"Achieving Outcomes by Building Capability"

The AgriBusiness Group™

Assessment of economic potential of irrigation water in Tairawhiti.

Prepared for Trust Tairāwhiti

Prepared by The AgriBusiness Group and Aqualinc

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Contents

Please Read

Executive Summary

Trust Tairāwhiti (TT) has invited The AgriBusiness Group (TAG) and Aqualinc to report on an "Assessment of economic potential of irrigation water in Tairāwhiti".

This project is in response to the Tairāwhiti Economic Plan[1] which has the Whakakitenga of "Investing in ourselves for economic sovereignty". The plan seeks to lift Regional GDP, diversifying the economy, unlocking the whenua and attracting investment to provision of irrigation water in order to optimise the economic contribution of water to the Region and assist the realisation of the Region's economic vision.

This work has been broken into two sections, the first being a current inventory of the land and the water resources which are available, and the second section examines the economic potential of combining the land and water resources and maximising the potential from the available irrigation capability from what is a constrained resource.

We have created two scenarios, the current scenario and a future scenario which incorporates achieving the maximum allowable abstraction of irrigation water and a shift from low value irrigation production to a high value of irrigation output. The future minus the current reports the financial impact of lifting the production from the available water.

Current Scenario

The current inventory has identified that there is approximately 86,644 ha of irrigable land in Tairāwhiti across the seven catchments. Of that irrigable land, 8,689 ha (10%) is currently allocated water to irrigate it, leaving approximately 78k of land which is irrigable but is dryland. The Waipaoa Catchment dominates the metrics in both the irrigated area and the irrigable area and has the majority of the intensive Horticultural land uses and the high quality soils.

As reported by the GDC at their "Waipaoa River Catchment Planning hui 11 - The Waipaoa River minimum flow" the MALF of the river has been recalculated as 2,500l/sec and that all potential minimum flows above the status quo (1,300 l/s) would decrease the reliability of water takes from the river and increase the frequency of time when water could not be taken from the river for irrigation. In the absence of a new minimum flow we have assumed that the 2,000 l/s flow regime has been adopted, and the surface water irrigators have had their revenue dropped by 11% in the current scenario.

The notes of the discussion in the hui also points to the requirement of the Makauri Aquifer irrigators to reduce their abstraction of irrigation water. They report scenario 4, which is labeled Sustainable Allocation, which is for a 15% cut now and a further 15% cut at 2045. We have modeled that the current irrigators from the Makauri Aquifer are required to make a 15% cut in their current abstraction of water in the current scenario.

Future Scenario

In the future scenario we have assumed that the surface water irrigators have been able to restore their reliability by building dams which are able to make up for the short fall in access to irrigation

[1] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://trusttairawhiti.nz/assets/Resources/Tairawhiti-Economic-Plan_SEP-2024.pdf

water that is caused by the minimum flows and that the Makauri Aquifer irrigators are able to maintain their abstractions by the addition of a Managed Aquifer Recharge (MAR) scheme.

Table ES 1 indicates that there is surplus water available to be abstracted from various Catchments, which all have more than sufficient high class soils.

Table ES 1: Available water for abstraction by Catchment.

Catchment	Available water for abstraction.
Northern	371
Waiapu	2,535
Uawa	346
Waimata	-30
Motu	153
Waipaoa	-14
Southern	54
Total	**3,415**

In this scenario it is assumed that all of the available water is used. It has been allocated across the Catchments according to the distance from the Gisborne hub. It has been allocated to the four highest crops in the efficiency measure $/m^3 utilised. Those four land uses are Pipfruit, Citrus, Kiwifruit and Vegetables.

We have also assumed that there has been a transition from the current areas of maize and pasture irrigation to these highly efficient land uses.

The future scenario has an additional 1,030 ha of irrigation plus the Makauri Aquifer and Waipaoa irrigators restoring their reliability of irrigation abstraction to that which they enjoy presently.

Unconstrained Scenarios

We have also modelled two unconstrained from access to river or aquifer water scenarios. One is for the future scenario irrigable area (the irrigable area is all of the land which is flat to rolling and is below 15^o slope) plus all of the irrigable area identified modeled as being irrigated and the other is for the future scenario irrigable area plus all of the irrigable area identified modeled as well as the potentially irrigable area (the potentially irrigable area is all of the land which is strongly rolling from 16^o – 20^o which will require development work for high value crops) being irrigated.

These unconstrained scenarios has been modeled to show the economic potential of the Region if the current constraints on available irrigation water can been overcome.

Results

The output at the orchard / farm gate for the current and future scenarios and the net increase are shown in Table ES 2.

Table ES 2: Output for the current, future and unconstrained scenarios. ($m)

Scenario	Current	Future	Unconstrained Irrigable	Unconstrained Irrigable and Potentially Irrigable
Current	692.76	939.32	2,454	3,687
Net Increase		246.56	1,761	2,994

The $246m increase in output from the future scenario is a significant amount, 35% increase on the current scenario.

The multipliers for the increase in output are shown in Table ES 3.

Table ES 3: Output for the current and future scenarios. ($m)

Multiplier	Result	Unconstrained Irrigable	Unconstrained Irrigable and Potentially Irrigable
Gross Domestic Product	402.51	2,871	4,881
Value Added	188.00	1,339	2,276
Employment (FTE's)	1,926	13,563	23,057
Household Income	70.39	493	838

The increase in orchard / farm gate output would result in a $402m increase in all goods and services produced in the Tairāwhiti Region with an increase in value added, which is the increased value over and above the cost of supply or the increased profit margin on its production being $188m, a 1,926 increase in FTE's and $70m increase in household income.

These are all very significant figures for the Tairāwhiti Region.

The two unconstrained scenarios show a considerable uplift in the Regional multipliers being eight times those of the future scenario for the irrigable area and twelve times for the irrigable and potentially irrigable areas.

Summary

The Tairāwhiti Region is blessed with an abundance of good deep soils with relatively high Plant Available Water in the river valleys. However, the climatic conditions mean that there are often summer periods when there is little or no rain and high evapotranspiration rates which mean that the available water for plant growth is limited. At the same time the rivers run at very low levels which limit the amount of water that can be abstracted from them.

Tairāwhiti has been, and is increasingly, seen as an area that can produce good volumes of horticultural produce which require a consistent supply of moisture. It has some very highly

productive horticultural operations which include the necessary post harvest handling facilities and servicing industries.

In order to achieve the results that are shown in this report requires improving the reliability of existing irrigators, encouraging the take up of irrigation capability in those Catchments that still have available water and encouraging transitions to highly efficient output systems are all required.

To make the next step forward the Region needs to have a legislative framework which is focused on maximising the output from its constrained water resources in the Waipaoa River and its aquifers. This would include allowing MAR for the Makauri Aquifer and allowing the establishment of out of river water storage facilities to harvest high winter flows and encouraging the establishment of cooperative water supply companies that can access and distribute the water.

New development is going to occur predominantly in the Waiapu catchment which has a high proportion of Maori ownership which may require some support to allow Maori to take advantage of the opportunities that Horticulture offers, including enhanced employment.

This report has identified that the potential benefits are significant for the land owners and the Regions economy. However there is a considerable amount of heavy lifting required to ensure that it happens.

1 Background

Trust Tairāwhiti (TT) has invited The AgriBusiness Group (TAG) and Aqualinc to report on an Assessment of economic potential of irrigation water in Tairāwhiti.

This work has been broken into two sections, the first being a current inventory of the land and the water resources which are available and the second section examines the economic potential of combining the land and water resources and maximising the potential from the available irrigation capability from what is a constrained resource.

1.1 Current Inventory

A significant proportion of the information requested has already been assembled by Aqualinc in the Regional Water Assessment[2] prepared for GDC in 2023. We were able to access GDC's records which enabled us to update the datasets from the Regional Water Assessment.

Our methodology for assembling the inventory data is as follows:

Locations

The most straightforward way to divide the areas was to use the surface water catchment from the Regional Water Assessment. The Poverty Bay Flats area was further divided into sub-catchments; these have been retained.

Irrigable land

Aqualinc has previously defined (for the whole of Aotearoa New Zealand) land areas that are suitable for irrigation: both the areas that are most suited to irrigation, and areas that are less suited but still possible. This dataset was used in the National-scale Assessment of Water Availability and Security for MPI. These areas were summarised for Tairāwhiti.

Ownership type

We combined the LINZ primary parcels layer with the Māori land layer from Te Kooti Whenua Māori, and summarised the land ownership within the catchment boundaries. We were able to identify the major corporate farming operations and estimate the size of their landholdings.

Soils

S-Map data from Manaaki Whenua Landcare Research covers most, but not all of the study area. For the areas outside of the S-Map coverage we have used data from the Fundamental Soils Layer. We have summarised the soil type and also profile available water (PAW).

Existing land use

We have been provided with spatial data from GDC's crop survey from the 2024/25 report, and previous years. Gaps in the survey data have been filled using the Land Cover Database (LDCB5), although this is only able to provide broad categories rather than specific land uses.

[2] Alexander, J; Calder-Steele, N; Dark, A. (2023): Gisborne Regional Water Assessment. Gisborne District Council, Aqualinc Report RD23011-1. Aqualinc Research Ltd.

Existing irrigation will be used as an indicator of land-use intensity (i.e. an irrigated land-use is considered more intensive than the same land-use without irrigation).

Existing water rights.

We have summarised the existing water take consents by location, source (groundwater / surface water) and consented rate / volume. We have combined consent information with land-use to give an indication of the area able to be irrigated by each consent (note that this may differ from the area actually irrigated).

1.2 Economic Potential

The information on economic potential has been compiled based on the information provided in the current inventory section of this report. This has resulted in the total irrigable area which has been identified being assigned a land use be it irrigated or dryland. As part of this we have had to take into account that the Gisborne District Councils Water Planning exercise has identified that the Waipaoa Rivers Mean Annual Low Flow (MALF) is higher than originally calculated and that the minimum low flow for irrigation takes is only 51% of MALF, which is low for a River of this size. This means that there is an expectation that the minimum flow will have to be lifted. Also the level of water in the Makauri Aquifer continues to decline and is now at risk of saline intrusion which will mean that cuts of 15% of current actual use are required immediately to avoid permanent adverse effects on the aquifer.

Financial models have been developed for each of the land uses and these have been rated up to produce a total financial output figure for the area as it currently stands and in a future scenario which assumes that all of the irrigation capability has been taken up and that some of the land use has moved to a higher earning land use.

There are four scenarios presented:

- Current which reflects the current consented irrigators that will be required to reduce the reliability of their ability to abstract water because of the intention to lift the minimum flow on the Waipaoa River and from the Makauri aquifer.
- Future which assumes that the Waipaoa River abstractors are able to meet their current consent application conditions by using B block water to store the water in out of river Dams and that the Makauri aquifer abstractors are able to carry out a Managed Aquifer Recharge system to restore their current abstractions. This scenario also utilises all of the available River abstraction capability in the Northern Rivers.
- Unconstrained irrigable which reflects all of the irrigable area identified in the Region is irrigated regardless of water availability.
- Unconstrained irrigable and potentially irrigable which reflects the total area irrigable and potentially irrigable identified in the Region is irrigated regardless of water availability.

We have then used a set of input / output multipliers for the Gisborne District to calculate For each of the current and future scenarios which report the change in:

- Gross Domestic Product ($m)
- Value Added ($m),
- Employment (Full Time Equivalents),
- Household Income ($ 000),

that will occur in the Tairāwhiti/ Gisborne Region.

Commentary has been provided on the nature of the change in existing irrigation and future new irrigation development.

2 Current Inventory

We have completed our analysis using the same catchments as used by Alexander, et al. (2023), as shown in Figure 1. Table 1 lists catchment area.

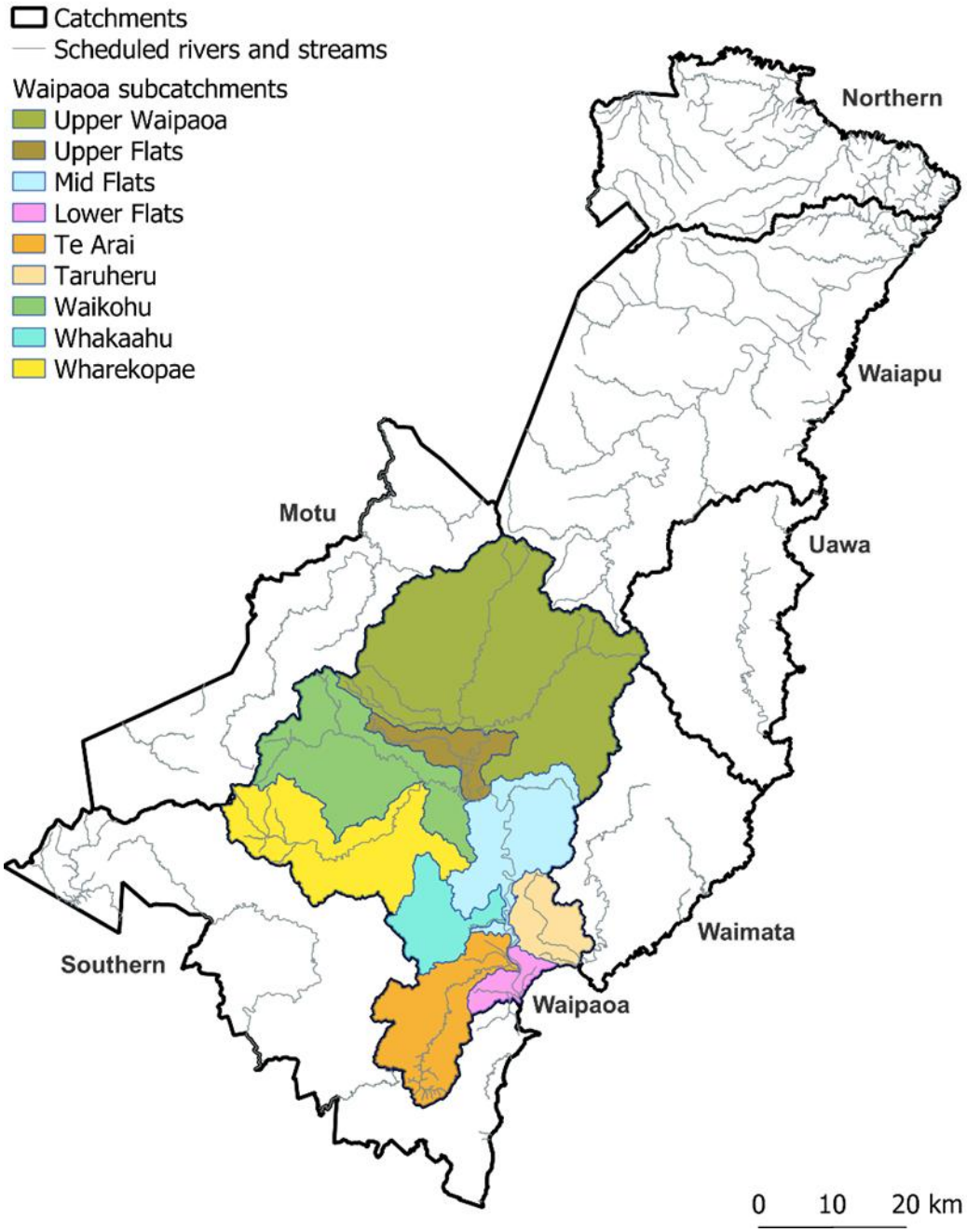

Figure 1: Catchments and Waipaoa sub-catchments used in this analysis.

