

Standard Operating Procedure #009





Current and Flow Direction

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Natural Resources Department
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Prepared for:
EPA Region 10

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REVISION RECORD

Approval	Date	Responsible Person	Description of Change	Location of Change
1	October 2018	Kara Kuhlman	Initial Approval and Release of Version 1.0	N/A
1.1	December 2019	Kara Kuhlman	Added staff	Distribution
			Added use of flagging tape on wand as method of determining presence of flow	Section 2

SIGNATURE PAGE

Document: Current and Flow Direction SOP #009

Version 1.0

The following technical staff have read this manual. A copy of this page will be distributed to the employee training record file.

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1. INTRODUCTION

This document, the Standard Operating Procedures (SOP) for current and flow direction, should be used any time current and flow direction are documented at a surface water site. This document describes the standard operating procedures and best practices for determining current and flow direction. This document is to be used in conjunction with the relevant project Quality Assurance Project Plan (QAPP).

1.1 Method Summary

The direction of the current or flow of the waterbody is visually assessed at the sample site. Flow direction is measured in confined channels (*e.g.*, Lummi River) and current direction is used for open waters (*e.g.*, Portage Bay).

1.2 Health and Safety Warnings

No water quality measurement is worth risking injury or death. Field personnel must be aware of the environment, use common sense and training, and not exceed their abilities or limits. Field work is never conducted alone. All Lummi Natural Resources (LNR) Water Resources Division (LWRD) Health and Safety Plan (LWRD 2015a) requirements and guidelines are followed at all times while conducting fieldwork.

2. PARAMETER MEASUREMENT

The direction of the current or flow of the waterbody is visually assessed for surface waters. Flow direction is measured in confined channels (*e.g.*, Lummi River) and is reported as flowing upstream or downstream. Current direction is used for open waters (*e.g.*, Portage Bay) and is reported as the cardinal direction flow is moving toward (*e.g.*, NW).

Current and flow direction is determined by visual assessment of the sample site.

1. Observe current and flow direction while performing measurements at the sample site.
2. Observe the position and movement of plants or submerged vegetation, air bubbles, sediment plumes, and other debris.
3. Submerge sampling wand with thin strip of flagging tape in water downstream of sampling location to check presence of flow and flow direction.
4. At the end of the site visit, record current/flow direction and variation, if present, in Water Database or on field datasheet following data entry instructions provided in the Quality Management Plan (LWRD 2019d) or the Water Database User Guide (LWRD 2018).

For wading sites, take care to minimize water column disturbance and actively evaluate for water entrained by sampler. Avoid areas disturbed by the sampler to determine current or flow direction.

2.1 Channels

Flow direction is measured in confined channels and is recorded as “downstream” or “upstream” (may be abbreviated as “ds” and “us” on field datasheets). If no flow direction is evident, record flow as “none evident” or “none” for that site.

2.2 Open Waters

Current direction is measured for open waters. Record the cardinal direction in which the current is flowing. Cardinal direction should be estimated to the nearest of the eight points of a compass: North (N), Northeast (NE), East (E), Southeast (SE), South (S), Southwest (SW), West (W), Northwest (NW). If no current direction is evident, record “none evident” or “none” for that site.

If the site is near the intersection of another waterbody (*e.g.*, Site SW039, which is located on Hale Passage adjacent to Portage Bay), the sampler notes if water is flowing into or from the adjacent waterbody.

3. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Current and flow direction are measured through visual assessment without use of equipment. There are no current and flow direction standards with which to conduct calibration or accuracy check activities.

Duplicate current and flow direction measurements may be collected at 10% of sites measured in a given day as determined by the project QAPP. Duplicate current and flow direction measurements inform the sampler of site variability and measurement precision. Duplicates are documented in the Water Database or on field datasheets.

4. ACRONYMS AND ABBREVIATIONS

LIBC	Lummi Indian Business Council
LNR	Lummi Natural Resources
LWRD	Lummi Water Resources Division
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
SOP	Standard Operating Procedure

5. REFERENCES

- Lummi Water Resources Division (LWRD). 2015a. Health and Safety Plan. Prepared for the Lummi Indian Business Council. April.
- LWRD. 2018. Water Database User Guide. Prepared for the Lummi Indian Business Council. Lummi Reservation, Washington. October.
- LWRD. 2019a. Quality Assurance Project Plan: Ambient Surface Water Quality Monitoring Project. Version 1.1. Prepared for the Lummi Indian Business Council. Lummi Reservation, Washington. December.
- LWRD. 2019b. Quality Assurance Project Plan: Department of Health Support National Shellfish Sanitation Program (NSSP) Project. Version 1.1. Prepared for the Lummi Indian Business Council. Lummi Reservation, Washington. December.
- LWRD. 2019c. Quality Assurance Project Plan: First Flush Monitoring Project. Version 1.1. Prepared for the Lummi Indian Business Council. Lummi Reservation, Washington. December.
- LWRD. 2019d. Quality Management Plan for the Lummi Nation Water Quality Monitoring Program. Version 1.1. Prepared for the Lummi Indian Business Council. Lummi Reservation, Washington. December.