



## Monitoring Water Quality for Aquaculture using NASA Remote Sensing Observations

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# Outline

- Introduction
- About the Applied Remote Sensing Training (ARSET) program
- Workshop objectives and agenda



# Impact of Aquaculture

- Improve food security and nutrition for humans
- Boosts economic growth
- Can help keep waterways clean

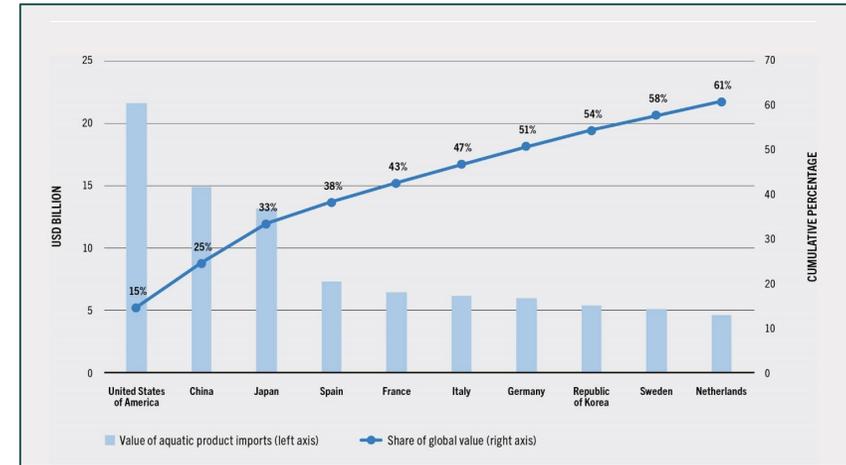
## In the US:

- 5961 aquaculture farms
- About 1500 aquatic species
- 22000 jobs in aquaculture activities
- Economic Impact \$4,000,000,000
- Value of Seafood Imports \$29,682,165,000

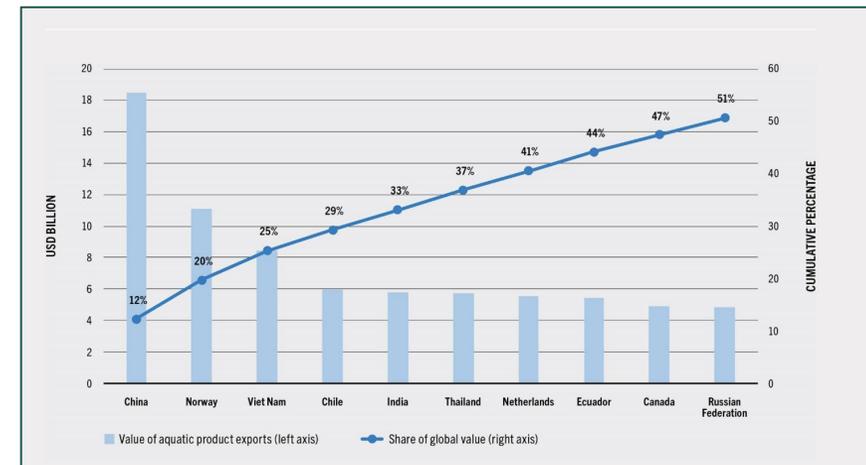
[NOAA Fisheries](#)  
[National Aquaculture Association](#)

NASA ARSET – Monitoring Water Quality for Aquaculture using NASA Remote Sensing Observations

TOP TEN IMPORTING COUNTRIES OF AQUATIC PRODUCTS, 2020



TOP TEN EXPORTING COUNTRIES OF AQUATIC PRODUCTS 2020



[Food and Agriculture Association](#)



# Harmful Algal Bloom Impact on Aquaculture

## Harmful Algal Bloom (HAB) in waters:

- Produce toxins
- Reduce dissolved oxygen
- Contaminate or kill fish & shellfish – directly by toxins or clogging gills

## HAB events and aquaculture:

- Contaminated fish consumption can affect human health
- Result in delay or closure of harvest
- Supply and demand chain disruption & food insecurity
- Prevent the growing of new cohorts
- Cause economic losses of millions of dollars

[NOAA Fisheries](#)



[NOAA Ocean Service](#)

**Monitoring water quality and  
HAB benefit aquaculture  
productivity and management**





## **Applied Remote Sensing Training (ARSET) Program**

# About ARSET

- **ARSET provides accessible, relevant, and cost-free training on remote sensing satellites, sensors, methods, and tools.**
- Trainings include a variety of applications of satellite data and are tailored to audiences with a variety of experience levels.



