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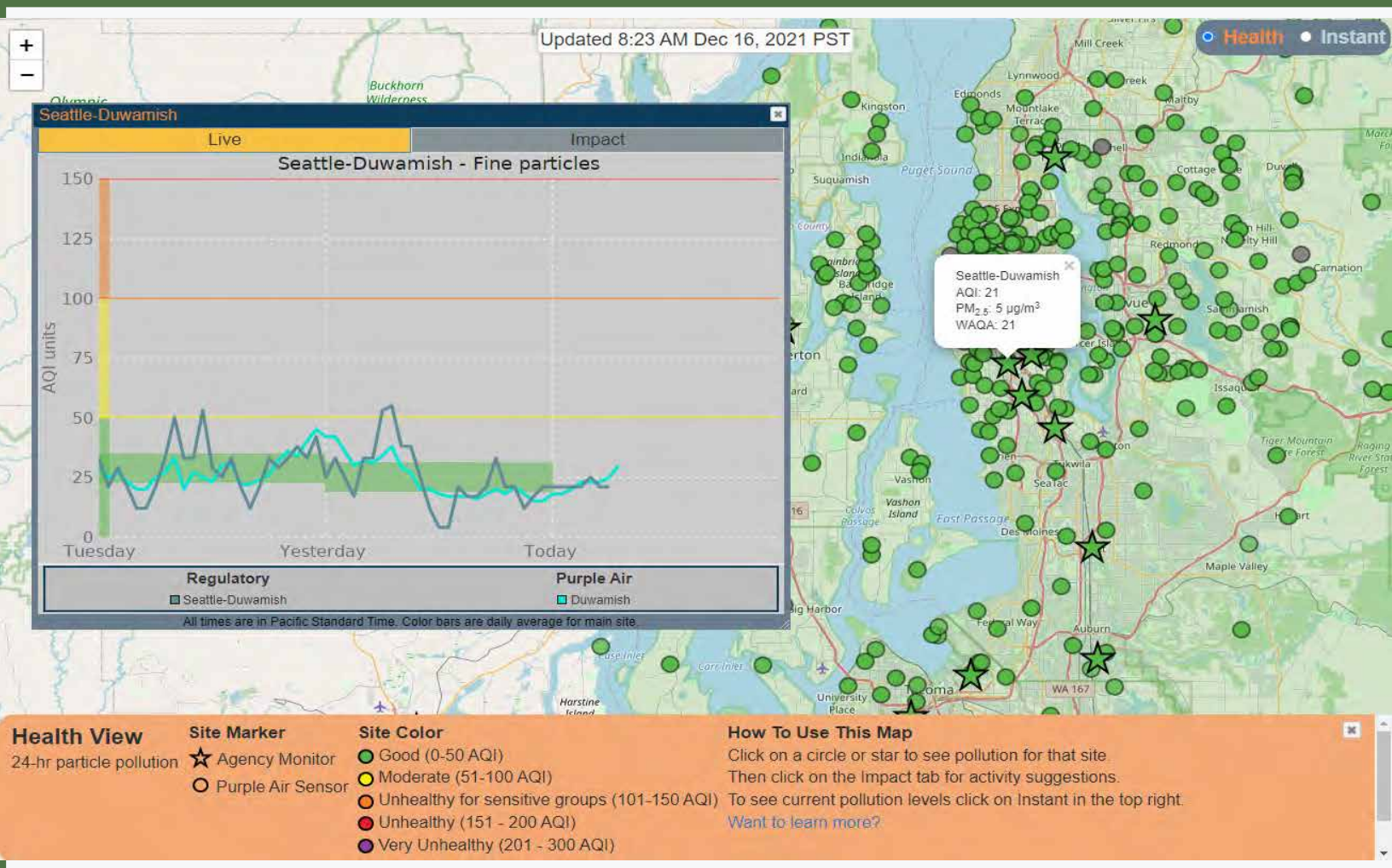
Participatory Science Data Management Case Studies

Puget Sound Air Quality Sensor Map



***Environmental Protection Agency [Contract No. GS-35F-410DA] to Information International Associates, INC.**

Puget Sound Air Quality Sensor Map

Improving Data Management for Participatory Science

The Sensor Map exemplifies using passive participatory science (PS) data from the Purple Air Network and tackles data integration, QC issues, and calibration. Adding processed sensor data to reference data increases the number of locations with air quality information and enables displaying data in real-time. The project's quality control methods have also been employed by other air monitoring networks.

Project Overview & Goals

In 2017, the Puget Sound Clean Air Agency (PSCAA) began developing the Puget Sound Air Quality Sensor Map Project to address integration challenges of low-cost air quality sensors. The tool combines air quality data collected by the public's sensors and regulatory monitors into a single on-line interface. The Sensor Map provides information for individuals and organizations to use in public health decision making.

Role of Project Participants

Project participants who opt to allow public data collection from their PurpleAir Sensors contribute to the Sensor Map. The role of the participants is mostly passive once their air sensors are set up. However, the public has also provided feedback on features of the Sensor Map, such as the air quality scale and the visual presentation of data.

Data Management

Participatory science (PS) data for the 4-county Puget Sound, Washington area is pulled from a third-party data collection platform, ThingSpeak, to feed the Sensor Map tool via a SQL database. The project does not collect its own PS data but focuses on data validation and quality control. Its methods calibrate the public sensor to the nearest regulatory monitor and compare it to nearby sensors for quality control and integrate data from regulatory monitors and public sensors.

Data Use

Issue:
Air pollution

Location:
Puget Sound, WA

Tools:
Purple air sensors and a sensor map

Contact:
Graeme Carvlin

Data distribution and use occur primarily through the Sensor Map interface. The Sensor Map has two modes – health view, which provides 24-hour estimates, and instant view, which provides up-to-the-minute data. The Sensor Map supports individual and agency decision-making, especially during wildfire events.

Issues and Lessons Learned

Major issues involve limited staffing and technical difficulties when integrating or processing the data from their external sources. Also, the Sensor Map team learned first-hand about the need for flexibility to scale during times of heavy usage.

Outcomes and Success Factors

The inclusion of PurpleAir sensor data allows for better characterization of air quality in the 4-county Puget Sound area. The Sensor Map project has been successful due to its identification of a useful problem, creation of a solution that is easy for users to understand and interact with, and its willingness to respond to feedback from users and partners.

Opportunities

- The Sensor Map project and other similar projects would benefit from EPA support of technical resource sharing, a sensor quality control and calibration database, and grant initiatives.