

**U.S. Geological Survey
Techniques of Water-Resources Investigations**

**Book 9
Handbooks for Water-Resources Investigations**

**National Field Manual
for the Collection of
Water-Quality Data**



**Chapter A4.
COLLECTION OF
WATER SAMPLES**

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U.S. DEPARTMENT OF THE INTERIOR
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Foreword

The mission of the Water Resources Discipline of the U.S. Geological Survey (USGS) is to provide the information and understanding needed for wise management of the Nation's water resources. Inherent in this mission is the responsibility to collect data that accurately describe the physical, chemical, and biological attributes of water systems. These data are used for environmental and resource assessments by the USGS, other government agencies and scientific organizations, and the general public. Reliable and quality-assured data are essential to the credibility and impartiality of the water-resources appraisals carried out by the USGS.

The development and use of a *National Field Manual* is necessary to achieve consistency in the scientific methods and procedures used, to document those methods and procedures, and to maintain technical expertise. USGS field personnel use this manual to ensure that the data collected are of the quality required to fulfill our mission.

Robert M. Hirsch
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EDI and EWI methods are preferred for most USGS field applications. Do not use VCF unless you know your stream section to be well mixed with respect to your target analytes.

Guidelines for using the VCF method:

1. Measure discharge along the cross section where sampling is to be done. (This is not necessary if the section is stable and accurate historical discharge measurements are available.)
2. Locate the centroid of flow from the discharge measurement.
 - Either (a) construct an EDI graph using cumulative discharge or cumulative percentage of discharge plotted against cross-section stationing (for example, in fig. 4-5, the centroid location is station 38, which corresponds to 50 percent of cumulative flow), or (b) determine centroid location directly from the discharge measurement sheet (for example, in fig. 4-6, the centroid location is station 74).
 - EDI graphs of cumulative discharge at various stages can be based on historical discharge measurements if the stream channel is stable at the cross section to be sampled. The location of centroids can be determined from these EDI graphs so that discharge measurements do not have to be made before each sampling. **EDI graphs require periodic verification.**
3. Examine the cross section for uniformity of appearance.
4. Measure the cross-sectional variation of field measurements (such as specific electrical conductance, pH, temperature, and dissolved oxygen) at sites with little sampling history. Record and review variations along the cross section.
5. Evaluate data from steps 1–4 to decide if the VCF method is appropriate. Use either the EDI or the EWI sampling method if streamflow, field-measurement, or chemical-analysis data do not confirm that the stream section is well mixed vertically and laterally.
6. If the VCF method is used, follow steps 3 and 4 of the instructions for the EDI method for selecting transit rate and collecting samples.
7. **Process samples** → Refer to NFM 5.
8. **Clean equipment** → Refer to NFM3, and to the information under Step 6 in either the preceding EDI or EWI methods.