

CASE STUDY BRIEF

Land Monitoring Case Studies

A repeatable evidence workflow for forests, cities, and mining concessions

What this resource provides

Three illustrative workflows show how land-use signals can become transparent review queues for enforcement, planning, and compliance teams.

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From imagery to an accountable review queue

Land monitoring is most useful when a change signal is connected to a responsible team, a review date, and an evidence trail. A satellite alert should identify where and when a difference was observed; it should not be presented as a legal finding without the relevant verification process.

The cases below use a common pattern: define the reference condition, compare a consistent time window, inspect the spatial context, and document the disposition of each flagged location.

- Keep baseline imagery, current imagery, and processing dates with every review item.
- Use confidence or data-quality labels so reviewers can separate clear signals from ambiguous ones.
- Preserve field notes, permits, and adjudication outcomes alongside the spatial evidence.
- Publish the review rule and limitations to stakeholders who rely on the results.

Case 1 — Deforestation enforcement in protected areas

A protected-area team needs to focus patrol planning on recent canopy loss inside a large reserve. A change-detection workflow identifies candidate areas by comparing a baseline with a current period, then applies reserve boundaries, distance-to-road context, and data-quality checks.

The output is a prioritized inspection list. Rangers or investigators verify each candidate on the ground or with additional evidence before enforcement action.

- Define the protected-area boundary version used in the analysis.
- Exclude clouds, shadows, and known seasonal or managed-clearance areas where appropriate.
- Classify outcomes such as confirmed change, false positive, permitted activity, or needs more evidence.
- Measure time from detection to verification and the proportion of alerts resolved.

Case 2 — Urban sprawl tracking for city planning

A planning department wants a consistent view of built-up expansion at the edge of a growing city. Annual or seasonal composites can show where built-up indicators have changed, while zoning and infrastructure layers provide the context needed for planning review.

The decision is to focus site inspections, infrastructure planning, and public communication—not to infer ownership or compliance from imagery alone.

- Use a stable boundary and reporting grid so change is comparable across years.

- Review changes near construction sites, bare soil, quarries, and roads for likely confusion.
- Overlay zoning, drainage, and transport plans before recommending action.
- Explain resolution and classification limits in public-facing maps.

Case 3 — Mining compliance across concessions

A compliance unit monitors multiple concessions for expansion outside approved footprints or new disturbance near waterways. A shared review queue gives analysts one place to compare imagery, concession boundaries, permits, and follow-up status.

The workflow supports risk-based inspection. It does not replace a permit register, environmental audit, or legal determination.

- Version concession polygons and permit documents so the comparison is auditable.
- Flag proximity to sensitive areas for earlier human review.
- Assign each case an owner, due date, evidence status, and resolution note.
- Report aggregate patterns separately from individual allegations.

Land-monitoring readiness checklist

- ☐ Area-of-interest boundaries have an owner and a version date.
- ☐ Change rules include data-quality and seasonal considerations.
- ☐ Every flag can be traced to source observations and processing dates.
- ☐ Human review outcomes are recorded and fed back into the workflow.
- ☐ Public reports distinguish observed change from verified cause or violation.

Important note

Illustrative scenarios are provided for planning and training. They do not establish that a location has been deforested, illegally developed, or operated outside a permit.