Monitoring Water Quality in Lakes and Coastal Regions Using STREAM

February 10 & 17, 2026

10:00-11:30 or 14:00-15:30 EST (UTC-5)

NASA has developed a Satellite-based Tool for Rapid Evaluation of Aquatic Environments (STREAM)—a new, interactive web tool that enables high-resolution (20–30 meter) monitoring of water quality in inland lakes and coastal waters across the U.S. and selected other countries. STREAM provides both past (since 2018) and near real-time maps of chlorophyll-a concentration, Secchi disk depth, and total suspended solids based on Landsat 8/9 Operational Land Imager (OLI) & Sentinel 2 Multispectral Instrument (MSI). Additionally, an open-source machine learning model based on a Mixture Density Network (MDN) is available to estimate water quality parameters for any inland or coastal water body worldwide (minimum size: 100m x 100m).

This two-part training introduces the STREAM web tool to visualize maps of water quality parameters over lakes and coastal areas and how to use STREAM API to discover and download satellite images and water quality data for a selected water body. The training demonstrates how to assess changes in water quality in a given lake using QGIS. The training also demonstrates the application of a MDN model to estimate water quality parameters from Landsat OLI & Sentinel-2 MSI images.

Part 1: Introduction and Demonstration of STREAM

ARSET instructor: Amita Mehta (NASA Goddard Space Flight Center)

Guest Instructor: William Wainwright (NASA Goddard Space Flight Center)

- Introduction to STREAM webtool and API
- Demonstration of mapping water quality using STREAM
- Demonstration of making time series of water quality parameters
- Q&A Session

Part 2: Introduction to a Machine Learning Model to Estimate Water Quality Parameters Based on Satellite Observations

ARSET trainers: Amita Mehta (NASA Goddard Space Flight Center)

Guest Instructors: Ryan O'Shea (NASA Goddard Space Flight Center)

- Overview: Access and process satellite images for the machine learning model for estimating water quality parameters
- Overview of the Mixture Density Network (MDN) based model
- Demonstration of deriving water quality parameters using the model and satellite data
- Q&A session

ARSET empowers the global community through remote sensing training.