THE WEST COAST
REGIONAL COUNCIL

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CONFIDENTIAL

AGENDA AND SUPPORTING PAPERS FOR COUNCIL'S AUGUST MEETINGS

TO BE HELD IN THE OFFICES OF THE WEST COAST REGIONAL COUNCIL 388 MAIN SOUTH ROAD, GREYMOUTH

TUESDAY, 13 AUGUST 2019

The programme for the day is:

10.30 a.m:	**Resource Management Committee Meeting**
On completion of RMC Meeting:	**Council Meeting**

Presentation: **NZTA**

RESOURCE MANAGEMENT COMMITTEE

THE WEST COAST REGIONAL COUNCIL

Notice is hereby given that a meeting of the **RESOURCE MANAGEMENT COMMITTEE** will be held in the Offices of the West Coast Regional Council, 388 Main South Road, Paroa, Greymouth on **Tuesday, 13 August 2019**

N. CLEMENTSON
CHAIRPERSON

M. MEEHAN
Chief Executive Officer

AGENDA NUMBERS	PAGE NUMBERS	BUSINESS	
1.		**APOLOGIES**	
2.		**MINUTES**	
	1 – 4	2.1	Confirmation of Minutes of Resource Management Committee Meeting – 9 July 2019
3.		**PRESENTATION**	
4.		**CHAIRMAN'S REPORT**	
5.		**REPORTS**	
		5.1	**Planning and Operations Group**
	5 – 29	5.1.1	Planning and Hydrology Report
	30	5.1.2	Reefton Air Quality Summary
		5.2	**Consents and Compliance Group**
	32 – 34	5.2.1	Consents Monthly Report
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		6.0	**GENERAL BUSINESS**

THE WEST COAST REGIONAL COUNCIL

MINUTES OF THE MEETING OF THE RESOURCE MANAGEMENT COMMITTEE HELD ON 9 JULY 2019, AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL, 388 MAIN SOUTH ROAD, GREYMOUTH, COMMENCING AT 10.30 A.M.

PRESENT:

N. Clementson (Chairman), T. Archer, P. Ewen, P. McDonnell, A. Birchfield, S. Challenger, J. Douglas

IN ATTENDANCE:

M. Meehan (Chief Executive Officer), R. Mallinson (Corporate Services Manager), H. McKay (Consents & Compliance Manager), H. Mills (Planning, Science & Innovation Manager), R. Beal (Operations Director), T. Jellyman (Minutes Clerk), The Media.

1. APOLOGIES

Moved (Clementson / Archer) *That the apology from Cr Robb be accepted.*

Carried

2. MINUTES

Cr Clementson asked the meeting if there were any changes to the minutes of the previous
Moved (Archer / Birchfield) *that the minutes of the previous Resource Management Committee meeting dated 11 June 2019, be confirmed as correct.*

Carried

Matters Arising

There were no matters arising.

3. PUBLIC FORUM

Cr Clementon welcomed Frida Inta to the meeting via telephone. Ms Inta's letter was taken as read. She spoke of her concerns regarding the Mokihinui Estuary. Ms Inta stated that she has seen the degradation of the estuary over the years and is concerned that this is unnecessary and could have been avoided. Ms Inta spoke of the clearing of Swannies culvert and stated that the sand taken from this area cannot be dumped in this area as she feels this area is swamp marsh and contains rare plants. Ms Inta stated that the culvert structure is visually awful and she does not understand how Council can give retrospective consent to such an ugly structure. She also stated that she does not understand how this can be a permitted activity. Cr Archer asked Ms Inta various questions relating to where the sand could be dumped and what industries it could be used for. She responded that there are many uses for sand. Ms Inta stated that fairy terns and dotterel also need to be protected as these faunas are in the estuary. Further questions took place on who owns the area and who should be responsible for work in this area. Cr Clementson advised Ms Inta that as her letter contained staff members names, a response will be discussed in the confidential section of today's meeting and will be provided to her in due course. He passed on Council's thanks to Ms Inta.

4. CHAIRMAN'S REPORT

Cr Clementson reported that he attended final meeting for the Marrs Beach Working Group.
He attended the unveiling for the pou whenua on the Mokihinui Estuary, this was also attended by the Minister of Conservation.

Moved (Clementson / Archer) *That the report is received.*

Carried

5. REPORTS

5.1 PLANNING AND OPERATIONS GROUP

5.1.1 PLANNING REPORT

H. Mills spoke to his report and advised that the report on the decisions for Plan Change 1 will be presented to next month's Council meeting as this is now being finalised.
H. Mills reported that at the recent Grey Mawhera FMU meeting discussion took place on the NPSFM.
H. Mills outlined the paper relating to the Kawatiri FMU which outlines the members of the community who will be recommended to join this group.
H. Mills reported that there is considerable work going on with changes to the Freshwater NPS, along with the NES for Freshwater Management. He stated that draft version of the NES is expected to be released in the next few months.
M. Meehan commented that Council is not set up to implement the NES for Freshwater Management as this would require additional resources as it is looking at stock exclusion, planting across catchments, farm planning, and there are at least 400 farm plans that would need to be done. M. Meehan advised that Canterbury has mandatory farm plans, but noted that the West Coast does not have the same issues with water quality that Canterbury has. Meehan stated this will be a major issue and Council may well find itself the odd one out as potentially not have some of the issues that the NES seeks to address. H. Mills confirmed that a draft policy is expected in a few months' time. Cr Ewen expressed concern if the NES becomes law. Cr Birchfield stated this is basically government regulation of the farming industry and will cost farmers and ratepayers a lot of money to administer. Cr Archer also expressed his concern that central government is loading local government with huge additional high cost requirements without consideration to the costs to communities. He stated that communities are already saying that they cannot afford this. M. Meehan stated he would like to think that a thorough regulatory impact statement will come through with the NES. He stated at the moment the Freshwater NPS is being implemented, Council is engaging with the community through the work the resource science team is doing, and central government is making decisions on behalf of the community that potentially will be overshot by more legislation coming in. M. Meehan stated that the Freshwater NES was set up for the community to make decisions about what they want from the environment. M. Meehan advised that a similar situation happened with the Reefton Air shed. H. Mills advised that he is part of the Resource Manager's Groups, who sit with MfE in meetings and stated that they do take the concerns on board. H. Mills advised that Council will get to submit on this NES. Extensive discussion ensued, M. Meehan advised that Council can make a strong submission on what comes through but he flagged that radical changes can be expected and it is likely that Council will be lumped with more costs, potentially for not a lot of benefit. Cr McDonnell commented that the NES may even make some farming impractical. H. McKay stated that there will impacts from this for the West Coast.
Discussion took place on the recommendations with Cr Archer stating that he knows at least half of the appointees to the Kawatiri FMU.

Moved (Archer / McDonnell)

1. *That the report is received.*

2. *That Council approves a further extension of six months to release decisions on submissions to the Proposed Plan Change 1 to the Regional Land and Water Plan, by 21 February 2020.*

3. *That Council approved the Implementation Team's recommended applicants for membership of the Kawatiri Freshwater Management Unit Group.*

Carried

5.1.2 MARRS AND SHINGLE BEACH WORKING GROUP REPORT: STAGE 1

H. Mills spoke to this report and provided background information on the working group since its inception. He spoke of the key findings and advised that Bradshaws Creek was identified as having high levels of E. coli., with ruminants the most likely source. H. Mills advised that water quality targets have

now been set with farmers in the catchment working voluntarily with Council to meet the target by 2023. He stated if the targets are not met by 2023, farmers within the catchment are happy for Council to come in with a regulatory approach which would be rules and plans. Cr Clementson commented that it is likely that Bradshaws Creek will come under increased scrutiny with the NES for Freshwater therefore it is good that they are already working on raising the level for water quality to an acceptable standard now. Cr McDonnell asked if Shingle Beach has a catchment of its own. H. Mills advised that as this is over the other side of the Buller River, a connection was not made as it was looking as though results were getting better at Shingle Beach. H. Mills advised that the recommendations only apply to Marrs Beach. H. Mills explained how dye tracing was used. Cr Archer stated this is a very comprehensive and robust report. H. Mills answered further questions from Councillors. Cr Archer suggested a 7th recommendation, commending the working group and staff to thank them for their contribution to this project.

Moved (Archer / Ewen)

1. *Work with farmers in the Bradshaws Creek catchment to reduce sources of faecal contamination to waterbodies.*

2. *Aim to improve E. coli concentrations in Bradshaws Creek to above the NPSFM 'D' category by 2023. If this is not achieved then regulatory measures may be considered in close consultation with farmers and the community.*

3. *Pursue avenues for working with farmers to implement voluntary measures that will lead to less faecal contamination of Bradshaws Creek.*

4. *If Bradshaws Creek has improved significantly, but water quality targets at Marrs Beach have not been achieved by 2023, then further investigation should be undertaken to determine the source of contamination at Marrs Beach.*

5. *WCRC staff to work with Buller District Council to make the content of public health signage at Marrs Beach more relevant for the public.*

6. *The Group remains formed in its existing structure and continues in future to meet as required.*

7. *That Council commends the Marrs Beach and Shingle Beach Working Group, and Council staff, for their enthusiasm and contribution to this project.*

Carried

5.1.3 REEFTON AIR QUALITY SUMMARY

H. Mills spoke to this report and advised that there have been no exceedances of the NES for air quality in Reefton so far this season. He advised that the new machine has been installed and is now recording both PM_{10} and $PM_{2.5}$. H. Mills advised that data is being collected via USB as there is not yet a telemented link back to Council.

Moved (Archer / Birchfield) *That the report is received.*

Carried

52.1 CONSENTS MONTHLY REPORT

H. McKay spoke to this report and advised that six site visits were carried out, nine non-notified resources consents were granted, and two changes to consent conditions were granted during the reporting period. H. McKay reported that two changes to and reviews of consent conditions were granted, and two limited notified resource consents were granted during the reporting period. H. McKay answered questions from Cr Challenger in relation to Westland District Council's resource consent for the Franz Josef Wastewater Treatment Plan, she confirmed that this is for the new ponds.

Moved (McDonnell / Challenger) *That the July 2019 report of the Consents Group be received.*

Carried

5.2.2 COMPLIANCE & ENFORCEMENT MONTHLY REPORT

H. McKay spoke to this report and advised that 62 site visits were carried out during the reporting period. H. McKay reported that there were 23 complaints or incidents were received with 11 resulting in site visits. H. McKay reported that there were 11 non-compliances during the reporting period.
H. McKay reported that two abatement notices, 22 formal warnings and two infringement notices were issued during the reporting period. H. McKay advised that 21 formal warnings were in relation to gravel returns which have not been submitted for some time.
H. McKay reported that 13 work programmes were received with ten being approved. One bond is recommended for release.
Cr Birchfield stated that gravel extraction is creating unnecessary bureaucracy and should be made a permitted activity with rules. He stated this would make things cheaper and simpler for people to operate. M. Meehan advised that a holistic consent was investigated about ten years ago and looking how all could be consented. He stated that different approaches are taken all around the country for gravel extraction. M. Meehan offered to look at other options. Extensive discussion took place and it was agreed that there would not be a lot of benefit in seeking a plan change, and this would also be very costly. Cr Birchfield stated that he would like to know what this is costing Council to administer. It was agreed that costs would be provided to Councillors. M. Meehan advised gravel returns give good information on how much gravel has been taken and how much is available for other users. It was agreed no further work would be done on this matter but costs would be provided to Councillors.

Moved (Archer / Ewen)

1. *That the July 2019 report of the Compliance Group be received.*

2. *That the bond for RC-07078 Leisure Land Limited of $12,000 is released.*

Carried

GENERAL BUSINESS

There was no general business.

The meeting closed at 11.26 a.m.

.....
Chairman

.....
Date

THE WEST COAST REGIONAL COUNCIL

Prepared for:	Resource Management Committee Meeting – 13 August 2019
Prepared by:	Hadley Mills, Planning Science and Innovation Manager
Date:	2 August 2019
Subject:	**PLANNING HYDROLOGY REPORT**

Envirolink

Four small advice grants have been secured. One is to continue work investigating the coastal erosion issues at Cobden, two are for Punakaiki - looking at the impact of the NZTA seawall on the village seawall and focussing on the village seawall. The other is to advise on the implementation of measures to improve water quality at Marrs Shingle.

Coastal Plan

An extension of one year is requested to notify decisions on submissions to the proposed Coastal Plan, to 1 December 2020. The Coastal Plan review process has been put on hold to enable the Regional Policy Statement appeals to be resolved.

Grey Mawhera FMU update

The 10th Grey FMU meeting took place on 23 July. Ngāi Tahu Forestry and Irrigation New Zealand both presented to the Group, providing valuable insights into industry on the West Coast. Alluvial gold mining was also discussed.

Kawatiri FMU update

The first Kawatiri meeting is scheduled to occur on 6 August 2019 in Westport. The Group will work through the draft terms of reference (approved by RMC) and the legislative framework for freshwater management.

Submission on the Climate Change Response (Zero Carbon) Amendment Bill

The West Coast Regional Council submission on the Bill is attached. It was lodged on 16 July.

State of the Environment Report

On 1 August 2019 we released our 2018 State of Environment (SOE) report which provides a snapshot of the state and trends of some of our region's natural resources, including land cover, water quality, water quantity and air quality.

Usually produced every three years for various resources, this time the SOE report combines all of the monitoring data into the one document, complemented with an easy to read summary for the benefit of West Coast residents interested to find out more. The report is attached.

Hydrology

Flood Warning

There were several small flood alarms on the Hokitika and Waiho Rivers during the reporting period.

Site	Time of peak	Peak level	Warning Issued	Alarm threshold
Hokitika River at Gorge	03/07/2019 08:50	3937mm	03/07/2019 08:20	3750mm
Hokitika River at Gorge	14/07/2019 04:55	3989mm	14/07/2019 03:35	3750mm
Waiho River at SH6	03/07/2019 06:45	8248mm	03/07/2019 05:00	8000mm

RECOMMENDATION

1. *That the report is received.*

2. *That the Resource Management Committee agree to seek an extension for releasing decisions on submissions to the proposed Regional Coastal Plan, to 1 December 2020.*

Hadley Mills
Planning, Science and Innovation Manager

THE WEST COAST
REGIONAL COUNCIL

12th July 2019

Committee Secretariat
Environment Committee
Parliament Buildings
Wellington 6143

Dear Committee Secretariat

Climate Change Response (Zero Carbon) Amendment Bill 2019

Thank you for the opportunity to submit on the Climate Change Response (Zero Carbon) Amendment Bill 2019. Attached is the West Coast Regional Council's submission.

Yours faithfully

Mike Meehan
Chief Executive Officer

West Coast Regional Council Submission on the Climate Change Response (Zero Carbon) Amendment Bill

Introduction

The West Coast Regional Council (WCRC or the Council) supports the intent of the Climate Change Response (Zero Carbon) Amendment Bill (the Bill), but suggest parts of the bill need to be amended in order to give more certainty as to the economic and social impacts on our region. There has been no information provided on how this Bill will affect our regions' communities, and there is no scope for social or economic impact assessments of the emissions budgets or emissions reduction plans. These social and economic impact assessments should be carried out sooner rather than later to ensure there will not be considerable adverse impacts on local communities.

It is not explicit within the Bill that consultation or submission processes must be undertaken by the Commission or Minister on the budgets, emission reduction plans or risk assessments.

The West Coast is a large region with a small population of approximately 32,000. The region relies heavily on resource-based industries such as mining, forestry and farming to sustain our local communities economically and socially. The tourism industry is a growing industry on the West Coast that largely focuses on tourists wanting a natural experience. These industries or parts of these industries rely heavily on carbon emitting fuels. In addition to this, 84% (1,964,141.14ha) of the West Coast is public conservation land, constraining the land available for private use and development and limiting economic activity.

Structure

The Council's submission is in three parts:

- Part A sets out our key concerns with the Bill, in particular where we believe the Bill should be amended to include additional requirements for public consultation and submission processes to ensure social and economic impacts are appropriately considered.
- Part B has other general comments on parts of the Bill.
- Part C provides the West Coast context for how the Bill is likely to impact the region.

Part A: Key concerns with the Bill

We generally support the creation of the Emission Budgets, Emissions Reduction Plans, National Climate Change Risk Assessments, National Adaptation Plan, and progress reports required under the Bill as they provide direction for how people and communities are to meet the 2050 target. However, we have concerns that the Bill does not require the Minister or the Commission to appropriately consider the economic and social impacts on local communities when setting the budgets, and writing the plans and assessments.

The current wording of the Bill is weak when considering economic effects at regional and local levels. For example, clauses 5L(c) and (d) states:

"In performing its functions and duties and exercising its powers under this Act, the Commission must consider, where relevant,— ...

(c) the likely economic effects; and

(d) *social, cultural, environmental, and ecological circumstances, including differences between sectors and regions; and..."*

These clauses include the terms "where relevant" and "likely", meaning that the Commission must only consider the likely economic effects on a region or sector and the social, cultural, environmental,

and ecological circumstances on sectors and regions, only if they deem that these considerations are relevant when performing their functions and duties under this Bill. Many sections throughout the Bill use similar wording to clauses 5L(c) and (d). The Council's view is that wording throughout the Bill needs to be amended to require the assessment of social and economic impacts when implementing the Bill. For example, section 5L should be amended to remove the words "where relevant" and "likely", and words added to require the Commission and the Minister to undertake regional social and economic impact assessments. The Bill should also require that those impacts identified should be recognised and provided for.

The Council supports the New Zealand Society of Local Government Managers (SOLGM) submission point on the lack of consultation when implementing the Bill. We have similar concerns, but believe this issue is wider than sections 5K and 5M. Many clauses throughout the Bill only require the Commission and/or the Minister to *"have regard" to* public consultation. The clauses do not explicitly *"require"* public consultation to be undertaken or considered, and do not *"require"* submission processes to be undertaken. Clause 5Z(2) is an example of this. The Council suggests that the wording of section 5M needs to be amended to say that the Commission "shall" invite submissions on discussion papers and draft reports. Various sections throughout the Bill need to be amended to state that the Minister and the Commission must invite submissions on the proposed Emission Budgets and Emissions Reduction Plans. If the Bill is not amended to require the Minister and Commission to invite submissions on these documents, social, economic, health, environmental, ecological, and cultural impacts for the West Coast may not be appropriately considered or mitigated when implementing the Bill. If these impacts are not appropriately considered, then implementing the Bill is going to have significant costs for West Coast communities, industries, and stakeholders, in particular the resource-based industries mentioned previously, and the tourism industry. Therefore, the Bill needs to be amended to require public consultation and submission processes to be undertaken on the aforementioned budgets, plans and assessments.

The Council also supports the SOLGM view that the Bill is almost silent on the role of agencies outside of the Commission for implementing the Bill and managing the impacts of climate change. The impacts of climate change will occur at local levels and so councils and other key agencies will need to have input into, and clear direction for, how they are to address and manage the effects of climate change at local levels. Currently the Bill does not provide direction for how this is to be done. Further consideration and amendment of the Bill is required to address this.

Part B: Other general comments on parts of the Bill

Part 1A Climate Change Commission

Under sections 5A and 5B, the Council supports the Commission being independent to the Government. This will ensure that advice is independent and accurate.

We also support sections 5C to 5I because they will ensure suitable people are appointed as members of the Commission.

Part 1B Emission Reduction

Subpart 1 - 2050 Target

As stated in our submission on the Discussion Document, we support the setting of a 2050 target in legislation as it provides more certainty for businesses and the public (section 5O).

We partly support section 5P because this allows for the 2050 target to be reviewed and amended. However, clause 5P(1) is not clear about when the Commission can review the 2050 target. As a minimum, the Council would support amending this clause to require the Commission to review the 2050 target in 2036, as touched on in clause 5P(1). However, our preference is for clause 5P(1) to be amended to require the 2050 target to be reviewed at least twice before the year 2050. Impacts of climate change, and advances in technology to manage climate change impacts, could be quite different to what is currently predicted. Therefore, requiring the target to be reviewed on a more regular basis will ensure that the 2050 target reflects the current climate change predictions and any changes in technology.

Currently section 5P does not require the Commission to undertake public consultation or a submission process when reviewing the 2050 target. We see this as a significant gap in the legislation, and consider that the legislation needs to be amended to require public consultation and a submission process to be undertaken when reviewing the target. This will ensure that social, economic, health, environmental, ecological, and cultural impacts on local communities are considered when the target is reviewed.

We have not provided a comment on the technical aspects of the 2050 target as we do not have the expertise to comment.

Subpart 2 – Setting emissions budgets and Subpart 3 – Role of Commission in setting emissions budgets

Regarding clause 5U(3) which sets out the dates for when the budgets are to be set by, the Council supports these as they provide clear direction for achieving the 2050 target. However we have concerns that the first budget is to be set by 2021, and the Council has not yet been consulted on it. Given that the 2021 date is only a few years away, we believe that the Government has some knowledge of what the budget will include, and so they should be undertaking consultation with councils and the public immediately.

In regards to how emission budgets are to be met, the Council supports sections 5W and 5X as they permit the 2050 target being met through domestic emissions reductions and offshore mitigation. This provides flexibility for New Zealand to meet the 2050 target.

We support section 5ZB Revision of emission budgets, because it allows the Commission to recommend amending the emission budgets that have been set, and allows the Minister to make appropriate adjustments to the relevant budgets. This enables changes to be made, for example, where actual emissions vary to estimated emissions, or where significant adverse effects of implementing the Bill are occurring. We do have concerns that clause 5ZB(6)(a) does not clarify what exceptional circumstances are. This provision should be rewritten to provide clarification of what is considered exceptional circumstances. In our view, exceptional circumstances would include significant impacts on particular communities, industries or regions.

We also support section 5ZC Banking and Borrowing of emissions because it provides flexibility to manage the emission budgets.

Subpart 3 - Role of Commission in setting emissions budgets, Emissions reduction Plan to be prepared (sections 5ZD, 5ZE, and 5ZF)

The Council supports in principle the formation of an Emissions reduction plan (the Plan) to provide direction for how the relevant emissions budget will be met.

We support clause 5ZD(3) because we envisage that it will consider impacts on the West Coast. However, we have noted that this clause does not require the consideration of financial support for vulnerable communities where climate change mitigation is going to be significant. As set out in Part C of our submission, climate change mitigation may have significant impacts on West Coast communities. Therefore, we support the Bill being amended to require the consideration of opportunities to provide financial support to vulnerable communities.

We also support clause 5ZE(3) as this requires public consultation to be undertaken when the Commission is preparing its advice on emissions reduction plans. In addition to public consultation we would also like to see this clause amended to require the Plan to go through a submissions process to ensure impacts on the West Coast are appropriately considered.

Subpart 4 – Monitoring (clauses 5ZG, 5ZH, and 5ZI)

The Council supports in principle the Commission monitoring and reporting on the progress being made to meet an emissions budget. However, we have noted that monitoring does not appear to assess the consequences of the emissions budget on local communities and industries. These impacts need to be assessed so they can be considered when setting the next emissions budget. The impacts will also need to be addressed in the Emissions Reduction Plan, National Adaptation Plan, and National Climate Change Risk Assessment. Therefore we suggest amending section 5ZI to require the Commission to undertake public consultation, with information on the impacts of the emission budgets being made available for submitters, allowing informed submissions to be lodged.

Part C: Impacts of the Zero Carbon Bill on the West Coast

As referred to earlier in our submission, we are concerned about the effects on West Coast people and communities from implementing the Bill. In our submission on the Discussion Document last year, we outlined a number of potential adverse social and economic effects on our Region, and we reiterate them here as they need to be given serious consideration when setting targets and budgets, and creating the various plans and reports.

Reduced fossil fuel use:

If Emission Reduction Plan's (ERP) and/or the National Adaptation Plan (NAP) (or the plans) require West Coast communities to reduce or eliminate the use of solid fuel for domestic heating without providing affordable alternatives, then many households will have insufficient heating as they may not be able to afford to heat their homes using other methods, without financial support. Electricity costs for the West Coast are some of the highest in New Zealand. This may cause people to get sick and potentially trigger ongoing health issues for the same people. Local hospitals also use coal fired boilers to heat buildings, triggering additional costs if they have to change to alternative heating forms. These effects need to be considered when writing the ERP and NAP.

Many industries on the West Coast use coal-fired boilers, such as Westland Milk Products, while diesel and petroleum are used to operate machinery in primary industry. If the ERP's and/or the NAP require primary industries to reduce their emissions, the costs of changing to alternative fuels may make it difficult for industries in the region to continue. They may close down causing substantial job losses. This could have flow-on effects to other parts of the economy. Service industries such as machinery and equipment repair and maintenance may close down because they will not have enough work to continue operating. In larger cities and highly developed regions, this transition to technological industries is likely to be smoother and better absorbed, but for the West Coast the effect will be felt sharply.

Resource-based industries:
The West Coast economy is largely made up of resource-based industries such as mining, forestry, and farming. Without appropriate support being included in the ERP's and NAP, many of these industries will be susceptible to ongoing job losses. Fewer people equals less health facilities (and schools), which means more people will need to travel to Christchurch to receive medical care. In the current socio-political climate of job losses in coal mining, and restrictions on the use of public conservation land, there may be considerable local resistance to these plans if they potentially cause job losses in a number of sectors. When drafting these plans, methods will need to be incorporated to support communities and industries at the regional level to avoid the situation where reducing carbon emissions leads to ongoing job losses, and other negative social and economic effects. They will also need to consider whether the technology for reducing emissions can keep pace with emissions targets and budgets, or is financially too expensive.

Electric vehicles:
We accept the need to reduce our reliance on fossil fuelled vehicles and see that there may be opportunities for West Coast business in this sector. However, there will be challenges on the West Coast that may delay the move to fully electric transport. There are currently no trucks, utility vehicles or long range busses on the New Zealand market and this may disadvantage businesses in the tourism and primary sectors, key sectors on the West Coast. Many locals use roads that are not on the main highway network, and will be unable to use full electric cars if there are insufficient recharging stations on local roads. We expect that District Councils will not have the resources to install and maintain substantial numbers of charging stations on local roads. The Council would support the ERP's and the NAP including provisions for the Government to invest in new technology to encourage use of electric vehicles, such as regional charging stations. Given that the average income on the West Coast is below the national average, many residents will have to wait until second hand full electric cars come on the market at an affordable price.

Plant more trees:
The ERP's and the NAP will need to consider the West Coast's limited ability to contribute to reducing carbon levels by planting more exotic or native forests, as there is only 16% of land that is not protected in the conservation estate, and not all of this is productive land. Historically, the region has had a major economic disadvantage when it comes to availability of arable land and has also suffered from a general lack of development due to high rainfall, rugged terrain and boom and bust economic cycles (notorious with industries such as gold mining). Due to the above-mentioned and other complex variables, the region finds itself with 84% of its land area held within the Department of Conservation estate (1,964,141.14 ha).

DOC estate:
A further limit to the planting of more forests on the West Coast are the restrictions on using conservation land, including stewardship land. This is land that was previously Crown forestry land, but was transferred to the conservation estate, despite many areas having little conservation value. Use of a portion of DOC stewardship land for forestry would be an excellent initiative, enabling the West Coast to contribute to the offsetting of carbon. This is an idea that should be considered when writing the plans.

Increase renewable electricity generation:
The Council supports provisions being added into the ERP's and the NAP to enable renewable electricity generation. There are plenty of water resources on the West Coast for micro, small and medium-scale hydro generation. Being able to generate hydroelectricity to supply West Coast communities, and communities outside the region, would have social and economic benefits for local communities. For example, this could help improve job opportunities on the West Coast if job losses occur in other resource based industries, such as coal production. However, many of our water

resources are located on conservation land, and under the current Conservation Minister's approach, use of these resources for renewable hydro electricity generation may be further restricted or prohibited. West Coast communities could bear the cost of increased line charges from having to continue importing electricity to the region, rather than benefitting from reduced prices from increased generation within the region.

If the plans require a move away from using fossil fuels such as coal, then the framework also needs to provide for local renewable electricity generation, and improved transmission and distribution to overcome the negative impacts on West Coast communities.

Limited rating base:
It is worth mentioning that the Council does not receive rates from the DOC estate; limiting the amount of financial support the Council can provide to communities to aid them in reducing their emissions. Therefore the Council supports the Bill being amended to require the consideration of financial assistance when writing ERP's and the NAP.

Conclusion

The Climate Change Response (Zero Carbon) Amendment Bill appears to be well-intentioned, however, the key will be how it is implemented. The Council has concerns about how the Bill is to be implemented as the regulations lack strong requirements to consider social and economic impacts on local communities such as the West Coast, where the effects are likely to be significant. As the Bill currently stands, it will put obligations on individuals, businesses and organisations to change their behaviour and reduce emissions nationally, but the impacts will be felt at the regional and local level, particularly on the West Coast. Therefore we suggest amending the Bill to allow additional requirements for public consultation and submission processes. We also suggest that the Bill is amended to require social and economic impact assessments to be undertaken. These assessments should be made publically available prior to the consultation period for any emissions budget or emissions reduction plan.

THE WEST COAST
REGIONAL COUNCIL

Cover photo
Lake Matheson

State of the Environment

WEST COAST REGION | SUMMARY 2018

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Introduction

The West Coast natural environment is generally in good shape. While our land, water, air, and ecosystems are healthy compared to other parts of the country, there is still plenty of work to be done on improving things, particularly with certain aspects of water quality in some catchments.

The Council is constantly collecting information on the quality of our natural resources. Council monitors groundwater, lakes, rivers, coastal beaches, and air quality across the region at 85 sites. In addition, Council collects a range of environmental data on the quantity of water on the West Coast, including rainfall, river flows, and groundwater levels. We generally focus our monitoring efforts in areas where resource use and pressure is highest.

We are continually improving our monitoring programmes to gain a better understanding of our natural resources and environment. Better data allows us to make more informed decisions when setting appropriate rules and limits on resource use.

In partnership with Poutini Ngāi Tahu, Council facilitates a growing number of community groups who focus on a range of environmental topics. Through these groups we seek to understand community values and encourage the groups to make recommendations to Council for potential non-regulatory or regulatory solutions.

We need to maintain and, where possible, improve the current state of our natural resources. The West Coast Regional Council is committed to leading this work, and with your help, we can improve things together.

We hope this document provides a useful summary for understanding the state of our natural environment and the pressures the West Coast faces. Additional information will be available on the Council website for those wanting more technical detail on water quality, so please visit our website or contact us directly.

Hadley Mills
Planning, Science and Innovation Manager

Mike Meehan
Chief Executive

What we are doing

The West Coast Regional Council is the smallest Regional Council in New Zealand, managing the fifth largest area in the country, yet must deliver the same services and functions as the other regions of New Zealand. Resourcing is therefore one of our biggest challenges. Council prioritises its resource management efforts in areas where the greatest resource pressures occur and in specific areas as directed by Central Government policy.

National resource management policy is currently focusing attention on freshwater quality and subsequently Council continues to expand planning and science capacity in this area.

The National Policy Statement for Freshwater Management (NPSFM) requires Councils to work with communities to understand how they value waterways, and to set goals based on economic, social, cultural, and environmental factors. The NPSFM recognises Te Mana o te Wai and sets out objectives and policies that direct local government to manage water in an integrated and sustainable way. A key requirement of the NPSFM is that the quality of our rivers, lakes, and groundwater must be maintained or improved.

In May 2018, the Council's Resource Management Committee approved the West Coast Regional Council National Policy Statement for Freshwater Management – Regional Implementation Strategy 2018. This document sets out the Councils strategy for implementing the NPSFM and includes a detailed Progressive Implementation Program (PIP), which outlines key milestones for achieving full implementation of the NPSFM by 2030. The strategy has been reviewed by the Ministry for the Environment (MfE), which has resulted in minor adjustments to the PIP. The updated PIP has been publicly available since November 2018. Both the strategy and PIP are available on our website: https://www.wcrc.govt.nz/our-services/resource-management-planning/Pages/Freshwater-Management.aspx

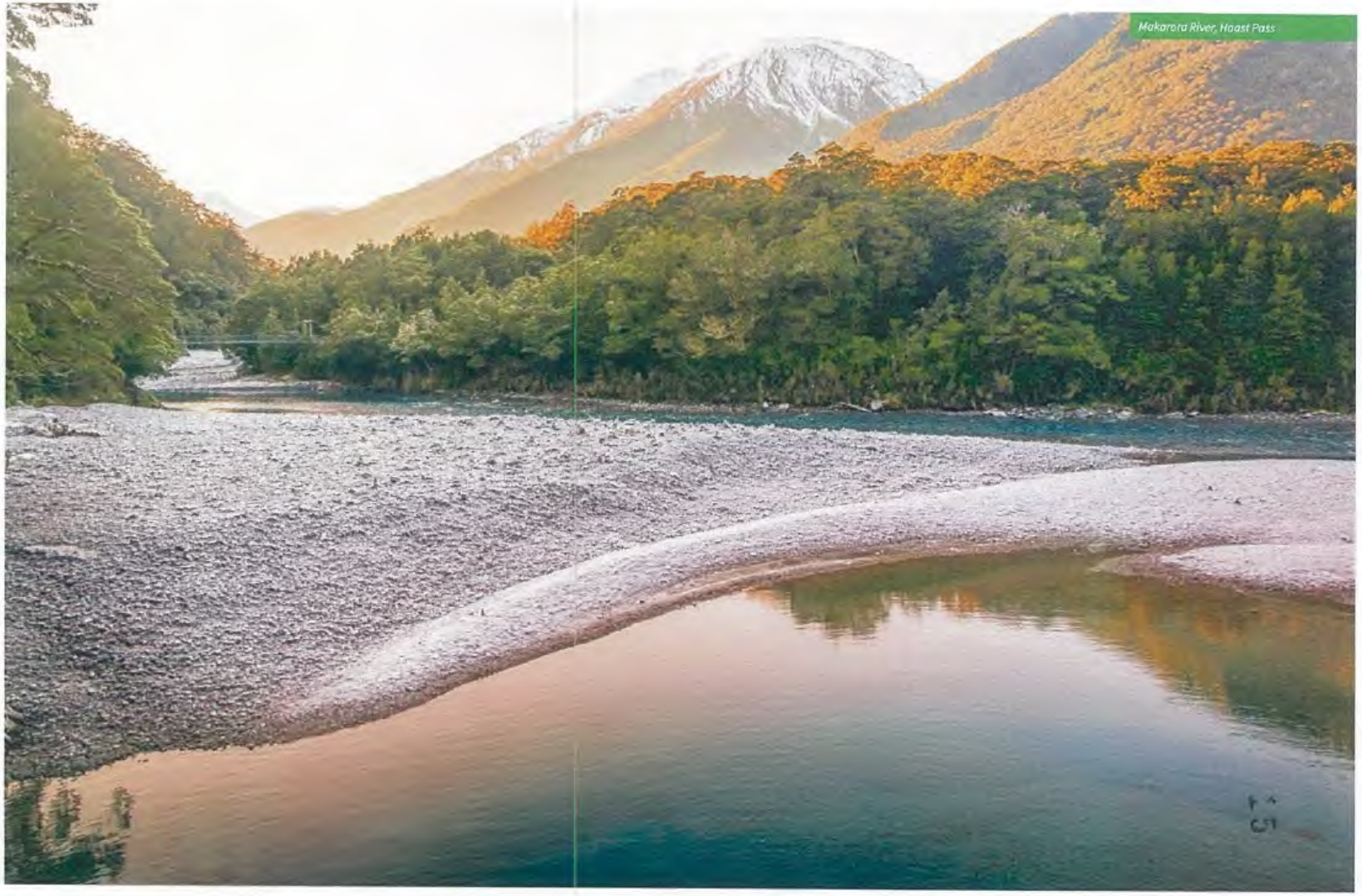
Six Freshwater Management Units (FMUs) have been identified by Council across the West Coast region in order to effectively manage water resources among areas where issues and community values may vary. In partnership with Poutini Ngāi Tahu, Council initiated the first FMU in July 2018 – the Grey FMU, which encompasses the Grey River catchment. The Grey FMU group held their first meeting in October 2018. The remaining five FMU groups will be established over the next few years.

A key purpose for the FMU groups is to represent local community interests within their local catchments. Having locals involved is really important for assisting Council in identifying the community values within their FMU. Each FMU group will make recommendations to Council's Resource Management Committee regarding future plan provisions and work programmes, which in turn will direct water resource management within their FMU.

FMU Groups will operate in partnership with either Te Rūnanga o Ngāti Waewae or Te Rūnanga o Makaawhio to recognise and respect the principles of the Treaty of Waitangi and develop recommendations that consider manawhenua cultural values.

FMU groups are officially appointed by the Council's Resource Management Committee and will include up to eight members from the community who encompass a range of backgrounds and interests that relate to the community' land and water values. The selection process ensures that an adequate cross section of community values are represented and a broad range of perspectives are considered.

There are many areas where Council is working to improve resource quality on the West Coast, and the NPSFM is currently one of our main focus points.



Makarora River, Haast Pass

The West Coast's land cover

The West Coast's land cover profile is characterised by:

A predominance of forest cover (about two thirds of land area), of which most is indigenous forest

A substantial area of grassland and herbaceous vegetation (almost 20% of land area), of which more than half is tussock grassland

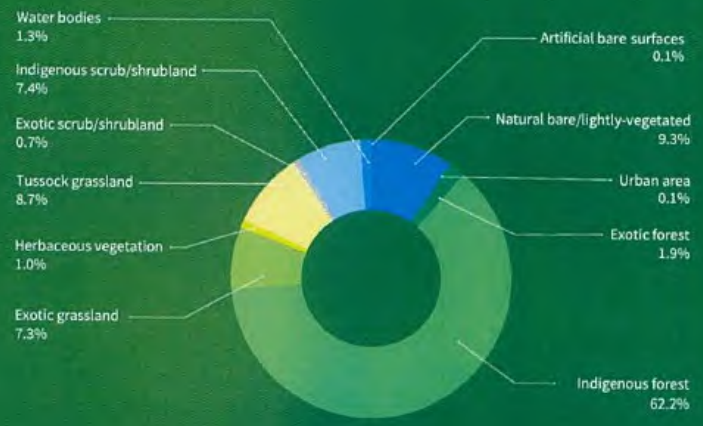
A relatively substantial area of natural bare/ lightly vegetated surfaces (e.g. gravel or rock, permanent snow and ice) (Figure 1)

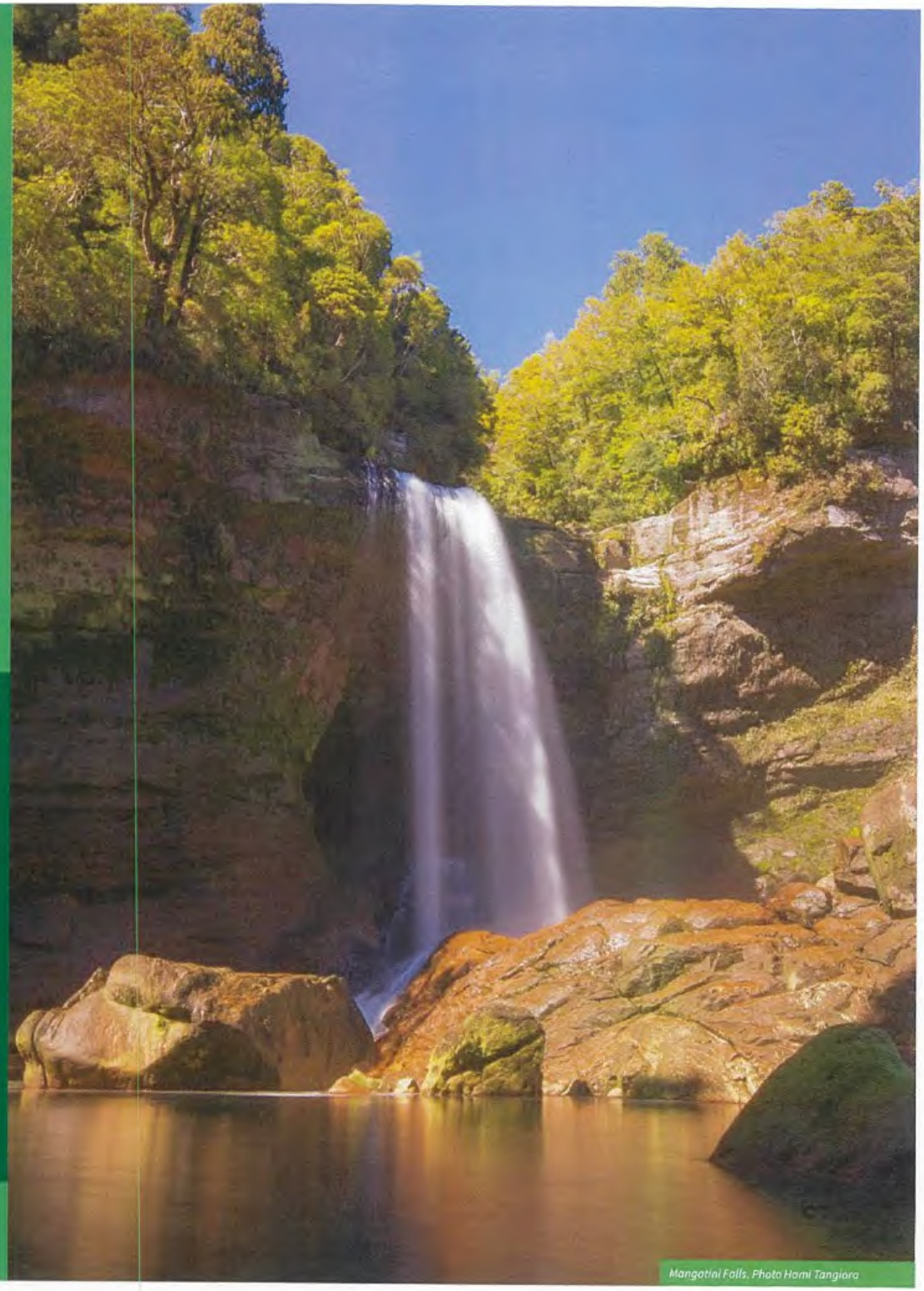
The key changes in land cover between 1996 and 2012 in the West Coast region are:

Native forest and scrub/shrubland (both exotic and indigenous) have decreased in area by 5,300ha and 6,800ha, respectively.

Exotic grassland and exotic forest have increased in area by 10,000ha and 2,700ha, respectively.

Figure 1:
Landcover by percentage cover for the West Coast region as of 2012




Mangatini Falls. Photo Hami Tangiora

Our regions water quality

The West Coast region is renowned for its natural and physical attributes, including its lakes, rivers, and coastal areas. Our water resources provide a range of benefits that support agriculture, industry, tourism, and the health and well-being of people and communities. Reduced water quality increases risks to public health and affects our ability to use freshwater environments for recreational and commercial purposes. Freshwater ecosystems on the West Coast are rich in animal and plant biodiversity and work via complex processes. Modified freshwater environments, and reduced water quality and quantity, have negative consequences for ecosystem health.

Natural factors, such as climate, geology, and topography help determine how human pressures affect the state of water quality and ecosystem health in a particular waterbody. The types of pressures vary, for example, faecal contamination versus nutrients versus sediment discharges, which will impact on a waterbody's values in different ways. Finally, values themselves will differ among waterbodies, for example, popular for swimming versus important whitebait habitat. What this demonstrates is a need to consider the site-specific context of each water body when assessing river quality and health.

The majority (88%) of waterways in the West Coast region drain catchments with indigenous landcover (for example native bush, tussock, ice, and rock). Most of these waterways come from higher altitude headwaters that have good water quality, and which often buffer the impact of contaminants entering downstream. Council maintains ground and surface water quality monitoring programmes for assessing state and trends in a variety of catchment types. Most of these are from the smaller subset of more variable, lowland catchments that are affected by agricultural, industrial, and urban pressures. Trends for the last 10 years, where significant, have been calculated for many water quality attributes. Water quality state is determined over a 5 to 10 year period depending on the method required.

Agricultural landcover and intensity has increased as native forest and shrubland has decreased by the same amount. This may explain some of the increasing trends observed for nitrogen and Escherichia coli (E. coli), especially as most monitoring sites have some agricultural activity in their catchment. Similar to the rest of New Zealand, decreasing ammonia and phosphorus levels might reflect improved handling of point source contaminants and better soil nutrient management. However, this has been offset by an increase in diffuse pollutants. Nitrates have increased in both ground and surface waters, although they are below toxicity thresholds for people and aquatic life. Nitrogen levels in rivers are usually high enough to support prolific algal growth but this is not particularly common due to frequent, high rainfall events and a potential lack of other key nutrients like phosphorus.

Iveagh Bay. Photo Hami Tangiora

DID YOU KNOW...

IRRIGATION ALLOCATION *has increased by* **161% SINCE 2012**

Faecal contamination and swimmability is currently a hot topic in New Zealand. Faecal contamination and pathogen risk, as indicated by (E. coli) levels in ground and surface waters, is an ongoing issue for West Coast water quality.

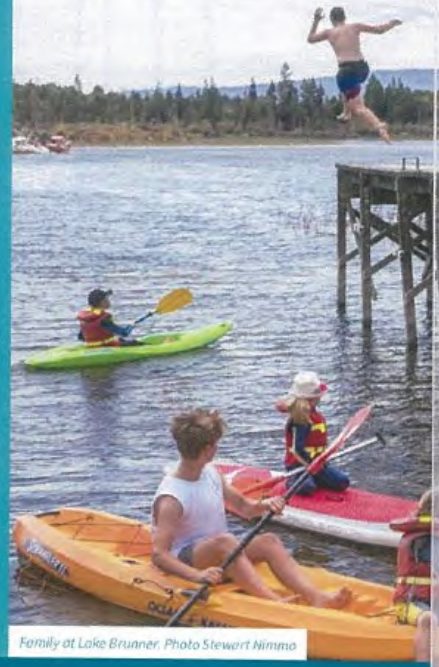
Despite the West Coast's predominantly cool, wet climate, the occasional hot, dry period can drive up temperatures in intrinsically vulnerable streams where stress on the aquatic animals is likely. Intrinsic factors that make waterways susceptible to warming include: smaller size, lower altitude catchments, brown water colouration, warm and dry summer microclimates, and a lack of recharge sources. Warmer waterways tend to be inland and to the north of the region. Dissolved oxygen is important for all aquatic animals. It is influenced by intrinsic factors like temperature, turbulence, and aquatic plant biomass. Significantly low dissolved oxygen was recorded at 10% of Councils monitoring sites. The majority of aquatic animals living in streams are freshwater invertebrates, which include organisms such as crustaceans, molluscs, worms, and freshwater insects. Invertebrates perform important ecosystem functions and become food for fish, birds, and people. They are affected by impacts on water and habitat quality, therefore they are useful indicators of stream health. Invertebrate communities indicative of poor water quality were encountered at 13% of sites, with another 18% having fair quality but typical of moderate impacts from pollution.

E. coli

Water contaminated with faeces from warm blooded animals can be a risk for people and stock that are drinking or coming into contact with it. The presence of E. coli in water indicates contamination from faecal matter. Concentrations of E. coli are used to estimate the risk of disease causing organisms like campylobacter.

From November to March, Council monitors E. coli and Enteroccocci at rivers, lakes, and coastal beaches used for swimming. Council applies criteria from the Ministry for the Environments (MfE) microbiological water quality guidelines for marine and freshwater recreational areas to this data. Rivers were more frequently unsuitable for swimming, particularly during, and shortly after, rain events (Figure 2).

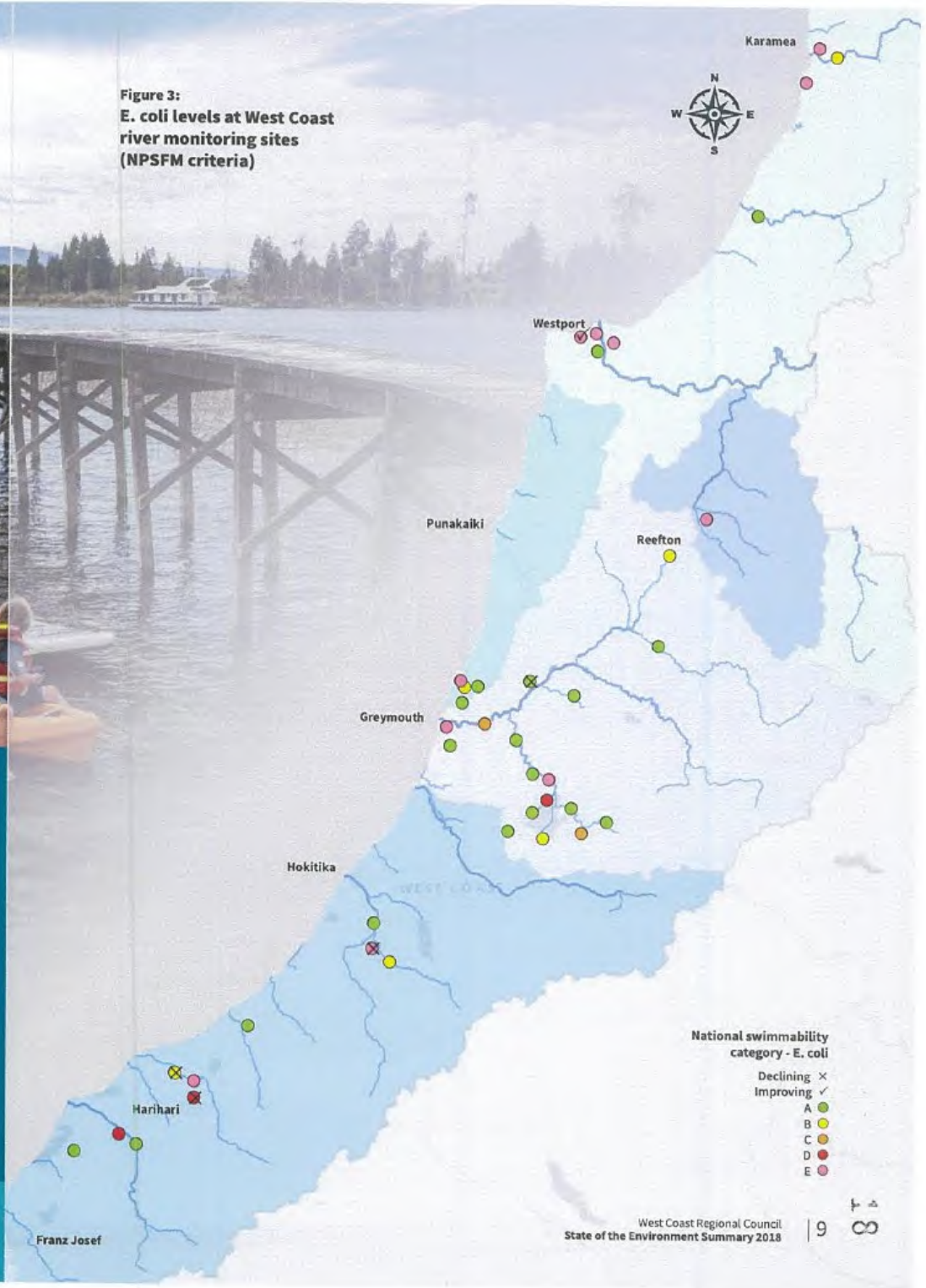
The Council also measures E. coli in all its monitored rivers, and during summer at a range of swimming locations. Two thirds of river sites monitored year round met the National Policy Statement for Freshwater Management (NPSFM) annual criteria for swimmability, being above the bottom line (a D or E grade) (Figure 3). Few sites have displayed strong trends in E. coli over the last ten years, with 10% of them declining and 3% of them improving.



Family at Lake Brunner. Photo Stewart Nimmo

Figure 2:
Swimming suitability on the West Coast based on MfE single sample microbial guideline criteria for freshwater and marine swimming areas

Figure 3:
E. coli levels at West Coast river monitoring sites (NPSFM criteria)



Water clarity and turbidity

Fine particles, like suspended silts, reduce clarity and make water more turbid. There are also dissolved substances that reduce clarity, some of which occur naturally, for example, the brown 'tea staining' seen in many West Coast forest streams. Elevated suspended sediment is the main cause for poorer clarity and turbidity, and is generated by any activity that involves land disturbance. Associated problems include diminished amenity value and impacts on stream ecology from reduced vision, light, and streambed smothering.

The majority of West Coast river monitoring sites have human activity within their catchments and approximately half had clarity and turbidity similar to that found in pristine streams around New Zealand. Two thirds of these had visibility suitable for safe contact recreation (Figure 4). The remaining 20-30% had clarity and turbidity that would have affected safe swimming and water sports. A subset of these, approximately 5%, were likely to have had reduced ecological health as a result of sediment loads.

Changes in turbidity and clarity over time can relate to quite specific activities, particularly in smaller catchments, for example, development associated with individual farms and mines. Statistically significant deterioration was measured at 16% of sites, while 6% showed improvement.

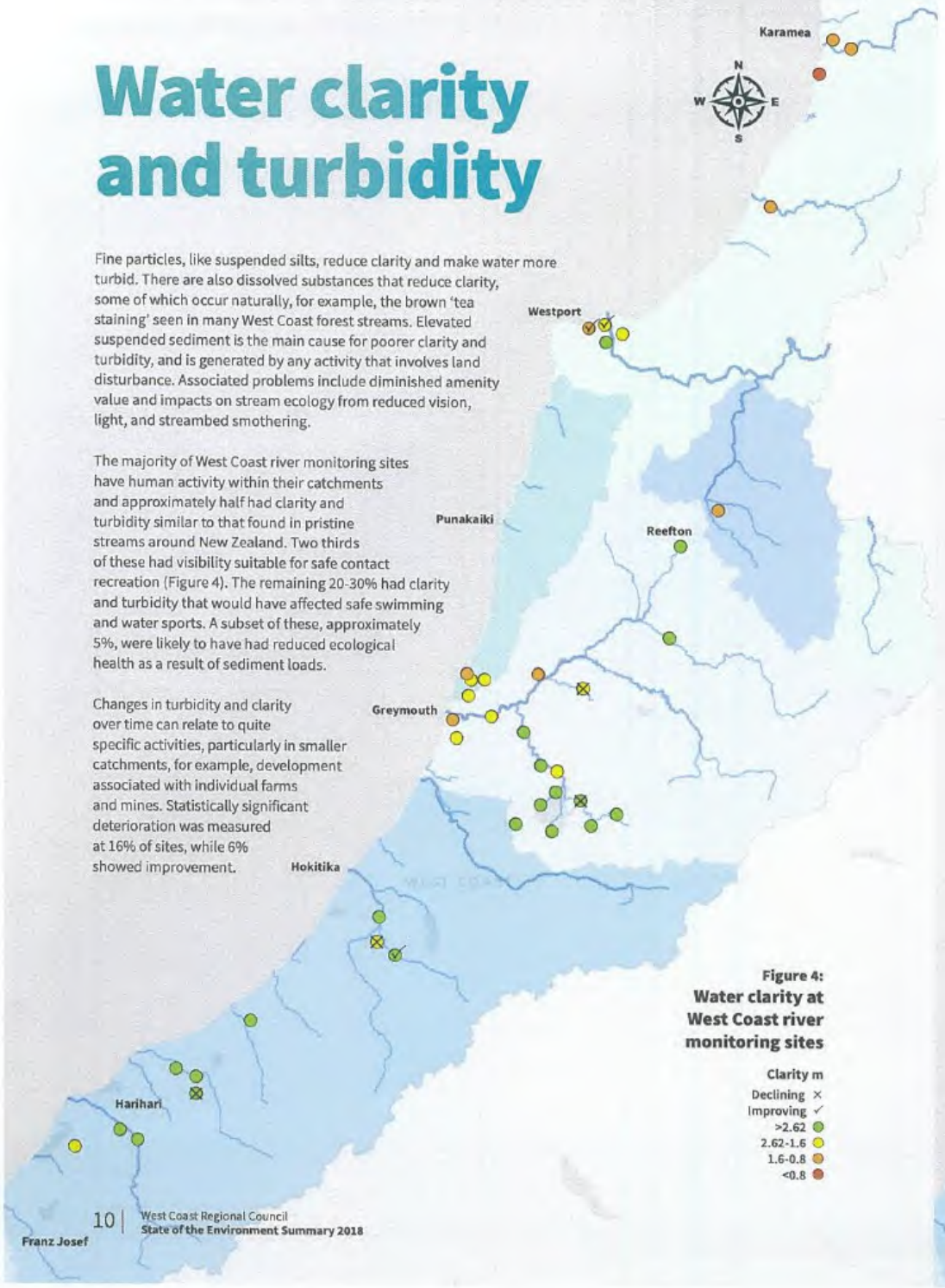


Figure 4: Water clarity at West Coast river monitoring sites

Nitrogen

Nitrogen is an essential nutrient required for plant growth. Total nitrogen consists of all nitrogen forms found in waterways. Nitrate and ammonia are highly soluble components of total nitrogen and are readily used by plants and algae to help them grow. They can leach from land to rivers, particularly when conditions are wet. Too much nitrogen can cause excessive algal growth or be toxic. In agricultural catchments, nitrate generally comes from nitrogen fertilizer and livestock urine, while ammonia comes more from point-sources such as discharges from sewerage treatment plants, farm dairy effluent, and industrial operations.

Ammonia levels improved at 38% of West Coast monitoring sites, which might indicate improvements in the way discharges have been managed. Ammonia and nitrate levels tended to be between low and moderate in most West Coast waterways, with no toxic levels of either measured among routine monitoring sites (Figure 5). Most waterways with human activity in their catchments had dissolved nitrogen levels sufficient for prolific algal growth, but other factors are required before this will occur, including stable weather patterns, light, and sufficient phosphorus. Various forms of nitrogen have increased in around a third of West Coast waterways affected by urban and agricultural activity, most likely in response to an intensification of these activities.

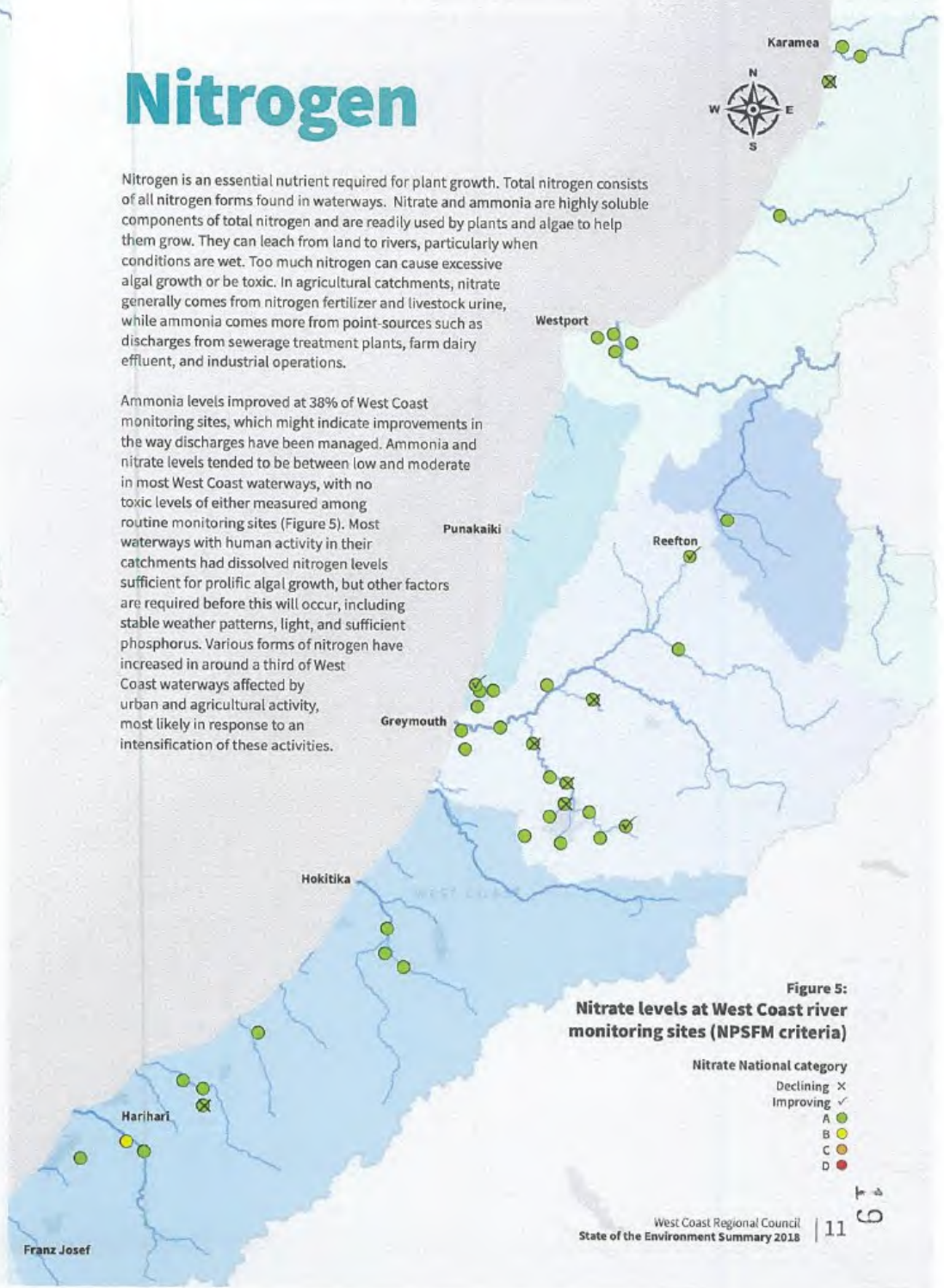


Figure 5: Nitrate levels at West Coast river monitoring sites (NPSFM criteria)

Phosphorus

Phosphorus is an essential nutrient for plants and is a natural component of healthy rivers. Agricultural and urban land use can add more phosphorus to waterways, which may cause excessive algal growth having a negative effect on river habitats. Council monitors the state and trends for both total phosphorus and dissolved reactive phosphorus. Dissolved reactive phosphorus (DRP) is the form of phosphorus immediately available to support plant and algae growth.

