



Hawke's Bay Regional Council **Wairoa Flood Mitigation**

Ecological Assessment

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Wairoa Flood Mitigation
Ecological Assessment

Hawke's Bay Regional Council

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1 BACKGROUND & SCOPE

As a consequence of the severe weather events that affected New Zealand's North Island, the need for flood protection and community safeguarding has been dramatically increased. Hawke's Bay Regional Council (HBRC) is undertaking the design of a floodway and associated stopbanks to minimise impacts on the Wairoa community when severe weather events cause the Wairoa River to flood.

WSP previously completed an ecological values assessment (WSP, 2024 – Wairoa River High Level Values Assessment) when alternative floodway alignments and flood protection options were under consideration. Many of the areas assessed in the previous work are included in the final flood protection area, making much of the earlier work is still relevant. For areas not previously covered a new desktop assessment was undertaken and subsequently a site visit was completed. This document is an ecological assessment for the project prepared at the concept design phase and incorporates both desktop assessment and on-site investigations. This assessment will form part of a resource consent application (to be prepared by Strategy Planning) under HBRC's Order in Council (OIC) process.

2 METHODOLOGY

2.1 DESKTOP AND FIELD ASSESSMENT

The desktop review involved a review of relevant literature and databases. Information sources reviewed as part of this assessment included:

- Google earth aerial imagery and street view;
- Proposed stopbank alignment plans;
- Wairoa District Council and Hawke's Bay Regional Council Plans, planning maps and online databases;
- The New Zealand Freshwater Fish Database;
- The ebird NZ bird atlas database of bird observations in proximity to the site;
- Manaaki Whenua Threatened Environment Classification maps;
- Department of Conservation bat and herpetofauna bioweb databases;
- Herpetofauna distribution maps from van Winkel et al. (2018);
- Department of Conservation GIS database;
- A review of the WSP (2024) 'Wairoa River Values Assessment' which included field assessments along the Wairoa River in January 2024.
- A review of WSP (2025) 'Wairoa Flood Mitigation, Ecological Options Assessment' January 2025.

A site visit within the floodway area was also completed by three WSP ecologists on 15 October 2025. The site visit consisted of:

- An assessment of wetland presence and extent;
- An assessment presence of streams and overland flow paths;
- Lizard habitat suitability assessment and manual habitat searches in likely habitat;
- A bat roost tree assessment.

2.2 EIANZ GUIDELINES

The following report is a high-level ecological assessment, identifying the likely ecological values that might be affected by the proposed design and providing a preliminary assessment of potential effects. Due to the absence of detailed ecological information at this stage, the magnitude of effects cannot be fully determined. Therefore, detailed environmental management plans are recommended to support the construction phase.

Guidelines for undertaking Ecological Impact Assessments published by the Environment Institute of Australia and New Zealand (EIANZ, 2018) were used to assess ecological values and potential impacts of the Wairoa River flood mitigation options. The guidelines assist in assigning ecological values and effects in a consistent and transparent way. However, sound professional judgement is still required when applying the framework and matrix approach recommended.

2.2.1 ASSESSMENT OF ECOLOGICAL VALUES

The first step of the EclA guidelines approach requires ecological values to be assigned on a scale of 'Low', 'Moderate', 'High', or 'Very High' to each ecological feature (Table 1).

The EIANZ guidelines provide guidance on four key matters for consideration when assigning ecological value or importance to a site or area of vegetation/habitat/community. These are:

- Representativeness;
- Rarity/distinctiveness;

- Diversity and pattern; and
- Ecological context.

More information on these matters and how they are applied to assign value ecological features can be found within Table 4 of the EIANZ guidelines. Scoring for sites or areas combining values for the four matters can be found within Table 6 of the EIANZ guidelines (EIANZ, 2018). The key matters provide a basis for assessing values of sites. The application of the four key matters to consider is discussed in more detail in the relevant sections below.