Table 1: Area of catchments and Waipaoa sub-catchments (italics)

Catchment *Sub-catchment*	Area (ha)
Northern	77,838
Waiapu	180,841
Uawa	65,325
Waimata	64,757
Motu	88,762
Waipaoa	225,835
Upper Waipaoa	*81,635*
Upper Flats	*8,827*
Waikohu	*33,283*
Wharekopae	*31,575*
Mid Flats	*23,035*
Whakaahu	*11,793*
Te Arai	*21,543*
Taruheru	*9,449*
Lower Flats	*4,696*
Southern	126,599
Total	**829,957**

This report presents the insights from the current state environment.

We have completed our assessment against the areas that Alexander, et al. (2023) identified as irrigable (land most topographically suited[3] to irrigation but not necessarily irrigated at present) or potentially irrigable (land that is less topographically suited[4] by maybe OK for high value crops with more development effort, such as land-form modification to enable mechanical harvesting), as shown in Figure 2 (land that is not currently irrigated or does not have potential to be irrigated is excluded from the analysis). Table 2 shows:

- Waipaoa has 38% of the irrigable area, followed by Waiapu (18%), and Northern (10%). All other [sub]catchments have <10% of the irrigable area.
- Waipaoa has 28% of the potentially irrigable area, followed by Waiapu (27%), Southern (18%) and Upper Waipaoa (10%). All other [sub-]catchments have <10% of the potentially irrigable area.
- Waipaoa has 34% of the irrigable and potentially irrigable areas, followed by Waiapu (22%), and Southern (12%). All other [sub-]catchments have <10% of the total irrigable and potentially irrigable areas.

[3] Primary slope category A – C (i.e. flat to rolling, 0 – 15°), and secondary slope category also in this range.

[4] Also including slope category D (strongly rolling, 16 – 20°) in the secondary slope category.

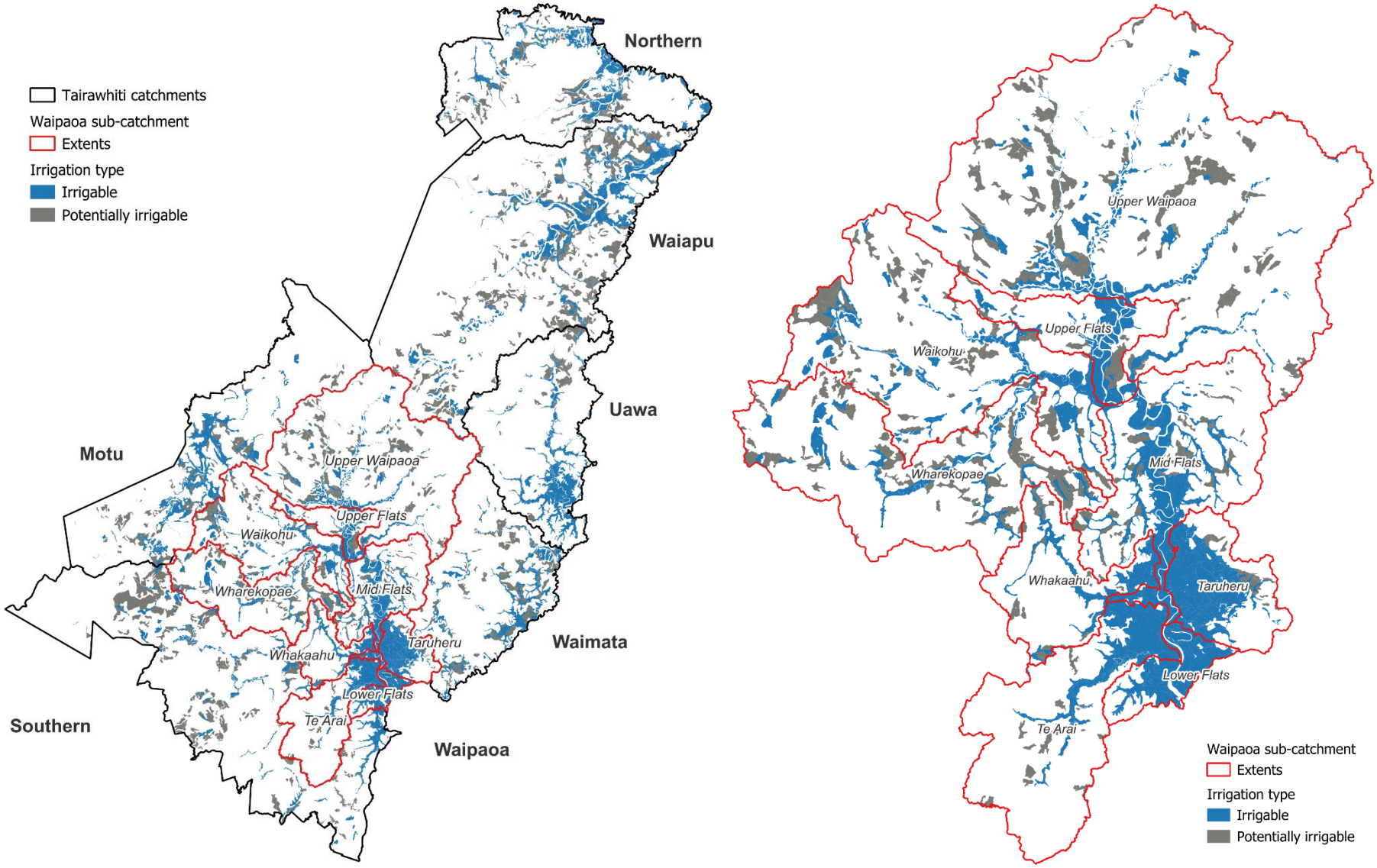

Figure 2: Tairāwhiti irrigable and potentially irrigable areas as identified by Alexander, et al. (2023) for the region (left) and Waipaoa catchment (right)

Table 2: Irrigable and potentially irrigable area (ha) per catchment and Waipaoa sub-catchment (italics)

Catchment *Sub-catchment*	Irrigable	Potentially irrigable	Total
Northern	8,577	5,121	**13,697**
Waiapu	15,917	17,045	**32,961**
Uawa	8,029	2,589	**10,618**
Waimata	6,724	5,152	**11,877**
Motu	7,963	4,383	**12,346**
Waipaoa	32,956	18,147	**51,104**
Upper Waipaoa	*4,536*	*6,487*	***11,023***
Upper Flats	*2,296*	*684*	***2,980***
Waikohu	*3,749*	*3,600*	***7,349***
Wharekopae	*2,801*	*4,047*	***6,847***
Mid Flats	*5,980*	*1,543*	***7,523***
Whakaahu	*2,034*	*642*	***2,677***
Te Arai	*3,612*	*725*	***4,336***
Taruheru	*4,827*	*419*	***5,247***
Lower Flats	*3,122*	*-*	***3,122***
Southern	6,477	11,397	**17,874**
Total	**86,644**	**63,833**	**150,477**

2.1 Land Ownership

We consider irrigable and potentially irrigable area relative to Māori, corporate, and private land holding.

2.1.1 Māori land

We identify Māori land as that captured in the Māori Land Spatial Dataset [5]. Figure 2 shows Māori land that coincides with irrigable and potentially irrigable areas. Table 2 shows the Waiapu catchment has the largest proportion of irrigable and potentially irrigable area under Māori ownership (9,630 ha in total), followed by Northern, Waipaoa, Upper Waipaoa, Uawa, and Southern [sub-]catchments. Waiapu has the largest extent of irrigable area under Māori ownership and the largest extent of potentially irrigable area.

Across Tairawhiti, 33% of irrigable and potentially irrigable area is Māori-owned. 76% of irrigable area and 61% of potentially irrigable area in the Northern catchment is Māori-owned, making Northern the catchment with the greatest proportion of irrigable and potentially irrigable area under Māori ownership. Waiapu is the only other catchment that has the majority of irrigable and potentially irrigable area under Māori ownership, with 58% of irrigable area and 49% of potentially irrigable area under Māori ownership. Uawa, Upper Waipaoa, Lower Flats, Waimata, Southern, and Upper Flats [sub-]catchments all have 20-40% of irrigable and potentially irrigable area in

[5] https://catalogue.data.govt.nz/dataset/maori-land-spatial-dataset

Māori ownership, with Uawa, Upper Waipaoa, Waimata, Lower Flats, and Upper Flats [sub]catchments having 20-40% of irrigable area in Māori ownership.

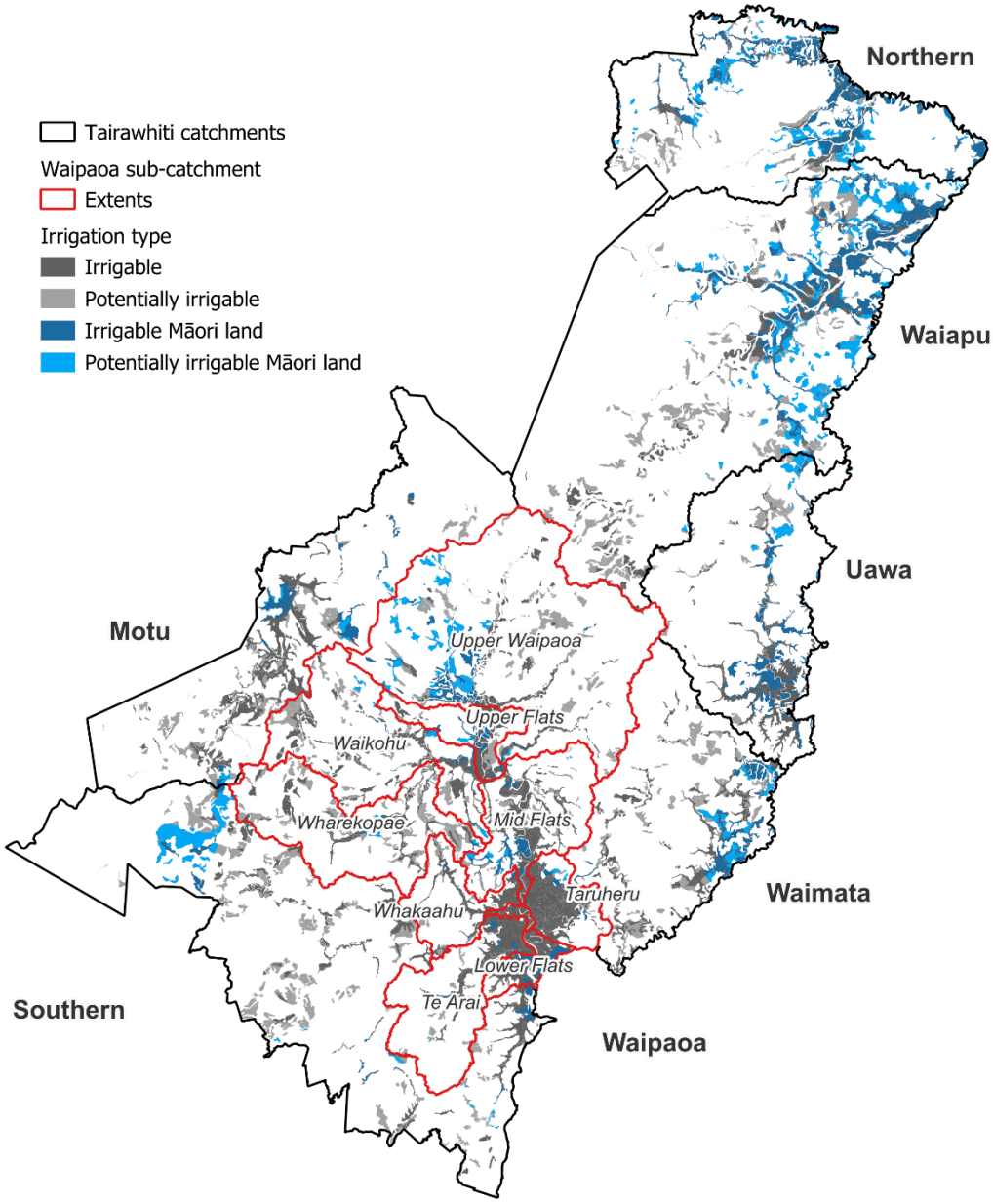

Figure 2: Irrigable and potentially irrigable land captured in the Māori Land Spatial Dataset (r31.5.2017)

Table 3: Irrigable and potentially irrigable area (ha) that coincides with areas captured in the Māori Land Spatial Dataset (r31.5.2017)

Catchment / *Sub-catchment*	Maori land			All identified area		
	Irrigable	Potentially irrigable	Total	Irrigable	Potentially irrigable	Total
Northern	6,521	3,108	**9,630**	8,577	5,121	**13,697**
Waiapu	9,181	8,305	**17,486**	15,917	17,045	**32,961**
Uawa	3,165	1,037	**4,202**	8,029	2,589	**10,618**
Waimata	2,059	1,236	**3,294**	6,724	5,152	**11,877**
Motu	1,472	543	**2,015**	7,963	4,383	**12,346**
Waipaoa	4,956	3,774	**8,730**	32,956	18,147	**51,104**
Upper Waipaoa	*1,531*	*2,688*	***4,219***	*4,536*	*6,487*	***11,023***
Upper Flats	*495*	*134*	***629***	*2,296*	*684*	***2,980***
Waikohu	*263*	*338*	***601***	*3,749*	*3,600*	***7,349***
Wharekopae	*161*	*170*	***331***	*2,801*	*4,047*	***6,847***
Mid Flats	*972*	*244*	***1,216***	*5,980*	*1,543*	***7,523***
Whakaahu	*75*	*11*	***86***	*2,034*	*642*	***2,677***
Te Arai	*216*	*100*	***315***	*3,612*	*725*	***4,336***
Taruheru	*297*	*89*	***386***	*4,827*	*419*	***5,247***
Lower Flats	*948*	*-*	***948***	*3,122*	*-*	***3,122***
Southern	1,080	2,992	**4,072**	6,477	11,397	**17,874**
Total	**28,434**	**20,994**	**49,428**	**86,644**	**63,833**	**150,477**

2.2 Soils

To understand Tairāwhiti soils we have relied on S-Map data where available and Fundamental Soils Layer data in its absence. We have considered soil depth, drainage, and profile available water (PAW) as key parameters of soil type. We have only considered soils across the irrigable and potentially irrigable areas.

