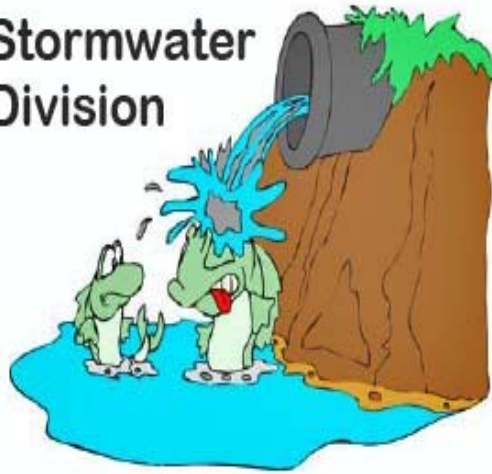


The City of Eureka

Stormwater
Division



FINDING SOLUTIONS TO STORMWATER POLLUTION

SAMPLING MANUAL

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I. GENERAL DESCRIPTION OF DUTIES

In order to obtain reliable and accurate data, Environmental Laboratory Accreditation Program (ELAP) guidelines must be followed. When ELAP guidelines are not applied to environmental monitoring efforts, contaminated samples, improper analytical techniques and inaccurate data interpretation are inevitable. This manual outlines proper sample collection and handling following ELAP protocols. It will serve as a sampling procedure for monitoring events within the City of Eureka.

As a sampler for stormwater monitoring events, you are required to fulfill certain functions which are vital to the efficiency and quality assurance (QA) of laboratory results. Not only are you asked to physically go and collect samples, but also track and process every sample that is to be analyzed for the sampling event. Below is a short list of some of the functions you may be asked to perform:

- Clean, prep, and label appropriate sampling containers for all samples or procure properly cleaned sampling containers and label them
- Collect samples from streams, Humboldt Bay and stormwater facilities
- Maintain and report accurate sampling notes
- Maintain accurate chain of custody records

II. SAMPLING

A. Sampling Introduction

The results of any testing method can be no better than the sample on which it is performed. The objective of sampling is to collect a quantity of material small enough in volume to be transported, stored and handled in the laboratory while still accurately representing the material being sampled. This objective implies that the relative proportions or concentrations of all pertinent components will be the same in the sample as in the material being sampled, and that the sample will be handled in such a way that no significant change in composition occurs before the tests are made.

This manual is not intended to be comprehensive. It is a guide to most routine sampling events. Those procedures and specifications that are made in detail are required because of the guidelines of the City of Eureka's NPDES Permit (No. 1B03185SHUM) under which we operate.

The usefulness of data to support policy decisions, or as applied to action level, permit limit or other criteria is directly dependent on its completeness and representativeness. These are qualitative expressions of the extent by which the data set defines an environmental condition and meets the objectives of the data collection activity. The determination of whether or not a data set is sufficiently complete and representative of the media measured and/or sampled is an integral part of QA.

Each parameter and concentrations of interest must be defined so that the appropriate sampling protocol and analytical method is chosen. The Stormwater Division will be involved in, contribute to and/or prescribe sampling plans. Recognizing that field conditions are not uniform or ideal all of the time, samplers must have full knowledge of the intent of the data collection effort. Without full knowledge, the sampler will be unable to make appropriate logical choices and adjustments in the field.

Most of our sampling efforts are performed in response to local, state and federal environmental laws. Because of this, each sample has the potential of being involved in litigation or legal challenges. At the very least, these samples are being used for decisions involving environmental impact. Considerable sums of money may hinge on the decisions being made based on the results of the analyses. Utmost attention to ensure sample integrity from collection to data reporting is essential.

The ability to trace possession and document handling throughout the process of sampling, transportation, analysis and final disposition is called "Chain-of-Custody" (COC). A COC is also extremely useful for project leaders to be able to track any potential causes for contamination of a sample or samples. Details of the COC procedures and forms used in our monitoring are described in a later section. The following is a discussion of useful concepts.

B. Sampling Plan Documents

All information about a monitoring program, the samples to be taken, how they are to be taken and the sampling locations must be defined prior to sampling. The minimum required information is:

- Program contact person's name, phone and address.
- Purpose of sampling.
- Analyses to be performed.
- Locations of sampling point(s).
- Type of sample (e.g. stormwater, freshwater, seawater, stream sediment, etc.)
- Collection method (grab or composite)
- Procedure and equipment to be used for sampling.
- When sample collection is to take place.

Sufficient detail is required for a sampler to be able to execute the sampling plan without having to rely on anything else. Sampling Plan forms can be obtained from the Stormwater Division.