A threshold of 0.01 mg/L has been used to indicate whether DRP might contribute to nuisance algal growth in a river (Figure 6). The number of sites that exceeded this more than half of the time was 10%.

Phosphorus levels improved at a third of monitoring sites, declining at 7% of them. Improved stock and nutrient management, and greater use of phosphorus by algae as a result of increased nitrogen and algae, may be responsible for decreasing phosphorus levels.

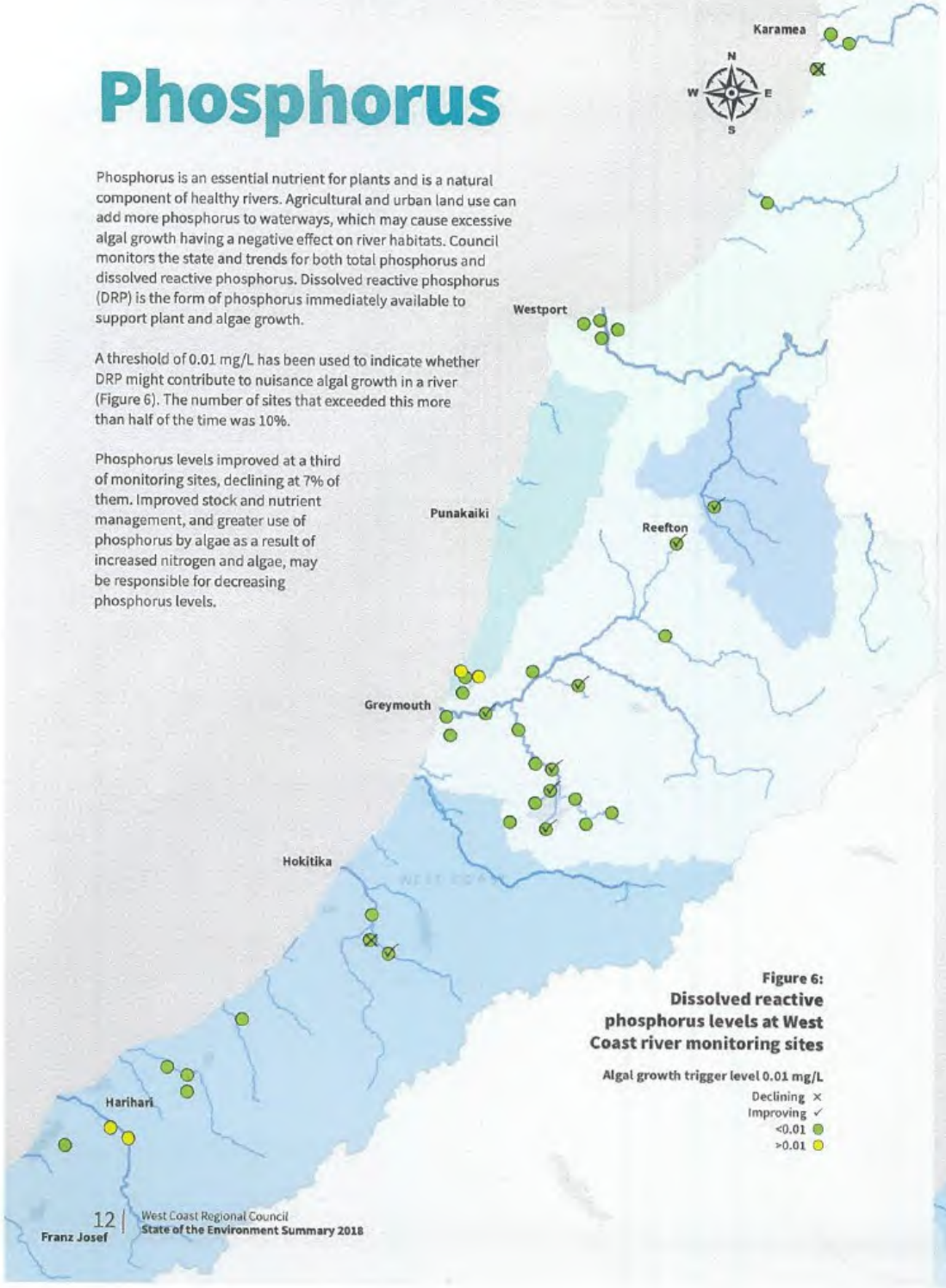


Figure 6: Dissolved reactive phosphorus levels at West Coast river monitoring sites

Invertebrates and periphyton

Freshwater invertebrates include organisms such as crustaceans, molluscs, worms, and freshwater insects. Invertebrates perform important ecosystem services, become food for native fish and birds, and some become food for people. They are affected by impacts on water and habitat quality, therefore they are useful indicators of stream health. Invertebrate communities indicative of poor water quality were found at 13% of sites, with another 18% having fair quality but typical of moderate impacts on water quality (Figure 7).

Periphyton is the algae growing on the bed of streams and it plays a key role by turning dissolved nutrients into nutritious food for invertebrates that are themselves food for fish and birds. However, too much periphyton can cause problems. Periphyton blooms (thick slimy mats or long filamentous growths that cover much of the streambed), can make a stream unsuitable for water sports and reduce biodiversity by making the streambed habitat unsuitable for many sensitive invertebrate species. Periphyton blooms are most likely to occur during periods of long, dry summer weather. Significant blooms have not been common on the West Coast, possibly due to the wet climate. No measured periphyton abundances were likely to be below the National Policy Statement for Freshwater Management (NPSFM) national bottom line.

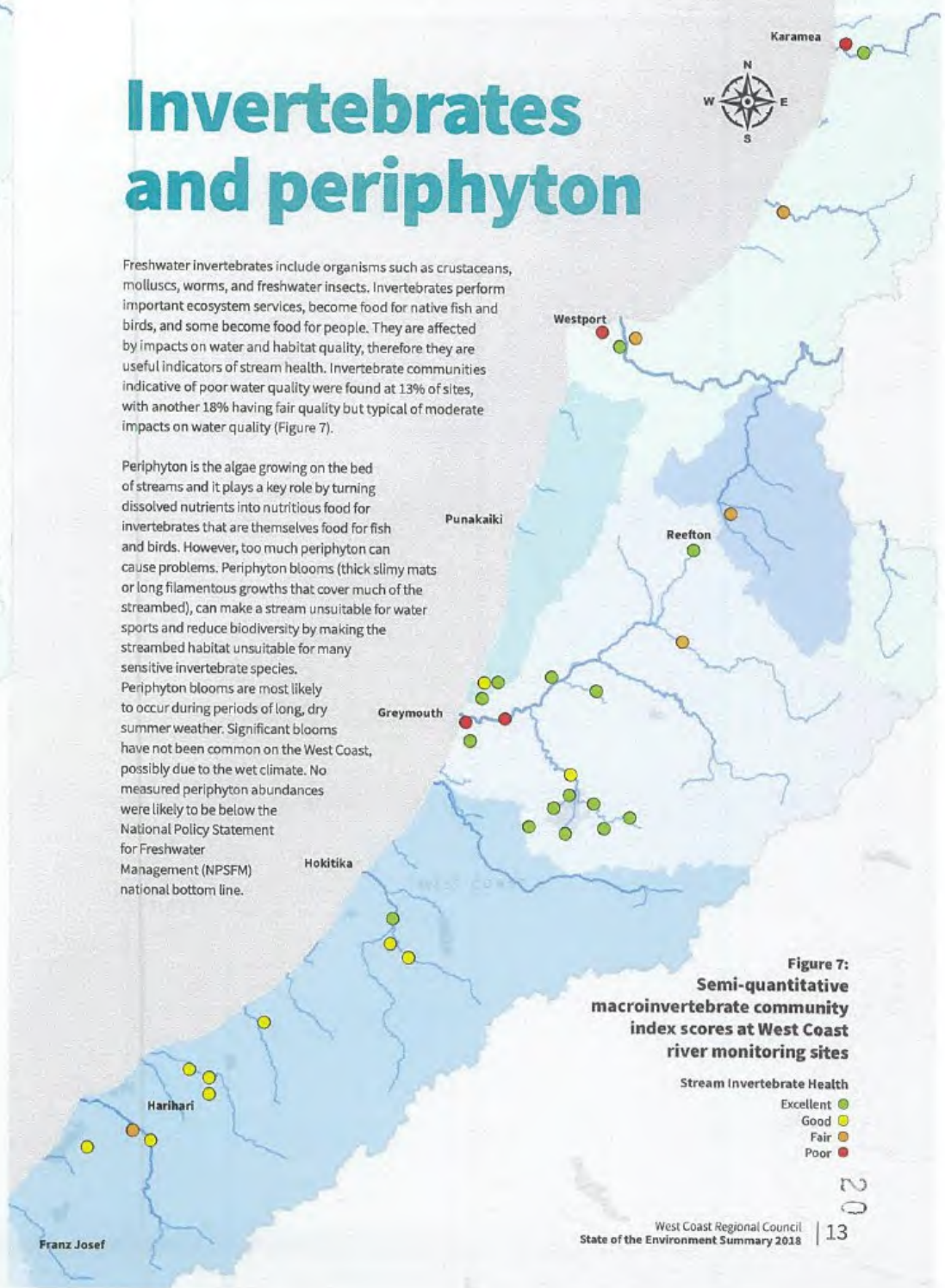


Figure 7: Semi-quantitative macroinvertebrate community index scores at West Coast river monitoring sites

Water temperature and dissolved oxygen

Aquatic fauna experience stress from high water temperatures. Temperature also affects water composition including the solubility of oxygen and toxicity of ammonia. While late December has the longest and strongest sunlight, peak stream temperatures on the West Coast can occur from late November through March depending on weather patterns. Intrinsic factors that make waterways susceptible to warming include: smaller size, lower altitude catchments, brown water colouration, warm and dry summer microclimates, and a lack of recharge sources. Temperature has been continuously measured at 31 sites, 33% of which have experienced periodic summer temperatures high enough to cause significant thermal stress to a range of organisms. Of these sites, 62% have periodically had temperatures sufficient to affect sensitive species (Figure 9).

Dissolved oxygen has been measured continuously at 24 sites over several summers. Reduced oxygen impairs the growth of aquatic organisms and very low oxygen levels will kill them. Consequently, dissolved oxygen concentrations are critical to stream ecosystem health. Poor oxygen levels often occur when there are: high temperatures, low water turbulence, and an abundance of plants or algae (plants use oxygen at night). A total of 8% of sites experienced significantly low dissolved oxygen concentrations (Figure 8). While some streams are naturally disadvantaged, increasing riparian shade and reducing nutrients will be beneficial. Trends have not been evaluated for temperature or oxygen.

Figure 8:
Dissolved oxygen levels in some West Coast Rivers

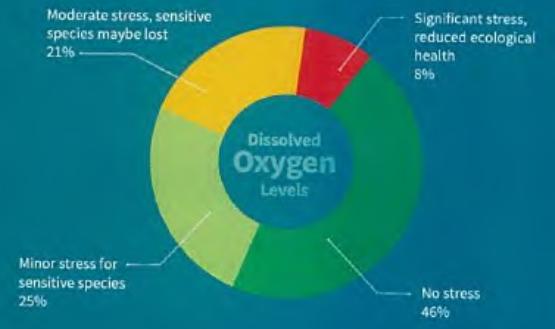
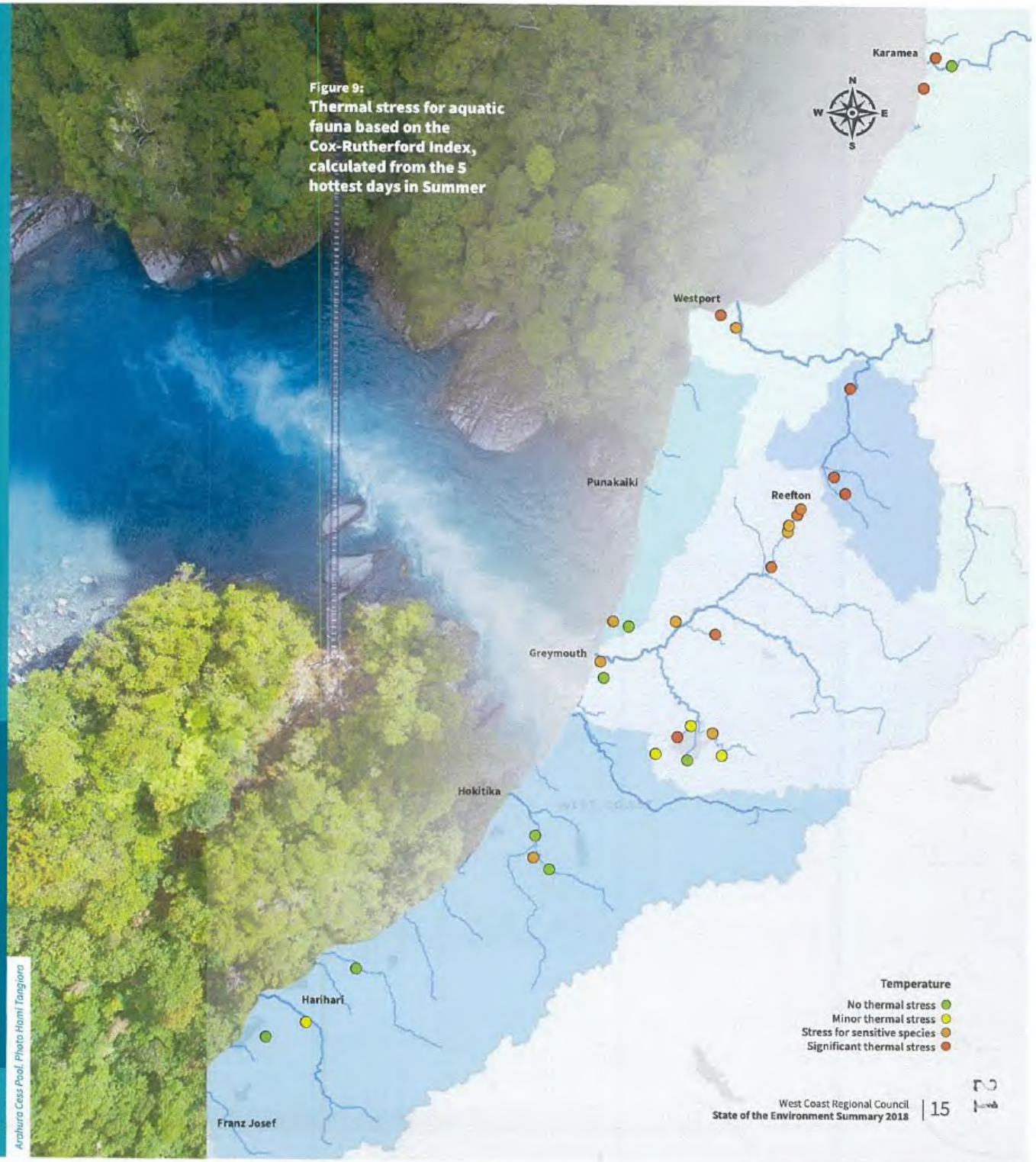


Figure 9:
Thermal stress for aquatic fauna based on the Cox-Rutherford Index, calculated from the 5 hottest days in Summer



Arahura Cess Pool. Photo Hami Tangioro

Lake Brunner

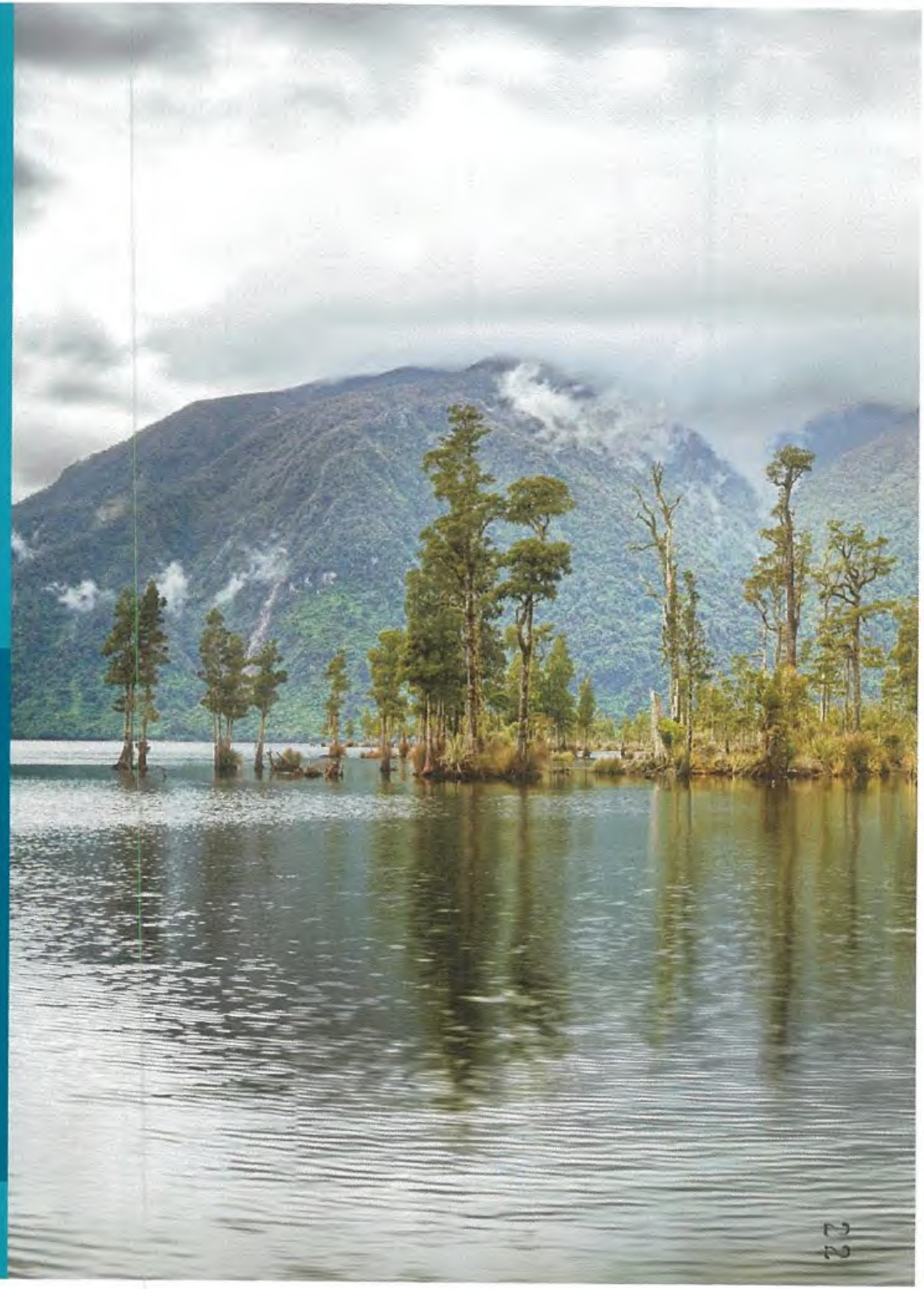
Lake Brunner is an oligotrophic (low nutrient) lake that is a popular recreational destination for people within and beyond the region. The lake has been monitored by Council since the 1990's and a comprehensive data record has been created – one which Council continues to build on. Nutrient increases observed since the 1990's have caused Council to intensify monitoring, and have led to improved environmental mitigations among the farming community. An increase in nutrients can lead to levels of algal growth that could threaten the lakes health.

Central government policy ascribes A to D attribute states for important lake attributes. Of these, total phosphorus, ammonia, and chlorophyll were in the best category of "A". Total nitrogen was a "B". Higher lake nitrogen relative to phosphorus and chlorophyll could be due to elevated nitrogen leaching as a result of the cool, wet climate.

Lake algal growth is primarily limited by the availability of phosphorus. Currently, oxygen at the bottom of the lake remains high enough to avoid undesirable cycles of phosphorus release from the lake bed. In the last ten years phosphorus levels have improved in two of the lakes main tributaries, and deteriorated in none. Trends are regularly assessed for lake water quality attributes and despite a significant increase in dissolved forms of nitrogen, clarity and algal levels have improved between 2001 and 2018.

The Trophic Level Index (TLI) is a key measure used by Council to assess the health of Lake Brunner. Council has a target TLI threshold in its Land & Water Plan, which is currently being met (Figure 10). Lower TLI scores indicate better water quality. In New Zealand, lakes with TLI scores between 2–3 have low levels of nutrients and algae.

Figure 10:
Trophic Level Index for Lake Brunner



Water quantity at a glance

Hydroelectric power is the largest water user in the region

2012-2017 was generally a period of lower summer flow conditions and less than average rainfall

On the back of drier years and reduced summer flows, demand for water for irrigation has increased significantly since 2012

The Grey River catchment has the largest amount of consented water takes in the region

Managing water use and values

The West Coast is the wettest part of New Zealand with annual rainfall amounts between 1,745mm - 11,228mm recorded across the region (Figure 19). Across the region there is generally very little pressure on water resources with only small percentages of the mean annual low flow allocated. The main areas where higher amounts of water are allocated are the driest parts of the region: the top of the Northern Grey River catchment (Mawheraiti, Stony, and Rough), Inangahua, and Waimangaroa Catchments. The lowest flows generally occur during summer (December-February), with the exception of the alpine/glacier sourced catchments (such as Hokitika, Whataroa, and Haast Rivers) where winter flows are the lowest (June-August).

Where significant amounts of surface water are taken the following impacts can occur:

- Changes in flow characteristics (e.g. flow is very low for longer)
- Reduced dissolved oxygen/increased water temperatures
- Increased nuisance algae
- Changes in flow suitability for fish and insects
- Reduced reliability of supply for existing takes.

Where significant amounts of ground water are taken the following impacts can occur:

- Reduction of flow of nearby surface water
- Lowering of groundwater levels of existing bores.

There have been no significant impacts, as a result of over allocation, identified across the region. As water demand increases, the Councils Planning and Science teams will work with the community to identify values, determine allocation amounts, and set flow limits across the region.

Regional water usage

Demand for water has increased across the region, with water being used for irrigation, drinking, stock water, industry, and hydroelectric power generation (Figures 11 and 12). There is currently 2,508 million m³/year of water allocated (groundwater and surface water). Hydroelectric power generation is the largest user of water with 1,792 million m³/year allocated, or 87 % of all allocated water. The majority of takes are located between the Hokitika and Karamea River catchments (the top half of the region), with the largest concentration of takes in the Grey River catchment (Figure 15).

Figure 11:
West Coast consented consumptive water takes by use type

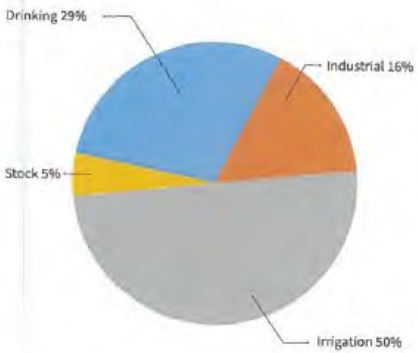
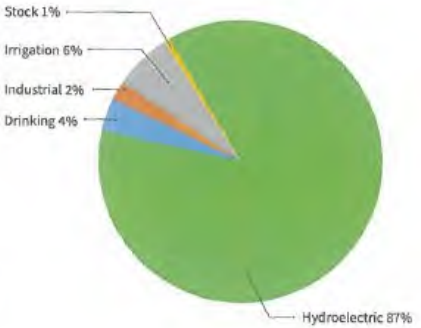


Figure 12:
West Coast consented water takes by use



Drinking Industrial Irrigation Stock Hydroelectric

Demands for irrigation, drinking water, and industrial water use has steadily increased. The current combined annual allocation of 274.5 million m³/year is a 92% increase on that measured in 2012 (Figure 13). Surface water makes up the largest amount of allocated water at 66%. Demand for groundwater has steadily risen with groundwater allocations increasing by 117% since 2012 (Figure 14). Currently, irrigation makes up 6% of all water allocated (Figure 12), and 50% of all water when hydroelectric use is excluded from analysis (Figure 11). Growth in demand for irrigation has been significant. There is currently 137.3 million m³/year allocated for irrigation, an increase of 161% since 2012 (Figure 14).

Figure 13:
Changes in consented water takes (1997-2017)

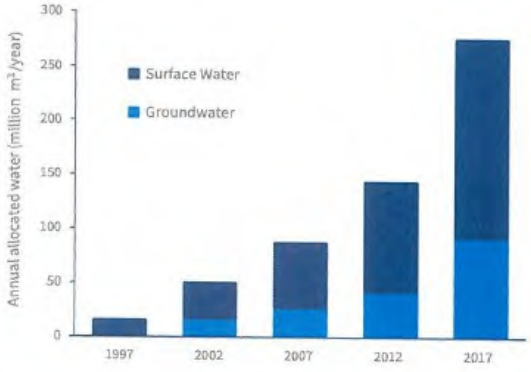
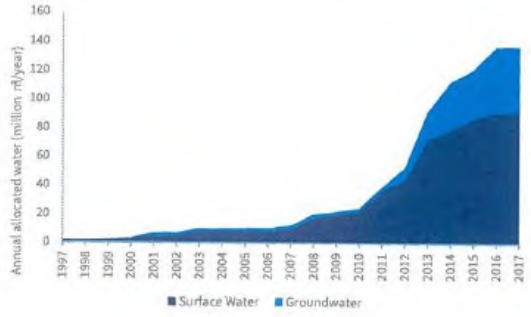


Figure 14:
Cumulative irrigation allocation over time

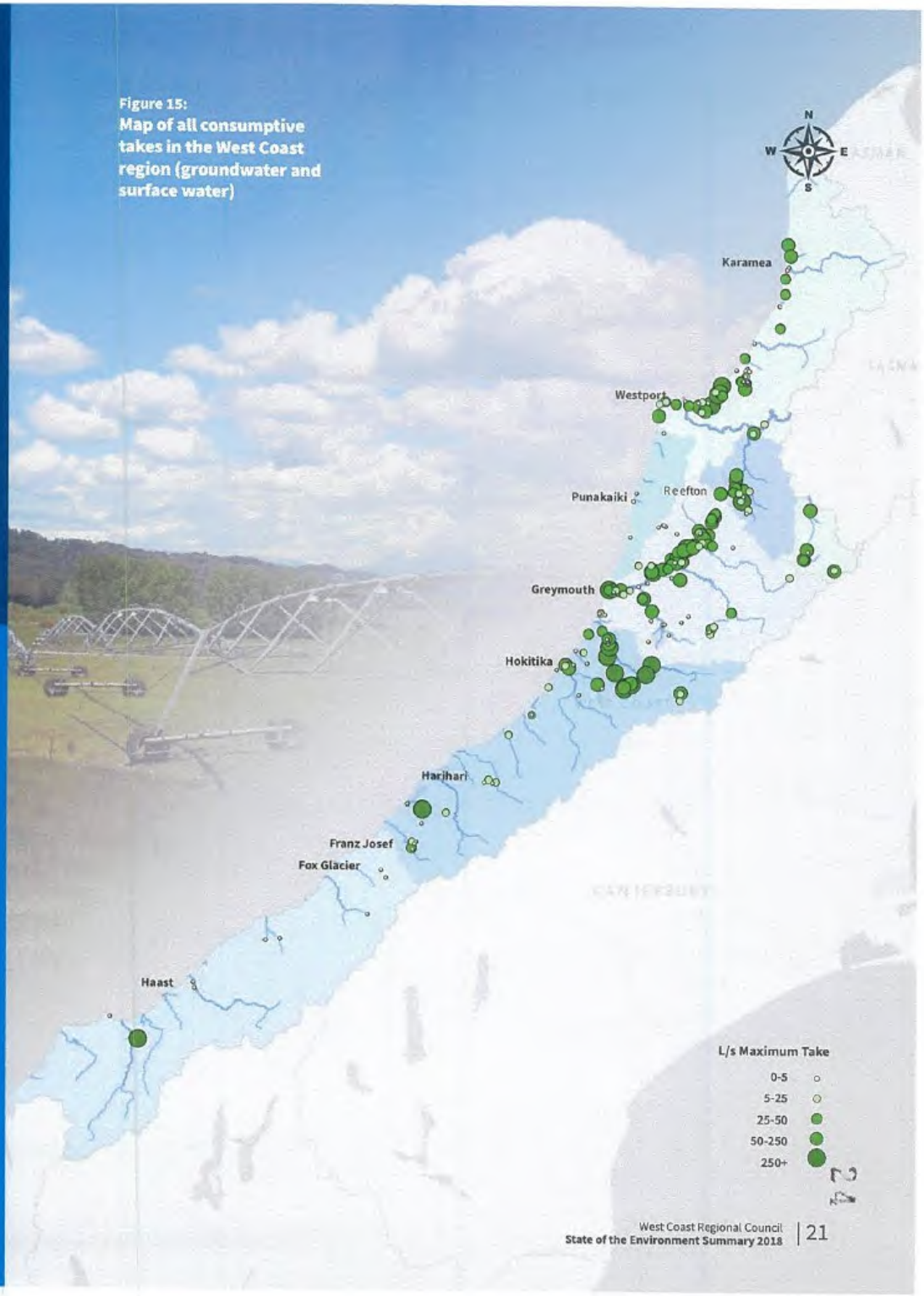


DID YOU KNOW...

The demand for **GROUND WATER** *has more than* **DOUBLED SINCE 2012**

HYDROELECTRIC POWER *is the largest consented user of water in the region with* **1,963 OLYMPIC SWIMMING POOLS OF WATER USED PER DAY**

Figure 15:
Map of all consumptive takes in the West Coast region (groundwater and surface water)



Monitoring our water quantity

Council operates a network of flow and rainfall recorders across the region (Figure 16). This network is used for flood warning, consenting, water allocation, and limit setting. Some of the flow recorders have been recording data for 55 years.

The current monitoring program consists of:

- 20 rainfall sites
- 14 flow sites
- 16 water level sites
- 22 manual groundwater level sites

Figure 16:
Current WCRC continuous hydrometric network

Flow summary
for the 2012-2017 period

Summer river flows over the 2012-2017 period have been generally average to below average (Figure 17). Individual years where summer flows were at or below average across the region were 2011/12 and 2014/15. The summer of 2016/17 was wetter than average and had significantly higher than average summer river flows (Figure 17).

Figure 17:
Regional river flow summary – 2012-2017 percentage of long-term average summer river flows

Table 1: Summary of flow statistics across region

Site	7 day mean annual low flow (m^3/s)	Mean flow (m^3/s)	Maximum recorded flow (m^3/s)	2012-2017 Maximum recorded flow (m^3/s)	2012-2017 Maximum recorded flow (Date)	2012-2017 Maximum recorded flow (Return period)
Ahaura River at Gorge	26.45	99.77	3,972.06	2,555.66	19/01/2017 6:45	15.9
Arnold River at Moana	23.57	59.58	343.00	259.29	20/06/2015 2:40	6.6
Buller River at Te Kuha	105.85	428.20	8,497.83	7,980.36	15/07/2012 10:15	25.8
Buller River at Woolfs	75.62	258.98	5,044.05	4,187.17	15/07/2012 15:00	13.7
Butchers Ck at L Kaniere Rd	0.013	0.323	54.86	53.68	18/06/2015 20:30	38.2
Grey River at Dobson	91.15	357.80	5,951.11	5,304.54	19/01/2017 11:10	12.4
Grey River at Waipuna	14.73	57.38	2,074.65	1,546.28	19/01/2017 5:40	20.9
Haast River at Roaring Billy	43.85	190.01	6,325.88	4,889.08	2/01/2013 5:45	6.6
Hokitika River at Gorge	23.90	99.99	3,070.25	3,037.22	2/01/2013 9:15	44.3
Inangahua River at Landing	12.99	73.95	2,759.55	2,109.48	11/09/2013 11:45	9.3
Ivory Lake at Ivory Glacier	3.73	0.74	37.56	19.93	2/01/2013 8:20	1.8
Karamea River at Gorge	25.80	121.97	3,279.75	3,279.75	14/10/2013 21:15	22.8
Mokihinui River at Welcome Bay	13.95	90.31	2,874.92	2,405.27	14/10/2013 19:45	10.5
Whataroa River at SH6	25.38	128.17	4,006.53	3,964.28	2/01/2013 7:00	14.9

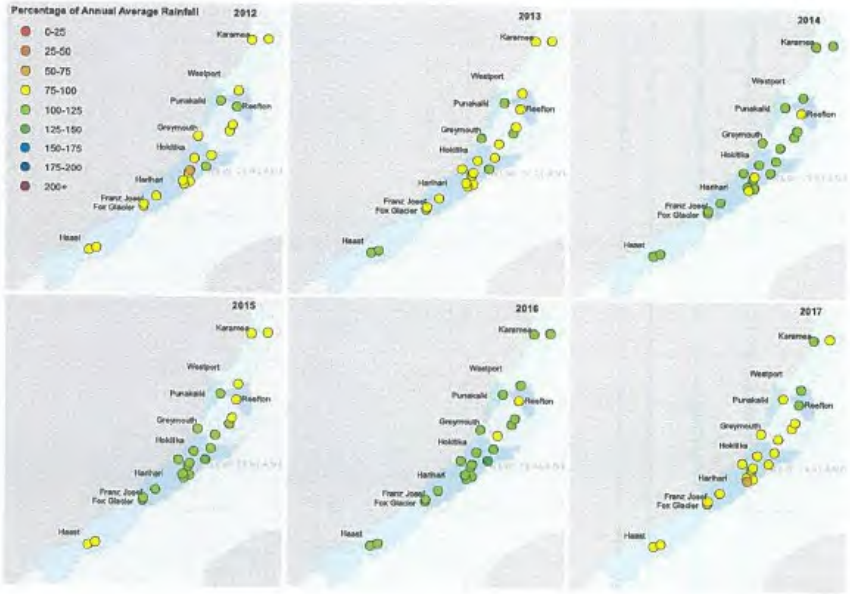
Kohaihai River. Photo Hami Tangiora

Rainfall summary
for 2012-2017 period

The West Coast is the wettest region in New Zealand with average rainfall totals of between 1,746mm and 11,228mm of rainfall per year (Figure 18). Annual rainfall is generally higher in the mid to southern region, particular in the mountains. The Cropp rain recorder, located in the headwaters of the Hokitika River, has measured New Zealand's highest rainfall with 11,228mm in one year.

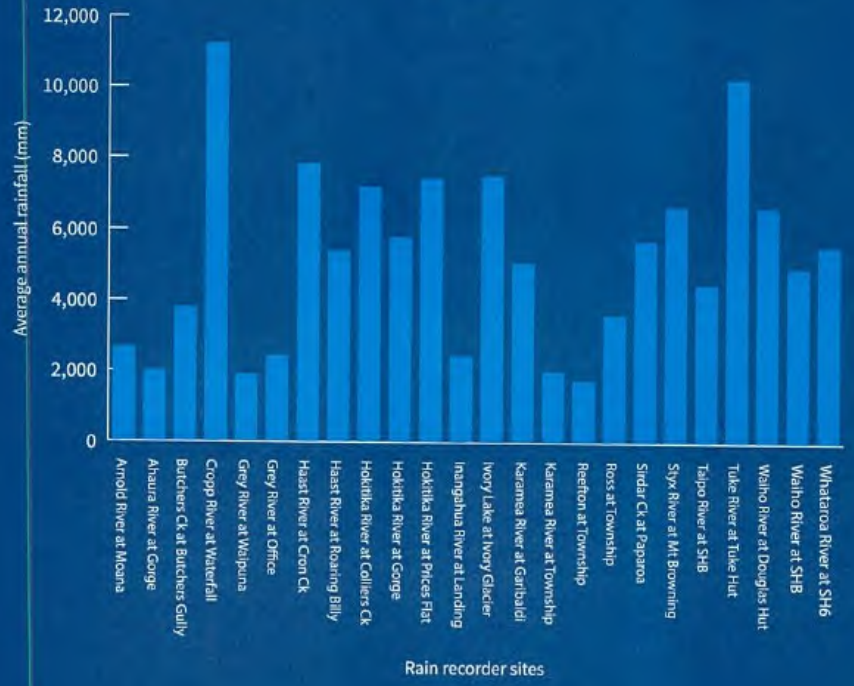
Most rain recorders measured lower than average rainfall in 2012, 2013 and 2017 (Figure 18). Rainfall was around average or slightly above for 2014, 2015, and 2016.

Figure 18:
2012-2017 graphs of annual average rainfall percentage compared to long-term annual average rainfall



Leaving the Garibaldi rain gauge site. Photo Karamea Heli Charter.

Figure 19:
Annual rainfall averages across region



Groundwater quality

Groundwater is an important source of drinking water, irrigation water, and a major contributor to surface water flows. The Council monitors a broad range of physical and chemical attributes at a number of wells across the region. This is so Council can track state and trends in groundwater quality.

High nitrate levels are undesirable in drinking water. Nitrate concentrations have increased slightly since 2007 but this increase was only significant at a few sites (Figure 20). West Coast groundwater's remain relatively dilute overall, and exceedances of the NZ Drinking Water Standards maximum allowable limit for nitrate (11.3 mg/L), are rare.

Microbial contamination can be an issue for potable groundwater. E. coli is commonly used as an indicator of pathogen risk. The NZ Drinking Water Standard for E. coli is stringent, requiring there to be no E. coli in the sample (<1 E. coli/100 ml). Of the monitored wells that were used for human consumption, 62% had E. coli detected on average 47% of the time. While often above the guideline, E. coli levels were normally low with an overall average of 2.6 E. coli/100 ml, and a median of <1 E. coli/100ml. Likely causes of contamination were inadequate wellhead protection or the bore being located in close proximity to a potential contaminant source.

While not toxic, high levels of naturally occurring iron can be a nuisance in groundwater used for domestic purposes.

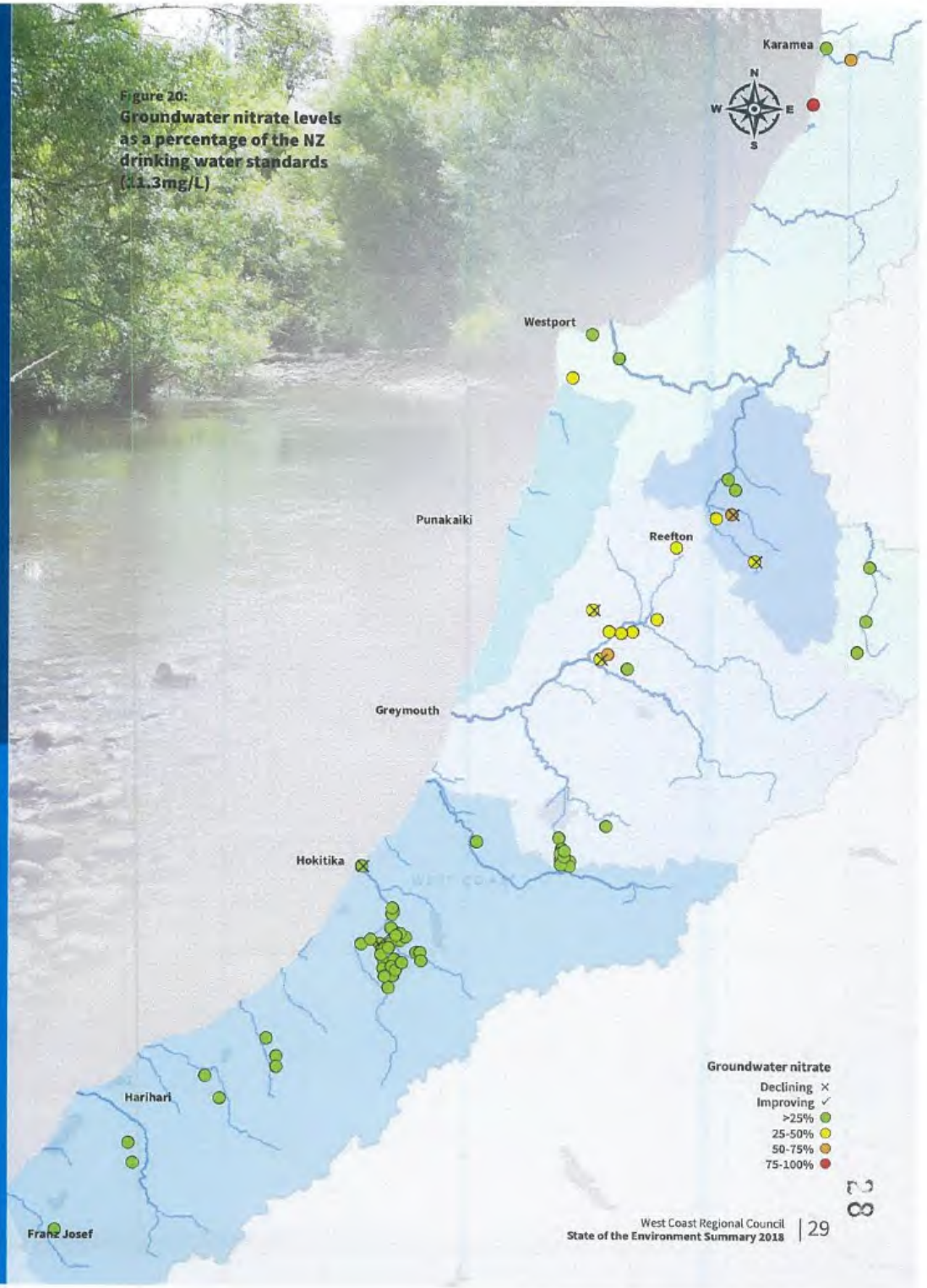
How old is West Coast Groundwater? Of the few studies undertaken on the Coast, times have varied between 2 to 50 years. The majority of water in a river after a few fine days is groundwater, so the age is relevant for how long it takes for contaminants, like nitrates, to move from the land into streams.

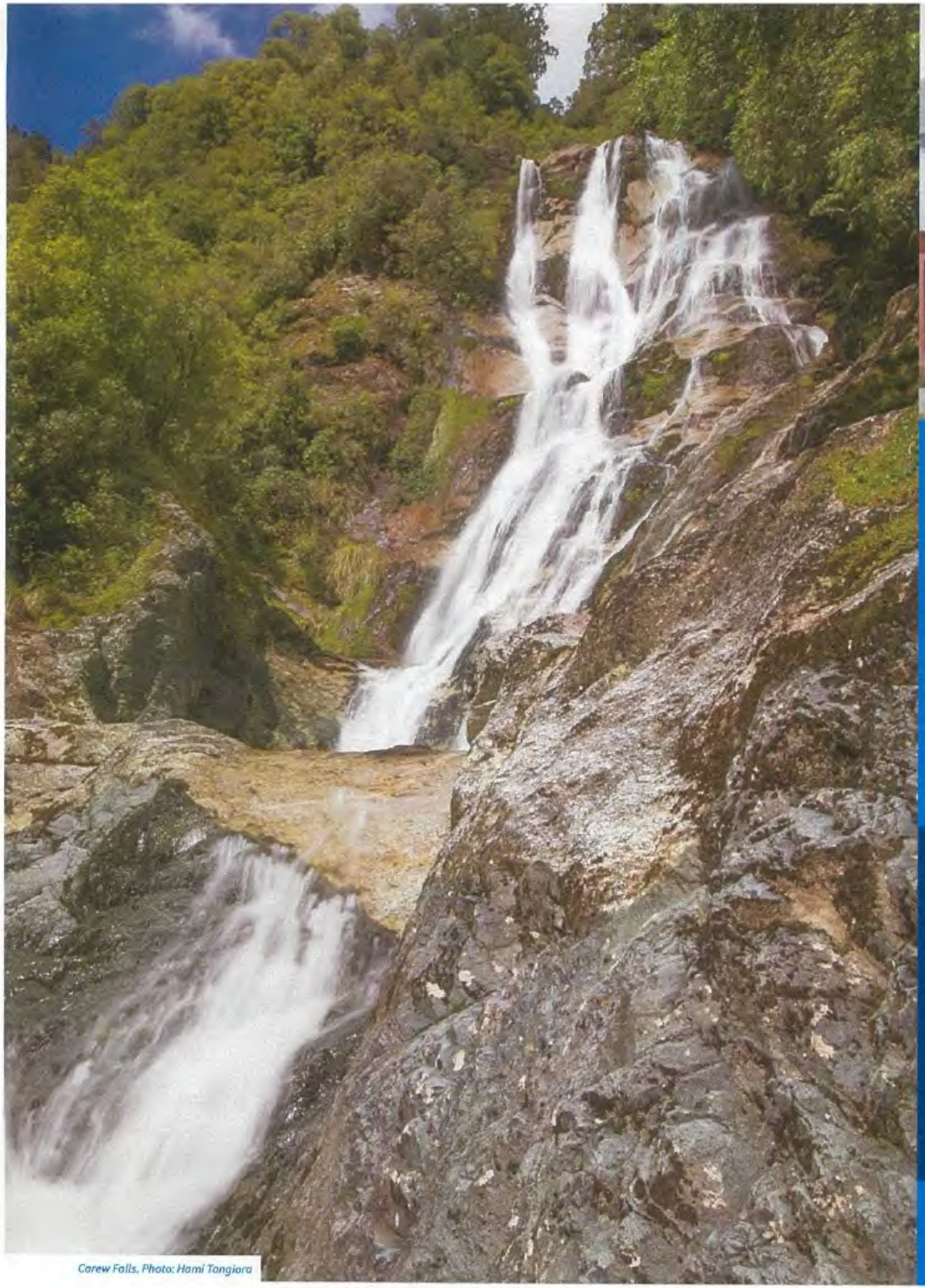
93% OF *groundwater bores passed* **NITRATE DRINKING WATER STANDARDS 92% OF THE TIME**

86% OF *groundwater bores passed* **IRON AESTHETIC DRINKING WATER STANDARDS 90% OF THE TIME**

Surveying well heights in the Grey District.

Figure 20:
Groundwater nitrate levels as a percentage of the NZ drinking water standards (11.3mg/L)





Carew Falls. Photo: Hami Tangiora

Main Street - Reefton
Photo Stewart Nimmo

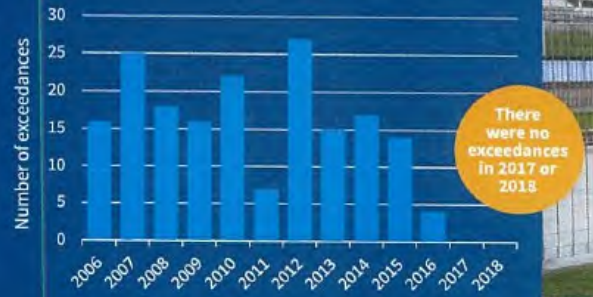
Air quality

The West Coast Regional Council has one permanent air quality monitoring site, located in Reefton. As a result of its geography, climate, and domestic heating habits, Reefton suffers from poor air quality over the winter months. Council has monitored PM_{10} in Reefton since 2006. PM_{10} are particles in the air smaller than 10 micrometers in diameter, which affect human health when frequent and abundant. The main source of PM_{10} in Reefton is from domestic heating. Small contributions come from industry, traffic, and outdoor burning. The town is surrounded by hills that impede air movement. During winter, cold temperatures and reduced air flow cause an inversion layer to form, restricting the movement of polluted air.

Reefton generally has satisfactory air quality, but emissions from domestic heating have periodically exceeded the PM_{10} National Environmental Standard (NES) over the winter months (Figure 21). An exceedance occurs when there has been an average of more than 50 micrograms/m^3 of PM_{10} recorded over a 24 hour period. The NES allows one permissible exceedance per year. There were no exceedances in 2017 or 2018, which is positive, but this may relate in part to a shift in the monitoring site. Further work is being undertaken to ensure Council has consistent air quality data for this area.

Figure 21

Air quality exceedances in Reefton



Reefton air quality site.

Back cover photo
Porarari River

388 Main South Road, Paroa,
PO Box 66, Greymouth
Freephone: 0508 800 118
Phone: +64 3 768 0466
Email: info@wcrc.govt.nz

wcrc.govt.nz

THE WEST COAST
REGIONAL COUNCIL

Photo Hami Tangiora

THE WEST COAST REGIONAL COUNCIL

Prepared for:	Resource Management Committee Meeting – 13 August 2019
Prepared by:	Emma Perrin-Smith, Senior Resource Science Technician
Date:	2 August 2019
Subject:	**REEFTON AIR QUALITY SUMMARY**

There have been no exceedances of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 for PM_{10} in Reefton so far this year (Figure 1).

The new Teledyne T640x machine is operational and undergoing validation at present. Data presented below is from the BAM.

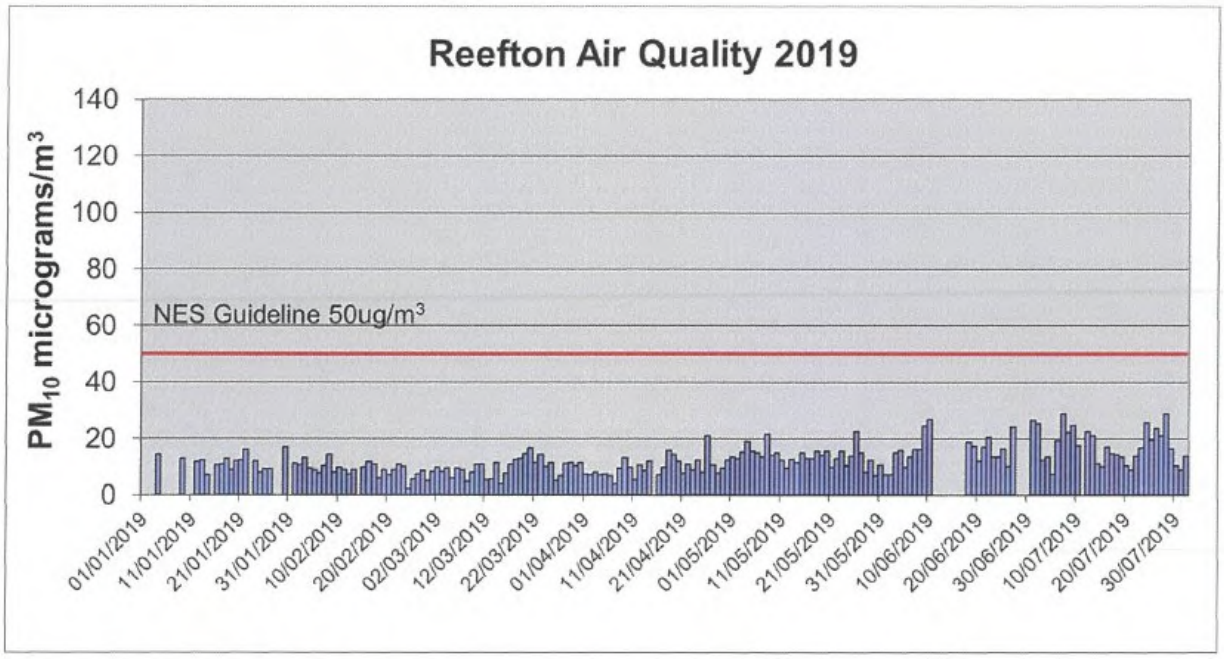


Figure 1. Reefton daily PM_{10} for 2019.

RECOMMENDATION

That the report is received.

Hadley Mills
Planning, Science and Innovation Manager

THE WEST COAST REGIONAL COUNCIL

Prepared for: Resource Management Committee – 13 August 2019
Prepared by: Jorja Hunt – Consents and Compliance Support Officer
Date: 29 July 2019
Subject: CONSENTS MONTHLY REPORT

Four Consents Sites Visit were undertaken 29 June to 29 July 2019

10/07/2019	RC-2019-0058, To undertake alluvial gold mining activities, Hou Hou Creek, A Fowlie	To assess application against the receiving environment.
18/07/2019	RC-2019-0067, realign creek in the Coastal Marine Area, Limestone Creek, D Lynch	To observe the creek and its current flow path and discussed works to be undertaken.
26/07/2019	RC-2019-0074, Gold mining in the Westland District, Stafford, Western Dynasty Holdings Limited	To observe the consent variation site.
29/07/2019	RC-2017-0092-V1, Increase disturbed gold mining area, Arthurstown, Fitzherbert Investments Limited	To observe area they wish to extend mining into and increased disturbed area and noted visual amenity issues.

12 Non-Notified Resource Consents were Granted 29 June to 29 July 2019

CONSENT NO. & HOLDER	PURPOSE OF CONSENT
RC-2019-0053 BRW Challis Blue Spur Road, Hokitika	To discharge treated onsite sewage wastewater from a domestic dwelling to land at 556A Blue Spur Road, Hokitika.
RC-2019-0055 Rosco Contractors Limited Buller River, Organs Island	To disturb the dry bed of the Buller River at Organs Island for the purpose of removing gravel.
RC-2019-0059 J J Nolan Limited South Westland Rivers	To disturb the dry bed of the Arawhata River for the purpose of removing gravel. To disturb the dry bed of the Haast River upstream of the road bridge for the purpose of removing gravel. To disturb the dry bed of the Haast River downstream of the road bridge for the purpose of removing gravel. To disturb the dry bed of the Okuru River for the purpose of removing gravel. To disturb the dry bed of the Turnbull River for the purpose of removing gravel.
RC-2019-0024 MBD Contracting Limited Taylorville	To discharge demolition waste and cleanfill to land, Taylorville.

RC-2019-0023 New Zealand Transport Agency Reid Stream, Springs Junction	To disturb the bed of Reid Stream to undertake protection works (rock protection and diversion). To temporarily divert water in Reid Stream from protection structures. To temporarily discharge sediment to water associated with the construction of river protection and diversion works, Reid Stream.
RC-2019-0062 S Lynch & T Wood Marsden Road, Greymouth	To discharge treated onsite sewage wastewater from a domestic dwelling to land at Lot 5 Aorangi Estate, 328 Marsden Road, Greymouth.
RC-2019-0060 Taramakau Trading Limited Taramakau River	To disturb the dry bed of the Taramakau River upstream of the State Highway 6 Bridge for the purpose of removing gravel.
RC-2019-0052 IS Anderson & EJM Harding Stuart Street, Hans Bay	To discharge treated onsite sewage wastewater from a domestic dwelling to land at Lot 4 Stuart Street, Hans Bay.
RC-2019-0018 New Zealand Transport Agency Goat Creek, Otira	To disturb the bed of Goat Creek to undertake protection works (rock rip-rap and stream training). To permanently divert water in Goat Creek from protection structures and as a result of stream training. To temporarily discharge sediment to water associated with the construction of river protection and stream training works, Goat Creek.
RC-2019-0072 KW Ryan Kaniere Road, Kaniere	To discharge treated onsite sewage wastewater from a domestic dwelling to land at 92B Lake Kaniere Road, Kaniere.
RC-2019-0073 Canaan Farming Deer Limited & Christian Community Ahaura and Waikiti Rivers	To disturb the dry bed of the Ahaura River for the purpose of removing gravel. To disturb the dry bed of the Waikiti River for the purpose of removing gravel.
RC-2019-0069 MC Ralfe Hokitika and Kokatahi River	To disturb the dry bed of the Hokitika River for the purpose of extracting gravel. To disturb the dry bed of the Kokatahi River for the purpose of extracting gravel.

Five Changes to and Reviews of Consent Conditions were Granted 29 June to 29 July 2019

CONSENT NO. & HOLDER	PURPOSE OF CHANGE/REVIEW
RC98005-V3 MJK Mining Limited Bell Hill Road	To change conditions relating to the area of gold mining and to decrease the maximum unrehabilitated disturbed area and bond, Bell Hill Road

RC-2017-0114-V1 Paramount Mining Limited East Road, Hokitika	To allow a discharge point outside of area of MP60383, East Road, Hokitika.
RC06232-V1 NJ Mouat Punakaiki	To amend conditions relating to daily sewage discharge volumes, Punakaiki.
WS-2017-665-V1 JF & JG Mitchell Mokihinui River	To change the whitebait stand design, Mokihinui River
WS-2017-921-V1 KJ Scurr Arawhata River	To change the whitebait stand design, Arawhata River

Public Enquiries
42 written public enquiries were responded to during the reporting period. 36 (86%) were answered on the same day, and the remaining 6 (14%) within the next ten days.

RECOMMENDATION

That the August 2019 report of the Consents Group be received.

Heather McKay
Consents & Compliance Manager

THE WEST COAST REGIONAL COUNCIL

Prepared for: Resource Management Committee – 13 August 2019
Prepared by: Heather McKay – Consents & Compliance Manager
Date: 1 August 2019
Subject: **COMPLIANCE & ENFORCEMENT MONTHLY REPORT**

Site Visits

A total of 52 site visits were undertaken during the reporting period, which consisted of:

Activity	Number of Visits
Resource consent monitoring	16
Mining compliance & bond release	16
Complaints	20
Dairy farm	0

- A total of 38 complaints and incidents were recorded.

Non-Compliances

Note: These are the activities that have been assessed as non-compliant during the reporting period.

A total of 13 non-compliances occurred during the reporting period.

Activity	Description	Location	Action/Outcome	INC/Comp
Forestry	A compliance inspection was undertaken at a forestry operation.	Rutherglen Road	On site it was found that slash and debris had been left in the bed of a waterbody which is a breach of the National Environmental Standards for Forestry Plantation. Enquiries are ongoing.	Incident
Gold Mining	A compliance inspection of a gold mining operation established that the miner had excavated the bed of a creek in breach of their resource consent conditions.	Notown Road	An abatement notice was issued and further enforcement action is pending.	Incident
Forestry	A complaint was received that a creek was discoloured with sediment.	Chesterfield	The site was investigated and found that a forestry operation had caused the discharge of sediment into the creek. Enforcement action is pending.	Complaint
Quarry	An inspection was undertaken on a Lime quarry and established that they were operating without a resource consent.	Karamea	The operator has been required to obtain a resource consent to authorise the earthworks undertaken on the site.	Incident

Activity	Description	Location	Action/Outcome	INC/Comp
Gold Mining	A compliance inspection was undertaken at a gold mining operation that had been non-operational for some time.	Greenstone	Enquiries established that site rehabilitation had started but was yet to be completed. A breach of the resource consent conditions regarding the timeframes for completion of the rehabilitation at the conclusion of mining. Site will be re-inspected to check progress.	Incident
Earthworks within the CMA	A complaint was received that a person had dumped soil within the CMA.	Hokitika	The site was investigated and the person was told to stop the activity. Earthworks of this nature cannot be undertaken within 50 metres of the CMA without a resource consent.	Complaint
Earthworks	A complaint was received about the dumping of demolition waste and other materials at Sunset Point.	Hokitika	The site has been investigated and established that the area was being built up by depositing demolition waste and other materials then capped with soil. It has been established that the works undertaken are unauthorised and enquiries are ongoing.	Complaint
Discharge land	A complaint was received that dairy cows were being stood off in the vicinity of a river.	Little Wanganui	The site has been investigated and established a breach of the regional rules. Enforcement action is pending.	Complaint
Gold Mining	A compliance inspection was undertaken at a gold mining operation and established that the miner had discharged sediment laden water in breach of resource consent conditions.	Kaniere	Water had been pumped from the mining pit into the bush without first passing through a settling pond system for treatment. Enquiries are ongoing.	Incident
Gold Mining	A complaint was received about the discharge from a gold mining operation into a creek.	Marsden Road	The site was investigated and established that the miner had discharged mine pit water directly into the creek. The discharge must first go through a settling pond system. Enquiries are ongoing.	Complaint
Gravel Extraction	A compliance inspection was undertaken at a gravel extraction site on the Mokihinui River.	Mokihinui	Follow up enquiries established that two of the consent holders for those extraction areas had not supplied their gravel volume returns which is a technical breach of their consent conditions. Returns will be required to be submitted.	Incident

Activity	Description	Location	Action/Outcome	INC/Comp
Gravel Extraction	A compliance inspection was undertaken at a gravel extraction site on the Mokihinui River.	Buller River Organs Island	Follow up enquiries established that one of the consent holders for those extraction areas had not supplied their gravel volume returns which is a technical breach of their consent conditions. Returns will be required to be submitted.	Incident

Other Complaints/Incidents

Note: These are the other complaints/incidents assessed during the reporting period whereby the activity was not found to be non-compliant or compliance is not yet established at the time of reporting.