AGRICULTURE



DISASTERS



ECOLOGICAL CONSERVATION



HEALTH & AIR QUALITY



WATER RESOURCES



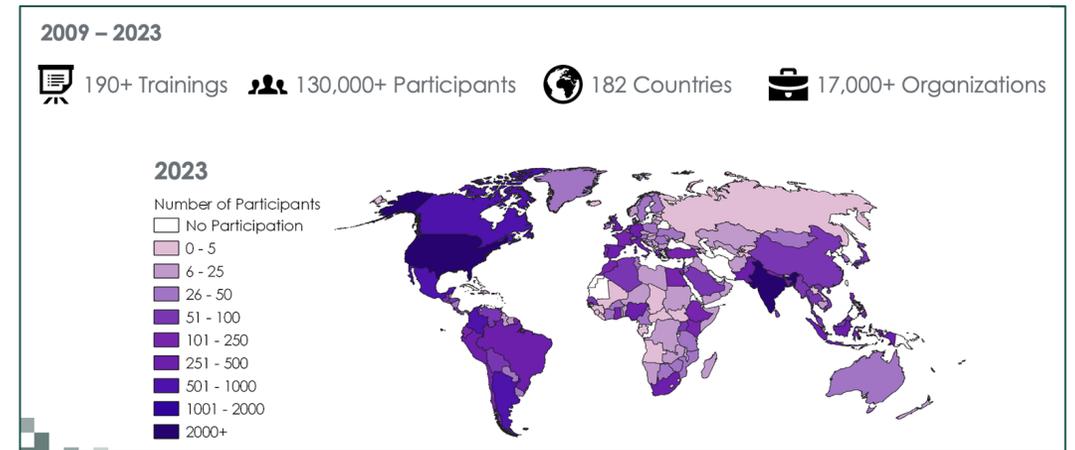
WILDLAND FIRES



# About ARSET Trainings

- Online or in-person
- Live and instructor-led or asynchronous and self-paced
- Cost-free
- Bilingual and multilingual options
- Only use open-source software and data
- Accommodate differing levels of expertise
- Visit the [ARSET website](#) to learn more.

## ARSET Trainings Reach a Global Audience





## **Workshop Objectives and Agenda**

# Learning Objectives

By the end of this workshop attendees will be able to:

- Recognize how remote sensing data can be used to estimate water quality parameters.
- Identify relevant NASA missions and data products for detecting harmful algal blooms (HABs) via chlorophyll-a and water temperature, total suspended solids (TSS), water transparency, and salinity in coastal zones and inland lakes.
- Identify interactive web tools for historical and near-real time analysis and visualization of HAB indicators, TSS, and water transparency.
- Use the web tools for assessing water quality parameters in coastal zones and inland lakes to facilitate aquaculture management.



# Workshop Agenda

## Part 1: Presentations [9:30 to 11:00 AM]

- Introduction to NASA Water Resources Program
- Introduction to Earth Observations for Monitoring Water Quality
  - Fundamentals of Remote Sensing
  - Satellite missions
  - Data products
- **Demonstration:** data access, analysis, and visualization web tools: [Worldview](#)
- Overview of Satellite-based Tool for Rapid Evaluation of Aquatic Environments (STREAM)
- **Demonstration:** data access, analysis, and visualization web tools: [STREAM](#)