2.2.1 Soil Depth

Figure 3 shows most irrigable and potentially irrigable areas have deep soils (>100 cm deep (Fundamental Soils Layer class 1)). Moderately deep soils (45-100 cm deep (Fundamental Soils Layer classes 2, 3 and 4)) are generally inland, while shallow (20-45 cm deep (Fundamental Soils Layer class 5)), and very shallow soils (<20 cm deep (Fundamental Soils Layer class 6)) are mostly in southern Tairāwhiti and along the Waiapu catchment.

Table 3 shows the area of soil depth category by irrigable and potentially irrigable area per catchment and Waipaoa sub-catchment. Across the irrigable area 85% of the area has deep soils, 9% has moderately deep soils, and the remaining is split evenly between shallow and very shallow soils. Across the potentially irrigable area 89% of the area has deep soils, 6% has moderately deep soils, 3% has very shallow soils, and 1% has shallow soils.

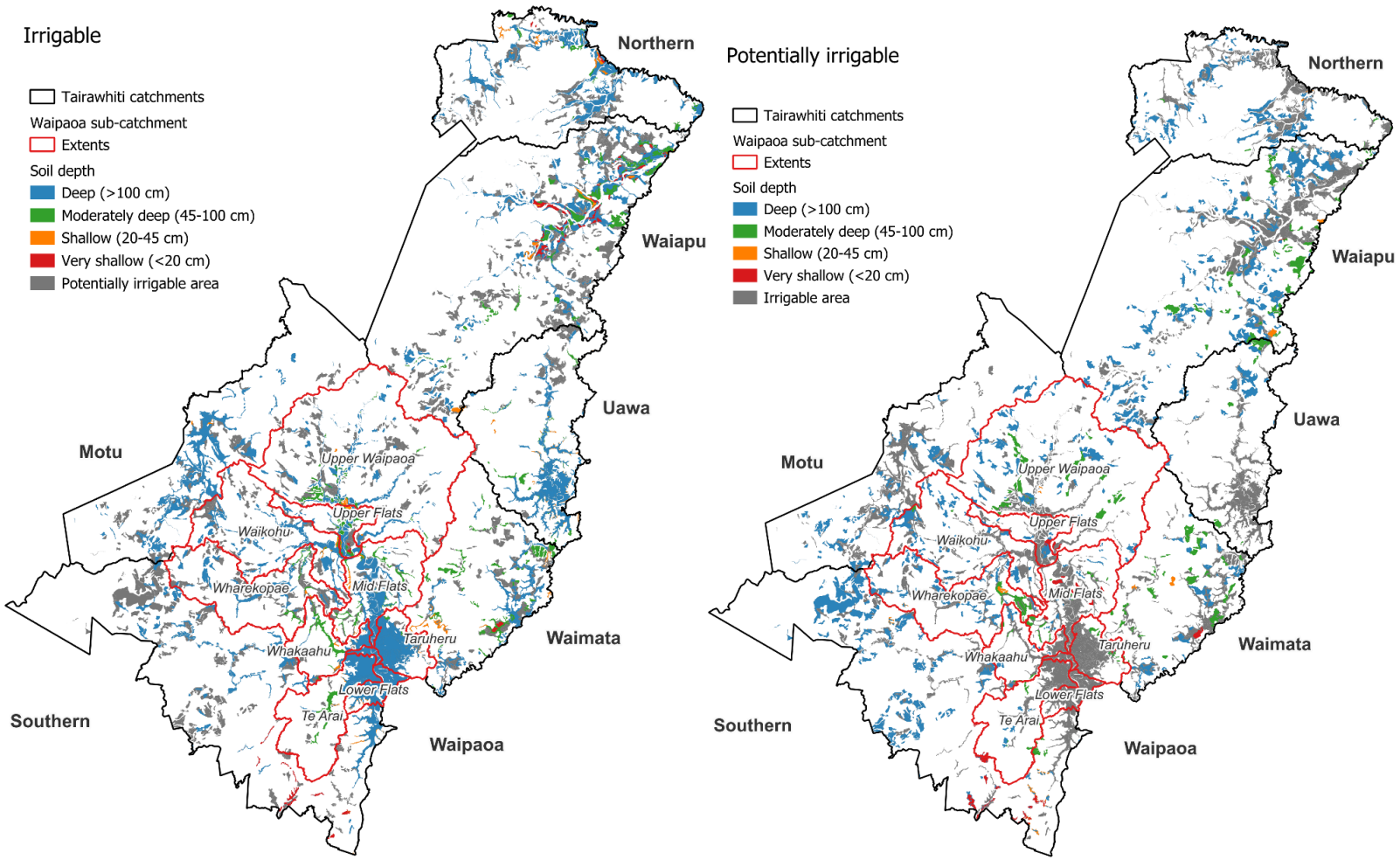

Figure 3: Soil depth[6] for irrigable (left) and potentially irrigable (right) areas

[6] In S-Map, the depth classification reflects the dominant (shallowest) depth to a layer that makes augering or digging difficult within the S-Map polygon. There is no directly corresponding attribute in the Fundamental Soils Layer, so we use 'potential rooting depth' in areas where there is no S-Map coverage.

Table 4: Sum area (ha) of soil depth classification per catchment and Waipaoa sub-catchment (italics)

Catchment / *Sub-catchment*	Irrigable					Potentially irrigable					Total
	Deep	Moderately deep	Shallow	Very shallow	Total	Deep	Moderately deep	Shallow	Very shallow	Total	
Northern	7,577	466	429	106	**8,578**	5,033	31	29	-	**5,093**	**13,671**
Waiapu	10,654	3,257	640	1,439	**15,990**	16,212	667	259	47	**17,184**	**33,175**
Uawa	7,145	459	327	-	**7,931**	2,193	359	<1	-	**2,552**	**10,483**
Waimata	5,580	597	448	142	**6,766**	3,849	869	156	189	**5,063**	**11,829**
Motu	7,411	-	51	-	**7,462**	4,043	-	-	-	**4,043**	**11,505**
Waipaoa	30,298	3,299	863	684	**35,144**	20,536	1,976	202	1,964	**24,678**	**59,822**
Upper Waipaoa	*3,917*	*450*	*65*	*<1*	***4,432***	*5,374*	*967*	*77*	*99*	***6,517***	***10,949***
Upper Flats	*1,661*	*271*	*250*	*61*	***2,243***	*559*	*<1*	*-*	*84*	***643***	***2,886***
Waikohu	*3,803*	*9*	*93*	*<1*	***3,905***	*3,228*	*16*	*-*	*153*	***3,397***	***7,301***
Wharekopae	*4,291*	*358*	*32*	*-*	***4,680***	*9,342*	*137*	*125*	*-*	***9,605***	***14,285***
Mid Flats	*4,836*	*857*	*173*	*<1*	***5,867***	*619*	*367*	*<1*	*550*	***1,535***	***7,402***
Whakaahu	*1,262*	*724*	*138*	*-*	***2,125***	*362*	*164*	*<1*	*-*	***526***	***2,651***
Te Arai	*3,428*	*624*	*54*	*622*	***4,728***	*761*	*235*	*<1*	*1,013*	***2,009***	***6,737***
Taruheru	*4,406*	*7*	*58*	*<1*	***4,472***	*291*	*90*	*<1*	*65*	***446***	***4,918***
Lower Flats	*2,694*	*-*	*-*	*-*	***2,694***	*-*	*-*	*-*	*-*	***-***	***2,694***
Southern	4,536	6	112	1	**4,656**	5,207	11	<1	-	**5,218**	**9,874**
Total	**73,200**	**8,084**	**2,870**	**2,372**	**86,527**	**57,073**	**3,913**	**646**	**2,200**	**63,832**	**150,359**

2.2.2 Soil Drainage

Figure 4 shows soil drainage[7] across irrigable and potentially irrigable areas. This shows predominantly imperfectly drained soils in the north, transitioning to predominantly well drained in western and southern parts of the Region.

Error! Reference source not found. shows the area of soil drainage category by irrigable and potentially irrigable area per catchment and Waipaoa sub-catchment. **Error! Reference source not found.** shows across the:

- Irrigable area 37% of the area has well drained soils, 32% has moderately well drained soils, 18% has poorly drained soils, 12% has imperfectly drained soils, and 1% has very poorly drained soils.
- Potentially irrigable area 48% of the area has well drained soils, 38% has moderately well drained soils, 11% has imperfectly drained soils, 2% has very poorly drained soils, and 1% has poorly drained soils.

[7] In S-Map, the drainage classification reflects the dominant (worst) soil drainage within the S-Map polygon. In the Fundamental Soil Layer, drainage classes were assigned using criteria of soil depth and duration of water tables inferred from soil colours and mottles. S-Map and the Fundamental Soils Layer have the same drainage naming convention, so we have assumed comparable classes.

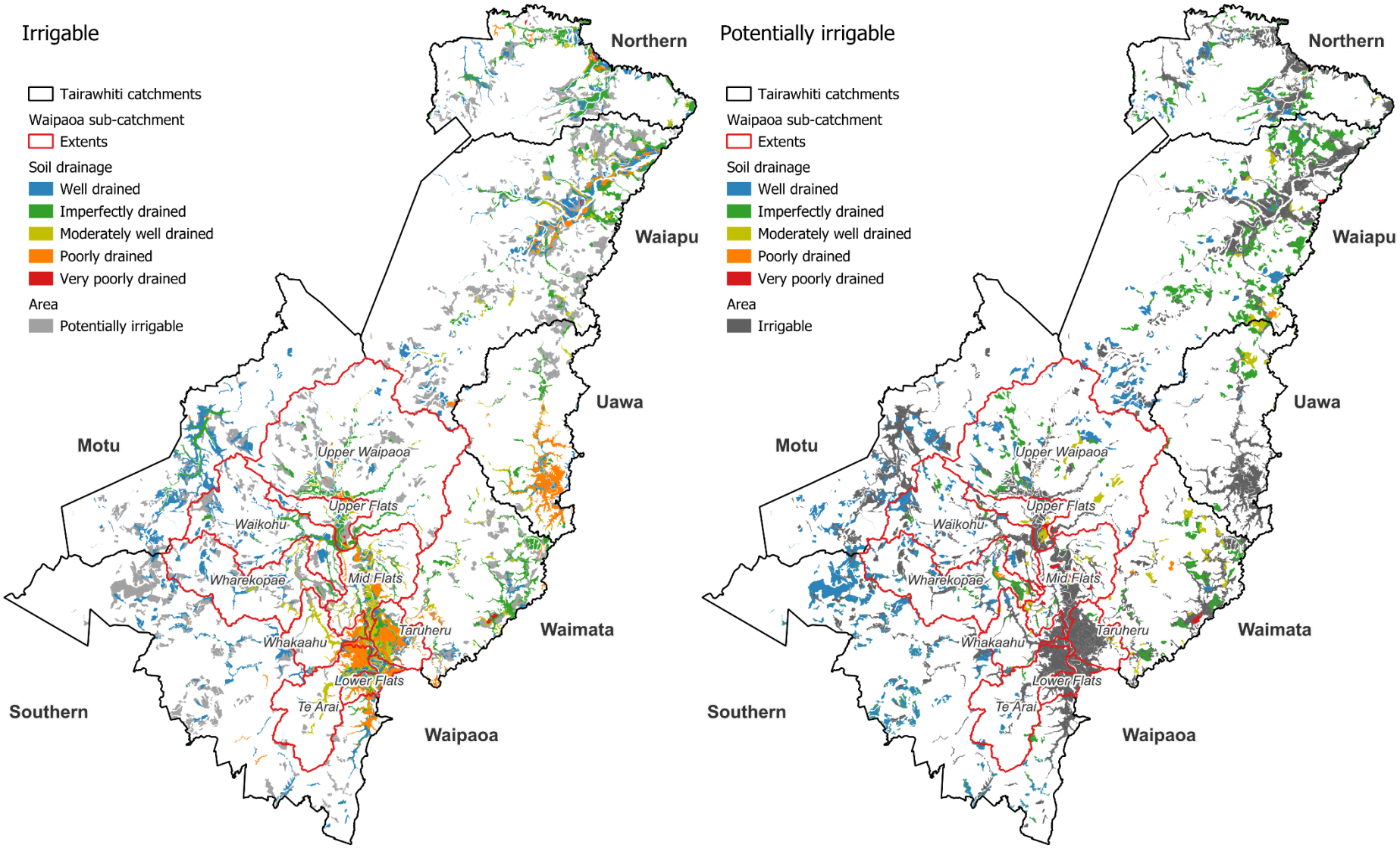

Figure 4: Soil drainage for irrigable (left) and potentially irrigable (right) areas