To assign value to vegetation or habitat at the species level, conservation status was used as a starting point for determining value; the presence of those species classified as 'At Risk' or 'Threatened' conveying a higher value than those classified as 'Not Threatened'. Threat classifications have been sourced as follows: bats (O'Donnell et al., 2022); birds (Robertson et al., 2021); herpetofauna (Hitchmough et al., 2021); aquatic fauna (Dunn et al., 2017; Grainger et al., 2018) and plants (de Lange et al., 2024). In determining the value of vegetation or habitat based on threat classification of species, the likelihood of species being present and the importance of the habitat to the species based on habitat quality has also been considered. Note that in assigning value based on species a site may support a high value species on occasion but may have low value for a species based on habitat quality and the degree to which the species relies on it in the context of the wider habitat resource it uses.

Table 1: Assignment of values to vegetation, habitats, and species (adapted from EIANZ, 2018).

Value	Species Value Requirements	Vegetation/Habitat Value Requirements
Very High	Nationally 'Threatened' species occur or expected to occur regularly within the Project footprint on a permanent or seasonal basis.	Area rates High for 3 or all four assessment matters (as above). Likely to be nationally important and recognised as such.
High	Nationally 'At Risk-Declining' species occur or expected to occur on a permanent or seasonal basis.	Area rates High for 2 of the assessment matters (as above). Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	No Nationally 'Threatened' or 'At Risk-Declining' species occur, but other categories of 'At-Risk' or locally uncommon or rare species, or keystone species (that are considered important for ecological integrity and function) present on a permanent or seasonal basis.	Habitat provides locally important ecosystem services (e.g., erosion and sediment control, and landscape connectivity). Area rates High for one matter (as above), Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder. Likely to be important at the level of the Ecological District.
Low	No species present that are Nationally 'Threatened', 'At Risk', locally uncommon or rare, or considered keystone species.	Nationally or locally common habitat that does not provide locally important ecosystem services. Area rates Low or very Low for majority of assessment matters (as above) and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Exotic species, including pests, and species with recreational values occur or are expected to occur within the project area either permanently or seasonally.	Limited ecological values other than as a local habitat. Area rates Very Low for 3 matters (as above) and Moderate, Low or Very Low for remainder.

3 PROPOSED WORKS

3.1 FLOODWAY ALIGNMENT

The floodway will be constructed through the inner ‘peninsula’ of the greater Wairoa meander. The floodway inlet starts on the true left of Wairoa River, between Railway Road and Ruataniwha Road (Figure 1). Construction will involve stripping the majority of existing vegetation within the floodway corridor, followed by re-establishment of grass cover. In addition, the alignment of Ruataniwha Road near the floodway will be modified, and a stopbank will be constructed along the floodway boundary.



Figure 1: Approximate floodway alignment.

3.2 TOWNSIDE FLOOD PROTECTION

The townside flood protection stopbank (‘stopbank’) is proposed to be constructed along the true right of the Wairoa River. The proposed stopbank will extend from the western side of Wairoa bridge and run adjacent to the river until it reaches Rimu Drive (Figure 2).

The construction of the stopbank will involve earthworks and impact existing riparian vegetation along the margins of the Wairoa River.

