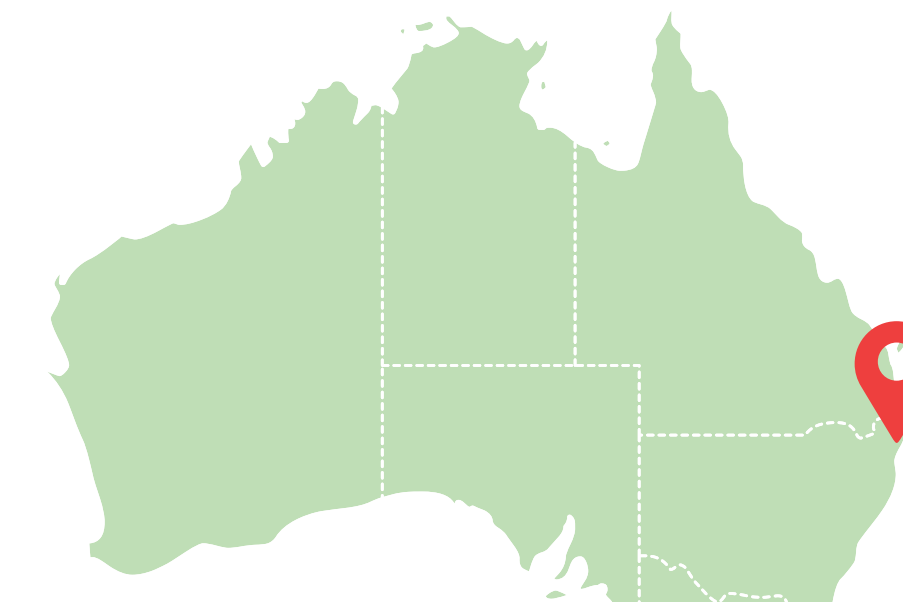


# Hydrological Restoration at Minyumai Indigenous Protected Area

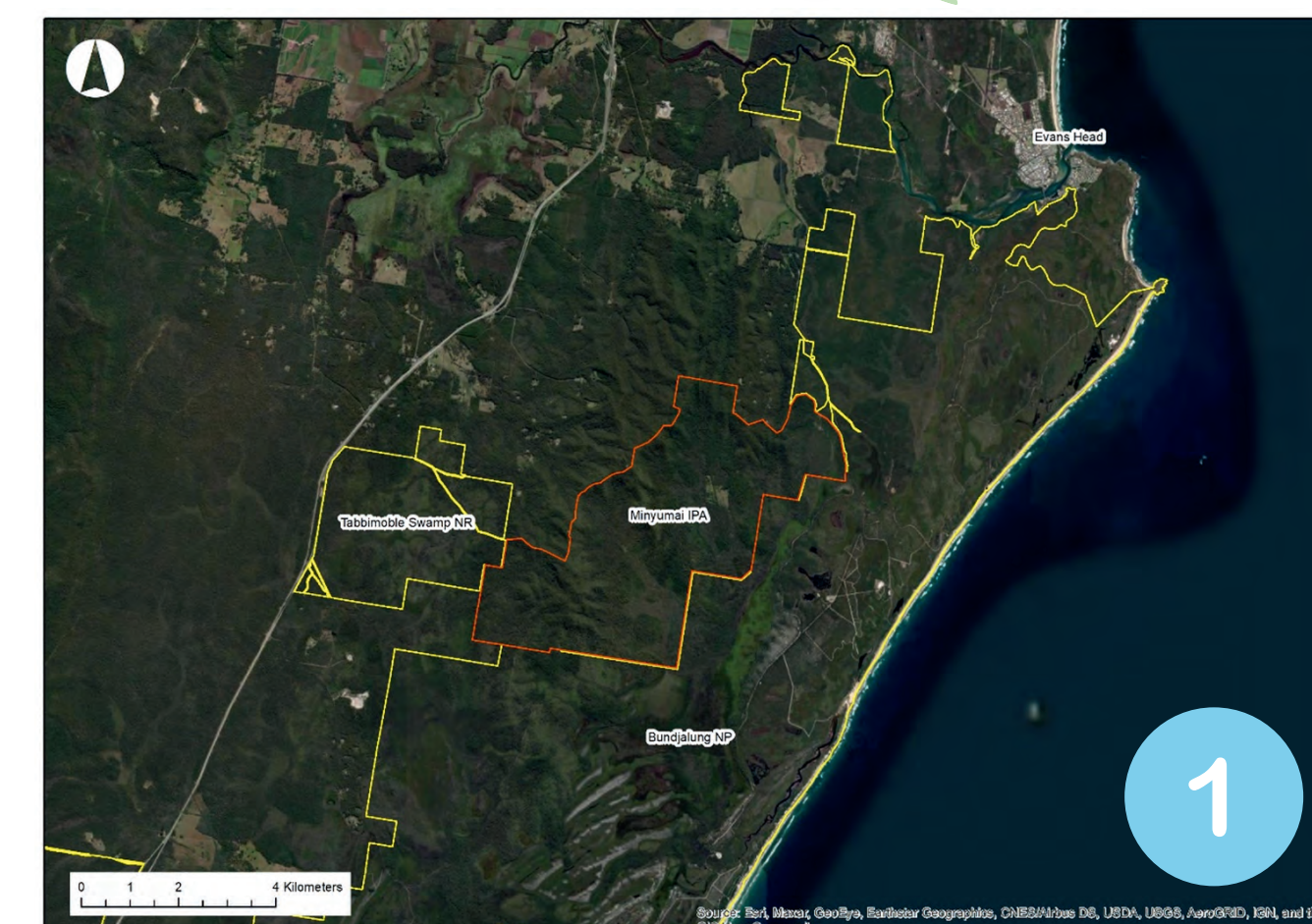
## Background

Nature Glenelg Trust (NGT) is an apolitical, not-for-profit, charitable environmental organisation delivering applied scientific projects to reverse biodiversity loss across south-eastern Australia. NGT is currently working with the Minyumai Land Holding Aboriginal Corporation (MLHAC) to restore the natural hydrology of an area of swamp forest within Minyumai Indigenous Protected Area. The objective of the traditional owners is to conserve and restore the ecological values of the reserve. The hydrological restoration project is an important step towards that objective.