Table 5: Sum area (ha) of soil drainage classification per catchment and Waipaoa sub-catchment (italics)

Catchment / *Sub-catchment*	Irrigable						Potentially irrigable						Total
	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Total	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Total	
Northern	2,930	488	4,567	491	102	**8,578**	1,700	31	3,333	29	-	**5,093**	**13,671**
Waiapu	6,431	2,378	5,019	2,123	40	**15,990**	4,781	892	11,271	163	78	**17,184**	**33,175**
Uawa	1,062	460	1,957	4,444	8	**7,931**	221	882	1,450	-	-	**2,552**	**10,483**
Waimata	818	775	4,416	615	142	**6,766**	163	1,575	2,981	156	189	**5,063**	**11,829**
Motu	5,984	10	1,411	51	6	**7,462**	4,030	12	1	-	-	**4,043**	**11,505**
Waipaoa	11,575	5,640	10,531	7,087	311	**35,144**	15,534	2,887	5,097	204	957	**24,678**	**59,822**
Upper Waipaoa	*1,232*	*446*	*2,537*	*217*	*<1*	***4,432***	*2,956*	*968*	*2,437*	*58*	*99*	***6,517***	***10,949***
Upper Flats	*702*	*368*	*855*	*256*	*61*	***2,243***	*59*	*444*	*56*	*-*	*84*	***643***	***2,886***
Waikohu	*2,328*	*25*	*1,459*	*93*	*<1*	***3,905***	*2,734*	*80*	*426*	*4*	*153*	***3,397***	***7,301***
Wharekopae	*3,658*	*421*	*578*	*24*	*-*	***4,680***	*7,922*	*247*	*1,305*	*131*	*-*	***9,605***	***14,285***
Mid Flats	*616*	*1,546*	*2,509*	*1,065*	*131*	***5,867***	*191*	*512*	*277*	*6*	*550*	***1,535***	***7,402***
Whakaahu	*383*	*804*	*390*	*548*	*-*	***2,125***	*241*	*218*	*65*	*2*	*-*	***526***	***2,651***
Te Arai	*1,207*	*862*	*749*	*1,910*	*-*	***4,728***	*1,431*	*325*	*253*	*<1*	*-*	***2,009***	***6,737***
Taruheru	*652*	*763*	*892*	*2,093*	*71*	***4,472***	*1*	*94*	*277*	*3*	*71*	***446***	***4,918***
Lower Flats	*798*	*405*	*562*	*882*	*47*	***2,694***	*-*	*-*	*-*	*-*	*-*	***-***	***2,694***
Southern	2,981	355	147	1,135	38	**4,656**	3,928	997	259	18	16	**5,218**	**9,874**
Total	**31,781**	**10,106**	**28,048**	**15,946**	**647**	**86,527**	**30,356**	**7,275**	**24,392**	**570**	**1,239**	**63,832**	**150,359**

2.3 Depth and drainage

We have combined soil depth and drainage data to increase our insight into the Region's soils.

Table 6 shows the potentially irrigable area under each combination of depth and drainage per catchment. This shows 33% of the irrigable area has deep well drained soil, 31% has deep moderately well drained soil, and 15% has deep poorly drained soil. The remaining combinations occupy 0-7% of irrigable area.

Table 7 shows the potentially irrigable area under each combination of depth and drainage per catchment. This shows across the potentially irrigable area 46% of soils are deep and well drained, 38% are deep and moderately well drained, 6% are moderately deep and imperfectly drained, 5% are deep and imperfectly drained, very shallow well drained and very shallow very poorly drained soils each occupy 2% of the potentially irrigable area, while the remaining combinations occupy ≤1% of potentially irrigable area.

Table 6: Sum area (ha) of soil depth and drainage classification of irrigable area per catchment and Waipaoa sub-catchment (italics)

Catchment / *Sub-catchment*	Deep					Moderately deep					Shallow				
	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained
Northern	2,925	-	4,567	84	-	-	466	-	-	-	-	21	<1	407	-
Waiapu	3,763	767	4,161	1,931	33	1,645	1,612	-	-	-	255	-	186	192	6
Uawa	1,055	1	1,957	4,132	-	-	459	-	-	-	8	-	<1	311	8
Waimata	818	196	4,416	149	-	-	579	-	18	-	-	-	<1	447	-
Motu	5,984	10	1,411	-	6	-	-	-	-	-	-	-	-	51	-
Waipaoa	10,978	2,475	10,556	6,091	250	-	3,143	<1	158	-	-	26	2	898	<1
Upper Waipaoa	*1,232*	*148*	*2,537*	-	-	-	*298*	*<1*	*151*	-	-	-	*<1*	*65*	-
Upper Flats	*702*	*104*	*855*	-	-	-	*265*	-	*7*	-	-	-	-	*250*	-
Waikohu	*2,328*	*17*	*1,459*	-	-	-	*9*	-	-	-	-	-	-	*93*	-
Wharekopae	*3,658*	*56*	*577*	*1*	-	-	*358*	-	-	-	-	*7*	*1*	*23*	-
Mid Flats	*616*	*689*	*2,509*	*891*	*131*	-	*857*	-	-	-	-	-	-	*173*	-
Whakaahu	*383*	*80*	*389*	*409*	-	-	*724*	-	-	-	-	-	*<1*	*138*	-
Te Arai	*585*	*221*	*749*	*1,872*	-	-	*624*	-	-	-	-	*16*	-	*38*	-
Taruheru	*652*	*756*	*892*	*2,035*	*71*	-	*7*	-	-	-	-	-	-	*58*	-
Lower Flats	*823*	*405*	*589*	*882*	*47*	-	*1*	-	-	-	-	*3*	-	*60*	*<1*
Southern	2,980	349	138	1,032	38	-	6	-	-	-	-	-	9	103	<1
Total	**28,503**	**3,798**	**27,205**	**13,419**	**327**	**1,645**	**6,264**	**<1**	**176**	**-**	**263**	**48**	**198**	**2,411**	**15**

Table 7: Sum area (ha) of soil depth and drainage classification of potentially irrigable area per catchment and Waipaoa sub-catchment (italics)

Catchment / *Sub-catchment*	Deep					Moderately deep					Shallow				
	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Very poorly drained	Well drained	Imperfectly drained	Moderately well drained	Poorly drained	Ve poo drai
Northern	1,700	-	3,333	-	-	-	31	-	-	-	-	-	<1	29	-
Waiapu	4,759	210	11,225	17	1	19	682	-	-	-	-	-	<1	147	<1
Uawa	221	523	1,449	-	-	-	359	-	-	-	-	-	<1	-	<1
Waimata	163	705	2,981	<1	-	-	869	-	-	-	-	-	-	156	<1
Motu	4,030	12	1	-	-	-	-	-	-	-	-	-	-	-	<1
Waipaoa	14,521	914	5,075	21	5	-	1,707	19	26	-	-	266	3	157	<1
Upper Waipaoa	*2,956*	*1*	*2,417*	-	-	-	*967*	*19*	*26*	-	-	-	*<1*	*32*	<1
Upper Flats	*59*	*444*	*56*	-	-	-	*<1*	-	-	-	-	-	-	-	<1
Waikohu	*2,734*	*64*	*426*	*4*	-	-	*16*	-	-	-	-	-	*<1*	-	<1
Wharekopae	*7,922*	*112*	*1,303*	*6*	-	-	*69*	-	-	-	-	*65*	*3*	*125*	<1
Mid Flats	*191*	*145*	*277*	*6*	-	-	*367*	-	-	-	-	-	-	*<1*	<1
Whakaahu	*241*	*54*	*65*	*2*	-	-	*164*	-	-	-	-	-	*<1*	*<1*	<1
Te Arai	*417*	*90*	*253*	-	-	-	*35*	-	-	-	-	*200*	*<1*	*<1*	<1
Taruheru	*1*	*5*	*277*	*3*	*5*	-	*90*	-	-	-	-	-	-	*<1*	<1
Lower Flats	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern	3,928	997	248	18	16	-	<1	-	-	-	-	-	11	<1	<1
Total	**29,321**	**3,361**	**24,313**	**56**	**22**	**19**	**3,648**	**19**	**26**	**-**	**-**	**266**	**15**	**488**	**<1**

2.3.1 PAW

Profile available water (PAW) is the amount of water available in the soil profile to support plant growth. We use PAW at 90 cm depth from both S-Map and the Fundamental Soils Layer.

Figure 5 shows most irrigable and potentially irrigable areas have high (150-249 mm) PAWs. There are small areas of very high PAW in Northern and Waiapu catchments.

Table 8 shows the irrigable area PAWs by catchment and Waipaoa sub-catchment. This shows that 73% of the irrigable area has soil with a high (150-249 mm) PAW and 15% has moderate to low (60-89 mm) PAW. Very high (>250 mm), moderate to high (120-149 mm), and moderate to low (60-89 mm) PAW classes each represent 4% of the irrigable area, very low (<30 mm) PAW is 1% irrigable area, and low (30-59 mm) is <1% irrigable area.

Table 9 shows the potentially irrigable area PAWs by catchment and Waipaoa sub-catchment. This shows 76% of the potentially irrigable area has high PAW soils, 21% has moderate PAW soils, 3% has low PAW soils, and 1% has moderate to low PAW soils. Other PAW classes are <1% of potentially irrigable area.

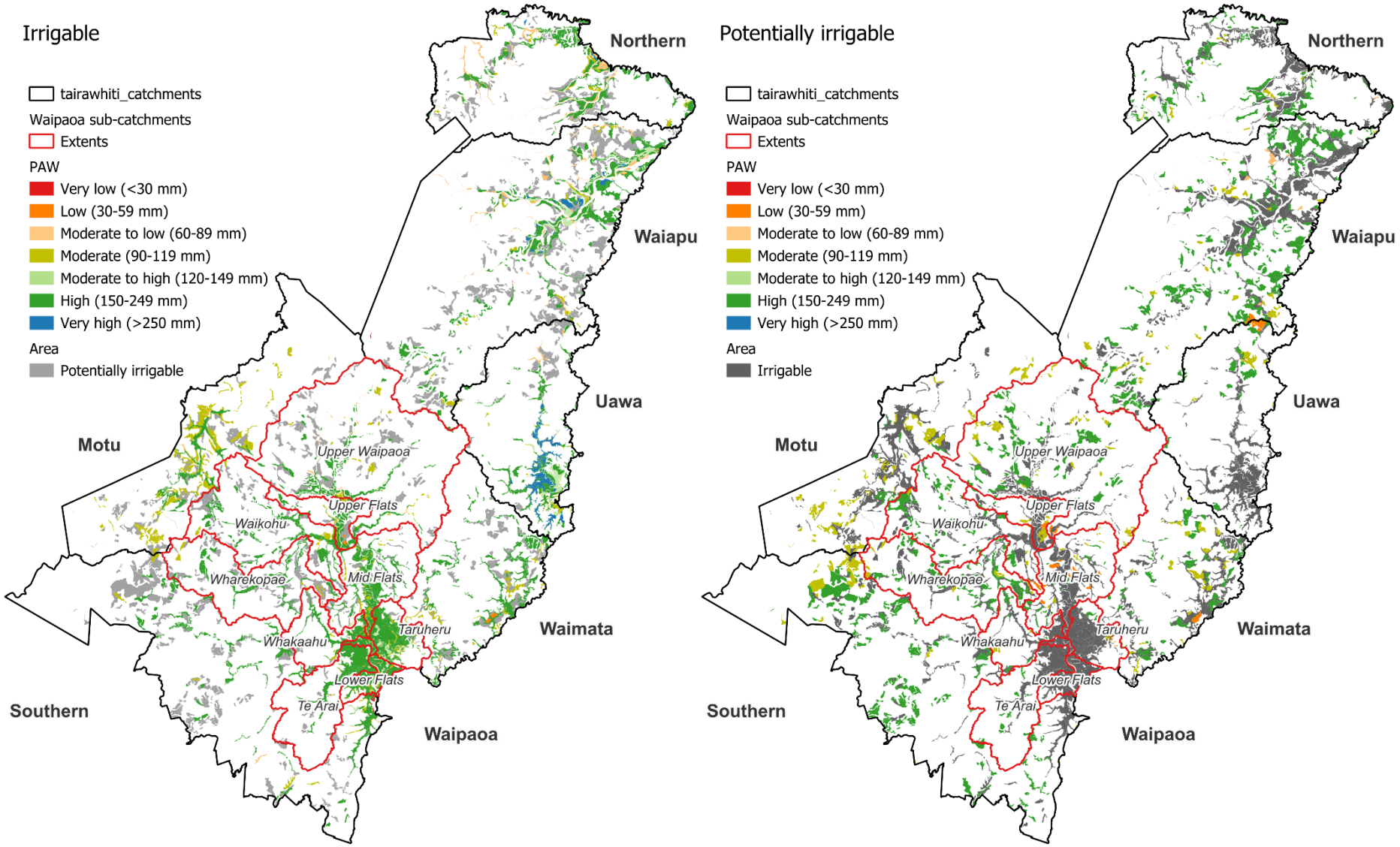

Figure 5: Soil PAW for irrigable (left) and potentially irrigable (right) areas

Table 8: Sum irrigable area (ha) of soil PAW classification per catchment and Waipaoa sub-catchment (italics)