Activity	Description	Location	Action/Outcome	INC/Comp
Vehicle within the CMA	A complaint was received that an unoccupied vehicle was stuck on the beach near the high tide line.	Houhou Creek	Enquiries located the owner and a contractor was engaged to remove it from the beach.	Complaint
Discharge Air	A complaint was received that a person was going to burn materials from a demolished house.	Hokitika	The site was investigated and the person advised of the materials that cannot be burnt.	Complaint
Structure in the bed of a river	Complaint received that a stock crossing bridge may be causing erosion.	Stafford	Enquiries are ongoing.	Complaint
Discharge Air	A complaint was received regarding the discharge from an outside fire at a trade and industrial premises.	South Beach	The site was investigated and established that the person was burning old wood. It may have discharged black smoke when it was initially ignited. No breach of the regional rules.	Complaint
Discharge Air	Complaint received about smoke from a domestic outside fire.	Greymouth	The site was investigated and established that the person was burning old wood. No breach of the regional rules.	Complaint
Discharge to water	A complaint was received that there was polystyrene floating down the river	Grey River	The site was visited and found that it was foam which was likely generated from tannin stained creeks mixing into the Grey upstream of the Cobden Bridge.	Complaint
Gravel Extraction	Two separate complaints were received about the noise from gravel extraction and the traffic movements on the public road.	Kaniere	Informed to contact WDC over noise and traffic issues or speak to the contractors themselves. No breach of regional rules.	Complaint

Activity	Description	Location	Action/Outcome	INC/Comp
Riparian Margin clearance	Complaint received about riparian margin clearance	Haast	Enquiries are on going	Complaint
Discharge Surface Water	A complaint was received that a creek was discoloured with sediment.	Waimea Creek	The site was investigated and unable to establish the cause.	Complaint
Discharge Surface Water	Complaint received about a creek discoloured with sediment.	Hokitika	A site visit was undertaken and the creek was clean when inspected.	Complaint
Litter	Complaint received about bailage wrap in a creek.	Karamea	The farmer was spoken to and said he was aware of the issue. It had been buried years ago however recent erosion has exposed it and it will be removed.	Complaint
Vehicle accident	Complaint received about a crashed car in close proximity to a drain. Complainant was concerned that oil could discharge into the drain.	Marsden	The GDC were to contact the registered owner to remove the vehicle.	Complaint
Discharge Land	Complaint received about storm water discharging from neighbouring property	Greymouth	Enquiries are ongoing	Complaint
Discharge to Water	A complaint was received that a gold mining operation was discharging sediment to a river which was affecting the Westport drinking water supply.	Westport	Enquiries established that the miner was not responsible and that drain water above the mining operation was discharging through slip material into the river.	Complaint
Discharge Air	A complaint was received about the burning of rubbish in an outside fire.	Greymouth	The site was investigated and established no breach of the regional rules.	Complaint
Discharge to water	A complaint was received about milk fat/ oil discharging into a river	Hokitika River	Enquiries are ongoing	Complaint
Discharge to air	Complaint received about possible spray drift discharging onto a neighbouring property.	Westport	Phone enquiries established that the operator was not going to continue spraying that area because of the change in wind conditions.	Complaint
Gold Mining	Complaint received about the discharge of sediment laden water to the creek.	Notown Road	Site was investigated and water samples were taken. Enquiries are ongoing.	Complaint
Coastal Marine Area	A complaint was received about stock grazing on sand dunes	Karamea	The farmer was contacted and had stopped using this area. The cows were in a fenced area beside the dunes. There is no breach of the regional rules.	Complaint

Activity	Description	Location	Action/Outcome	INC/Comp
Discharge to Land	A complaint was received that a farms slurry tanker had left mud and effluent on the road when the machine crossed the state highway to access paddocks.	Harihari	The farmer was spoken to regarding the incident to bring it to their attention. There is no breach of the regional rules.	Complaint
Earthworks	Complaint received about dumping of earth onto the Haast riverbed	Haast	The contractor has been contacted and advised to stop dumping spoil on the river bed. Enquiries are ongoing.	Complaint
Unauthorised structures in the bed of a river	Complaint received that there were two white bait stands left in the bed of the river from the last fishing season.	Mokihinui	The site was inspected and established that the white bait stands complained about are the lift up type and were out of the river bed as required by resource consent conditions.	Complaint
Discharge to water	Complaint that Waimea Creek was discoloured with sediment.	Waimea Creek	The site was investigated and established that the creek was discoloured from overnight rain.	Complaint
Discharge to water	Complaint that a creek was discoloured with sediment.	Ross	The site was investigated and established that the creek was discoloured from wet weather.	Complaint

Update on Previously Reported Ongoing Complaints/Incidents

There is no update on previously reported complaints/incidents.

Formal Enforcement Action

Abatement Notices: There was one abatement notice issued during the reporting period.

Activity	Location
Gold Mining: one notice to cease the disturbance of a river bed.	Notown

Mining Work Programmes and Bonds

The Council received the following two work programmes during the reporting period. Both of the work programmes have been approved.

Date	Mining Authorisation	Holder	Location	Approved
22/07/2019	RC-2017-0117	Whyte Gold Limited	Ogilvie Creek	Yes
22/07/2019	RC-2017-0036	Whyte Gold Limited	Dunganville	Yes

One Bond was Received During the Reporting Period

Date	Mining Authorisation	Holder	Location	Amount
08/07/2019	RC98005	M J K Mining Limited	Bell Hill	$12,000

One Bond is Recommended for Release

Mining Authorisation	Holder	Location	Amount	Reason For Release
RC10239	BSK & KG Ferguson	Ikamatua	$18,000	Mining has concluded and rehabilitation completed.

RECOMMENDATIONS

1. *That the August 2019 report of the Compliance Group be received.*
2. *That the bond for RC10239 BSK & KG Ferguson of $18,000 is released.*

Heather McKay
Consents and Compliance Manager

COUNCIL MEETING

THE WEST COAST REGIONAL COUNCIL

Notice is hereby given that an **ORDINARY MEETING** of the West Coast Regional Council will be held in the Offices of the West Coast Regional Council, 388 Main South Road, Greymouth on **Tuesday, 13 August 2019** commencing on completion of the Resource Management Committee Meeting

A.J. ROBB
CHAIRPERSON

M. MEEHAN
CHIEF EXECUTIVE OFFICER

AGENDA NUMBERS	PAGE NUMBERS		BUSINESS
1.			**APOLOGIES**
2.			**PUBLIC FORUM**
3.			**MINUTES**
	1 – 5	3.1	Minutes of Council Meeting 9 July 2019
	6 - 8	3.1.1	Minutes of Special Council Meeting 19 July 2019
4.			**REPORTS**
	9 – 63	4.1	Engineering Operations Report
	64 – 83	4.1.1	Cobden Sea Erosion Report
	84 – 90	4.1.2	Hokitika Coastal Erosion Report
	91 - 126	4.1.3	Investigation into the benefit of putting a cut through the Waiho Loop
	127 – 129	4.2	Variation 6 to the West Coast Regional Land Transport Plan 2015 – 21
	130 – 132	4.3	Corporate Services Manager's Monthly Report
	133 – 146	4.3.1	Setting of Rates for 2019 / 20
	147	4.4	Councillor Leave of Absence
5.	148		**CHAIRMAN'S REPORT**
6.	149 – 157		Twelve Month Review
	158		**CHIEF EXECUTIVE'S REPORT**
7.			**GENERAL BUSINESS**

THE WEST COAST REGIONAL COUNCIL

MINUTES OF THE MEETING OF THE COUNCIL HELD ON 9 JULY 2019, AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL, 388 MAIN SOUTH ROAD, GREYMOUTH, COMMENCING AT 11.27 A.M.

PRESENT:

N. Clementson (Chairman), T. Archer, P. Ewen, P. McDonnell, A. Birchfield, S. Challenger

IN ATTENDANCE:

M. Meehan (Chief Executive Officer), R. Mallinson (Corporate Services Manager), H. McKay (Consents & Compliance Manager), H. Mills (Planning, Science & Innovation Manager), R. Beal (Operations Director), N. Costley (Strategy & Communications Manager), T. Jellyman (Minutes Clerk).

1. APOLOGY:

Moved (Clementson / Birchfield) *That the apology from Cr Robb be accepted.*

Carried

2. PUBLIC FORUM

There was no public forum.

3.1 CONFIRMATION OF MINUTES

The Chairman asked the meeting if there were any changes to the minutes of the previous meeting. There were no changes requested.

Moved (Archer / Challenger) that *the minutes of the Council meeting dated 11 June 2019, be confirmed as correct.*

Carried

Matters arising

M. Meehan stated that he has been corresponding with Cr Ewen regarding the matter of fuel storage for the West Coast following a civil defence disaster. It was agreed that a letter would be drafted to the Minister of Civil Defence outlining Council's concern.

3.1.1 CONFIRMATION OF MINUTES OF SPECIAL COUNCIL MEETING 21 JUNE 2019

The Chairman asked the meeting if there were any changes to the minutes. There were no changes requested. Cr Archer stated he has no changes to the minutes but he is concerned that Council might have a failing in communicating with ratepayers as to what can be included as submissions to the Annual Plan and what cannot be actually acted upon. He stated that there is an expectation by these submitters that Council is going to give their funding requests consideration. Cr Archer is concerned that there are people in the community who think the appropriate time to make requests for funding is via a submission to the Annual Plan. He stated that there is no mechanism to deal with this. M. Meehan advised that this is a case by case situation as Council approved expenditure for the GNS study into geothermal work during the year, and there was no consultation on this. M. Meehan advised that the point the Auditor General made around the UAGC was that they said that Council could not make such a change to the funding via a submission and recommended going out for further consultation. M. Meehan stated that

Council's response to a submission on the fairness of the UAGC was a difference in opinion. M. Meehan asked R. Mallinson for his advice on this matter. R. Mallinson advised that the legislation channels councils to identify matters for consultation, but Council would always accept a submission even if the submission wasn't identified in the consultation document as this is basic democracy. R. Mallinson advised that Council would always receive and consider the submission but may not necessarily act on it. M. Meehan stated that advice would be sought if a submission was likely to have a major impact on a community and could consult on this in future Annual Plans. He stated that would still be a case by case situation. Cr Archer used the example of the request for $100,000 from the Westport 2100 Working Group. He stated there is a potential for a councillor conflict of interest in this type of situation as both Crs Archer and Clementson have been part of this working group. Cr Archer spoke at length about the submission from Westport 2100. Cr Archer also spoke of the submission process in general and stated that because Council does not ask questions, it becomes quite a daunting process for submitters, and he feels that Council only listens and does not contribute. Cr McDonnell stated that he did ask Mr Coll from the Westport 2100 how much he funding he was seeking. Cr Archer stated that Council never would have considered $100,000 and then have to rate the community for this when they have had no input into it.

Moved (Birchfield / Ewen) that *the minutes of the Special Council meeting dated 21 June 2019, be confirmed as correct.*

Carried

Matters arising

There were no matters arising.

3.1.2 CONFIRMATION OF MINUTES OF SPECIAL COUNCIL MEETING 28 JUNE 2019

An amended version of the minutes of the meeting of 28 June were tabled. These had previously been emailed to Councillors.
The Chairman asked the meeting if there were any changes to the minutes of the previous meeting. There were no changes requested.

Moved (Birchfield / Archer) that *the minutes of the Special Council meeting dated 28 June 2019, be confirmed as correct.*

Carried

Matters arising

Cr Archer drew attention to the second line in item 2 which says that "Councillors now have legal advice from the Local Government Commission (LGC) on the One District Plan". Cr Archer queried if this was legal advice. R. Mallinson confirmed that the LGC provided a summary of the legal advice they had received.

REPORTS:

4.1 OPERATIONS REPORT

R. Beal spoke to his report and advised that the future works listed are all related to the March weather event and will be part of the insurance claims. He stated that contractor capacity is almost at full capacity.
R. Beal reported that just over 30,000 tonne of rock has been recovered for the work in the Lower Waiho rating district (LWRD). He advised that the likely time of completion for this project is early September, providing rock recovery continues to progress well. Cr McDonnell spoke of concerns from the LWRD at the prospect of a large loan of around $500,000 and their concerns with insurance and being able to get the stopbank back in place. R. Beal advised that the insurance will not cover 100% of the rebuild, Council is well committed to the rebuild and cannot stop it now as this would impact on insurance. R. Beal stated that costs are ongoing and have been communicated consistently to the LWRD, they have also been advised that Council is unsure how much the insurance pay out will be. M. Meehan advised

that staff are in constant communication with the Ministry of Civil Defence. R. Mallinson advised that he has also been in constant contact with the Ministry on behalf of the Crown, and the insurers. He stated that the assessor will be making a second visit to the site in early August and will be accompanied by Council's engineer. R. Mallinson advised the he and Council's engineer met with the representative from the Crown a couple of weeks ago at the site. R. Beal reconfirmed that the best case scenario is a cost of $2.2 - $2.4M if rock recovery prices are at $21.00 per tonne. Discussion took place on the possibility of a shortfall of around $500,000. M. Meehan advised that the original report which went to Council was that any costs that weren't recovered by insurance, or the Ministry, would be a loan on behalf of the rating district. This has been the approach which has been communicated to the LWRD from the start. Cr Birchfield commented that the original stopbank had lasted for 37 years. Discussion took place. Cr McDonnell commented that the LWRD is feeling disappointed as they thought they had an insured asset and this is not going to be replaced without costing them something. M. Meehan stated that this is a difficult situation, weekly meetings are being held, and Council's engineer is ensuring that as much rock as possible is being recovered from the river. R. Beal confirmed the Council's engineer is doing an excellent job at keeping the end costs down, with early quotes for the rebuild being at $3.4M. It was agreed that work and communication would continue with the insurer and the community.

Moved (Birchfield / Challenger)

1. *That the report is received.*

2. *That the rebuild budget of $2,600,000 + /- 10% for the Milton & Others Stopbank is approved.*

Carried

4.1.2 VARIATION 6 TO THE WEST COAST REGIONAL LAND TRANSPORT PLAN 2015 – 21

M. Meehan spoke to this report and advised that both the Chairman and Deputy Chairman are council representatives on the West Coast Regional Transport Committee (RTC). M. Meehan stated that this matter has been discussed at the RTC and these recommendations have come through from the RTC for Council to approve. Cr Ewen expressed concern that the Minister could be considering dropping the speed limit to 80 km per hour on our roads. He stated if that is the case this could be a handbrake on the whole West Coast economy. Cr Ewen stated that he does not support this. Cr Clementson stated that this sentiment was strongly reflected at the RTC meeting. Cr Clementson stated that the RTC was assured that this is not the intention. Cr Birchfield agreed with Cr Ewen and stated that this is the green agenda and it is about getting everyone on bikes or walking to slow the road system down. Cr Birchfield believes this is all part of climate change as they don't like fuel being used. Cr Birchfield is against this. M. Meehan stated that he is unsure of where Council stands if Council rejects the recommendations from the RTC. Extensive discussion ensued and it was agreed that Council would defer the consideration of this report until the August Council meeting as Councillors would like more information, especially on the 80 km per hour issue.

Moved (Archer / Ewen)

That a decision on Variation 6 to the Regional Land Transport Plan 2015 -21 will be deferred until the August 2019 Council meeting.

Carried

4.2 CORPORATE SERVICES MANAGER'S MONTHLY REPORT

R. Mallinson spoke to his report and asked Councillors to disregard the two tables on page 15 of his report as he would like to do further work and he will then recirculate the tables. R. Mallinson advised that the deficit has increased with the main contributors being investment income being $366,0000 below that budgeted for the year to date. He stated that the VCS surplus is also less that what was budgeted but is expected to improve. R. Mallinson reported that quarries have been trading well due to the heavy demand for rock.
R. Mallinson spoke to the rest of his report and advised that $613,000 has been spent to date on the rebuild of the Milton & Other Stopbank at Franz Josef.

R. Mallinson drew attention to the omission of a formal recommendation being included in the staff report for the submission in relation to the Westport 2100 working group, which is now included in the recommendations of this report.
Cr Archer suggested that an addition to the third recommendation and it include the words, *"or a special rating district be created".* M. Meehan advised that under the Rating Act, to form a rating district outside of an annual plan process, good reason is required. R. Mallinson confirmed that it would need to be an emergency that could not have been foreseen under Section 23 of the Rating Act. He provided further information on the setting up of rating districts.
Cr Ewen asked if Council is covered should an event occur now and take out the Milton & Others Stopbank before it is completed. R. Mallinson stated that this would be a separate event but Council's insurance cover would still come in to play, and there would be further excess to pay.
Cr McDonnell asked if the shortfall in the budget variances is attributed to any one thing. R. Mallinson stated that he still needs to confirm if this figure is accurate but stated it has been challenging to generate the cost recovery in the resource management area that was hoped for. Discussion took place on contributing factors to the budget variances.

Moved (Ewen / Birchfield)

1. *That the report is received.*

2. *That Councillors note the liquidation of the Catastrophe Fund Portfolio, to be rebuilt once all Insurance and Crown funds are to hand, and any long term borrowing is undertaken.*

3. *That the Westport 2100 Committee be advised that any actual works required flowing from the Group recommendations will need to be considered as part of future Annual / Long Term Plan processes. Re-purposing of existing Council budgets will be considered as appropriate.*

Carried

4.4 LEAVE OF ABSENCE – 13 AUGUST 2019 COUNCIL MEETING

This report was taken as read.

Moved (Ewen / McDonnell)

That Council grants Cr Archer a Leave of Absence from attending the 13 August 2019 scheduled Council meeting.

Carried

Moved (Archer / McDonnell)

That Council grants Cr Challenger a Leave of Absence from attending the 13 August 2019 scheduled Council meeting.

Carried

5.0 CHAIRMANS REPORT

The Chairman's report was taken as read.

Moved (Clementson / Birchfield) *that this report is received.*

Carried

GENERAL BUSINESS

Cr Archer asked if there has been any progress with the list of closed landfill sites that was requested. H. McKay advised that the recommendation was that Envirolink fund be sought. H. Mills advised that it was ascertained that Envirolink funding was not appropriate but her staff have now put a list together and could be brought to the next meeting. M. Meehan advised that ECAN are leading work in this area. He stated that risk assessments are being done at a national level and work is being done on what

constitutes a landfill. M. Meehan stated that the main issue is historic landfills that aren't covered by the RMA, landfills that are closed, old sites and sites that are not known about.

The meeting closed at 12.18 p.m.

.....
Chairman

.....
Date

THE WEST COAST REGIONAL COUNCIL

MINUTES OF A SPECIAL MEETING OF THE COUNCIL HELD ON 19 JULY 2019, AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL, 388 MAIN SOUTH ROAD, GREYMOUTH, COMMENCING AT 11.00 A.M.

PRESENT:

A. Robb (Chairman), P. Ewen, P. McDonnell (via telephone), A. Birchfield, S. Challenger

IN ATTENDANCE:

M. Meehan (Chief Executive Officer), R. Beal (Operations Director), R. Russ (Council Engineer), T. Jellyman (Minutes Clerk). The media.

APOLOGIES:

Moved (Ewen / Challenger) *That the apologies from Cr Archer and Clementson be accepted.*

Carried

Moved (Birchfield / Challenger)

That Standing Orders are suspended to allow Cr McDonnell to participate via telephone.

Carried

MINUTES

The minutes from the Special Meeting of the Hokitika Joint Seawall Committee meeting were tabled. It was noted that these minutes will be adopted by the Hokitika Joint Seawall Committee at their next meeting.

PUBLIC FORUM

Moved (Birchfield / Challenger) *That Mr Don Neale (Hokitika resident) be granted speaking rights.*

Carried

Mr Neale addressed the meeting and stated that he attended the meeting of the Hokitika Joint Seawall Committee meeting last week. Mr Neale stated that his involvement is in a personal capacity, and not do with his occupation as a coastal specialist with the DoC. Mr Neale stated he holds a Master's Degree in coastal processes and has lived within 200 metres of the Hokitika Beach for 30 years. Mr Neale stated that he is part of the rating district and would like to see some consultation with the rating district prior to a decision being made. Mr Neale spoke extensively of the options available and spoke to various diagrams that he had brought to the meeting. Mr Neale spoke of the options that are available including hard options of a seawall and beach re-nourishment. Mr Neale stated that he does not see the benefit of a rubble wall being put in place and feels that this could be harmful and he would like to see Council hold off on this option. Mr Neale stated this is not an urgent situation as there is still 20 – 30 metres of public land, then another 10 – 20 metres of private land before any built assets are affected. Mr Neale stated that he would like WCRC to seek urgent advice from NIWA prior to commencing any work. Mr Neale stated that other structural and cladding options should be looked at. Mr Neale stated that road access for trucks and machinery to get to the site would be detrimental and would make the hazard worse as it would destroy the vegetation which helps to build the sand dunes. Mr Neale stated that if a seawall is an option it should be the last line of defence and potentially even on private land. He stated that NIWA has not recommended at any stage that a rubble wall be put in place as is currently on the table. Cr Challenger asked Mr Neale questions relating to high tides forecast for August and if he feels these could pose a threat to the area. Mr Neale stated that these higher tides are not necessarily a greater threat.

Cr Birchfield asked questions of Mr Neale relating to beach nourishment. Mr Neale stated that artificial beach nourishment using trucks could be done but there are other ways of managing this. Mr Neale stated that the river does have an impact on what is happening on the beach. Mr Neale stated keeping things as stable as possible without making massive changes might be the best approach. Further discussion relating to the mouth of the Hokitika River, potential groynes and the impact historic groynes have had on this area in the past. Cr Ewen stated do nothing is not an option as there could be issues coming up over the next month. He stated if these issues are not addressed now, there could be bigger issues to face. Mr Neale stated that the do nothing option is hard but feels that it is important to be sure that the situation is not made worse, he feels that the rubble solution could make things worse. Mr Neale stated that rubble does not give full protection against erosion, and it does not do anything to feed the beach. Mr Neale stated that the Hokitika Beach now has enough elevation to stop the waves coming over the top. Mr Neale spoke of the option of putting a road formation on the beach and how this might work. Further discussion took place on this option. Cr McDonnell asked Mr Neale how he felt the community might react to this. Mr Neale stated that as long as it was stated that this is a short term solution and it was explained to the community that this is the best short term solution and will bide some time until there is a longer term solution is recommended by the experts. The Chairman thanked Mr Neale.

Moved (Birchfield / Challenger) *That Mr Kerry Jeffs (Hokitika resident) be granted speaking rights.*
Carried

Kerry Jeffs addressed the meeting and stated that he is an affected property owner and has lived in the area for the last four years. Mr Jeffs stated that there is a huge amount of erosion in front of his property and is concentrated between Hampden and Tudor Streets. Mr Jeffs stated that he as seen around 15 – 20 metres of land vanish over a 4 – 6 week period. Mr Jeffs stated that he has never seen so much erosion as what has occurred recently. Mr Jeffs stated the affected area is on marine road reserve. Mr Jeffs stated residents have had several meetings and those living between Hampden and Tudor Streets are very nervous. He stated that these residents want something done. Mr Jeffs spoke of large trees and pensioners flats in this area. Mr Jeffs expressed his concern about the possibility of high tides in August. Cr McDonnell asked Mr Jeffs questions relating to his boundary and road reserve land. Mr Jeffs stated that vegetation is vanishing every time there are high tides or big waves. Mr Jeffs stated that he does not support the option of river gravel being used as he feels that quarry rubble would lock in better.

REPORTS:

COASTAL EROSION REPORT

R. Beal spoke to his report. He stated that he is seeking long term advice from NIWA on what impact the river mouth is having on beach nourishment, information on the current cycle and coastal processes, current erosion solutions and the effectiveness of establishing more groynes. R. Beal explained the short to medium term options to the meeting. He stated that the community needs some effective solutions, urgently. He stated that consideration has been given to using river gravel and this has been costed on the same design, but it is felt that this will not provide the short term protection needed. R. Beal explained the recommendations in his report. He answered questions from Cr Birchfield relating to putting a cut into the Hokitika River to move the mouth closer to the town, along with the use of river gravel. R. Beal stated that this been considered and could add some benefit but is unlikely to stop the current erosion. Cr Birchfield stated that this work needs to be done immediately. Cr Ewen asked if any of the existing groynes would be touched. R. Beal confirmed that they would not be, and he is expecting further advice on the groynes from NIWA.
Cr Challenger spoke of an erosion cut which was moving north, with the last one coming as far north as the Hau Hau River. He is stated that this one could already be moving north and therefore he feels that more money than necessary should not be spent. He suggested waiting to see what happens. R. Beal advised spoke of risks of waiting with one being there might not be access to the area.
B. Russ addressed the meeting. He stated he is concerned about risk of further erosion over the next couple of months. B. Russ stated that if there was more time then beach nourishment would be an option. He stated the sea was cutting in further to the north a couple of weeks ago and this is where beach nourishment should be considered before too much land is lost. B. Russ stated that there is a natural sand dune system which is high at the moment and the erosion is now getting to this dune. He

stated that the area cannot afford to lose this dune system as waves could end up going through properties in this area.
The Chairman stated that in view of the urgency of this work there is not the option of public consultation as this work is emergency work.
Cr McDonnell stated that he understands the urgency of this work but is concerned that the whole rating district has to pay for the work and therefore he is in favour of the softer engineering option of beach nourishment. Cr McDonnell stated that he is would like to wait for the advice from NIWA.
B. Russ confirmed that NIWA are not available to visit the site until September. He stated that he is currently trying to get an engineer from BECCA to visit. B. Russ confirmed that it is hard to know just how urgent this work is as it could turn around and there might be no further erosion, or it could continue. B. Russ advised that over 20,000 tonne of rubble needs to be brought in and it is likely that the job would take around four weeks to complete which would be towards the end of August.
Cr Ewen stated that it is a gamble to wait and he feels Council cannot take the risk. Discussion took place on whether it would be quicker to get the rubble from the Hokitika River, rather than Camelback Quarry. B. Russ advised that he would not feel comfortable using this as any sandy gravel would get sucked out when the erosion hits the bank and the material from Camelback Quarry is a far better option.
Crs Birchfield, Ewen and Robb were in favour of the recommendations.

Moved (Birchfield / Ewen)

1. *Build a 3:1 batter with rubble from the Camelback quarry to form a 450m (from Hampden Street groyne to Tudor Street groyne) sacrificial "wall" on the foreshore bank (estimated cost $250,000) with the ability to increase the length of works if required.*

2. *Council fund this work through a 5 year loan against the Hokitika Seawall Rating District at the ratios set out in the Annual Plan.*

3. *Council approve up to a $500,000 loan, which will also be used to implement recommendations from NIWA in relation to the river mouth and coastal groyne engineering works.*

4. *Suspend the maintenance of the access ramps on the Seawall until such time that the environmental conditions allow for the cost effective maintenance of the access ramps.*

Against
Crs Challenger and McDonnell
Carried

The meeting closed at 11.44 p.m.

.....
Chairman

.....
Date

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting – 13 August 2019
Prepared by: Paulette Birchfield – Engineer, Brendon Russ - Engineer
Date: 5 August 2019
Subject: **ENGINEERING OPERATIONS REPORT**

WORKS COMPLETED AND WORKS TENDERED FOR

Inchbonnie Rating District

Work involving the placement of 2,675 tonne of rock and 800 tonne of rubble was awarded to GH Foster Contracting at a cost of $81,500.50 (GST Exclusive).

Extensive damage was caused to the upstream end of the rock protection works in the March 2019 floods. A claim will be submitted to our insurer and the Ministry of Civil Defence & Emergency management.

Hokitika Coastal Erosion

Quotes have been received for the proposed works.
BECCA have been engaged to undertake a site visit and make recommendations on the proposed solutions.
The erosion line was surveyed on the 1st of August and will be re-surveyed following the high seas of the 2nd and 3rd of August.
A drone flight to capture the location and direction of the river mouth will also be undertaken.

Karamea Rating District

A committee meeting was held on the 30th July in Karamea to discuss the stop bank upgrade. The committee supported an information sheet mail out to all Rating District members that includes facts on risks to stop banks, clarification on the annual plan consultation, and the committee's recommendation to contribute $5000 to a local planting project.

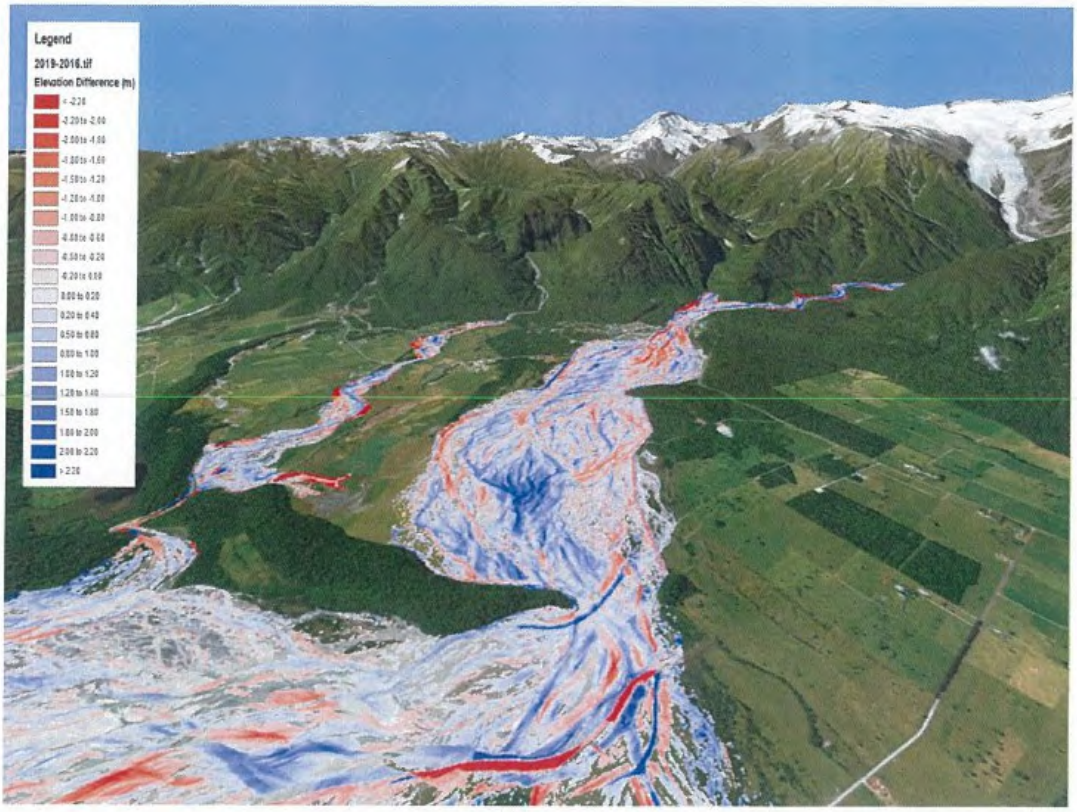
Franz Josef Rating District

The tender for the stopbank has been amended to increase the width of the crest from 4-5m to 8m at the request of the rating district committee.

The "Waiho River: Change Detection Analysis" report has been received.

The report states that;

- 3.3 million cubic metres of sediment have entered the Waiho River system since 2016
- More than a third of this is between cross section "0" and cross section "5"
- The last time a build up of this volume was observed was in the 1980's and the sediment took 10 years to move through the system.
- There is no information on what has occurred within the Callery River catchment.
- Aggradation is occurring in the vicinity of the Waiho Loop for the first time since the 1980's
- More likely that a permanent avulsion into the Tartare will take place in the future



Kaniere Rating District

Work involving the placement of 1,860 tonne of rock, 39 tonne of rubble and 42m3 of fill was awarded to Henry Adams Contracting at a cost of $57,937.50 (GST Exclusive).

Extensive damage was caused to the upstream end of the rock protection works in the March 2019 floods. A claim will be submitted to our insurer and the Ministry of Civil Defence & Emergency management.

Repair Works under construction

Completed repair works

Lower Waiho Rating District

Re-construction of Milton and Others Stopbank- Progress Update:

The bulk earthworks component of the stopbank re-build to full height and length has been completed with AGPR placed to half height of the full length. A further 90m of stopbank has been constructed to a lower level as was the original Milton & Others stopbank.

Completed section of new Stopbank – with rock placed to half height

The following plant is currently being used onsite:

Arnold Contracting Team

- 1 x 20T Excavator
- 3 x 30T Excavators
- 1 x 50T Excavator
- 1 x 26T Dump Truck
- 1 x 40T Dump Truck
- 1 x 12T Construction Roller
- 1 X D375 Bulidozer

As of 2 August 2019 approximately 40,000T of rock has been recovered and placed into the new stopbank and the temporary diversion channel. Rock recovery from all sources is currently costing approximately $21.00+GST per tonne.

As of 31 June 2019 $1,056,940.62+GST has been spent on this project. As of 2 August 2019 approximately $1,600,000+GST has been spent on this project.

Quarry Rock Movements for the period
1 June 2019 to 30 June 2019

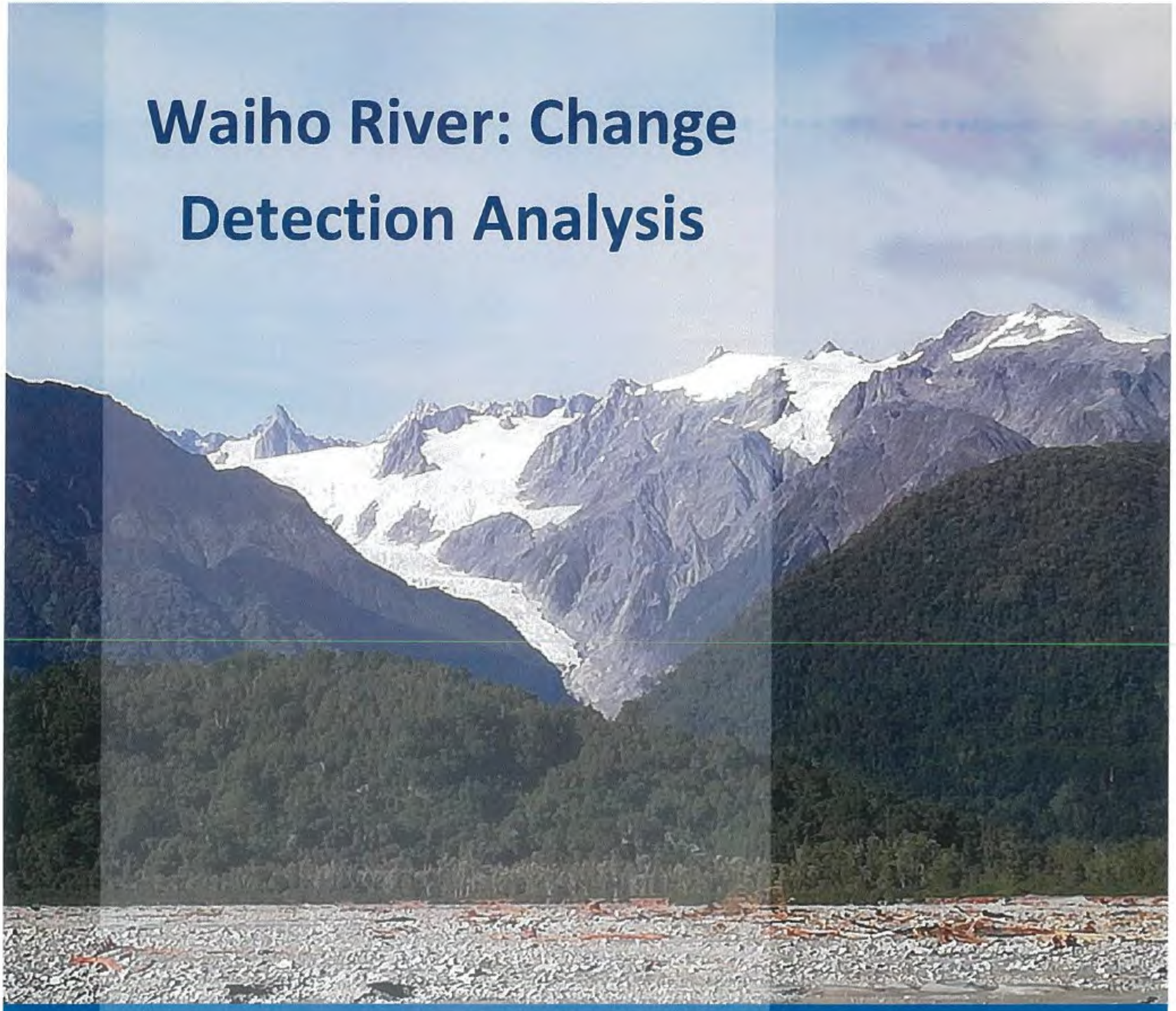
Quarry		Opening Stockpile Balance	Rock Sold	Rock Produced	Closing Stockpile Balance
Camelback	Small/medium	11,943	0	0	11,943
	Large	3,165	0	0	3,165
Whataroa	Small/medium	5,640	0	0	5,640
	Large	790	11,527	11,527	790
Blackball		850	0	0	850
Inchbonnie		15,621	16,289	16,289	15,621
Kiwi		0	0	0	0
Miedema		0	0	0	0
Okuru		1,000	0	0	1,000
Whitehorse		1,334	0	0	1,334
Totals		**43,866**	**27,816**	**27,816**	**43,866**

RECOMMENDATION

That the report is received

Randal Beal
Operations Manager

Waiho River: Change Detection Analysis



JULY 31, 2019

ANALYSIS OF CHANGE BETWEEN 2016 AND 2019 LIDAR SURVEYS

Client: West Coast Regional Council
Report by: Matthew Gardner & James Brasington
Land River Sea Consulting / Waikato University
www.landriversea.com www.waikato.ac.nz

THE WEST COAST REGIONAL COUNCIL

LANDRIVERSEA CONSULTING

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

WAIHO RIVER: CHANGE DETECTION ANALYSIS

REVISION HISTORY

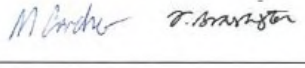
Author:	Matthew Gardner, James Brasington
Signature:	
Date:	31/7/2019
Revision:	01
Authorised by:	Randal Beal
Signature:	
Organisation:	West Coast Regional Council
Date:	

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 OBJECTIVE

Land River Sea Consulting in conjunction with Waikato University have been contracted by the West Coast Regional Council in order to carry out an analysis of the changes in bed levels which have occurred in the Waiho River Catchment between the periods of 2016 and 2019, as well as commenting on the long term bed level trend in relation to historic surveys.

The comparison is primarily to be carried out between LiDAR datasets collected in July 2016 and April 2019, however commentary is also made on the changes in relation to historic cross section surveys going back to 1983.

1.2 BACKGROUND

The Waiho River is located on the West Coast of the South Island of New Zealand, running from the Franz Josef Glacier in the Southern Alps to the Tasman Sea, approximately 10km southwest of Okarito. The river is crossed by the State Highway 6 (SH6) Bridge which is operated by the New Zealand Transport Authority (NZTA) and runs adjacent to the town of Franz Josef / Waiau, situated on the true right bank of the river.

The area has a high level of geologic activity, with the Alpine Fault running through the town of Franz Josef itself and crossing the river in the vicinity of the SH6 Bridge. From the glacier, the Waiho River is confined in a glacial valley, with steep sides. The river is confined in the upper reaches but widens out and has a wide gravel bed downstream of the State Highway Bridge. The river widens out into a natural alluvial fan, however the current fan is constrained on the true left bank by man-made stopbanks, forcing the river to aggrade in its current alignment, rather than naturally deposit sediment over a wider area.

The main tributary of the Waiho River within the study area is the Callery River which enters the Waiho River immediately upstream of SH6. Figure 1-1 shows the location of the Waiho River as well as the catchment boundaries which feed the river within the study area.

Figure 1-1 – Location map of the Waiho River highlighting the hydrological catchments for the Waiho River and the Callery River upstream of SH6 bridge

2. DATA COLLECTION / PREPARATION

2016 LIDAR

LiDAR data was collected in June 2016 by New Zealand Aerial Surveys Ltd. The data was supplied in the form of a 1m DEM as well as with a raw point cloud in LAS format classified into ground and non-ground points.

The data is reported to have been collected using a fixed wing aircraft equipped with an Optech Orion H300 sensor at altitudes between 1190-2375 m

The elevation accuracy of the resulting 3D point cloud was assessed using checkpoint survey observations acquired on bare earth surfaces. The standard deviation of the differences between the checkpoints and locally interpolated point cloud is reported to be 0.016 m and the average difference is 0.007 m suggesting minimal bias.

2016 CROSS SECTION SURVEY

Chris J Coll & Associates carried out a full cross section survey of the Waiho River in April 2016. In order to fully utilise this survey data in this analysis, the water surface has been manually delineated based on the aerial imagery collected at the time of collecting the LiDAR and the wetted channel has been interpolated between cross sections utilising tools within the DHI Mike Hydro River software as well as in ArcGIS. This DEM of the wetted channel has then been merged with the DEM generated from the LiDAR.

2019 LIDAR

LiDAR data was collected in April 2019 by James Brasington from Waikato University. Data was supplied as a 1m DEM as well in with a raw point cloud in LAS format classified into ground and non-ground points.

The data was acquired from a helicopter equipped with a Riegl VUX-1LR sensor at an altitude of 350 m above ground.

The elevation accuracy of the resulting 3D point cloud was assessed using a checkpoint survey of n=97 observations acquired on bare earth surfaces. The standard deviation of the differences between the checkpoints and locally interpolated point cloud was found to 0.017 m and the average difference is 0.001 m with an RMS error of 0.017 m suggesting minimal bias.

3. CHANGE DETECTION METHODOLOGY

3.1 GCD SOFTWARE

The analysis has been undertaken using the Geomorphic Change Detection (GCD, see gcd.riverscapes.xyz) toolkit developed by James Brasington (University of Waikato), Joe Wheaton (Utah State University) and Philip Bailey (North Arrow Research). The GCD toolkit facilitates the measurement of bed level change by comparing time-series of digital elevation models and accounting for the uncertainty that arises from survey instrument errors, interpolation artefacts, surface roughness and the pattern of spatial sampling.

The GCD toolkit uses the statistical theory of errors to enable users to classify the probability that elevation differences observed between two DEMs are likely to be significant (real) relative to the underlying data uncertainty. The method generates a cell-by-cell model of elevation change, termed a Digital Elevation model of Difference (DoD) from which the local patterns of bed level change can be aggregated to yield total and regional areas and volumes of predicted bed level decreases (i.e., erosion, subsidence or sediment extraction) and bed level increase (i.e., sedimentation, uplift or sediment augmentation).

Several methods are available for accounting for DEM uncertainty in a GCD analysis. In this study, the probabilistic thresholding approach is applied. This allows for an estimate of error to be applied separately for each input DEM and then propagates these errors through to a Difference of DEMs (DoD) using standard statistical theory. The GCD tool then compares the propagated error to the observed elevation change on a cell-by-cell basis and evaluates the probability that the change is could be due to chance sampling errors using a 'Students t' score. This approach enables the user to define a statistical threshold – a confidence interval – to filter changes that are assumed to be 'real' and those that reflect uncertainties in the underlying data (Brasington et al., 2003; Wheaton et al., 2010; Vericat et al., 2017).

In the analysis reported here, a sensitivity experiment was used to compare bed level change predictions based on three confidence intervals: 68%, 84% and 95%. Following analysis of the results from each run, here we focus on the 84% confidence interval, to present the overall analysis, though we incorporate results from the additional uncertainty thresholds in the accompanying appendix. The resulting maps presented, and the areas/volumes of change tabulated therefore include only elevation changes that have an 84% or greater likelihood of being significant relative to the underlying data uncertainty.

3.2 DEM UNCERTAINTY MODELLING

A spatial model of DEM uncertainty was constructed for each surface (2016 and 2019) based on the observed pattern of land cover. Given the high quality (low magnitude of vertical errors reported) of the two lidar datasets, the surface cover is first order control on data quality. This reflects the combined effects of vegetation cover on the ability to of the lidar survey to penetrate to through to ground level, the local surface roughness (e.g., riverbed gravels vs pasture) and the effects on laser reflectivity – in particular the lack of data retrievals on wet/inundated areas. To represent these effects, data masks (Figures 3-1 and

3-2) were developed for both the 2016 and 2019 datasets using temporally coincident multispectral satellite imagery from the Sentinel 2 platform. The multispectral data were used to provide an unsupervised classification of the land cover at a 10 m resolution, based on a five-point classification scheme. For each land cover class, an estimated vertical uncertainty was set, guided by the local pattern of elevation uncertainty revealed in the raw point cloud. The resulting land-cover classification and DEM elevation uncertainty is shown in Table 3-1.

Table 3-1 – Land cover classification and associated DEM uncertainty

Land Cover Class	Characteristic Vertical Uncertainty (m)
Exposed river gravels	0.13
Inundated areas (without correction)	0.5
Inundated areas (with section corrections, 2016 only)	0.25
Pasture	0.15
Tall Vegetation	0.3

Figure 3-1 – Uncertainty Mask – 2016 LiDAR

Figure 3-2 - Uncertainty Mask – 2019 LiDAR

3.3 AREA OF INTEREST

The main area of interest for the change analysis has been defined as the active channel of the Waiho River, but has also included a section of the Tartare Stream as well as the outbreak path of the Waiho River downstream from Milton's Bank.

The area of interest used in the analysis is presented in Figure 3-3 below.

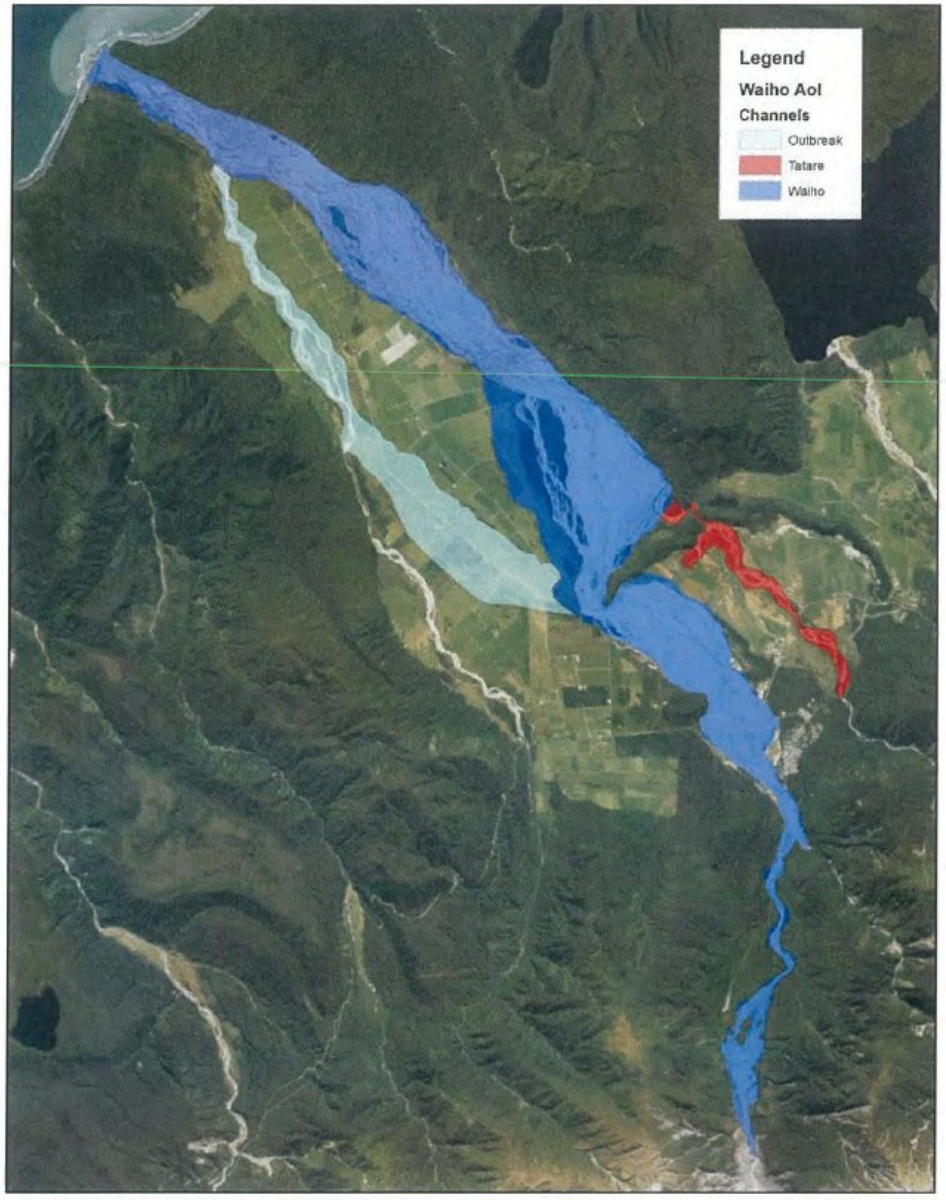

Figure 3-3 – Area of Interest for Change Analysis

3.4 SUB REACH ANALYSIS

In addition to reporting volumetric changes in the three areas identified in the area of interest, analysis of the Waiho River was been split into a series of downstream units or 'cells', in order to quantify the longitudinal pattern of bed response from the glacier to the coast.

Two different models of downstream cells were used. First, the analysis has been divided up into reaches delimited at each end, by the location of historic cross section surveys (XS0-XS23). This approach provides a spatially integrated measure of bed level change between the repeatedly surveyed sections, providing a robust insight into the local pattern of change that averages out the sampling bias due to the siting of specific cross-section.

However, as the historic cross sections do not extend significantly downstream of the Waiho Loop (XS-23), a separate longitudinal analysis has also been completed, in which the entire length of the river was divided into a set of regular 500 m cells based on the channel centreline.

The resulting pattern of sub-areas (cells) for each of these two longitudinal models is shown in Figure 4-1 and Figure 4-2 on the following pages.

Figure 3-4 – XS Units

Figure 3-5 – 500m Longitudinal Units

4.1 BROADSCALE PATTERNS OF BED-LEVEL CHANGE AND CHANNEL ADJUSTMENT

4.1.1. VOLUMES OF EROSION AND DEPOSITION

The aggregated volumes of erosion and deposition and the total net difference (net difference = deposition – erosion) for the three main areas of interest are summarized below in

Table 4-1 below. For all three areas, the net difference is positive, indicating an increase in sediment storage (an increase in bed level).

Table 4-1 -Summary of thresholded volume differences within AOI

	Volume Erosion (m^3)	+- Error (m^3)	% Error	Volume Deposition (m^3)	+- Error (m^3)	% Error	Net Volume Difference (m^3)
Waiho	3,677,044	876,810	23.85	6,676,789	1,535,078	22.99	2,999,745
Tatare	364,640	57,109	15.66	372,244	87,744	23.57	7,604
Outbreak	245,911	77,876	31.67	588,866	226,455	38.46	342,955

Along the mainstem of the Waiho, from the Glacier to the mouth, the depositional signal is exceptionally strong, with over 6.6 M m^3 of sedimentation and a net increase in sediment storage of nearly 3 M m^3. When averaged over the 19 km^2 area of interest (shown in blue in Figure 3-3), this represents an average, system wide, increase in bed level of 0.16 m.

In the Tatare Stream, the volumes of erosion and deposition are approximately balanced, with infilling of the historic channel compensated by significantly local widening of the channel (see discussion below).

Volumetric changes along the path of the outbreak flood reveal the expected pattern of significant sedimentation with over 0.58 M m^3 of deposition and a net increase in sediment storage of 0.34 M m^3 within the area of interest. It should be noted, that the changes within this region reflect significant reworking along the lower reaches of Docherty's Creek in addition of sedimentation from the outbreak through Milton's Bank.

4.1.2 VISUAL INTERPRETATION OF CHANNEL CHANGES

A visual representation of the observed pattern of bed level adjustment between the two surveys is shown by the DEMs of Difference (DoDs) presented in Appendix A. To aid visualisation, the results have been split across three maps representing key areas of interest as follows:

- Glacier to Callery Confluence
- Callery Confluence to Waiho Loop (incorporating the Tatare Stream area of interest)
- Waiho Loop to Coast (incorporating the breakout from Milton's Bank).

Due to the significant differences for the range of bed level change for each of the three maps, each map has used a different set of intervals for the colour legend.

GLACIER TO CALLERY CONFLUENCE

This 6 km reach exhibits a major adjustment in both planform and bed level. In the first 2 km immediately downstream of the glacier, the riverbed has aggraded significantly, with sedimentation widely exceeding 5-8 m, infilling the historic incised channel. Figure 4-1 shows a cross-section extracted at a distance of 500 m downstream from the upstream limit of the lidar surveys (at the interface between cells 1 and 2 in Figure 3-5 above). Here, the blue profile represents the river section extracted from the 2016 lidar and the red the resurveyed profile from the 2019 survey. While, some caution must be taken to reflect the lack of a bathymetric correction in 2019, the scale and extent of channel is clearly evident, with over 10 m of channel fill locally and between 5-8 m across the active valley width.

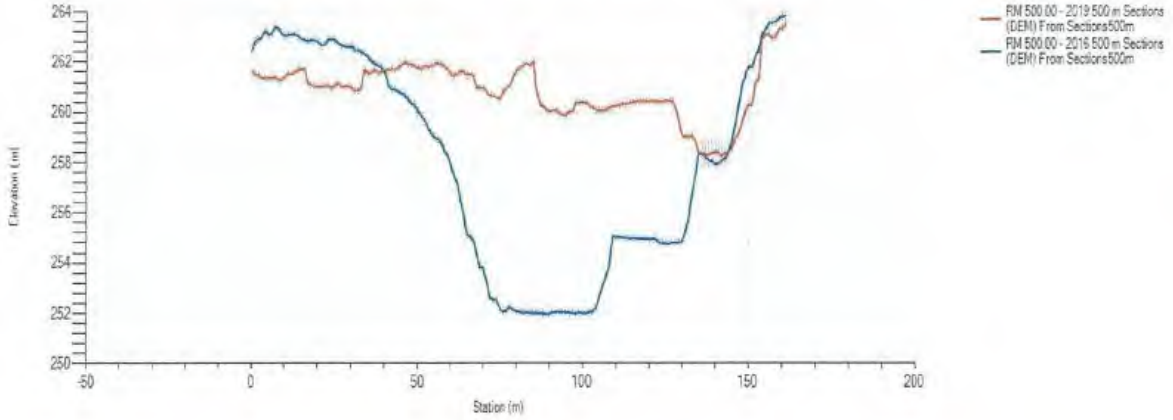

Figure 4-1 Comparison of valley floor profiles extracted from the 2016 and 2019 surveys 500 m downstream from the upper extent of the lidar surveys

Infilling of the 2016 true-left channel continues downstream of Teichelmann and Sentinel Rocks, while flow convergence around these islands has induced scour on the true-right of the active fairway. Between Sentinel Rock and the Callery confluence, channel adjustment comprises infilling of the historic channel and periodic but significant widening of the valley floor associated with erosion on the outer bends of the sinuous channel. Widening of the valley floor exceeds 70 m on the outside bends, resulting in a major

influx of material into the channel associated with destabilization of the adjacent slopes which also resulted in a c. 250 m slope failure across the glacier access road around NZTM 1,371,450 E 5,190,400 N.

CALLERY TO WAIHO LOOP

Between the Callery confluence and the SH6 bridge, the river exhibits an approximate balance of erosion (sourced from cliff retreat on the true right) and channel infilling. The net result is only minor change in bed level at the bridge. Downstream of the SH6 bridge, there is net scour for c. 1.5 km, before the braidplain widens downstream of the Heliport and a net pattern of bed level increase is established through to the Waiho Loop. Locally depths of sedimentation are very high given the expansive width of the channel, and may exceed 2-3 m widely, with average bed level changes of 0.3-0.7 m.

TATARE STREAM

The Tatare river is incised into the Waiho fan limiting the potential for significant sedimentation as described on the Waiho above. By contrast, the pattern of channel adjustment here can be summarized as a combination of infilling the 2016 channel accompanied by significant local widening on outer bends. The net result is a sediment budget that is more or less in balance, and where increases in bed level are offset by widening of the fairway.

WAIHO MAINSTEM FROM THE WAIHO LOOP TO THE MOUTH

Downstream of the Waiho Loop the riverbed is net aggradational, with a net increase in sediment storage exceeding 1 M m3, in the lower 13 km of the river. This reach includes the breach of Milton's Bank, seen clearly by the pattern of left-bank erosion that traces the arcuate form where the historic stopbank once stood. Reworking of the braidplain in these lower reaches is extensive indicating major resetting of the anabranch network. There is also significant local scour and widening of the fairway, most notably along the right bank downstream of the airfield (between channel units 29-33 shown in Figure 3-5.

OUTBREAK AND DOCHERTY'S CREEK

The lidar surveys capture the outbreak flood along the true left of the lower Waiho valley, originating from the breach at Milton's Bank. The breakout joins Docherty's Creek at NZTM 1364,900 E 5197250 N. Immediately downstream of the breach, there is significant sedimentation over existing paddocks, Waiho Flat Road and Franz Josef Aerodrome. The pattern of sedimentation observed in the DoD is concentrated in historic palaeochannels, where depths of fill widely exceed 0.4-0.6 m. The extent of overbank sedimentation is likely to be a conservative estimate however, as the uncertainty analysis used in the DEM differencing (based on areas covered by grassland in both surveys) limits the detection of elevation change to a threshold level of 0.32 m. The actual extent of sedimentation is therefore likely to be significantly underestimated.

4.2 CROSS SECTIONAL ANALYSIS

A more detailed analysis of bed level and volume changes along the main Waiho River has been carried out by dividing the river into sub-reaches, using the historical cross section locations as end-points between spatial units (as shown in Figure 3-4). This permits analysis of the average change in bed level between sections and thus reduces the local bias associated with singular measures at specific sections. A summary of the results is presented in Table 4-2 below.

Table 4-2 – Summary of bed level and volume change between cross sections

	Cross Section	Bed Level Change (m)		Volume Change (m^3)	
		DZ	Error		
Glacier to Callery Confluence	XS0-XS1	2.98	± 0.19	277,817	±17,263
	XS1-XS2	2.21	± 0.19	486,570	±41,686
	XS2-XS3	0.81	± 0.17	220,568	±45,631
	XS3-XS4	0.70	± 0.18	95,745	±24,815
	XS4-XS5	0.20	± 0.25	17,723	±22,262
	XS5-XS6	0.78	± 0.23	52,555	±15,568
Callery Confluence to end of Helipad Bank	XS6-XS7	-1.55	± 0.21	-142,315	±19,654
	XS7-XS8	-1.95	± 0.19	-141,705	±13,926
	XS8-XS9	0.45	± 0.19	23,155	±9,670
	XS9-XS10	0.79	± 0.17	33,633	±7,313
	XS10-XS11	-0.08	± 0.25	-4,247	±13,519
	XS11-XS12	-0.94	± 0.18	-35,746	±6,791
	XS12-XS13	0.55	± 0.18	25,528	±8,433
	XS13-XS14	-0.06	± 0.17	-2,557	±7,316
	XS14-XS15	-0.35	± 0.18	-24,718	±12,856
End of Helipad Bank to Waiho Loop	XS15-XS16	-0.02	± 0.15	-2,278	±14,142
	XS16-XS17	0.05	± 0.14	14,718	±42,110
	XS17-XS18	0.42	± 0.15	134,797	±47,797
	XS18-XS19	0.70	± 0.16	131,761	±29,644
	XS19-XS20	0.32	± 0.15	162,480	±77,470
	XS20-XS21	0.47	± 0.16	251,304	±82,739
	XS21-XS22	0.65	± 0.19	289,959	±83,278
	XS22-XS23	0.26	± 0.17	86,523	±55,908

The longitudinal pattern of erosion and deposition, as well as a cumulative total volume change based on these units is also presented below in Figure 4-1. This analysis quantifies the downstream patterns of channel adjustment mapped in the Appendix and described in Section 4.1. Units XS0-XS04 demarcate the extensive fill at the head of the Waiho valley, comprising a net increase in sediment storage of more than 1 M m^3 of sediment. The erosional input into the system between XS06-XS08 reflects the extensive channel widening and associated toe-slope failures through the confined reach before the Callery confluence. The bed level change between XS08-XS16 is then predominantly degradational before extensive sedimentation occurs as the river widens towards the Waiho Loop (XS16-XS22).

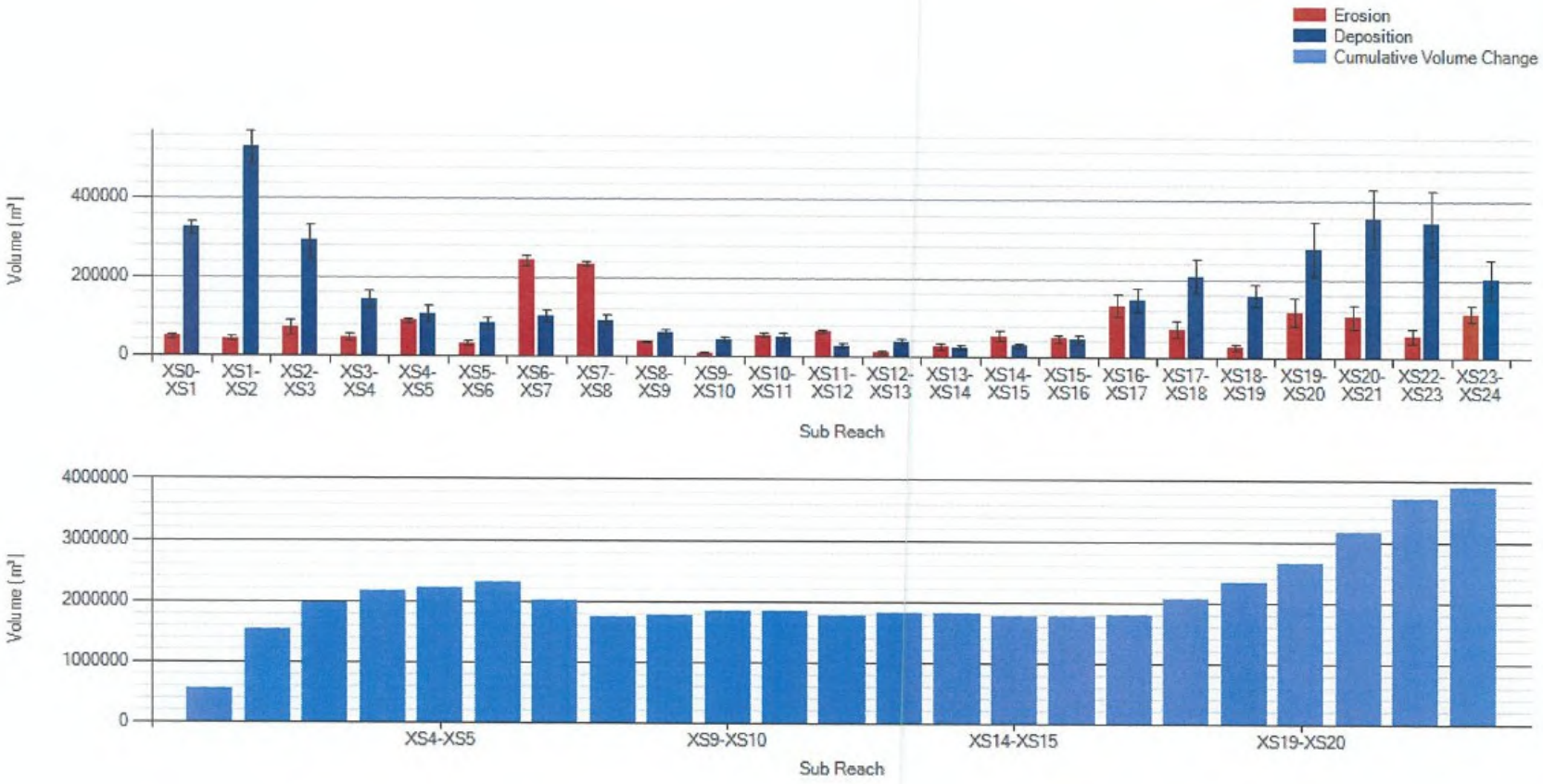

Figure 4-1 – Summary of erosion and deposition and cumulative volume change between XS 1 to XS23

4.3 LONGITUDINAL ANALYSIS BASED ON 500M UNITS

A longitudinal analysis of volume changes was also undertaken along the entire length of the Waiho River, dividing the river into 500 m units starting at the glacier and working downstream. In total the river is divided into 47 longitudinal units, representing the full 23.5 km centreline length. A summary of the erosion and deposition changes for each of these units as well as a cumulative total volume change are plotted in Figure 4-2 below.

