OPERATIONAL MANUAL FOR COMMUNITY FOREST MONITORING WITH GLOBAL FOREST WATCH

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Narakajmanta Indigenous Territory • ETHNO-PROGRAM FOR CLIMATE MANAGEMENT OF FOREST IN THE COLOMBIAN ANDEAN MOUNTAINS • 2026

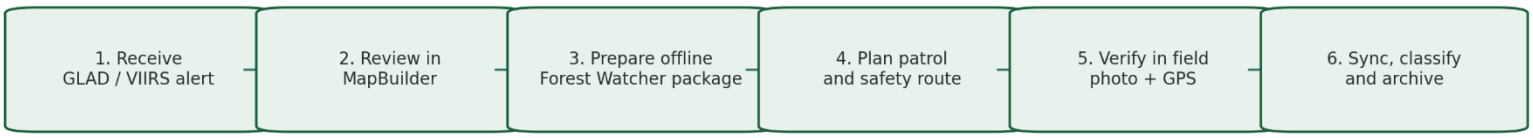
Manual purpose. We use this manual to convert Global Forest Watch alerts into safe, traceable and community-led territorial decisions. It standardizes the workflow used by the Narakajmanta Indigenous Environmental Secretariat and the community brigades after the WRI-funded implementation period.

1. Purpose, scope and operating standard

We developed this manual for the Narakajmanta community monitoring system established through the ETHNO-PROGRAM FOR CLIMATE MANAGEMENT OF FOREST IN THE COLOMBIAN ANDEAN MOUNTAINS. The operational area used throughout this manual is 9,800 hectares of ancestral tropical forest in the Sierra Nevada de Santa Marta. Within that landscape, we give special attention to 980 hectares that the project has treated as higher-risk because of fire exposure, pressure on water sources and prior forest-cover loss. Our purpose is practical: when a satellite alert appears, every monitor should know what information must be reviewed, how the route is selected, what must be verified on the ground, and how the evidence becomes part of a community record.

The manual is designed for the Indigenous Environmental Secretariat, the five community monitoring brigades and the trained Narakajmanta women, girls and LGTBI participants who use Global Forest Watch data. It also supports the Indigenous Tribal Council when it reviews territorial priorities. The project objective is to strengthen the forest monitoring, fire prevention and land stewardship capacities of 300 Indigenous participants through GLAD Alerts, Forest Watcher and MapBuilder. The monitoring system therefore has to remain understandable to people who work in the forest, not only to technicians who work from a computer.

We organize the procedure around one evidence chain. First, we receive or identify a deforestation or fire signal. Second, we examine the location in the customized MapBuilder context. Third, we decide whether the signal requires verification and prepare Forest Watcher for offline use. Fourth, we define the route and safety conditions. Fifth, we verify the site and collect photographs, coordinates and a concise field description. Sixth, we return to a connectivity point, synchronize the record and archive it for monthly review. A report is considered complete only when the alert, field evidence and final status can be linked to the same incident record.



Operational chain used by Narakajmanta community monitoring brigades

Figure 1. Standard operational chain for Narakajmanta community forest monitoring.

This procedure responds directly to the conditions documented during implementation. In April–June 2026, our teams experienced unreliable connectivity, pending offline synchronization and uncertainty caused by limited GPS accuracy in steep

terrain. We also found that an alert could be spatially displaced by several hundred meters relative to the verified event. The manual therefore avoids treating a satellite point as an exact field location. We use the alert as a search cue, combine it with terrain knowledge, and document the final verified position separately.

The standard applies to routine patrols and to alert-driven verification. It does not replace the authority of the Narakajmanta Indigenous Tribal Council, emergency agencies or specialized fire-response services. Community monitors identify, verify, document and communicate. When a situation presents immediate danger, the priority is human safety and escalation through the agreed response protocol. We do not require a monitor to enter a burning area, confront a suspected offender or remain in a location where slope, weather or access conditions make verification unsafe.

Core performance rule. Our operating benchmark is to verify at least 90% of prioritized active alerts and, where access and safety permit, complete the verification and response decision within 48 hours. Evidence must remain auditable through photographs, GPS coordinates, incident forms and Forest Watcher or MapBuilder records.

2. Territorial context and monitoring priorities

The Narakajmanta monitoring model was created because the community previously depended mainly on direct observation, general patrols and radio communication. That system produced valuable local knowledge, but it required people to travel long distances before knowing whether a threat was present. The project changed the sequence. We now use satellite information to narrow the search area before mobilizing a patrol. That change matters in the Sierra Nevada de Santa Marta because the terrain includes steep slopes, narrow trails and sections that become difficult during the rainy season. The cost of a poorly targeted route is measured in time, exposure and reduced ability to reach the next priority site.

Our operational planning uses two spatial scales. The first is the 9,800-hectare monitoring landscape. We maintain a broad view because deforestation and fire can move beyond previously affected sites. The second scale is the 980-hectare priority area. We concentrate more frequent review there because the project has already identified a stronger combination of fire exposure, forest-cover pressure and impact on water sources. The priority area does not mean that the remaining landscape is ignored. It means that scarce patrol time is assigned first to places where an early response can prevent the greatest damage.

We interpret alerts through territorial context. A GLAD deforestation alert near an agricultural plot is reviewed differently from a point inside a previously intact forest patch. A VIIRS fire alert close to a water source or an area with previous burning receives higher attention because the consequence of spread may be greater. We also consider access time. An alert may be environmentally important but impossible to verify safely during heavy rain. In that case, we record the limitation, use the best available remote information, and reschedule the field visit for the earliest safe window.

The Indigenous Tribal Council and community guides provide information that a satellite layer cannot supply. They know whether a trail is passable, whether a slope has become unstable and whether a location has cultural restrictions. During implementation, traditional knowledge helped validate access routes and territorial priorities. We therefore require patrol planning to combine MapBuilder information with a local access check before departure. This is a control measure, not an optional courtesy.

Priority criteria used before mobilization

Criterion	Operational question	Effect on priority
Forest-cover signal	Is there a recent deforestation alert or visible change near the point?	Raises priority when recent and spatially coherent.
Fire signal	Is there a VIIRS hotspot or recent burn evidence?	Raises priority, especially in dry conditions.
Water-source exposure	Could the event affect a spring, stream or collection route?	Raises consequence score.
Previous disturbance	Is the point near a previously burned or cleared area?	Raises recurrence concern.
Access and safety	Can a brigade reach the site without unacceptable	May defer field verification while keeping remote review

Criterion	Operational question	Effect on priority
	exposure?	active.

We keep the prioritization simple enough to use in a community meeting. The objective is not to calculate a complex risk index. The objective is to make the reason for dispatch transparent. Each patrol should be able to answer three questions before leaving: why this alert matters now, what evidence we expect to collect, and what condition would make us stop or change the route. This discipline reduces random patrolling and makes the monitoring system more efficient.

