Safety and Resilience Committee
23 February 2023

Meeting will be held in the Council Chamber at Level 2, Philip Laing House
144 Rattray Street, Dunedin
ORC Official YouTube Livestream

Members:

Cr Gary Kelliher (Co-Chair)	Cr Tim Mepham
Cr Alan Somerville (Co-Chair)	Cr Andrew Noone
Cr Alexa Forbes	Cr Gretchen Robertson
Cr Michael Laws	Cr Bryan Scott
Cr Kevin Malcolm	Cr Elliot Weir
Cr Lloyd McCall	Cr Kate Wilson

Senior Officer: Pim Borren, Interim Chief Executive

Meeting Support: Liz Spector, Governance Support Officer

23 February 2023 11:30 AM

Agenda Topic Page

1. WELCOME

2. APOLOGIES

Cr Bryan Scott has submitted apologies for this meeting.

3. PUBLIC FORUM

Requests to speak should be made to the Governance Support team on 0800 474 082 or to governance@orc.govt.nz at least 24 hours prior to the meeting, however, this requirement may be waived by the Chairperson at the time of the meeting. No requests to speak were made prior to publication of the agenda.

4. CONFIRMATION OF AGENDA

Note: Any additions must be approved by resolution with an explanation as to why they cannot be delayed until a future meeting.

5. DECLARATION OF INTERESTS

Members are reminded of the need to stand aside from decision-making when a conflict arises between their role as an elected representative and any private or other external interest they might have. Councillor interests are published on the ORC website.

6.1. River Management Update

Prepared for:	Implementation Committee
Report No.	OPS2262
Activity:	Environmental - River & Waterway Management
Author:	Michelle Mifflin, Manager Engineering; Pam Wilson, Infrastructure Engineering Lead
Endorsed by:	Gavin Palmer, General Manager Operations
Date:	22 February 2023

PURPOSE

[1] To provide an update on the progress of recovery from the July/August 2022 floods and earlier floods.

[2] To provide an update on river management operational progress of global consents, development of work programmes for 2022/23 and asset management plans for plantings alongside riverbanks.

RECOMMENDATION

That the Committee:

1) ***Notes** this summary.*
2) ***Notes** the progress that is being made with the reporting, planning and progression of the framework that supports river management activities.*
3) ***Notes** the update of the recovery resulting from the July/August 2022 floods and earlier floods*

FLOOD EVENT OVERVIEW

[3] Otago experienced two weather events in February 2020 and July/August 2022 which have had significant impact, not only financially, but also on the scheme and/or rivers environment. The two heavy rainfall events affected the Otago region and the Clutha River catchment particularly. Both events were consistent in characteristics as there was widespread rainfall that elevated river levels. Whilst each event had unique hydrology specifics, both events required response and resultant recovery with significant repairs and cost.

JULY/AUGUST 2022 EVENT

[4] Between 12 July and 8 August 2022 there were four successive weather events that resulted in elevated flows in rivers across the region. The distribution of rainfall accumulations across the region varied for each event and subsequently had different impacts throughout the region, impacting areas across central, coastal, and south Otago at different times throughout - this is shown in Appendix 1.

[5] During these weather events staff actively monitored rivers and river mouths across the region to observe their behaviour and provide on the ground intelligence back to ORC's Flood Team. Damage assessments were finalised once water levels subsided, and the flood repair programme was compiled and shared on the ORC website on 27 October 2022.

[6] The flood repair programme is available online as an interactive map showing repair sites, their programmed completion, and their status. It is updated monthly as work progresses. The live repair programme can be viewed by visiting the following ORC webpage and clicking the link to the dashboard near the bottom of the page – Flood Repair Programme | Otago Regional Council (orc.govt.nz). The programme is subject to changes as the initial investigations and first stages of recovery are undertaken, therefore the work status and cost estimates may reflect this with further detail.

[7] Figure 1 shows the distribution of flood recovery works identified across the Otago region, and the status of this work identified as at the end of December 2022. Most of this work is related to bank erosion and debris accumulation. This programme includes work from across the schemes and rivers.