Catchment *Sub-catchment*	Very high (>250 mm)	High (150-249 mm)	Moderate to high (120-149 mm)	Moderate (90-119 mm)	Moderate to low (60-89 mm)	Low (30-59 mm)	Very low (<30 mm)	Total
Northern	102	6,015	-	877	1,579	-	5	**8,578**
Waiapu	846	10,532	1,752	1,470	1,376	<1	20	**15,995**
Uawa	2,432	3,995	776	531	204	<1	<1	**7,939**
Waimata	-	5,603	-	1,040	-	142	<1	**6,785**
Motu	-	2,655	-	5,053	102	-	<1	**7,809**
Waipaoa	-	33,031	1,179	4,115	296	61	405	**39,087**
Upper Waipaoa	-	*3,523*	-	*666*	*212*	*<1*	*<1*	***4,400***
Upper Flats	-	*1,770*	-	*363*	*80*	*61*	-	***2,274***
Waikohu	-	*3,526*	-	*548*	-	*<1*	-	***4,074***
Wharekopae	-	*2,514*	-	*266*	*<1*	-	*<1*	***2,780***
Mid Flats	-	*6,917*	*149*	*899*	*1*	*<1*	-	***7,966***
Whakaahu	-	*2,876*	*39*	*354*	*<1*	-	-	***3,269***
Te Arai	-	*4,252*	*132*	*94*	-	-	-	***4,478***
Taruheru	-	*4,613*	*510*	*506*	*<1*	*<1*	*161*	***5,791***
Lower Flats	-	*3,040*	*349*	*419*	*3*	-	*243*	***4,054***
Southern	-	5,714	120	662	62	-	132	**6,690**
Total	**3,380**	**67,545**	**3,827**	**13,748**	**3,619**	**204**	**561**	**92,884**

Table 9: Sum potential irrigable area (ha) of soil PAW classification per catchment and Waipaoa sub-catchment (italics)

Catchment Sub-catchment	Very high (>250 mm)	High (150-249 mm)	Moderate to high (120-149 mm)	Moderate (90-119 mm)	Moderate to low (60-89 mm)	Low (30-59 mm)	Very low (<30 mm)	Total
Northern		4,543		571	32		1	5,146
Waiapu	26	15,019	26	1,775	387	170	1	**17,404**
Uawa	-	1,487	-	561	<1	359	<1	**2,408**
Waimata	-	3,316	-	1,869	8	189	-	**5,382**
Motu	-	598	-	3,621	<1	-	<1	**4,219**
Waipaoa	-	14,237	-	2,955	78	956	<1	**18,228**
Upper Waipaoa	-	*4,892*	-	*1,220*	*<1*	*99*	*<1*	***6,211***
Upper Flats	-	*115*	-	*444*	*<1*	*84*	-	***643***
Waikohu	-	*3,285*	-	*165*	*16*	*153*	-	***3,619***
Wharekopae	-	*3,531*	-	*606*	*<1*	-	-	***4,137***
Mid Flats	-	*750*	-	*304*	-	*551*	-	***1,604***
Whakaahu	-	*454*	-	*179*	*<1*	-	-	***633***
Te Arai	-	*919*	-	*<1*	-	-	-	***920***
Taruheru	-	*292*	-	*37*	*63*	*69*	-	***460***
Lower Flats	-		-	-	-	-	-	**-**
Southern	-	9,365	-	1,904	-	-	<1	**11,269**
Total	**26**	**48,566**	**26**	**13,256**	**506**	**1,674**	**2**	**64,056**

2.4 Land Use

We considered GDC's crop survey data in the first instance and filled gaps using the Land Cover Database (LDCB5), noting this indicates broad categories rather than specific land uses.

2.4.1 Summer 2024/25 crop survey

GDC's crop survey data was consolidated into ten broad categories, as described in 0.

Table 10 shows the irrigable area crop types by catchment and Waipaoa sub-catchment. This shows that across the irrigable area:

- 44% of crops are veg, 21% are maize, with the remaining crop types <1-9% of irrigable area. Veg is predominantly either 'squash' or 'to be planted' according to the GDC classifications.
- Veg is the predominant crop type in every [sub-]catchment except Upper Flats, Mid Flats, and Te Arai where maize is the predominant crop type.

Table 11 shows the potentially irrigable area crop types by catchment and Waipaoa sub-catchment. This shows 71% of potentially irrigable area is veg, 13% is pasture, 7% maize, 5% grapes, 4% citrus, and <1% each of avocados, minor crops, and other.

Table 10: Sum area (ha) of 2024/25 summer crops in irrigable areas per catchment and Waipaoa sub-catchment (italics) based on GDC data.

Catchment *Sub-catchment*	Apples and Pears	Avocados	Citrus	Grapes	Kiwifruit	Maize	Minor crops	Pasture	Veg	Other	Total
Northern	-	-	8	-	-	-	-	157	-	-	**165**
Waiapu	-	3	2	-	-	-	-	2,467	14	-	**2,485**
Uawa	-	-	17	-	11	656	1	1,830	334	57	**2,906**
Waimata	-	2	20	1	5	80	-	160	9	59	**335**
Motu	-	-	-	-	-	-	-	671	178	-	**849**
Waipaoa	888	111	1,697	1,603	1,057	4,648	108	5,720	1,693	1,231	**18,757**
Upper Waipaoa	*-*	*-*	*-*	*31*	*-*	*30*	*-*	*410*	*41*	*12*	***525***
Upper Flats	*23*	*-*	*6*	*13*	*35*	*493*	*93*	*392*	*389*	*32*	***1,476***
Waikohu	*-*	*-*	*<1*	*-*	*-*	*210*	*-*	*413*	*143*	*8*	***774***
Wharekopae	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*36*	*-*	*-*	***36***
Mid Flats	*298*	*35*	*371*	*328*	*231*	*1,141*	*-*	*980*	*544*	*240*	***4,166***
Whakaahu	*105*	*6*	*102*	*128*	*57*	*501*	*3*	*676*	*158*	*70*	***1,806***
Te Arai	*159*	*8*	*242*	*338*	*226*	*1,083*	*-*	*673*	*169*	*187*	***3,085***
Taruheru	*204*	*46*	*634*	*558*	*356*	*649*	*12*	*789*	*184*	*511*	***3,943***
Lower Flats	*100*	*16*	*341*	*207*	*153*	*540*	*-*	*1,350*	*65*	*172*	***2,945***
Southern	9	-	99	-	-	383	-	783	157	27	**1,457**
Total	**897**	**115**	**1,842**	**1,603**	**1,074**	**5,767**	**109**	**11,788**	**2,384**	**1,374**	**26,954**

Table 11: Sum area (ha) of 2024/25 summer crops in potentially irrigable areas per catchment and Waipaoa sub-catchment (italics) based on GDC data

Catchment *Sub-catchment*	Apples and Pears	Avocados	Citrus	Grapes	Kiwifruit	Maize	Minor crops	Pasture	Veg	Other	Total
Northern	-	-	-	-	-	-	-	-	-	-	**-**
Waiapu	-	-	-	-	-	-	-	-	-	-	**-**
Uawa	-	-	-	-	-	-	-	-	-	-	**-**
Waimata	-	-	-	<1	-	-	-	32	-	-	**32**
Motu	-	-	-	-	-	-	-	66	-	2	**68**
Waipaoa	-	2	17	20	-	31	1	179	22	56	**329**
Upper Waipaoa	-	-	-	-	-	*4*	-	*4*	-	-	***8***
Upper Flats	-	-	-	-	-	*5*	-	*3*	-	-	***7***
Waikohu	-	-	-	-	-	-	-	*30*	*22*	*13*	***65***
Wharekopae	-	-	-	-	-	-	-	-	-	-	**-**
Mid Flats	-	-	*1*	-	-	*5*	-	*21*	-	*1*	***29***
Whakaahu	-	*<1*	*6*	-	-	*3*	*1*	*14*	-	-	***25***
Te Arai	-	*2*	-	*1*	-	*6*	-	-	-	*41*	***50***
Taruheru	-	*<1*	*10*	*19*	-	*4*	-	*62*	*0*	-	***95***
Lower Flats	-	-	*<1*	-	-	*3*	-	*45*	-	*1*	***49***
Southern	-	-	-	-	-	-	-	*22*	-	*1*	**22**
Total	**-**	**2**	**17**	**21**	**-**	**31**	**1**	**298**	**22**	**58**	**451**

2.4.2 Remaining areas

The summer 2024/25 crop survey covered <20% of the area identified as irrigable (26,222 ha) or potentially irrigable (165 ha) by Alexander, et al. (2023). We used the Land Cover Database (version 5, field 'Name_2018') to describe land use in the remaining >80% of irrigable or potentially irrigable area. 0 shows how we simplified the land covers.

Table 12 shows the simplified land covers across the irrigable area. This shows that 68% of the irrigable area is under high producing exotic grassland cover, with 13% in forest and forestry, 11% in scrub, 3% in low producing exotic grassland and in short rotation cropland, and 1% in orchard, vineyard, or other perennial crop.

Table 12: Sum area (ha) of land covers (based on Land Cover Database 5.0 2018_Name field) in irrigable areas per catchment and Waipaoa sub-catchment (italics)

Catchment *Sub-catchment*	Forest and forestry	High producing exotic grassland	Low producing exotic grassland	Orchard, vineyard, or other perennial crop	Scrub	Short rotation cropland	Total
Northern	1,040	4,241	631	2	2,403	106	**8,423**
Waiapu	2,121	8,098	1,037	<1	2,540	317	**14,113**
Uawa	923	1,616	68	21	445	345	**3,417**
Waimata	480	8,124	87	17	237	93	**9,039**
Motu	281	58	57	-	351	-	**747**
Waipaoa	2,235	2,269	83	692	860	1,100	**7,239**
Upper Waipaoa	*1,527*	*1,600*	*23*	*1*	*373*	*5*	***3,528***
Upper Flats	*51*	*26*	*9*	*6*	*64*	*102*	***257***
Waikohu	*86*	*15*	*5*	*-*	*166*	*21*	***293***
Wharekopae	*160*	*19*	*-*	*-*	*66*	*-*	***245***
Mid Flats	*156*	*96*	*3*	*163*	*74*	*453*	***945***
Whakaahu	*52*	*2*	*1*	*17*	*34*	*46*	***151***
Te Arai	*123*	*79*	*5*	*79*	*50*	*152*	***488***
Taruheru	*49*	*415*	*13*	*354*	*29*	*233*	***1,092***
Lower Flats	*32*	*17*	*24*	*74*	*4*	*89*	***240***
Southern	925	18,876	31	19	275	139	**20,265**
Total	**8,005**	**43,281**	**1,995**	**752**	**7,111**	**2,099**	**63,243**

Table 13 shows the simplified land covers across the potentially irrigable area. This shows 57% of potentially irrigable land is under high producing exotic grassland cover, with 24% in forest and forestry, 14% in scrub, 5% in low producing exotic grassland, and <1% orchard, vineyard, or other perennial crop, or short rotation cropland.

Table 13: Sum area (ha) of land covers (based on Land Cover Database 5.0 2018_Name field) in potentially irrigable areas per catchment and Waipaoa sub-catchment (italics)

Catchment *Sub-catchment*	Forest and forestry	High producing exotic grassland	Low producing exotic grassland	Orchard, vineyard, or other perennial crop	Scrub	Short rotation cropland	Total
Northern	2,327	1,699	310	-	1,574	-	**5,910**
Waiapu	4,612	4,715	2,775	-	4,867	<1	**16,969**
Uawa	349	196	75	-	236	-	**856**
Waimata	475	56	18	-	227	<1	**777**
Motu	351	23	21	-	328	-	**724**
Waipaoa	5,929	28,129	243	2	815	3	**35,120**
Upper Waipaoa	*4,074*	*2,347*	*196*	-	*381*	-	***6,997***
Upper Flats	*44*	-	-	-	*42*	-	***86***
Waikohu	*210*	*23*	*2*	-	*196*	-	***431***
Wharekopae	*510*	*5*	*3*	-	*89*	-	***606***
Mid Flats	*186*	*5,166*	*19*	*2*	*52*	*1*	***5,426***
Whakaahu	*128*	-	-	*<1*	*20*	*1*	***150***
Te Arai	*680*	*20,571*	*<1*	-	*12*	-	***21,264***
Taruheru	*97*	*18*	*22*	*<1*	*23*	-	***160***
Lower Flats	-	-	-	-	-	-	**-**
Southern	1,288	1,359	37	-	627	-	**3,311**
Total	**15,332**	**36,178**	**3,479**	**2**	**8,674**	**3**	**63,667**

2.5 Freshwater Allocation Limits

We used the allocation limits specified in Alexander, et al. (2023), as reproduced below.

GDC surface water allocation limits are summarised in Table 14. For catchments without a catchment management plan, Policy C6.1.1 of the Tairāwhiti Resource Management Plan requires a cease-take flow of 100% of MALF and an allocation limit of 30% of MALF. The exception is the Southern-Mangapoike catchment where we have assumed no cease-take or allocation cap, as approximately 97% of demand is from the Mangapoike reservoirs for Gisborne City's municipal supply.

Table 14: Surface water allocation block rules. Where limits are not set in the Tairāwhiti Resource Management Plan they have been calculated as described in text

Site	Block	Cease-take flow (L/s)	Allocation (L/s)
Waipaoa at Kanakanaia	A Block	1,300	2,000
	B Block	4,000	2,000
Te Arai at Pykes Weir	A Block	60	70
	B Block	220	100
Catchments without catchment management plans:			
Northern		1,252	376
Waiapu		8,449	2,535
Uawa		1,671	501
Waimata		81	24
Motu		510	153
Taruheru		48	14
Southern-Maraetaha		217	65
Southern-Mangapoike		-	-

Within the Waipaoa catchment, the Tairāwhiti Resource Management Plan prevents new allocation from Deep Groundwater (Makauri and Matokitoki aquifers), and caps allocation at current for the Te Hapara Sands aquifer. The Plan also sets reduced allocation targets for these aquifers as reproduced in Table 15.

Table 15: Tairāwhiti Resource Management Plan Table DF1.4.3.2 target allocations for the Poverty Bay Flats

Aquifer	2020 allocation target (m^3/year)	2025 allocation target (m^3/year)
Makauri Aquifer	1,892,160	1,702,944
Matokitoki Aquifer	630,720	567,648
Te Hapara Sands	295,000	

For all other areas, default allocation under Tairāwhiti Resource Management Plan policy C6.1.1.6 is the greater of 30% annual average rainfall recharge to groundwater or total allocation. Table 16shows that Alexander, et al. (2023) calculated availability as 30% recharge as greater than consented allocation for all catchments, except Motu where there is no mapped aquifer extent.