3. Governance, roles and chain of responsibility

The monitoring system operates under Narakajmanta Indigenous governance. The Indigenous Tribal Council authorizes and guides territorial activities. The Indigenous Environmental Secretariat coordinates routine use of Global Forest Watch tools, reviews active alerts and maintains the monitoring record. The five community brigades provide the field capacity. Together, these levels connect territorial authority with the technical workflow established by the project.

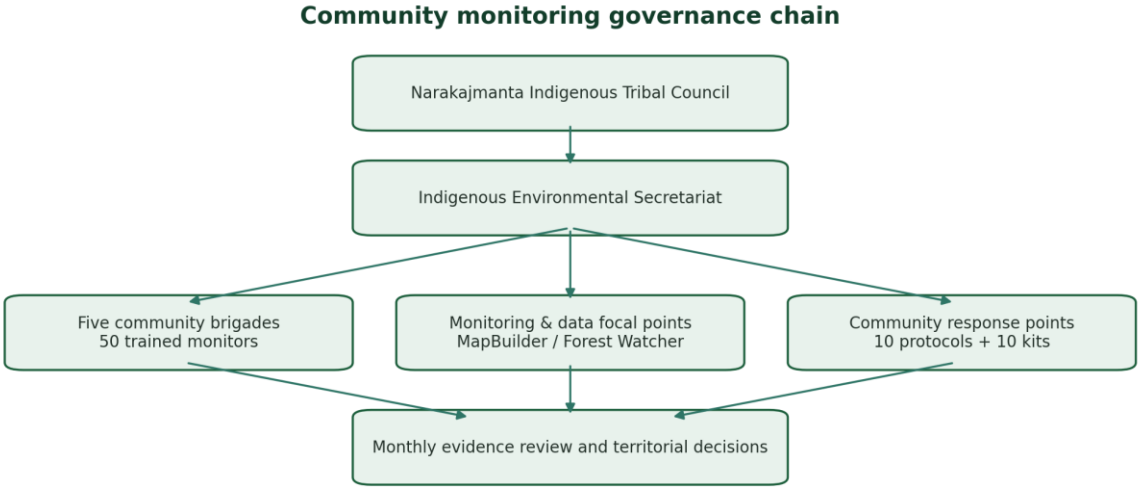


Figure 3. Governance chain for community monitoring and evidence review.

We use role separation to avoid gaps in evidence and duplicated work. The person who receives an alert does not automatically become the patrol leader. The Secretariat first confirms that the alert has enough information for review. The patrol leader then validates route feasibility with local knowledge. During the field visit, at least one monitor is responsible for georeferencing and at least one person is responsible for photographic documentation. After returning, a data focal point checks whether the record is synchronized and complete. This separation creates an internal control without making the process bureaucratic.

Minimum operating roles

Role	Primary responsibility	Required output
Indigenous Tribal Council	Territorial authorization and governance guidance.	Validated access and escalation decisions when required.
Indigenous Environmental Secretariat	Alert review, assignment, monthly coordination and record custody.	Alert register, patrol assignments and monthly review notes.
Brigade leader	Route, safety check and field coordination.	Patrol log and final field status.
Georeferencing monitor	Coordinates and location notes.	GPS point or track linked to the incident.
Evidence monitor	Photographs and concise description.	Minimum evidence set with time and context.
Data focal point	Synchronization, file naming and archive control.	Record marked synced, complete and archived.

The project trained 300 Narakajmanta women, girls and LGTBI individuals in the use of GFW tools and created a pathway for local leadership in forest monitoring. The operational brigades are the specialized field component

within that broader capacity. Their work must remain connected to the wider trained group because community monitoring depends on people recognizing threats, communicating local observations and understanding why a patrol was prioritized. We therefore treat the brigades as the field arm of a larger community monitoring system.

The Indigenous Environmental Secretariat is the continuity mechanism after grant funding. It should maintain a monthly review meeting even when no high-priority alerts are active. A quiet month is still a monitoring month. The Secretariat reviews whether MapBuilder layers remain current, whether Forest Watcher devices have usable offline information, whether kits are accessible, and whether any pending records remain unsynchronized. This routine prevents the system from becoming active only after an emergency.

When an alert may involve illegal activity, monitors document the environmental condition and communicate through the agreed governance channel. We do not instruct monitors to investigate responsibility, confront individuals or make accusations in the field. The evidence record should describe what is observable: clearing, burned vegetation, smoke, recent cutting, affected area or other physical indicators. Any enforcement or external notification decision remains with the competent authority and the Indigenous governance process.

Decision principle. Every alert must have one accountable status: under review, assigned for verification, verified, deferred for safety or access, escalated, or closed. An alert without a status creates uncertainty and can lead to duplicated patrols.

4. End-to-end monitoring workflow

We use one standard workflow for deforestation and fire monitoring because continuity is more important than the individual tool. Global Forest Watch provides the alert environment. MapBuilder provides the territorial context. Forest Watcher supports field work where connectivity is unreliable. Community verification determines what actually happened on the ground. The incident record then links those stages into evidence that can be reviewed later.

Step 1 — Receive and register the alert

The Secretariat or designated monitor checks the alert source and creates a simple alert entry before any patrol is assigned. The entry includes the date of review, alert type, approximate location, and the person who opened the record. We avoid relying on screenshots alone because an image without an identifier can become separated from the later field evidence. The record receives a unique project code that will also appear in the patrol and incident files.

Step 2 — Analyze the context in MapBuilder

We review the point against the project layers. The most important questions concern whether the alert falls within the 9,800-hectare operational area, whether it intersects the 980 hectares treated as higher risk, and what known features are nearby. We check previous disturbance, water-source relevance and practical access. The result of this review is a decision: verify soon, keep under observation, or defer field verification because the location is unsafe or inaccessible.

Step 3 — Prepare Forest Watcher for offline use

Before departure, the team confirms that the alert or patrol area needed for the day is accessible on the field device. The project has already experienced a situation in which photos and coordinates remained pending until the team returned to a point with solar connectivity. We therefore treat offline preparation as a formal pre-departure control. The monitor confirms the correct area, device battery, available storage and the record code to be used in the field.

Step 4 — Plan the route and safety limits

The brigade leader combines the digital location with community knowledge of trails and current conditions. The route should minimize unnecessary exposure. During heavy rain, a long route can be divided into shorter days, as the project already did during implementation. The team agrees on a turnaround point and a communication plan before leaving. The objective is to collect sufficient evidence, not to reach a coordinate at any cost.