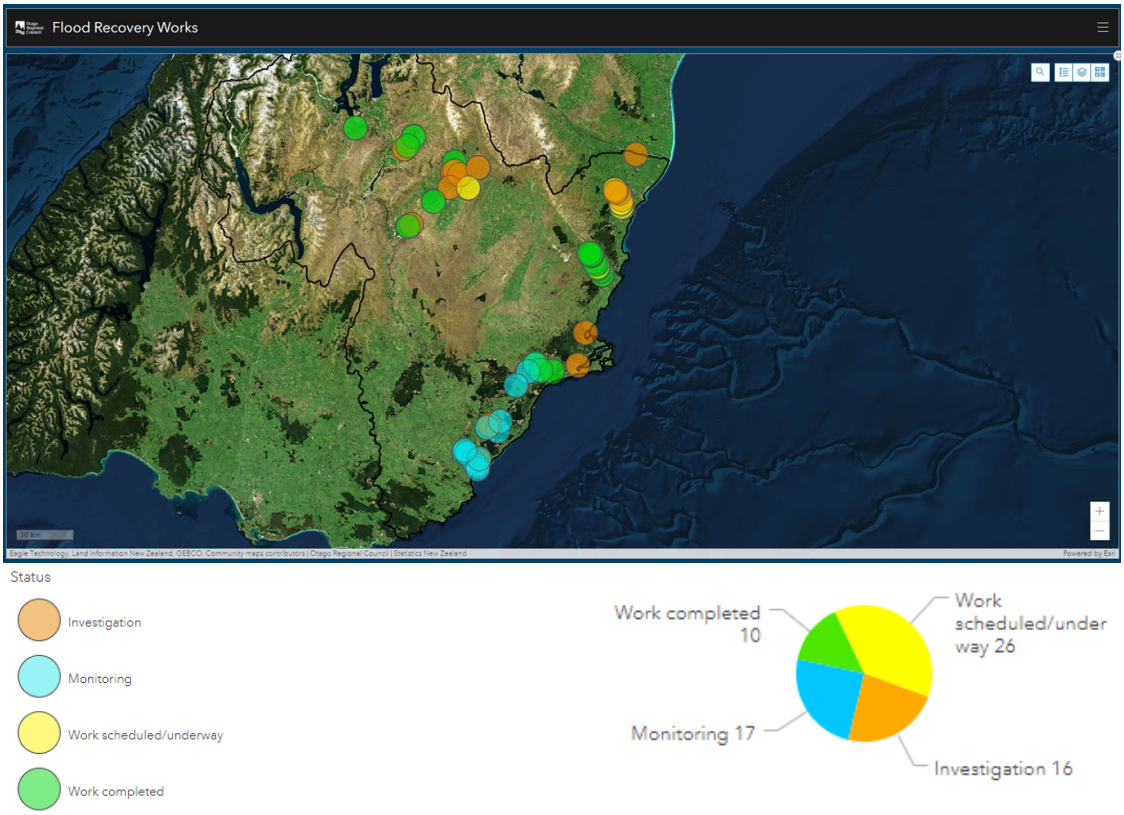


Figure 1: Flood recovery works identified during July/August 2022 flood event.

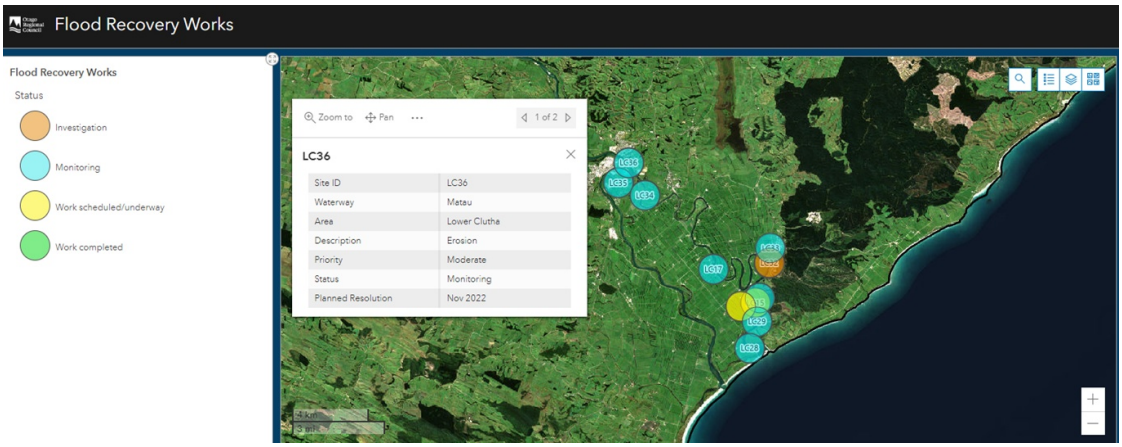


Figure 2: Flood recovery works with detail, site LC36

Effects on natural environment (riverbanks, waterways etc)

[8] In the Waitaki area most of the damage has occurred in the Kakanui River where the river has broken out of its usual bed, and where the natural process of gravel movement (including accumulation), impacts on river behaviour in elevated flows and can cause erosion of the riverbank in concentrated locations. There has also been a significant amount of debris accumulation in the Shag River.