Table 16: Groundwater availability and consented allocation by surface water catchment (excluding Waipaoa) (Alexander, Calder-Steele, & Dark, 2023)

Catchment	Availability as 30% recharge (m^3/year)	Consented allocation (m^3/year)
Northern	8,118,911	157,680
Waiapu	36,310,816	-
Uawa	8,251,065	-
Motu	-	-
Waimata	1,129,113	-
Southern	2,392,489	-

2.6 Freshwater use

Alexander, et al.'s (2023) review found 179 consented water takes in the Waipaoa catchment area (99 from groundwater and 80 from surface water, 166 (93%) of which were for irrigation) and 12 consents in other catchments (one from groundwater and 11 from surface water, all for irrigation or other/mixed uses). Of the 179 consents identified by Alexander, et al.'s (2023), 121 are expired as of 30 June 2025. The remaining 28 expire between 2026 and 2041.

GDC provided three spreadsheets[8] that we considered in understanding current consented freshwater allocation as of 8th May 2025. There was limited crossover between these consent IDs and those from Alexander, et al.'s work. In an attempt to match datasets and identify outliers we requested any previous consent IDs associated with these consents. We were still unable to align the majority of consents. We therefore requested the X, Y coordinates of the point of take for each consent to align them to a [sub-]catchment. Where a consent had points of take across multiple sub-catchments we apportioned the take evenly between each point of take.

2.7 Data by source

2.7.1 'All water takes' dataset

Of the consents listed in the 'all water takes' dataset, 152 consents had takes within a single [sub-]catchment, and nine[9] had consented takes across multiple [sub-]catchments. For these, we apportioned the allocation relative to the number of consented points of take (i.e. 300 L/s across three points of take is 100 L/s per point of take).

[8] 'Active deferred apps - 08-05-2025', 'COPY - ALL WATER TAKES - for Regional Consents Team (A3375275) - 08-05-2025', and 'Wait list - water permits - for external request' attached to email from Juliette Gottlieb received 12/05/2025 09:27

[9] 108520* (renewal application in process - 112306)
108868*, 108983*, 109641*, 110187*, 110328*, 112029*, 112100*, 112425*

Some consents are listed as joint surface and groundwater (type WG+ WS). We treat these as surface water consistent with Alexander, et al. (2023).

Table 17 shows the consented allocation and irrigated area per [sub-]catchment. 0 shows this by allocation unit. Not all consents have rate of take (L/s), daily volume (m^3/day), annual volume (m^3/year), and irrigable area (ha) specified. For example, Table 17 shows the Northern catchment has 60,000 m^3/year groundwater allocated but no irrigated area. Table 17 shows:

- No water is allocated in the Motu catchment (as expected, due to the Water Conservation Order).
- Only surface water is allocated in Waimata and Southern catchments, and in Upper Flats, Waikohu, and Wharekopae sub-catchments.
- Only groundwater is allocated in Waiapu catchment.
- 97% of groundwater consents, 82% of surface water consents, and 94% of all consents are in the Waipaoa catchment.

Table 18 shows this data for consents identified as “corporate”. Corporate consents are only within the Waipaoa catchment. They represent 13% of the annual allocation volume (32% of the annual groundwater allocation and 10% of the annual surface water allocation).

Table 19 shows this data for consents identified as “maori”. Maori-owned consents are more widespread than corporate, with consents outside the Waipaoa catchment. Maori consents make up 5% of the annual allocation (6% annual groundwater allocation and 5% annual surface water allocation).

Table 17: Consented groundwater and surface water allocation by [sub-]catchment. # is the number of consented takes per [sub-]catchment

Catchment / *Sub-catchment*	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Northern	1	5	432	60,000	-	1	5	475	33,615	14	2	10	907	93,615	14
Waiapu	1	1	23	8,249	1						1	1	23	8,249	1
Uawa	1	1	12	4,526	<1	2	30	2,593	576,110	204	3	31	2,605	580,636	204
Waimata						4	54	4,005	777,224	230	4	54	4,005	777,224	230
Motu															
Waipaoa	94	886	52,284	4,169,115	2,173	78	2,649	202,930	25,136,697	5,343	182	3,680	265,811	30,714,838	8,220
						9*	132*	10,072*	1,339,733*	690*					
Upper Waipaoa	*2*	*5*	*404*	*147,460*	*-*	*4*	*120*	*9,830*	*995,015*	*177*	*6*	*125*	*10,234*	*1,142,475*	*177*
Upper Flats						*9*	*307*	*29,734*	*2,370,579*	*445*	*10*	*312*	*29,786*	*2,381,499*	*445*
						*1**	*5**	*53**	*10,920**	*-*					
Waikohu						*2*	*86*	*3,104*	*746,750*	*126*	*2*	*86*	*3,104*	*746,750*	*126*
Wharekopae						*1*	*24*	*2,074*	*228,200*	*50*	*1*	*24*	*2,074*	*228,200*	*50*
Mid Flats	*15*	*113*	*4,932*	*514,487*	*158*	*40*	*1,828*	*137,330*	*19,476,892*	*3,805*	*60*	*2,056*	*151,808*	*21,265,672*	*4,508*
						*5**	*115**	*9,545**	*1,274,293**	*544**					
Whakaahu	*4*	*55*	*3,270*	*367,918*	*233*	*3*	*53*	*3,491*	*110,610*	*41*	*7*	*107*	*6,761*	*478,528*	*274*
Te Arai	*2*	*7*	*521*	*76,100*	*24*	*12*	*133*	*9,583*	*446,435*	*194*	*14*	*140*	*10,104*	*522,535*	*218*
Taruheru	*53*	*620*	*37,780*	*2,343,373*	*1,533*	*1*	*6*	*200*	*19,800*	*4*	*55*	*640*	*38,505*	*2,432,466*	*1,552*
						*1**	*14**	*525**	*69,293**	*15**					
Lower Flats	*18*	*87*	*5,377*	*719,778*	*224*	*6*	*92*	*7,584*	*742,416*	*501*	*27*	*191*	*13,435*	*1,516,714*	*870*
						*3**	*12**	*475**	*54,520**	*146**					
Southern						1	11	690	66,337	20	1	11	690	66,337	20
Total	**97**	**893**	**52,751**	**4,241,890**	**2,174**	**95**	**2,881**	**220,765**	**27,929,716**	**6,500**	**193**	**3,787**	**274,041**	**32,240,899**	**8,689**

Table 18: Consented "corporate" groundwater and surface water allocation by Waipaoa sub-catchment. # is the number of consented takes per [sub-]catchment

Sub-catchment	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/yr	ha	#	L/s	m^3/day	m^3/yr	ha	#	L/s	m^3/day	m^3/yr	ha
Upper Waipaoa															
Upper Flats															
Waikohu															
Wharekopae															
Mid Flats	1	6	495	44,200	13	5	420	31,751	2,708,136	445	6	426	32,246	2,752,336	458
Whakaahu	1	25	1,400	95,341	113						1	25	1,400	95,341	113
Te Arai															
Taruheru	6	350	25,702	1,214,746	1,141						6	350	25,702	1,214,746	1,141
Lower Flats															
Total	**8**	**382**	**27,597**	**1,354,287**	**1,266**	**5**	**420**	**31,751**	**2,708,136**	**445**	**13**	**801**	**59,348**	**4,062,423**	**1,712**

Table 19: Consented "maori" groundwater and surface water allocation by [sub-]catchment. # is the number of consented takes per [sub-]catchment

Catchment / *Sub-catchment*	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/yr	ha	#	L/s	m^3/day	m^3/yr	ha	#	L/s	m^3/day	m^3/yr	ha
Northern	1	5	432	60,000	<1	1	5	475	33,615	14	2	10	907	93,615	14
Waiapu	1	1	23	8,249	1						1	1	23	8,249	1
Uawa						1	2	200	51,950	4	1	2	200	51,950	4
Waimata															
Motu															
Waipaoa															
Upper Waipaoa						*1*	*14*	*1,200*	*125,350*	*23*	*1*	*14*	*1,200*	*125,350*	*23*
Upper Flats						*1*	*26*	*3,380*	*126,300*	*27*	*1*	*26*	*3,380*	*126,300*	*27*
Waikohu															
Wharekopae															
Mid Flats						*5*	*229*	*13,446*	*927,000*	*129*	*5*	*229*	*13,446*	*927,000*	*129*
Whakaahu															
Te Arai	*1*	*4*	*345*	*35,500*	*14*	*1*	*4*	*325*	*29,000*	*13*	*2*	*8*	*670*	*64,500*	*27*
Taruheru	*4*	*28*	*1,856*	*142,147*	*45*						*4*	*28*	*1,856*	*142,147*	*45*
Lower Flats															
Southern															
Total	**7**	**38**	**2,656**	**245,896**	**61**	**10**	**280**	**19,026**	**1,293,215**	**210**	**17**	**318**	**21,681**	**1,539,111**	**270**

2.7.2 'Waitlist' dataset

Some areas are overallocated. GDC maintains an unverified waitlist[10] of parties who want to take water in these areas. As this information is unverified[11], derived numbers should be treated as indicative only. This list contains 70 consents. Table 20 shows the consented allocation and irrigated area per [sub-]catchment. 0 shows this by allocation unit. As with the 'all water takes' dataset, not all consents have rate of take (L/s), daily volume (m^3/day), annual volume (m^3/year), and irrigable area (ha) specified.

[10] 'Wait list - water permits - for external request' attached to email from Juliette Gottlieb received 12/05/2025 09:27

[11] GDC provided the following disclaimer with the waitlist spreadsheet: *This spreadsheet contains a preliminary list of water permit waitlist applications in the Gisborne district. The information has not been verified and may contain inaccuracies, including but not limited to incorrect application details. The order of applications on this list has not been verfied and should not be interpreted as a reflection of processing priority or allocation sequence. Additionally, some applications may be missing from this list. This document is provided for indicative purposes only and should not be relied upon as a definitive or complete record. Users are advised to seek confirmation from the relevant consenting authority before relying on the information contained herein.*

Table 20: Consented groundwater and surface water allocation by [sub-]catchment. # is the number of consented takes per [sub-]catchment

Catchment / *Sub-catchment*	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Northern	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waiapu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uawa	-	-	-	-	-	1	125	9,000	-	5	1	125	9,000	-	5
Waimata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waipaoa	41	316	22,685	2,197,977	393	28	375	25,533	1,708,890	392	69	691	48,217	3,906,867	785
Upper Waipaoa	*1*	*1*	-	-	-	-	-	-	-	-	*1*	*1*	-	-	-
Upper Flats	-	-	-	-	-	*2*	*43*	*1,947*	*60,480*	*16*	*2*	*43*	*1,947*	*60,480*	*16*
Waikohu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wharekopae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid Flats	*4*	*14*	*773*	-	*31*	*13*	*125*	*7,368*	*636,430*	*196*	*17*	*139*	*8,141*	*636,430*	*227*
Whakaahu	-	-	-	-	-	*1*	*25*	*250*	*29,250*	*5*	*1*	*25*	*250*	*29,250*	*5*
Te Arai	-	-	-	-	-	*6*	*132*	*13,799*	-	*137*	*6*	*132*	*13,799*	-	*137*
Taruheru	*20*	*178*	*11,906*	*1,648,377*	*239*	*3*	*17*	*1,284*	*882,980*	*16*	*23*	*195*	*13,190*	*2,531,357*	*255*
Lower Flats	*16*	*124*	*10,006*	*549,600*	*124*	*3*	*33*	*885*	*99,750*	*22*	*19*	*157*	*10,891*	*649,350*	*146*
Southern	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**41**	**316**	**22,685**	**2,197,977**	**393**	**29**	**500**	**34,533**	**1,708,890**	**397**	**70**	**816**	**57,217**	**3,906,867**	**790**

2.7.3 'Active deferred apps' dataset

Table 21 shows the number of groundwater and surface water take consents GDC has classified as active (consent holder is currently exercising the consent) or deferred (granted consent that is not yet being exercised) relative to allocation blocks, Waipaoa aquifer, and other catchments.

Table 21: Number of consents classified by GDC as groundwater or surface water in the active deferred apps dataset

		Groundwater	Surface water
Allocation block	Waipaoa A Block	6	10
	Waipaoa B Block	5	5
	Te Arai A Block	-	3
	Te Arai B Block	-	3
Aquifer	Te Hapara Sands	1	-
	Matokitoki Aquifer	2	-
	Makauri Aquifer	5	-
Catchment	Northern	-	1
	Waiapu	-	3
	Uawa	1	2
	Waimata	-	2
	Motu	-	2
	Taruheru River	-	1
	Southern	-	3
Total		**20**	**35**

2.7.4 Takes that serve multiple properties

The number of privately owned intakes that service more than a single property is difficult to quantify accurately. In cases, multiple entities may share an intake structure, but this is not always disclosed. There are also instances where a single entity operates one intake that services multiple land parcels or blocks, which may be leased, owned, or managed under a common operational structure.

GDC[12] identified the consents in Table 22 as involving shared infrastructure. GDC notes that while it is likely that there are numerous intakes serving more than one property in practice, the exact number is unknown due to the variable and often informal nature of these arrangements.

The total area and spatial extent of the areas serviced by the consents in **Error! Reference source not found.** is not known.

[12] 'Economic assessment of irrigation' attached to email from Juliette Gottlieb received 12/05/2025 09:27

Table 22: Water takes that serve multiple properties

Consent(s)	Consent holder	Description of shared services
WS-2023-108686-01	Patutahi Pipelines Ltd	A shared river intake and pipeline scheme
WS-2023-111946-00, WS-2023-112127-00, WS-2023-112301-00, WS-2023-112302-00, WG-2023-112304-00	Matawhero Pipelines Ltd	A shared river intake and pipeline scheme
WS-2024-112425-00	Turanga Waimaori	Multiple take use locations, some intakes shared with other consent holders, including WS-2019-108871-00 and WS-2020-109601-00.
WG-2022-111615-00	Alandale Farms	Shared bore
WG-2022-111623-00	Thompsons Horticulture Ltd	
WS-2024-112604-00	Ohiwa Horticulture Ltd	Water is accessed via a shared pipeline
WG-2024-11214901	Williams Horticulture Ltd	Application proposes sharing intake with OCP II Limited Partnership (WS-2018-108569-00)

2.8 Freshwater availability

Freshwater availability is what remains when considering consented allocation against limits. We consider consented allocation to be that represented by the 'all water takes' dataset only in the first instance, and also when considering the 'waitlist' dataset too.