Step 5 — Verify the alert in the field

At the site, we first observe from a safe position. We record whether there is visible evidence consistent with the alert. We capture coordinates and photographs, then write a concise description. If the alert location appears displaced, we do not force the evidence to match the original point. We record the verified position and explain the difference. This rule is especially important in steep terrain where GPS accuracy and satellite geolocation can create uncertainty.

Step 6 — Synchronize, classify and archive

When connectivity becomes available, the data focal point synchronizes the record once, confirms its status and moves the complete evidence into the project archive. The

Secretariat then classifies the incident for monthly review. A complete workflow ends with a decision, not merely with a photograph. The decision may be closed with no confirmed disturbance, verified and monitored, referred for community response, or escalated through the agreed protocol.

Operational objective. The workflow must remain short enough to be applied routinely. Every additional field requested from monitors should have a clear purpose in verification, safety, accountability or follow-up.

5. Receiving, screening and prioritizing GLAD and VIIRS alerts

We begin with the assumption that an alert is a signal that requires interpretation. It is not a final finding. GLAD deforestation alerts help us identify possible forest-cover change. VIIRS fire alerts help us identify thermal anomalies that may indicate active or recent fire. In the Narakajmanta system, both types of alerts are used to focus field attention, but the field team confirms the territorial condition before the community treats the signal as a verified incident.

Initial screening

When a new alert is reviewed, the designated monitor checks whether the location is inside or adjacent to the operational monitoring area. We then check whether the point is within the 980-hectare higher-risk area or near a previously affected sector. This first screen helps us distinguish a point that requires rapid review from one that can remain under observation. The screening entry should be short. It is designed to support a decision, not to reproduce all information visible on the platform.

1. **Confirm the alert source.** Record whether the signal is a deforestation alert or a fire alert. Keep the source type explicit because the field evidence we expect will differ.
2. **Check spatial relevance.** Confirm the alert in relation to the 9,800-hectare operational area and the 980-hectare higher-risk area. If it is outside the mapped boundary but close enough to affect the territory, record that relationship instead of discarding the signal automatically.
3. **Check consequence.** Review nearby forest, water sources, settlements and previous disturbance. A small event may still receive high priority when it threatens a critical water source or can spread into a larger forest block.
4. **Check field feasibility.** Ask whether the site can be reached safely within the intended response window. If not, document the access constraint and use remote review until a safe route becomes available.

Priority levels used by the manual

Level	Meaning	Operational response
P1 — Immediate review	Strong alert signal with high consequence or active fire concern.	Secretariat assigns review immediately; field verification as soon as safely feasible, aiming for <48 hours.
P2 — Priority verification	Credible signal in a relevant forest or water-source context.	Include in next targeted patrol and maintain evidence chain.
P3 — Observe	Signal is weak, spatially uncertain or lower consequence.	Keep in alert register; compare with subsequent imagery or alerts before dispatch.
Deferred — Safety/access	Verification would expose monitors to unsafe conditions.	Record reason, maintain remote monitoring, reschedule when conditions improve.

The 48-hour project benchmark is a management target for the alert-to-decision process where conditions allow. It should never be interpreted as permission to ignore weather or terrain risk. A deferred alert remains active in the register until the Secretariat records a new decision. This prevents unsafe conditions from producing an administrative gap.

We also avoid interpreting the absence of a fire alert as evidence that no fire occurred. Short-duration burns, cloud conditions, terrain and data timing can affect detection. Community observations therefore remain important. When a resident reports smoke or recent burning in a priority area, the Secretariat can create a community-originated monitoring record and compare it with GFW information. The system is strongest when remote sensing and local knowledge reinforce each other.

6. MapBuilder: territorial analysis before field deployment

MapBuilder is the project's territorial decision layer. We use

it to place alerts inside the Narakajmanta context before sending a brigade into the field. The purpose is to answer practical questions: where is the alert relative to the monitored forest, what sensitive feature may be affected, and what route is likely to be useful? We do not use MapBuilder only as a presentation map. It is the step that converts a satellite point into a field task.

The customized project approach integrates deforestation alerts, fire-risk information and critical water sources. During implementation, women and young monitors increasingly connected satellite alerts with known plots, water sources and previously burned areas. That shift improved route planning because the digital signal began to be interpreted through local territorial knowledge. We preserve that practice in this manual by requiring a short context note before every priority patrol.

Pre-patrol MapBuilder review

- Open the current project map and confirm the operational boundary before reviewing the alert. If a layer has been updated, verify that all monitors are using the same version or date reference.
- Locate the alert and identify the nearest known access feature. The access feature may be a trail, settlement, community reference point or other locally recognized landmark.
- Review whether the alert overlaps or approaches a water source, previously burned area or high-risk zone. Record the factor that explains the patrol priority.
- Estimate whether the point lies on a steep slope or in terrain where the original alert location may be difficult to reach. This prepares the brigade for a search area rather than an unrealistic expectation of point-level precision.

Map annotation standard

Each priority record should preserve four pieces of spatial information. The first is the original alert location. The second is the planned access direction. The third is the final field verification point when one is obtained. The fourth is any relevant area or feature affected by the event. Keeping these elements separate prevents a common error: replacing the original alert point with the field point and losing the ability to analyze how far the two locations differed.

Map element	What we record	Why it matters
Original alert point	Location and alert type as reviewed.	Preserves the satellite signal for audit and comparison.
Priority area relationship	Inside/outside the 980-ha priority area; nearby risk factor.	Explains why the alert received a patrol decision.
Planned access direction	Trail or community reference selected before departure.	Supports safety and reduces unnecessary travel.
Verified field point	GPS location of observed evidence.	Separates field reality from satellite geolocation.
Affected feature	Forest patch, water source, burned area or agricultural edge.	Supports territorial follow-up and prevention.

The project reported that MapBuilder would benefit from lighter mobile controls and layers that can be downloaded by area. Until such functionality is available in the version used by the team, we manage this limitation procedurally. The pre-patrol review is completed while connectivity is available. The patrol team carries the necessary offline alert information in Forest Watcher and retains a simple route reference. We avoid requiring a monitor to depend on live MapBuilder access in remote areas.

After field verification, the data focal point updates the project record with the verified point and status. If the incident reveals a new high-risk pattern, the Secretariat considers whether the priority map should be adjusted. The map should therefore evolve from evidence. Its role is to guide the next decision, not only to document the previous one.

7. Forest Watcher: preparing an offline patrol package

Forest Watcher is the operational bridge between the alert system and field verification. The Narakajmanta territory includes locations without reliable mobile connectivity, so the patrol must be able to work after leaving the signal area. Our procedure therefore starts before the brigade departs. We confirm that the relevant alert information is available on the device and that the monitor understands which incident code will be used for the field record.