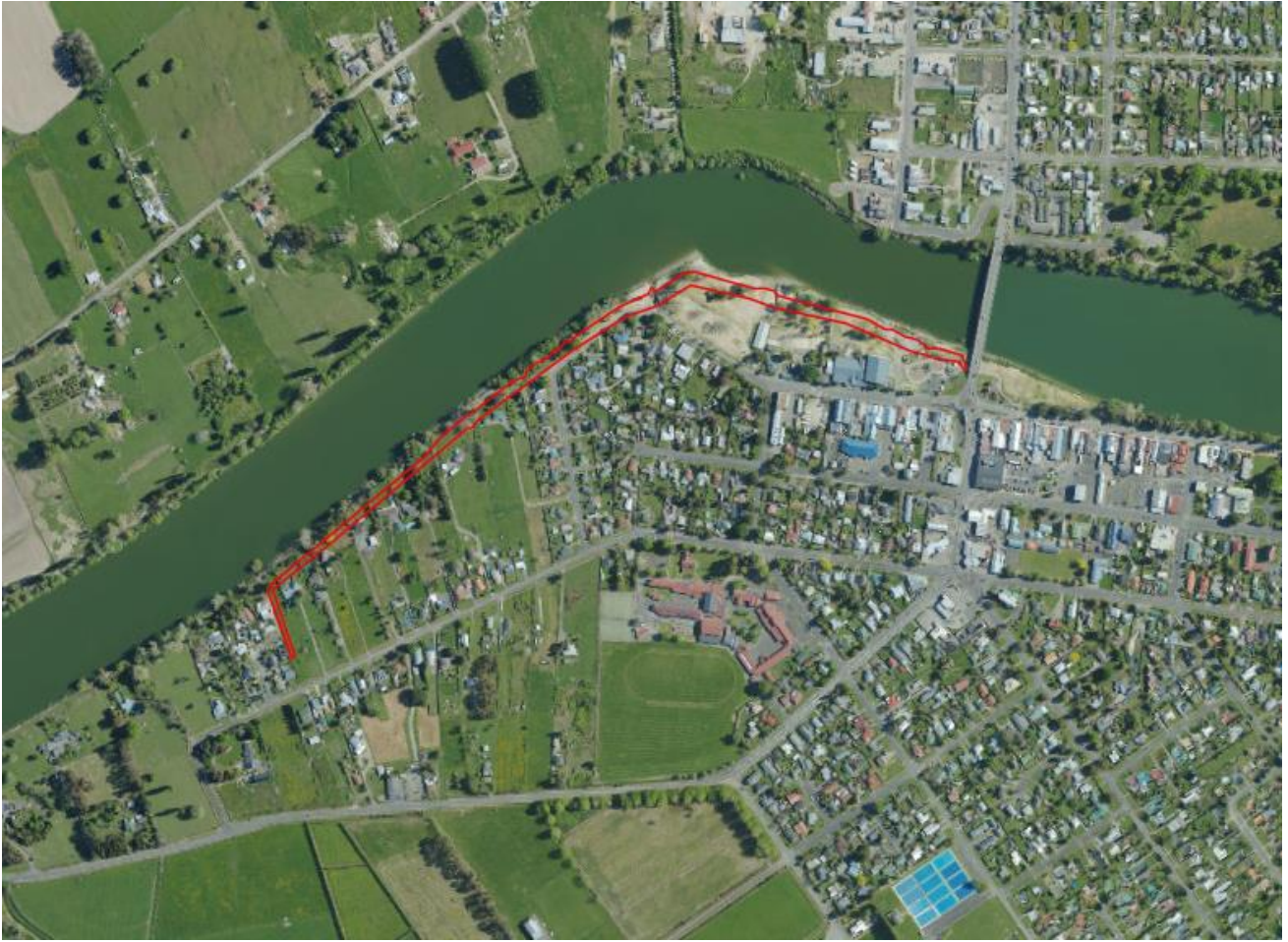


Figure 2: Approximate stopbank alignment.

4 ECOLOGICAL VALUE & POTENTIAL EFFECTS

The following sections provide an assessment of the ecological values likely present and potentially impacted by each proposed design (floodway and stopbank), along with a preliminary assessment of potential effects of the works on those values. The Wairoa River is discussed separately (section 4.3 below) as both of the designs have connectivity to the river and could impact the river to varying degrees.

It is recommended that prior to works occurring a detailed ecological management plan is developed. This should include a site visit to ensure detailed ecological data was available to inform mitigation measures.

4.1 FLOODWAY

4.1.1 VEGETATION

The vegetation within the floodway extent is predominantly grazed pastoral land, likely dominated by common exotic species. Some areas of exotic dominated riparian vegetation and occasional areas of cropping (i.e. maize) are also present.

The previous WSP ecological values assessment (WSP, 2024) identified vegetation blocks within the vicinity of the proposed stopbanks and found the overall vegetation composition to be dominated by common exotic grass species. Common native and exotic shrub/tree species were also present (WSP 2024¹ includes a full species list).

Overall, the vegetation within the project footprint is considered likely to be of low value and the proposed impacts of removal of the vegetation will be of a Low-Moderate effect. Resulting in a likely **Low** overall ecological effect.