Table 23 and Table 24 show surface water availability by allocation unit and catchment respectively. Table 23 shows that when considering 'all water takes' data Waipaoa A and B block and Te Arai B block have water available, with Waipaoa B having the greatest water availability. Te Arai A block has no water available. When looking at 'all water takes' + 'waitlist' only Waipaoa B block has water available.

When considering other catchments (Table 24), 'all water takes' data shows Waiapu has the greatest surface water availability, significantly more than Uawa, Northern, Motu, and Southern who also have water available. When considering 'all water takes' + 'waitlist' Uawa has less water available while Taruheru is more overallocated.

Table 23: Waipaoa and Te Arai A and B block surface water availability

Allocation unit	Allocation (L/s)	'All water takes'		'All water takes' + 'waitlist'	
		Allocated (L/s)	Available (L/s)	Allocated (L/s)	Available (L/s)
Waipaoa A Block	2,000	1,795	205	2,175	-175
Waipaoa B Block	2,000	861	1,139	861	1,139
Te Arai A Block	70	70	-	115	-45
Te Arai B Block	100	63	37	134	-34

Table 24: Surface water availability in other catchments

Catchment	Allocation (L/s)	'All water takes'		'All water takes' + 'waitlist'	
		Allocated (L/s)	Available (L/s)	Allocated (L/s)	Available (L/s)
Northern	376	5	371	-	371
Waiapu	2,535	-	2,535	-	2,535
Uawa	501	30	471	155	346
Waimata	24	54	-30	-	-30
Motu	153	-	153	-	153
Taruheru	14	20	-6	28	-14
Southern	65	11	54	-	54

Table 25 and Table 26 show groundwater availability by Waipaoa aquifer and catchment respectively.

Table 25 shows that when considering 'all water takes' data, available allocation in the Matokitoki aquifer exceeds the overallocation in the Makauri and Te Hapara Sands aquifers. However, when considering 'all water takes' + 'waitlist', overallocation far exceeds the availability in the Matokitoki.

Table 26 shows there is significant groundwater allocation available in Northern, Waiapu, Uawa, Waimata, and Southern catchments. There are no 'waitlist' groundwater consents in these catchments.

Table 25: Groundwater availability from Waipaoa aquifers

Aquifer	2020 allocation target (m^3/year)	2025 allocation target (m^3/year)	'All water takes'		'All water takes' + 'waitlist'	
			Allocated (m^3/year)	Available (m^3/year)	Allocated (m^3/year)	Available (m^3/year)
Makauri Aquifer	1,892,160	1,702,944	1,743,910	-40,966	2,772,974	-1,070,030
Matokitoki Aquifer	630,720	567,648	274,500	293,148	274,500	293,148
Te Hapara Sands	295,000	-	514,180	-219,180	671,173	-376,173

Table 26: Groundwater availability in other catchments

Catchment	Availability (m^3/year)	'All water takes'		'All water takes' + 'waitlist'	
		Allocated (m^3/year)	Available (m^3/year)	Allocated (m^3/year)	Available (m^3/year)
Northern	8,118,911	60,000	8,058,911	60,000	8,058,911
Waiapu	36,310,816	8,249	36,302,567	8,249	36,302,567
Uawa	8,251,065	4,526	8,246,539	4,526	8,246,539
Motu	-	-	-	-	-
Waimata	1,129,113	-	1,129,113	-	1,129,113
Southern	2,392,489	-	2,392,489	-	2,392,489

3 Economic Potential

3.1 Land Use

The current inventory has identified that there is approximately 86,644 ha of irrigable land in Tairāwhiti across the seven catchments as is shown in Table 27. Of that irrigable land 8,689 ha (10%) is currently allocated water to irrigate it. As can be seen from Table 27 the Waipaoa Catchment dominates the metrics in both the area irrigated and the irrigable area.

Table 27: Current area of irrigation water allocation, irrigable area and dryland by Catchment.

Catchment	Groundwater	Surface water	Total Area Irrigated	Irrigable Area	Currently Dryland
Northern	-	14	14	8,577	8,563
Waiapu	1		1	15,917	15,916
Uawa	<1	204	204	8,029	7,825
Waimata		230	230	6,724	6,494
Motu				7,963	7,963
Waipaoa	2,173	6,033	8,220	32,956	24,736
Southern		20	20	6,477	6,457
Total	**2,174**	**6,500**	**8,689**	**86,644**	**77,955**

As can be seen from Table 10 which shows the results of the GDC summer crop survey the Waipaoa Catchment currently has the majority of the intensive Horticultural land uses. The information presented in Table 27 and in the GDC summer crop survey has been used to allocate the land uses, both Irrigated and Dryland, for the current scenario as is shown in Table 28.

3.1.1 Current Scenario

Table 28: Land use allocated across irrigation and dryland for the current situation.

Landuse	Irrigated	Dryland
Pipfruit	888	-
Avocados	113	3
Citrus	1,763	82
Grapes	400	-
Kiwifruit	1,073	-
Maize	1,225	4,484
Minor crops	108	-
Pasture	406	72,894
Veg	2,047	492
Other	666	-
Total	**8,689**	**77,955**

As reported by the GDC of their "Waipaoa River Catchment Planning hui 11[13] the Waipaoa River minimum flow" the MALF of the river has been recalculated as 2,500l/sec and that all potential minimum flows above the status quo (1,300 l/s) would decrease the reliability of water takes from the river and increase the frequency of time when water could not be taken from the river for irrigation.

TAG evaluated the impact on reliability of a range of minimum flows up to 2,000 l/s in its report in 2012.[14] and reported that the Waipaoa River is quite benign in terms of the regularity of restrictions but when they do occur they occur for reasonable periods of time. The other point to note is the extreme of the maximum period of restriction as can be seen in Table 29. They calculated that at the 2000 litres/sec flow shows a much more considerable impact with a change in gross margin of -11 %. In the absence of a new minimum flow we have assumed that the 2,000 l/s flow regime has been adopted, and the surface water irrigators have had their revenue dropped by 11% in the current scenario.

Table 29: Waipaoa River Restrictions at 2000 liters/sec.

Start Month	Occurrence of restrictions over 50 years.	Occurrence %	Average no of days	Maximum	Minimum
Oct	1	2	36	36	36
Nov	3	6	29	60	7
Dec	3	6	23	56	4
Jan	11	22	26	101	2
Feb	13	26	22	70	4
March	2	4	13	16	10

The notes of the discussion in the hui also points to the requirement of the Makauri Aquifer irrigators to reduce their abstraction of irrigation water. They report scenario 4 which is labeled Sustainable Allocation, which is for a 15% cut now and a further 15% cut at 2045. We have modeled that the current irrigators from the Makauri Aquifer are required to make a 15% cut in their current abstraction of water in the current scenario.

3.1.2 Future Scenario

In the future scenario we have assumed that the surface water irrigators have been able to restore their reliability by building dams which are able to make up for the short fall in access to irrigation water that is caused by the minimum flows and that the Makauri Aquifer irrigators are able to maintain their abstractions by the addition of a Managed Aquifer Recharge (MAR) scheme.

Table 24 indicates that there is surplus water available to be abstracted from various Catchments, which all have more than sufficient high class soils, as is shown in Table 30.

[13] Keruru Consultants (2024): Waipaoa Catchment Planning Advisory Group – Hui 11. Water Quantity in the Waipaoa Catchment – Summary and Update.
[14] The AgriBusiness Group (2012): An assessment of the economic value of irrigation on the Poverty Bay Flats

Table 30: Available water for abstraction by Catchment.

Catchment	Available water for abstraction.
Northern	371
Waiapu	2,535
Uawa	346
Waimata	-30
Motu	153
Waipaoa	-14
Southern	54
Total	**3,415**

In this scenario it is assumed that all of the available water is used. It has been allocated across the Catchments according to the distance from the Gisborne hub. It has been allocated to the four highest crops in the efficiency measure $/m^3 utilised. Those four land uses are Pipfruit, Citrus, Kiwifruit and Vegetables.

We have also assumed that there has been a transition from the current areas of maize and pasture irrigation to these highly efficient land uses.

The future scenario land use mix is shown in Table 31.

Table 31: Land use allocated across irrigation and dryland for the current situation (ha).

Landuse	Irrigated	Dryland
Pipfruit	1,605	-
Avocados	113	3
Citrus	2,421	82
Grapes	400	-
Kiwifruit	1,731	-
Maize	-	4,334
Minor crops	108	-
Pasture	6	72,020
Veg	2,669	492
Other	666	-
Total	**9,719**	**76,931**

The future scenario has an additional 1,030 ha of irrigation plus the Makauri Aquifer and Waipaoa irrigators restoring their reliability of irrigation abstraction to that which they enjoy presently.

3.1.3 Unconstrained Irrigable Area

This scenario has the future scenario irrigable area (the irrigable area is all of the land which is flat to rolling and is below 15º slope) plus all of the irrigable area identified modeled as being irrigated.

The areas of land use have been allocated across the Catchments according to the distance from the Gisborne hub. The irrigated land use has been allocated to the five highest crops in the efficiency measure $/m3 utilised. Those five land uses are Pipfruit, Avocados, Citrus, Kiwifruit and Vegetables. The land uses used in the unconstrained irrigable areas is shown in Table 32.

This scenario has been modeled to show the economic potential of the Region if the current constraints on available irrigation water can been overcome.

Table 32: Land use allocated across all of the irrigable areas identified (ha).

Landuse	Area
Pipfruit	21,430
Avocados	14,208
Citrus	15,316
Grapes	400
Kiwifruit	17,106
Maize	-
Minor crops	108
Pasture	-
Veg	15,785
Other	666
Total	**85,019**

This area of additional irrigation will require approximately 203m m^3 of water storage.

3.1.4 Unconstrained Irrigable plus the Potentially Irrigable area (ha).

This scenario has the future scenario irrigable area plus all of the irrigable area identified modeled as well as the potentially irrigable area (the potentially irrigable area is all of the land which is strongly rolling from 16° – 20° which will require development work for high value crops) being irrigated. Because the area that has been identified as potentially irrigable has a requirement of land form modification to allow access to crops the area that it is possible to grow crops on has been limited to 75% of the available area.

The areas of land use have been allocated across the Catchments according to the distance from the Gisborne hub. The irrigated land use has been allocated to the five highest crops in the efficiency measure $/m3 utilised. Those five land uses are Pipfruit, Avocados, Citrus, Kiwifruit and Vegetables. The land uses used in the unconstrained irrigable areas is shown in Table 33.

This scenario has been modeled to show the economic potential of the Region if the current constraints on available irrigation water can been overcome.

Table 33: Land use allocated across all of the irrigable and potentially irrigable areas identified (ha).

Landuse	Area
Pipfruit	35,793
Avocados	28,571
Citrus	29,679
Grapes	400
Kiwifruit	17,490
Maize	-
Minor crops	108
Pasture	-
Veg	15,785
Other	666
Total	128,491

This area of additional irrigation will require approximately 368m m^3 of water storage.

3.1.5 Financial

Financial budgets were created for each of the land uses. Much of the information used in compiling those budgets was gained from sources who do not wish, for commercial reasons, to make the results public therefore we do not list them. The Revenue data used in the modelling is shown in Appendix C.

The following is a brief description of how they were compiled.

Pipfruit

The Pipfruit budget was compiled based on the MAF Pipfruit Monitoring data which has been adjusted to reflect the Gisborne climate and yields. The revenue is based on an analysis of SOPI[15] using an average of the last four years and four years of forecast data.

Avocados

The avocado data is based on an avocado budget which TAG created for some work in Northland [16]which was adjusted to reflect revenue and costs that are current.

Citrus

The citrus budgets for Oranges, Lemons and Mandarins that were developed for the work in Northland were updated to reflect revenue and costs that are current.

[15] Ministry for Primary Industries (2025): Situation and Outlook for the Primary Industries.
[16] Williamson Water Advisory Ltd (2000): Pre feasibility study of four Dam sites in Northland.

Grapes

The data on the Gross Margins for grape growing in Gisborne[17] were updated to reflect the current costs and revenue with reference to Hawkes Bay and the current Marlborough[18] data.

Kiwifruit

The Kiwifruit budget was created by reference to the Kiwifruit Monitoring Report[19] and the two Zespri publications, the Annual report[20] and the 2025 Outlook document[21].

Maize

The maize financial budget was created with reference to Pioneers Maize Grain Cost calculator and SOPI.

Minor Crops

The minor crops and other crops were assumed to have the same financial performance as the Vegetable budget.

Pasture

The pasture financial performance is based on the B+LNZ farm survey data and SOPI.

Vegetable

The vegetable financial data was based on information provided by Leaderbrand.

3.1.6 Multipliers

For the purposes of this work, the model was estimated for the Gisborne Region by Geoff Butcher of Butcher Partners. The input output model is an approximation based on a 2019/20 national model and generally assumes that national average production technologies for each industry (including various types of farming / horticulture) will also apply at the regional level. The model takes into account Tairāwhiti/ Gisborne's limited production base in some industries and assumes that inputs are 'imported' from outside the region where they are not available locally.

The model was used to generate "multipliers", which show the relationship between any direct increase in production in a given industry and the total increase in regional value added and employment which flows from that direct increase.

3.2 Results

3.2.1 Output at the Orchard / Farm Gate

The output at the orchard / farm gate for the current and future scenarios and the net increase are shown in Table 34.

[17] MPI (2016): Vineyard Gross Margin Benchmarking report.
[18] MPI(2024): Marlborough vineyard monitoring report.
[19] MPI (2025): Kiwifruit monitoring report.
[20] Zespri (2025): Annual report 2025.

[21] Zespri (2025): Outlook.

Table 34: Output for the current, future and unconstrained scenarios. ($m)

Scenario	Current	Future	Unconstrained Irrigable	Unconstrained Irrigable and Potentially Irrigable
Current	692.76	939.32	2,454	3,687
Net Increase		246.56	1,761	2,994

The $246m increase in output is a significant amount, 35% increase on the current scenario.