Pre-departure device check

Control	Minimum standard	If the control fails
Alert/area available	The day's alert or patrol area can be opened before departure.	Do not leave assuming it will load later; resolve or create a clear offline reference.
Battery	Sufficient for route, evidence capture and return.	Recharge; assign a second device where available.
Storage	Space available for photographs and local records.	Remove non-project files or transfer prior evidence before departure.
Time/date	Device clock is reasonable and consistent.	Correct before collecting evidence because timestamps support traceability.
Incident code	Same code appears in patrol note and device record.	Resolve before departure to avoid duplicate or orphan evidence.

We use a simple rule: offline work must be deliberate. During the April–June period, a patrol correctly captured photographs and coordinates, but the files remained pending synchronization until the team returned to a community point with solar connectivity. Another monitor later believed the record had not been saved and repeated part of the route. That event showed that a pending record can become an operational risk if its status is not visible to the team. The manual therefore requires the patrol leader to treat locally stored evidence as valid pending data until the data focal point confirms otherwise.

What the field package must contain

The brigade needs enough information to identify the search area and return with a complete evidence set. We keep the package compact: alert type, approximate location, priority reason, planned route reference, incident code and expected evidence. The monitor should know whether the objective is to verify possible clearing, possible fire, or another forest condition. This distinction improves the usefulness of photographs and field notes.

We avoid overloading the device with unnecessary files. Large or outdated map packages can make field use slower and increase confusion about which information is current. The Secretariat should therefore review the active patrol set before each field day. Completed records are archived after synchronization rather than remaining indefinitely in the active queue.

Return-to-connectivity rule

When the brigade returns to a location with connectivity, the monitor does not immediately create a second record. The first action is to check the existing record. If it is pending, the team allows it to synchronize. If synchronization is uncertain, the data focal point compares the local photographs, coordinates and incident code before deciding what corrective action is needed. A second record is created only when the first record is demonstrably unusable and the replacement is explicitly linked to the original code.

Field discipline. One alert should normally produce one incident chain. Multiple photos may support that chain, but duplicate digital records should be avoided because they distort verification counts and make monthly review harder.

8. Patrol planning: route, team, safety and expected evidence

A patrol begins with a decision, not with movement. The brigade leader receives an assigned alert or monitoring area from the Secretariat and converts it into a route that can be completed safely. The route must reflect both the digital signal and the actual terrain. In Narakajmanta, steep slopes, narrow trails, mud and long distances can change the feasibility of a patrol from one day to the next. We therefore confirm access conditions on the day of departure.

Patrol briefing

Before leaving, the team states the purpose of the patrol in one sentence. For example: "Verify a GLAD alert near a previously burned agricultural edge and determine whether recent forest clearing is present." A clear purpose helps the team decide what evidence is needed. It also prevents a routine patrol from expanding into unrelated tasks that consume time and increase exposure.

We assign field responsibilities before departure. The brigade leader manages route and safety decisions. A georeferencing monitor is responsible for coordinates. An evidence monitor is responsible for photographs and the concise field description. These roles can be rotated between patrols so that more trained participants gain operational

experience, but they should be explicit on each outing.

Route decision table

	Acceptable condition	Action when condition is not met
	At least one team member or community guide can describe the route.	Seek local guidance or select another access direction before departure.
e route?	No condition creates an unacceptable slope, river or visibility risk.	Delay, shorten or divide the route.
	Departure time allows return before the agreed safety limit.	Reduce route length or reschedule.
r?	Team knows what condition it is verifying.	Repeat the alert briefing before departure.
	Team has the agreed check-in method or return time.	Establish an alternative before leaving.

During implementation, the project resolved difficult access by rescheduling outings and dividing some routes into shorter, safer days. That practice is now part of the manual. A route is not considered failed because a brigade stops for safety. The patrol log records the point reached, the reason for stopping and the next feasible action. This preserves accountability without pressuring monitors to continue under unsafe conditions.

Evidence planning

The field team should know what will make the verification conclusive enough for a decision. A deforestation alert may require a wide photo showing the affected forest edge, a closer photo showing fresh cutting or exposed soil, and coordinates taken from a safe representative point. A fire alert may require evidence of smoke, active flame, charred vegetation or a recently burned surface. The monitor should also note when the site shows no visible disturbance. Negative verification is still useful because it helps calibrate future interpretation of alerts.

We do not measure patrol success by distance walked. We measure it by whether the team returns with sufficient information to classify the alert and decide what happens next. This protects time, supports safety and keeps the monitoring system focused on evidence rather than effort.

9. Field verification procedure

Field verification is the point where remote information becomes territorial evidence. We follow a consistent sequence so that records from different brigades can be compared. The sequence is observation, positioning, photography, description and decision. We keep the procedure short enough to use under field conditions, while preserving the information required for later review.

9.1 Observe before entering

When the team approaches the search area, the brigade leader first evaluates whether the site can be observed from a safer position. Smoke, active burning, unstable slopes or conflict risk can make direct entry inappropriate. If the site cannot be approached safely, the team records the best available observation point and communicates the limitation. We do not require close-range evidence when doing so would increase risk.

9.2 Confirm the field position

The georeferencing monitor waits briefly for the device location to stabilize and records the coordinates of the observation or evidence point. The coordinate is not assumed to be the exact center of the disturbance. If the event extends across an area, the field note explains what the point represents. Where practical, an additional point may be recorded at a second edge, but the manual does not require monitors to walk around a hazardous or large disturbance merely to create a polygon.

9.3 Capture photographs

Photographs should show context before detail. The first useful image usually shows the relationship between the event and surrounding forest. A second image can document the specific sign that supports classification, such as fresh cutting, burned vegetation or smoke. We avoid taking many redundant photographs. A smaller set of clear images is easier to review and archive than dozens of nearly identical files.

9.4 Write a factual field description

The description should state what the team observed, not what it assumes about cause or responsibility. A good note might say: “Freshly cut vegetation observed approximately 180 m downslope from the original alert point; exposed soil visible; agricultural plot adjacent to the affected edge.” A weak note would say only “illegal deforestation confirmed” without describing the physical evidence. The manual prioritizes observable facts because they remain useful even when later interpretation changes.

9.5 Assign a provisional field status

Status	Meaning in the field	Next action
Verified disturbance	Physical evidence is consistent with forest clearing, fire or	Complete evidence chain; apply response/escalation rules.

Status	Meaning in the field	Next action
	recent burn.	
No visible disturbance	Team reached the search area but found no physical evidence.	Record negative verification; keep for comparison with later alerts.
Spatially displaced	Evidence exists but at a different field position from the original alert.	Record both locations and the estimated relationship.
Inconclusive	Evidence is insufficient or terrain prevented adequate observation.	Maintain open status; remote review or follow-up patrol.
Unsafe/inaccessible	Team cannot verify without unacceptable risk.	Document reason; return for Secretariat decision.