The project is being undertaken on Aboriginal land owned freehold by the MLHAC. Minyumai is the traditional country of the Bandjalang clan. By declaring the property an IPA, the traditional owners have expressed their dedication to the conservation and restoration of its natural habitats in a way that is consistent with Bandjalang culture and that can help offer training and employment for the clan. The Minyumai IPA Plan of Management identifies hydrological restoration as a priority. Through the NSW Environmental Trust, a grant was secured in late 2021 to investigate, plan and implement hydrological restoration of key areas of the property. Since then, NGT and MLHAC are working closely together to implement the objectives of the grant.



Location of Minyumai IPA



## Project Summary

Minyumai IPA is a 2,162 ha protected area adjoining Bundjalung National Park and Tabbimoble Swamp Nature Reserve in north eastern NSW (Fig. 1). Although largely intact remnant vegetation, Minyumai includes a 150 ha area that was cleared and drained for agriculture in the early 1970s (Fig. 2). This area formerly supported swamp forest and dispersed, shallow inundation. Over time the central agricultural drain has eroded considerably, from 2 m wide by 1 m deep to (in places) 16 m wide by 3 m deep (Fig. 3).

The eroding drain in the vicinity of the proposed structure.



This drain and associated tributary drains now rapidly remove surface water from 150 ha of swamp forest. Full recovery of the swamp forest within the area is compromised and, although overstory swamp forest tree species (*Melaleuca quinquenervia* and *Casuarina glauca*) have re-established over approximately 70% of the area (Fig. 4), the understory remains weed (pasture grass) dominated (Fig. 5). It lacks the vegetation structure, floristic diversity (Fig. 6) and shallow pools (Fig. 7) of comparable undisturbed areas.

Erosion is ongoing, further exacerbating the problem and depositing sediment and weed propagules into otherwise undisturbed habitat downstream (Fig. 8), including within Bundjalung National Park downstream.

The objective of the project is to halt and reverse the erosion and restore the natural hydrology of the recovering swamp forest through a series of earthen blocks and related earthworks. Using existing funding an initial structure is proposed, as proof-of-concept (Fig. 4). However, complete restoration of the project area requires several such structures, and this is currently unfunded.

Collectively, the works would lift flows back to natural surface, rehydrate the former clearance footprint and thereby promote swamp forest recovery. Shallow floodplain pools would be recreated, drought resilience improved, weeds disadvantaged and native understory species favoured by the restored hydrology. Habitat for threatened species including the Oxleyan pygmy perch (*Nannoperca oxleyana*) and Wallum froglet (*Crinia tinnula*) would be restored and existing habitat protected against sedimentation. Dispersal of native flora and fauna into restored areas as their condition improves will be supported by the surrounding intact vegetation and populations.



Project area in 1971 showing the area recently cleared and drained



Project Area in 2023 showing the location of the proposed initial structure (red X).



Recovering swamp forest near the proposed structure. Note the weed (pasture grass) dominated understory.



Intact swamp forest understory, reference location.



A floodplain pond within swamp forest. The project will restore these habitats.



Recent sedimentation within a wallum swamp near the downstream end of the drain.

## Supporting ecosystem recovery processes

The primary objective of the project is to reinstate ecological function by restoring the natural hydrology of the 150 ha former clearance footprint while interrupting erosion processes which are exacerbating both on site and downstream issues.

Hydrological restoration will restore natural patterns of dispersed, shallow flow to the recovering swamp forest, which will favour native understory species over introduced grasses. Over the long term, with some additional management intervention (e.g. fire), the understory will be supported to shift from weed dominated to a native dominated and structurally diverse condition.

## Aiming for the highest level of recovery possible

As an IPA, Minyumai is part of Australia's conservation reserve estate. It is the objective of the traditional owners to restore the property as closely as possible to its condition prior to colonisation. This is seen as both a cultural and ecological project and an opportunity for employment and training for the Bandjalang.

## Priorities for allocating funding

While the existing project at Minyumai is funded through the NSW Environmental Trust, the scope of past hydrological damage, and therefore the scale of on-ground works required, was not fully recognised at the outset.

Through investigations and engagement since December 2021 we have determined the current priority to be the construction of a single earthen blocking bank within the main agricultural drain. This structure is to serve as a proof of concept. Its location and design have been carefully considered to minimise the risk of further erosion and maximise its hydrological restoration effectiveness. A detailed design and hydraulic study have been completed, by project partners The Mullett Institute, to model the behaviour of water diverted by this structure in an extreme event. This structure is ready to construct, subject to approvals.

To achieve full hydrological restoration of the full 150 ha 1971 clearance footprint surrounding this drain, 4-6 such structures are required. The cost to design and construct each structure is \$10-\$20K, depending upon location. We would use the SER funding to design and construct as many additional structures as possible. Each structure would increase the total area of hydrologically restored floodplain swamp forest, thereby complementing and value adding to the work achievable under the existing grant.



## Key partner organisations



- Nature Glenelg Trust (NGT) – project proponent
- Minyumai Land Holding Aboriginal Corporation (MLHAC) – landholder
- The Mullett Institute – technical support
- Give Soil a Chance – technical support
- NSW Environmental Trust – funding body