4.1.2 BIRDS

Terrestrial vegetation within and adjacent to the proposed floodway is likely to provide some suitable nesting and foraging habitat for common native and exotic bird species. The presence of multiple wetlands in the area further enhances the diversity of available suitable nesting and foraging habitat.

A full list of the avifauna present in the area is provided in WSP (2024)² and identifies that the area is dominated by common native and exotic species. While it is possible that rare or threatened species utilise the area, the available habitat suggests it is considered unlikely. Birds have therefore been assessed as having a Moderate ecological value. The works will result in some bird habitat clearance, including within wetlands and there are potential direct effects on birds (disturbance, injury or death) during the works, however, these effects are likely to only have a minor effect on bird populations. The likely magnitude of effect is considered Low resulting in a **Low** overall ecological effect.

It should be noted that all native birds, other than those excluded under Schedule 5 of Wildlife Act, are protected under the Wildlife Act 1953.

¹ Table 19 provides a list of the observed plant species.

² Table 21 and A1 provide a list of the observed species within the wider Wairoa area.

4.1.3 BATS

Long-tailed bats (*Chalinolobus tuberculatus*) have been recorded within approximately 20 km of Wairoa township. Long-tailed bats can fly more than 20 km in a single night and frequently use waterways as commuting pathways and foraging grounds.

Several trees with potential long-tailed bat roost features (high-risk bat roost trees) were identified within the floodway extent during the site visit. The wetlands on site could also provide suitable foraging habitat for long-tailed bats. In the absence of an automatic bat monitoring (ABM) survey, bat presence cannot be confirmed, however, based on records of bats occurring in the wider landscape and habitat features present, it is assumed that bats may be present.

Long-tailed bats are classified as Threatened – Nationally Critical and are therefore assigned a Very High ecological value. The works have the potential to result in clearance of suitable roost trees and reduction in value or extent of the wetlands present as well as potential direct effects on roosting bats (disturbance, injury or death) during the works. As such the potential magnitude of effects could be considered Moderate-High dependent on the extent of habitat removal and degree to which bats utilise the site, resulting in an overall **High - Very High** effect for bats.

It should be noted that all native bats are protected under the Wildlife Act 1953.

4.1.4 LIZARDS

The floodway falls within the geographic range of seven indigenous lizard species, and three introduced and naturalised frogs. A full list of species with geographical ranges encompassing the site can be found in WSP (2024)³.

Site investigations and previous reporting (WSP 2025), indicate the floodway area is primarily rank grass used for agricultural purposes with scattered native shrubs and exotic trees (Figure 3). It is possible that the areas of rank grass and other vegetation cover other than regularly grazed pasture, provide habitat for copper skink (*Oligosoma aeneum*, At Risk - Declining), ornate skink (*Oligosoma ornatum*, At Risk - Declining) and northern grass skink (*Oligosoma polychroma*, Not Threatened). Manual searches carried out within the floodway confirmed the presence of two northern grass skink within the A & P Society property showgrounds, which had the highest quality habitat present across the project area. The site experienced significant damage from Cyclone Gabrielle, with extensive silt deposition along the riparian margins of the Wairoa River, reducing the quality of lizard habitat in those areas.

Due to the confirmed presence of Not Threatened northern grass skink and the availability of suitable habitat for At Risk lizard species, the ecological value for lizards has been assessed as Moderate-High. The proposed floodway will result in a substantial area of temporary habitat loss and, without management, may cause direct effect (disturbance, injury or death) to lizards present, therefore the magnitude of effect has been assessed as Moderate-High, dependent on the population size of lizards in the area, resulting in a potentially **High** overall level of effect.

It should be noted that all native lizards are protected under the Wildlife Act 1953.

It is highly likely that active lizard management will be needed to comply with the Wildlife Act (1953) which will require a Wildlife Act Authority (WAA).