The provisional field status is reviewed after synchronization. The Secretariat may change the classification when the photographs, coordinates and MapBuilder context are considered together. This two-stage process prevents a hurried field judgment from becoming the final project record without review.

10. Photographic evidence, coordinates and record integrity

The project's monitoring indicator depends on verifiable records. Photographs and GPS coordinates are therefore operational evidence, not decorative attachments. We use a minimum evidence standard so that a record created by one brigade can be understood by another person months later. The standard also supports the project target of producing 300 georeferenced incident reports and verifying at least 90% of prioritized GLAD alerts.

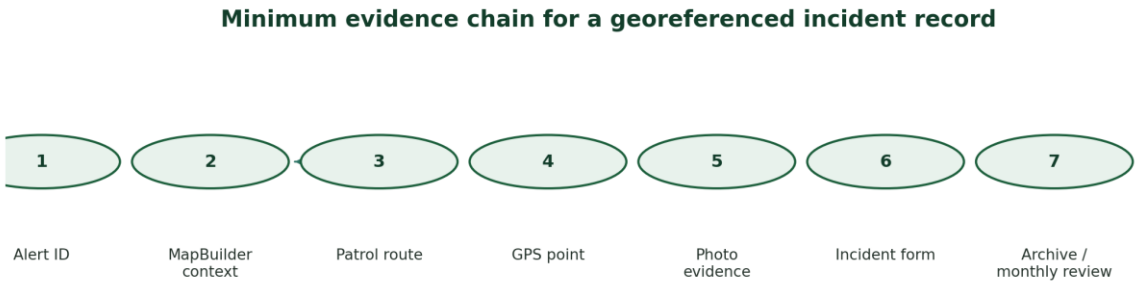


Figure 4. Minimum chain that connects an alert to an auditable georeferenced incident record.

Photographic standard

We aim for two to four useful photographs per incident unless conditions require more. At least one image should provide landscape context. At least one image should show the specific condition that supports the field status. When the site has no visible disturbance, the photograph should still show the search area that was inspected. We avoid photographing people unless their presence is necessary to document the activity and appropriate consent has been obtained.

Photographs should remain linked to the incident code. If the device automatically records date and location metadata, we preserve the original file where possible. We do not edit a field photograph in a way that removes context or changes the interpretation. A resized copy may be created for reporting, but the project archive keeps the original evidence file when storage allows.

Coordinate standard

The coordinate represents the location where evidence or observation was collected. The field note states whether it is an observation point, the approximate center of an affected patch or another reference. This distinction matters because the Narakajmanta project has already observed alert displacement in mountainous terrain. We do not overwrite the original alert coordinate with the field coordinate. Both are retained so that spatial differences can be analyzed.

Incident identifier

Each incident receives one identifier used across the alert register, patrol note, photographs and archive. A practical format is NKM-YYYYMM-###, where the final number is

sequential within the month. The exact format may be adapted by the Secretariat, but it must remain unique and consistent. The identifier is more important than the naming convention itself.

Evidence item	Required content	Quality check
Alert reference	Type, date reviewed and original location.	Can another person find the same alert context?
Field coordinates	Latitude/longitude and what the point represents.	Does the note explain any difference from the alert point?
Photographs	Context plus specific evidence.	Are images clear enough to support the provisional status?
Field description	Observable condition in concise language.	Does it avoid unsupported claims about cause or responsibility?
Patrol metadata	Date, brigade and responsible monitor.	Can the record be traced to a field outing?
Final status	Verified, negative, displaced, inconclusive, deferred or escalated.	Is the next action clear?

Record integrity requires restraint. We do not improve a weak field record by inventing precision after the patrol. If the coordinates were uncertain, we record that limitation. If cloud, slope or vegetation made interpretation difficult, we say so. Transparent uncertainty is more useful than false accuracy because it helps the Secretariat decide whether another visit is justified.

11. Offline synchronization: preventing lost or duplicated records

Connectivity is a known operational constraint in the Narakajmanta territory. Forest Watcher allows the project to carry alert information into areas without internet access, but the value of offline work depends on disciplined synchronization afterward. The most important lesson from implementation is that “not yet synchronized” is different from “not saved.” We build the procedure around that distinction.

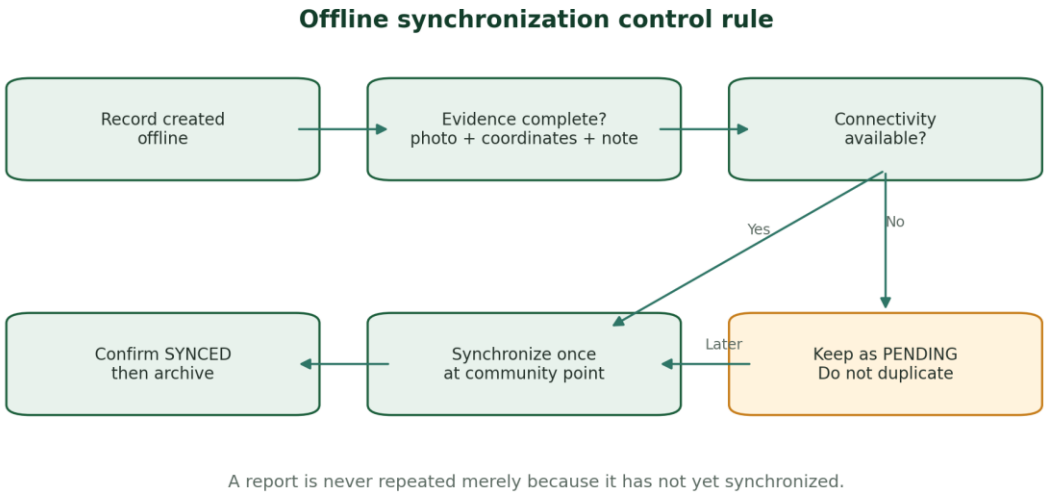


Figure 5. Synchronization decision flow used after an offline patrol.

The three record states

For community operations, we use three plain-language states: LOCAL, PENDING and SYNCED. LOCAL means the field evidence exists on the device but has not yet reached a connectivity point. PENDING means synchronization has been initiated or is expected, but confirmation is not yet visible. SYNCED means the data focal point has confirmed that the record is available in the intended project environment or archive. The interface may use different labels depending on the software version. The operational meaning remains the same.

Return procedure

1. **Do not duplicate.** When returning from a patrol, open the existing record first. Do not create a new record merely because the original is not immediately visible online.
2. **Confirm the evidence set.** Check that the local photographs, coordinates and incident note exist before initiating troubleshooting. This establishes that the field

work itself was captured.

3. **Use stable connectivity.** Synchronize from the community connectivity point where the device can remain connected long enough to complete the process.
4. **Confirm once.** After synchronization, verify the incident code and evidence. Mark the local checklist as SYNCED and avoid repeated uploads unless a specific file is missing.
5. **Escalate technical failures.** If the record remains unresolved, the data focal point preserves the local files and documents the problem. A replacement record, if needed, must reference the original incident code.

