Australia's National Science Agency

AquaWatch Australia

Developing a world class integrated water quality monitoring and forecasting system

Safe drinking water and sanitation are human rights. Without access to these services, a life of dignity, stability and good health is virtually impossible.

Water, when managed sustainably and equitably, can be a source of peace and prosperity. It is also the literal lifeblood of agriculture, the major socio-economic driver of billions of people.

Water is a vital resource. Current monitoring methods are fragmented and lack an integrated approach.

AquaWatch Australia is developing a world class integrated water quality monitoring and forecasting system for implementation nationally and internationally providing actional information on in-land and coastal water quality.

AquaWatch is committed to contributing to the United Nations (UN) Sustainable Development Goal (SDG) 6: to ensure the availability and sustainable management of water and sanitation for all and SDG:14: to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Impact

Informed decision-making: AquaWatch provides essential water quality information for informed decision-making by communities, government agencies and commercial water users by delivering reliable and robust data.

Credit: NASA-GSFC

Early warning: Offers predictive forecasts to help communities, governments and industries awareness to mitigate water quality issues such as toxic algal blooms, black water and run-off contamination.

Performance evaluation: Measuring the outcomes of water resource management and policy changes, to demonstrate evidence-based improvements.

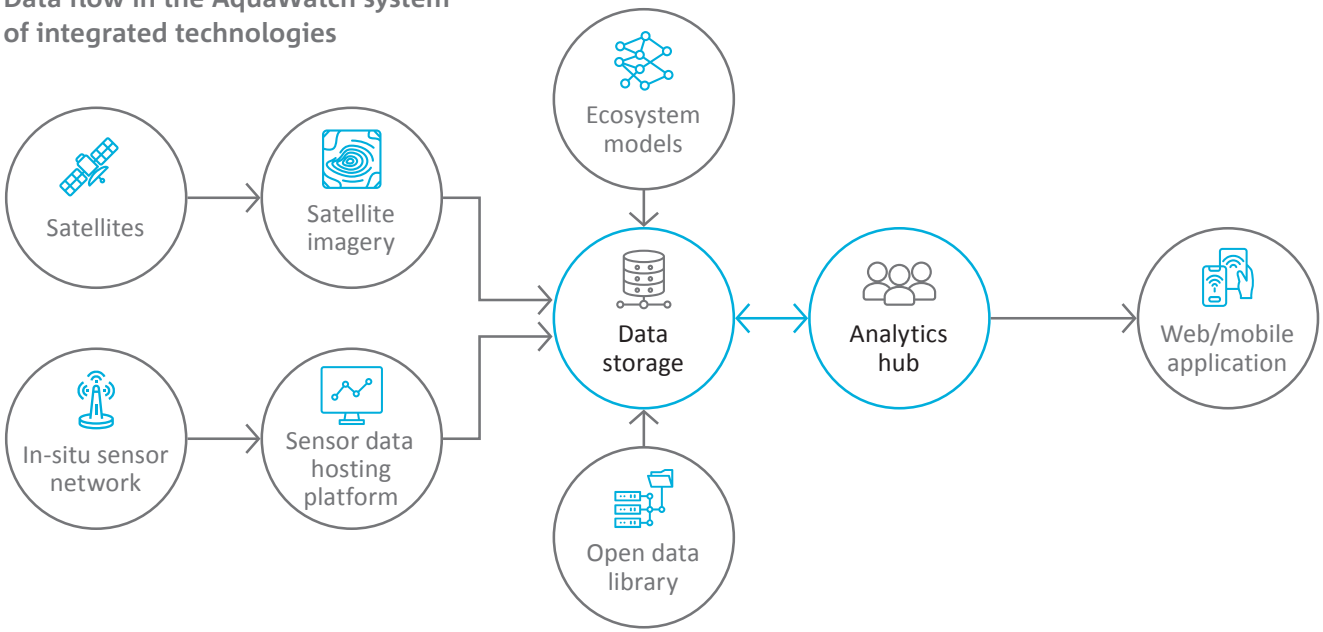
Quantifying water quality issues: Ensuring users have the precise information in addition to helping key sectors identify the causes of water quality issues, including the impact of land management practices.

The AquaWatch system collects extensive data from both water-based sensors and Earth observation (EO) satellites. Advanced data analytics is essential to transform the raw data into actionable insights, facilitating informed decisions from water management to preparedness for climate change impacts.

AquaWatch uses CSIRO's Earth Analytics Science and Innovation (EASI) platform to aggregate and analyse water quality data. By integrating environmental modelling and artificial intelligence (AI), we can develop forecasts to better anticipate future conditions. This new high-performance platform enables us to "turbo-charge" the capacity to process and integrate large amounts of data.

Currently, CSIRO is operationalising AquaWatch deployments of EASI for the national test sites and is in the process of testing for international sites.

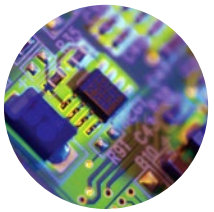
Data flow in the AquaWatch system of integrated technologies



Technologies

Water quality sensors: In-situ water-based sensors provide highly accurate measurements used to validate satellite data. We aim to contribute additional sensors, expertise and data aggregation capabilities to establish national and international water quality sensor networks.

Earth observation: data from satellites provides water quality information across continents and provides environmental insights to support spatial scale monitoring. Space engineering and aquatic remote sensing experts from AquaWatch have developed specifications for custom-built water quality satellite sensors.



Data system: The data is processed using our advanced cloud computing analytics platform. Within this system, AI inversion modelling can be applied and result in different data services (monitoring and forecast information) to suit the application and end users.

Water quality modelling: Sensor and EO data is integrated with physical models to make predictions about water quality. The use of AI can help to scale up local forecasting models to regional and continental coverage.

Work with us

Partnerships are essential to AquaWatch's success, spanning research, academia, industry and government sectors.

We welcome both national and international partners who want to co-invest and collaborate with us to build the system. Our partners gain early access to data and have the opportunity to co-design solutions tailored to their specific needs and key objectives.

Indigenous communities | environmental protection | aquaculture | agriculture | water utilities | government agencies | councils | research institutions | universities | philanthropic organisations | space technologies hydroelectricity | desalination plants | emergency response organisations.

As Australia's national science agency, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Creating a better future for everyone.

Contact us
1300 363 400
csiro.au/contact
csiro.au

For further information
AquaWatch Australia
Alex Held
AquaWatch Australia Lead
aquawatch@csiro.au
csiro.au/AquaWatch

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Credit: European Union