This sequence reveals the dominant aggradational pattern, from source to sink. The net volumetric change of +3.3 M m^3 represents the minimum coarse sediment yield from the combined Waiho and Callery catchments over c. 3-year period between the surveys. Given the high frequency of floods through the system, it is impossible to attribute all of this material to the single event at the end of March 2019, but it seems likely that this will represent the dominant driver of the observed pattern.

The downstream series plotted in Figure 4-2 shows three major areas of sedimentation: a) in first 1-3 km immediately downstream of the glacier (units 1-5); b) river distances 8-11 km, upstream of the Waiho Loop (units 16-21); and c) at river distance 12.5-14 km, on the distal margins of the fan downstream from the Waiho Loop (units 25-28). Areas dominated by erosional signal are limited to the areas of valley widening just upstream of the Callery confluence (river distances 4-5 km, units 9-10) and to a lesser degree, downstream of the SH6 bridge between units 12-14.

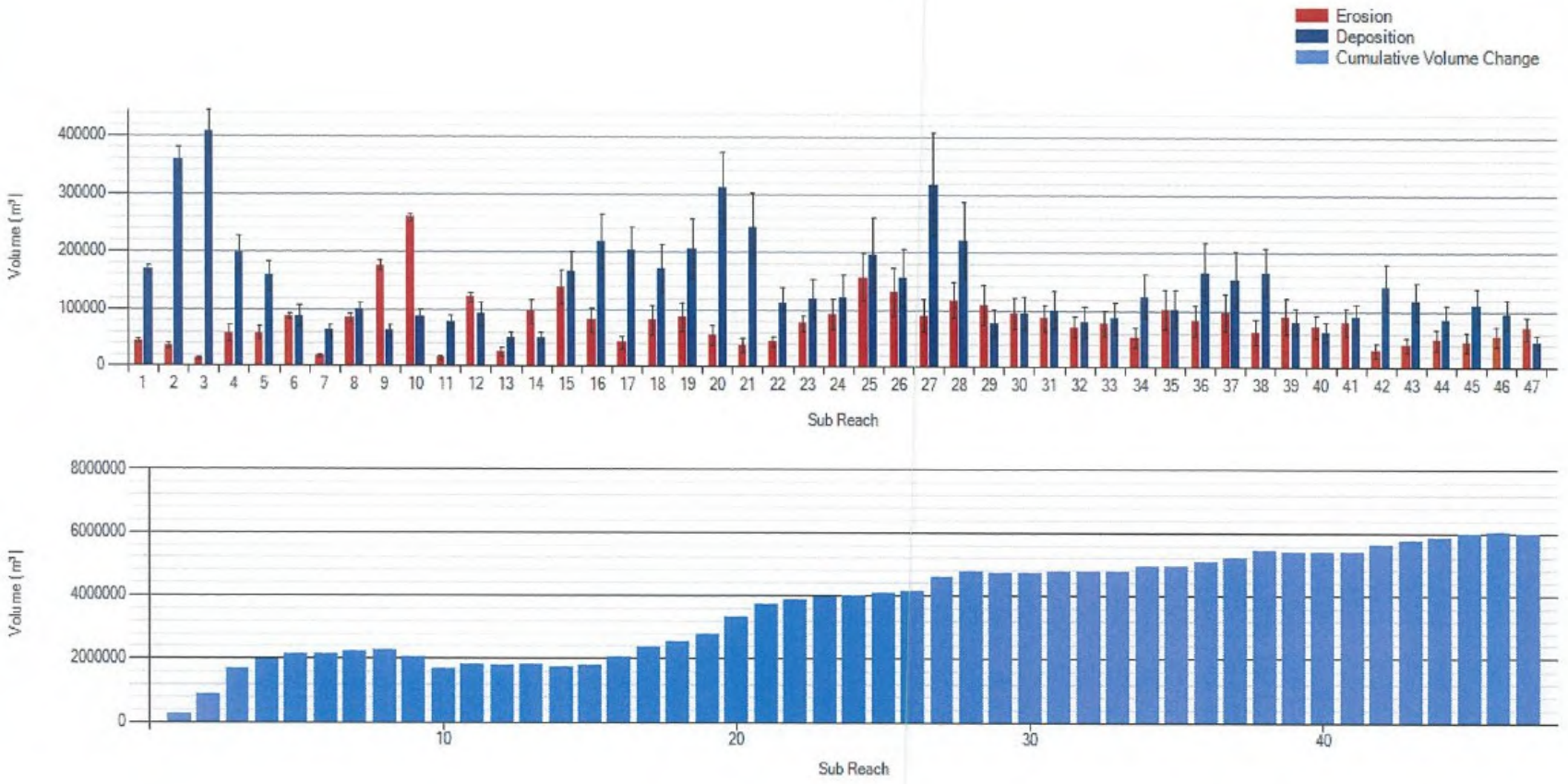

Figure 4-2 - Summary of erosion and deposition and cumulative volume change for whole reach based on 500m units

5. CROSS SECTION MEAN BED LEVEL ANALYSIS

In order to allow a comparison with historic cross-sectional survey data on file, a basic mean bed level analysis has also been carried out at each of the historic cross section survey locations.

Unlike the 2-dimensional analysis carried out using the LiDAR with the GCD tools, no adjustment has been made with the 2019 dataset in order to account for the water surface for the cross sectional analysis, so the results have a greater degree of uncertainty and will slightly overestimate the overall mean bed level for the 2019 survey. However, considering the water surface only covers a small area of the active channel, the overall conclusions and trends are considered valid.

A summary of the changes in mean bed level from 1983 to 2019 is presented in Table 5-1 on the following page with plots showing the cumulative change from 1983 for each surveyed cross section presented in Appendix B.

The overall trends match fairly closely with the results of the GCD analysis presented in section 4, however some cross sections are showing localised increases (such as at XS6 and XS7) whereas the GCD analysis between sections 6 and 7 shows a significant decrease in MBL and volume. Inspection of the LiDAR shows that this decrease in mean bed level between the cross sections is due to significant lateral erosion as was alluded to in section 4-2. Figure 5-1 presents this clearly by showing a comparison of the 2017 and 2019 imagery and results of the GCD analysis. The dark red areas on the GCD plans highlight significant lateral erosion in these outer bends.

Table 5-1 – Summary of Mean Bed Level based at historic cross section locations

	Mean Bed Level (m)												MBL Change (m)	MBL Change (m)
	1983	1990	1993	1999	2002	2008	2011	2012	2014	2015	2016	2019	1993 to 2019	2016 to 2019
CS1			245.5	253.0		253.1				250.7	250.6	253.8	8.2	3.2
CS2	226.0	229.4	229.5	234.5		234.0				233.3	233.6	235.1	5.5	1.5
CS3	212.8	214.0	214.6	216.3		216.4				217.2	217.3	217.6	3.0	0.3
CS4	205.2		206.8	207.8		207.6				207.8	207.5	208.6	1.8	1.1
CS5	195.8	196.1	196.0	195.9	195.9	195.7				196.0	196.3	198.4	2.4	2.2
CS6	185.4	185.3	184.9	185.3	185.3	184.7				185.4	185.0	186.8	1.9	1.8
CS7	173.5	172.5	173.3	175.0	175.0	175.5				174.9	175.0	176.2	2.9	1.2
CS8	163.6	163.5	164.8	166.4	166.4	167.2				167.0	167.3	168.2	3.4	0.9
CS9	157.4	157.2	159.2	161.7	162.1	162.0				162.3	162.5	163.8	4.5	1.2
CS10	152.8		154.2	158.0	158.0	158.3	160.2	160.1	159.5	159.4	159.4	159.6	5.4	0.3
CS11	149.9	151.4	152.5	155.0	154.8	155.7	157.8	157.3	156.7	156.3	156.8	157.2	4.7	0.4
CS12			150.0	152.6	153.1	153.3	155.0	154.4	154.4	154.2	154.2	154.9	4.9	0.7
CS13	145.7	145.1	145.9	148.9	148.4	149.1	150.6	150.0	150.5	149.9	150.5	150.5	4.6	0.0
CS14			143.6	146.3	145.9	146.6	147.6	146.8	147.8	147.7	148.0	147.6	4.0	-0.4
CS15			141.2	143.2	143.4	143.7	144.5	144.5	144.9	144.6	145.1	144.7	3.5	-0.3
CS16			137.7	139.2	139.6	139.8	140.2	140.2	140.5	140.5	140.9	140.9	3.2	0.0
CS17			133.1	134.3	134.4	134.6	135.2	135.2	135.6	135.7	136.0	136.2	3.1	0.2
CS18			127.8	128.7	128.9	129.2	129.7	129.7	129.8	129.8	130.1	130.7	2.9	0.6
CS19	123.6		124.0	124.3	124.6	124.8	125.2	125.3	125.2	125.3	125.6	126.5	2.5	0.9
CS20	116.9		117.1	117.4	117.4	117.9	118.3	118.4	118.5	118.8	118.7	119.1	1.9	0.4
CS21	109.1		109.1	109.2	109.2	109.4	109.5	109.6	109.6	109.7	109.7	109.9	0.9	0.2
CS22	101.4		100.9	101.0	101.0	101.0	101.0	100.8	100.9	101.0	100.9	101.7	0.8	0.7
CS23	93.4		94.5	94.5	94.7	95.0	95.0	94.9	95.0	95.1	95.1	95.7	1.2	0.6

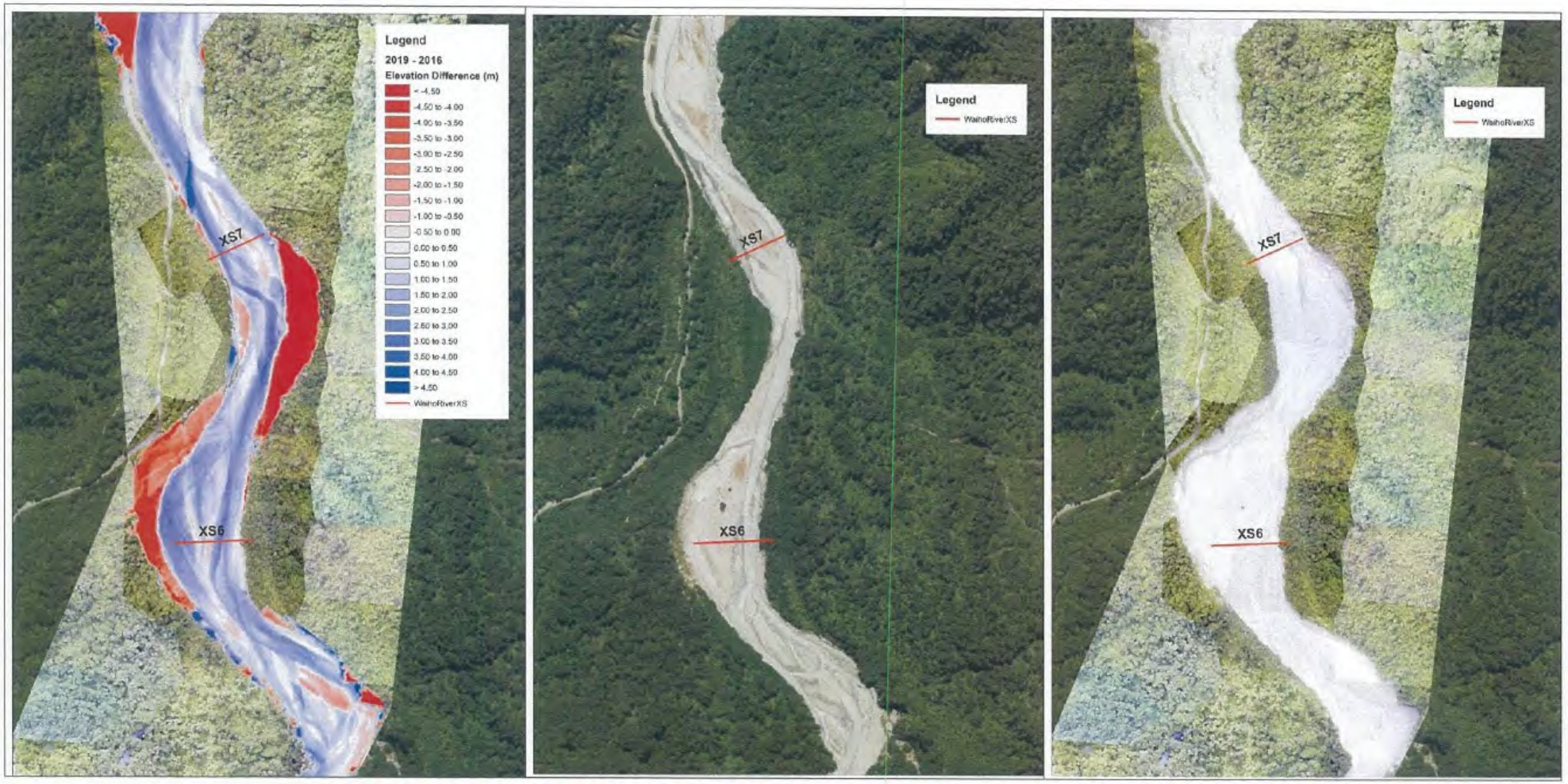

Figure 5-1 – Change in elevation at XS6 at XS7 between 2016 and 2019 LiDAR (left), 2017 aerial imagery (centre), 2019 aerial imagery (right)

In general the following conclusions can be drawn from the cross sectional mean bed level (MBL) analysis (see Appendix B for cumulative plots of MBL change).

XS1 to XS2 – the trends of degradation which had been observed from 2008 to 2016 have now been reversed with very significant aggradation present at these two sections. MBL are now higher than they were in 2008.

XS3 to XS4 – these two cross sections appear to have continued the historic rate (and apparently consistent) aggradation since 2016.

XS5 to XS6 – these two cross sections have been consistently stable since 1983. Bed levels at both of these cross sections has sharply increased for the first time since 1983, with the MBL increasing by over 2m at XS5.

XS6 to XS9 – these three cross sections have all increased in MBL at a greater rate than in the previous 15 years. The rate of aggradation since 2014 appear to be similar to the rate observed between 1990 and 1999

XS10 to XS16 – this reach has been historically aggrading, however appears to be behaving as a transfer reach (ie sediment is passing through this reach rather than being stored). MBL have had little change in this reach.

XS17 to XS21 – this reach appears to be aggrading at a slightly accelerated rate in comparison to the years from 1983 to 2016. Due to the very wide width of the river here, the volume of sediment accumulation is very significant. This indicates that the material that was previously aggrading in the reach between the Callery River and the Heliport bank is now being transferred through to this area and is aggrading here rather than upstream. If this rate of aggradation continues then significant pressure can be expected on the bank protecting the treatment ponds on the true right bank.

XS22 to XS23 – Both of these sections have increased significantly in the last three-year period. This is the first time that section 22 has had a significant increase since 1983. This may indicate that the gravel fan is beginning to extend beyond the Waiho Loop.

6.1 IMPACT OF WEATHER PATTERNS ON SEDIMENTATION

It is very difficult to predict with any certainty future behaviour of such a complex natural system, however historic trends can give some insight as to what may occur in the future.

The main Alpine Fault crosses the Waiho River, dividing the mountainous upper catchment from the coastal plains. This fault line is known to rupture on a regular basis giving rise to significant inputs of fractured rock into the river systems. Due to the mid-latitude location in the southern Pacific Ocean, with the Alps intercepting the westerly circulation of anticyclones and depressions, the area is also prone to very high rainfall intensities (Gardner & Williams, 2019)

Flood flows are generated rapidly through the catchment and the steep nature of the Waiho River gives rise to very high rates of sediment transport over short time periods. The high relief in the vicinity of the river also comprises weak, fractured rock which results in very high rates of sediment supply even under the natural forest cover.

The oceanic climate is highly variable but subject to long-term oscillations of large global circulations, specifically the Southern Ocean circulation and circulations around the South Pacific (Gardner & Williams, 2019). The Interdecadal Pacific Oscillation (IPO) is a major driver of regional variations in storm intensity and flood flows in New Zealand. This has a typical cycle with 20-30 year phases (positive & negative) which gives rise to periods of high flood intensity followed by a generally quiescent period, before a return to more and larger floods.

For the Waiho River of the Franz Josef Glacier system, there is some evidence of a correlation between glacier advance and rising mean bed levels at the State Highway (SH) Bridge. Conventionally, this association is interpreted to reflect increased sediment supply associated with high rates of glacial erosion during periods of advance. An alternative explanation, however, is that the bed level response actually reflects increased erosion due to elevated rainfall, which in turn leads to a positive glacier mass balance and so also causes glacier advance (albeit with the terminal response lagging). Such behaviour would be expected during the positive phase of the IPO and provides an alternative causality for the correlation of glacier advance and bed level change.

Analysis of the hydrological records of several West Coast rivers (Whataroa, Grey and Buller) indicates that the regional climate seems to have been in the negative phase of the IPO cycle since the late 1990's. The negative phase of the cycle correlates to generally lower overall rainfall intensities, indicating that the last 20 years or so has been a relatively quiescent period for the West Coast. Increased rainfall events as of late may be indicating that the cycle has changed to a positive phase suggesting we can expect more increased rainfall events for the next 20 to 30 years. Increased rainfall intensities will ultimately lead to an increase in sediment supply into the West Coast rivers and will likely lead to a change in sedimentation patterns.

Increased rainfall volumes in the Waiho River catchment will be very likely to mobilise the sediment, which is currently stored in the upper Waiho River, as well as mobilise greater volumes of the fractured material

present in the steep valley slopes, leading to even greater volumes of sediment in the river. It is likely that this material will continue to deposit downstream of the SH Bridge, however there is also significant likelihood based on past behaviour that the reach between the Callery confluence and the Helipad bank may return to being in an aggradational phase, although this will also be influenced by the volume of material coming into the system from the Callery River system.

One thing to keep in mind is that the climate is changing fairly rapidly and this appears to be impacting on the behaviour of the global climate patterns. As a result, historic behaviour may no longer be as good an indicator as to what will happen in the future. Recent events such as tropical cyclone Gita and Fehi coming as far south as the top of the South Island do not fit normal patterns of weather behaviour for New Zealand and indicate that global weather patterns are changing as the seas warm etc. These changes in weather patterns may be a further indicator that the West Coast may be in line for even greater storm intensities in coming decades, which will likely lead to even greater volumes of sedimentation in the West Coast rivers, including the Waiho River.

6.2 FUTURE SEDIMENTATION TRENDS

As has been highlighted above, it is likely that increased volumes of sediment will continue to enter the Waiho River. We consider the following trends to be likely;

- The fan will continue to build downstream of the Helipad bank. This may lead to increased pressures on the true right embankment protecting the oxidation ponds. Whilst the overall trend is one of aggradation, the rock lined embankment on the true right bank will likely encourage the main braid of the river to flow along the edge of the bank causing significant scour at the toe of the bank. If the stopbank does not have a well-founded toe that extends several metres beneath the current bed, there will be a reasonable risk of failure of this bank, no matter how thick it is.
- Based on historic behaviour there is a chance that the reach between the helipad bank and the confluence of the Callery River will return to an aggradational condition due to the increased volume of sediment now stored in the upper reaches of the river. Historically, there has been a delay between upstream storage and downstream increase in MBL at the SH bridge which is an order of a decade. While a similar lag-time could be likely, the precise link between upstream storage and downstream bed level change will dependent on the frequency of flood events with sufficient energy to transport the material downstream.
- It is likely that the fan will continue to grow and increase bed levels downstream of the Waiho Loop, potentially increasing the pressure on Milton's bank, which was destroyed in the March 2019 flood event and has now been rebuilt.
- While the increase in sediment storage in the main Waiho River system is estimated to be in excess of 3 M m^3, it is helpful to put this in context. For example, in the Fox River catchment (South of the Waiho River) debris flows in the Alpine Gardens and Mills Creek area have fed greater than twice this volume of debris into the Fox River between March 2017 and June 2018. Volume estimates indicate that the volume of debris entering the river system is in excess of 6.5 M m3 (Massey, et al., 2019). Due to the similar nature of the bedrock and relief in the Waiho and Callery River catchments, it would not be unrealistic to expect future slips of a similar magnitude in this catchment. Such events would lead to very significant bed level changes in the river.

- When the Alpine Fault ruptures (which is very considered likely in the coming decades), the system will be essentially reset due to exceptionally large volumes of sediment supply that will result in dramatic changes in river morphology and behaviour.

7. CONCLUSIONS

The following conclusions can be drawn from this analysis.

- Significant volumes of sediment have entered the Waiho River system since the last LiDAR survey was carried out in 2016. It is likely that the rainfall event in March 2019 was the principal driver of this sediment supply.
- A detailed analysis of volume changes has estimated that greater than 3.3 million cubic metres has been deposited in the study area since 2016. This volume represents the minimum plausible rate of catchment sediment supply to the Waiho River, but it is likely that a significant volume of material, in particular finer sediments passed directly through the system to the sea.
- Significant volumes of material have been deposited in the upper reaches of the Waiho River with greater than 1 M m^3 depositing between XS0 and XS5 since 2016. This is a very large volume of material which will ultimately work its way through the system.
- No information on sediment volumes is currently collected in the Callery River catchment which makes up a significant proportion of the overall catchment. Significant volumes of material may have also been destabilised in the March rainfall event which will also eventually make their way into the Waiho River system.
- Based on historic behaviour, significant increases in bed level in the upper Waiho catchment appear to correlate with delayed increases in bed level at the bridge location. There is a chance that the increased bed levels observed in the upper reaches may cause bed levels to aggrade near the bridge in the coming decade. The precise phasing of this connection will depend strongly on the frequency of future storm events.
- A change in weather patterns in the West Coast is likely leading to increased rainfall intensities and as a result increased sedimentation.
- Increased aggradation on the fan downstream of the helipad bank is likely to continue and may lead to increased pressure on the existing stopbanks, in particular the true right stopbank which is protecting the oxidation ponds. If this bank is not well founded with a buried toe, then it maybe at risk of failure in the future due to the fact that it is currently sucking the main braid into the bank.
- Cross sectional analysis shows bed levels aggrading rapidly in the vicinity of the Waiho loop for the first time since the 1980's. This indicates the fan is extending downstream and as the fan continues to aggrade and extend downstream in the vicinity of the Waiho Loop the pressure on the Milton's stopbank may increase as a result.
- With the level of increased aggradation being observed on the Waiho Fan, it is becoming more likely that a permanent avulsion into the Tartare will take place in the future.

8. REFERENCES

Brasington, J., Langham, J. and Rumsby, B., 2003. Methodological sensitivity of morphometric estimates of coarse fluvial sediment transport. *Geomorphology, 53*, 299-316.

Gardner, M. & Williams, G., 2019. *FOX GLACIER — ROAD ACCESS, ENGINEERING REVIEW,* Christchurch: Land River Sea Consulting Ltd.

Massey, C. et al., 2019. *Landslide hazard and risk assessment for the Fox and Franz Josef Glacier valleys,* s.l.: GNS Science.

Wheaton, J.M., Brasington, J., Darby, S.E. and Sear, D.A., 2010. Accounting for uncertainty in DEMs from repeat topographic surveys: improved sediment budgets. *Earth surface processes and Landforms, 35*, 136-156.

Vericat, D., Wheaton, J.M. and Brasington, J., 2017. Revisiting the morphological approach: opportunities and challenges with repeat high-resolution topography. *Gravel-Bed Rivers: Process and Disasters, 121.*

APPENDIX A – GCD VISUAL REPRESENTATION

SCALE BAR

0 0.25 0.5 1 km

PROJECT

Waiho River
Change Detection Analysis

Legend

2019-2016

Elevation Difference (m)

- < -4.50
- -4.50 to -4.00
- -4.00 to -3.50
- -3.50 to -3.00
- -3.00 to -2.50
- -2.50 to -2.00
- -2.00 to -1.50
- -1.50 to -1.00
- -1.00 to -0.50
- -0.50 to 0.00
- 0.00 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.50
- 2.50 to 3.00
- 3.00 to 3.50
- 3.50 to 4.00
- 4.00 to 4.50
- > 4.50

TITLE **Bed Level Change Detection**
Glacier to Callery Confluence
Change in bed level 2016 to 2019

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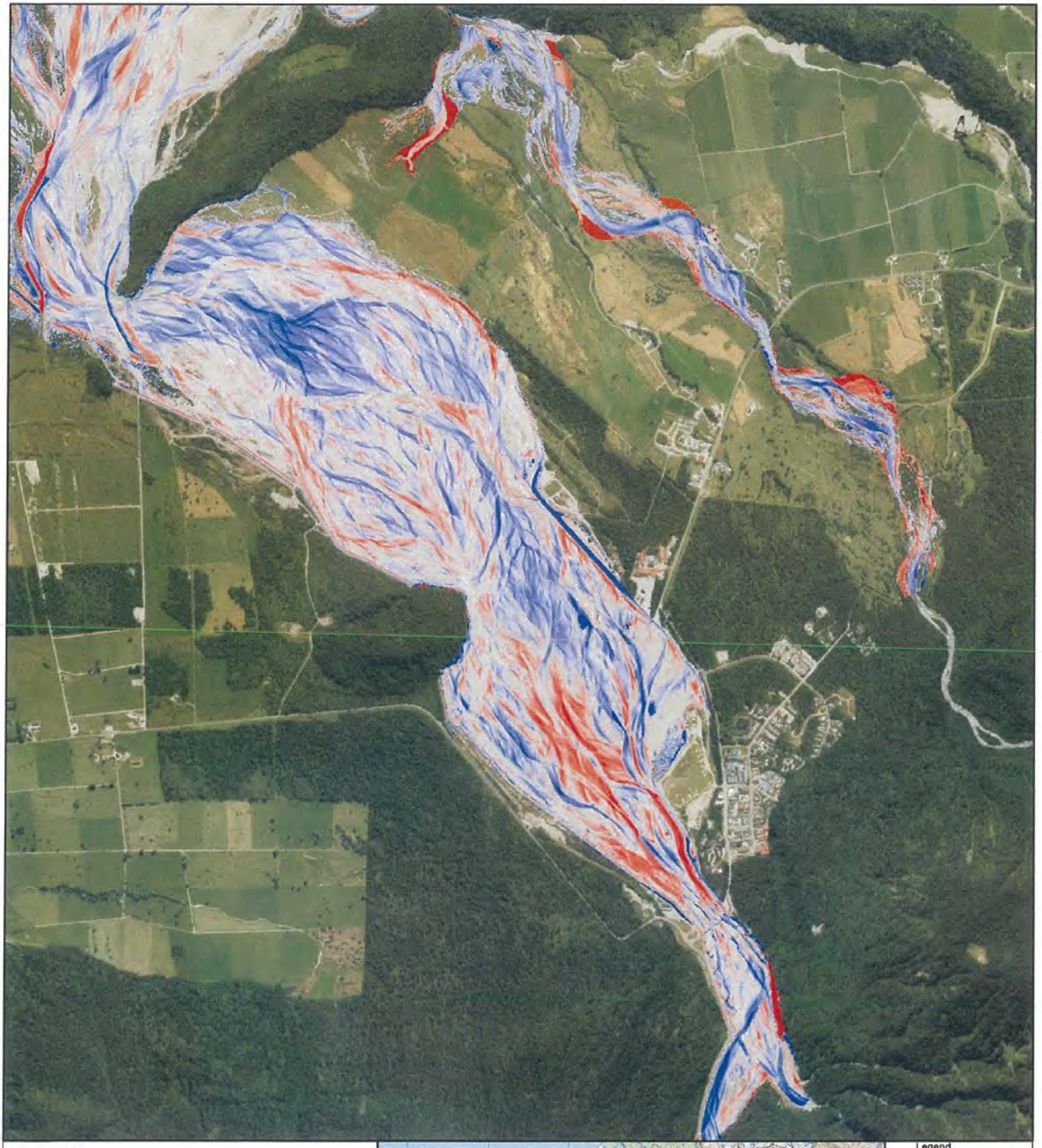
Te Whare Wānanga o Waikato

AUTHOR	DATE	JOB CODE	REVISION	N
Matthew Gardner	29 July 2019	WCRC017	01	



SCALE BAR

0 0.25 0.5 1 km

PROJECT

Waiho River
Change Detection Analysis

Legend

2019-2016

Elevation Difference (m)

- < -2.20
- -2.20 to -2.00
- -2.00 to -1.80
- -1.80 to -1.60
- -1.50 to -1.20
- -1.20 to -1.00
- -1.00 to -0.80
- -0.80 to -0.60
- -0.50 to -0.20
- -0.20 to 0.00
- 0.00 to 0.20
- 0.20 to 0.40
- 0.50 to 0.80
- 0.80 to 1.00
- 1.00 to 1.20
- 1.20 to 1.40
- 1.50 to 1.80
- 1.80 to 2.00
- 2.00 to 2.20
- > 2.20

TITLE **Bed Level Change Detection**
Callery Confluence to Waiho Loop
Change in bed level 2016 to 2019

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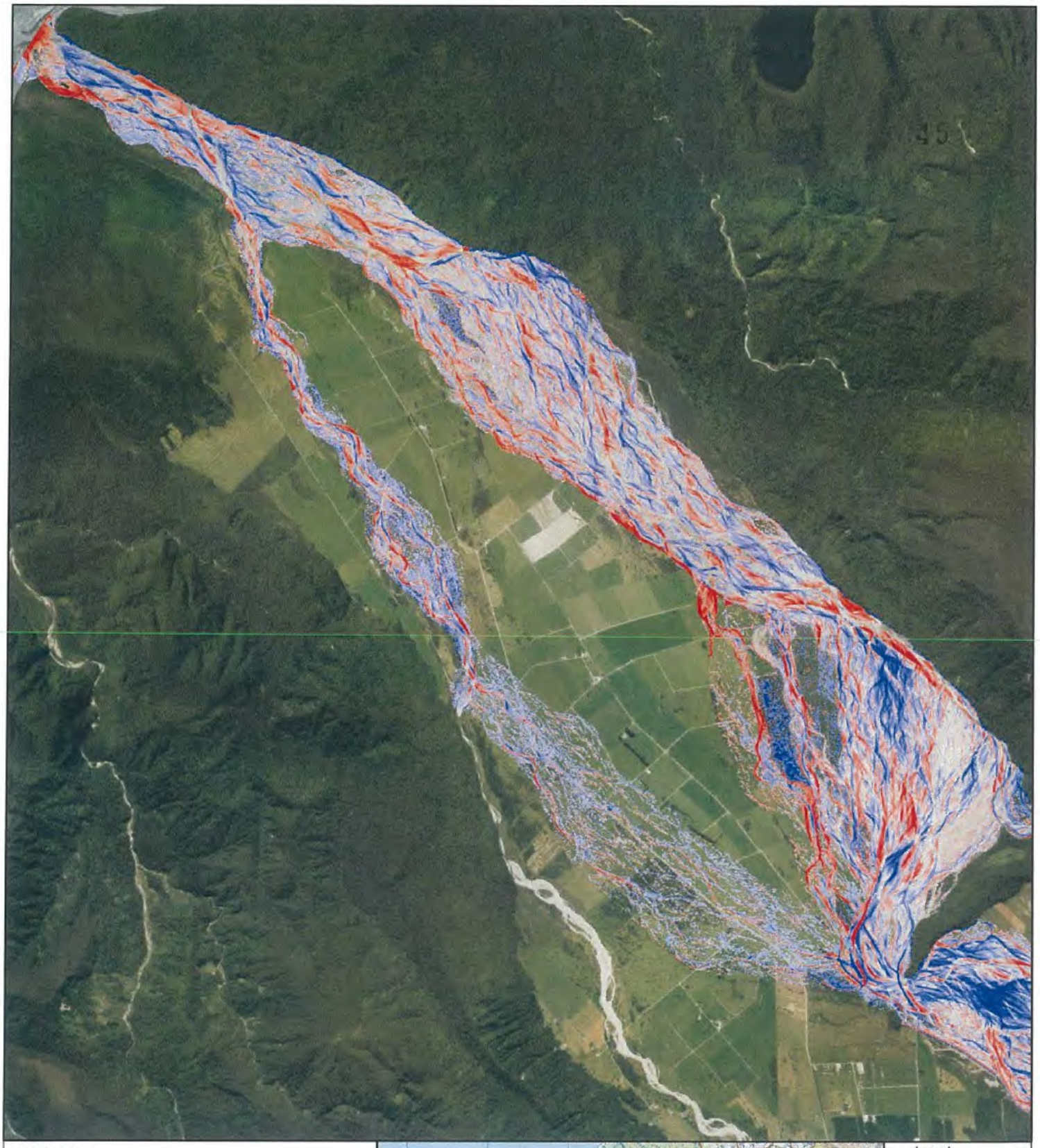

SCALE BAR

0 0.5 1 2 km

PROJECT

Waiho River
Change Detection Analysis

Legend

2019-2016

Elevation Difference (m)

- < -1.40
- -1.40 to -1.20
- -1.20 to -1.00
- -1.00 to -0.90
- -0.90 to -0.80
- -0.80 to -0.60
- -0.60 to -0.40
- -0.40 to -0.30
- -0.30 to -0.20
- -0.20 to -0.10
- 0.00 to 0.20
- 0.10 to 0.20
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 0.90 to 1.00
- 1.00 to 1.20
- 1.20 to 1.30
- > 1.40

TITLE **Bed Level Change Detection**
Waiho Loop to Mouth
Change in bed level 2016 to 2019

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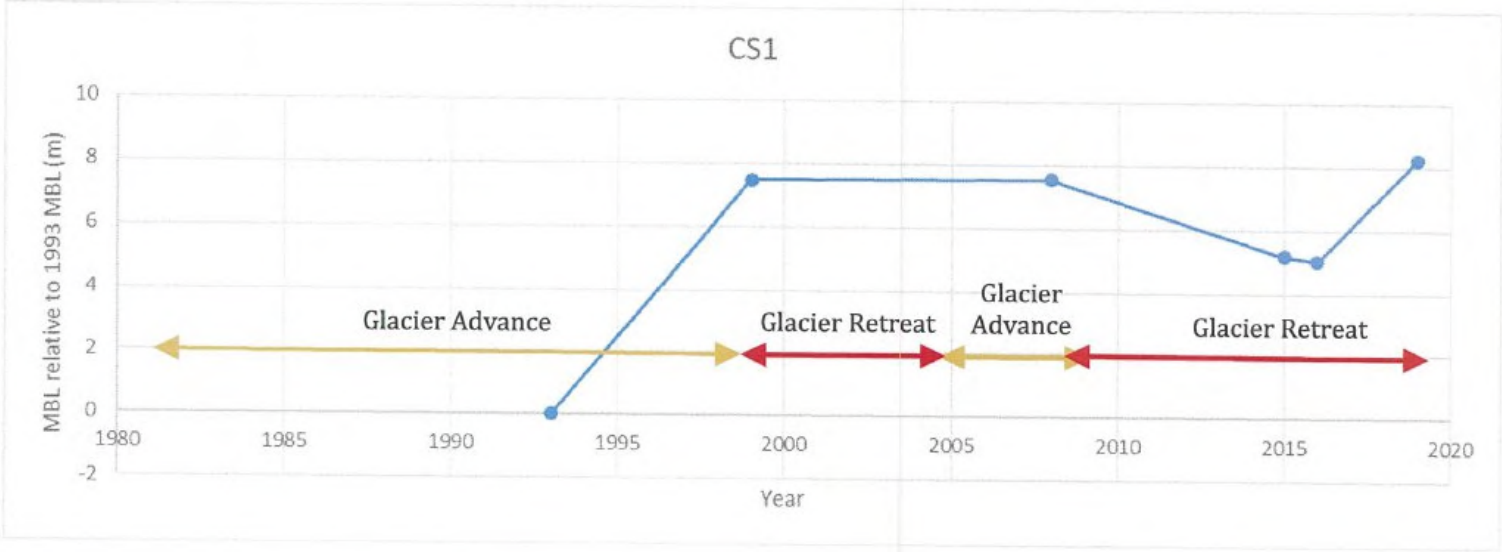
Te Whare Wānanga o Waikato