[9] In Central Otago most of the damage is associated with riverbank erosion on the Manuherikia River and its tributaries.

[10] Appendix 2 shows examples of the sites identified as shown in Figures 1 and 2.

[11] Preliminary estimates for remedying the river management damage are in the order of $939,000 or more, as set out in Table 1, with the cost of more significant damage to be refined.

komairiro Mouth Road, downstream from Coal Gully Road junction, erosion damage with encroachment to nearby road.

Effects on built environment (flood protection and drainage scheme structures)

[12] The majority of the damage relating the flood protection schemes is in the Lower Clutha Flood Protection & Drainage Scheme. The majority of the damage relates to accelerated erosion of the riverbank in concentrated locations.


Photos 2 (L) and 3 (R) showing the vulnerability of an erosion site at Lower Clutha at the Kaitangata site location of the Lower Clutha Flood Protection Scheme.

Preliminary Estimate

[13] The preliminary repair expenditure required for both the scheme and river management repairs is summarised in Table 1 below, including a forecasted expenditure across Annual Plans.

July/August 2022 flooding event	Preliminary Estimate as at Jan 2023	Actual Expenditure to Date as at end of Dec 2022 financials	Forecast Expenditure to Complete		
			FY2022/2023	FY2023/2024	FY2024/2025
Flood protection and drainage schemes	**$1,189,000**	**$55,000**	**$700,000**	**$434,000**	**Nil**
Rivers (outside schemes)	**$939,000**	**$67,000**	**$200,000**	**$672,000**	**Nil**
Total	**$2,128,000**	**$122,000**	**$900,000**	**$1,106,000**	**Nil**

Table 1: Preliminary estimate for scheme and river management recovery

[14] The Council was advised on the 14th of Sept 2022 that the preliminary estimates for damage across rivers and schemes was in the order of $400,000 and $1,900,000 ($2,300,000) respectively. Note that the preliminary estimate was provided while work was still being identified and programmed.

[15] The forecast expenditure is based on current resourcing in team, time required to investigate and implement more complex solutions. This also includes regulatory considerations to support undertaking the work. The forecast provided in Table 2 is also based on priority of repairs criteria; low, moderate, high and urgent. The urgent works relate to debris accumulation and scheme damage in most cases. High priority works are also categorised as riverbank riparian works and other works that relate to infrastructure that may be impacted if a weather system was to occur whilst not remediated/repaired.

[16] High priority repairs are defined as having the potential to deteriorate further and/or impact existing infrastructure including people and property, with future weather

events. The actions required for urgent repairs include investigation, coordination and design needed ahead of undertaking more complex flood recovery repairs.

[17] Completed works to date have been recovery works that have focussed on debris removal and some channel works, such as channel realignment and bank stabilisation.

Photos 4 (L) and 5 (R): Silverstream, Taieri, Debris removal, Taieri River (floodbank) Debris accumulation

Funding sources for July/August 2022 event

[18] The July 2022 weather event repairs will not be eligible for any Central Government reimbursement. This is due to a requirement that any reimbursement is to primarily support response and repairs of essential infrastructure. The majority of the repairs from the July 2022 event relate to riverbank erosion and debris removal. ORC does have infrastructure within the vicinity of some of these repairs, namely the Clutha River repairs where we have floodbank assets along the river, however the cost of these repairs is unlikely to exceed the minimum spend threshold.

[19] Government funding to repair essential infrastructure following emergencies is administered through NEMA. Costs to repair essential eligible infrastructure above a specified threshold are claimable at a 60% subsidy from Central Government. The threshold is set at 0.002% of the Net Capital Value of the region as at the date the damage occurred. For Otago the threshold for response and recovery costs from this event is calculated at $2,339,276.91[1]. This is summarised by Table 2 below.

Description	Unit	Amounts	Comments
Rateable Value of Otago	$	116,963,845,570.00	*CV as of 25 July 2022*
NEMA Threshold Modifier	%	0.0020	*Stipulated by NEMA*
Calculated NEMA Claim Threshold	$	2,339,276.91	*CV x 0.00002*

Table 2: February 2023 Claim threshold calculation

[1] Calculated on rating information in calendar year 2022. The threshold calculation is fixed for the event, as it refers to the calculated CV at the time of the event.