C. Container Prep

All collection containers must be properly cleaned and labeled before using. Plastic containers are rinsed with bleach and then washed in the washing machines. Any container used to hold a sample for a metals analysis must be acid washed. Any container used to hold a sample for an organic analysis must be Teflon lined, glass or stainless steel and solvent rinsed. Any container used to hold a sample for a bacti analysis must be autoclaved. It is the responsibility of the sampler to make sure that all containers used for sampling are properly washed and cleaned before being used. This includes new containers. Containers must also be labeled before usage.

1. **Acid Washing** - Acid washing is required for any sample that will be analyzed for metals. It is important that all acid washed containers be **neutral** before they are used especially when the sample is going to be analyzed for other constituents.

Wash items with a 5:4:1 solution of DI water : concentrated hydrochloric acid : concentrated nitric acid. Rinse container with three volumes of tap water and one volume of DI Water to ensure that all acid has been rinsed out of the container. If there is any question of the container being acidic, check with a calibrated pH meter and continue rinsing until neutral. Acid waste can be neutralized and disposed of in the sanitary sewer.

2. **Solvent Rinsing** - All samples being analyzed for organics (e.g. pesticides, herbicides, base neutrals) must be in a solvent rinsed container. For stormwater samples the solvent used is Methylene Chloride. Rinse bottles three times with a small volume of solvent, making sure that the solvent touches all surfaces of the container. Allow the containers to dry completely in the hood before capping and labeling. Waste solvent is collected and dumped as hazardous waste.
3. **Autoclave** - All containers used to sample for bacti analyses need to be autoclaved prior to sample collection. The lab performing the analysis will usually provide sample containers. If not, disposable pre-cleaned bacti containers are available.

D. Sample Labels

Use labels to prevent misidentification of samples. Affix labels to the sample container before or at the time of sampling. Make sure the labels are waterproof and labeled with waterproof ink. The following information is the minimum required:

- Sample Source
- Date & Time of Collection (just before sample collection when bottle is dry)
- Sample Matrix
- Sampler Initials

E. Sample Collection

1. If you feel the conditions are not safe for sampling, do not collect samples (**Safety First!**).
2. Wear clean, powder-less nitrile gloves during the entire sampling process.
3. Do not rinse sample containers before filling because sampling containers have been pre-cleaned.
4. Unscrew the container caps immediately before sampling. Avoid touching inside of the container, its lip or the inside surface of the cap. Do not set caps down on the surface while sampling.
5. Whenever possible, use the sample container provided to directly sample from the water source. Sampling poles are effective in sampling hard to reach sample points. Avoid getting too much unrepresentative debris. Take care not to disturb bottom sediment. Always sample upstream of any disturbance.
6. If using the sample containers to sample is not possible, make sure the collection device being used is the proper container type and is properly cleaned for the requested analyses (see Section C). Rinse the collecting device three times with sample water and then collect the sample. Collection device should be placed with open end facing upstream and at a minimum of two riffles downstream from any storm drain inputs (to assure mixing of sample). When using the collection device at multiple sample sites, make sure the device is rinsed thoroughly with DI water between sites.
 - a. Open the sample containers just prior to transferring the sample from collection device to sample container.
 - b. Aliquot the sample in the collection device into the sample containers.
 - c. Recap the sample containers without touching the lip or inside of the cap.
7. Enter all information requested for each sample on the Chain-of-Custody form provided.
8. The amount of rain fall preceding the sampling and number of dry days before the rain will be recorded by the project leader. Other weather conditions, such as the ambient temperature, weather conditions, wind direction and tide level (if sample site is tidally influenced) will be recorded at each collection site. Make sure you write the sample location, date and time, sample matrix and sampler's initials on the bottle before it gets wet.

F. Storage & Transport

Samples must be protected and preserved during storage, in a refrigerator and/or adding the appropriate chemical preservatives. Samples must be preserved at approximately 4°C throughout their transportation by packing in wet ice or blue ice. Make sure all sample containers are securely capped to avoid any contamination. Packing should be appropriate to protect the samples from spillage, breakage, loss or contamination during storage and transportation. Usually, the laboratory will specify or supply sample containers as well as packing and transportation instructions. Be sure that the samples arrive at the lab well before the holding time for a particular analysis is up. Bacti samples usually have the shortest holding time, 6 hours.

G. Custody

The sample is under a person's custody if it is in that person's possession. Delivery of a sample to the receiver must be made by having the receiver take the sample into his/her physical possession and signing the Chain-of-Custody (COC) form. COC forms can be obtained from the Stormwater Division.