AUTHOR	DATE	JOB CODE	REVISION	
Matthew Gardner	29 July 2019	WCRC017	01	N

APPENDIX B – CROSS SECTIONAL MBL COMPARISON 1983 TO 2019


CS1
MBL relative to 1993 MBL (m)
10
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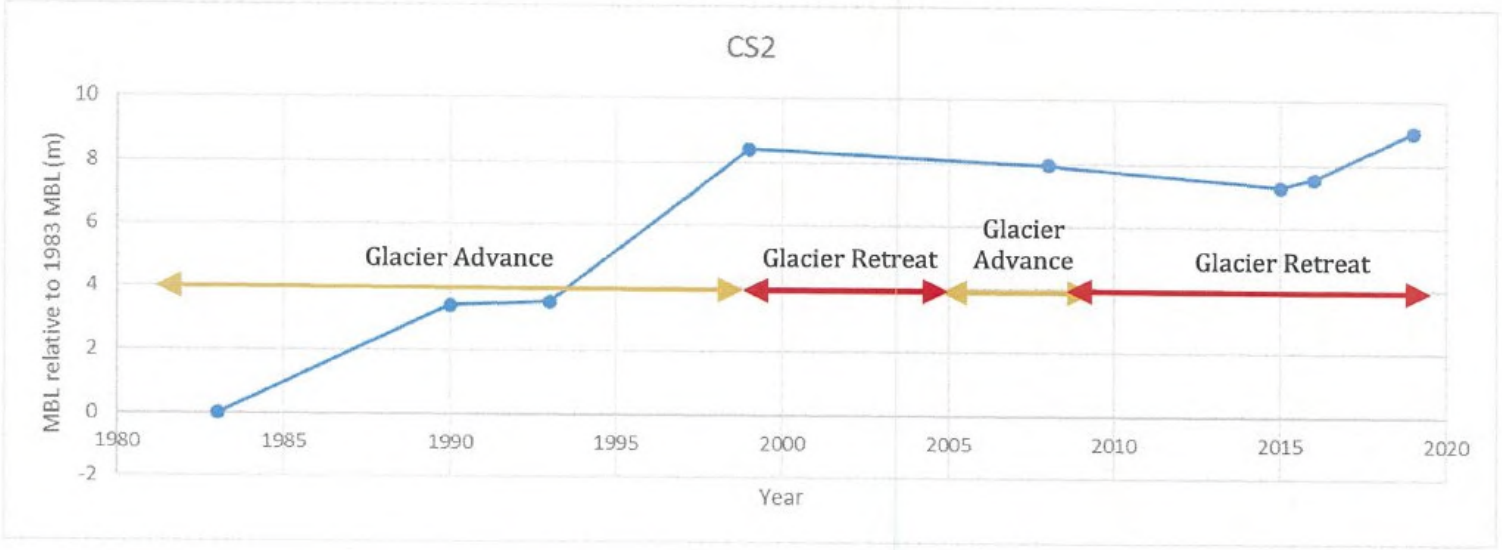
Year
Glacier Advance
Glacier Retreat
Glacier Advance
Glacier Retreat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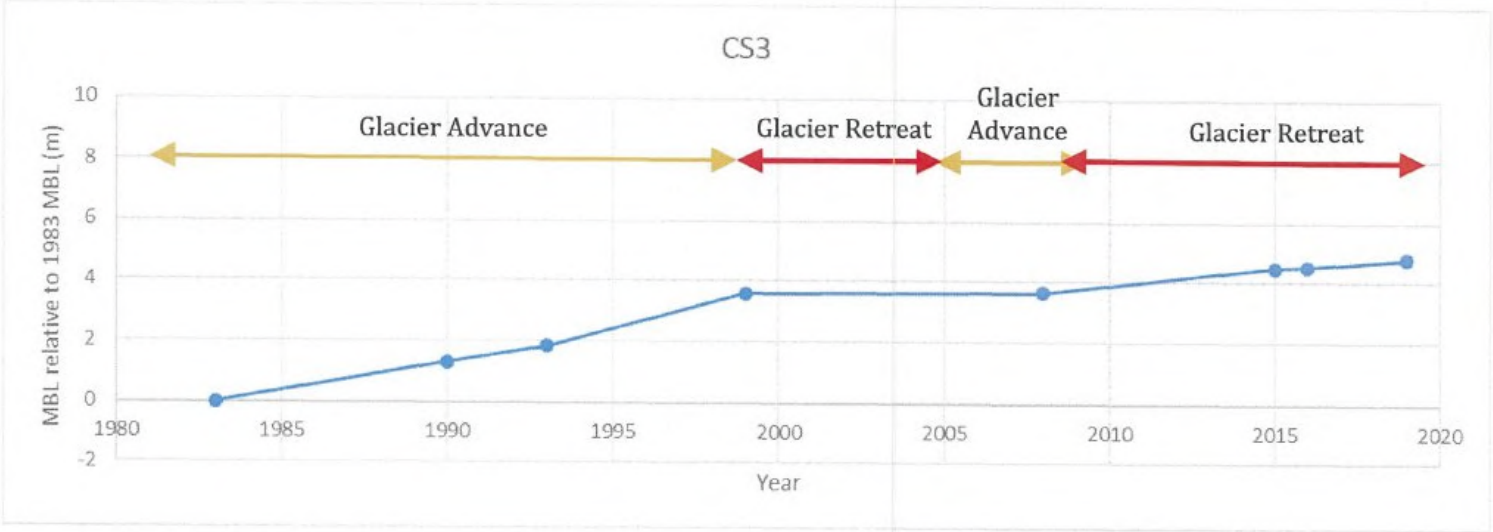
Year
Glacier Advance
Glacier Retreat
Glacier Advance
Glacier Retreat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Glacier Advance
Glacier Retreat
MBL relative to 1983 MBL (m)
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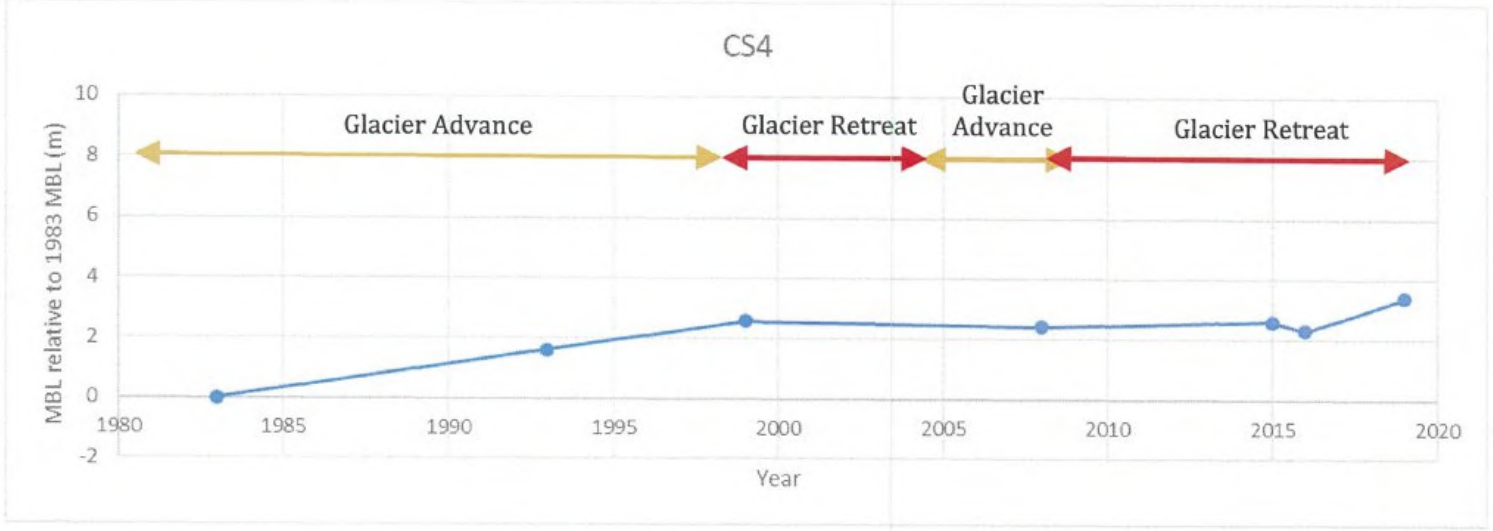
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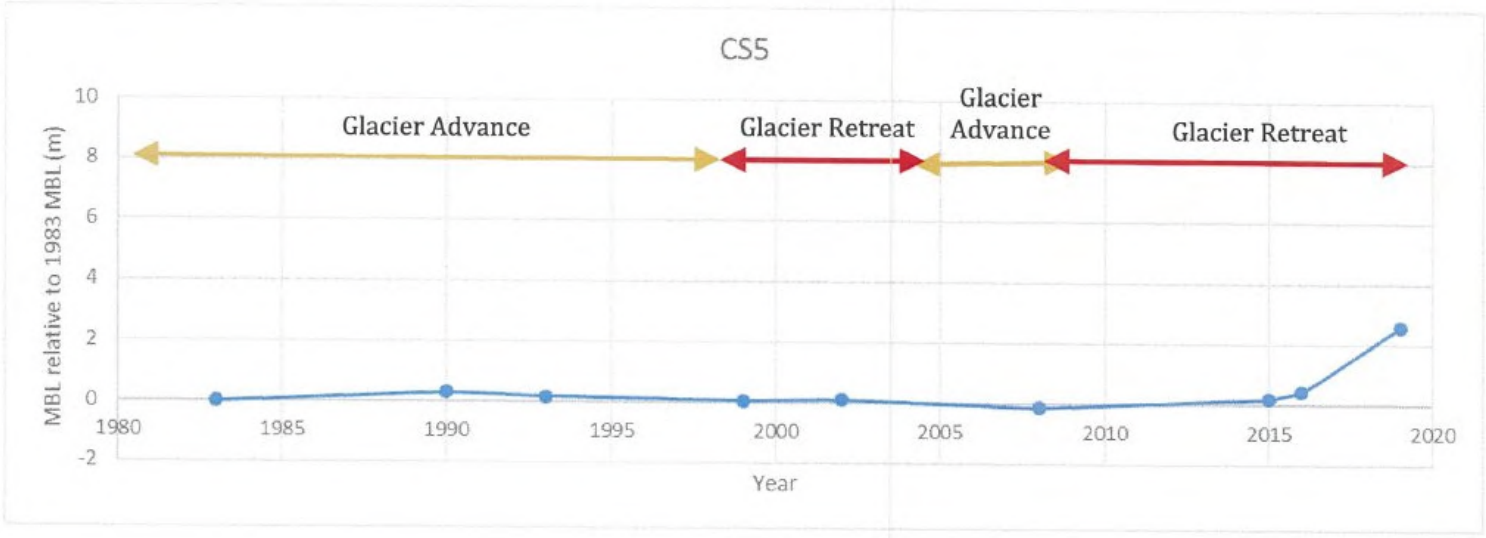
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MBL relative to 1983 MBL (m)
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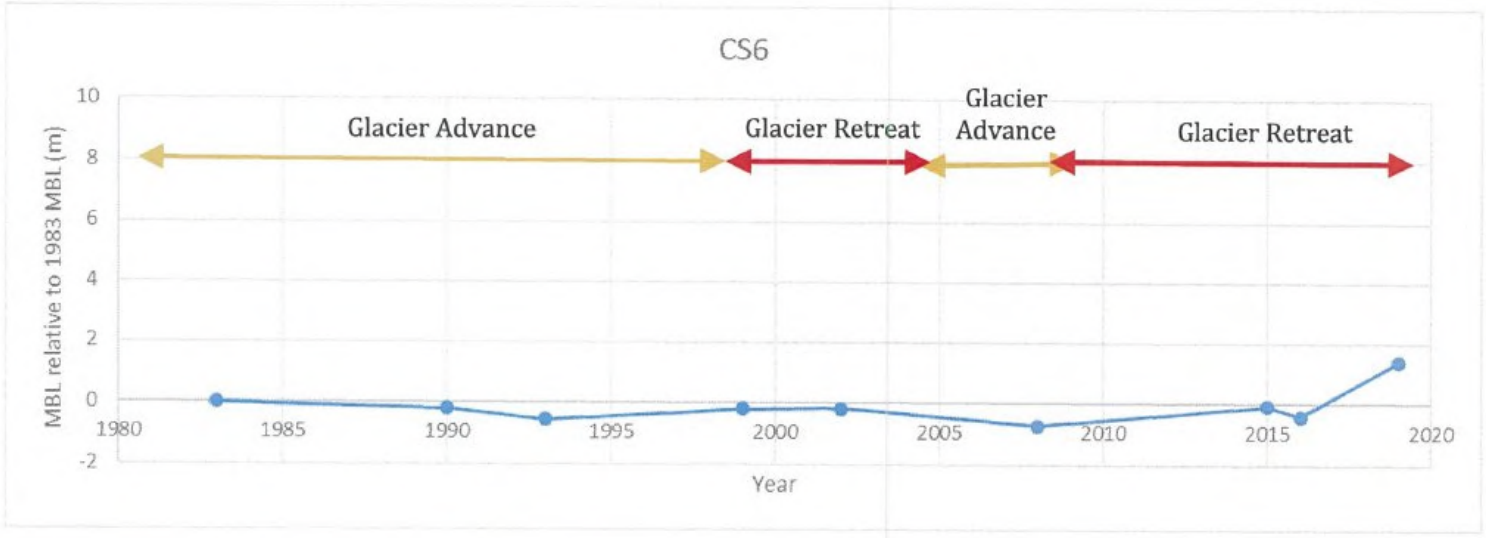
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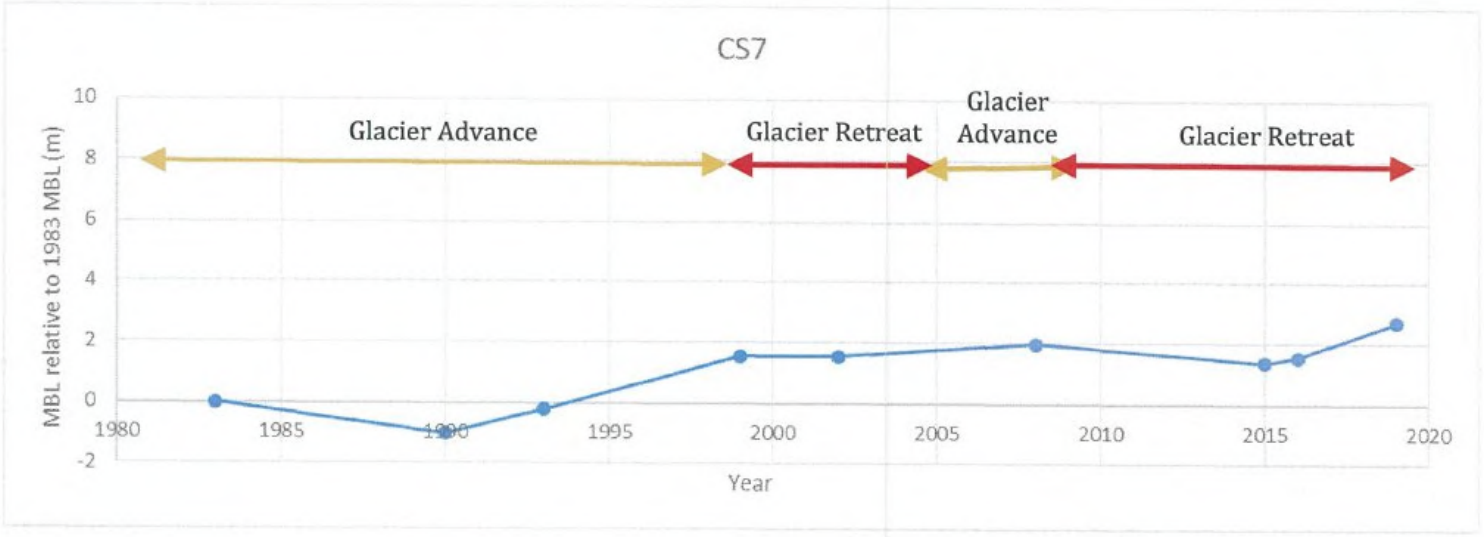
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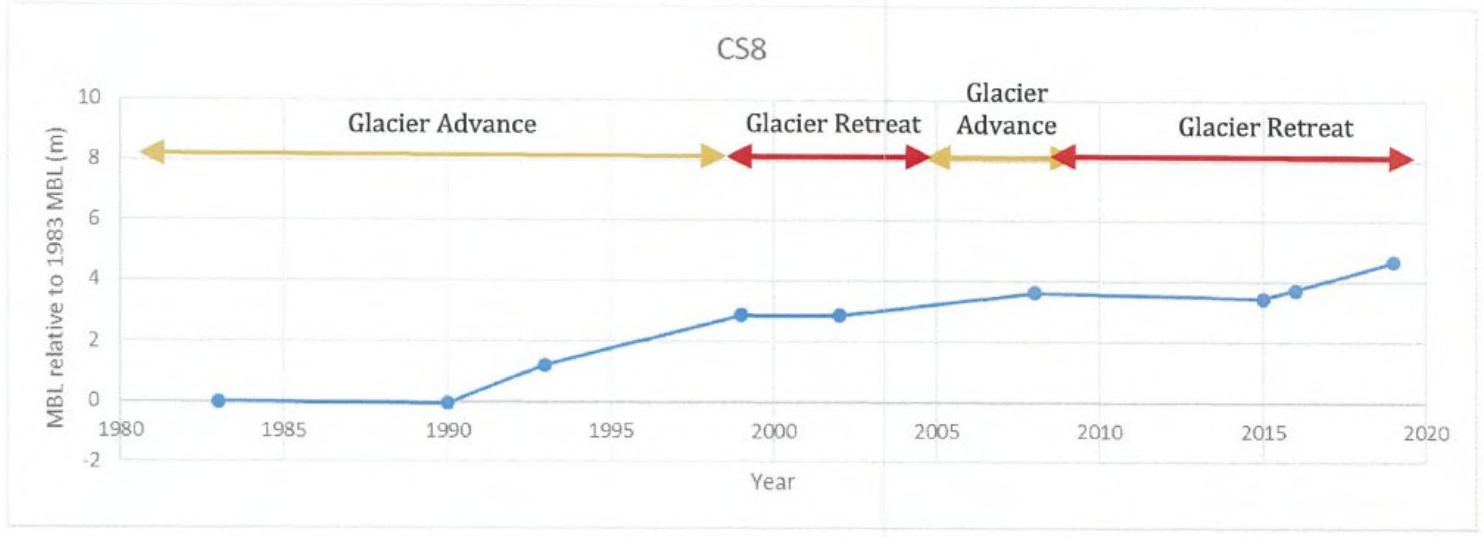
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Glacier Retreat
MBL relative to 1983 MBL (m)
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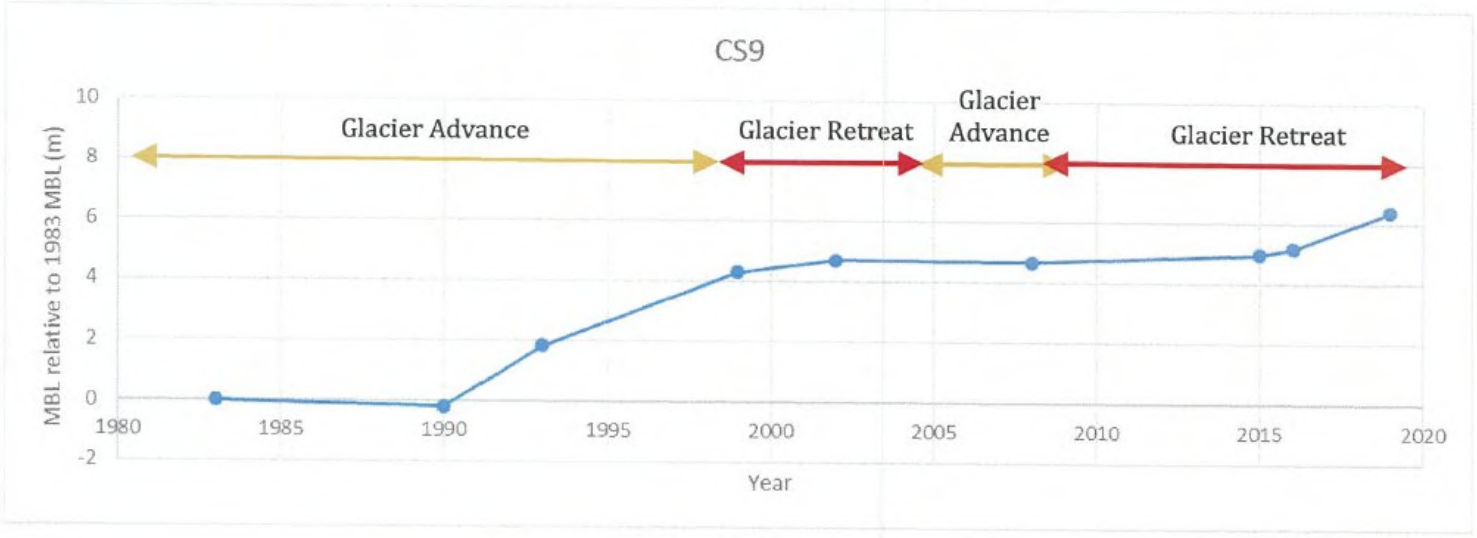
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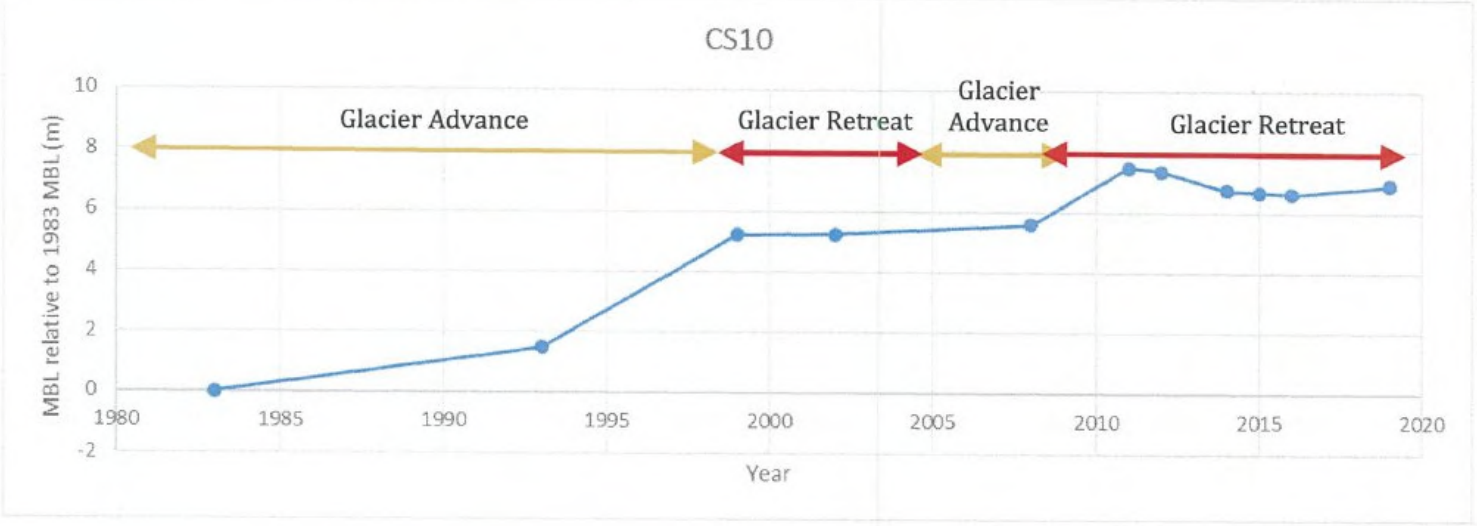
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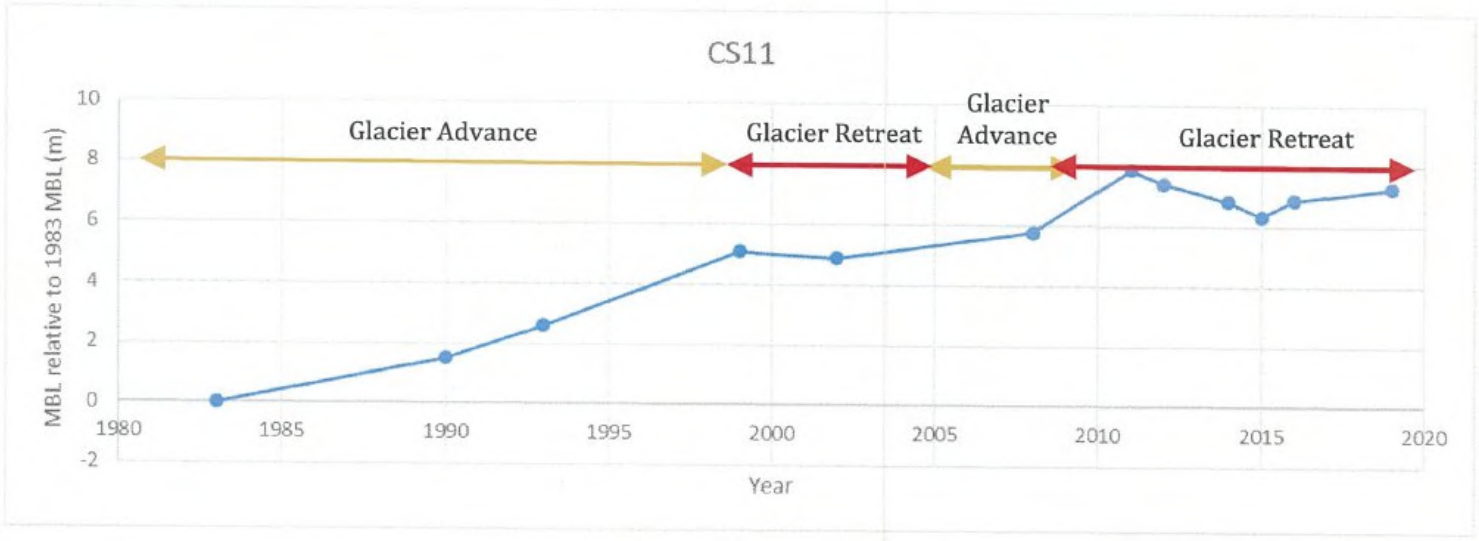
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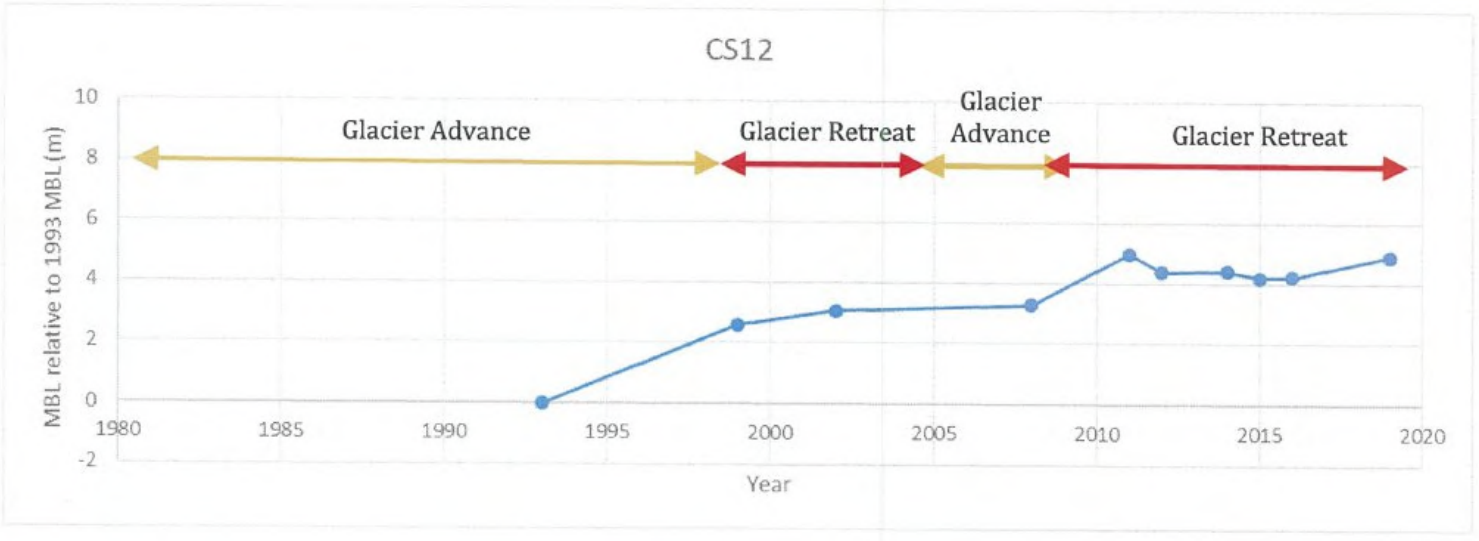
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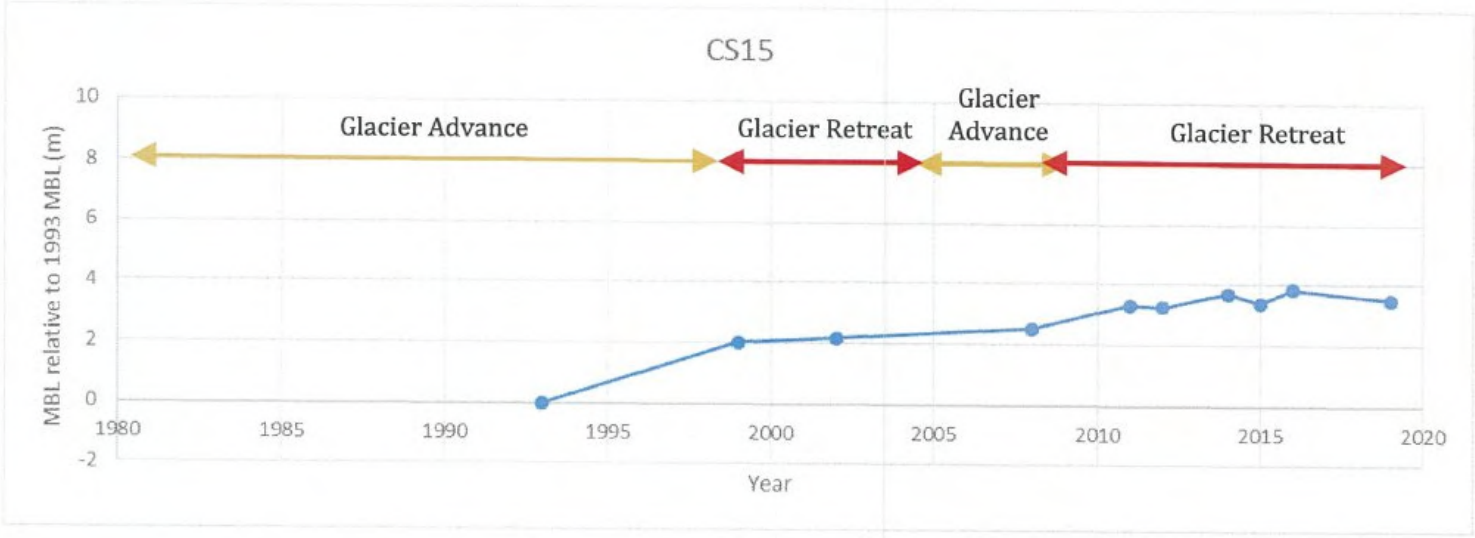
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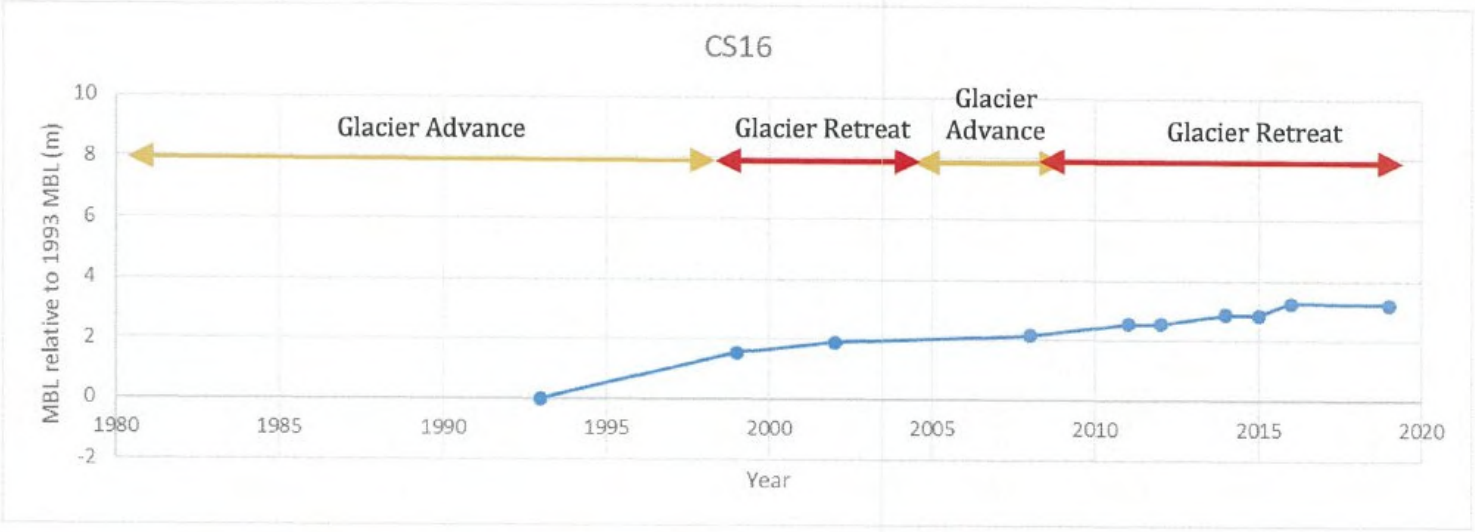
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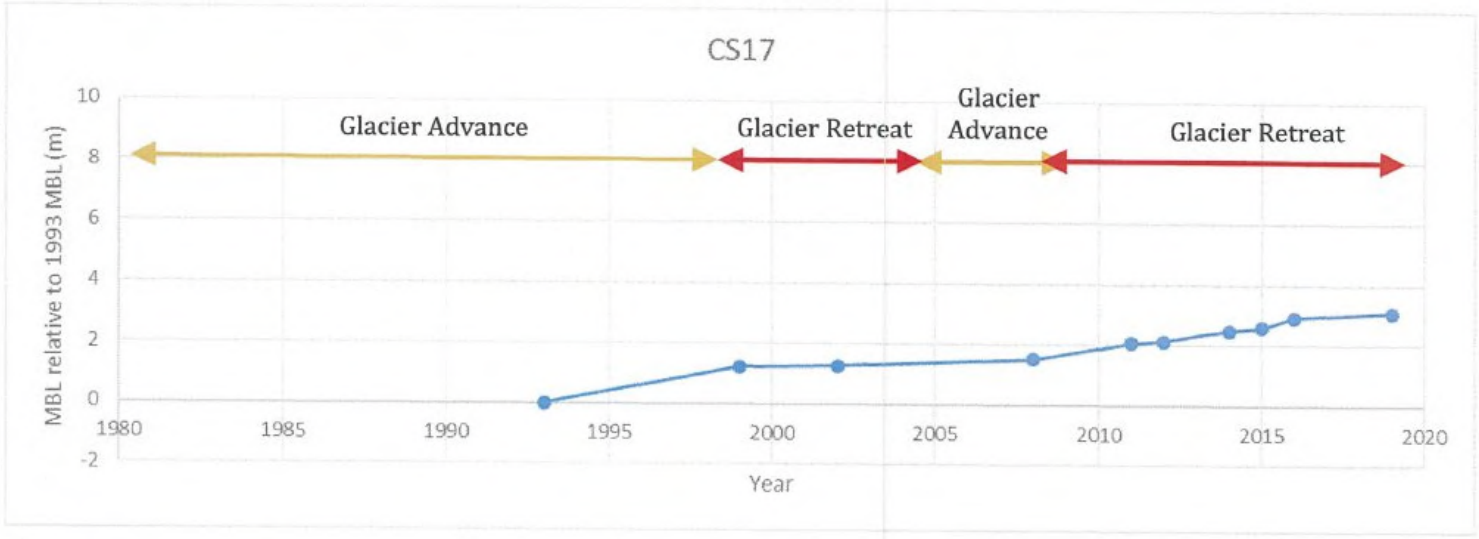
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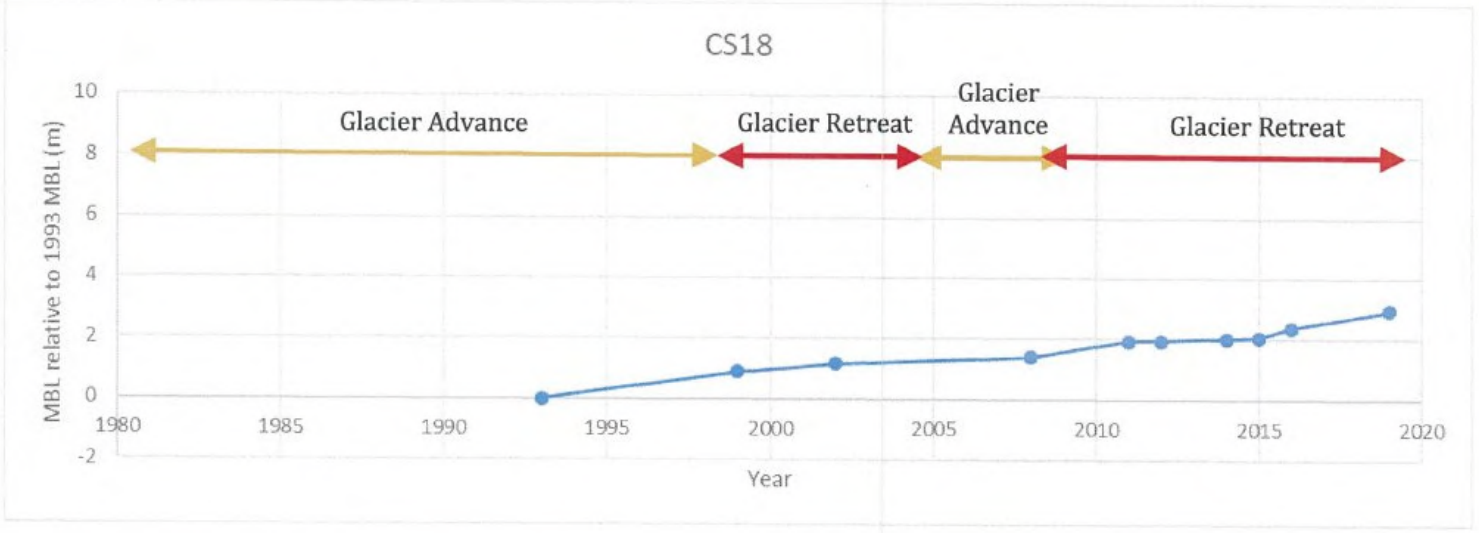
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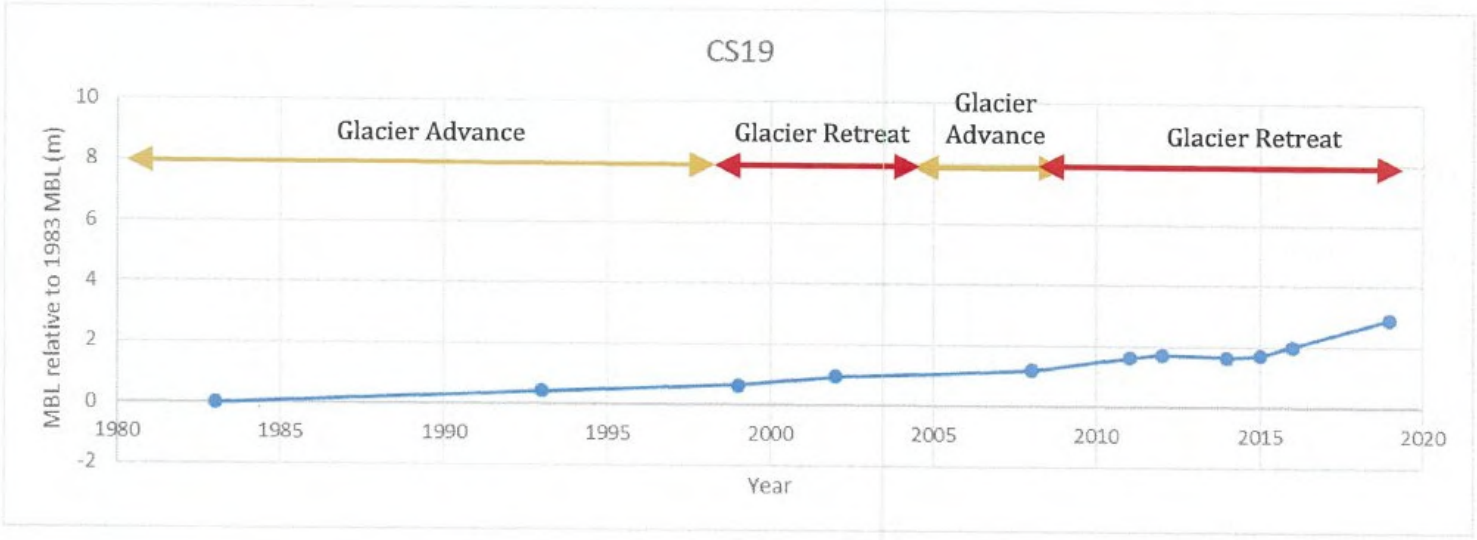
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MBL relative to 1983 MBL (m)
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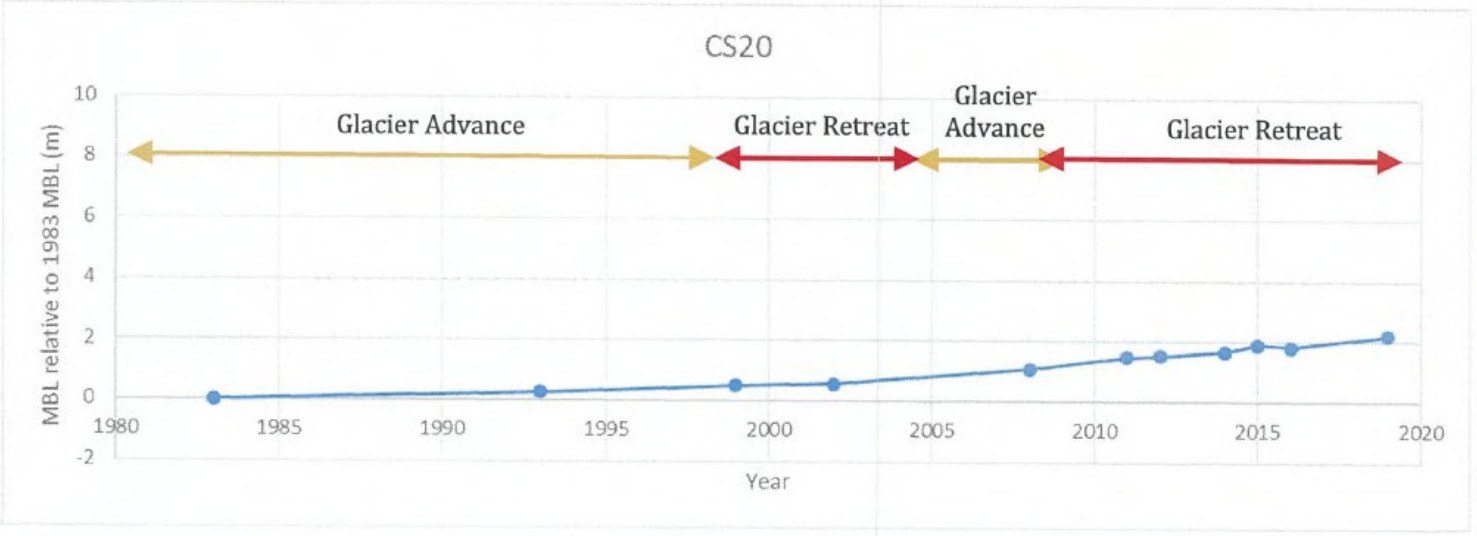
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MBL relative to 1983 MBL (m)
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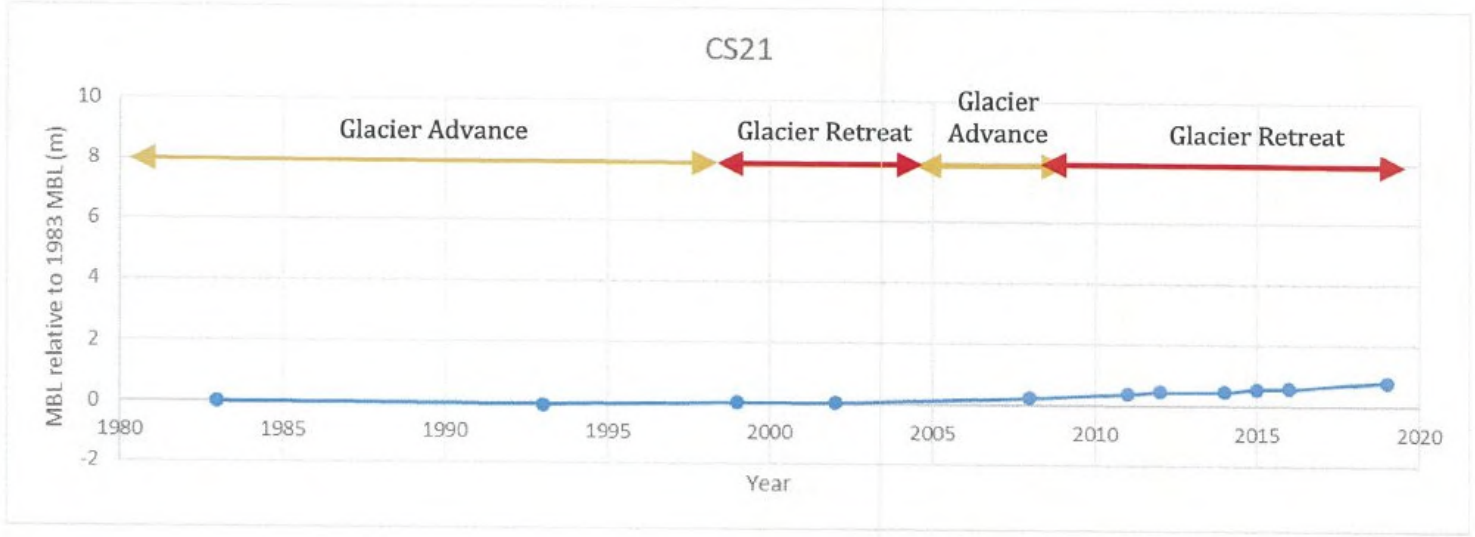
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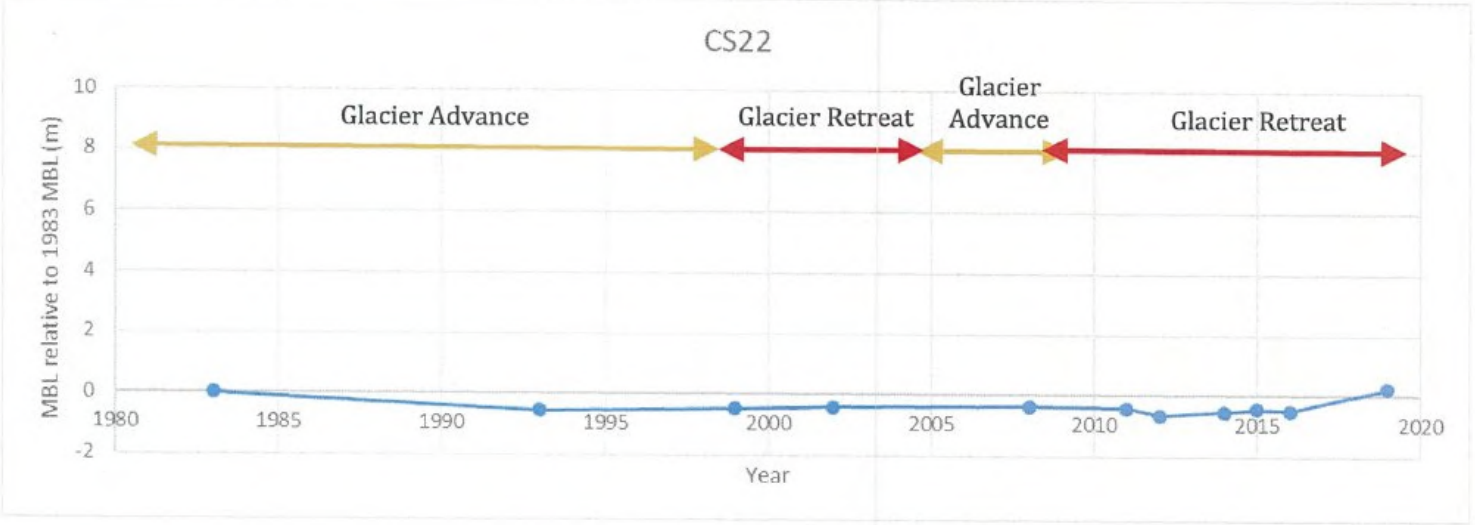
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Glacier Advance
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Glacier Advance
Glacier Retreat
MBL relative to 1983 MBL (m)
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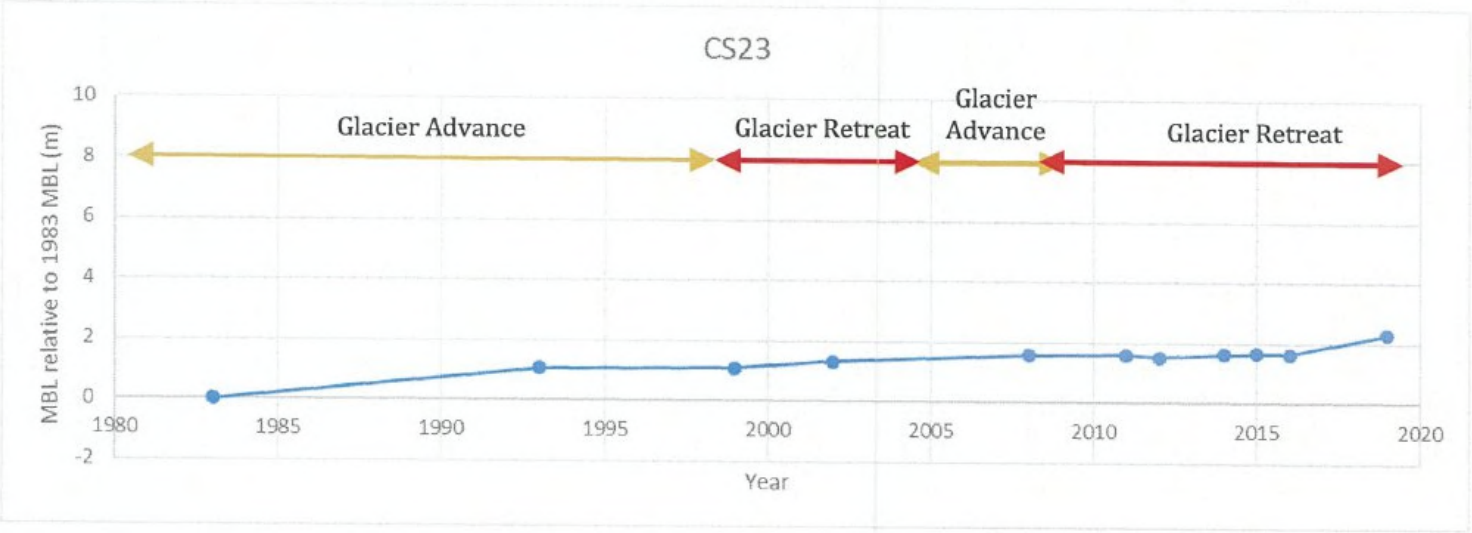
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Glacier Advance
Glacier Retreat
MBL relative to 1983 MBL (m)
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THE WEST COAST
REGIONAL COUNCIL

VEGETATION AND STOPBANKS
Frequently asked questions

Many of our stopbanks have been around for so long people hardly notice them, but they do an essential job. Ask around and you'll hear stories from back in the day of widespread flooding, damage and distress.

WHAT ARE STOPBANKS?

Stopbanks are compacted earth banks designed to contain the power of rivers and streams in flood, preventing floodwater spreading into land and property up to a designed limit. They may look like grassy banks, but are constructed according to very specific engineering designs. Stopbanks are only as good as their weakest link.

WHO OWNS THE STOPBANKS?

The West Coast Regional Council maintains 68km of stopbanks and erosion protection schemes throughout the region on behalf of the relevant rating district. There are 25 Rating Districts from Karamea in the north to Jacksons Bay in the south.

Some stopbanks are located on privately owned land.

WHO DETERMINES WHAT WORK WILL BE DONE ON A STOPBANK?

Council engineers regularly review the various schemes throughout the region and provide this information to the rating district committees who meet annually with Councilors and Council staff to make recommendations on what maintenance work is required in the coming year, whether schemes need to be upgraded and how the rating district is to fund the work. The committee is made up of representatives from the relevant Rating District as well as the local Regional Council representatives.

HOW EFFECTIVE ARE STOPBANKS?

No matter how well stopbanks are constructed and maintained, they are only as strong as the weakest link and are vulnerable to damage, particularly from vegetation.

HOW DOES VEGETATION DAMAGE STOPBANKS?

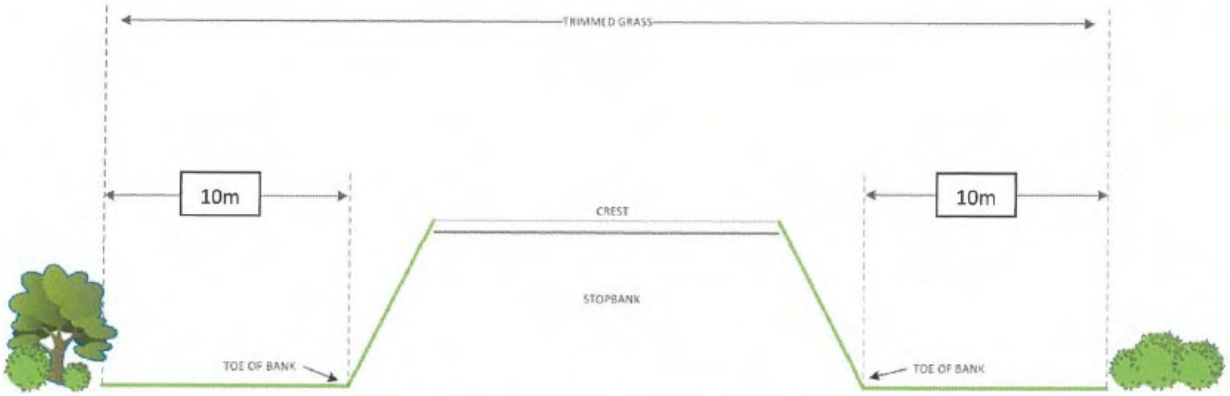
Good grass cover is essential to the sound structure of a stopbank, preventing the formation of a breach, even on the side facing away from the river. Healthy grasses help bind the soil surface. While trees and shrubs can enhance the landscape they can increase the risk factors that contribute to bank failure, as listed below:

1. They do not allow for a healthy grass cover on the bank.
2. The roots of trees and shrubs create a weakness in the stopbank foundation. While roots stabilize the plant, they can destabilize a bank by loosening the soil mass. During a flood the hydraulic pressure gradient from one side of the bank to the other forces water along any weakness. In this case, water can begin flowing along the root path, leading to a rapid failure and the stopbank collapsing. Trees and shrubs growing on the inside of the stopbank are capable of capturing flood-borne debris and diverting flows against a bank.
3. Trees can topple during strong wind and heavy rain events, creating a hole where the water can flow through. The weight of the trees themselves can also become an issue causing destablilsation when the ground is saturated.

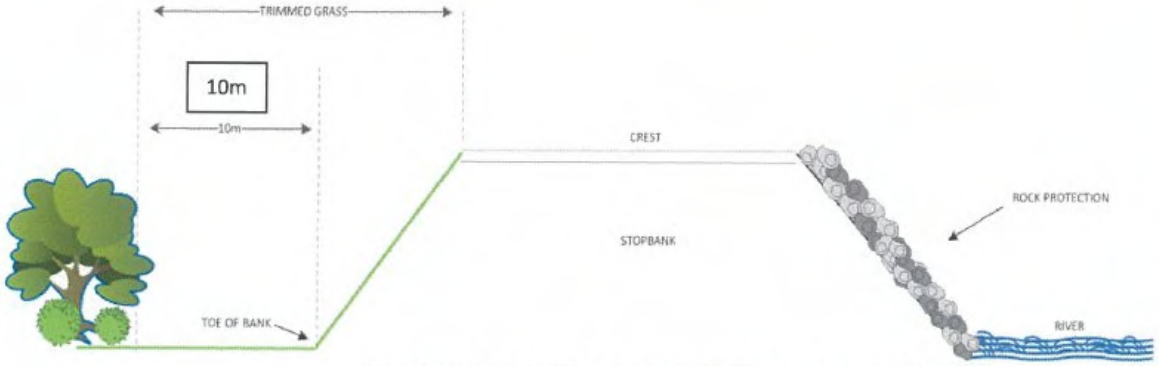
4. Shrubs and trees make it hard to judge how sound the stopbank really is. The ability to undertake quick visual inspections, especially after floods when repairs may be needed, is essential.

WHAT DISTANCE SHOULD BE MAINTAINED BETWEEN TREES AND STOPBANKS?

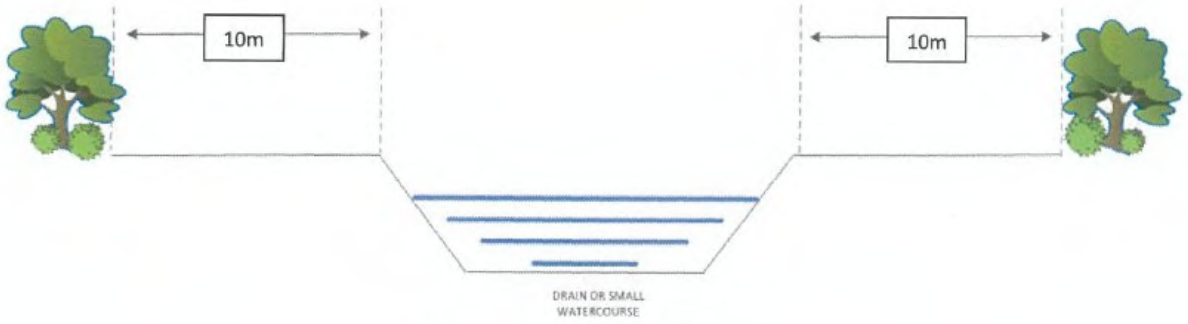
The purpose of the Flood Protection Bylaw, adopted in 2015, is to manage, regulate and protect the efficient operation and integrity of flood protection works from damage or misuse. This includes the proximity of vegetation to stopbanks. The Bylaw provides clear guidance on vegetation setback distances.



VEGETATION SET-BACK DISTANCE: STOPBANK



VEGETATION SET-BACK DISTANCE: STOPBANK WITH ROCK PROTECTION



VEGETATION SET-BACK DISTANCE: DRAINS

was identified several years ago as a high risk factor to the bank's structural integrity. The removal of the trees and vegetation from the Domain Bank several years ago was undertaken to address this risk. Whether or not the planned upgrade of the stopbank occurred, the four rata trees would still require removal due to their size, weight and proximity to the bank, and potential for toppling causing damage to the stopbank and/or bank foundation (approximately 6 neighboring trees in the stand have already toppled).

WHY IS COUNCIL UPGRADING THE STOPBANK?

The upgrade of the stop bank was planned and budgeted for within Councils 2018-28 Long Term Plan. The consultation in Council's 2019/20 Annual Plan was only on a change to the timeline of the work and its funding mechanism. The Rating District Committee requested this change at the 2018 Karamea Rating District Annual General Meeting. Council strongly supported the intent of the Rating District Committee as the high risk of failure of the existing bank is considered an unacceptable level of risk.

WHY CAN'T THE STOPBANK BE BUILT AROUND THE RATA TREES?

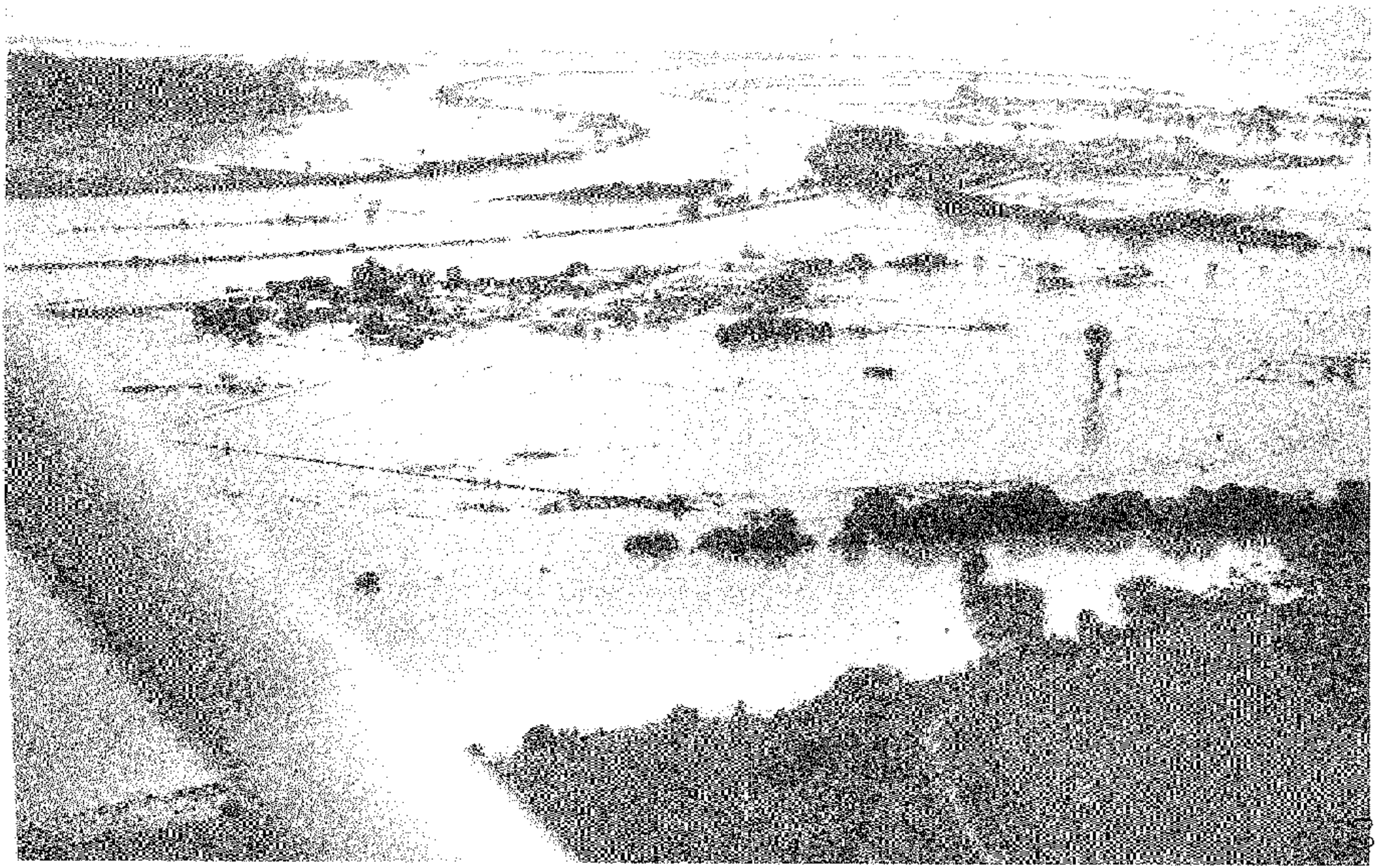
The location of a stopbank is generally determined by the location of the river, quantity of flood flow and area to be protected. Moving the stopbank to a new alignment has been considered, however this would have resulted in considerable extra cost to the rating district which was unsustainable. Whether or not the upgrade of the stopbank occurred, the four rata trees would still require removal due to their size and proximity to the current bank. The budget for the planned upgrade is $400,000. A new alignment, that would prevent the necessary removal of the rata trees, would cost an estimated $1,150,000.

The Rating District will contribute $5,000 towards funding the planting of native species in other areas such as the domain.

ARE THERE ANY IMPLICATIONS FROM THE CULLEN REVIEW THAT HAVE AN IMPACT ON OUR FLOOD PROTECTION ASSETS?

On 6 April 2017, a breach of the Rangataiki River Stopbank in Edgecumbe resulted in widespread flooding of properties and the evacuation of the entire township. An independent review of the infrastructure and the circumstances leading up to the breach (the Cullen Review) was released publicly in October 2017. While the review contained recommendations specific to the Rangataiki Scheme, there were a number of recommendations around long term river management strategies, community understanding of flood risk, evacuation and civil defence emergency management planning. It would be remiss of the West Coast Regional Council to not take these findings into consideration as we manage our flood protection assets into the future. A copy of the Cullen Review is available here https://cdn.boprc.govt.nz/media/681909/2017-10-03-rrsr-final-report-public.pdf

Image: Karamea River Flooding circa 1973



THE WEST COAST REGIONAL COUNCIL

Prepared for:	Council Meeting- 13 August 2019
Prepared by:	Michael Meehan – Chief Executive
Date:	5 August 2019
Subject:	**COBDEN SEA EROSION**

Background
Attached is a letter received from Grey District Council in relation to the ongoing coastal erosion at Cobden. Council has initiated reports by NIWA utilising Envirolink funding to support more informed decision making in relation to the issues faced. Attached is the most recent report by NIWA, noting that NIWA have been asked to provide a further report due later in 2019.

The majority of infrastructure at risk is Grey District Council assets including the dump, car park area, Jellyman Park and road. There are private properties that could be considered at risk that are located the landward side of the Grey District Council assets.

Recommended pathway
It is proposed that Council staff provide further information including the NIWA report and survey information and coordinate a meeting of the Grey Floodwall Committee to discuss. The only asset potentially impacted by the erosion is the Cobden cut, which has not been utilised to great effect in recent floods due to the surrounding conditions. It is important to note that if Council were to initiate physical works in this area this would be a significant change from the purpose of the Grey Floodwall Rating District and would require some form of formal consultation.

RECOMMENDATIONS

1. *That Council receive this report.*

2. *That staff organise a meeting of the Greymouth Joint Floodwall Committee to discuss further.*

Michael Meehan
Chief Executive

MĀWHERA
GREY
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C5

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14 June 2019

Mike Meehan
West Coast Regional Council
PO Box 66
GREYMOUTH 7840

Email: mm@wcrc.govt.nz

Dear Mike

SEA INUNDATION POTENTIALLY ENDANGERING LOWER COBDEN

As you will recall, I have discussed our concerns for the safety of lower Cobden in the face of what appears to be an ever-rising sea onslaught, with you. I confirm that staff from both our Councils have been monitoring the issue closely.

Council has now come to the conclusion that the threat to lower Cobden is real and immediate and that West Coast Regional Council be asked to, in consultation with the Cobden community find the most appropriate mitigation of the perceived threat urgently. Council accepts that it will become a ratepayer to any rating district that your Council may decide to set up.

An important specific consideration for Council is the future of Jellyman Park carpark. This carpark is currently closed because of high seas having repeatedly washed onto it over the past few months. It is a very popular tourist and community parking area and retaining it is our preferred position. Notwithstanding, Council fully accepts that the eventual mitigation may exclude the carpark or part of it or may be constructed over it, and on that basis it has an open mind in this.

I look forward to hearing how you want to progress this matter. As stated, we believe that there is some urgency involved.

Kind regards

Paul Pretorius
CHIEF EXECUTIVE OFFICER

Copy: Rob and Ailsa Harrison robandailsaharrison@gmail.com
Infrastructure Manager

NIWA
Taihoro Nukurangi

66

Managing and adapting to coastal erosion at Cobden Beach

Prepared for West Coast Regional Council

May 2017

Prepared by:
Michael Allis

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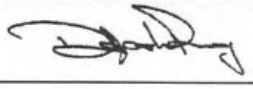
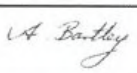
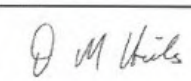
NIWA CLIENT REPORT No: 2017137HN
Report date: May 2017
NIWA Project: ELF17210

Quality Assurance Statement		
	Reviewed by:	Doug Ramsay
	Formatting checked by:	Alison Bartley
	Approved for release by:	Murray Hicks

Contents

Figures

Executive summary

This report has been prepared for West Coast Regional Council (WCRC) to aid the decision-making processes associated with management of Cobden Beach. The investigations undertaken as part of this assessment includes a site visit, review of aerial photographs and recent literature. WCRC requested advice on 1) the likely implications of recent in-situ coastal protection works, and 2) recommendations for effective and feasible options that allow long-term management and protection of infrastructure and properties along the Cobden Beach foreshore.

Overall, Cobden Beach is not experiencing current long-term and widespread erosion and is relatively healthy and well-stocked with a wide gravel beach and vegetation between the beach face and road infrastructure or private property. The northern 5 km of the beach is wider and remains in an accreting phase, with evidence of 50 m or greater accretion in the previous 30 years. The southern 1 km of the beach has also accreted since the 1980s but to a lesser extent. Despite the general trend of accretion over the last 30 or so years, episodic storms or spates of storms can cause overwashing and short-term cut back of the seaward gravel berm along the entire frontage.

Future trends in the Cobden Beach shoreline position relate principally to continued sediment bypassing from Blaketown Beach around the river training works. Further extensions to the tipheads are unlikely, thus it is anticipated that the supply of sediment to Cobden Beach will continue in the foreseeable future in a similar manner as has been occurring over the last 30 or so years. This suggests that the shoreline along the Cobden frontage will in general be relatively stable or accretionary in the long-term, but episodic, short-term natural cycles of accretion and erosion (consequential on river floods, storm events and sequencing and wave climate variability) should still be expected. These natural cycles are expected to cause smaller changes to the Blaketown and Cobden Beaches compared to the historic changes that resulted from the construction of the river training walls.

There is no requirement for any erosion management interventions over the northern 5 km of the beach (north of Monro Road) as this section of the beach appears wide and stable, is expected to withstand storms and can absorb tens of metres of shoreline retreat before the road or private assets are threatened. However, it is imperative that no development or new infrastructure is permitted on the seaward side of the road along this section. Monitoring in the form of regular cycles of aerial photographs from WCRC, Grey District Council (GDC) and Google Earth should be conducted to capture ongoing shoreline changes and provide early warning of any developing risks.

The coastline along the southern 1 km section of the beach near Jellyman Park will continue its unstable fluctuations as the defences surrounding the car park continue to interfere with natural beach processes. The fundamental issue is that the car park and associated infrastructure have been located too close to the active shoreline and do not provide for sufficient beach crest buffer to accommodate the cycles of storm-related erosion that are experienced. It is recommended that:

1. The Cobden community and both Councils (WCRC and GDC) discuss their values, objectives and expectations for the carpark, and its future as an amenity or coastal defence buffer.

2. Consideration be given to relocating the car park and its access further landward and a minimum 10 m beach crest vegetated buffer reinstated (ideally this would be wider and closer to the 30 – 40 m width occurring along much of Domett Esplanade).

1 Introduction

Coastal erosion is an issue facing several communities on the West Coast. This report is one of several recent reports by NIWA assessing coastal issues for the West Coast Regional Council (WCRC). This report assesses coastal erosion at Cobden Beach, situated immediately north of the Grey River mouth and part of the wider Greymouth community.

Cobden Beach is a popular recreational area that has experienced a number of recent erosion events affecting the beach and seaside infrastructure. Attempts have been made to rebuild and repair eroded sections of the beach and protect the infrastructure using rock riprap and other various ad-hoc methods.

WCRC is concerned that these coastal protection methods may have unintended detrimental effects on Cobden Beach and has requested advice on 1) the likely implications of the recent works, and 2) recommendations for effective and feasible options that allow long-term management and protection of infrastructure and properties along the Cobden Beach foreshore. The advice provided in this report is intended to support WCRC, the Cobden community and recreational users of the beach.

The investigation included a site visit to Cobden by Drs Michael Allis and Murray Hicks on the 21st of November 2017 and review of literature including the West Coast Coastal Hazard Assessment (NIWA, 2012).

This investigation and report has been funded by an Envirolink Small Advice Grant (ref No 1740: C01X1627).

2 Site description

Cobden Beach stretches about 6 km north from the mouth of the Grey River. The southern limit of the beach is the north bank of the Grey River which is fixed in place by a rock training wall (locally known as the 'tiphead'). The northern extremity of the beach is near to Point Elizabeth where it is replaced by the cliffed shoreline formed by the 12 Apostles Range (Figure 2-1). The beach is sometimes referred to as North Beach (e.g., North Beach Road).

Except for the northern extremity near Point Elizabeth, the Cobden Beach hinterland is backed by low lying areas composed of reclaimed tidal lagoons, creek mouths and former channels of the Grey River. Remnants of these are still present, namely Cobden Lagoon, Cobden Island and Lake Ryan (Figure 2-1).

Cobden Beach is mainly composed of mixed sand and gravel. It is typical of coarse grained beaches in that it is relatively steep and narrow (over the present-day active beach foreshore) compared to fine-grained (sand) beaches.

The primary driver of coastline change at Cobden Beach is the supply of sediment to/from the beach by the nearshore littoral drift. Along this coastline the littoral drift trend is bi-directional, i.e., moving sediment along the beach in both a northerly and southerly direction. The northerly drift direction is dominant, being driven by the predominant W-SW wave and wind direction at a net rate somewhere between 10,000 m^3/year and 100,000 m^3/year (Phaflert 1984).

Figure 2-1: Cobden Beach location diagram. Key site inspection locations shown, Scale: 1 km squares. [*Credit*: Topo NZ, LINZ].

2.1 Shoreline trends

The Grey River training works, constructed over 100 years ago, extend approximately 1 km from the 1884 shoreline (see Figure 2-2), and they significantly altered the coastline by modifying sediment supply to the adjacent beaches. To the south of the river (Blaketown and South Beach), since constructed massive accretion occurred as the northerly littoral drift was trapped against the river training works. Conversely, to the north of the river at Cobden, significant historical erosion occurred as the beach was starved of the sediment that had been trapped on the south side of the river training works (Gibb 1978, Pfahlert 1984, Benn & Todd 2003).

Mapping of the coastline position from aerial photographs and cadastral maps showed that from 1884 to 1981 Blaketown beach prograded (advanced seaward) about 300 m at a rate of 2.9 m/year, while the southern part of Cobden Beach retreated about 130 m at a rate of 1.35 m/year (Pfahlert 1984).

Figure 2-2: Changes to the coastline at Greymouth 1875-2014. [*Credit*: West Coast New Zealand History[1]].

This rate of sediment trapping at Blaketown was expected to reduce in time with a concomitant increase of sediment bypassing around the river training works and onto Cobden Beach. Pfahlert calculated that more than half the original volume of sediment that accumulated on Blaketown Beach (south of the Grey River) in 1884 (about 18,000 m^3/year) was bypassing onto Cobden Beach at a rate of about 9,000 m^3/year as at 1984. It was also suggested that if this trend continued (assuming a linear trend and no change in sediment supply), Blaketown Beach would eventually stop prograding in 2067 and all sediment would bypass onto Cobden Beach.

[1] http://westcoast.recollect.co.nz/nodes/view/18234#idx24171

Subsequently, Benn and Todd (2003) updated the observations of coastline change with new aerial photographs and found that the southern 1.2 km of Cobden Beach (Bright Street to Kettle Street) had ceased its widespread retreat and had prograded about 30 m from 1981 to 2001 at a rate of about 1.4 m/year. Their investigation did not comment on changes to the northern 4 km of Cobden Beach. The more recent coastal hazard assessment (CHA) prioritised Cobden as a medium hazard area due to threats to North Beach Road and houses at the North of Cobden township (NIWA 2012, updated 2015). It appears the hazard was based on reports of wave overwash causing nuisance inundation along Domett Esplanade, and the prior installation of a small bund alongside the road to manage the overtopping. Photos from the CHA confirmed the widespread accretion along the beach.

The November 2016 site visit (see Section 2.2) confirms the advance and stabilisation of the Cobden Beach coastline. Physical evidence on the rearmost gravel berms suggests 30-40 years have elapsed since that beach material was deposited by wave action on the beach face. This timing aligns with aerial photographs, suggesting that the 1970s-1980s decades mark the transition from erosion to accretion along Cobden Beach. This beach accretion is most prominent further north along the beach, with the beach now well stocked with gravel and the beach face now 60-70 m distant from the road.

The 1980s transition from erosion to accretion at Cobden Beach reflects the increasing volume of sediment bypassing the river training works resulting in the long-term supply of sediment to the southern part of Cobden Beach now exceeding sediment losses from the southern part of the beach alongshore to the north. It can be expected this rate of bypassing would continue to increase as Blaketown Beach intercepts less sediment each year.

The future of sediment supply to Cobden Beach relies on continued bypassing from Blaketown Beach around the river training works, and ongoing flood-flow supply from the Grey River. Further extensions to the tipheads are unlikely, thus it is anticipated that the supply of sediment to Cobden Beach will continue in the foreseeable future in a similar manner as has been occurring over the last 30 or so years. This suggests that long-term shoreline changes along the Cobden frontage will be relatively stable or accretionary but with episodic, short-term natural cycles of accretion and erosion consequential on river floods, storm events, storm event sequences and wave climate variability. These natural cycles are expected to cause smaller changes to the Blaketown and Cobden Beach systems compared to the historic changes that stemmed from the construction of the river training walls.

2.2 Walkover inspection

NIWA and WCRC staff performed a walkover inspection of Cobden Beach on 21st November 2016 (12 pm to 2 pm). Low tide was about 11:09 am for the Grey River mouth, offshore significant wave height was approximately 1.5 m from the west, and winds were light (< 10km/h) and from the west.

The beach was accessed at multiple locations along North Beach Road (see Figure 2-1). Distances referenced below represent distance alongshore (north) from the tiphead. In the following description, the beach has been divided into three separate areas.

2.2.1 Tiphead to Jellyman carpark (0 km - 0.6 km)

This beach is predominantly medium-coarse sand, with minor gravel and cobbles. Due to it being in the wave shadow of the tiphead, sheltered from the prevailing south-westerly waves, the beach is sandy in composition and relatively flat-sloping.

The former Cobden landfill is nestled behind the active beach, adjoining the tiphead wall. The landfill is located on (and forms) reclaimed land and is separated from the sea by a broad low beach crest. A floodway 'cut' channel (mechanically excavated to allow flood flows to exit Cobden Lagoon) separates Jellyman Park and carpark from the tiphead. Aerial photographs show there is sometimes a low-tide bar in the nearshore surf zone close to the tiphead - possibly related to pulses of sediment delivered to the beach during Grey River flood events. The landfill crest is about 5 m above beach crest level, with its sides and toe armoured by building rubble.

The carpark occupies the broad crest of the beach, with the car park surface approximately 1.5 m above the beach level (Figure 2-3). The seaward edge of the carpark is protected by a rock revetment composed of small-medium granite rocks (0.3-0.7 m diameter) at a slope of 1:1.5 to 1:2. We understand that the rocks were added when the carpark was resized in 2015, resulting in the seaward edge of the carpark being pushed further over the beach. No geotextile underlay is apparent beneath the rocks. The crest of the revetment is only one rock wide (0.5 m), and it sits nearly flush with the carpark elevation (Figure 2-3). The carpark now protrudes onto the active beach face 3-5 m from the adjacent vegetation lines and adjacent beach crest. There is no vegetation on the beach in front of the carpark. The seaward edge of the carpark has been repaired several times after storm erosion has undermined the rubble revetment (pers. comm. P. Birchfield). The carpark remains a popular overnight stop for freedom campers.

Figure 2-3: Jellyman Park rock protection and beach front. Left: view south to tiphead from northern end of structure. Right: view north towards Point Elizabeth from southern end of structure. [21 Nov 2016. *Credit*: M. Allis (L), M. Hicks (R)].

To the north and south of the carpark, the beach shows evidence of wave/gravel overwash and vegetation dieback. Immediately north of the carpark, retreat of the beach crest has caused vegetation dieback (gorse/flax, see Figure 2-5). This retreat is likely due to overwashing events, with overwashed gravels reaching 5 m inland from the beach face and up to 10 m inland at access paths. There is also vehicle access at the northern end of the carpark structure, with wheel rut disturbances to sediment and vegetation (Figure 2-4).

Figure 2-4: Cobden Beach at 0.6 km from the tiphead, (at carpark), looking north towards Point Elizabeth. Note vehicle tracks past the end of carpark protection rocks [Credit: M. Hicks, 22/11/2017].

Figure 2-5: Cobden Beach at 0.7 km from the tiphead (100 m north of carpark), looking north toward Point Elizabeth. [*Credit*: M. Allis, 22/11/2017].

2.2.2 Jellyman Carpark to Monro Road (0.6 km - 1.4 km)

Between Jellyman Park and Monro Road the beach has been recently exposed to large waves (either a single storm or series of storm events), with driftwood/gravels being cast into and onto the vegetated beach crest (Figure 2-5). The vegetation dieback indicates there may be some short-term shoreline retreat. There remains at least 20-30 m of vegetated setback to Domett Esplanade.

Closer to Monro Road, there are historic protection works alongside North Beach Road (Figure 2-6), however, these have been buried by more recent accretion and growth of the beach. At present, the inner gravel is elevated 1.5-2 m above the roadway, with one or two storm-berms (terrace-like ridges parallel to the shoreline). Vegetation and lichen (slight discoloration on gravel) have colonised the gravel berms (Figure 2-6), suggesting that these gravels have not been re-worked for over 30 years (other than vehicle and foot traffic – see Figure 2-6).

Figure 2-6: Cobden Beach at 1.4 km from the tiphead (opposite Monro Road) looking south. Note dark-grey lichen growth on gravel outside vehicle tracks, and note historic rock protection alongside roadway [Credit: M. Hicks, 22/11/2017].

2.2.3 Monro Road to end of road (1.4 km - 5 km)

The width of beach gradually increases with distance north from Monro Road, widening from 30-40 m in the south to 60-70 m at the end of North Beach Road, as seen in the sequence of photographs in Figure 2-7 to Figure 2-9.

This section of the beach typically has three storm-berms (terrace-like ridges parallel to the shoreline). Collectively, these ridges represent a recent accretionary phase, with sufficient sediment available to create a berm during storms and then to build-out the beach face during benign conditions. A fourth berm may be forming at present. Stranded driftwood, lichen growth and advancing vegetation all indicate that this accretionary phase has been of the order of 30 years or more.

Overall, Cobden Beach is not experiencing current long-term and widespread erosion and is relatively healthy and well-stocked, with a wide gravel beach and vegetation between the beach face and road infrastructure or private property. The northern 5 km of the beach is wider and remains in an accreting phase, with evidence of 50 m or greater accretion in the previous 30 years. The southern 1 km of the beach has accreted also since the 1980s but to a lesser extent. Despite the general trend of accretion over the last 30 or so years, episodic storms or spates of storms can cause overwashing and short-term cut back of the seaward gravel berm along the entire frontage.

Figure 2-7: Cobden Beach at 1.4 km from tiphead (opposite Monro Road) looking north towards Point Elizabeth. [*Credit*: M. Allis, 22/11/2017].

Figure 2-8: Cobden Beach at 2.9 km from tiphead (opposite 162 North Beach Road) looking north towards Point Elizabeth. [*Credit*: M. Hicks, 22/11/2017].

Figure 2-9: Cobden Beach at 5 km from tiphead (end of North Beach Road) looking north towards Point Elizabeth. [*Credit*: M. Allis, 22/11/2017].

3 Implications of protection works

The Jellyman Park carpark (Hill Quay) occupies the seaward edge of Jellyman Park, as shown in Figure 3-1 (red shading). The carpark acts as both a vehicle carpark, freedom camping site, and coastal defence for the Cobden community and Jellyman reserve. The carpark stretches approximately 200 m along the shoreline between from Cobden Cut (a mechanically-managed channel for drainage of the Cobden Lagoon during high rainfall or river floods) and connects to Hill Quay.

We understand the carpark was previously[2] a narrow gravel extension to Domett Esplanade positioned on the vegetated gravel barrier. This has been gradually enlarged, with the vegetation lost (either through vehicular trampling or deliberate removal)[3] so the gravel barrier berm no-longer had the capacity to accommodate natural fluctuations in shoreline position due to storm events. We understand that the seaward rock protection was added when the carpark was resized in 2015.

Figure 3-1: Jellyman Park, Cobden. Background photograph dated 2013. [*Credit*: WCRC Westmaps].

The carpark runs parallel along the top of the beach crest and protrudes onto the active beach face 3-5 m further than the adjacent beach crest and vegetation lines to the immediate north and south. Wave action appears to reach the base of the carpark revetment on most high tides.

[2] As in 2004 aerial photograph (not shown)
[3] As in 2013 aerial photograph (not shown)

Despite the accretion that has occurred along this section of coast, the carpark and associated infrastructure has been placed too close to the active beach to accommodate episodic storm events that can cause beach crest overwashing and beach crest cutback. No natural beach crest buffer width has been maintained to enable these short-term erosion events to be accommodated. As such, the carpark suffers from common issues with rock protection placed on beaches. These being the process of lowering of the beach level in front of the structure (a reduction in beach elevation caused by loss of sediment from wave reflections off the structure face) and edge effects eroding around the flanks of the structure (caused by waves wrapping around the structure).

The key issues identified during the site inspection were:

- Immediately north of the carpark, edge effects have contributed to retreat of the beach crest, with overwashing of the gravel storm berm and vegetation dieback (gorse/flax) evident. There was evidence of recent overwash gravels reaching 5 m inland from the beach face and up to 10 m inland at access paths. The out-flanking erosion is also exacerbated by vehicle access to the beach from the carpark itself, preventing vegetation growth, disturbing beach sediment and lowering beach levels.
- In front of the carpark the beach is lowering (relative to adjacent beach sections), with gravel being stripped from the beach face rather than being deposited on the upper part of the beach crest. Any driftwood is also swept past the revetment, piling up downdrift of the structure (which was the north side during the site visit).
- To the south of the carpark structure, the edge effects are less pronounced, perhaps due to increased wave sheltering from the tiphead. However, GDC have extended the rock protection at the Lagoon Cut (Figure 3-2) to prevent waves eroding the cut and entering the lagoon (pers. comm. P. Birchfield). The rock protection has a slope from 1:1.5 to 1:2 and is comprised of small (<0.4 m diameter) rocks.