[20] Some of the repairs located in the Lower Clutha FPDS may be eligible to be claimed from Contact Energy Limited (CEL) in accordance with their Consent contributions that relate to remedial work for berm/bank instability and erosion.

[21] There may be opportunities to receive funding to reduce the deficit of the Lower Clutha FPDS reserve by accessing the Kuriwao Fund. To enable the Lower Clutha FPDS to access additional resources from the Kuriwao fund, it requires the following:

a. the proposed use of the income to fall within the Kuriwao Endowment Act 1994 purposes; and
b. the works must be for the benefit of the Lower Clutha District (as defined); and
c. Council to approve use of the income.

[22] The recovery costs for some sites may overlap with Territorial Authority (TA) or other infrastructure owners' obligations to maintain/protect their infrastructure. Staff will liaise with respective TA's as detailed solutions are developed.

Cost and Work Programme impacts

[23] The costs required to progress the July 2022 flood recovery will require an estimated overspend ($2,300,000). This will have an impact on the deficit to respective the scheme and river reserves. This impact has yet to be assessed.

[24] All the identified recovery sites are vulnerable to any weather systems, until they are repaired. The priority for repairs is expediting the urgent sites to ensure risk of further damage is reduced/eliminated and to ensure appropriate measures are in place to respond in the case of a weather event. An example of this is shown in Photos 2 and 3 where the riverbank erosion has adjacent infrastructure, owned by others (power poles, pump station roadways) including ORC's floodbank asset.

FEBRUARY 2020 EVENTS

[25] Between November 2019 and February 2020 two heavy rainfall events affected the Otago region and the Clutha River catchment particularly: the November/December 2019 event had a long duration and large amounts of rain falling on the headwaters of Otago during this period; the February 2020 event was shorter, more widespread with the largest amounts of rain falling in the headwaters and in the lower parts of the Clutha River catchment. This resulted in the ninth largest flow (3,175 cubic metres per second) since 1863 and the largest flow in the last 20 years in the Clutha River at Balclutha.

[26] Of the 35 flood damaged sites, 30 have now been completed, two are underway, and three have been investigated and left to monitor and repair if needed under business as usual.

[27] The forecast repair expenditure required to complete the February 2020 flood recovery is summarised in Table 3 below, including a forecasted expenditure across Annual Plans.

February 2020 flooding event	Original Estimate as at Jan 2023	Actual Expenditure to Date as at end of Dec 2022 financials	Forecast Expenditure to Complete			Estimated Cost to Complete
			FY2022/2023	FY2023/2024	FY2024/2025	
Otago region (schemes and rivers)	**$4,000,000**	**$3,500,000**	**$100,000**	**$900,000**	**Nil**	**$4,500,000**

Table 3. February 2020 Flood recovery programme cost summary. This was reported to Council in June 2023

[28] The values in Table 3 have been previously reported to Council (9th June 2022), totalling estimated cost to complete of $4,640,000, which includes the cost for the Hospital Creek Embankment, which has been determined to be the responsibility of Clutha District Council (CDC).

[29] MBIE has contributed $608,000 towards flood recovery for flood damage repairs on floodbanks at Riverbank Road in the Lower Clutha, approved as part of the Climate Resilience "Shovel Ready" programme.

[30] The NEMA contribution towards this expenditure is estimated to be $598,000. Of this, $69,000 has been received (Claim 1 to April 2021) and the remainder is yet to be claimed.

[31] The forecast expenditure to complete relate to two remaining sites on the Lower Clutha FPDS which are:

a. Balclutha Pressure Relief Wells, site LC22 in Appendix 2a, and
b. Floodbank at Factory Road, Paretai (near old cheese factory), site LC03 in Appendix 2a.

Summary of Weather Event expenditure

[32] The weather events discussed in this paper are due to the significant impacts on costs and work programmes. This is summarised in Table 4 below. There have been weather events in December 2019, January 2021 and January/February 2022 which have required recovery, however these events have not been discussed as they have not reached or exceeded the 'threshold' described in Table 2. Most of these works have been resolved and/or included as part of annual plan works cycle.