4.1.5 WETLANDS

Seven natural inland wetland areas are likely to be affected by the floodway works (Figure 3). All were found to be dominated by common native and exotic species, with between 70-100% facultative/obligate species-

³ Appendix A, Table A3

specific cover, and passed the pasture exclusion tests, no grazing was identified during the site investigations. As a result of common native and exotic dominance, they were assessed to be of **Low** ecological value.

All existing wetlands within the excavated floodway will be lost due to the excavation. The proposed stopbanks and associated floodway earthworks have the potential to alter the hydrology of those outside the of the floodway extent. The complete loss of some wetlands and potential drainage of others could result in a Very High magnitude of effect. Other potential effects include changes in vegetation composition, wetland functions and increased sediment and contaminant loads. The overall ecological effect has therefore been assessed as **Moderate-High**.

As assessment of the impact on groundwater will be required to confirm the extent of potential drainage of those wetlands outside the floodway footprint. Wetland delineation will also need to be carried out to accurately map the known impacted wetlands and potentially impacted wetlands. It is understood that the adverse effects will need to be managed according to the Ecology Principles in Condition 26 of the OiC.

4.1.6 FRESHWATER

The floodway stopbanks start and end at the Wairoa River, which is assessed separately in Section 4.3.

Three permanent streams and one overland flow path were identified within the proposed floodway during the site visit in October 2025 (Figure 3):

- Two permanent streams, near the southern extent of the floodway, which provide surface flow to a significant wetland to the southwest of Takitimu Marae.
- A overland flow path to the northeast of the A & P showgrounds, draining into the Wairoa River
- A permanent stream with riparian wetlands, in the northwest of the project area (specifically to the northwest of the Te Kopua Urupa).

These streams currently function as semi-rural drains with significant agricultural input, however, are likely to serve as suitable habitat for a number of freshwater species due to their connectivity to Wairoa River and adjacent wetlands. The streams have therefore been assessed to have an ecological value of Low to Moderate.

The works could result in effects on stream extent and value due to altered hydrology and sediment and contaminant loads could increase from construction and operation of the floodway. Detailed design, construction methodologies and Stream Ecological Valuations will need to be completed to assess the potential effects on streams from the proposed works.



Figure 3. Extent of streams (blue) and overland flow paths (purple), natural inland wetlands (yellow) and significant skink habitat (green) within the project footprint of the Wairoa Floodway. Note that the wetlands have not been delineated so the boundaries are only indicative.

4.2 TOWNSIDE FLOOD PROTECTION

4.2.1 VEGETATION

The proposed stopbanks will impact a substantial area of riparian vegetation that is accessible to the public. A portion of this area was assessed in the initial values assessment (WSP,2024) and was found to contain common exotic species, some natives and ornamental shade trees. The southwest and northeast portions of this stopbank were not assessed on-site in 2024, however aerial imagery shows that vegetation in those areas is similar with a combination of mown grassland, ornamental exotic shade trees, and common native and exotic vegetation. There also appears to be areas of vegetated riparian margins along the Wairoa River which will require further field assessment.

WSP (2024) provides a species list for the central portion of this stopbank, with no Threatened or At Risk species identified. Areas not assessed on-site have been assessed via desktop assessment only and may require further on-site assessment once the project designs are developed further.

The vegetation is dominated by common native and exotic species and as such is considered to be Low ecological value. The likely magnitude of effects of the vegetation removal will be Low-Moderate and therefore the overall ecological effect will likely be **Low**.

4.2.2 BIRDS

The proposed area of impact is predominantly riparian margin, and some tree land and ornamental vegetation. These habitats are likely to provide low quality nesting and foraging habitat for birds in this area. WSP (2024), showed that this area was utilised by common native and exotic species⁴. The riparian habitat has been degraded significantly by Cyclone Gabrielle, including large deposits of silt along the riparian margin. It is possible that rare or threatened species utilise the area, although due to habitat present this is considered unlikely. Birds have therefore been assessed as having a Moderate ecological value.

The works will result in some bird habitat clearance, and there are potential direct effects on birds (disturbance, injury or death) during the works, however, these effects are likely to only have a minor effect on bird populations. The likely magnitude of effect is considered Low resulting in a **Low** overall ecological effect.