The overwash and retreat around the carpark flanks are principally due to the abrupt rectangular shape of the carpark and its protrusion onto the beach face. The steep face of the structure and protrusion onto the beach are causing the increased wave reflections off the structure face, causing the beach to lower in front of the carpark.

Figure 3-2: Rock extension south of the carpark to protect the Lagoon Cut entrance. [Credit: M. Hicks, 21/11/2017].

4 Future management options

Future trends in the Cobden Beach shoreline position relate principally to continued sediment bypassing from Blaketown Beach around the river training works. It is anticipated that this will continue in the foreseeable future in a similar manner as has been occurring over the last 30 or so years (especially as further extensions to the tipheads are unlikely). This suggests that long-term shoreline changes along the Cobden frontage in general will be relatively stable or accretionary but with episodic, short-term natural cycles of accretion and erosion. These natural cycles (e.g., river floods, storm events and sequencing and wave climate variability) are expected to cause smaller changes to the Blaketown and Cobden Beaches compared to the historic changes that stemmed from the river training walls.

There is no requirement for any erosion management interventions over the northern 5 km of the beach (north of Monro Road), as this section of the beach appears wide and stable, is expected to withstand storms and can absorb tens of metres of shoreline retreat before the road or private assets are threatened. However, it is imperative that no development or new infrastructure is permitted on the seaward side of the road along this section. Monitoring in the form of regular cycles of aerial photographs from Councils (WCRC and GDC) or Google Earth should be conducted to capture ongoing shoreline changes and provide early warning of any developing risks.

The southern section of the beach near Jellyman Park will continue to change as the defences surrounding the car park continue to interfere with natural beach processes. With no intervention the outflanking erosion will continue to affect the adjacent beach (particularly to the north). The small size of rock armour used to construct the revetment and likely continued beach lowering in front of the carpark revetment will affect the defence performance and seaward parts of the car park (depending on the rock embedment depth). These processes are expected to continue, requiring a frequent commitment of maintenance of the revetment and seaward edge/surface of the car park. However, the size, position and construction mean the carpark structure is not expected to withstand large storm events without damage. If no mitigation works are undertaken then larger rock armouring is likely to be required to ensure the defence provides an adequate level of protection over the long term. Placing a properly constructed revetment may result in further detrimental environmental effects.

The fundamental issue is that the car park and associated infrastructure have been located too close to the active shoreline and so do not provide for sufficient beach crest buffer to accommodate the cycles of storm-related erosion that are experienced. It is recommended that:

1. The Cobden community and council discuss their values, objectives and expectations for the carpark, and its future as an amenity or coastal defence.
2. Consideration be given to relocating the car park and access further landward and a minimum 10 m beach crest vegetated buffer reinstated (ideally this would be wider and closer to the 30 – 40 m width occurring along much of Domett Esplanade).

5 References

Benn, J., Todd, D. (2003) The effects of beach gravel mining in the Greymouth environs. *Report for Department of Conservation*. February 2003. Ref 1073.136WCRC: 39.

Gibb, J.G. (1978) Rates of Coastal Erosion and Accretion in New Zealand. *NZ Journal of Marine & Freshwater Research,* 12(4): 429-456.

NIWA (2012) Review of West Coast Region Coastal Hazard Areas. *NIWA Client Report* CHC2012-081, prepared for the West Coast Regional Council: 65. Revised December 2015.

Pfahlert, J. (1984) Coastal Dynamics and Sedimentation at Point Elizabeth, West coast, South Island, New Zealand. *MSc Thesis,* University of Canterbury, New Zealand.

THE WEST COAST REGIONAL COUNCIL

Prepared for:	Council Meeting – 13 August 2019
Prepared by:	Randal Beal
Date:	5 August 2019
Subject:	**Hokitika Coastal Erosion**

Background

Property owners raised concerns about the recent rapid erosion of the foreshore prompting Council to investigate options and current and presented these to the Hokitika Seawall Committee on 11/07/2019. The recommendations from the committee were presented to Council on 19/07/2019.

Following the king tide event of 2 & 3 August Council staff are re-assessing the area and will provide further information with recommendations to the Council meeting.

Attached is the independent advice provided by Ian Goss of BECA on the proposed solutions to the coastal erosion.

The independent advice has raised several issues with the proposed works including:

- Structural performance and stability are expected to be inadequate.
- The concept does not incorporate geotextile to provide separation between the underlying beach and rubble and reinforcement to limit settlement, and to provide a filter to reduce washout of the material from the scarp behind the rock batter.
- The alignment of the batter will be governed by the existing irregular scarp position rather than a straight seawall alignment.
- Failure of the batter would result in distribution of rubble across the beach.

Council staff requested further consideration from BECA on a modified short term solution incorporating geo-fabric and a deeper foundation and also requested an alternative solution be provided.

The independent advice proposes:

- The use of large AGPR and geo-fabric as a temporary emergency works solution.

Council staff have received quotes to undertake the initial proposed emergency works. Contractors have confirmed that access from the beach is sufficient to undertake the works.

Council staff have surveyed the erosion line prior and post the high swells experienced in the first week of August. A drone survey will also be undertaken to assess the river mouth direction and alignment.

RECOMMENDATION

That this report be received.

Randal Beal
Director of Operations

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388 Main South Road
South Beach
Greymouth 7805

31 July 2019

Attention: Brendon Russ

Dear Sir

Hokitika Foreshore Protection

We write in response to your request for brief comment on the seawall works proposed for protection of the Hokitika township foreshore. We note that until yesterday's site visit we were not aware that review and comment on this proposal was required and in such a short timeframe, rather we were expecting to undertake a review and performance of the groyne field performance and recent coastal changes. We note that our comments set out below are limited to coastal engineering aspects, and we have not consenting or coastal management planning issues.

It transpires that as a result of recent and apparently ongoing erosion episodes, West Coast Regional Council (WCRC) and local concern has arisen for the security of properties inshore of the coastline between the northern end of the existing rock seawall, and the Tudor Street groyne, a distance of 670 m. This concern is also based on the tidal predictions for August 2019, which include a series of Red Alert tides from 1 to 5 August, and 4 days of tide levels approaching highest astronomical tide level in the 30 August to 3 September period.

Recent (23 July 2019) council drone photography shows the erosion scarp at a minimum of approximately 25 m to 27 m from private property boundaries between the Hampden and Tudor Street groynes and a minimum of approximately 15 to 17 m seaward of the 1943 vegetation line alignment shown in council's shoreline mapping. These distances are relative to localised areas of retreat indicated as up to 15 m over the June 2019 to July 2019 period in the council's aerial photography and shoreline mapping. On this basis, concern is justified that a similar rate of retreat over the next month could result in the scarp retreating to approach the 1943 position. Observation during the site visit showed that the ground level rises from the present scarp position to a low ridge in the vicinity of the 1943 vegetation line position.

We have not had the opportunity to assess the current erosion process in any detail, but historic records indicate that short term erosion events have occurred regularly since the 1860s, often with extremely rapid accretion rates quoted by Gibb (1987) as up to 130 m per year.

From the information that council has provided we understand that the council's preferred course of action is to construct a 3:1 batter with quarry rubble from the northern end of the existing seawall to Tudor Street groyne, a distance of 670 m. This is described as a sacrificial wall on the foreshore bank. We understand this to mean that the rock material (understood to be in the 150 – 400 mm size range or 10 to 100 kg) would be placed against the current exposed scarp, and founded approximately 1m below the present upper beach level, with a crest height to match the existing ground level landward of the beach. On this basis, the toe of the rock batter would be at about mean high water level. In comparison, the existing seawall is founded 1 m below mean sea level (or approximately 2 m lower), and with 50% of the rock in the 3 to 6 tonne range.

After consideration of these characteristics, we would not recommend this rubble batter option as a practical or economic solution to the immediate exposure for the following reasons:

- The structural performance and stability are expected to be inadequate in terms of rock size, with the rubble moving under wave attack (refer also to failure comment below).
- The founding level is too high to protect against undermining with further beach lowering which will further affect the overall stability.
- The concept does not incorporate geotextile to provide separation between the underlying beach and rubble and reinforcement to limit settlement, and to provide a filter to reduce washout of the material from the scarp behind the rock batter.
- The alignment of the batter will be governed by the existing irregular scarp position rather than a straight seawall alignment. This has potential to cause localised effects (e.g. wave focussing and increased damage), increasing maintenance requirements.
- The crest level of the batter would be variable as described rather than constant at a selected run-up level, providing lesser protection against overtopping to the more vulnerable lower areas which will be the first to experience this.
- The limited time available for installation of the batter may result in additional challenges to construction quality.
- Failure of the batter would result in distribution of rubble across the beach. The rubble would be difficult to recover, and is unlikely to be able to be incorporated in a durable protection structure in the longer term.
- In the event that the beach recovers naturally and the batter is buried, it will become exposed again in the future with the effects of climate change and still be of limited value in terms of protection.
- Effects of any structure on the adjacent coastline, including the beach and dune as far north as the wastewater treatment ponds, should be considered as part of the work and mitigation identified.

The present situation is problematic in terms of exposure with Red Tide alerts in early and late August. It is noted that the designated Highest Red Tide alert for the end of August is 100 to 200 mm above the predicted tides for this week (ie relatively little difference). Weather conditions will be a critical factor in relation to erosion damage as they affect storm surge and wave climate. We understand that the council will be monitoring closely any changes to erosion scarps over the first period of Red Alert tides which start this week, as well as long range forecasts, to identify the need for targeted emergency work and readying of emergency management plans in anticipation of the high tides at the end of the month. Such emergency works in other locations have included the temporary placement of large rock and geotextile (the 3-6 tonne rock used in the existing seawall could provide an indication of size if placed at a similar batter slope) at identified vulnerable areas with a view to subsequent re-use and incorporation of this rock into a permanent structure based on considered design.

We trust that this outline is helpful.

Yours sincerely

Ian Goss
Senior Associate - Civil Engineering

on behalf of

Beca Limited

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West Coast Regional Council
388 Main South Road
South Beach
Greymouth 7805

1 August 2019

Attention: Brendon Russ

Dear Sir

Hokitika Foreshore Protection - Emergency Options

This commentary is further to our letter of 31 July 2019 and our subsequent discussions on 1 August 2019. As discussed, our comments regarding the Council proposed rock rubble batter remain as provided in our 31 July 2019 letter. In our 1 August discussions, the Council requested additional comments on possible temporary emergency works to the Hokitika foreshore between the new seawall and the Tudor Street groyne, given the forecast tide and storm conditions on 2 August 2019. The Council has advised during this discussion that:

- It considers it does not have the option to do nothing in response to the potential imminent erosion / inundation event.
- Local quarries have rock up to 8 tonne in mass stockpiled and available.
- Contractors are available to handle, cart, and place rock protection.

It is understood that the Council will address any Resource Management Act matters associated with temporary emergency works.

We note that we have minimal information on the site and the unexpected, short timeframe has not allowed for obtaining site information or engineering assessment. As discussed today, any general comments that we make in response to the Council's request will be considered by the Council on this basis and set in context with the Council's wider responsibilities and knowledge of the site, and assessment of conditions on the ground. It is also noted that temporary emergency works, which necessarily utilise material to hand in the time available, cannot be expected to provide certainty of protection or performance and are no substitute for properly designed shore protection or emergency works. Comprehensive safety plans and supervision will be required to ensure that workers and the public are not put at risk during the works.

The Council will take into consideration many elements in deciding what actions to take in any emergency situation, including the points made above. These elements will include information which is wider than that presently available to ourselves and matters which are outside our purview. Given these circumstances, Beca can accept no liability related to this commentary.

We comment that the Council could consider the following temporary emergency works:

- Preparation and monitoring
  - Establish readily accessible stockpiles of larger rock sizes, geotextile (eg Bidim A44), lighting/generator sets and sandbags, together with cartage arrangements.

- Closely monitor the marine conditions and beach situation to establish the level of immediate risk to the community and property, potential peak exposure, and windows when emergency works can be carried out (e.g. daylight low tide). This information will support decision-making by relevant managers on the ground about when to implement the works.

- Implementation of temporary emergency works.

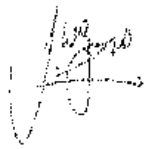
  - Priority - place sand bags to raise levels along the low ridge landward of the beach (prioritising low sections of the ridge), protect houses and other buildings, confine flow paths, etc. This work is generally not expected to be tide-dependent and can be undertaken in advance of the event as a precautionary measure.

  - Place rock and geotextile temporary emergency works as required based on site conditions. For temporary emergency works place rock on the existing upper beach level (ie without excavation). This work requires access to areas affected by tide, requires heavy machinery for delivery and placement, potentially in the dark. A comprehensive safety plan and supervision is required to ensure that people are not put at risk.
    - Place geotextile against vertical erosion scarp and across upper beach beneath rock footprint to help to reduce washout of beach and erosion scarp.
    - Progressively place rock along the scarp to provide continuous coverage, ideally 2 rows in bottom layer, with a further row as a top layer (if time and conditions permit). Clearly the more rock that can be applied the better protection, but this may be at the expense of coverage. Close management and judgement required.
    - Be aware of risk of end erosion when starting and stopping rock coverage – i.e. extend coverage to appropriate points.

  - Rock to low scarp areas (where single rock layer is higher than scarp from upper berm – these are probably the most exposed sections in relation to overtopping). Refer above for comments re safety issues.
    - Place first row of rock against any erosion scarp.
    - Place geotextile over this rock and the adjacent upper berm
    - Place a second row of rock on the fabric to capture a vertical component of fabric to resist washout exposure.

We understand that the Council will also be taking decisions on when to implement other emergency monitoring and management measures, such as advice to residents and evacuation plans, particularly noting the present forecast timing of the potential event during the night of Friday 2 August.

Yours sincerely



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4.1.3

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting – 13 August 2019
Prepared by: Randal Beal
Date: 5 August 2019
Subject: Investigation into the benefit of putting a cut through the Waiho Loop

---

Background

This report was commissioned following feedback from the Franz Josef community regarding the possibility and advantages in proceeding with a cut through the area known as the Waiho Loop or Terminal Moraine.

This report has simply looked at the physical nature of the concept using Lidar survey data and testing the concept with experienced river engineers. The work has not looked at the regulatory issues that would follow should the concept be implemented. Much of the area is Department of Conservation National Park and is well known as a unique example of these types of formations. It can be considered without significant analysis that the regulatory test would be high and a significant process would follow if this option was ever considered past the concept phase.

Attached is the "Waiho Loop Cut Investigation" Report.

Volumetric analysis shows that the cut would require removal of approximately 282,500 m3 of material. This allows for an excavation down to a depth of 5m to remove large boulders which may be buried beneath the existing bed material. Allowing for a bulking factor of 1.3 increases this to a total volume of 367,250 m3 of material. The cost estimated by Council staff for removing this material is in the order of $3.7 million.

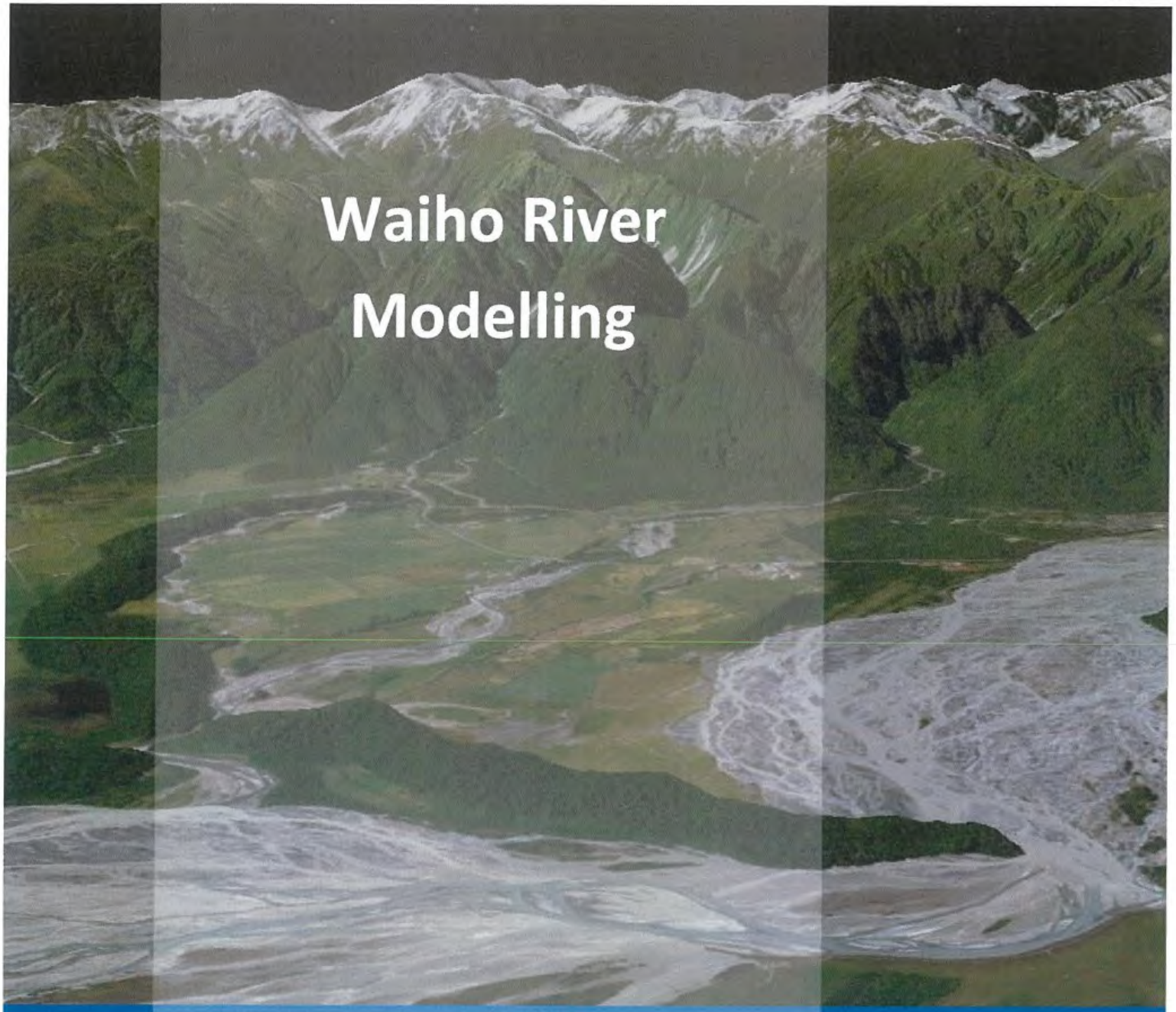
The report shows there is no long term benefit in undertaking this work and has risk of undesirable consequences including:

- Whilst it is considered likely that some degradation would occur, model results indicate that degradation cannot be guaranteed.
- Risk that this could undermine existing stop banks most particularly on the South bank, however also the new stop bank on the North bank which protects the treatment ponds.
- Based on current bed levels, it is considered very likely that any degradation would simply speed up the future permanent avulsion of the river into the Tartare River.
- Due to the greater than 20m fall into the Tartare, this has the potential to set off uncontrollable nick point retreat and rapid bed degradation and is not considered desirable at this point of time

RECOMMENDATION

1. *That this report be received.*
2. *No further work be undertaken.*

Randal Beal
Director of Operations



Waiho River Modelling

JULY 31, 2019

WAIHO LOOP CUT INVESTIGATIONS

Client: West Coast Regional Council
Report by: Matthew Gardner & James Brasington
Land River Sea Consulting / Waikato University
www.landriversea.com www.waikato.ac.nz

THE WEST COAST REGIONAL COUNCIL

LANDRIVERSEA CONSULTING

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

WAIHO RIVER MODELLING

REVISION HISTORY

Author:	Matthew Gardner, James Brasington
Signature:	
Date:	31/7/2019
Revision:	01
Authorised by:	Mike Meehan
Signature:	
Organisation:	West Coast Regional Council
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TABLE OF CONTENTS

1 INTRODUCTION

1.1 OBJECTIVE

Land River Sea Consulting have been contracted by the West Coast Regional Council in order to carry out an analysis of the potential impacts of creating a cut through the Waiho Loop on the Waiho River.

It is understood that the desired outcome for the cut is to;

- Remove pressure from the existing Milton's stopbank, which was destroyed in March 2019 and has since been rebuilt;
- To act as a siphon in order to rapidly increase the volume of gravel throughput in this location and assisting in degrading the bed levels upstream of this location, ideally lowering bed levels all the way up to the State Highway Bridge.

1.2 BACKGROUND

The Waiho loop is a terminal moraine which represents the extent of the Franz Josef glacier approximately 12,000 years ago (McSaveney, 2007). The moraine likely consists of a range of materials which will have consolidated to a degree overtime. It is likely that the base of the moraine consists of very large boulder material that likely extends approximately 80 m below the existing bed level (Alexander, et al., 2014).

The 'Waiho Loop' is unique in many ways compared to other terminal moraines and is considered to be of international geological significance by national and international geologists.

The terminal moraine currently has two gaps in it which have been formed naturally due to natural erosion processes. There is a gap which allows water from the Tatare River to flow as well as a larger gap in the vicinity of Milton's bank where the current course of the Waiho River is forced to go. The location of the Waiho Loop is presented in Figure 1-1 below.

Figure 1-1 – Location of the Waiho Loop

The base model which has been used for simulating the effect of the cut is the same model as used in the November 2016 report (Gardner, 2016). It is important to highlight that this model is a fixed bed model and does not allow for the movement of the riverbed during a flood event as happens during a real flood event. As a result, the model results need to be interpreted with care.

The model has been used to compare the likely peak water levels, velocities, shear stress and Froude number for the scenarios with and without the cut in place.

Details of the cut were provided by John Ellis (consultant to WCRC). The cut was to have a base width of 50m with 45 degree benched slopes. The location of the proposed cut is presented in Figure 2-1 below.

Figure 2-1 – location of proposed cut

In order to simulate the effects of the proposed cut, the base digital elevation model (DEM) which has been used in the model has been modified to include the cut. It has been assumed that the bed level through the cut will form a constant slope between the upstream and downstream extents of the loop. A comparison of the DEM based on the 2016 LiDAR has also been presented in Figure 2-2 and Figure 2-3.

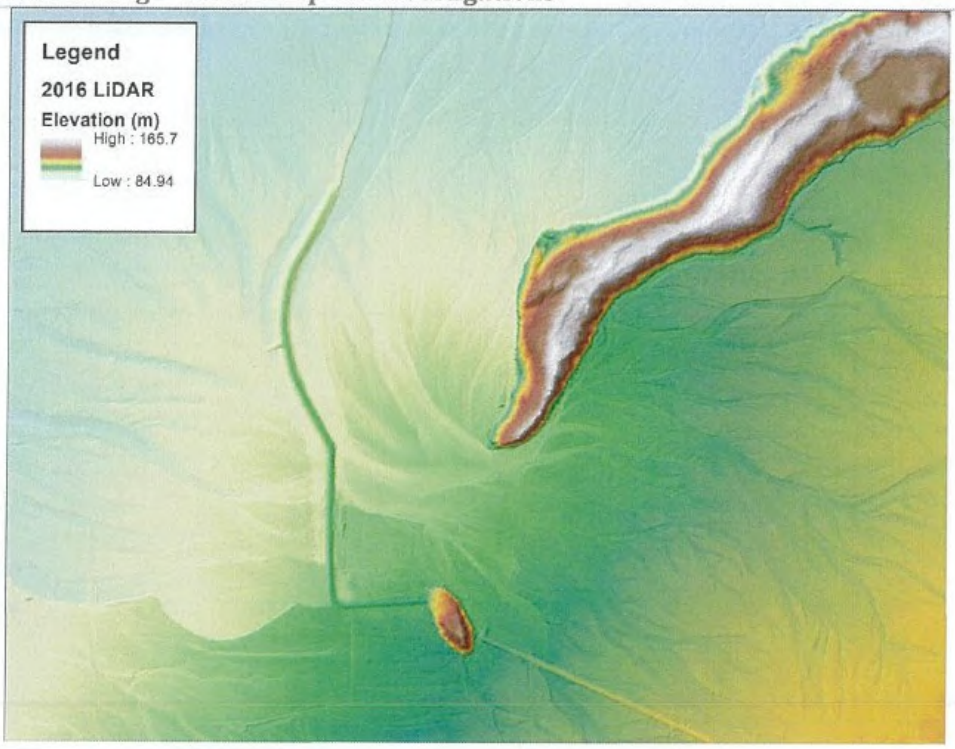


Figure 2-2 – Existing model setup - based on 2016 LiDAR data

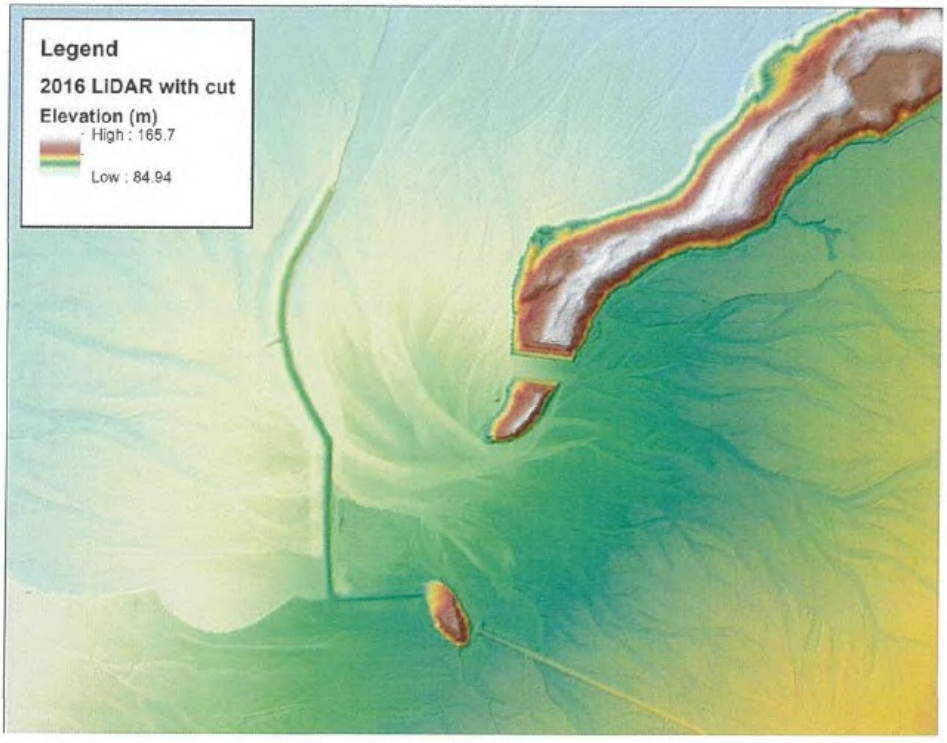


Figure 2-3 – Altered model setup including Waiho Loop cut - based on 2016 LiDAR data

An analysis of the LiDAR shows that there is an approximately 4m fall in elevation through the cut from one side if the loop to the other as shown in Figure 2-4 below.

Figure 2-4 – Comparison of ground profile with and without the proposed cut

Volumetric analysis shows that the cut would require removal of approximately 282,500 m³ of material. This allows for an excavation down to a depth of 5m to remove large boulders which may be buried beneath the existing bed material. Allowing for a bulking factor of 1.3 increases this to a total volume of 367,250 m³ of material. (NB. Order of magnitude cost estimated by John Ellis for removing this material is in the order of $3.7 million)

It should be highlighted that numerical modelling indicates that the base of the terminal moraine is likely to extend approximately 80m below the current bed levels (Alexander, et al., 2014). This indicates that the maximum level of bed degradation will be controlled by the depth of excavation in the vicinity of the cut. Excavation of this base rock may prove to be very difficult due to the sheer size and make of the bed rock material at the base of the moraine.

3 MODELLED SCENARIOS / RESULTS

3.1 MODELLED SCENARIOS

The model has been run for the existing scenario as well as with the cut in place for two inflow scenario which are;

- 1100 m^3/s - this is estimated to be an approximate annual flood event (based on scaled flows at Whataroa @SH6)
- 2500 m^3/s – this is estimated to be approximately a 1 in 100 year return period event (based on scaled flows at Whataroa @SH6)

Please note that due to the fact that it is not currently possible to gauge the Waiho River, there is no truly reliable flood frequency estimation available. All flows are based on the Whataroa catchment which is nearby and has reasonably similar characteristics.

3.2 MODEL RESULTS

Model outputs have been presented as a range of individual plans which are presented in Appendix A at the back of this report.

The following maps have been produced for each scenario;

- Peak flood depth
- Change in peak flood depth
- Peak flood speed
- Change in peak flood speed
- Peak shear stress
- Change in peak shear stresss
- Peak Froude number
- Change in peak Froude number

4. RESULTS ANALYSIS

Results show that the cut will have the potential to achieve some of the desired outcomes, however also present very significant risks which would need to be carefully considered.

4.1 REMOVE PRESSURE FROM THE EXISTING MILTON'S STOPBANK

The two key parameters to look at when analysing pressure on the stopbank are changes in peak water level and change in peak shear stress.

REDUCTION IN PEAK WATER LEVELS

Model results show that for the estimated 100-year event, peak water levels at Milton's bank would be reduced in the order of 0.4m.

For an annual event, these water levels would also be reduced in the order of 0.3m.

This indicates that creating a cut through the Waiho Loop will reduce the likelihood of Milton's Bank experiencing a failure due to overtopping, however does not look at failure due to stress.

REDUCTION IN PEAK SHEAR STRESS

Model results show that the existing peak shear stress levels are fairly high at the Milton's Bend location showing levels exceeding 300 N/m^2 in some locations as high as 400 N/m^2. Model results show that with the cut in place peak shear stress levels are not significantly reduced with peak shear stress levels only reducing by approximately 10%.

For the annual event, shear stress levels are not as high as in the 100-year event, however results also show a reduction in shear stress in the order of 10% at the location of Milton's bank.

These results indicate that the existing Milton's Bank will likely still be under significant pressure after the cut is put in place, although a slight reduction in peak shear stress levels will take place.

4.2 IMPACT ON GRAVEL THROUGHPUT IN THIS LOCATION ASSISTING IN BED LEVEL DEGRADATION UPSTREAM

Shear stress is a good indicator of ability to transport gravel. Model results show that there will be a fairly significant increase in shear stress immediately upstream of the cut location for the 1 in 100-year event with peak shear stress levels exceeding 500 N/m^2. These levels are likely to indicate high transport capabilities, however it should also be pointed out that the model also shows shear stress in this range in the current river channel between the Waiho loop and Milton's bank. Considering historic bed level

surveys show that this location has been relatively stable in the last 30+ years, it cannot be guaranteed that these shear stress levels will be sufficient to encourage bed degradation in this section of the river.

Assuming that there is sufficient energy to encourage gravel transport through this reach, the next question is how would the upstream riverbed likely behave. The answer to this is impossible to state with any certainty, however it can be assumed that some degree of backcutting would likely occur with a channel beginning to work its way upstream from the cut location.

Considering the current conditions of the riverbed, it is considered there is a high probability that any backcutting would likely propagate towards the Tartare, speeding up the likelihood of a permanent avulsion into the Tartare. Previous studies carried out by Professor Tim Davies, have indicated that a permanent avulsion into the Tartare may encourage what has been described as an uncontrolled nick point retreat which has the potential to significantly alter the dynamics of the system and create fairly rapid bed degradation upstream from here. Current LiDAR shows an approximately 20m drop from the main bed level of the Waiho River into the Tartare at this location.

Considering the maximum fall through the Waiho loop cut location is only 4m, if the river was not to avulse into the Tartare River, it is unlikely that the level of upstream degradation would be as significant as desired, however may potentially slow down current rates of aggradation in the short term.

The maximum bed degradation achievable at the location of the cut would be less than 4m, however in reality if the bed was to degrade here, it would likely try and find a natural equilibrium slope which may involve the bed aggrading downstream of the cut therefore reducing the overall fall through the cut and minimising the overall efficiency of the cut.

If the bed was to degrade several metres in the location of the cut, it is unlikely that this would propagate naturally upstream in a linear fashion with the level of degradation being fairly minimal by the time it has reached the State Highway bridge, if at all making it that far upstream.

It should also be highlighted that the bed will only likely reform itself during significant flood events, and will likely take many years work its way upstream from the cut location.

ADDITIONAL RISKS

If the bed level was to degrade by several metres, then it needs to be highlighted that has the risk that the existing stopbanks on the both the south and north banks would have the potential to be undermined causing bank failure.

5. CONCLUSIONS / RECOMMENDATIONS

The following conclusions can be drawn from this investigation;

- Creating a 50m wide cut through the Waiho loop in the location presented in Figure 2-1 would require the removal of approximately 370,000 m³ at an estimated cost of $3.7 million.

Impacts on Milton's Bank

- Hydraulic modelling indicates that this cut has the potential to reduce peak water levels at the location of Milton's bank by up to 0.4m in a 1 in 100-year return period flood event.
- Model results indicate that the current alignment of Milton's bank results in very high shear stress levels against the bank. Whilst creating the cut will reduce peak water levels, the impact on shear stress is much more limited with peak shear stress levels only reducing in the order of 10%. This indicates that the bank will still be prone to breach in high flow events.

Impact on gravel throughput in this location assisting in bed level degradation upstream

- Model results indicate relatively high shear stress levels in the location of the cut; however, these are only slightly higher than those already present in the reach between the Waiho loop and Milton's bank which has been relatively stable for the past 30+ years. Whilst it is considered likely that some degradation would occur, model results indicate that degradation cannot be guaranteed.
- Whilst it cannot be guaranteed, it is considered likely that a degree of back cutting would occur at the location of the cut, causing localised degradation as a minimum.
- Based on current bed levels, it is considered very likely that any degradation would simply speed up the future permanent avulsion of the river into the Tartare River. Due to the greater than 20m fall into the Tartare, this has the potential to set off uncontrollable nick point retreat and rapid bed degradation and is not considered desirable at this point of time.
- Considering the fall through the cut is only 4m, if an avulsion into the Tartare River does not take place, significant bed degradation as far upstream as the State Highway bridge is unlikely to take place.
- If degradation was to propagate upstream however, there is a risk that this could undermine existing stopbanks most particularly on the South bank, however also the new stopbank on the North bank which protects the treatment ponds.

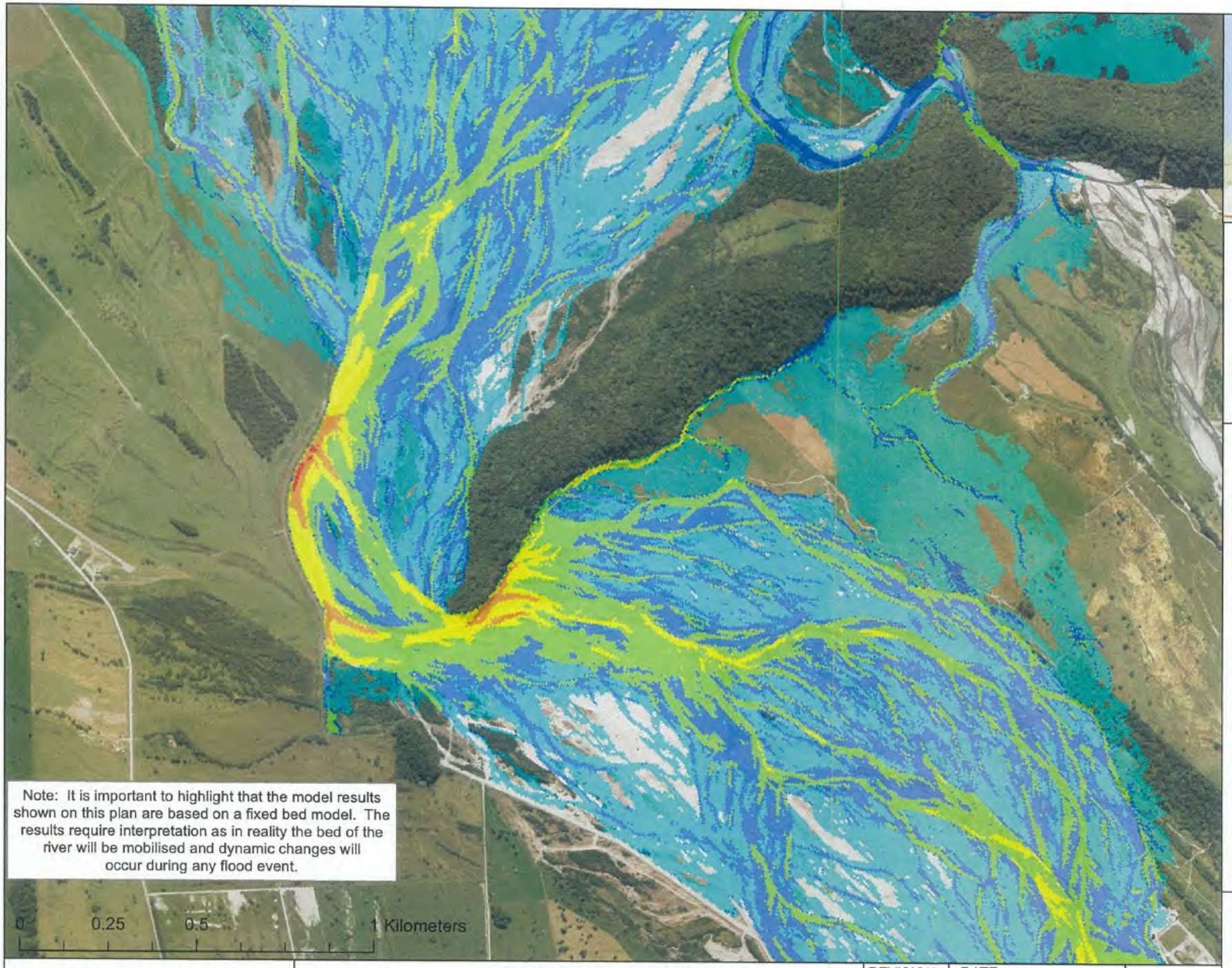
6. REFERENCES

Alexander, D., Davies, T. & Shulmeister, J., 2014. Formation of the Waiho Loop terminal moraine, New Zealand. *Journal of Quaternary Science,* 29(4), pp. 361-369.

Gardner, M., 2016. *WAIHO RIVER - 2D Hydraulic Modelling based on LiDAR,* Christchurch: Land River Sea Consulting Ltd.

McSaveney, E., 2007. *Glaciers and glaciation - Retreating ice and the glacier legacy.* [Online] Available at: https://teara.govt.nz/en/photograph/10744/waiho-moraine-loop-franz-josef [Accessed 2007].

APPENDIX A – FLOOD MAPS



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THE WEST COAST REGIONAL COUNCIL

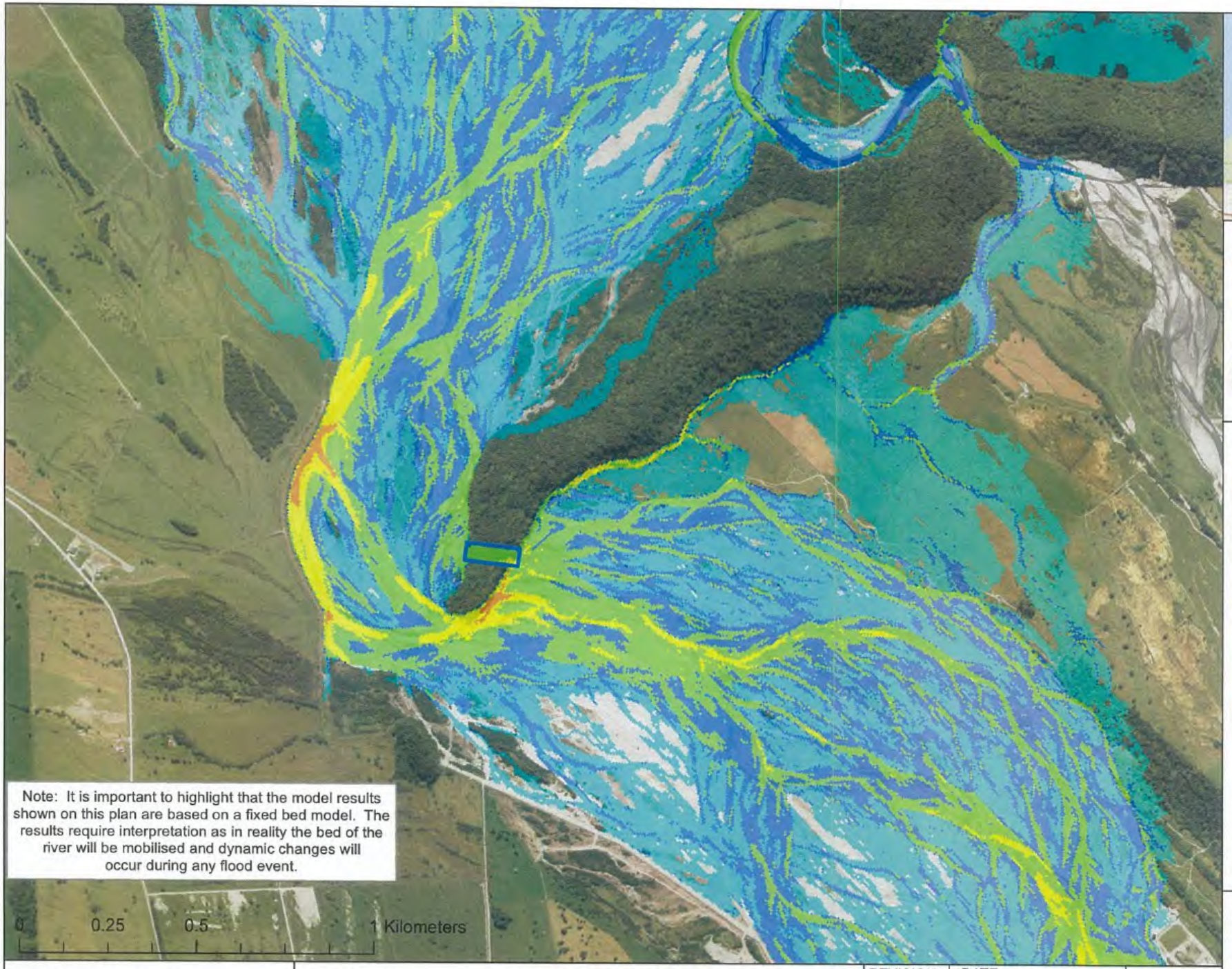
Legend

Peak Depth (m)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK FLOOD DEPTH MAP** **Scenario 01: Existing (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**
		A3 SCALE **1:10,000**	AUTHOR **Matthew Gardner**

N



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Legend

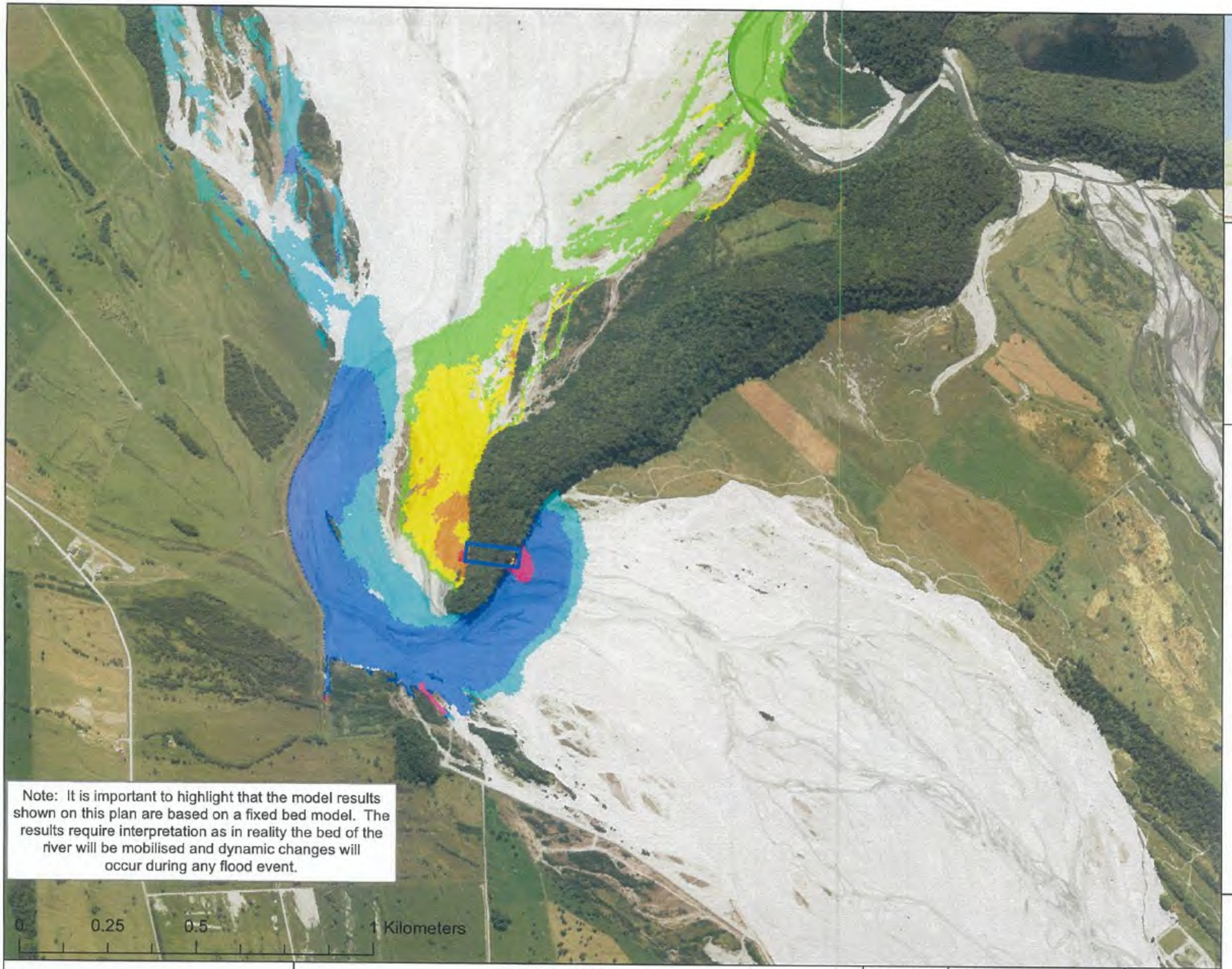
Waiho Loop Cut

Peak Depth (m)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK FLOOD DEPTH MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01** A3 SCALE **1:10,000**	DATE **8 May 2019** AUTHOR **Matthew Gardner**

N



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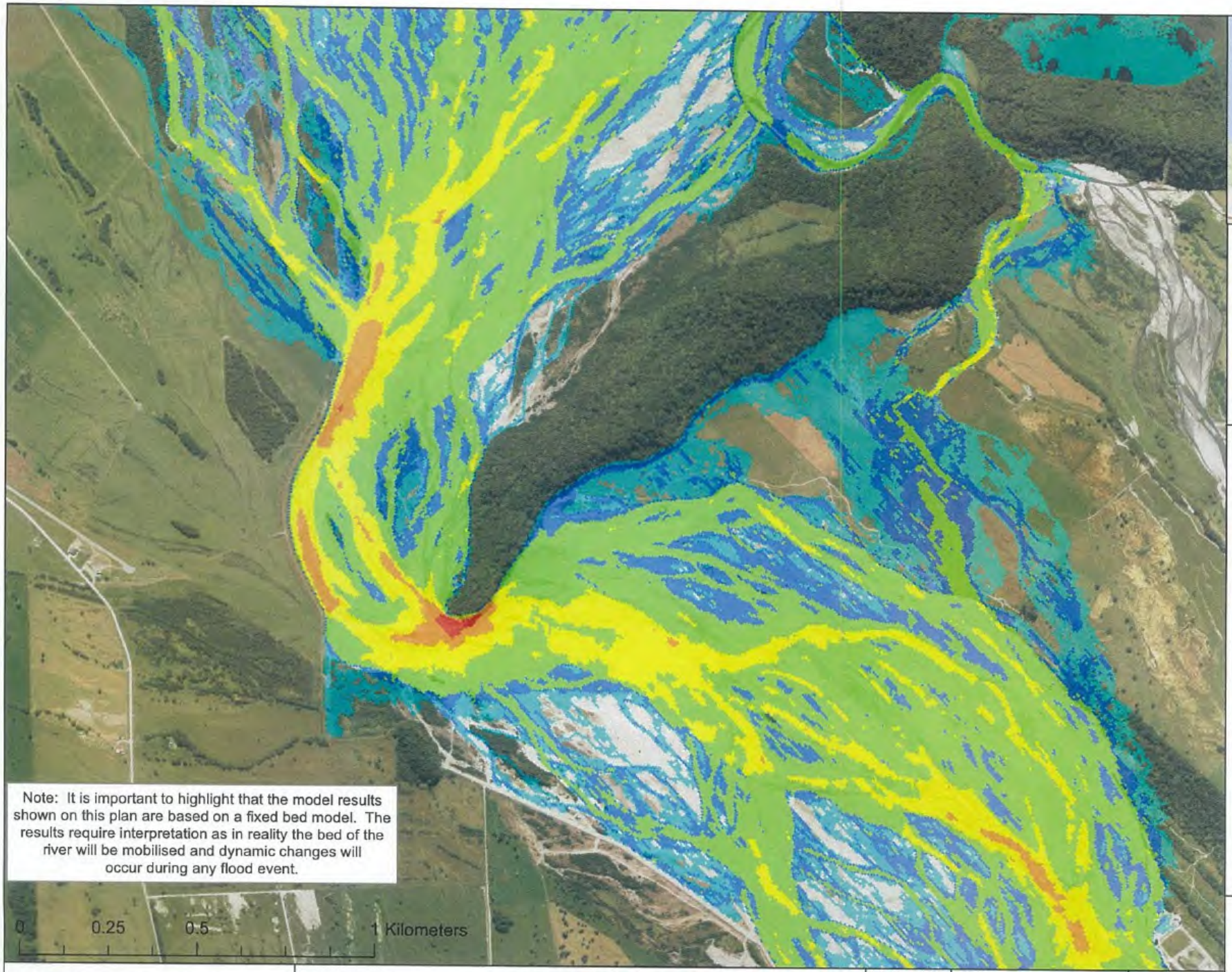
PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **CHANGE IN WATER DEPTH MAP** **Waiho Loop Cut** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**	N
		A3 SCALE **1:10,000**	AUTHOR **Matthew Gardner**	



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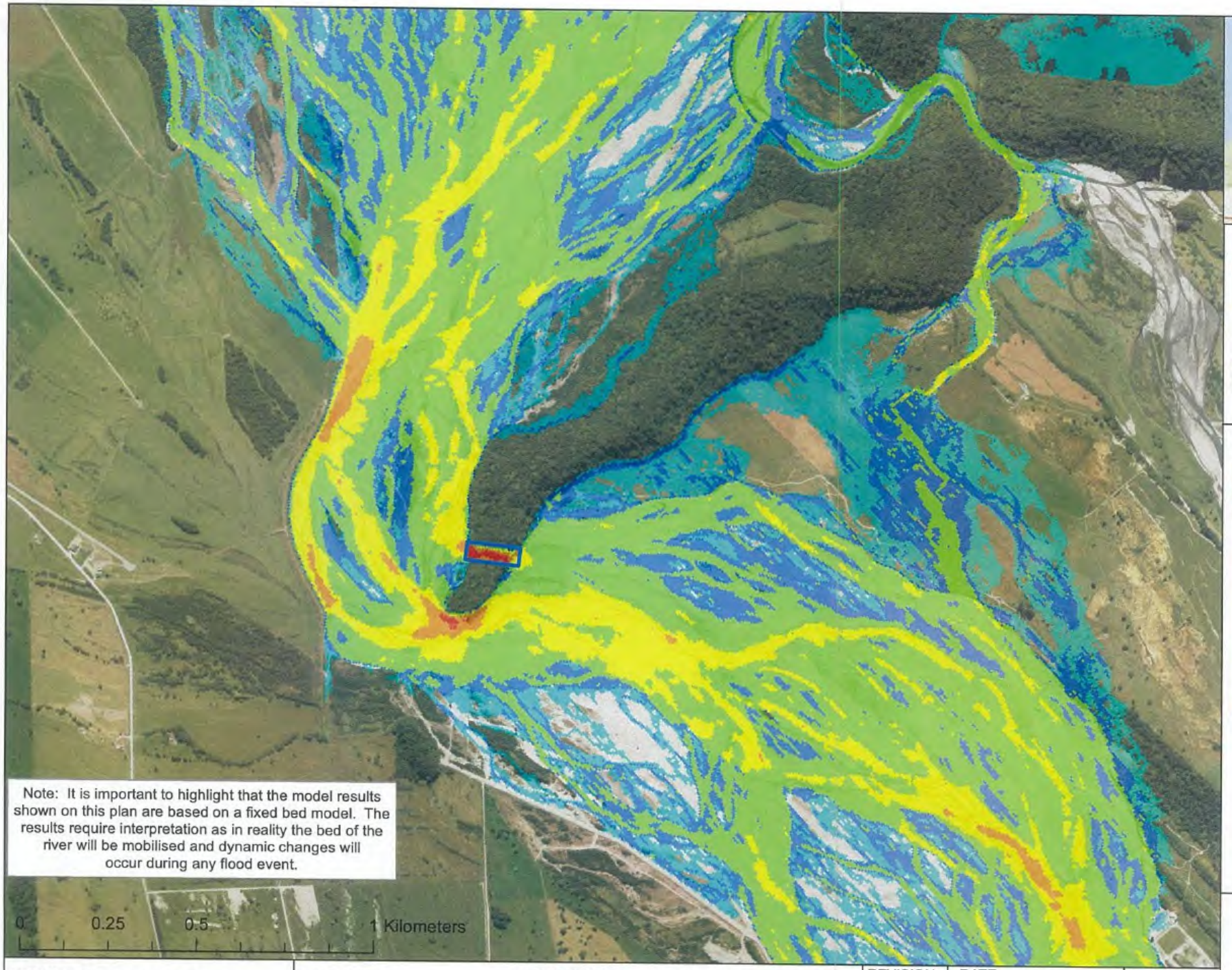
Legend

Peak Speed (m/s)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

601

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK WATER SPEED MAP** **Scenario 01: Existing (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**	N	
		A3 SCALE **1:10,000**	AUTHOR **Matthew Gardner**		



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Legend

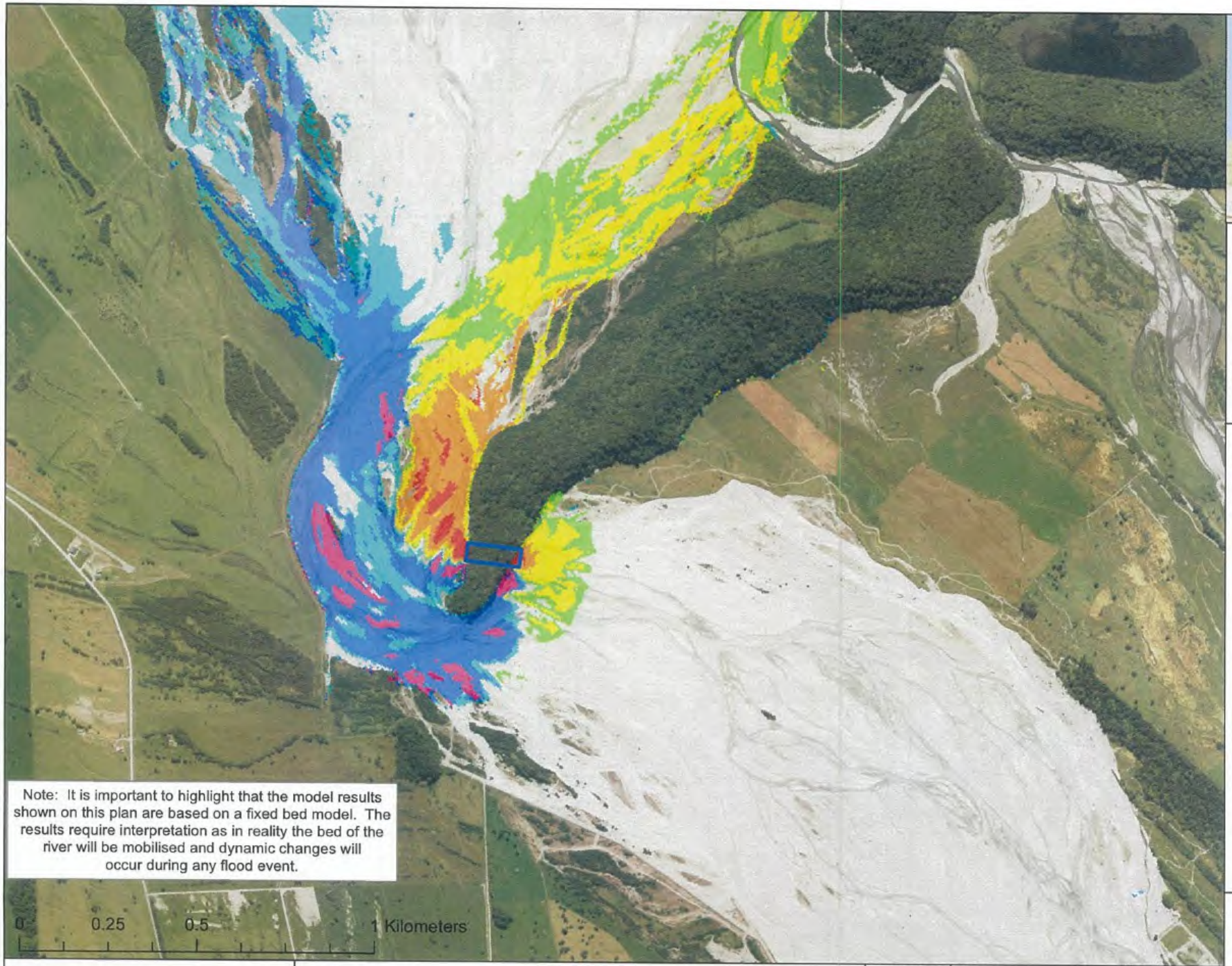
- Waiho Loop Cut

Peak Speed (m/s)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK WATER SPEED MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01** A3 SCALE **1:10,000**	DATE **8 May 2019** AUTHOR **Matthew Gardner**

N



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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Peak Speed (m/s)

- <-1
- -1 to -0.5
- -0.5 to -0.2
- -0.2 to -0.1
- -0.1 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- 0.5 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE	**CHANGE IN SPEED MAP** **Waiho Loop Cut** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**	N
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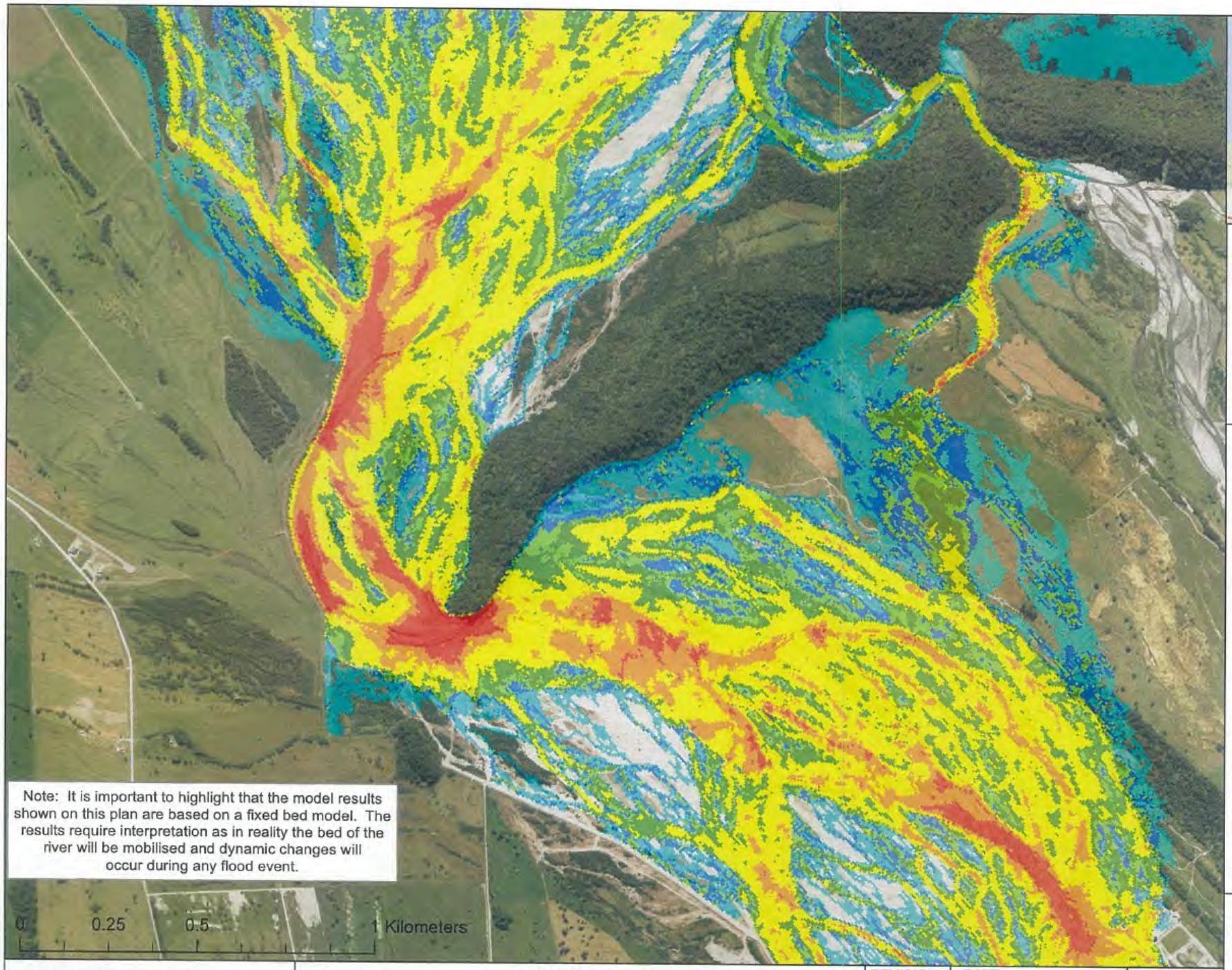