Weather event	Original Estimate as at Jan 2023	Actual Expenditure to Date as at end of Dec 2022 financials	Forecast Expenditure to Complete			Estimated Cost to Complete (ETC)
			FY2022/2023	FY2023/2024	FY2024/2025	
February 2020 Otago region (schemes and rivers)	$4,000,000	$3,500,000	$100,000	$900,000	Nil	$4,500,000
July/August 2022 Otago region (schemes and rivers)	$2,194,000	$122,000	$700,000	$1,372,000	Nil	TBC
Total	**$6,194,000**	**$3,622,000**	**$800,000**	**$2,272,000**	**0**	**$4,500,000**

Notes:

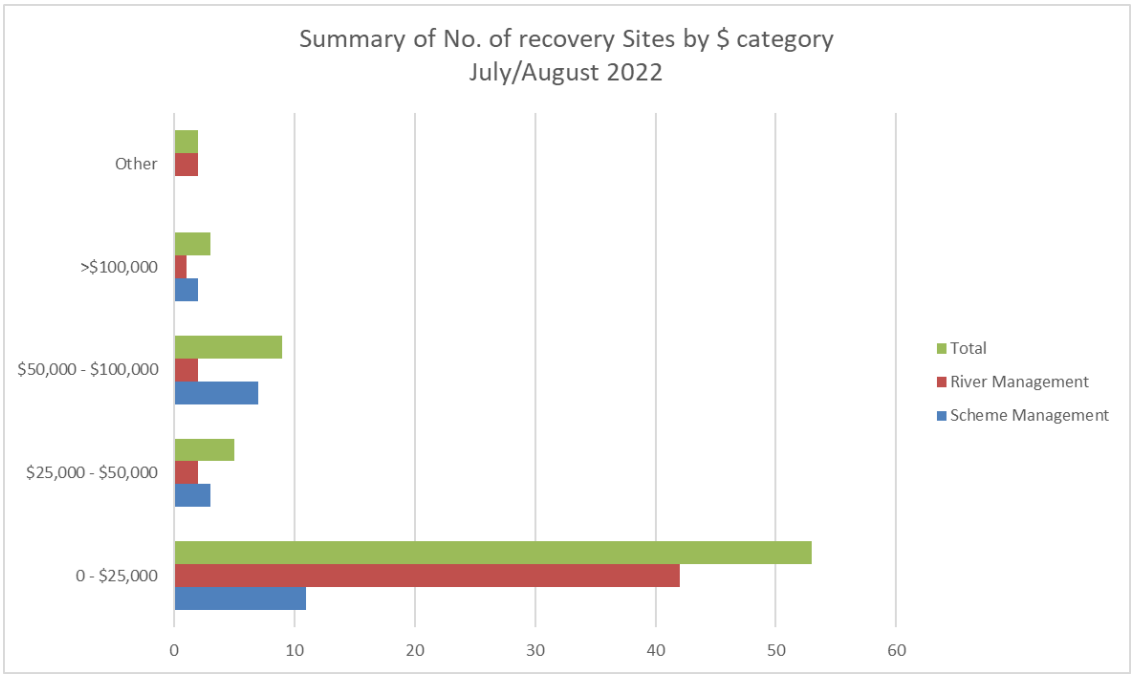
1. ETC for July/August 2022 event has yet to be determined from detailed investigations/scoping/pricing

2. Forecast is based around preliminary estimates for July/August 2022

3. February 2020 forecast has been based around detailed scoping/procurement

Table 4: Summary of Weather events, 2020 and 2022.

[33] A summary of the number of sites identified in the July/August 2022 event, shows the volume of sites per financial category, in Graph 1.



Notes:

1. Other means external stakeholders involved/monitoring only.

Graph 1: July/August 2022 weather event – number of sites per $ category

[34] The weather events of July and August 2022 have impacted on the work programme, with at least 20 additional contracts proposed to be awarded to remove debris, realign channels and/or undertake erosion mitigation work.

[35] To manage the risks and constraints outlined above, the River Management team has adapted work programmes where possible to address priority works. Priority activities are those activities that pose an imminent risk to the environment, people, or property.

Photo 6 (L) and 7 (R); Relief Well #34 showing subsidence and Relief Well #7 showing offset in pipe joint.

WORK PLANNING AND GLOBAL CONSENT PROGRESS

[36] Planning for the development of work programmes for 2023/2024 is currently underway with a focus on building the foundational framework for delivery of ORC's overall strategic direction and strategies (Figure 3 below) and tying this in with the future implementation of the new Global Consent.