## Break [11:00 to 11:15 AM]

## Part 2: Hands-on Exercises [11:15 AM to 12:15 PM]

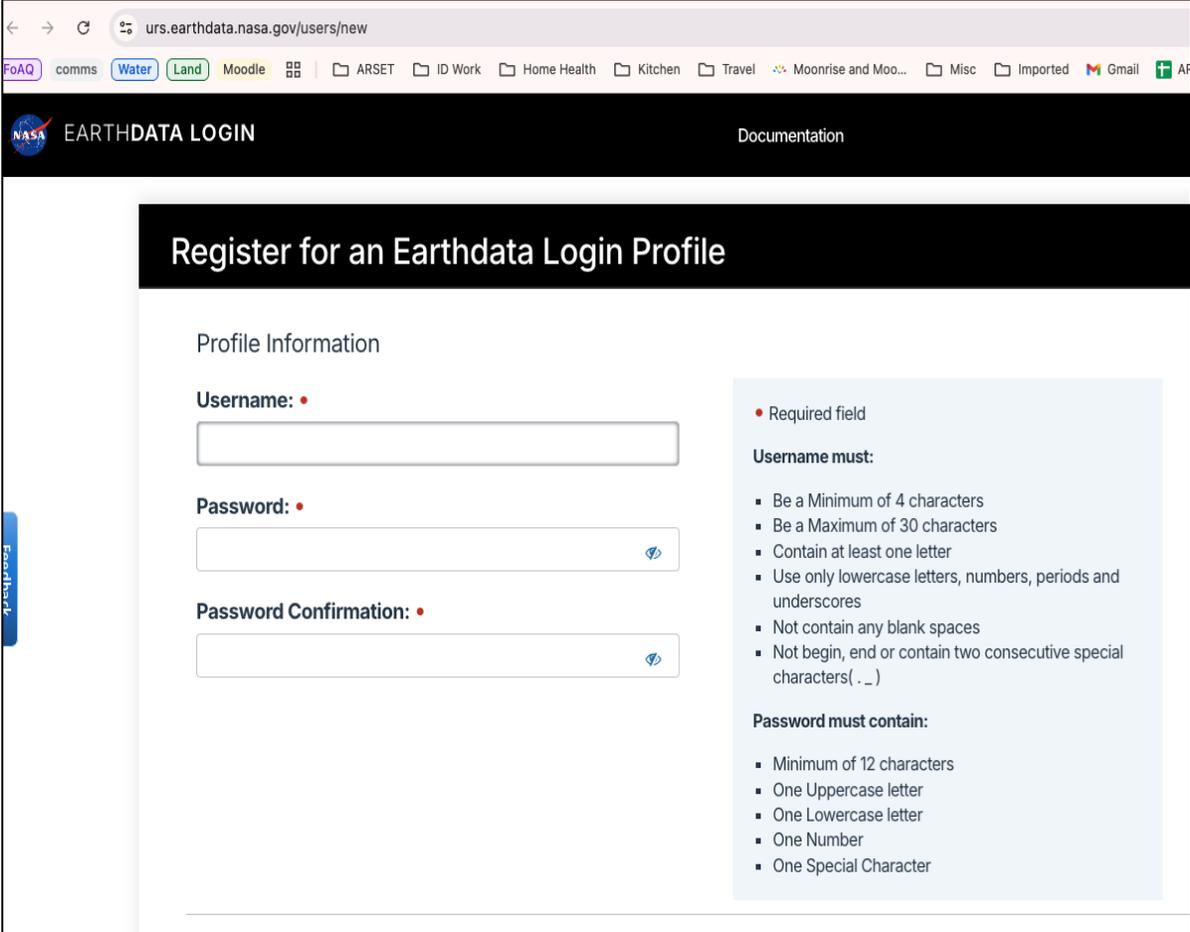
- Monitoring coastal and inland WQ parameters for facilitating aquaculture applications using Worldview and STREAM

## Summary and Survey [12:15 to 12:30 PM]



# Registration to NASA Earthdata

- NASA earth observation data products are open source.
- The data are available from [Earthdata Search](#) and distributed active archive centers (DAACs).
- Registration for NASA [Earthdata](#) is required to access data products.



The screenshot shows the registration page for an Earthdata Login profile. The browser address bar displays 'urs.earthdata.nasa.gov/users/new'. The page header includes the NASA logo, 'EARTHDATA LOGIN', and a 'Documentation' link. The main heading is 'Register for an Earthdata Login Profile'. Below this, there is a 'Profile Information' section with three input fields: 'Username', 'Password', and 'Password Confirmation'. Each field has a red dot indicating it is a required field. To the right of the input fields, there is a list of requirements for the username and password. The 'Username must:' requirements are: Be a Minimum of 4 characters, Be a Maximum of 30 characters, Contain at least one letter, Use only lowercase letters, numbers, periods and underscores, Not contain any blank spaces, and Not begin, end or contain two consecutive special characters (. \_). The 'Password must contain:' requirements are: Minimum of 12 characters, One Uppercase letter, One Lowercase letter, One Number, and One Special Character.

urs.earthdata.nasa.gov/users/new

comms Water Land Moodle ARSET ID Work Home Health Kitchen Travel Moonrise and Moo... Misc Imported Gmail

NASA EARTHDATA LOGIN Documentation

## Register for an Earthdata Login Profile

Profile Information

**Username:** •

**Password:** •

**Password Confirmation:** •

• Required field

**Username must:**

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# Introduction to NASA Water Resources Program

Kelly Luis