

Attachment 3.4: Adverse Effects

Describe any anticipated and known adverse effects of the project on the environment

1. The level of detail provided is tailored to the statutory purpose of the referral stage. At this point, the Minister is not required to undertake a full assessment of environmental effects. Rather, the information need only be sufficient to determine whether the Project is appropriate for referral to the Fast-track Approvals regime. In saying this, the Applicant does not shy away from or seek to deny or minimise the fact this Project would create the potential for significant, unavoidable and in some cases irreversible adverse effects. The scale of the development—including the inundation of approximately 7,100 hectares of land, hydrological modification of catchments, the creation of a new large dam structure and the installation of extensive lower-reservoir infrastructure—will change natural, cultural, ecological and social environments.
2. The referral process does not require - and is not designed to accommodate - a comprehensive assessment of environmental effects. Accordingly, the following provides a concise but sufficiently informative summary of the key potential adverse effects to enable the Minister to evaluate whether the Fast-track pathway is appropriate.
3. The potential effects described in this document reflect a ‘before mitigation’ scenario. The net environmental outcome will be shaped by substantial mitigation, remediation, offsetting and compensation measures, which will be developed in detail if the Project proceeds.
4. The Applicant does not underestimate the magnitude of what is proposed – in both benefit and detriment. Nonetheless, it remains confident that, on balance, the Nation will derive considerably more benefit than detriment from this Project.

Loss of Wetlands and Freshwater Ecosystems

5. One of the most significant potential adverse effects of the proposal is the permanent loss of approximately 1,300 hectares of wetland ecosystems within the Onslow Basin. These wetlands are ecologically important at both national and regional scales. The Fortification Creek wetland complex, for example, is nationally significant for its size, intactness, and high indigenous plant diversity. Approximately 526 ha of this wetland will be lost. This area is also recognised in statutory planning documents as an area of Significant Natural Value.

6. Other wetlands, such as the Boundary Creek Fen (94 ha) and the Middle Creek wetland (65 ha), are regionally significant due to their naturalness and biodiversity values. All would be largely or entirely eliminated by inundation. The Teviot wetland, known as the Teviot Swamp, which is above the project and is habitat for the Teviot flathead galaxiid habitat, will remain.
7. Wetlands are not expected to naturally re-establish around the margins of the enlarged Lake because those margins are generally steeper and because of water level fluctuations of up to 70 metres. This prevents the development of stable littoral zones required for wetland formation. As a consequence, the Project would result in a loss of wetlands.
8. In addition to wetland loss, the inundation of tributaries and stream networks will cause the loss of aquatic habitats, including those supporting sensitive species. The Onslow catchment is a relatively small catchment. As the maps filed show, the enlarged lake would comprise most of the catchment. This fundamentally changes it, including habitat complexity and natural flows. These losses cannot be fully mitigated and substantial off-set/ compensation measures will be required.

Impacts on Threatened Species and Indigenous Biodiversity

9. The inundation of the Onslow Basin will result in loss and fragmentation of habitats for a wide range of threatened and at-risk species. Initial investigations identified over 47 notable plant species, including numerous taxa classified as Nationally Critical, Nationally Endangered, or Nationally Vulnerable, which would be directly affected by inundation. Many of these species occupy wetlands, seepages or dryland turf communities that will disappear entirely under the reservoir. These effects are acknowledged as unavoidable consequences of the hydrological changes required to realise the scale of national benefits associated with the Project's storage capacity.

Threatened Fish: Teviot Flathead Galaxias

10. The Teviot flathead galaxias, classified as Threatened – Nationally Critical, exists within the Te Awa Makarara/Teviot River catchment. Initial estimates are that up to a significant amount of all known habitat for the species would be lost or degraded. The species relies on shallow, cool, slow-flowing tributaries and wetlands—environments that are highly sensitive to inundation and altered flow regimes. Despite application of a range of mitigation, offsetting and compensation tools, the risk of population decline may be inevitable.

Lizards and Terrestrial Fauna

11. The inundation and associated ground disturbance will impact several Threatened and At-Risk lizard species, including the Burgan skink (Threatened – Nationally Endangered), the southern grass skink, and the Otago green skink. Lizard habitat around rock outcrops and tussock grasslands will be lost under the enlarged lake footprint and construction footprint. Offsetting measures will include some lizard habitat having to be created or enhanced elsewhere.

Bird Species

12. The lake margins, wetlands, and associated mosaics of vegetation provide habitat for a range of Threatened and At-Risk bird species, including the black-fronted tern (Nationally Endangered), and several culturally significant taoka species such as grey duck, southern crested grebe, and New Zealand falcon. The Project creates the potential for loss of foraging, breeding, roosting, and nesting habitat. Because the new lake margins will be unstable due to water level variation, birds that rely on shoreline stability or shallow-water habitat may lose suitable ecological niches.

Effects on Lake Onslow Recreational Fishery

13. The inundation of tributaries feeding Lake Onslow will result in the loss of trout spawning habitat. This habitat loss will translate into a material decline in trout recruitment and a negative impact on the existing Lake Onslow brown trout fishery, which is valued for recreational angling. Compensation through enhancement of other regional fisheries may reduce the general impact of any loss in this regard, but compensatory measures will not be able to replace the loss of the Onslow fishery itself.