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Legend

Shear Stress Size (N/m2)

- 0
- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 50
- 50 to 100
- 100 to 150
- >150

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE	**PEAK SHEAR STRESS MAP** **Scenario 01: Existing (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**	N
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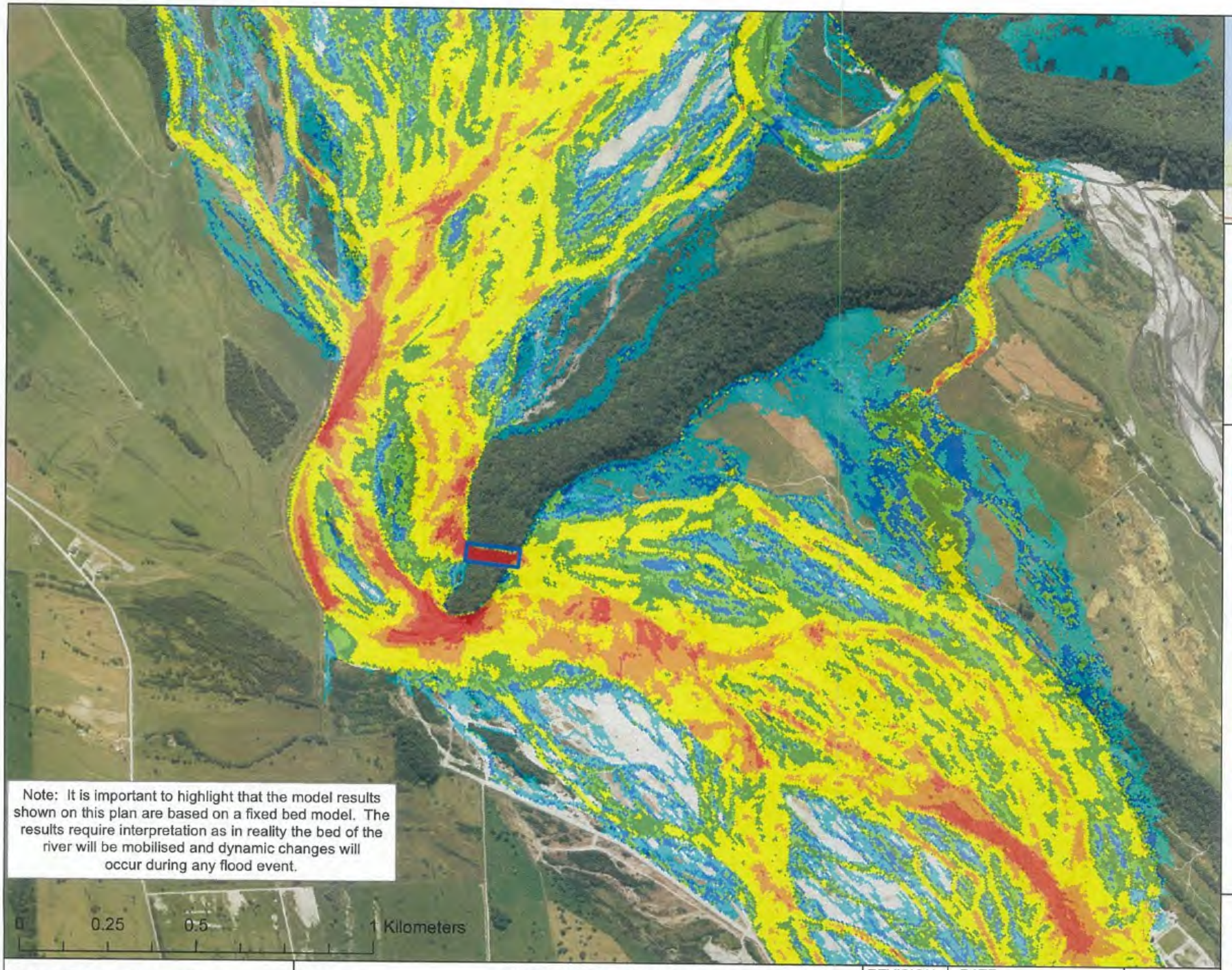

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Legend

Waiho Loop Cut

Shear Stress Size (N/m2)

- 0
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PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK SHEAR STRESS MAP** Scenario 02: Waiho Loop Cut (2016 Bed Conditions) Estimated Annual return period event (1100 m3/s)	REVISION **01**	DATE **8 May 2019**	N
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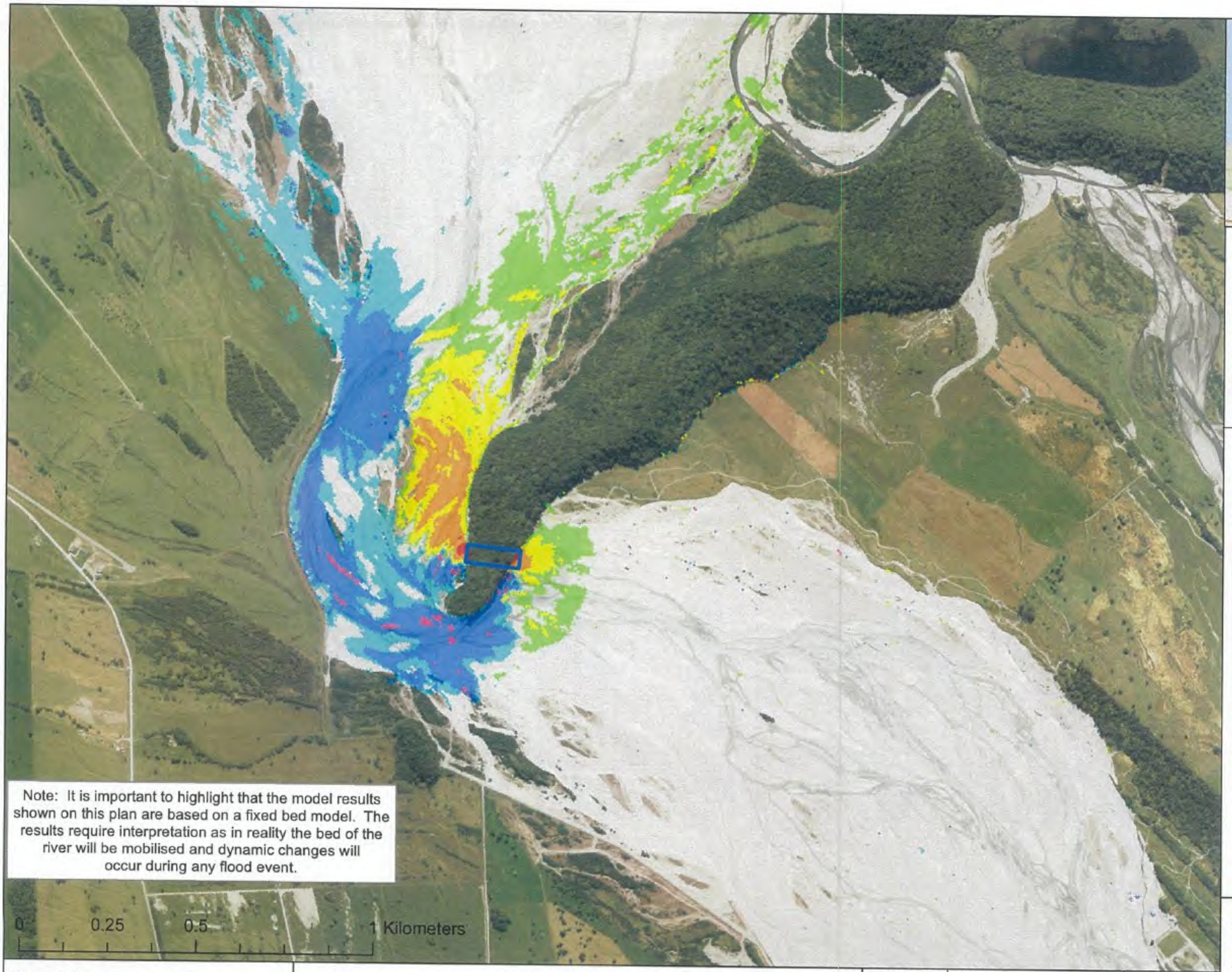

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Legend

Waiho Loop Cut

Shear Stress Size (N/m2)

- <-150
- -150 to -50
- -50 to -20
- -20 to -10
- -10 to 10
- 10 to 20
- 20 to 50
- 50 to 150
- >150

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **CHANGE IN SHEAR STRESS MAP Waiho Loop Cut Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**
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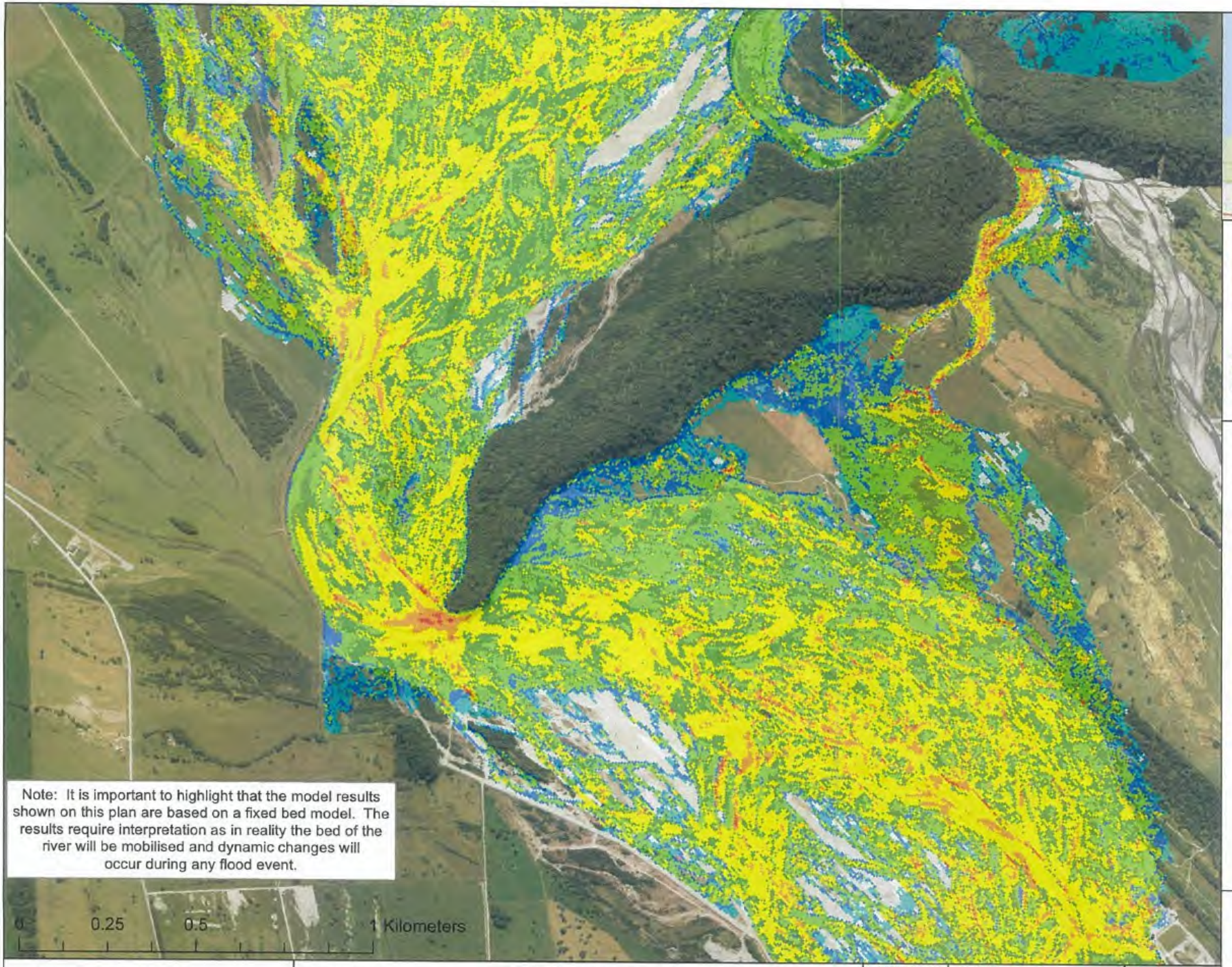

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Legend

Froude Number

- 0
- 0 to 0.1
- 0.1 to 0.3
- 0.3 to 0.5
- 0.5 to 0.6
- 0.6 to 0.8
- 0.8 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK FROUDE NUMBER MAP** **Scenario 01: Existing (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**
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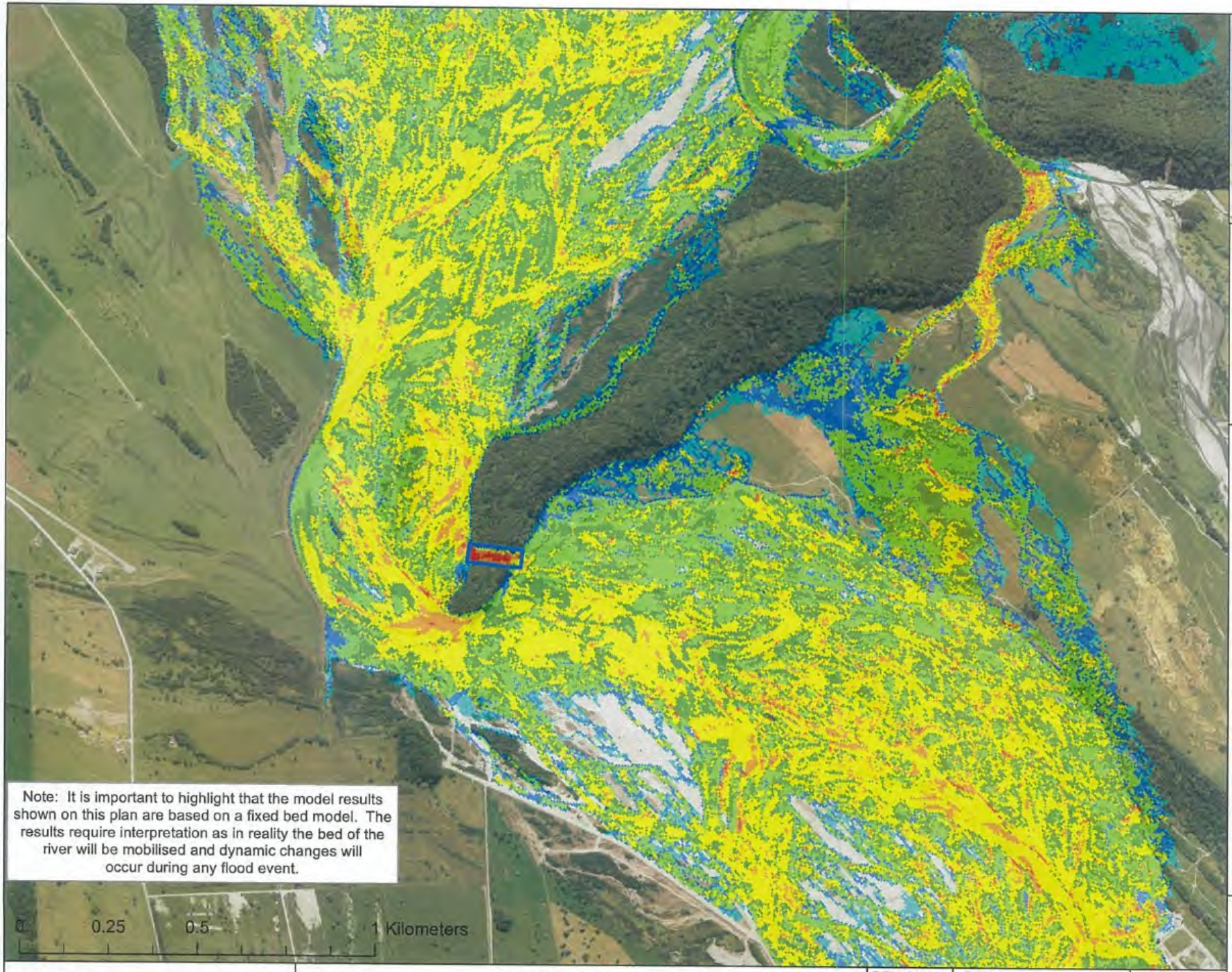

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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Froude Number

- 0
- 0 to 0.1
- 0.1 to 0.3
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- 0.5 to 0.6
- 0.6 to 0.8
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- >1

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE	**PEAK FROUDE NUMBER MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated Annual return period event (1100 m3/s)**	REVISION **01**	DATE **8 May 2019**	N
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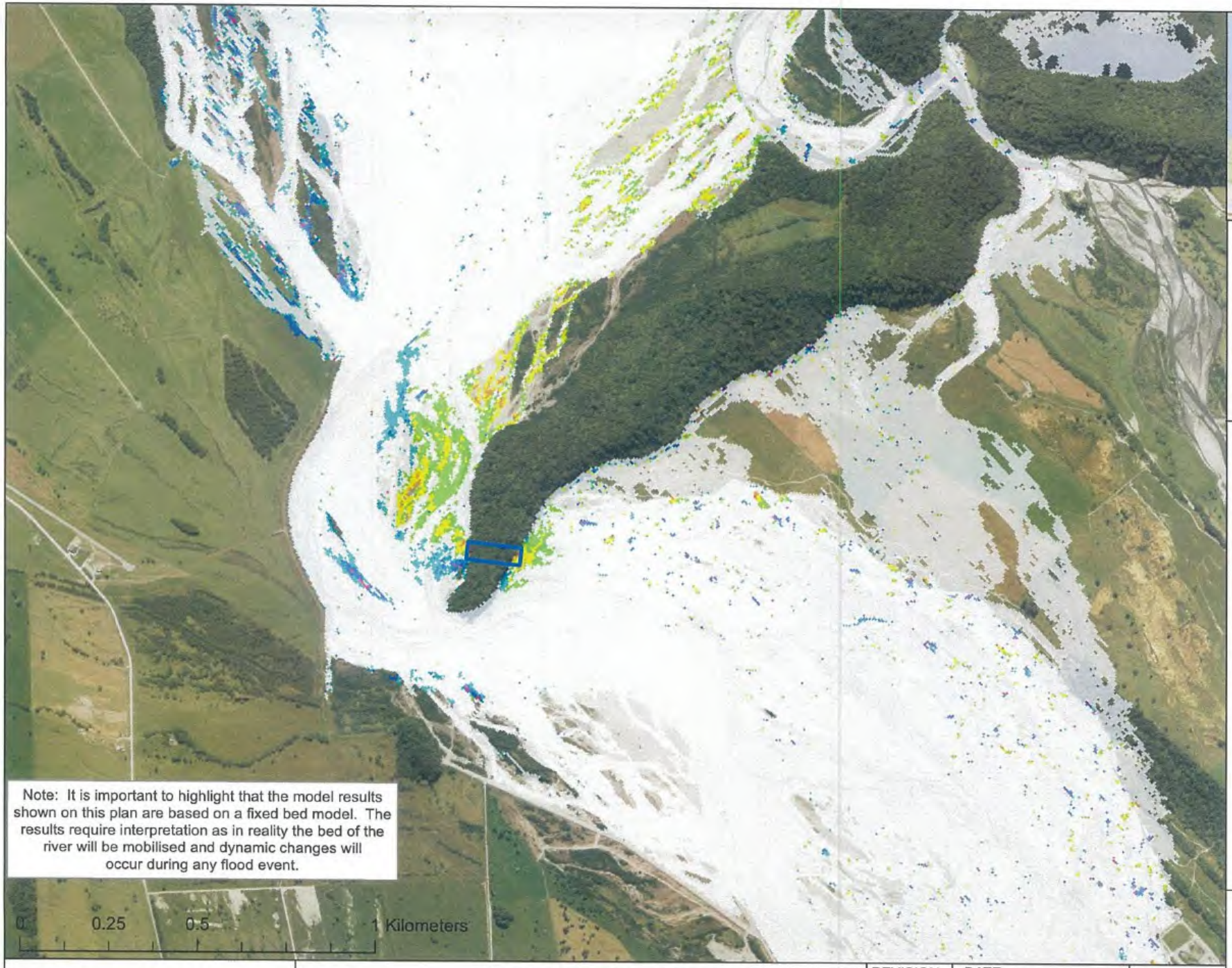

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Legend

Waiho Loop Cut

Froude Number

- <-1
- -1 to -0.5
- -0.5 to -0.2
- -0.2 to -0.1
- -0.1 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- 0.5 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**

MAP TITLE **CHANGE IN FROUDE NUMBER MAP**
Waiho Loop Cut
Estimated Annual return period event (1100 m3/s)

REVISION	DATE
01	**8 May 2019**
A3 SCALE	AUTHOR
1:10,000	**Matthew Gardner**

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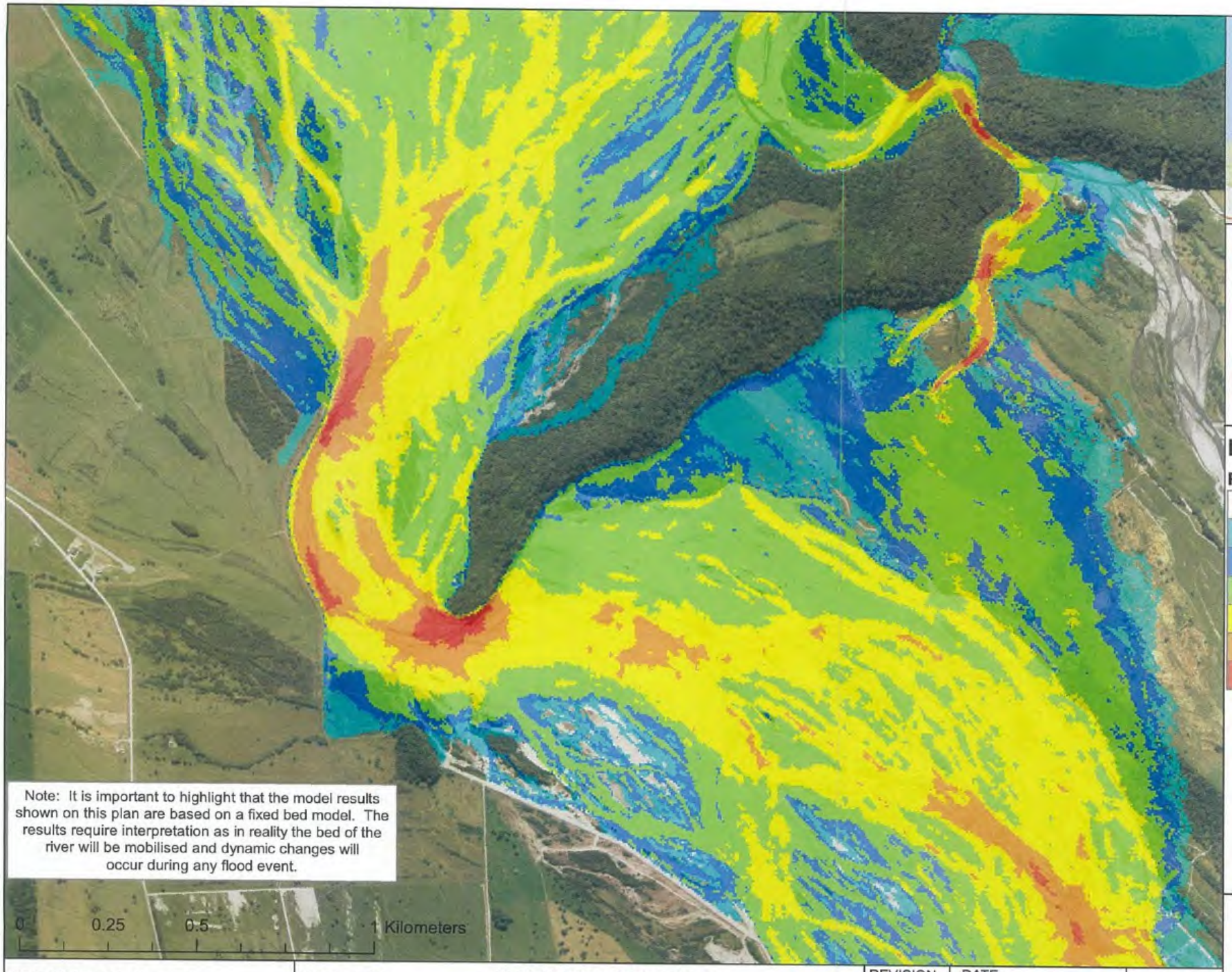

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THE WEST COAST REGIONAL COUNCIL

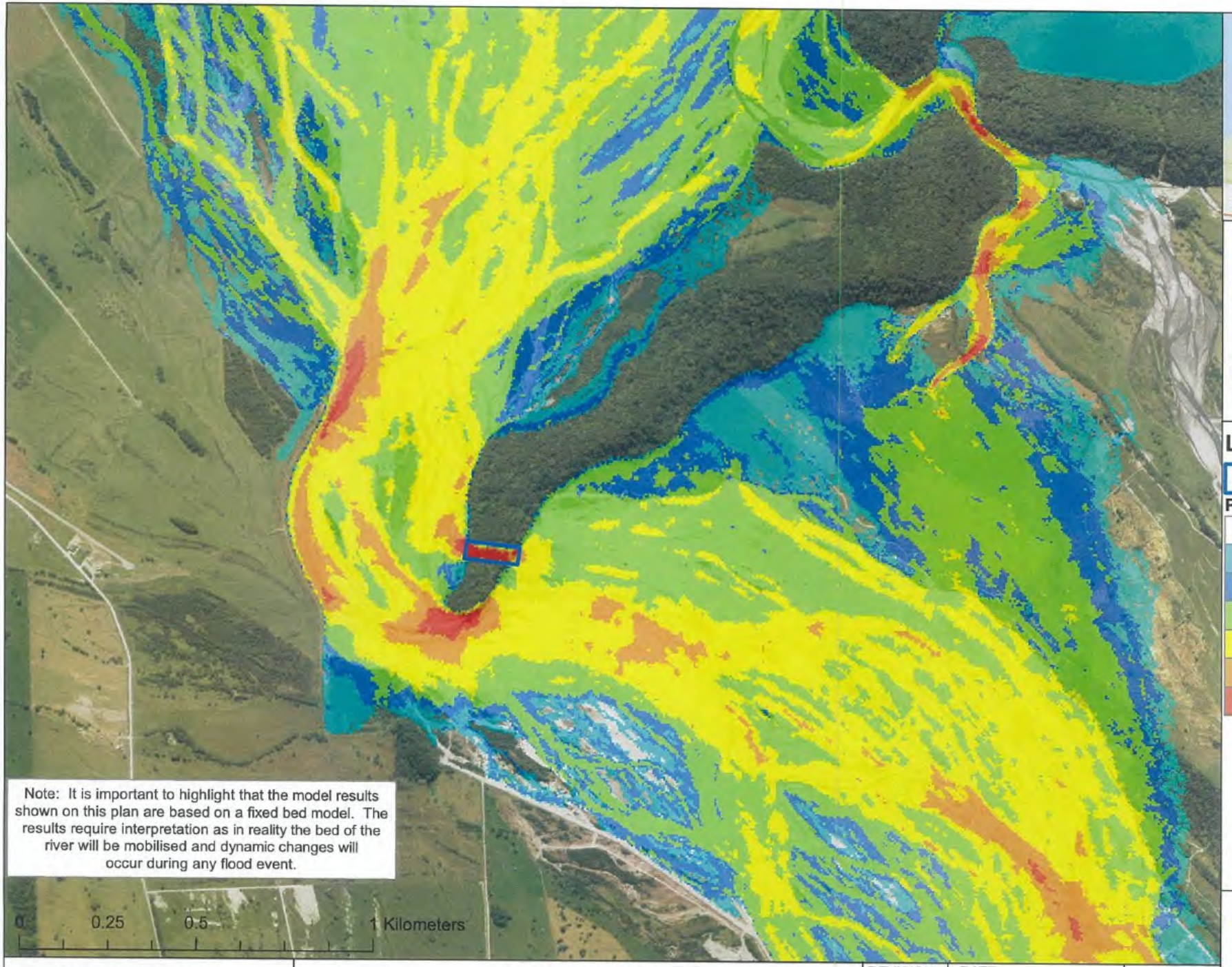
Legend

Peak Speed (m/s)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

N

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK WATER SPEED MAP** **Scenario 01: Existing (2016 Bed Conditions)** **Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01** A3 SCALE **1:10,000**	DATE **24 April 2019** AUTHOR **Matthew Gardner**



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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

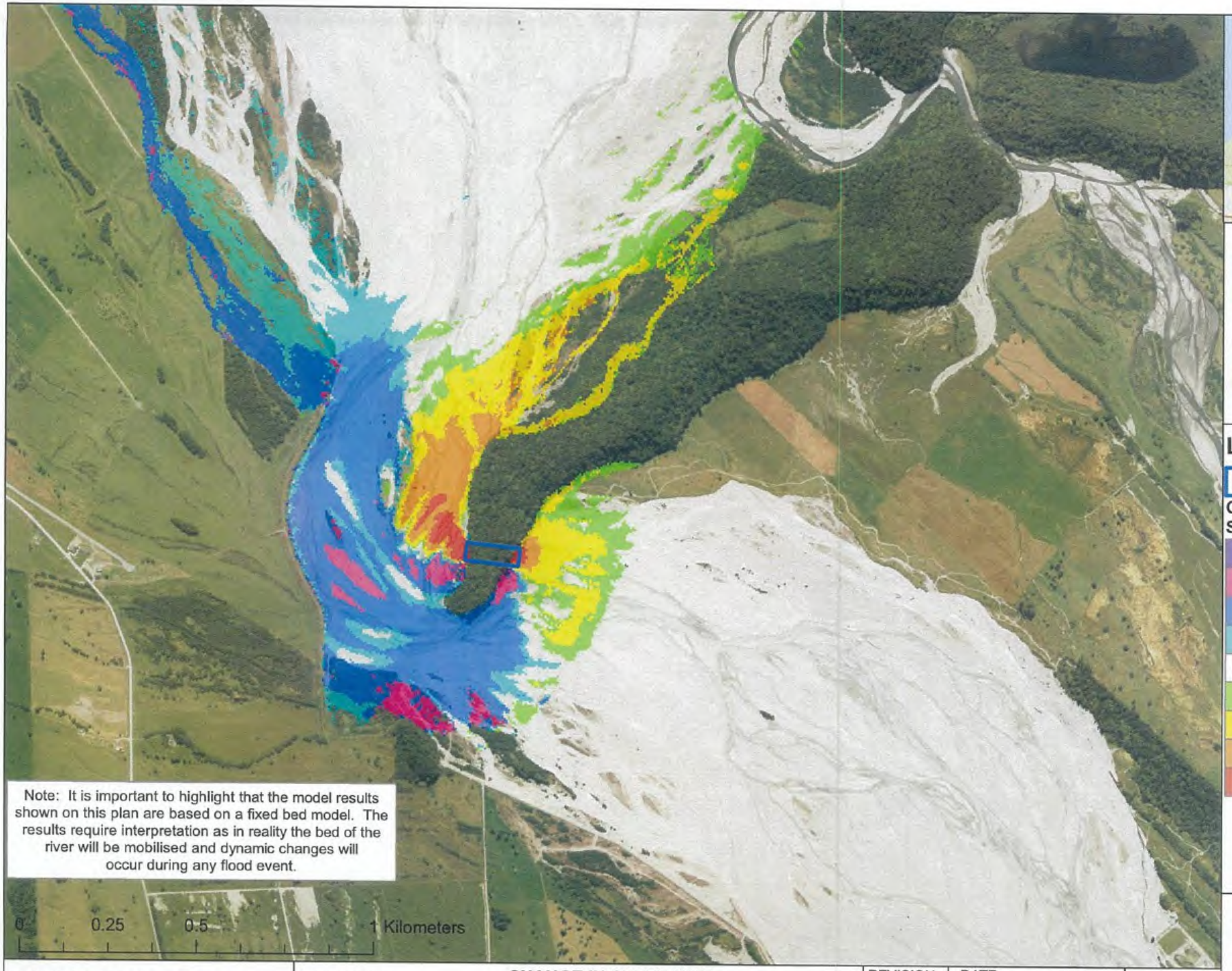
Peak Speed (m/s)

- 0
- 0 to 0.5
- 0.5 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- >4

Note: It is important to highlight that the model results shown on this plan are based on a fixed bed model. The results require interpretation as in reality the bed of the river will be mobilised and dynamic changes will occur during any flood event.

0 0.25 0.5 1 Kilometers

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK WATER SPEED MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01**	DATE **24 April 2019**	N
		A3 SCALE **1:10,000**	AUTHOR **Matthew Gardner**	



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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Change in Peak Speed (m/s)

- <-1
- -1 to -0.5
- -0.5 to -0.2
- -0.2 to -0.1
- -0.1 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- 0.5 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **CHANGE IN SPEED MAP** **Waiho Loop Cut** **Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01**	DATE **24 April 2019**	N
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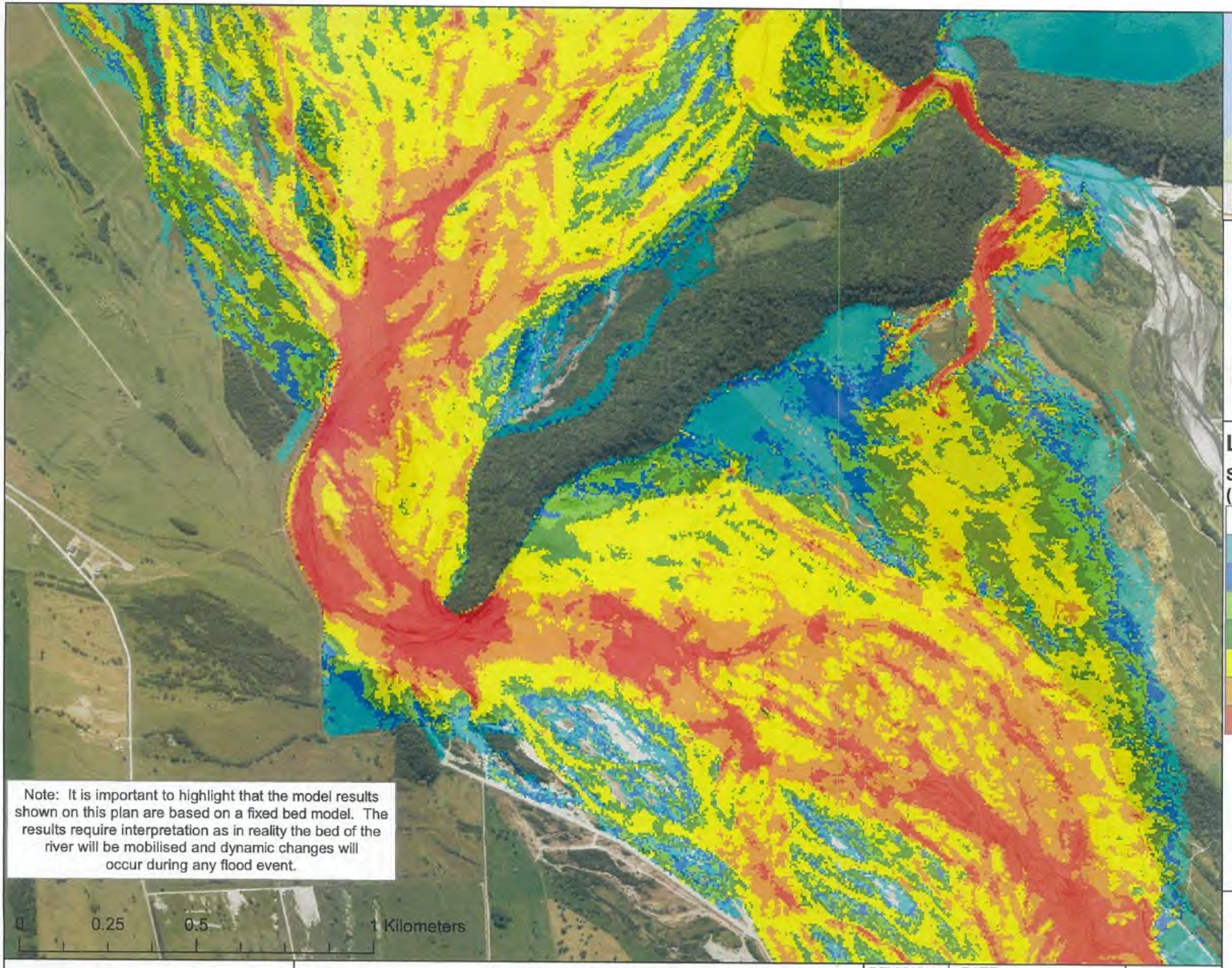

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THE WEST COAST REGIONAL COUNCIL

Legend

Shear Stress Size (N/m2)

- 0
- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 50
- 50 to 100
- 100 to 150
- >150

PROJECT **Waiho River Hydraulic Modelling**

MAP TITLE **PEAK SHEAR STRESS MAP**
Scenario 01: Existing (2016 Bed Conditions)
Estimated 1 in 100 year return period event (2500 m3/s)

REVISION	DATE
01	24 April 2019
A3 SCALE	AUTHOR
1:10,000	Matthew Gardner

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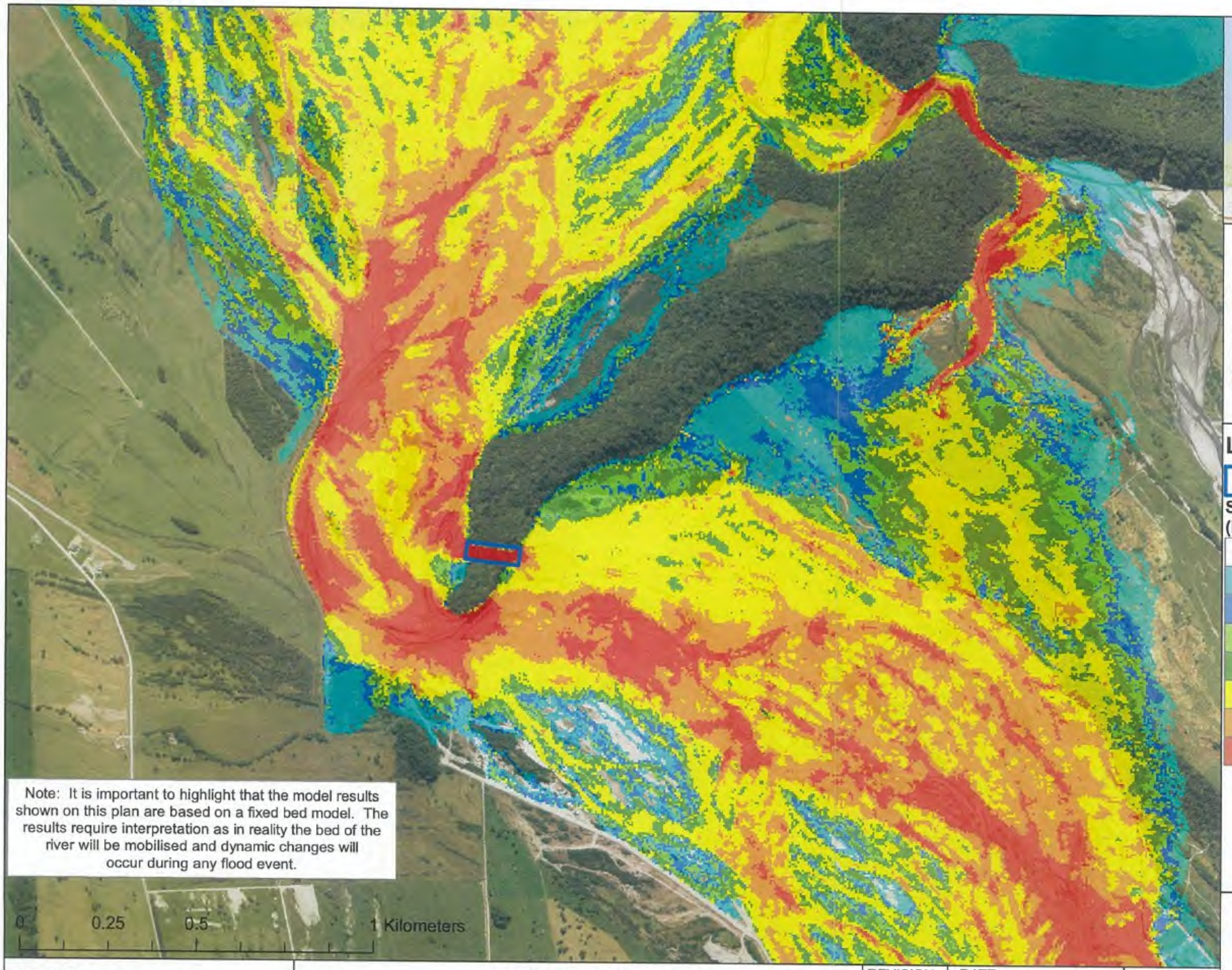

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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Shear Stress Size (N/m2)

- 0
- 0 to 10
- 10 to 20
- 20 to 30
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PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK SHEAR STRESS MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01** A3 SCALE **1:10,000**	DATE **24 April 2019** AUTHOR **Matthew Gardner**

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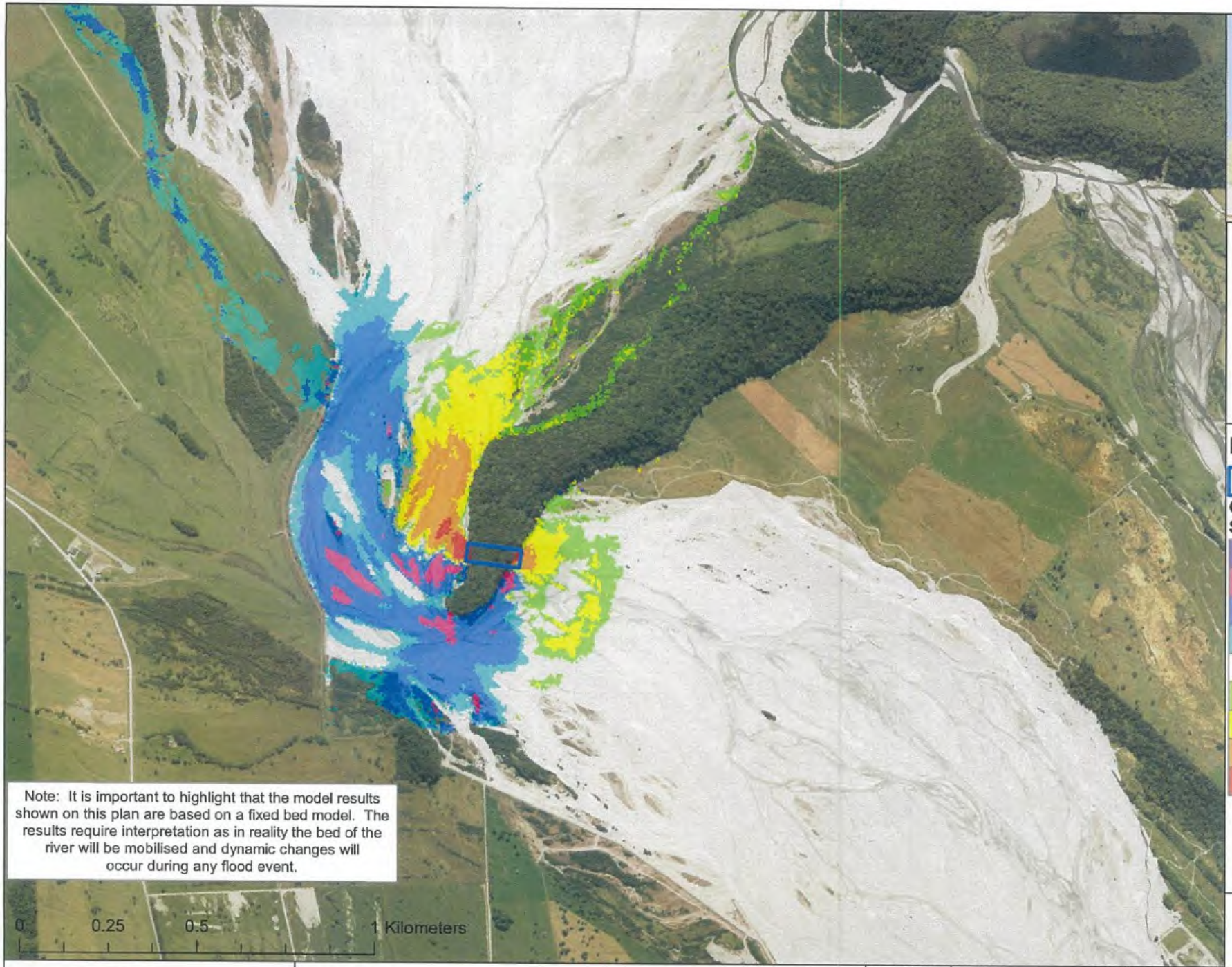

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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Change in Shear Stress Size (N/m2)

- <-150
- -150 to -50
- -50 to -20
- -20 to -10
- -10 to 10
- 10 to 20
- 20 to 50
- 50 to 150
- >150

N

PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **CHANGE IN SHEAR STRESS MAP Waiho Loop Cut Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01**	DATE **24 April 2019**
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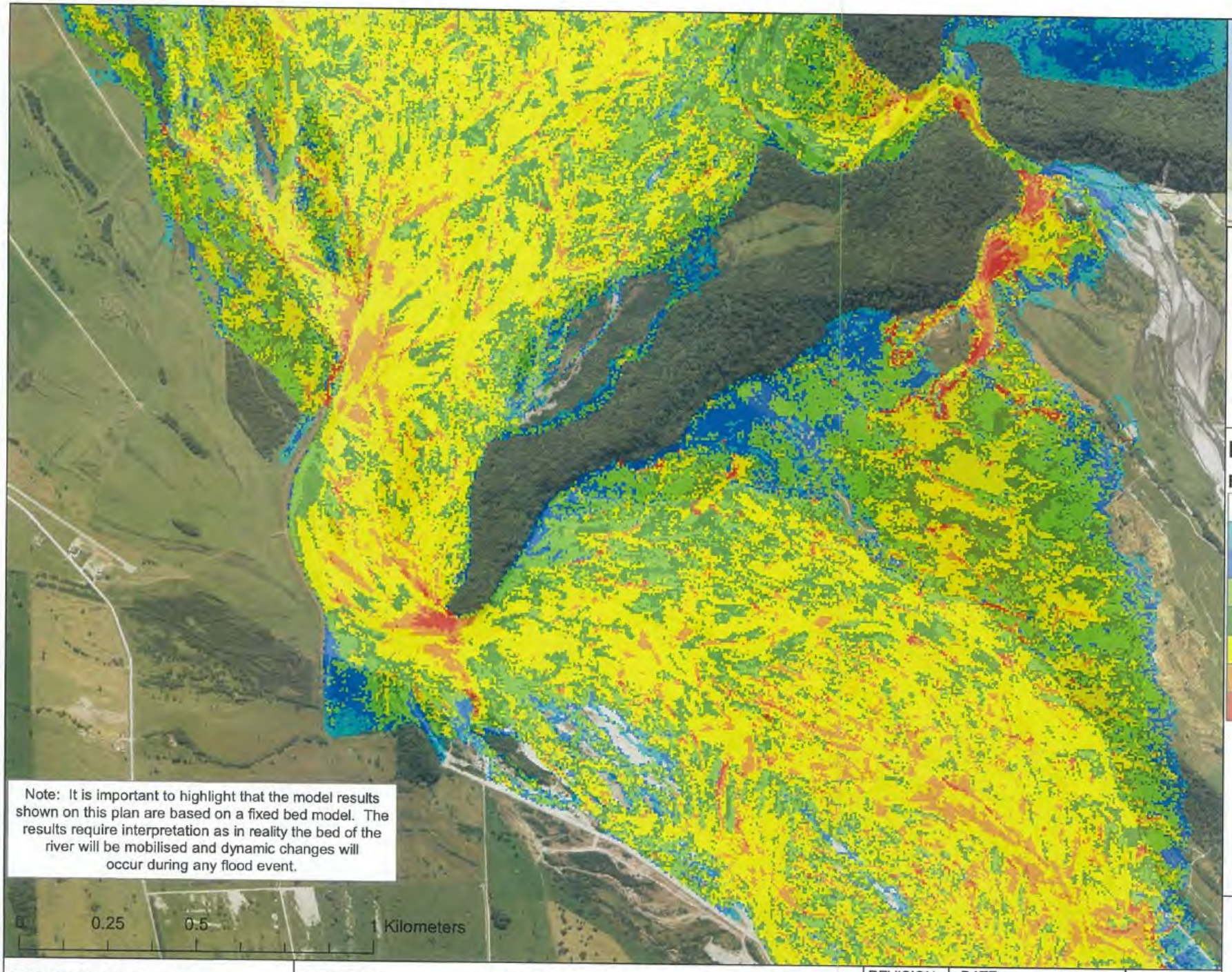

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THE WEST COAST REGIONAL COUNCIL

Legend

Froude Number

- 0
- 0 to 0.1
- 0.1 to 0.3
- 0.3 to 0.5
- 0.5 to 0.6
- 0.6 to 0.8
- 0.8 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**

MAP TITLE **PEAK FROUDE NUMBER MAP**
Scenario 01: Existing (2016 Bed Conditions)
Estimated 1 in 100 year return period event (2500 m3/s)

REVISION	DATE
01	24 April 2019
A3 SCALE	AUTHOR
1:10,000	Matthew Gardner

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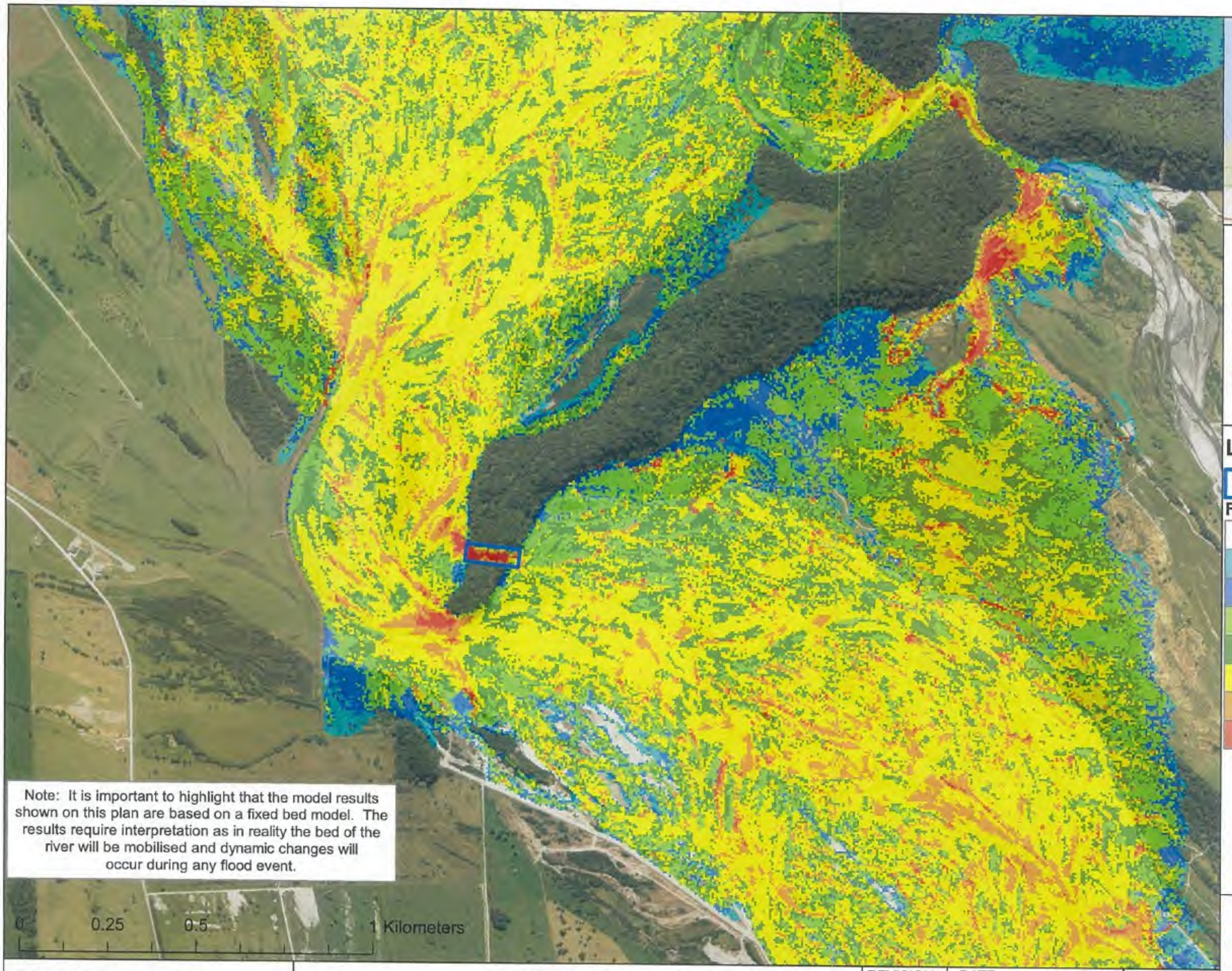

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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Froude Number

- 0
- 0 to 0.1
- 0.1 to 0.3
- 0.3 to 0.5
- 0.5 to 0.6
- 0.6 to 0.8
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PROJECT **Waiho River Hydraulic Modelling**	MAP TITLE **PEAK FROUDE NUMBER MAP** **Scenario 02: Waiho Loop Cut (2016 Bed Conditions)** **Estimated 1 in 100 year return period event (2500 m3/s)**	REVISION **01** A3 SCALE **1:10,000**	DATE **24 April 2019** AUTHOR **Matthew Gardner**

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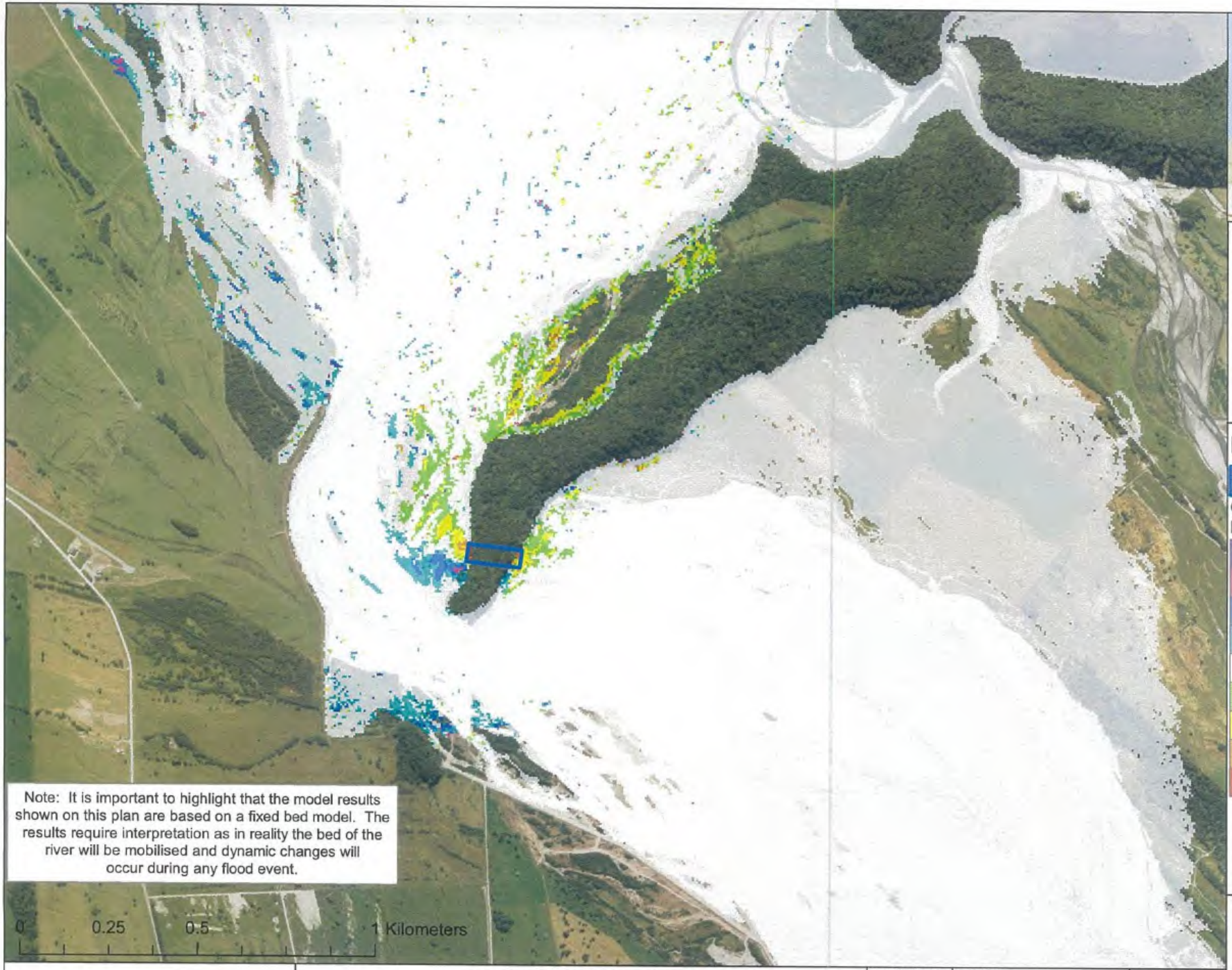

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THE WEST COAST REGIONAL COUNCIL

Legend

Waiho Loop Cut

Change in Froude Number

- <-1
- -1 to -0.5
- -0.5 to -0.2
- -0.2 to -0.1
- -0.1 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- 0.5 to 1
- >1

PROJECT **Waiho River Hydraulic Modelling**

MAP TITLE **CHANGE IN FROUDE NUMBER MAP**
Waiho Loop Cut
Estimated 1 in 100 year return period event (2500 m3/s)

REVISION	DATE
01	**24 April 2019**
A3 SCALE **1:10,000**	AUTHOR **Matthew Gardner**

N

THE WEST COAST REGIONAL COUNCIL

Prepared for: 13 August 2019 – Council Meeting
From: Nichola Costley – Manager Strategy and Communications
Date: 31 July 2019
Subject: Variation 6 to the West Coast Regional Land Transport Plan 2015 - 21

Purpose
The purpose of this request is to ask the Regional Council to vary the 2015-21 Regional Land Transport Plan (RLTP) to include the West Coast State Highway Speed Management Guide Implementation. This request is made pursuant to section 18D of the Land Transport Management Act 2003 (LTMA).

Overview
This paper went to the 9 July 2019 Council, whereby it was decided to defer making decisions on the recommendations until further information had been provided by the New Zealand Transport Agency (NZTA). NZTA will speak to this matter at the Council meeting on 13 August 2019.

The Regional Transport Committee (RTC) may prepare a variation to its RLTP during the six years to which it applies if the variation addresses an issue raised by a review; or good reason exists for making the variation.

A variation may be prepared by the RTC at the request of an approved organisation of the NZ Transport Agency or on the RTC's own motion. The provisions of the LTMA that apply to the preparation of a full RLTP apply with the necessary changes to a variation of an RLTP. Consultation is not required for any Variation that is not deemed significant in the criteria set out in the RLTP.

The RTC may recommend that the West Coast Regional Council vary the RLTP, however final approval of the variation is determined by the Council.

Background
The Government Policy Statement on Land Transport (GPS) 2018 presents a number of changes in direction for the New Zealand transport system, including prioritising a safer transport system free of death and injury. The Investment Assessment Framework (IAF) assessment methodology enables programmes of safety projects to be included in the 2018-21 National Land Transport Programme (NLTP) to deliver the step change in safety outcomes sought in the GPS by allowing for assessment and investment decisions to be made at a programme rather than individual project level.

Safer speed is a pillar of the Safe System approach that can deliver safety outcomes, i.e. in some situations, the best safety improvement option may be to simply lower the operating speed to a safe and appropriate level through the use of speed limit signs and minor infrastructure improvements that align with the adjusted speed limit.

When the RLTP, was published the SH Speed Management Programme was being developed as a national programme and hence was not submitted to the Regional RLTP's. The Transport Agency has now formalised the approach to speed management and seeks to include regional SH activities in all RLTP's.

Implementing a speed management approach, focusing on the top 10 percent of the SH network, will result in the greatest reduction in deaths and serious injuries. It aligns very highly with Priority 1 under the IAF.

The Safe Networks Programme (SNP) was endorsed by the NZTA Board at their November 2018 meeting. Three key components will be used to deliver the three-year national safety programme through the 2018-21 NLTP. The key work streams include:

- Safe Roads and Roadsides - State Highways and Local Roads
- Safe and appropriate speeds
- Safe level crossings

The work streams are complemented by a toolbox of measures to support their rollout, including investment in cycling, walking, effective enforcement, safer vehicles and customer behaviour measures. The NZTA Board reconfirmed its commitment to the acceleration of the speed management approach

at its December 2018 Board meeting, including the implementation of the Speed Management Guide (SMG).

The SMG is a document that helps modernise the approach to managing speed in New Zealand. It supports a consistent approach to speed that is appropriate for road function, design, safety, use and the surrounding environment (land use). It helps Road Controlling Authorities (RCAs) to identify and prioritise the parts of their networks where better speed management will contribute most to reducing deaths and serious injuries, while supporting overall economic productivity. It also assists RCAs to have better conversations and engagement with their communities, to better understand priorities and perspectives on local roads, and improve understanding of speed management activities.