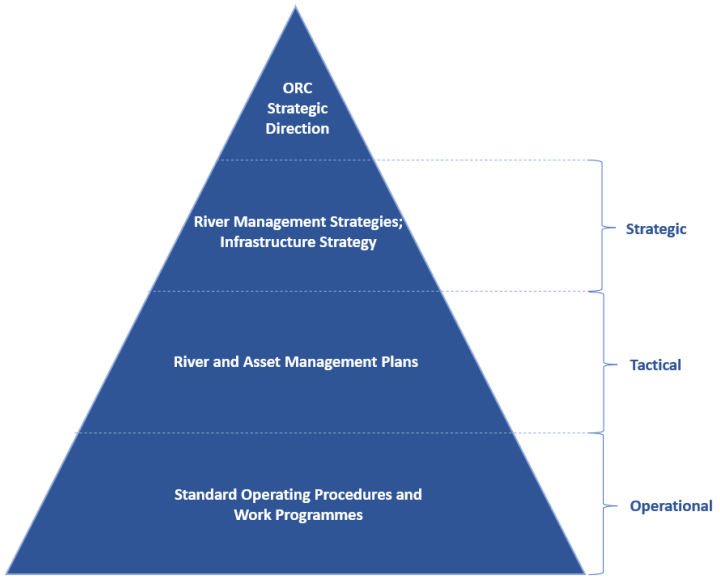


Figure 3: Relationship between strategic and operational framework within the river management function.

[37] Engineering has recently recruited a Principal Rivers Advisor (starting in May 2023) that will work alongside the team to implement plans and procedures at the tactical and operational level.

[38] To carry out river management activities (and some scheme related activities) Engineering operates under a set of Global Consents (RM10, 408.16, 17 and 18), which enable these activities to be carried out. This set of Global Consents is currently undergoing a renewal process which is updated later in this update. Engineering can continue operating under the current global consents until the new set of Global Consents are issued.

[39] Progress with the consent application is summarised in Table 4 below:

Date	Action/Update
22 February 2021	RM21.073.01, 02, 03 Global consent application lodged.
26 February 2021	Application accepted for processing and continued consent exercising rights approved under s124(2) of the RMA.
10 March 2021	Request for further information (s92(1) RMA).
20 June 2021	RM10.408.16-18 expired (but rights continue under s124(2).
30 November 2021	Meeting with Consultant Planner and Ecologist.
January 2022 onwards	Review and amendment of EMP, and preparation of s92 response as a result of stakeholder engagement and discussion with consultant planner and ecologists.
September 2022 onwards	▫ The revised EMP has been reviewed by stakeholders and informally reviewed by the consultant planner and ecologist. ▫ Further discussion is occurring with the consultant planner to confirm restraints on activity in the EMP for ecological benefit.
NEXT STEPS January 2023 onwards	▫ The intention is to lodge the s92 response late February 2023. ▫ ORC will seek a delayed start date for the consent so that the consent term aligns with the ORC financial year commencing 1 July 2023

Table 5: Summary of Global Consent renewal.

[40] Gravel extraction has been included in the renewal of the global consents for hazard mitigation only. The new Global Consent is for a term of five years.

[41] It is the intention through this long-term plan cycle to investigate a longer-term approach to gravel management which had been expressed in previous River Management Quarterly Updates to the former Implementation Committee. The timeframe to investigate the approach is during Year 2 of the 2021-31 Long Term Plan, which will proceed after the completion of the renewal of the global consents and work in with the reviews being undertaken of the regional plans.

[42] The global consent requires Annual Work Programmes (AWP) to be developed and submitted annually for the purpose of compliance with consent conditions. The AWPs are localised to specific rivers and activities which are notified to stakeholders, these activities are assessed annually from inspections and engagement with communities and

stakeholders. The development of the River Management Plans described in para [36] will set out the long-term objectives across our rivers linking the strategies with our BAU.

CONSIDERATIONS

Strategic Framework and Policy Considerations

[43] There are no policy considerations associated with receiving this report.

Financial Considerations

[44] These are described in the report, particularly the estimated costs of the July/August 2022 floods. Those costs are unbudgeted.

Significance and Engagement Considerations

[45] No considerations arising from this paper.

Legislative and Risk Considerations

[46] ORC is operating under the provision of the Soil Conservation and Rivers Control Act 1941.

[47] The potential scale of works arising from the July/August 2022 floods combined with a tight contracting market present a risk to the delivery of the 2022/23 Annual Plan work programme.

