duplicates taken as part of a bioassessment sampling event, SWAMP will take the following actions:

- Chlorophyll a and AFDM show a high spatial heterogeneity in the field. Therefore, RPD calculations will not be applied to field duplicates of chlorophyll a and AFDM samples. The data collected by the field duplicates will be evaluated in the data analysis and data assessment for small-scale natural spatial variability as part of the end-user's data assessment.
- The DMT will reassess those values that are currently in the database.
- Integrated samples and/or those associated with bioassessment will be clearly identified, and laboratories will be notified prior to their receipt. Grab samples will follow the SWAMP guidance currently in place.
- This issue will be clarified in the SWAMP algae quality assurance project plan (QAPP), as well as the upcoming *Surface Water Ambient Monitoring Program Plan Quality Assurance Program Plan* (QAPrP) revision encompassing bioassessment.