To help ensure future speed management efforts are better targeted to risk and applied consistently across the country, regional maps are produced by the NZTA for RCAs that identify the top 5-10 percent 'high benefit' speed management opportunities. These maps highlight the appropriate intervention based on the road's function, which may be a mix of safety improvements that support current or higher travel speeds and possible changes to the limits, up or down. These maps provide a starting point for RCAs to engage with their communities. The SMG promotes a tailored approach to engagement, supported by a variety of engagement tools. RCAs can use and adapt these tools to suit their engagement needs.

For many roads, no change to travel speeds – or speed limits – will be needed. It is for those corridors where current travel speeds or speed limits may be too low or to too high that changes should be made.

Key Points

The Government Policy Statement on Land Transport (GPS) 2018 presents a number of changes in direction for the New Zealand transport system, including prioritising a safer transport system free of death and injury. NZTA has developed the Safe Networks Programme to deliver the safety objectives within the GPS, including acceleration of the implementation of the Speed Management Guide.

GPS 2018 supports investment in state highways and local roads to accelerate the implementation of the new Speed Management Guide, focusing on treating the top 10 percent of the network which will result in the greatest reduction in death and serious injury as quickly as possible. This Guide was developed to provide a nationally consistent approach to speed management, delivering both a safe system and network efficiency.

MegaMaps (the Safer Journeys Risk Assessment Tool) is used to assess an appropriate operating speed for all roads, both local roads and state highways. The results from this technical exercise can then be used to increase community awareness and understanding of road risk, informing local communities so that they can effectively engage in discussions on proposed interventions.

As part of the SNP, a nationwide programme of activities is being developed and the West Coast region is identified as a Very High priority area for the implementation of speed management and a wider range of network safety improvements.

The Agency has established a framework through its Speed Management Guide to allow a systematic and consistent application and implementation of safe and appropriate speed across both the state highway network and local roading network under local government jurisdiction.

This comprehensive programme has identified those sections of the network which have the top 10% Death and Serious Injuries (DSI) savings on the network and because they will provide the greatest immediate benefit due to the level of traffic, regional speed reviews in Auckland, Waikato and Canterbury have commenced.

The West Coast SH Speed Management Guide Implementation activity covers the identification and implementation of the highest benefit safety improvements on the state highway network within the West Coast region and is part of the three year nationwide Safe Network Programme announced by the Minister on 16 December 2018.

Complementary projects may be required on local roads and these may be the subject of later RLTP variation requests. NZTA and local road controlling authorities will work collaboratively on developing the detailed programmes of work required.

Complementing this systematic approach, the Agency is concurrently seeking to undertake speed reviews of state highway corridors and parts of the network where it has given a historic commitment or there has been similar sustained historic local authority or community interest and where a similarly high potential benefit has been identified.

Public engagement and consultation form an important part of the speed review process so the community will be informed when the speed review publicly commences. This specific initiative and the wider programme are proceeding as they are a critical part of the Governments stated policy of improving road safety for all New Zealanders.

Note that the cost estimates presented are budget only and are subject to the business case and final NZTA funding approval process. We re-iterate that inclusion in the RLTP is the first step in the process to access funding from the National Land Transport Fund, with subsequent steps for inclusion in the National Land Transport Programme and more stringent tests that apply to activities for which funding approval is sought.

The West Coast SH Speed Management Guide Implementation activity is estimated to cost $1.45m in total (over 3 years). It will be funded through Work Category 324 "Road Improvements" with a 100% Funding Assistance Rate.

Project	Phase	Anticipated Cost	Profile	Work Cat
West Coast SH Speed Management Guide Implementation	Pre-implementation Implementation	$1.45 million	Very High, (Priority 1)	324 (Road Improvements)

This project is strongly aligned with the strategic direction of the RLTP.

This variation is low cost and is not significant, therefore public consultation is not required.

Regional Transport Committee support
The RTC accepted the following recommendations at its meeting on 14 June 2019:

That the West Coast Regional Transport Committee:

1. *Notes that the following state highway activity is proposed as a variation to the Regional Land Transport Plan:*
   a. *West Coast SH Speed Management Guide Implementation*
2. *Determines that the requested variation is not significant.*
3. *Agrees to vary the Regional Land Transport Plan by adding the above proposed activity to Table 9 – "Activities included in the West Coast Regional Land Transport Plan" in the RLTP.*
4. *Recommends the variation and change to the West Coast Regional Council.*

RECOMMENDATIONS

That Council:

1. *Approves the variation to the Regional Land Transport Plan 2015 – 21 for the inclusion of a West Coast State Highway Speed Management Guide Implementation;*

2. *Agrees to vary the Regional Land Transport Plan by adding the above proposed activity to Table 9 – "Activities included in the West Coast Regional Land Transport Plan" in the RLTP.*

3. *Submits the variation to the West Coast Regional Land Transport Plan 2015 – 21 to the New Zealand Transport Agency.*

Nichola Costley
Manager Strategy and Communications

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting 13 August 2019
Prepared by: Robert Mallinson – Corporate Services Manager
Date: 2 August 2019
Subject: Corporate Services Manager's Monthly Report

1. Financial Report 1 July to 30 June 2019

FOR THE TWELVE MONTHS ENDED 30 JUNE 2019

	ACTUAL Year to Date	BUDGET	BUDGET Annual	% ACTUAL vs BUDGET
REVENUES				
General Rates and Penalties	3,387,101	3,430,000	3,430,000	99%
Investment Income	681,513	906,709	906,709	75%
Resource Management	829,207	1,333,384	1,333,384	62%
Regional Land Transport	91,626	82,330	82,330	111%
Emergency Management	1,144,229	1,150,000	1,150,000	99%
Economic Development	37,500	150,000	150,000	25%
River, Drainage, Coastal Protection	1,959,328	1,557,222	1,557,222	126%
Warm West Coast	14,431	15,491	15,491	93%
VCS Business Unit	3,949,041	4,046,000	4,046,000	98%
Commercial Property Revaluation	-	-	-	
	12,103,975	12,671,136	12,671,136	
EXPENDITURE				
Governance	488,962	480,042	480,042	102%
Economic Development	268,159	300,000	300,000	89%
Resource Management	3,917,522	3,786,379	3,786,379	103%
Regional Land Transport	195,049	203,592	203,592	96%
Hydrology & Floodwarning Services	863,206	960,219	960,219	90%
Emergency Management	1,374,010	1,202,394	1,202,394	114%
River, Drainage, Coastal Protection	2,372,893	2,829,028	2,829,028	121%
VCS Business Unit	3,720,577	3,389,000	3,389,000	110%
Other	140,099	62,037	62,037	226%
Warm West Coast	8,857	10,223	10,223	
	13,349,334	13,222,914	13,222,914	
OPERATING SURPLUS/(DEFICIT)	**- 1,245,359**	**- 551,778**	**- 551,778**	

BREAKDOWN OF SURPLUS / (DEFICIT)	Net Variance ACTUAL vs BUDGETED Year to Date	ACTUAL	BUDGET Year to Date	ANNUAL BUDGET
Rating Districts	- 292,566	433,523	- 333,911	- 333,911
Economic Development	- 30,659	- 230,659	- 150,000	- 150,000
Quarries	328,787	29,548	- 297,239	- 297,239
Investment Income	- 225,196	681,513	906,709	906,709
VCS Business Unit	- 428,537	228,463	657,000	657,000
General Rates Funded Activities	- 975,654	- 2,253,222	- 1,277,568	- 1,277,568
Warm West Coast	307	5,575	5,268	5,268
Revaluation Investment Property	-	-	-	-
Other	- 76,062	- 140,099	- 62,037	- 62,037
TOTAL	**- 1,753,581**	**- 1,245,359**	**- 551,778**	**- 551,778**

Net Contributors to General Rates Funded Surplus /(Deficit)	Net Variance ACTUAL vs BUDGETED Year to Date	ACTUAL	BUDGET Year to Date	ANNUAL BUDGET
Rates	- 42,899	3,387,101	3,430,000	3,430,000
Representation	- 8,920	- 488,962	- 480,042	- 480,042
Resource Management	- 635,320	- 3,088,315	- 2,452,995	- 2,452,995
Transport Activity	17,839	- 103,423	- 121,262	- 121,262
River, Drainage, Coastal Protection	- 225,979	- 866,635	- 640,656	- 640,656
Hydrology & Floodwarning	97,013	- 863,206	- 960,219	- 960,219
Emergency Management	- 177,388	- 229,782	- 52,394	- 52,394
TOTAL	**- 975,654**	**- 2,253,222**	**- 1,277,568**	**- 1,277,568**

STATEMENT OF FINANCIAL POSITION AS AT 30 JUNE 2019

CURRENT ASSETS		
Cash	-	456,093
Deposit - Westpac		1,626
Accounts Receivable - General		814,291
Accounts Receivable - Rates		310,977
Prepayments		195,060
GST Refund Due		
Stock		545,194
Accrued Income		1,074,218
		2,485,273
NON CURRENT ASSETS		
Investments		10,471,940
Strategic Investments		1,245,867
Strategic Investments		208,202
LGFA Borrower Notes		89,600
Term Deposit - PRCC Bond		50,000
MBIE & DOC Bonds		23,866
Investments-Catastrophes Fund		214,731
Warm West Coast Loans		273,471
Commerical Property Investment		1,480,000
Fixed Assets		4,762,787
Infrastructural Assets		59,829,250
		78,649,714
TOTAL ASSETS		**81,134,987**
CURRENT LIABILITIES		
Bank Short Term Loan	-	910,000
Accounts Payable	-	1,867,871
GST		217,842
Deposits & Bonds	-	1,453,761
Sundry Payables	-	73,255
Revenue in Advance		-
Accrued Annual Leave, Payroll	-	399,692
	-	4,496,737
NON CURRENT LIABILITIES		
Future Quarry Restoration	-	398,000
Interest Rate Hedge Position		-
	-	7,582,993
	-	7,980,993
TOTAL LIABILITIES	-	**12,467,730**
EQUITY		
Ratepayers Equity	-	18,753,094
Surplus Transferred		1,236,675
Rating District Equity	-	1,844,169
Revaluation	-	38,333,289
Catastrophe Fund	-	1,059,380
Investment Growth Reserve	-	9,909,000
TOTAL EQUITY	-	68,667,257
LIABILITIES & EQUITY	-	**81,134,987**

2. Investment Portfolio

30 June 2019	Catastrophe Fund	Major Portfolio	TOTAL
Opening balance 1 June 2019	$ 775,076	$ 10,264,443	$ 11,039,519
Income (March)	$ 14,017	$ 207,497	$ 222,414
Deposit			
Withdrawl	-$ 575,262	$ -	-$ 575,262
Closing balance 30 June 2019	$ 214,731	$ 10,471,940	$ 10,686,671
Total income year to date to 30 June 2019	$ 49,863	$ 500,876	$ 550,739

Council investment portfolio increased in value by $222,000 during June 2019. The Catastrophe Fund was in the process of being liquidated @ 30 June 2019.

3. Commentary

This is an interim financial result for the year to 30 June 2019. There are a couple of areas that need a bit more work before we can finalise the result.

- Quarry rock inventory calculations.
- Infrastructure revaluation @ 31 December 2018. This work has been completed and externally peer reviewed (as per Audit NZ requirements). I am still evaluating the completed revaluation, but it would appear that our protection infrastructure has been revalued from just under $60 million to $70 million. This revlauation hasn't been incorpoarted into these interim financials.

The interim result is a deficit of $1.245 million for the year to 30 June 2019.

- Investment Income is $225,000 below that budgeted for year to date due to the losses incurred in the Devember quarter.
- VCS surplus of $228,000 is $429,000 less than budgeted.
- Net General Funded activities negative budget variance -$975,000.
- Major contributor to this was the nuch lower than budget cost recovery in the Consents & Compliance Group area, the River, Drainage & Coastal protection activity area.

$1,060,000 has been spent rebuilding the Milton stopbank @ Lower Waiho to 31 May 2019. I have treated this as a capital cost, so that expenditure is not included in the reported deficit of $930,000.

I am taking advice from PWC as to how to account for the impairment of the Milton stopbank which was almost completely destroyed on 26 March 2019.

4. Milton & Others Stopbank Rebuild.

As noted above, we have spent $1,060,000 on the Milton stopbank rebuild to 30 June. Discussion with our Insurers and the Crown continue with regard to this catastrophe event.

Our Area Engineer Brendon Russ met with Rob Rouse from MCDEM / DPMC on 2 August 2019 and it is likely that we will soon see Crown cash start to flow, following a detailed examination of the invoices we have paid to date for work to 30 June 2019. This will likely look like;

Costs paid by WCRC and approved by MCDEM	$1,060,000
60% Crown contribution	$636,000
Less Crown deductible	($146,000)
Net payment	$490,000

Brendon Russ and myself will meet again with the Assessor appointed by the Insurer on 8 August. It is not clear when cash flow from the insurance claim will start to flow.

I am in the process of borrowing $1.5 million from LGFA to cover our cash flow on the Milton & Others stopbank rebuild.

RECOMMENDATION

That the report be received.

Robert Maltinson
Corporate Services Manager

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting – 13 August 2019
Prepared by: Robert Mallinson -- Corporate Services Manager
Date: 31 July 2019
Subject: Setting of Rates for 2019/20

Background
Although Council will have already adopted the 2019/20 Annual Plan which included Council's rating intentions for 2019/20, legal process requires Council to adopt the following resolution.

The detailed values, factors and yields for each type of rate can be found on pages 42 - 46 of the 2019/20 Annual Plan (copies attached).

RECOMMENDATIONS

That Council adopt the attached proposed rates strike and penalty setting resolutions numbered:

1. *Setting of various rates as per 1 (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (y), (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii) pursuant to section 23 (1) and (2) of the Local Government (Rating) Act 2002.*

2. *Adopting due dates for payment of 20 October 2019 and 20 April 2020 as per 2 and pursuant to section 24 of the Local Government (Rating) Act 2002.*

3. *Setting Penalties as per 3 pursuant to section 57 of the Local Government (Rating) Act 2002.*

Robert Mallinson
Corporate Services Manager

West Coast Regional Council Rates Resolution
For the Financial Year 1 July 2019 to 30 June 2020

1. That the West Coast Regional Council resolves under the Local Government (Rating) Act 2002 to set the following rates for the 2019/2020 financial year:

(a) **General Rate** under section 13(2)(b) of the Local Government (Rating) Act 2002 at different rates in the dollar of capital value for all rateable land in the district, as follows:

Differential Category	Differential Relationship (proportion of total revenue sought for the general rate in each district)	Factor per dollar of capital value (incl GST)
Land in the Buller District local authority area	31%	0.00039430
Land in the Grey District local authority area	39%	0.00042623
Land in the Westland District local authority area	30%	0.00034521

(b) **Uniform Annual General Charge** under section 15 of the Local Government (Rating) Act 2002 for all rating units within the region being an amount of $83.38 including GST per rating unit.

(c) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Vine Creek Separate Rating Area**, on the land value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Factor per dollar of land value (incl GST)
Class A	100%	0.0017664
Class B	70%	0.0012364
Class C	50%	0.0008832
Class D	20%	0.0003533
Class E	10%	0.0001766

(d) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Wanganui River Separate Rating Area**, on the land value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	**Differential**	**Factor per dollar of land value (incl GST)**
Class A	100%	0.0023129
Class B	70%	0.0016190
Class C	45%	0.0010408
Class D	10%	0.0002313
Class U1	50%	0.0011564
Class U2	50%	0.0011564

(e) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Kaniere Area (Maintenance) Separate Rating Area**, on the land value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	**Differential**	**Factor per dollar of land value (incl GST)**
Class A	100%	0.0148682
Class B	60%	0.0089209
Class C	40%	0.0059473
Class D	15%	0.0022302
Class E	10%	0.0014868

(f) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Kaniere Area (Loan) Separate Rating Area**, on the land value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	**Differential**	**Factor per dollar of land value (incl GST)**
Class A	100%	0.0091401
Class B	60%	0.0054841
Class C	40%	0.0036560
Class D	15%	0.0013699
Class E	10%	0.0009133

(g) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Kowhitirangi Area Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Factor per dollar of capital value (incl GST)
Class A	100%	0.0002043
Class C	50%	0.0001022
Class E	29%	0.0000596
Class F	17%	0.0000341

(h) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Coal Creek Separate Rating Area**, of 0.0019150 per dollar of capital value (including GST).

(i) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Karamea Riding (Maintenance) Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, for maintenance of the Rating Area infrastructure, as follows:

Differential Category	Differential	Factor per dollar of capital value (incl GST)
Class A	100%	0.0013095
Class B	80%	0.0010476
Class C	60%	0.0007857
Class D	10%	0.0001309
Class E	5%	0.0000655

(j) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Karamea Riding (Loan) Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, for repayment of the loan raised to fund the 2019 upgrade of the works in the scheme, as follows:

Differential Category	Differential	Factor per dollar of capital value (incl GST)
Class A	100%	0.0006972
Class B	80%	0.0005577
Class C	60%	0.0004183
Class D	10%	0.0000697
Class E	5%	0.0000349

(k) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Inchbonnie Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Factor per dollar of capital value (incl GST)
Class A	100%	0.0011964
Class B	75%	0.0008973
Class C	50%	0.0005982
Class D	30%	0.0003589
Class F	15%	0.0001795

(l) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Greymouth Floodwall Separate Rating Area**, of 0.0003622 per dollar of capital value (including GST) (for repayment of a loan raised to fund the 2010 upgrade of the protection works).

(m) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Greymouth Floodwall Separate Rating Area**, of 0.00016243 per dollar of capital value (including GST) (for maintaining the protection works in the scheme).

(n) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Okuru (Maintenance) Separate Rating Area**, of 0.0004020 per dollar of capital value (including GST).

(o) **Red Jacks Separate Rating Area**, on the land area of a rating unit, set differentially for different categories of rateable land as an amount per hectare, as follows:

Differential Category	Differential	Rate per hectare
Class A	6.73%	$6191.60
Class B	35.55%	$2,942.34
Class C	3.56%	$2729.33
Class D	17.54%	$701.60
Class E	14.23%	$878.63
Class F	4.73%	$235.22
Class G	7.40%	$30.99
Class H	8.60%	$16.09
Class I	1.71%	$2.04

(p) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Raft Creek Separate Rating Area**, on the land area of a rating unit as a fixed amount of $12.07 per hectare.

(q) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Nelson Creek Separate Rating Area,** on the land area of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Rate per hectare
Class A	8.40%	$1482.63
Class B	13.21%	$916.60
Class C	9.99%	$186.77
Class D	9.15%	$178.78
Class E	13.04%	$141.48
Class F	28.14%	$89.40
Class G	8.89%	$98.78
Class H	9.18%	$92.20

(r) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Taramakau Settlement Separate Rating Area**, on the land area of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Rate per hectare
Class A	33.16%	$74.71
Class B	11.54%	$61.25
Class C	6.83%	$42.09
Class D	6.54%	$35.50
Class E	8.63%	$34.14
Class F	5.89%	$28.97
Class G	13.40%	$23.54
Class H	13.77%	$22.12
Class I	0.24%	$3.40

(s) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Kongahu Separate Rating Area**, on the land area of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Rate per hectare
Class A	1.00	$29.88
Class B	0.52	$ 15.67

(t) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Waitangi-toana River Separate Rating Area**, on the land area of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Rate per hectare
Class A	25.80%	$9.82
Class B	23.48%	$7.49
Class C	46.84%	$6.32
Class D	3.88%	$1.26

(u) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land located between the boundaries of the Pororai River, State Highway 6 and the Tasman Sea at **Punakaiki** (for repayment of the loan raised by Council to carry out the sea wall protection extension works), on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	**Differential**	**Factor per dollar of capital value (incl GST)**
Class A (Camping Ground)	100%	0.0423677
Class A (Other)	100%	0.0014778
Class B	65%	0.0009606
Class C	60%	0.0008867
Class D	30%	0.0004434

(v) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land located between the boundaries of the Pororai River, State Highway 6 and the Tasman Sea at **Punakaiki** (for maintenance of the sea wall protection works), of 0.0070171 per dollar of capital value (including GST).

(w) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on properties included in the **Hokitika River Southbank separate rating area,** on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	**Differential**	**Factor per dollar of capital value (incl GST)**
Area A	100%	0.0004900
Area B	10%	0.0000490

(x) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Franz Josef Separate Rating Area**, of 0.0005332 per dollar of capital value (including GST).

(y) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Lower Waiho 2010 Separate Rating Area**, of 0.0049312 per dollar of capital value (including GST).

(z) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Matainui Creek Separate Rating Area**, of 0.0007815 per dollar of capital value (including GST).

(aa) a targeted rate under section 16(3)(a) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land within the region to fund **Regional Emergency Management** activities, of 0.0001145 per dollar of capital value (including GST).

(bb) a targeted rate under section 16(3)(a) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land within the region to fund the cost of **One District Plan** activities (as directed by the Local Government Commission), of 0.000040 per dollar of capital value (including GST).

(cc) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on all rateable land situated in the **Mokihinui Separate Rating Area**, as a fixed amount of $306.67 per rating unit.

(dd) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land in the **Whataroa River Separate Rating Area,** on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Factor per dollar of capital value (inc GST)
Area A	100%	0.0024621
Area B	40%	0.0009849
Area C	20%	0.0004924

(ee) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land in the **New River/Saltwater Creek Catchment Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Differential Category	Differential	Factor per dollar of capital value (incl GST)
Area A	100%	0.0000000
Area B	4%	0.0000000

(ff) a targeted rate under section 16(3)(b) and 16(4)(a) of the Local Government (Rating) Act 2002 on properties that have received Council funding to install insulation and/or clean heating appliances under the **Warm West Coast Targeted Rate Scheme**, calculated at a rate of 14.9286% of the GST inclusive funding provided by Council to the property.

(gg) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated within the boundaries of **the Hokitika Seawall Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Loan Rate

Differential Category	Differential	Factor per dollar of capital value (incl GST)
A	100%	0.0013441
B	75%	0.0010081
C	60%	0.0008064
D	10%	0.0001344

(hh) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated within the boundaries of **the Hokitika Seawall Separate Rating Area**, on the capital value of a rating unit, set differentially for different categories of rateable land, as follows:

Maintenance Rate

Differential Category	**Differential**	**Factor per dollar of capital value (incl GST)**
A	100%	0.0003188
B	75%	0.0002391
C	60%	0.0001913
D	10%	0.0000319

(ii) a targeted rate under section 16(3)(b) and 16(4)(b) of the Local Government (Rating) Act 2002 on all rateable land situated within the boundaries of **the Neil's Beach Separate Rating Area**, of 0.0004636 per dollar of capital value (including GST).

Due dates for payment

2. That the West Coast Regional Council resolves that all rates for the 2019/20 financial year be due in two equal instalments, as set out in the table below; pursuant to section 24 of the Local Government (Rating) Act 2002

Instalments	**Due Date**
1	20 October 2019
2	20 April 2018

Penalties

3. That the West Coast Regional Council resolves to apply the following penalties on unpaid rates pursuant to section 57 of the Local Government (Rating) Act 2002.

A charge of 10 per cent on so much of each instalment that has been assessed after 1 July 2019 and which is unpaid after the due date of each instalment (above), to be applied on 20 October 2019 or 20 April 2020, respectively.

FUNDING IMPACT STATEMENT - RATES
FOR THE YEAR ENDING 30 JUNE 2020

Note
All amounts are stated inclusive of GST.

Rating Instalment Information

Rates will be payable by two instalments:

First instalment
Due date 20 October 2019
Penalty date 20 October 2019

Second instalment
Due date 20 April 2020
Penalty date 20 April 2020

A penalty for late payment will be applied at the amount allowed by the Local Government Rating Act 2002 of 10% on any part of an instalment that remains unpaid after the due dates of 20 October 2019 and 20 April 2020, on the penalty dates of 20 October 2019 and 20 April 2020.
A further 10% penalty will be charged on all accumulated rate arrears as at 30 June 2019, on 1 July 2020.

1. **General Rate**
The General Rate is used to fund activities that are of public benefit and where no other source of revenue is identified to cover the cost of the activities.

The General Rate will be a differential general rate in the dollar set for all rateable land within the region and calculated on the Capital value of each rating unit.

Differential
Rateable Capital Value in the Buller District Council area to yield 31% of the total general rate.
Rateable Capital Value in the Grey District Council area to yield 39% of the total general rate.
Rateable Capital Value in the Westland District Council area to yield 30% of the total general rate.

	differential		Estimated rateable Capital Value	Factor per $ of Capital Value		Estimated to Yield		GST Exclusive
Rateable Value of Land in the Buller District Local authority Area	31%	$	2,197,059,791	0.00038430	$	866,295	$	753,300
Rateable Value of Land in the Grey District Local authority Area	39%	$	2,556,920,500	0.00042623	$	1,089,855	$	947,700
Rateable Value of Land in the Westland District Local authority Area	30%	$	2,428,572,200	0.00034521	$	838,350	$	729,000
	100%	$	7,182,552,491		$	2,794,500	$	2,430,000

2. **Uniform Annual General Charge**
The Uniform Annual General Charge is charged at one (1) full charge per rating unit as per section 15 of the Local Government (Rating) Act 2002.
The Council sets a uniform annual general charge to fund activities that are of public benefit and where no other source of revenue is identified to cover the cost of the activities.

Estimated number of rating units		Amount per rating unit	Estimated Yield		GST Exclusive
20,000	$	83.38	$ 1,667,500	$	1,450,000

3. **TARGETED RATES**

(a) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Vine Creek Separate Rating Area and calculated on the land value of each rating unit, for maintaining the protection works in the scheme.**

Vine Creek Rating District		Estimated rateable Land Value	differential based on benefits	factor per $ of Land Value		Estimated to yield $		GST Exclusive
Class A	$	4,157,900	1.00	0.0017664	$	7,345	$	6,386
Class B	$	5,182,000	0.70	0.0012364	$	6,407	$	5,572
Class C	$	6,803,000	0.50	0.0008832	$	6,008	$	5,224
Class D	$	17,434,700	0.20	0.0003533	$	6,159	$	5,356
Class E	$	15,577,000	0.10	0.0001766	$	2,751	$	2,392
					$	28,750	$	25,000

(b) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Wanganui River Separate Rating Area and calculated on the land value of each rating unit, for maintaining the protection works in the scheme.**

Wanganui River Rating District		Estimated rateable Land Value	differential based on benefits	factor per $ of Land Value	Estimated to yield $		GST Exclusive
Class A	$	22,180,200	1.00	0.0020129	51,200	$	44,609
Class B	$	18,833,100	0.70	0.0016190	30,653	$	26,656
Class C	$	26,464,200	0.45	0.0010408	27,544	$	23,951
Class D	$	4,616,150	0.10	0.0002313	1,068	$	928
Class U1	$	2,841,900	0.50	0.0011564	3,286	$	2,858
Class U2	$	904,000	0.50	0.0011564	1,140	$	909
					115,000	$	100,000

(c) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Kaniere Separate Rating Area and calculated on the land value of each rating unit, for maintaining the protection works in the scheme.**

Kaniere Rating District (Maintenance)		Estimated rateable Land Value	differential based on benefits	factor per $ of Land value	Estimated to yield $		GST Exclusive
Class A	$	329,900	1.00	0.0148682	4,904	$	4,269
Class B	$	110,000	0.60	0.0089209	1,009	$	877
Class C	$	272,000	0.40	0.0059473	1,618	$	1,407
Class D	$	1,706,000	0.15	0.0022302	3,805	$	3,309
Class E	$	519,000	0.10	0.0014868	773	$	672
					12,108	$	10,528

(d) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Kaniere Separate Rating Area and calculated on the land value of each rating unit, for maintaining the protection works in the scheme.**

Kaniere Rating District (Loan)		Estimated rateable differential Land Value based on benefits		factor per $ of Land value	Estimated to yield $		GST Exclusive
Class A	$	329,900	1.00	0.0081401	3,016	$	2,622
Class B	$	113,000	0.60	0.0054841	620	$	539
Class C	$	272,000	0.40	0.0036560	994	$	865
Class D	$	1,706,000	0.15	0.0013710	2,339	$	2,034
Class E	$	519,000	0.10	0.0009140	474	$	412
					7,443	$	6,472

(e) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Kowhitirangi Separate Rating Area and calculated on the capital value of each rating unit, for repaying the loan raised in 2017 to extend the protection works.**

Kowhitirangi Flood Control Rating District		Estimated rateable differential Capital Value based on benefits		factor per $ of capital Value	Estimated to yield $		GST Exclusive
Class A	$	16,556,600	1.00	0.0002043	3,383	$	2,942
Class C	$	35,114,900	0.50	0.0001022	3,587	$	3,119
Class E	$	32,105,000	0.29	0.0000596	1,913	$	1,664
Class F	$	76,821,700	0.17	0.0000341	2,617	$	2,275
					11,500	$	10,000

(f) **A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Coal Creek Separate Rating Area and calculated on the capital value of each rating unit, for maintaining the protection works in the scheme.**

Coal Creek Rating District		Estimated rateable Capital Value	factor per $ of capital Value	Estimated to yield $		GST Exclusive
	$	5,005,140	0.0019150	11,500	$	10,000
				11,500	$	10,000

(g) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Karamea Separate Rating Area and calculated on the capital value of each rating unit, for maintaining the protection works in the scheme.**

Karamea Rating District (Maintenance)		Estimated rateable differential Capital Value based on benefits		factor per $ of capital Value	Estimated to yield $		GST Exclusive
Class A	$	2,681,300	1.00	0.0013095	3,511	$	3,052
Class B	$	30,935,150	0.80	0.0010476	32,407	$	28,180
Class C	$	4,538,870	0.60	0.0007857	3,566	$	3,101
Class D	$	114,755,290	0.10	0.0001309	15,027	$	13,067
Class E	$	45,659,690	0.05	0.0000655	2,989	$	2,600
					57,500	$	50,000

(h) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Karamea Separate Rating Area and calculated on the capital value of each rating unit, for repaying the loan raised to fund the 2019 upgrade of works in the scheme.**

Karamea Rating District (Loan Repayment)		Estimated rateable differential Capital Value based on benefits		factor per $ of capital Value	Estimated to yield $		GST Exclusive
Class A	$	2,681,300	1.00	0.0006972	1,869	$	1,626
Class B	$	30,935,150	0.80	0.0005577	17,254	$	15,003
Class C	$	4,538,870	0.60	0.0004183	1,899	$	1,651
Class D	$	114,755,290	0.10	0.0000697	8,001	$	6,957
Class E	$	45,659,690	0.05	0.0000349	1,592	$	1,384
					30,614	$	26,621

(i) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Inchbonnie Separate Rating Area and calculated on the capital value of each rating unit, for maintaining the protection works in the scheme.**

Inchbonnie Rating District		Estimated rateable differential Capital Value based on benefits		factor per $ of capital Value	Estimated to yield $		GST Exclusive
Class A	$	3,526,200	1.00	0.0011934	4,212	$	3,659
Class B	$	15,645,220	0.75	0.0008973	14,037	$	12,206
Class C	$	6,294,000	0.50	0.0005982	3,766	$	3,274
Class D	$	2,175,000	0.30	0.0003589	781	$	679
Class F	$	1,103,500	0.15	0.0001795	198	$	172
					23,000	$	20,000

(j) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Greymouth Floodwall Separate Rating Area and calculated on the capital value of each rating unit, for repayment of a loan raised to fund the 2010 upgrade of the protection works.

Greymouth Floodwall (Loan) Rating District	Estimated rateable Capital Value		factor per $ of capital Value	Estimated to yield $		GST Exclusive
	$ 708,014,100		0.0003622	256,450	$	223,000

(k) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Greymouth Floodwall Separate Rating Area and calculated on the capital value of each rating unit, for maintaining the protection works in the scheme.

Greymouth Floodwall (Maintenance) Rating District	Estimated rateable Capital Value		factor per $ of capital Value	Estimated to yield $		GST Exclusive
	$ 705,014,100		0.00016243	115,000	$	100,000

(l) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Okuru Separate Rating Area and calculated on the capital value of each rating unit, for maintaining the protection works in the scheme.

Okuru Rating District (Maintenance)	Estimated rateable Capital Value		factor per $ of capital Value	Estimated to yield $		GST Exclusive
	$ 14,302,000		0.0004020	5,750	$	5,000

(m) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Redjacks Separate Rating Area and calculated on the land area of each rating unit, for maintaining the protection works in the scheme.

Redjacks Rating District	Estimated rateable Land Area (ha.)	differential based on benefits		Rate per hectare	Estimated to yield $		GST Exclusive
Class A	0.10	6.75%	$	6,191.60	610	$	538
Class B	1.11	35.55%	$	2,949.34	3,266	$	2,841
Class C	0.12	3.56%	$	2,729.33	328	$	285
Class D	2.30	17.54%	$	701.60	1,614	$	1,403
Class E	1.49	14.23%	$	678.65	1,010	$	1,198
Class F	1.85	4.73%	$	235.22	435	$	378
Class G	21.57	7.40%	$	30.98	651	$	502
Class H	49.18	8.60%	$	16.09	791	$	688
Class I	77.02	1.71%	$	2.64	197	$	137
		100%			9,200	$	8,000

(n) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land in the Raft Creek separate rating area calculated on the land area of each rating unit for maintening the protection works in the scheme.

Raft Creek	Estimated Rateable Land Area (ha.)		Rates per hectare	Estimated to yield $		GST Exclusive
	762.24	$	12.07	9,200	$	8,000

(o) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Nelson Creek Separate Rating Area and calculated on the land area of each rating unit, for maintaining the protection works in the scheme.

Nelson Creek Rating District	Estimated Rateable Land Area (ha.)	differential based on benefits		Rates per hectare	Estimated to yield $		GST Exclusive
Class A	1.14	8.40%	$	1,482.63	1,690	$	1,470
Class B	2.90	18.21%	$	916.60	2,658	$	2,311
Class C	10.77	9.99%	$	186.77	2,011	$	1,749
Class D	10.30	9.15%	$	178.78	1,841	$	1,601
Class E	18.56	18.04%	$	141.48	2,625	$	2,282
Class F	63.34	28.14%	$	89.40	5,663	$	4,924
Class G	18.11	8.89%	$	98.78	1,789	$	1,556
Class H	20.04	9.18%	$	92.20	1,848	$	1,607
		100%			20,125	$	17,500

(p) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Taramakau Settlement Separate Rating Area and calculated on the land area of each rating unit, for maintaining the protection works in the scheme.

Taramakau Settlement Rating District	Estimated Rateable Land Area (ha.)	differential based on benefits		Rates per hectare	Estimated to yield $		GST Exclusive
Class A	306.28	33.16%	$	74.71	22,879	$	19,896
Class B	130.00	11.54%	$	61.25	7,963	$	6,924
Class C	111.98	6.83%	$	42.09	4,713	$	4,098
Class D	127.13	6.54%	$	35.50	4,513	$	3,924
Class E	174.43	8.63%	$	34.14	5,955	$	5,178
Class F	140.29	5.89%	$	28.97	4,064	$	3,534
Class G	392.74	13.10%	$	23.51	9,246	$	8,040
Class H	429.48	13.77%	$	22.12	9,501	$	8,262
Class I	43.66	0.24%	$	3.40	166	$	144
		100%			69,000	$	60,000

(q) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Kongahu Separate Rating Area and calculated on the land area of each rating unit, for maintaining the protection works in the scheme.

Kongahu Rating District

	Estimated Rateable Land Area (ha.)	differential based on benefits		Rates per hectare	Estimated to yield $		GST Exclusive
Class A	733.85	1.00	$	29.88	21,925	$	19,065
Class B	68.60	0.52	$	15.67	1,075	$	935
					23,000	$	20,000

(r) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land situated in the Waitangi-tuna Separate Rating Area and calculated on the land area of each rating unit, for maintaining the protection works in the scheme.

Waitangitaona Rating District

	Estimated Rateable Land Area (ha.)	differential based on benefits		Rates per hectare	Estimated to yield $		GST Exclusive
Class A	604.30	25.80%	$	9.32	5,634	$	5,160
Class B	721.43	23.46%	$	7.45	5,407	$	4,695
Class C	1705.34	46.54%	$	6.02	10,272	$	9,867
Class D	708.22	3.86%	$	1.23	893	$	777
		100%			23,000	$	20,000

(s) A targeted rate set in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land located between the boundaries of the Pororai river, State Highway 6 and the Tasman sea at Punakaiki calculated on the capital value of each rating unit for maintenance of the sea wall protection works.

Punakaiki (Maintenance) Rating District

	Estimated rateable Capital Value		factor per $ of capital Value	calculated yield $		GST Exclusive
$	15,569,000		0.0070171	109,250	$	95,000

(t) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land located between the boundaries of the Pororai river, State Highway 6 and the Tasman sea at Punakaiki calculated on the capital value of each rating unit for maintenance of the sea wall protection works.

Punakaiki (Loan) Rating District

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
Class A (Camping Ground)	$	720,000	1.00	0.0423677	30,505	$	26,525
Class A (Other)	$	4,605,000	1.00	0.0314778	5,806	$	5,919
Class B	$	2,364,000	0.65	0.0009606	2,272	$	1,976
Class C	$	2,220,000	0.60	0.0008867	2,057	$	1,789
Class D	$	5,560,000	0.30	0.0004434	2,465	$	2,143
	$	15,569,000			44,105	$	38,350

(u) A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on properties included in the Hokitika River Southbank separate rating area calculated on the capital value of each rating unit, for repayment of the loan raised in 2017 to finance the cost of the extension of the seawall.

Hokitika River South Bank Mtce

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
Area A	$	2,627,300	1.00	0.0004900	1,288	$	1,120
Area B	$	3,065,500	0.10	0.0000490	150	$	130
					1,438	$	1,250

(v) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land in the Franz Josef separate rating area calculated on the capital value of each rating unit for the maintenance of flood protection works.

Franz Josef

	Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $	GST Exclusive
$	107,832,500	0.0005332	57,503	$ 50,000

(w) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land in the Lower Waiho 2010 separate rating area and calculated on the capital value of each rating unit for the mintenance of flood protection works.

Lower Waiho

	Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $	GST Exclusive
$	15,569,500	0.0049312	86,600	$ 84,000

(x) A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land in the Matainui Creek separate rating area and calculated on the capital value of each rating unit for the maintenance of flood protection works.

Matainui Creek

	Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $	GST Exclusive
$	7,358,000	0.0007615	5,750	$ 5,000

(y) **A Targeted rate in accordance with sections 16, 17 and 18 of the Local Government Rating Act 2002**

The Targeted Rate will be a uniform rate in the dollar set for all rateable land within the region and calculated on the Capital value of each rating unit.
The rate will be used to fund Emergency Management activities within the Region.

Regional Emergency Management		Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $		GST Exclusive
Rateable Value of Land in the Buller District Local authority Area	$	2,197,059,791				
Rateable Value of Land in the Grey District Local authority Area	$	2,558,940,500				
Rateable Value of Land in the Westland District Local authority Area	$	2,426,552,200				
	$	7,182,552,491	0.0001145	822,250	$	715,000

(z) **A Targeted rate in accordance with sections 16, 17 and 18 of the Local Government Rating Act 2002**

The Targeted Rate will be a uniform rate in the dollar set for all rateable land within the region and calculated on the Capital value of each rating unit.
The rate will be used to fund the cost of preparation of "One District Plan" as directed by the Local Government Commission.

One District Plan		Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $		GST Exclusive
Rateable Value of Land in the Buller District Local authority Area	$	2,197,059,791				
Rateable Value of Land in the Grey District Local authority Area	$	2,558,940,500				
Rateable Value of Land in the Westland District Local authority Area	$	2,426,552,200				
	$	7,182,552,491	0.0000400	287,500	$	250,000

(aa) **A targeted rate in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land in the Mokihinui separate rating area calculated as a fixed charge of $306.67 per rating unit.**

Mokihinui	Estimated number of rating units		Amount per rating unit.	calculated yield $		GST Exclusive
	42	$	306.67	12,880	$	11,200

(ab) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on properties included in the Whataroa River separate rating area calculated on the capital value of each rating unit, for maintenance of the protection works.**

Whataroa River

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
Area A	$	8,654,000	1.00	0.0024621	21,307	$	18,529
Area B	$	12,281,000	0.40	0.0009849	12,095	$	10,517
Area C	$	30,253,500	0.20	0.0004924	14,898	$	12,954
					48,300	$	42,000

(ac) **A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on properties included in the New River /Saltwater Creek catchment separate rating area calculated on the capital value of each rating unit, for management of the river mouth.**

New River / Saltwater Creek Catchment

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
Area A	$	19,440,500	25.00	0.0000000	-	$	-
Area B	$	258,893,500	1.00	0.0000000	-	$	-
					-	$	-

(ad) **A targeted rate set in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on properties included in the Nail's Beach separate rating area calculated on the capital value of each rating unit, for management of the protection works.**

Nail's Beach

	Estimated rateable Capital Value	factor per $ of capital Value	calculated yield $		GST Exclusive
$	12,404,000	0.0004636	5,750	$	5,000
			5,750	$	5,000

(ae) **Warm West Coast Targeted Rate**
A targeted rate in accordance with sections 16, 17 and 18 of the Local Government Rating Act 2002 on properties that have received Council funding to instal insulation and/or clean heating appliances.
The rate is calculated as a % of the GST inclusive funding provided by Council to the property.
Funding provided by Council includes interest at 4.25%
The rate will be used to repay funding that Council has borrowed to fund this work and will be levied over a 10 year term from 1 July 2013 or 1 July 2014, depending on the year that the funding was approved.

Warm West Coast Funding Received During years to 30 June 2013 and 30 June 2014	Council funding provided	factor as a % of Council funding provided	calculated yield $		GST Exclusive
$	708,707	0.1139860	80,700	$	70,000

(af) **Hokitika Seawall (Loan Repayment)**
A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land within the boundaries of the Hokitika Township calculated on the capital value of each rating unit for maintenance of the seawall protection works.

The targeted rate set on Classes A, B, C and D is based on differentiated capital value.

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
A	$	20,725,000	1.00	0.0013441	$	27,856	$ 24,222
B	$	51,765,000	0.75	0.0010081	$	52,182	$ 45,375
C	$	16,590,000	0.60	0.0008064	$	13,378	$ 11,631
D	$	387,315,500	0.10	0.0001344	$	52,058	$ 45,268
						145,475	$ 126,500

(ag) **Hokitika Seawall (Maintenance)**
A targeted rate set differentially in accordance with sections 16, 17, 18 of the Local Government Rating Act 2002 on all rateable land within the boundaries of the Hokitika Township calculated on the capital value of each rating unit for repayment of the loan raised by the Council to contruct the seawall protection works.

The targeted rate set on Classes A, B, C and D is based on differentiated capital value.

		Estimated rateable Capital Value	differential based on benefits	factor per $ of capital Value	calculated yield $		GST Exclusive
A	$	20,725,000	1.00	0.0006188	$	6,606	$ 5,745
B	$	51,765,000	0.75	0.0002391	$	12,374	$ 10,760
C	$	16,590,000	0.60	0.0001913	$	3,173	$ 2,760
D	$	387,315,500	0.10	0.0000319	$	12,347	$ 10,736
						34,500	$ 30,000

Total Rates $ 7,051,138 $ 6,131,421

THE WEST COAST REGIONAL COUNCIL

Prepared for:	Council Meeting 13 August 2019
Prepared by:	Councillor Neal Clementson
Date:	3 July 2019
Subject:	**LEAVE OF ABSENCE – 10 SEPTEMBER 2019 COUNCIL MEETING**

I have made travel arrangements to travel overseas from the 9 September 2019 until 17 September 2019.

Regretfully my travel itinerary has resulted in my not being in New Zealand for the scheduled 10 September 2019 Council meeting. In terms of Standing Orders 3.61., I subsequently request a Leave of Absence from attending the 10 September 2019 Council meeting.

RECOMMENDATION

That Council grants Councillor Clementson a Leave of Absence from attending the 10 September 2019 scheduled Council meeting.

Neal Clementson
Councillor

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting- 13 August 2019
Prepared by: Andrew Robb – Chairman
Date: 2 August 2019
Subject: **CHAIRMAN'S REPORT**

Meetings Attended:

- I attended the inaugural meeting of the Tai Poutini Joint Plan Committee on 19 July.
- I attended the Mawhera FMU meeting on 23 July.
- I attended the Ospri Stakeholders meeting in Wellington on 25 July.
- I met with Minister's Ron Mark and Shane Jones on 29 July.
- I Met with Mark Patterson (List MP) in Wellington on 30 July. I also met with Minister O'Connor the same day.

RECOMMENDATION

That this report be received.

Andrew Robb
Chairman

THE WEST COAST REGIONAL COUNCIL

Prepared for:	Council Meeting – 13 August 2019
Prepared by:	Michael Meehan
Date:	2 August 2019
Subject:	**Twelve Month Review - 1 July 2018 – 30 June 2019**

Attached is the Twelve Month Review showing progress for the full financial year.

This report shows achievements as measured against the levels of service and performance targets in the Long Term Plan 2018 – 2028.

RECOMMENDATION

That this report be received.

Michael Meehan
Chief Executive

Governance Levels of Service and Performance targets

The performance targets included in this Group of Activities apply across each of the 10 years of the LTP.

Levels of Service	Measure	Performance Target	Progress Achieved
Maintain a Council of elected representatives in accordance with statutory requirements and in a manner that promotes effective decision-making, transparency, and accountability to the West Coast regional community	Number of public meetings held and individual Councillor attendance	Conduct eleven monthly meetings of Council and the Resource Management Committee, plus other scheduled meetings and scheduled workshops during the year with at least 80% attendance by all Councillors.	Councillor / Attendance / % Robb 18 out of 18 100% Clementson 13 out of 18 72% Birchfield 18 out of 18 100% Ewen 18 out of 18 100% Challenger 18 out of 18 100% McDonnell 18 out of 18 100% Archer 18 out of 18 100%
	Compliance with statutory timeframes	Prepare and notify the Council's Annual Plan or Long Term Plan by 31 May each year, and the Annual Report by 31 October, in accordance with the procedures outlined in the Local Government Act 2002.	Not achieved. The audited Annual Report for the year to 30 June 2018 was adopted by Council at a Special Council meeting on 21 December 2018.
	Timing and number of newsletters, and internet website based information related to public consultation processes.	Publish an informative Council newsletter twice a year to be circulated to all ratepayers, with their rate demand, in March and September and ensure required information is posted on the Council website when Council invites submissions on a new or revised policy document. *In 2018 these targets were all met.*	Achieved. The rates instalments which were sent out in September 2018 and March 2019 and contained the usual newsletters. Council's website continues to be updated whenever submissions are invited on new or revised policy document.
Continue to support the contribution our two West Coast Runanga make to Council's decision-making processes; and continue to seek contributions from other Maori	Attendance of Iwi appointees at Resource Management Committee meetings	Continue to invite attendance of Makaawhio and Ngati Waewae representatives as appointees to the Council's resource management committee, to enable Maori participation in resource management decision-making.	Achieved. Council has continued to invite both Makaawhio and Ngati Waewae representatives to attend all Resource Management Committee meetings.

Resource Management Performance targets

The performance targets included in this Group of Activities apply across each of the 10 years of the LTP.

<table>
<tr><th>Levels of Service</th><th>Measure</th><th>Performance Target</th><th>Progress Achieved</th></tr>
<tr><td rowspan="2">To maintain or enhance water quality in the West Coast's rivers</td><td>State of the Environment Monitoring:
Ammoniacal nitrogen, periphyton, clarity, turbidity and faecal coliforms are measured quarterly at 38 river sites. These parameters characterise the water quality of West Coast rivers and have been measured since 1996.</td><td>Improvement of these parameters, when compared with a baseline of 1996 data on water quality.</td><td>
<table>
<tr><th></th><th>% improving</th><th>% declining</th><th>% no change</th></tr>
<tr><td>Ammonia</td><td>50</td><td>0</td><td>50</td></tr>
<tr><td>FC's</td><td>8</td><td>24</td><td>68</td></tr>
<tr><td>Turbidity</td><td>18</td><td>8</td><td>74</td></tr>
<tr><td>Clarity</td><td>26</td><td>18</td><td>55</td></tr>
<tr><td>Periphyton</td><td>0</td><td>10</td><td>90</td></tr>
</table>
</td></tr>
<tr><td>Compliance Monitoring for Discharges:
The number of compliant or non-compliant point source discharges to water, or discharges likely to enter water; and council's response to any non-compliance.</td><td>All significant consented discharges[1] are monitored at least annually, and all dairy sheds at least biennially depending on each individual compliance record. All non-compliances publicly reported to the Resource Management Committee and responded to using Council's Compliance and Enforcement Policy.</td><td>Partially achieved.
The target for mine site discharges was met with 238 visits across 84 active mine sites.
The dairy target was not met with 208 of 338 required farm visits undertaken. Staff shortages have continued to impact inspection numbers. There is now a full dairy team on board and it is anticipated that the target will be met for 2019/2020.
All non-compliances have been reported as per the target.</td></tr>
<tr><td>To maintain or enhance the water quality in Lake Brunner</td><td>The trophic state of Lake Brunner is measured by the Trophic Level Index (TLI) which combines clarity, nutrient and algal measures. The rolling 5-year mean is compared with a 2002-2006 baseline mean.</td><td>The annual (rolling 5-year mean) TLI of Lake Brunner is less than the 2002-2006 TLI baseline mean of 2.79.</td><td>Achieved. The TLI for 20 May 2014 – 21 May 2019 (latest results) is 2.77.</td></tr>
</table>

[1] Significant Consented Discharge includes: any consented discharge from a municipal sewage scheme or landfill, any consented discharge from a working mine site, any consented discharge of dairy effluent to water, and any large scale industrial discharge (WMP, Kokiri).

Levels of Service	Measure	Performance Target	Progress Achieved
Complete current regional plans to operative stage, and review them to maintain their community acceptability.	Statutory requirements for plan review.	Compliance with statutory requirements for the review of Council's plans and strategies.	Workshop held with Councillors on responding to appeals on the proposed RPS through Environment Court mediation. Wetland site visits requested by the Hearing panel for the proposed Plan Change 1 to the Land & Water Plan completed. Staff recommendations on the site visit report recommendations circulated to submitters and Hearing Panel. Work continuing on draft S42A staff recommendations on submissions to the proposed Coastal Plan.
Advocate for the West Coast interests when external environmental policymaking may affect the West Coast.	Number of submissions made and number of successful advocacy outcomes.	Submit on all central or local government discussion documents, draft strategies, policies or Bills that may impact on West Coast interests, within required timeframes.	Achieved. Submissions made on the Conservation (Indigenous Freshwater Fish) Amendment, Draft Westland National Park Management Plan and DOC Conservation Management Strategy amendments to provide for helicopter landings and other activities on the Paparoa Great Walk. Feedback provided on matters that relate to Council's functions in the Draft Punakaiki Masterplan, and the Aotearoa NZ Resource Strategy for Petroleum and Minerals.
Compliance with the consent processing timeframes in the RMA and mining legislation.	Compliance with discounting regulations and mining timeframes	Process all resource consent applications without incurring any cost to Council due to the RMA discounting regulations; and process at least 95% of mining work programmes within 20 working days of receipt.	Achieved. All consents have been processed within time frames so no discounting has been required. 95% of mining work programmes submitted were processed within the 20 day timeframe. There were 146 mining work programmes received during this reporting period.

Levels of Service	Measure	Performance Target	Progress Achieved
To maintain or enhance the life supporting capacity and amenity value of the West Coast's rivers	Stream ecosystem health: Instream macroinvertebrate community health (SQMCI) scores are measured at 29 river sites. The values for each site are calculated using five year rolling means and comparing them to baseline means calculated from data from 2005-2009.	Macroinvertebrate health index[2] (SQMCI) mean is higher, or no more than 20% lower, than the baseline mean.	Not achieved. Five out of 29 sites have not met the criteria and have declined. These were Baker Ck, Bradshaws Ck, Burkes Ck, Page Stm, and Sawyers Ck.
	Bathing beach sampling: 18 swimming sites are sampled, either ten or 20 times per summer season for E coli (moderate-high risk > 550) or Enterococci (moderate-high risk > 280). *[note – two more sites are added this term]*	Scheduled swimming sites do not exceed the moderate-high risk threshold on more than 10% of sampling occasions.	Not achieved. Two out of 18 sites did not meet the target. During the 2018-2019 season Kaniere River at Kaniere-Kokatahi Rd, and Hokitika Beach, exceeded the moderate-high risk category more than 10% of the time.
To protect human health from adverse impacts of poor groundwater quality.	28 Wells are monitored at least twice annually, 24 of which are used for human consumption. The guideline of 11.3mg/L of nitrate is used to protect human health, particularly for babies. The data from the year is averaged before comparing against the 11.3mg guideline.	In wells used for human consumption, nitrate levels remain below the health guideline of 11.3 mg/L.	Achieved. In Summer and Winter 2019, as of July 26, all of 24 wells used for human consumption were within guidelines.
To protect human health from any adverse impacts of poor air quality in Reefton.	Reefton's air is monitored in accordance with the National Environmental Standard (NES) for air quality by measuring PM_{10} (airborne particles smaller than ten micrometers, which affect human respiration). The threshold is a 24hr mean PM_{10} of 50 micrograms/m^3.	NES Requirement: 24hr PM_{10} values do not exceed the NES threshold more than three times in one year, between 2016 & 2020; whereas after 2020 only 1 exceedance per year is allowed.	Achieved. There have been no exceedances of the National Environmental Standard for Air Quality in Winter 2019, thus far, up until 26 July 2019.

[2] This macroinvertebrate index uses comparative samples of aquatic invertebrates to evaluate water quality, based on the type and tolerances of invertebrates (bugs) found at that site and how those communities of invertebrates may change over time. Some bug species are pollution tolerant while others are pollution sensitive, so the mix of species tells us a lot about the water quality at the site.

Levels of Service	Measure	Performance Target	Progress Achieved
Respond to all genuine incident complaints received by the Council and take enforcement action where needed.	Number of complaints received and number of enforcement actions resulting from these.	Operate a 24-hour complaints service, assess and respond to all urgent complaints within 24 hours and non-urgent complaints within 5 working days in accordance with the Council's Compliance & Enforcement Policy.	Achieved. 24 hours complaint service has operated throughout the reporting period and all complaints received and enforcement actions resulting from them reported to Resource Management Committee. 27 infringement notices, 20 abatement notices and 28 formal warnings were issued through the reporting period.
Respond to marine oil spills in coastal waters in accordance with the Tier 2 Oil Spill Response Plan and maintain readiness for spill response.	Timing of responses & number of trained staff	Respond within 4 hours to all spills, using Council or MNZ spill equipment to contain spills; plus ensure at least 10 trained responders.	No major spills occurred during the reporting period. Maritime NZ requirements now state that ten staff are required. Number of trained responders is well in exceedance of 10.

Performance target

The performance targets included in this group of activities apply across each of the 10 years of the LTP.

Levels of Service	Measure	Performance Target	Progress Achieved
Maintain a Regional Land Transport Plan in compliance with relevant legislation and is acceptable to our West Coast community.	An Operative Regional Land Transport Plan	Compliance with statutory requirements for the preparation, review and implementation of the Regional Transport Plan and Passenger Transport Plan.	Achieved. The RLTP was made operative in 2018. Variations to this document are made as required to ensure that transport activities can be undertaken in a timely manner.

Performance targets

The performance targets included in this Group of Activities apply across the whole 10 years of the LTP.

Level of Service	Measure	Performance Targets	Progress Achieved
Continue to provide flood warning to assist communities to assess risk of impending floods, for the five rivers (Karamea, Buller, Grey, Hokitika, and Waiho).	Staff response to high flow events.	Provide flood monitoring service for the six rivers monitored (Karamea, Buller, Mokihinui, Grey, Hokitika and Waiho) and respond in accordance with the floodwarning manual.	Not Achieved. On 19 January 2019 a power outage meant that flood alarms were not generated for the Hokitika River.
	Availability of information about high flow events.	Ensure data on river levels (Karamea, Buller, Grey, Hokitika, Waiho and Mokihinui) is available on the Council website (updated 12 hourly, or 3 hourly during flood events) > 90% of the time.	Not Achieved. The Waiho Bridge was washed away during the 26 March 2019 flood event. This outage resulted in loss of water level data for the Waiho River. Once the bridge was rebuilt the sensor was reinstated on the 10th May 2019.

Other Hydrology and Flood Warning activities planned for 2018 – 28 years:

Prepare a hydrology data summary report for the West Coast every fifth year -- completed December 2019

Performance targets

The performance targets included in this Group of Activities apply across the whole 10 years of the LTP.

Levels of Service	Measure	Performance Targets	Progress Achieved
Maintain a Civil Defence Plan that delivers efficient and effective management of the region's civil defence functions in compliance with the legislation and is acceptable to West Coast community desires.	Number of trained staff	Ensure at least 30 Council staff are trained as Emergency Coordination Centre (ECC) personnel so that we have three shifts of ECC staff trained and exercised in case of a regional emergency.	Almost achieved. 29 Council staff are trained.

Performance targets

The performance targets included in this Group of Activities apply across the whole 10 years of the LTP.

Levels of Service for Quarries	Measure	Performance Targets	Progress Achieved
Ensure efficient and effective management and safe operation of Council's quarries, delivering rock to any customers within ten working days with priority given to Council rating district customers.	Timing of delivering on rock requests.	Deliver on requests for rock within two weeks, and ensure sufficient stockpiled rock is available where practical.	Achieved.
	Number of site inspections to monitor contractor health and safety and performance.	Visit each active quarry site at least twice a year, when contractors are working the quarry (where possible), to ensure health and safety standards and other permit requirements are being adhered to.	Achieved.

Performance targets

The performance targets included in this Group of Activities apply across the whole 10 years of the LTP.

Levels of Service	Measure	Performance Targets	Progress Achieved
Meet or exceed the flood protection, drainage or erosion protection levels as described in the 'levels of service – background' section above.	Completion of rating district inspections, works reports, and consultation meetings (for rating districts where material works are proposed).	Complete all asset inspections, works reports, and rating district meetings. Perform all capital and maintenance works as agreed at those meetings.	Achieved.
	Proportion of schemes performing to their agreed service level.	Monitor all rating district infrastructural assets to ensure they perform to the service level consistent with the Asset Management Plan of each Rating District, or whatever level the community has decided is an acceptable risk.	Achieved.
	Meet timeframes for plan review	Review Rating District Asset Management Plans every third year or earlier where information indicates a significant change from what is stated in the asset management plan.	Achieved.

Performance targets
The performance targets included in this Group of Activities apply across the whole 10 years of the LTP.

Levels of Service	Measure	Performance Targets	Progress Achieved
To produce a financial surplus (to offset general rates) by tendering for and delivering on vector control and other contracts.	Achieve or exceed budgeted financial return	Tender for, and win, sufficient contracts to provide or exceed the annual budgeted return to Council.	Not Achieved
To provide marine oil spill and terrestrial hazardous substance spill support, and biosecurity response services for the MNZ, MAF and the Regional Council	Availability of trained staff	Have staff available as a response unit for marine and terrestrial pollution spill events as per the MOU dated 11 November 2005.	Achieved.
	Availability of trained staff	Have 4 staff plus a vehicle available for biosecurity emergencies, as per the National Biosecurity Capability Network agreement 2011.	Achieved.

THE WEST COAST REGIONAL COUNCIL

Prepared for: Council Meeting- 13 August 2019
Prepared by: Michael Meehan – Chief Executive
Date: 5 August 2019
Subject: **CHIEF EXECUTIVE'S REPORT**

Meetings Attended:

- I met with Alan Tinnelly from MPI on 10 July.
- I hosted a meeting to discuss the Buller Plateau on 10 July.
- I hosted a Predator Free West Coast meeting on 18 July.
- I attended the inaugural meeting of the Tai Pountini Joint Plan Committee on 19 July.
- I hosted the West Coast Chief Executives meeting on 24 July.
- I attended a Directors Course in Auckland from 29 July to 2 August.
- I will be attending the Regional Chief Executives Forum in Wellington on 6 August.
- I will be attending the Chief Executives Environmental and Economy Forum in Wellington on 7 August.
- I will be chairing the CDEM Coordinating Executive Meeting on 8 August.

RECOMMENDATION

That this report be received.

Michael Meehan
Chief Executive

THE WEST COAST REGIONAL COUNCIL

To: Chairperson
West Coast Regional Council

I move that the public be excluded from the following parts of the proceedings of this meeting, namely, -

Agenda Item No. 8.

159 – 160	8.1	Confirmation of Confidential Minutes 9 July 2019
	8.2	Overdue Debtors Report (to be tabled)
161 - 183	8.3	Notification of Statement of Claim against Council
	8.4	Response to Presentation (if any)
	8.5	In Committee Items to be Released to Media

Item No.	**General Subject of each matter to be considered**	**Reason for passing this resolution in relation to each matter**	**Ground(s) under section 7 of LGOIMA for the passing of this resolution.**
8.			
8.1	Confirmation of Confidential Minutes 9 July 2019		Clause 7 subclause 2 (a)
8.2	Overdue Debtors Report (to be tabled)		Clause 7 subclause 2 (a)
8.3	Notification of Statement of Claim against Council		Clause 7 subclause 2 (g)
8.4	Response to Presentation (if any)		Clause 7 subclause 2 (i)
	In Committee Items to be Released to Media		Clause 7 subclause 2 (i)

I also move that:

- Michael Meehan
- Robert Mallinson
- Randal Beal
- Hadley Mills
- Heather McKay
- Nichola Costley

be permitted to remain at this meeting after the public has been excluded, because of their knowledge on the subject. This knowledge, which will be of assistance in relation to the matter to be discussed.

The Minutes Clerk also be permitted to remain at the meeting.