

Marsh Resampling Guidelines

Pete Rawlik

Water Quality Monitoring Division

SFWMD

Defining the Problem

- Compliance tests assume regular intervals of data (monthly)
- Some marsh stations have been sampled multiple times within the same month
- Multiple data points within a time interval may generate an appearance of bias if the compliance test uses all or just some of the data

Purpose of this Document

Marsh Resampling Guidelines

- Identify influencing factors and needs
- Provide guidance on
 - controllable causes
 - when resampling should be approved
 - when resampling should be denied

Resampling Issue Overview

- Project Logistics
 - Sampling is more frequent than mandated for the compliance test
 - Beyond the scope of this document
- Sampling Failure
 - Samples not collected, lost or improperly preserved
- Laboratory Failure (rare)
 - Samples lost, damaged, or improperly handled
- In response to Sampling and Laboratory Failures there is the potential for staff to collect a replacement sample, thereby creating multiple data points from the same station within the same period

Factors Influencing Guidelines

- Only TPO4 is subject to monthly compliance testing
- Total clear water depth is a co-factor (sampling and compliance)
- No mandate requires sampling the stations within the same day across a particular network
- There is value in sampling of stations within a water body in a minimal amount of time

General Guidelines for Resampling

- In the unlikely event that multiple samples are compromised for one sampling event stations may be resampled:
 - Resampling means all parameters associated with the original station are re-collected
 - Only failures in TPO4 or the measurement of total clear water depth may trigger a resampling event
 - Sampling staff and the field project manager are required to document why resampling has occurred
 - Resampling of stations should ideally be added onto already existing sampling trips if flight resources are available

Guidelines for Laboratory Failures

- Resampling is not recommended unless this failure occurs and is discovered within two days of sample collection, at which point the rules for sampling failure are invoked

Guidelines for Sampling Failure

- If # of missed samples is $< 25\%$ of total compliance stations per area
 - resampling is optional and requires written supervisor approval
 - Requires a pre-existing flight

Guidelines for Sampling Failure

- If # of missed samples is $\geq 25\%$ of compliance stations per area
 - If time/stage sensitive, resample within two days
 - If not time/stage sensitive, resample within the same month
 - If flight resources are available

Why 2 days?

- Primarily logistical
 - Sampling via helicopter scheduled the first three days of the week.
 - We can detect a sampling failure within hours
 - WCA1 is usually sampled on Monday, resampling could be scheduled for Tuesday or Wednesday
 - Sampling beyond this time frame increases the likelihood of changes in stage

Why 25%?

- The 25% guidance was not derived statistically, but rather was suggested by professional experience on a practical basis.
- Functionally, this represents the acceptable number of stations that could be missed each month for each of the tests.

How does this guidance help?

- The compliance tests have built in flexibility to handle data losses from environmental factors, field failures and laboratory failures, but:
 - Environmental factors are uncontrollable
 - Laboratory failures are relatively rare
 - Sampling failures are uncommon but can be corrected
- This guidance provides staff and partner agencies with a set of rules on how to determine if a sampling failure is of concern and how to respond.

For Example

- WCA1 has 14 stations for the Settlement Agreement Compliance Test
- In the very rare event in which sampling failures occur, this guidance would accept the loss of up to 3 samples (21%) in an individual month without requiring a resampling event
- Note: In the past, when sampling failures have occurred we have always rescheduled collection on another pre-existing trip

For Example

- WCA1 has 24 stations for the TP Rule Compliance Test
- In the very rare event in which sampling failures occur, this guidance would accept the loss of up to 5 samples (21%) in an individual month without requiring a resampling event
- Note: In the past, when sampling failures have occurred we have always rescheduled collection on another pre-existing trip

Discussion



Critical Comments

- EVPA samples are processed for TP within 5 days of collection, why is the time lag described as weeks or months?
- Response: While this document is highly relevant to the compliance tests carried out using EVPA data in LNWR, it also applies to data collected in other areas and under the TP Rule, which are not necessarily run within 5 days of collection.

Critical Comments

- Is the SFWMD interested in optimizing (reducing) compliance network stations?
- Response: The District is in favor of optimizing all monitoring programs, and has an active program for this. However, optimization does not always mean reducing the number of stations. In the context discussed here, the District is intent on optimizing sample collection by reducing the number of redundant station visits.