It should be noted that all native birds, other than those excluded under Schedule 5 of Wildlife Act, are protected under the Wildlife Act 1953.

4.2.3 BATS

High-risk bat roost trees are likely present within or near the proposed stopbank footprint. The adjacent Wairoa River provides suitable commuting and foraging habitat for long-tailed bats, which are known to use waterways as movement corridors.

The assessment for long-tailed bats in the stopbank area aligns with that of the floodway. In the absence of monitoring, bat presence cannot be confirmed; however, given regional records and suitable habitat features, it is conservatively assumed that bats may utilise the site.

The magnitude of effects is considered Moderate to High, depending on the extent of habitat removal and the degree to which bats use the area, resulting in an overall effect of **High to Very High**.

It should be noted that all native bats are protected under the Wildlife Act 1953.

⁴ Refer to Table 7 for a full species list

4.2.4 LIZARDS

The native lizard species with geographical ranges encompassing the stopbank site is consistent with the floodway.

The riparian margin contains areas of dense rank grass, tradescantia (*Tradescantia fluminensis*) and convolvulus (*Convolvulus sp.*) as well as toetoe (*Austroderia toetoe*) which had formed dense skirts, in areas. This habitat is highly suitable for native skinks, especially copper skink (At Risk - Declining), ornate skink (At Risk - Declining) and northern grass skink (Not Threatened). The Hawke's Bay Skink (*Oligosoma auroraense*) (Threatened – Nationally Endangered) has a potential geographical distribution that includes the site. However, suitable habitat is not present, so its presence is considered unlikely.

This site provides high value habitat for lizards, including At Risk species, therefore the ecological value for lizards has been assessed as High. The works will result in significant clearance of potential lizard habitat and, without management, may cause direct effects to lizard presence. As such, the magnitude of effects is potentially Moderate-High, resulting in a likely overall ecological effect of **High**.

As with the floodway assessment, it is highly likely that active lizard management will be needed to comply with the Wildlife Act (1953) which will require a Wildlife Act Authority (WAA).

4.2.5 WETLANDS

During the desktop assessment a few potential wetland areas were identified within the riparian margin. However, a site visit was able to confirm no wetlands are present within this area and as such they are not discussed further.

4.2.6 FRESHWATER

The stopbank site is bordered by the Wairoa River to the north. There are no known streams or tributaries that will be affected by. A detailed assessment of the Wairoa River and the potential effects of each design is provided below in Section 4.3.

4.3 WAIROA RIVER

The Wairoa River is the biggest river in the Hawke's Bay Region. The Wairoa River is central to the township of Wairoa, where it meanders through the town before its confluence with the Pacific Ocean (approximately 4 km from the proposed impact areas). Although the catchment is highly modified and subject to water quality impacts, the river still supports a wide range of habitats and a diverse array of fish species, including several that are threatened (see below). It also contains significant fish spawning sites and maintains important ecosystem functions.

A desktop assessment of the Wairoa River identified approximately 16 native fish species and three exotic species (WSP, 2024). Among these are 'At Risk - Declining' inanga (*Galaxias maculatus*), koaro (*Galaxias brevipinnis*), longfin eel (*Anguilla dieffenbachii*), bluegill bully (*Gobiomorphus hubbsi*) torrentfish (*Cheimarrichthys fosteri*); 'At Risk - Naturally Uncommon' giant bully (*Gobiomorphus gobioides*) and 'Threatened - Nationally Vulnerable' lamprey (*Geotria australis*) (Dunn et al. 2018; WSP, 2024). Several of the species identified are important mahinga kai and/or Taonga species. Whitebait (inanga, koaro and banded kokopu) form part of a commercial and recreational sport fishery. Further, brown trout (*Salmo trutta*), chinook salmon (*Oncorhynchus tshawytscha*) and rainbow trout (*Oncorhynchus mykiss*) are recognised as important recreational sports fish. The banks of the Wairoa River and lower reaches of tributaries of the Wairoa River are also likely important inanga spawning areas.

Taken together, the ecological value of the Wairoa River has been assessed as High to Very High.

