

CASE STUDY BRIEF

Water Resources Case Studies

Satellite-supported workflows for water quality, flood risk, and wetlands

What this resource provides

Three illustrative workflows show how water indicators and spatial context can support basin management while keeping field sampling and agency judgment in the loop.

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Water decisions need context

Water observations vary with season, weather, sensor conditions, and local land cover. A useful monitoring workflow therefore pairs an index or classification with acquisition metadata, a reference period, and a clear next action.

These cases focus on decision support: where should a team inspect, sample, communicate, or update a plan? Satellite observations can extend coverage, but they do not replace laboratory measurements, gauges, or local knowledge.

- Record the date and conditions for every water observation.
- Use thresholds as screening rules and validate them against local samples or agency records.
- Separate visible surface-water extent from water quality, which may require calibration.
- Make uncertainty visible when maps are used outside the technical team.

Case 1 — Lake water quality and algae-bloom screening

A lake authority wants an early screening signal for unusual surface conditions so sampling teams can respond quickly. A repeatable workflow compares a water-index and color-related signal against a seasonal baseline, then routes unusual areas for sampling.

The satellite result is a screening indicator, not a toxin or species identification. Laboratory and field measurements determine public-health or ecological action.

- Set a lake mask and exclude shallow shorelines where mixed pixels are common.
- Compare observations with wind, rainfall, and known inflow conditions.
- Link each flagged scene to a sample location and lab result where available.
- Communicate “screening signal” and “confirmed result” as separate statuses.

Case 2 — Flood risk assessment for river-basin agencies

A basin agency needs a common operating picture after intense rainfall. A workflow compares recent surface-water extent with a baseline and overlays settlements, roads, facilities, and evacuation routes to prioritize field confirmation and public updates.

Satellite scenes may arrive after peak conditions or contain clouds, so the system should show acquisition time and gaps rather than imply continuous visibility.

- Maintain a baseline flood extent and document the comparison period.

- Combine imagery with gauge, rainfall, topographic, and local incident data.
- Prioritize critical infrastructure and vulnerable communities for verification.
- Archive each map used in a situation report with its timestamp and source.

Case 3 — Wetland conservation tracking for Ramsar reporting

A conservation team wants a consistent annual record of wetland extent and nearby land-use pressure. The workflow summarizes changes by management unit and pairs the spatial record with field observations and restoration activities.

The resulting evidence package can support reporting and planning, while the team retains responsibility for interpretation under the applicable site and reporting framework.

- Use a documented wetland boundary and reporting year.
- Track both surface-water extent and surrounding land-use pressure.
- Keep notes on drought, flood, restoration, and other explanations for change.
- Export maps and methods in a form that reviewers can reproduce.

Suggested pilot measure

Measure the time from a satellite signal to field confirmation, the share of alerts with a known disposition, and the agreement between screening indicators and local measurements.

Important note

Illustrative scenarios are provided for planning and training. Satellite indicators are not laboratory water-quality results and should not be used alone for health or safety decisions.