Troubleshooting table

Problem observed	Likely operational issue	Required response
Record visible on device but not online	Pending synchronization.	Keep local copy; retry from stable connectivity; do not repeat patrol.
Photos present but incident form incomplete	Field record not finalized.	Complete factual note from same-day patrol information before archive.
Two records exist for same alert	Duplicate creation after uncertainty.	Retain one master record and link/close the duplicate.
Only screenshot of alert remains	Evidence chain is incomplete.	Recover alert context from MapBuilder/GFW and attach to incident file.
Device unavailable before sync	Potential local data loss.	Use any separately saved photos/notes; flag record as incomplete; determine if re-verification is justified.

A synchronization problem should not automatically trigger a second field trip. Repeating a route in steep terrain consumes patrol time and may expose monitors unnecessarily. We first determine whether the evidence already exists locally. Only the Secretariat decides whether a second visit is required because the original evidence is insufficient for classification.

The monthly review includes a pending-record check. The Secretariat should not close the month with unexplained records sitting on devices. Pending records are either synchronized, archived manually with an explanation, or formally marked incomplete. This simple control protects the reliability of project statistics.

12. Low GPS accuracy and spatially displaced alerts

Mountainous terrain creates a specific monitoring challenge: the alert point, the phone location and the actual disturbance may not coincide precisely. The project documented a case in May 2026 in which an alert appeared on a difficult hillside, while field verification located the relevant incident several hundred meters lower near an agricultural plot. Cloud cover, terrain and limited phone GPS accuracy complicated the initial search. We use that experience as a standard operating lesson.

Search-area approach

We do not ask a patrol to “stand on the alert point” before it can verify an event. We define a search area around the signal and use terrain logic to interpret where evidence may be visible. The brigade considers drainage, slope, agricultural edges, existing trails and previously disturbed patches. This approach reduces the risk of declaring a false negative simply because the initial point was spatially offset.

When the GPS position is unstable

If the device position visibly jumps or produces inconsistent readings, the monitor waits briefly in the safest open location available and records the best stable reading. The field note states that accuracy was limited. If another device is available, the team may compare positions, but we do not delay a patrol excessively in search of artificial precision. A clear note about uncertainty is part of good evidence.

Displacement documentation

Element	What to retain	Example of note
Alert location	Original point from the alert review.	GLAD point retained as received.
Field location	Coordinate where evidence was observed.	Verified clearing edge observed at field point.

Element	What to retain	Example of note
Approximate separation	Distance or directional description when practical.	Evidence located approximately 300 m downslope.
Terrain explanation	Relevant slope, cloud, vegetation or access condition.	Steep slope and dense canopy limited initial positioning.
Final interpretation	Why the field evidence is or is not considered related.	Field condition spatially coherent with the alert and adjacent land-use change.

The Secretariat should preserve spatially displaced cases as learning records. If several alerts repeatedly show a similar directional offset in one sector, the pattern can improve patrol planning. The objective is not to criticize the alert system. The objective is to understand how remote sensing behaves in the local topography and use that knowledge to reduce unnecessary walking.

False certainty to avoid

We do not convert a rough field observation into an exact area estimate unless the team actually measured the boundary. We do not report a precise distance between alert and incident when the underlying GPS readings were unstable. We do not change the original alert point to make the map look cleaner. These practices would reduce the audit value of the data. The manual favors a transparent statement such as “approximately 250–400 m downslope” when that is the level of certainty supported by the field evidence.

The project previously suggested that GFW tools could benefit from an estimated-accuracy category for mountainous areas. Until such information is consistently available to the team, this manual provides the local control: every incident file distinguishes original alert location, verified field location and any stated uncertainty. That distinction protects the credibility of the community monitoring system.

13. Incident classification and early-response escalation

Verification is useful only when it leads to a clear status and next action. The Narakajmanta project therefore links field evidence to community early-response protocols. The approved design established 10 community-based protocols with a target response time of less than 48 hours. The protocols define communication roles and escalation pathways. This manual provides a consistent classification layer so the Secretariat can decide which protocol applies.

Operational incident classes

Class	Field condition	Community action
D1 — Forest clearing	Fresh cutting, exposed soil or recent forest-cover removal consistent with alert context.	Document, notify Secretariat, maintain monitoring and follow authorized territorial response.
F1 — Active fire	Flame, smoke or thermal condition indicating active fire.	Prioritize safety; activate fire-response communication; do not enter unsafe area.
F2 — Recent burn	Charred vegetation or burn scar without active flame.	Document extent indicators; assess recurrence and nearby water/forest exposure.
N0 — No disturbance found	Search area inspected without visible evidence.	Close as negative verification or keep under observation if uncertainty remains.
U1 — Inconclusive	Insufficient evidence or spatial uncertainty.	Remote review or follow-up patrol.
S1 — Safety/access deferred	Verification prevented by weather, terrain or other risk.	Keep active; reschedule under Secretariat control.

The classification is descriptive. It does not assign legal responsibility. A D1 record documents a field condition consistent with clearing. It does not name an offender unless that information comes through an authorized governance or enforcement process. This distinction protects monitors and keeps the project record focused on environmental evidence.

Escalation logic

An active fire receives the fastest communication because the consequence can change within hours. A new clearing may also require rapid attention when it is expanding or located near a critical forest or water-source area. A recent burn without current fire may be handled through documentation and prevention follow-up. An inconclusive

alert remains in the register until the Secretariat records a closing or follow-up decision.

The 10 response protocols should be stored in a format accessible to brigade leaders. The monitor does not need to memorize every step. The team needs to know the first contact, the communication channel and the conditions under which external support is requested. The project design anticipated communication hubs using messaging or SMS where possible. In practice, the selected channel must match connectivity conditions and community agreements.

Response-time control

For each priority incident, the incident file records three times: when the alert was reviewed, when the field verification occurred, and when the response decision was recorded. This allows the Secretariat to evaluate the less-than-48-hour target without relying on memory. If a case exceeds the target, the monthly review identifies the cause. Access delay, weather, synchronization failure and unclear responsibility require different corrective actions.

Escalation boundary. Community monitors verify and communicate environmental conditions. They do not confront suspected offenders or expose themselves to active fire, unstable terrain or other immediate danger. Safety and Indigenous governance remain higher-order controls than the response-time target.

14. VIIRS fire alerts, wildfire response kits and firebreak areas

Fire prevention is integrated into the same monitoring chain as deforestation. VIIRS fire alerts help the Narakajmanta system identify thermal anomalies that may require rapid review. The project also deployed 10 community wildfire response kits and established 10 strategically located firebreak areas intended to protect approximately 1,000 hectares of critical forest. The monitoring procedure connects these physical resources to the alert system so they are used according to risk rather than stored without an activation rule.