Landscape and Natural Character Effects

14. There will be adverse effects on the landscape character and natural features of the East Otago Uplands, an area that includes designated Outstanding Natural Landscapes and Landscape Management Areas. The character of the Onslow Basin is currently defined by its open rolling landforms, mosaic of wetlands, and modest artificial lake. The proposed reservoir, fluctuating in level, introduces an exposed drawdown zone, engineered dam structures, and substantial supporting works including access roads, spoil areas, and tunnelling sites. The scale of the proposed dam would fundamentally alter the natural appearance of the Te Awa Makarara/Teviot River gorge and surrounding uplands. These landscapes are highly sensitive to human modification. Consequently, their full assessment, including any possible mitigation or compensation, will be undertaken if the Project proceeds to the next stage.

Cultural and Mana Whenua Effects

15. The Project area contains numerous wāhi tupuna (ancestral landscapes), ara tawhito (traditional travel routes), wetlands of spiritual and cultural significance, and a range of indigenous species that are important to mana whenua. Wai (water) is a taoka of “extreme significance” to Kāi Tahu. The proposed extent of inundation will alter or destroy landscapes containing culturally important ecosystems and sites. The degradation of waterbodies and the loss of wetland ecosystems will affect ecological values and the mauri of the water, which has deep cultural implications. If referral is granted, the Applicant intends to undertake a comprehensive, values-based cultural impact assessment in partnership with mana whenua, ensuring that cultural considerations and Mātauranga Māori help shape conditions, design refinement and mitigation.

Archaeological and Heritage Losses

16. The Project will result in the loss of recorded archaeological sites within the inundation footprint, including of “high” and “medium” significance. Additional recorded sites located within one kilometre of the inundation area are also likely to be impacted. These include remnants of early pastoral occupation, gold-mining features, and historic structures. Archaeological investigation, salvage, and recording may be possible, but cannot replace the loss of in-situ context or cultural heritage landscape integrity. In this vein, then, there will be an unavoidable adverse effect. Any works affecting archaeological sites would be subject to the Heritage New Zealand Pouhere Taonga Act 2014 authority process.

Hydrology, River Systems, and Water Quality Effects

17. The construction of the new dam will potentially require 4–5 years of river diversion along the Te Awa Makarara/Teviot River, altering current ecological processes, sediment transport, and hydrological patterns. Construction activities can be managed throughout this period to minimise such disruption as far as practicable. Post-construction, the Te Awa Makarara/Teviot River flows will be managed to mirror current arrangement.
18. The Mata-Au/Clutha River will experience some altered flow due to the new hydro storage operations. Where project outflows return to the lower Mata-Au/Clutha River, the scheme will cause greater variability and rapid fluctuations in flow, potentially affecting water quality, aquatic ecology, benthic communities, and recreational uses such as angling and boating. There may also be potential impacts on the operation of the Tuapeka Mouth Ferry, a heritage river crossing. There is a further risk associated with the inadvertent transfer of pest species through pumped storage operations, in particular *kōaro* (a native species with predatory traits) and aquatic pest plants such as *Lagarosiphon major* and elodea.

Soil and Highly Productive Land Loss

19. Some of the lower-reservoir and offtake locations, particularly the options located farther down the Mata-Au/Clutha, would remove areas of Land Use Capability (LUC) Class 3 soils. These soils currently meet the interim definition of “highly productive land” in the national planning framework. There is a potential for adverse effect on these soils.

Social Impacts, Community Disruption, and Amenity Loss

20. Although increased employment and improved services may provide some benefits, it is inevitable a project of this scale will generate adverse social impacts for local communities. These potentially include:
 21. Loss of productive farmland and impacts on farming operations;
 22. Displacement or disruption for affected private landowners;
 23. Increased demand for housing, services, and infrastructure due to the construction workforce;
 24. Loss of recreational opportunities, including the popular Lake Onslow angling experience;
 25. Reduced amenity from construction noise, dust, traffic, and long-term landscape modification.
26. While the affected community is wider than just those landowners directly affected, they are an important subset. The Applicant has taken considerable care to understand the level of support there is, from the directly affected landowners. For reasons explained in other parts of this referral application, the Applicant has ascertained a high degree of support from those who will be directly affected by the physical features of the Project. Potential social effects will be assessed in detail if referral is granted, including through direct engagement with the communities likely to experience both the costs and the benefits of the Project.

Greenhouse Gas Emissions and Carbon Effects

27. The inundation of land, vegetation, soils, and organic matter will result in greenhouse gas emissions from anaerobic decomposition within the newly created reservoir. Construction of the dam, tunnels, powerhouse, and supporting infrastructure will require substantial quantities of concrete, steel, and fuel, generating additional embodied emissions. While construction-phase emissions are unavoidable, the Project’s long-term contribution to national emissions reductions is anticipated to be substantial and well in excess of any downside in the initial phases.

Natural Hazards, Erosion, and Geotechnical Risks

28. The project will alter landform stability around the reservoir, potentially increasing susceptibility to landsliding, particularly around the steep margins of the enlarged lake. Large-scale excavation, spoil deposition, and tunnelling introduce further geotechnical risks. While engineering design will mitigate some hazards, residual risks remain and would require ongoing management.

Residual Environmental Effects and Limits to Mitigation

29. While mitigation, offsetting, and compensation options exist for some adverse effects, some of the potential effects — including on wetlands, threatened species, landscape values, and cultural values — may not be fully mitigated. The scale of inundation and hydrological modification creates the potential for permanent and widespread change. Given the nature and scale of potential residual effects, a decision-making framework capable of weighing them transparently against national benefits is essential. The Fast-track Approvals Act enables decision-makers to consider these potential adverse effects alongside the substantial national benefits the Project may deliver. No other existing approvals pathway provides this breadth of evaluative discretion. The regime is therefore particularly well-suited to a balanced, strategic and integrated assessment of the Project's overall implications.