[48] The nature and setting of the assets that have been damaged, particularly within the flood protection scheme, are such that they are vulnerable to future damage. This is a cost risk for ORC.

Climate Change Considerations

[49] Flood recovery has focused on reinstating like-for-like damaged infrastructure. Climate change considerations, particularly in the Lower Clutha Flood Protection Scheme are being investigated as part of a separate programme of work[2].

Communications Considerations

[50] There are no communications considerations with receiving this report.

NEXT STEPS

[51] Continue with the high priority repairs identified by the recovery program for the July August 2022 flood event.

[52] Complete the February 2020 flood recovery programme currently forecasted for 30 April 2023.

[53] Make final claim(s) to NEMA for their cost share of eligible flood damage repair costs for the February 2020 flood recovery.

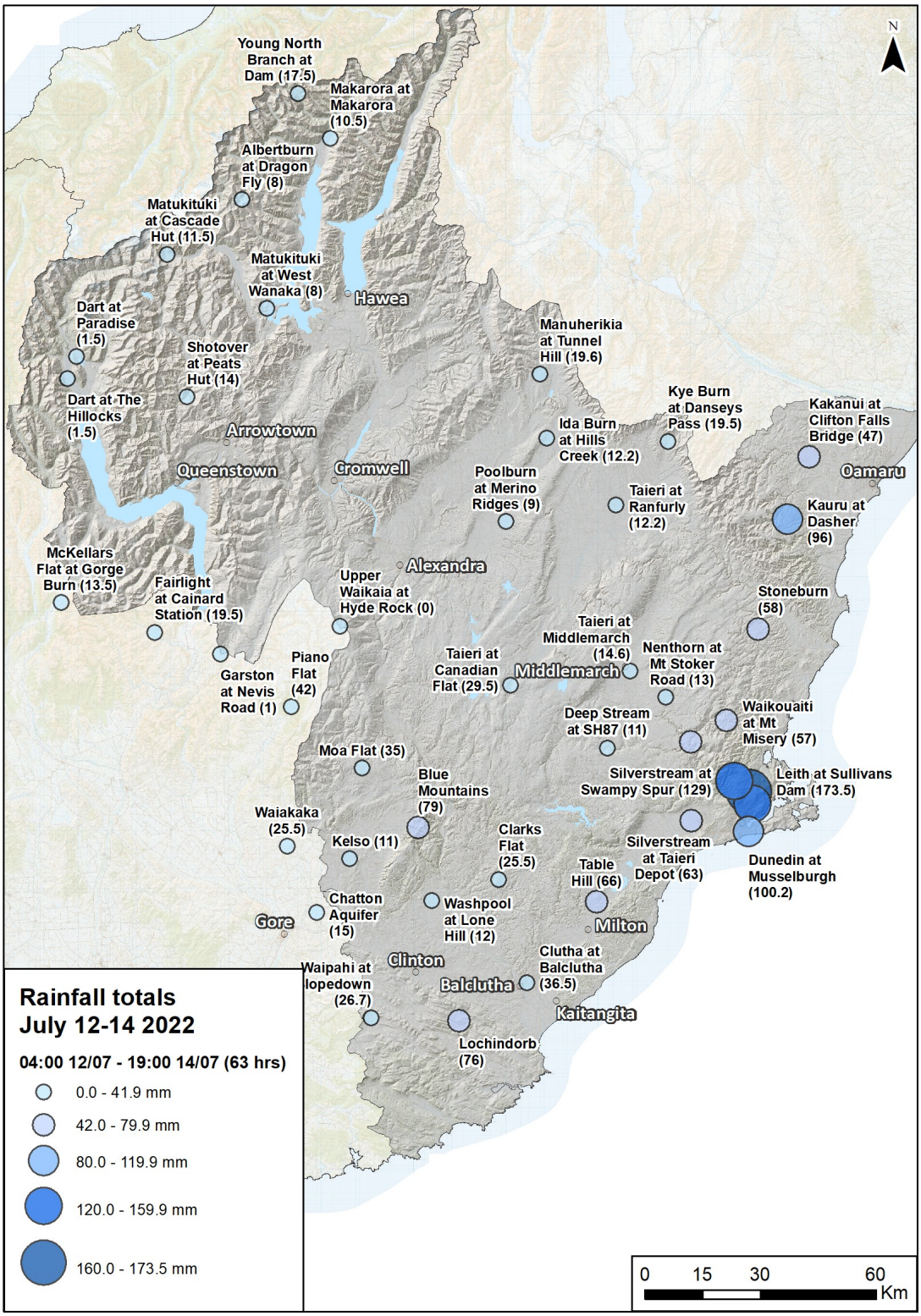
[54] Continue to incorporate information from flood recovery into scheme and river asset management plans, performance assessments and adaptation planning.