Fire alert review

When a VIIRS alert appears, the Secretariat checks whether the point falls near a known high-risk area, water source, settlement or previous burn. The team also considers current weather and access. If the alert suggests active fire and the site can be observed safely, the brigade verifies from a position that does not require entering smoke or flame. The first operational objective is to determine whether a community response protocol should be activated.

Use of the 10 response kits

The kits are community resources for organized response under the project protocols. Their location should be reviewed seasonally because a point that is accessible in dry conditions may become difficult to reach during the rainy period. During April–June, the project explicitly reviewed custody and placement so that kits would remain near the areas where they were most likely to be needed. This manual continues that control through a monthly inventory and access check.

Kit control	Monthly question	Action
Location	Can the kit be reached from the current priority routes?	Relocate within the agreed response network if seasonal access has changed.
Custody	Is a named community custodian responsible?	Update responsibility if the previous custodian is unavailable.
Condition	Are protective and response items usable?	Replace or repair before high-risk season.
Activation record	Was the kit used for a verified incident?	Record incident code, items used and replenishment need.

Firebreak areas as monitored infrastructure

The 10 firebreak areas are treated as infrastructure that requires observation. The brigade checks whether vegetation regrowth or access changes reduce their intended function. We do not assume that a firebreak remains effective because it was created once. Where maintenance is needed, the Secretariat records the condition and coordinates the appropriate community action under Indigenous governance.

A firebreak does not justify unsafe firefighting. Its purpose is to reduce the potential for spread in strategic locations. An active fire may still require professional support. The project design anticipated coordination with regional emergency capacity. The manual therefore uses a clear trigger: if the fire intensity, smoke, wind, terrain or access exceed the community team's safe capacity, the response becomes

communication and support mobilization rather than direct suppression.

Fire evidence

Fire records should distinguish active fire from recent burn. Photos should capture the affected vegetation and, where safe, the relationship to surrounding forest. The field note records whether smoke or flame was present. The verified point is linked to the original VIIRS signal. If the field team reaches the area after the thermal anomaly has ended, the record can still confirm a recent burn and support prevention work with nearby households.

15. Data management and the georeferenced incident archive

The monitoring system becomes durable when evidence remains organized after the field team returns. The project target of 300 georeferenced incident reports requires more than collecting 300 sets of photographs. Each record must preserve enough information to reconstruct the decision chain. We therefore maintain one master incident register controlled by the Indigenous Environmental Secretariat, supported by a structured digital archive.

Recommended archive structure

The Secretariat can organize the archive by year and month, then by incident code. Each incident folder contains the alert reference, field photographs, coordinate information, patrol note and final status. Where a document exists only on paper, the project may store a scanned copy or photograph, provided the incident code is visible. The objective is consistency rather than sophisticated software.

The master register functions as the index. It should contain one row per incident and avoid duplicating records for the same alert. At minimum, it records incident code, alert type, date reviewed, priority level, brigade, field date, final status, synchronization status and archive location. A short notes field can explain displacement, access delay or escalation.

Minimum master-register fields

Field	Purpose	Example
Incident code	Unique link across all evidence.	NKM-202608-014
Alert type	Separates deforestation and fire workflows.	GLAD / VIIRS / community observation
Priority	Shows why and when a patrol was assigned.	P1 / P2 / P3 / deferred
Original location	Preserves alert geography.	Latitude/longitude or mapped reference
Verified location	Stores field observation point.	Latitude/longitude
Field status	Summarizes verification result.	D1 / F1 / F2 / N0 / U1 / S1
Sync status	Prevents duplicate records.	LOCAL / PENDING / SYNCED
Archive path	Allows evidence retrieval.	2026/08/NKM-202608-014

We apply simple file naming. Photographs begin with the incident code followed by a sequence number, for example NKM-202608-014_P01. The patrol note uses the same code. This prevents evidence from becoming detached when files are transferred between devices. If a file must be renamed later, the original identifier remains in the archive metadata or log.

Data quality and Indigenous governance

The archive contains territorial information that can be sensitive. The fact that a record is useful for project monitoring does not mean every coordinate should be publicly distributed. The Indigenous Environmental Secretariat and Tribal Council determine what information can be shared externally. Public reporting can use aggregated results when revealing a precise location could create territorial or safety concerns. This approach keeps the project's evidence requirements compatible with Indigenous governance.

The archive is reviewed monthly. The data focal point looks for missing photographs, records with no final status, duplicate incident codes and pending synchronization. The review also checks whether the total number of verified alerts used in performance reporting can be traced back to actual incident files. We never adjust the incident count merely to match a target. The indicator should reflect the evidence base.

Archive rule. If an incident cannot be found by its code and reconstructed from the stored evidence, it should not be counted as a complete georeferenced incident report.

16. Quality assurance, indicators and monthly operational review

Quality assurance is built into the monitoring routine rather than added at the end of the year. The Indigenous Environmental Secretariat conducts a monthly review that connects operational evidence to the project indicators. This is how we protect the credibility of the 90% alert-verification target, the less-than-48-hour response standard and the 300 georeferenced incident-record target.

Monthly review sequence

1. **Reconcile alerts.** Compare the alert register with assigned patrols. Every priority alert should have a status, even when field verification was deferred.
2. **Reconcile records.** Check that every completed patrol has incident codes and that the supporting photographs and coordinates can be retrieved.
3. **Review time.** Calculate the interval between alert review, verification and response decision for priority cases. Record the reason for cases that exceed the intended window.
4. **Review spatial issues.** Identify alerts with large differences between the original point and field evidence. Use patterns to improve future search areas.
5. **Review safety and access.** Note routes that became impractical or dangerous. Update patrol planning before the next month.
6. **Review equipment.** Check field devices, connectivity needs and the accessibility of the 10 response kits.

Core dashboard

Indicator	Calculation	Management interpretation
Priority alerts reviewed	Number of priority alerts with assigned status.	Shows whether the monitoring queue is controlled.
Verification rate	Verified priority alerts ÷ priority alerts selected for field verification.	Target: at least 90%, subject to documented safety/access constraints.
Response-time compliance	Priority cases with decision <48 h ÷ priority cases where safe access was feasible.	Identifies delays in assignment, route, sync or governance.
Complete incident records	Records with alert + coordinates + photos + final status.	Tracks progress toward 300 georeferenced incident reports.
Pending synchronization	Records still LOCAL/PENDING at month end.	Should trend to zero through monthly reconciliation.
Spatially displaced cases	Verified cases where field evidence differs materially from alert point.	Supports local interpretation of alert precision.