3.2.2 Multipliers

The multipliers for the increase in output are shown in Table 35.

Table 35: Output for the current and future scenarios. ($m)

Multiplier	Result	Unconstrained Irrigable	Unconstrained Irrigable and Potentially Irrigable
Gross Domestic Product	402.51	2,871	4,881
Value Added	188.00	1,339	2,276
Employment (FTE's)	1,926	13,563	23,057
Household Income	70.39	493	838

The increase in orchard / farm gate output for the future scenario would result in a $402m increase in all goods and services produced in the Tairāwhiti Region with an increase in value added, which is the increased value over and above the cost of supply or the increased profit margin on its production being $188m, a 1,926 increase in FTE's and $70m increase in household income.

These are all very significant figures in the Tairāwhiti Region.

The two unconstrained scenarios show a considerable uplift in the Regional multipliers being eight times those of the future scenario for the irrigable area and twelve times for the irrigable and potentially irrigable areas.

Appendix A: Crop types

GDC provided[22] 2024/25 season crop survey data. We simplified crops from 34 categories to ten. 919 ha of the crop areas (3% of mapped area) are outside the irrigable or potentially irrigable areas. This is mainly due to differences in boundaries, as demonstrated below. We classified all crop survey areas as irrigable or potentially irrigable based on its location relative to the irrigable and potentially irrigable areas; we classified crop areas [mostly] within or surrounded by irrigable areas as irrigable, and the remainder potentially irrigable.

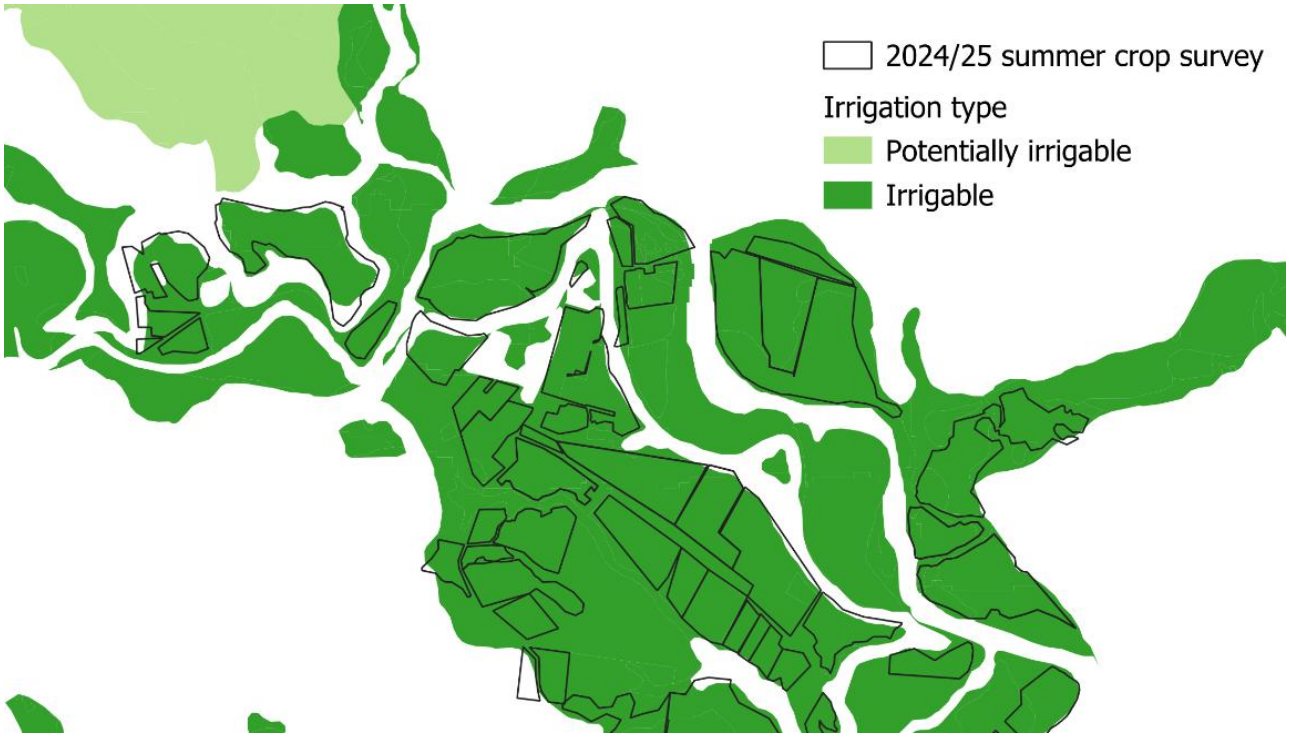

Figure Error! No text of specified style in document.**.1: Irrigated and potentially irrigable areas as per Alexander, et al. (2023) compared to the GDC mapped extents from the 2024/25 summer crop survey**

Table Error! No text of specified style in document.**.1: Assumed irrigation demand group for crop types identified in the 2024/25 survey, as in Alexander, et al. (2023)**

Crop type from survey	Assigned crop category	Crop type from survey	Assigned crop category
[Null]	Other	**Maize/Sweetcorn**	Maize
Apples and Pears	Apples and Pears	**Melons**	Minor crops
Avocados	Avocados	**Not Visible**	Other
Baleage	Pasture	**Olives**	Avocados
Cauliflower/Broccoli	Vege	**Other**	Other
Chamomile	Minor crops	**Pasture/Unused**	Pasture

[22] Email from Juliette Gottlieb received 7/05/2025 09:03

Crop type from survey	Assigned crop category	Crop type from survey	Assigned crop category
Chicory	Pasture	**Persimmon**	Citrus
Citrus	Citrus	**Pine Nursery**	Other
Clover	Pasture	**Pinenuts**	Minor crops
Courgettes	Vege	**Plantain/Chicory**	Pasture
Feijoa	Citrus	**Pomegranate**	Citrus
Flowers	Vege	**Poplar/Willow Nursery**	Other
Forage rape	Pasture	**Squash**	Vege
Grape nursery	Minor crops	**Stonefruit**	Apples and Pears
Grapes	Grapes	**Strawberries**	Minor crops
Kiwifruit	Kiwifruit	**Tamarillo**	Citrus
Leafy Turnip	Pasture	**To Be Planted**	Vege
Lettuce/Cabbage	Vege	**Tomatoes**	Vege
Lucerne	Pasture	**Yarrow**	Pasture

Table Error! No text of specified style in document..**2: Land Cover Database simplified categories**

Land Cover Database category	Assigned category
Broadleaves Indigenous Hardwoods	Scrub
Deciduous Hardwoods	Forest and forestry
Exotic Forest	Forest and forestry
Fernland	Scrub
Flaxland	Scrub
Forest - Harvested	Forest and forestry
Gorse and/or Broom	Scrub
High Producing Exotic Grassland	High Producing Exotic Grassland
Indigenous Forest	Forest and forestry
Low Producing Grassland	Low Producing Grassland
Manuka and/or Kanuka	Scrub
Matagouri or Grey Scrub	Scrub
Mixed Exotic Shrubland	Scrub
Orchard, Vineyard, or Other Perennial Crop	Orchard, Vineyard, or Other Perennial Crop
Short-rotation Cropland	Short-rotation Cropland

Appendix B: Consented allocation per allocation unit

This section summarises allocation information as provided by GDC against each allocation unit. L/s, m^3/day, and m^3/year reflect consented allocation rates and volumes. ha reflects the irrigated area (hectares). Not all consents have all four values specified.

'All water takes' dataset

Table Error! No text of specified style in document.**1: Groundwater allocation units**

Aquifer	Sub-catchment	Groundwater				
		#	L/s	m^3/day	m^3/year	ha
Makauri	*Mid Flats*	3	53	1,633	126,877	38
	Whakaahu	1	25	1,400	95,341	113
	Taruheru	25	407	25,918	1,521,692	1,039
	Total	***29***	***485***	***28,951***	***1,743,910***	***1,190***
Matokitoki	*Taruheru*	2	92	7,110	274,500	129
Te Hapara Sands	*Lower Flats*	8	41	2,340	277,400	98
	Taruheru	12	57	2,163	236,780	261
	Total	***20***	***99***	***4,503***	***514,180***	***359***

Table Error! No text of specified style in document.**2: Te Arai allocation blocks (surface water allocation unit)**

Allocation unit	Sub-catchment	Surface water				
		#	L/s	m^3/day	m^3/year	ha
Te Arai A block	*Te Arai*	8	70	4,125	281,300	112
Te Arai B block	*Te Arai*	4	63	5,458	165,135	82

Table Error! No text of specified style in document.**3: Waipaoa A block (surface water allocation unit)**

Sub-catchment	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Upper Waipaoa	1	4	300	109,500	-	2	92	7,406	841,513	128	3	95	7,706	951,013	128
Upper Flats						6	253	23,930	2,090,777	370	7	258	23,982	2,101,697	370
						1*	5*	53*	10,920*	-					
Waikohu						2	86	3,104	746,750	126	2	86	3,104	746,750	126
Wharekopae						1	24	2,074	228,200	50	1	24	2,074	228,200	50
Mid Flats	9	47	2,527	303,360	92	26	1,103	84,693	15,597,756	3,182	40	1,266	96,766	17,175,409	3,818
						5*	115*	9,545*	1,274,293*	544*					
Whakaahu	3	30	1,870	272,577	120	2	23	899	86,610	27	5	52	2,769	359,187	147
Te Arai	2	7	521	76,100	24						2	7	521	76,100	24
Taruheru	12	60	2,340	274,851	91						13	74	2,865	344,144	106
						1*	14*	525*	69,293*	15*					
Lower Flats	6	27	1,859	245,738	60	4	68	5,520	630,774	458	13	107	7,854	931,032	663
						3*	12*	475*	54,520*	146*					
Total	**33**	**175**	**9,417**	**1,282,126**	**387**	**53**	**1,795**	**138,223**	**21,631,406**	**5,046**	**86**	**1,970**	**147,640**	**22,913,531**	**5,433**

* Groundwater and surface water

Table Error! No text of specified style in document.**4: Waipaoa B block (surface water allocation unit)**

Sub-catchment	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Upper Waipaoa	1	1	104	37,960	-	2	28	2,424	153,502	49	3	29	2,528	191,462	49
Upper Flats						3	54	5,804	279,802	76	3	54	5,804	279,802	76
Mid Flats	3	12	772	84,250	29	14	725	52,637	3,879,136	623	17	737	53,409	3,963,386	652
Whakaahu						1	30	2,592	24,000	14	1	30	2,592	24,000	14
Taruheru	1	3	189	22,550	5						1	3	189	22,550	5
Lower Flats	4	18	1,178	196,640	67	2	24	2,064	111,642	42	6	42	3,242	308,282	109
Total	**9**	**34**	**2,243**	**341,400**	**100**	**22**	**861**	**65,521**	**4,448,082**	**804**	**31**	**895**	**67,764**	**4,789,482**	**904**

Table Error! No text of specified style in document.**5: Other allocation**

Catchment	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Northern	1	5	432	60,000	-	1	5	475	33,615	14	2	10	907	93,615	14
Waiapu	1	1	23	8,249	1						1	1	23	8,249	1
Uawa	1	1	12	4,526	0	2	30	2,593	576,110	204	3	31	2,605	580,636	204
Waimata						4	54	4,005	777,224	230	4	54	4,005	777,224	230
Southern						1	11	690	66,337	20	1	11	690	66,337	20
Taruheru	1	1	60	13,000	8	1	6	200	19,800	4	2	7	260	32,800	12

‘Waitlist’ dataset

Table Error! No text of specified style in document.**6: Groundwater allocation units**

Aquifer	Sub-catchment	Groundwater				
		#	L/s	m^3/day	m^3/year	ha
Makauri	*Mid Flats*	1	4	200		10
	Taruheru	5	82	6,422	1,029,064	163
	Total	*6*	*85*	*6,622*	*1,029,064*	*173*
Te Hapara Sands	*Lower Flats*	8	50	3,168	487,600	54
	Taruheru	10	48	2,578	503,320	24
	Total	*18*	*98*	*5,746*	*990,920*	*78*

Table Error! No text of specified style in document.**7: Te Arai allocation blocks (surface water allocation unit)**

Allocation unit	Sub-catchment	Groundwater					Surface water				
		#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Te Arai A block	*Te Arai*						1	5	200		6
	Lower Flats	1	40	5,000		10					
Te Arai B block	*Te Arai*						4	71	9,954		9

Table Error! No text of specified style in document.**8: Waipaoa A block (surface water allocation unit)**

Sub-catchment	Groundwater					Surface water					Total				
	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha	#	L/s	m^3/day	m^3/year	ha
Upper Waipaoa	1	1	-		-						1	1	-		-
Upper Flats						2	43	1,947	60,480	16	2	43	1,947	60,480	16
Waikohu															
Wharekopae															
Mid Flats	3	10	573		21	13	125	7,368	636,430	196	16	135	7,941	636,430	217
Whakaahu						1	25	250	29,250	5	1	25	250	29,250	5
Te Arai						1	56	3,645		122	1	56	3,645		122
Taruheru	4	44	2,786	94,993	32	2	9	584	819,980	15	6	53	3,370	914,973	47
Lower Flats	7	34	1,838	62,000	61	3	33	885	99,750	22	10	67	2,723	161,750	83
Total	**15**	**89**	**5,197**	**156,993**	**113**	**22**	**292**	**14,679**	**1,645,890**	**376**	**37**	**380**	**19,876**	**1,802,883**	**489**

* Groundwater and surface water

Table Error! No text of specified style in document.**9: Other allocation**

Catchment	Surface water				
	#	L/s	m^3/day	m^3/year	ha
Uawa	1	125	9,000	-	5

Appendix C: Gross Revenues of Land Uses.

Table 36: Gross Revenue of Land Uses ($/ha).

Landuse	Gross Revenue
Pipfruit	101,050
Avocados	42,050
Citrus	43,800
Grapes	24,000
Kiwifruit	175,000
Maize	5,525
Minor crops	n/a
Pasture	2,765
Veg	n/a
Other	n/a