The primary ecological impact from the proposed floodway is the modification of natural processes occurring within the Wairoa River catchment. The construction of both the floodway and

stopbank could increase sediment discharge to the stream and there is potential for fish passage impacts, where in-stream structures are required.

The floodway alignment has stopbanks through the inner 'peninsula' of the Wairoa meander. During large rainfall events flood flows will be directed across the 'peninsula' by the proposed stopbanks creating a flood channel. The intention is that this will prevent the Wairoa River overtopping its banks and flooding the surrounding township of Wairoa. During flood events, the floodway will bypass approximately 6.5 km of the Wairoa River. This shortened flow path, and the realigned stopbanks will likely cause high velocities which could disrupt surrounding riparian zones and existing freshwater ecology. This will likely have significant temporary ecological impacts on the hydrology and ecological functions of the Wairoa River. Since the diversion only occurs during flood flows (temporary) and the river will follow its natural course during normal conditions the magnitude of effects of the floodway has been assessed as Low – Moderate, resulting in a **Low – Moderate** overall level of effect.

The main effects on the Wairoa River from the stopbank are potential erosion and sediment runoff, assessed as a potential Low magnitude of effect, and **Low-Moderate** overall level of effect.

4.4 SUMMARY

The construction of the flood mitigation proposed will result in the removal of trees, grassland and vegetation that provide habitat for native fauna, as well as the loss of existing wetlands and watercourses within the floodway and potential impacts on wetlands and streams outside of the floodway. The construction works have the potential to disturb, injure, and cause death to native fauna.

The potential adverse effects of construction and maintenance of all the flood control options on ecological features within the project area has been preliminary assessed as Low to Very High. When the project designs are developed further, it is recommended that an ecological management plan is developed and the effects of the proposed are assessed against the effects management hierarchy.

The potential adverse effects on the ongoing operation of the flood control options are difficult to determine, and likely require further input from other specialists, such as hydrologists.

5 RECOMMENDATIONS

The following are recommended to avoid, remedy and mitigate effects on the ecology prior to, during and post construction:

Pre-construction

- Obtain Wildlife Act Authority for the active management of lizard species, particularly Northern Grass skink, within the works extent.
- Undertake Stream Ecological valuation for the four identified permanent streams/overland flow paths to determine overall loss in potential value as a result of the works and to assist within assessing the effects of the proposed works against the effects management hierarchy.
- Undertake wetland delineation and assessments and determine any offsetting/compensation to meet effects management hierarchy of the NPS-FW
 - It is understood that the OiC may not require extensive offsetting as mandated under the NPS-FM.
- Development of an Ecological Management Plan to mitigate effects on birds, bats, lizards, wetlands and freshwater effects. This should include a site visit to ensure detailed ecological data was available to inform mitigation measures.

Construction

It is anticipated that assessments and management plans will recommend the following:

- Avoid and minimise the loss of any existing vegetation within the riparian zone of the river.
- Best practice erosion and sediment control guidelines for any earthworks in the vicinity of waterbodies including undertaking earthworks during a period of stable weather and outside of heavy rain.
- Relocation of any freshwater fauna is recommended where instream works are required.
- Cleaning machinery prior to working onsite and following appropriate biosecurity protocols.
- Native planting is recommended for loss of existing native/exotic vegetation and fauna habitat.
- Restoration and rehabilitation of aquatic habitats for the modification and/or loss of habitat.
- Seasonal restraints on timing for works e.g. pre -clearance checks for native bird nests prior to vegetation removal and/or outside of the main bird nesting season.
- Lizard salvage/relocation which could include habitat creation, pest control and ongoing monitoring.
- Bat tree removal protocols (bat roost protocols) for any trees that could potentially support roosting long-tailed bats following current best practice DOC guidance. Replacement planting for the loss of bat roosts.

Operation

It is anticipated that assessments and management plans will recommend the following:

- Maintenance and enhancement of riparian zones where inanga spawning habitat is present.
- Inclusion of a buffer zone from any important habitats directly impacted by the project to minimise ongoing effects from maintenance activities e.g. mowing grassed areas across the stopbank.

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