The verification rate must use a clearly defined denominator. We do not calculate 90% against every satellite signal visible on a platform if the project has not selected all of those signals for field verification. The denominator should reflect the active alerts within the project's operational monitoring process and the criteria applied by the Secretariat. This makes the indicator reproducible and prevents overstating performance.

The monthly meeting also reviews what the data changed. If several verified incidents cluster near a water source, the next patrol plan should respond. If many alerts in one sector are negative verifications, the Secretariat may reduce unnecessary dispatch while continuing remote observation. Monitoring is therefore a learning system. The value of the data lies in changing how the next patrol is planned.

Corrective-action register

When the review identifies a recurring weakness, we create a simple corrective action with one responsible person and one completion date. Examples include unresolved duplicate records, an inaccessible kit location, a device with insufficient storage or a route that repeatedly becomes unsafe in rain. Corrective actions are closed only when the underlying operating condition has changed.

17. Gender-responsive monitoring, safeguarding and community knowledge

The project was designed to strengthen the capacities of 300 Narakajmanta women, girls and LGTBI individuals because

environmental degradation affects participation, water access and safety in differentiated ways. The operational manual therefore treats inclusion as part of monitoring quality. A system that depends on only one group to interpret alerts is less resilient and less representative of the territory. During implementation, we observed an important shift: women and young people increasingly explained Global Forest Watch alerts during community spaces and proposed verification routes. They also connected satellite information with known plots, water sources and previously burned areas. That change matters because the technical value of GFW increases when people who know daily land-use patterns can interpret what a signal may mean locally.

Participation standard

Roles in the monitoring system should be assigned according to training, availability and safety, not restricted by stereotypes about who can use digital tools or lead a patrol. Women and LGTBI participants can serve as alert reviewers, data focal points, brigade leaders or Secretariat members. Young participants can build technical experience through supervised rotation. Where age or safeguarding considerations limit field deployment, participants can contribute through alert review, data organization or community communication.

Safeguarding in field documentation

We collect only the personal information needed for project operations. Photographs focus on environmental evidence. When people appear in photographs, we consider whether their image is necessary and whether appropriate consent has been obtained. We do not publish sensitive territorial coordinates or personal information merely because they are available in the incident archive. The Indigenous governance structure determines external sharing.

Community knowledge as a control layer

Local knowledge helps the team distinguish a feasible route from a hazardous one. It also helps interpret whether an alert is near a known agricultural plot, a water source or a place with previous fire history. We document the operational contribution without requiring elders or community guides to disclose culturally sensitive information. The manual needs enough knowledge to plan safely, not a complete inventory of community knowledge.

Principle	Operational practice	Result
Inclusive technical roles	Rotate alert review, georeferencing and data functions among trained participants.	More people can sustain the system after grant funding.
Safe participation	Match field tasks to age, route risk and safeguarding requirements.	Participation does not depend on unnecessary exposure.
Territorial confidentiality	Share precise coordinates only when operationally justified and authorized.	Monitoring strengthens governance without creating new territorial risk.
Respect for local knowledge	Use community guidance for access and interpretation without extracting sensitive knowledge.	Better routes and stronger contextual interpretation.

We also avoid treating technology as superior to community observation. A resident report can justify a monitoring record even when no current satellite alert is visible. Conversely, an alert can remain unverified when the field team cannot find supporting evidence. The system is designed to combine these sources rather than force one to override the other.

18. Training, continuity and quick-reference operating tools

The project delivered 20 training sessions on Global Forest Watch, GLAD Alerts, Forest Watcher and MapBuilder and aimed to certify 300 Narakajmanta women, girls and LGTBI participants with at least 90% operational proficiency. The operational manual converts that training into a repeatable community routine. Its value after August 2026 depends on regular practice. Skills that are not used will decline, especially where software interfaces change or devices are replaced.

Refresher practice cycle

We recommend that the Indigenous Environmental Secretariat run a short practical refresher at least quarterly. The exercise uses a real or historical alert and walks participants through the full chain: context review, offline preparation, route decision, evidence capture and archive. The purpose is to maintain competence, identify new technical problems and train replacement monitors without waiting for a new grant-funded course.

Quick-reference checklist: before leaving

Check	Yes/No	Responsible
Incident code assigned and purpose understood.		Brigade leader
Alert/area available for offline reference.		Data/field monitor
Battery and storage checked.		Device user
Route validated with current local access information.		Brigade leader/community guide
Safety limit and return/check-in plan agreed.		Whole brigade
Expected evidence defined.		Evidence monitor

Quick-reference checklist: before closing an incident

Check	Required condition
Original alert preserved	Source/type/date/location remain linked to the record.
Field location documented	Coordinates indicate where observation or evidence was collected.
Photographs complete	Context and specific evidence are visible, or negative verification is documented.
Synchronization checked	Record is SYNCED or a documented manual archive explains the limitation.
Final status assigned	Incident is verified, negative, displaced, inconclusive, deferred or escalated.
Next action recorded	Follow-up, closure, prevention action or escalation is explicit.

Template: concise incident narrative

Incident narrative format. "On [date], Brigade [name/number] verified incident [code] following a [GLAD/VIIRS/community] alert reviewed on [date]. We observed [physical condition] at [field location], approximately [relationship] from the original alert point. Evidence includes [photos/coordinates]. The provisional status is [class]. The next action is [closure/follow-up/escalation]. Access/safety limitations: [if applicable]."

The Indigenous Environmental Secretariat should keep this manual as a living operational document. Changes are appropriate when they respond to evidence from field use. If a future version of Forest Watcher changes synchronization behavior, the technical instructions can be updated while preserving the project control principle: do not duplicate a record because its synchronization status is unclear. If MapBuilder layers change, the map-review section can be updated while preserving the principle of separating original alert location from verified field location.

We also retain the larger project purpose. The monitoring system is intended to strengthen forest stewardship and fire prevention across 9,800 hectares of Narakajmanta ancestral forest. The technology is useful because it improves the timing and targeting of community decisions. Its success is measured when alerts lead to safer routes, documented verification, faster response and better territorial follow-up. The Indigenous Environmental Secretariat is the structure that keeps those practices active after the WRI-funded period.

Manual control and evidence sources

This manual is grounded in the project Scope of Work, the approved ETHNO-PROGRAM proposal and the April–June 2026 interim narrative report. Those materials define the operational area, the GFW tools, the brigade model, the 90% alert-verification target, the 300 georeferenced records, the 10 early-response protocols and the field challenges that motivated the troubleshooting procedures. Where software interface labels change over time, this manual intentionally describes the project procedure rather than inventing version-specific buttons or menus.

Final operating rule. Receive the signal. Understand the territory. Prepare offline. Plan a safe route. Verify what is observable. Preserve the evidence. Synchronize once. Record the decision. Review the pattern monthly.