# Environmental Monitoring, Sampling and Assessment (EMSA)
# Fostering Environmental Monitoring Through Citizen Science Projects

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## CERTIFICATE COURSES

**1. EMSA 22: Foundations of Environmental Instrumentation, Sampling and Monitoring. Provides quantitative measurements to field conditions.**

- Correct sampling methods according to EPA and Standard Methods
- Documentation including chain of custody
- Calibration and use of field instruments that analyze physical parameters such as dissolved oxygen, pH, turbidity, temperature, chlorine.

**2. EMSA 28: Environmental Microbiology Methods. Provides quantitative measurements to field conditions.**

- Serial dilutions and calculations
- Making and using correct media for the detection of microbes
- Detection and enumerations of microbes according to EPA methods (membrane filtration, MTFT, IDEXX)

**3. SUST 5: Sustainability and the Environment Speaker Series.** Invited speakers from private, public and government industries talk about their career & educational paths to various fields including hydrologists, lab analysts, chemists, engineers.

**4. EMSA 30A: Water Quality Analysis by Anion-based Chromatography.** This course utilizes the ion chromatography instrument to examine bromide, fluoride, chloride, nitrate, nitrite levels according to EPA methods.

**5. CRAM – California Rapid Assessment Method of wetlands.** A scientifically defensible method for monitoring the health of wetlands. Provides qualitative assessment of field condition and relevance to quantitative measurements.

**6. Introductory GIS** – units on environmental monitoring to incorporate into an established course.

## INTRODUCTION

**The aim of CCSF's EMSA Certificate Program is to provide a working understanding of environmental monitoring and its application to real-world settings.**

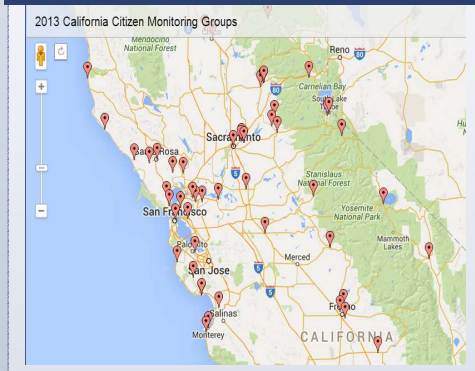
**Getting ready to sample by reading the enclosed directions and calibrating the instrument.**

Students are taught to recognize the distinctive features of different habitats, and how to assess a habitat's health and long-term viability. They learn how different environmental monitoring strategies might be used depending on the circumstances, and they are given practice evaluating and selecting the best of these strategies for their purposes and given the resources that they have. On a practical level, they gain valuable hands-on skills using the same field instruments as industry professionals to evaluate water, soil and air quality, and to test for inorganic and microbiological contaminants; and following EPA standards, they learn how properly to collect, document, and analyze samples in the field and in the laboratory to produce reliable data.

**Using a stadia to measure the depth of flood-prone bank during a riverine CRAM session.**

**Acknowledgements: Teachers in the departments of biology and earth science at CCSF.**

## CITIZEN SCIENCE




Our program has been outreaching specifically to community-based organizations that focus on environmental issues, seeking to provide these organizations with the training necessary to design and undertake small-scale environmental monitoring projects to address their specific concerns. In other words, we are promoting 'citizen science' with these types of monitoring projects, run by motivated people who care deeply about the environment, driven by the desire to produce the hard-data needed to argue for better environmental stewardship and to educate the public.

## FUTURE PLANS

- Courses need to be written and approved for the use of the GC-MS and the ICP-OES.
- Videos are in the planning stages for the use of equipment and analysis.
- Certificate for environmental monitoring is in progress

## CHALLENGES

- Enrollment & recruitment
- Allowing a class to be held when <10 students are enrolled despite grant funding
- Staffing shortages/turnover
- Purchasing and correct allocation of funding