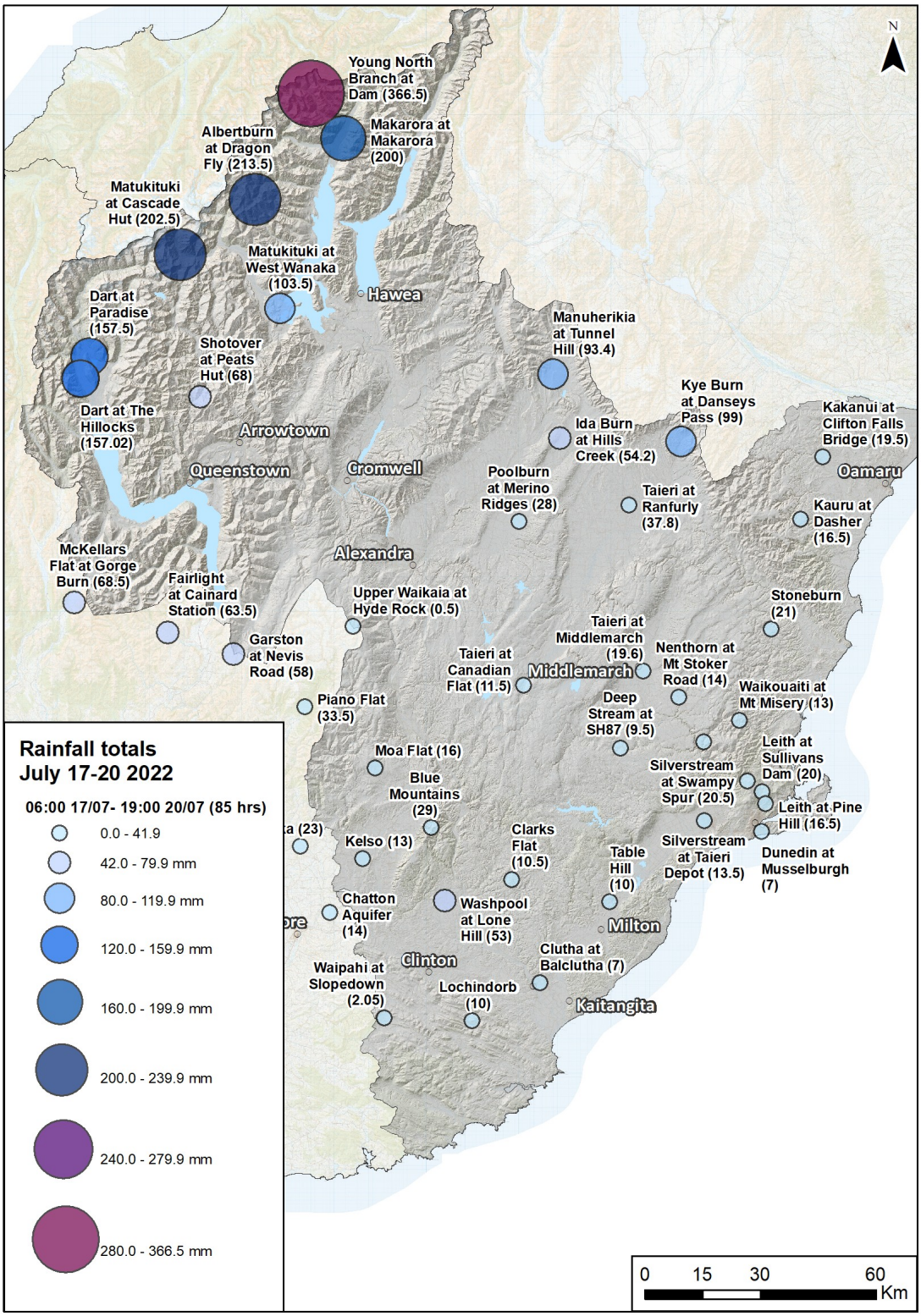
[2] *Clutha Delta and Molyneux Bay Coastal Morphology and Natural Hazards*, Report HAZ2207, Report to 8 December 2021 meeting of the Data and Information Committee.

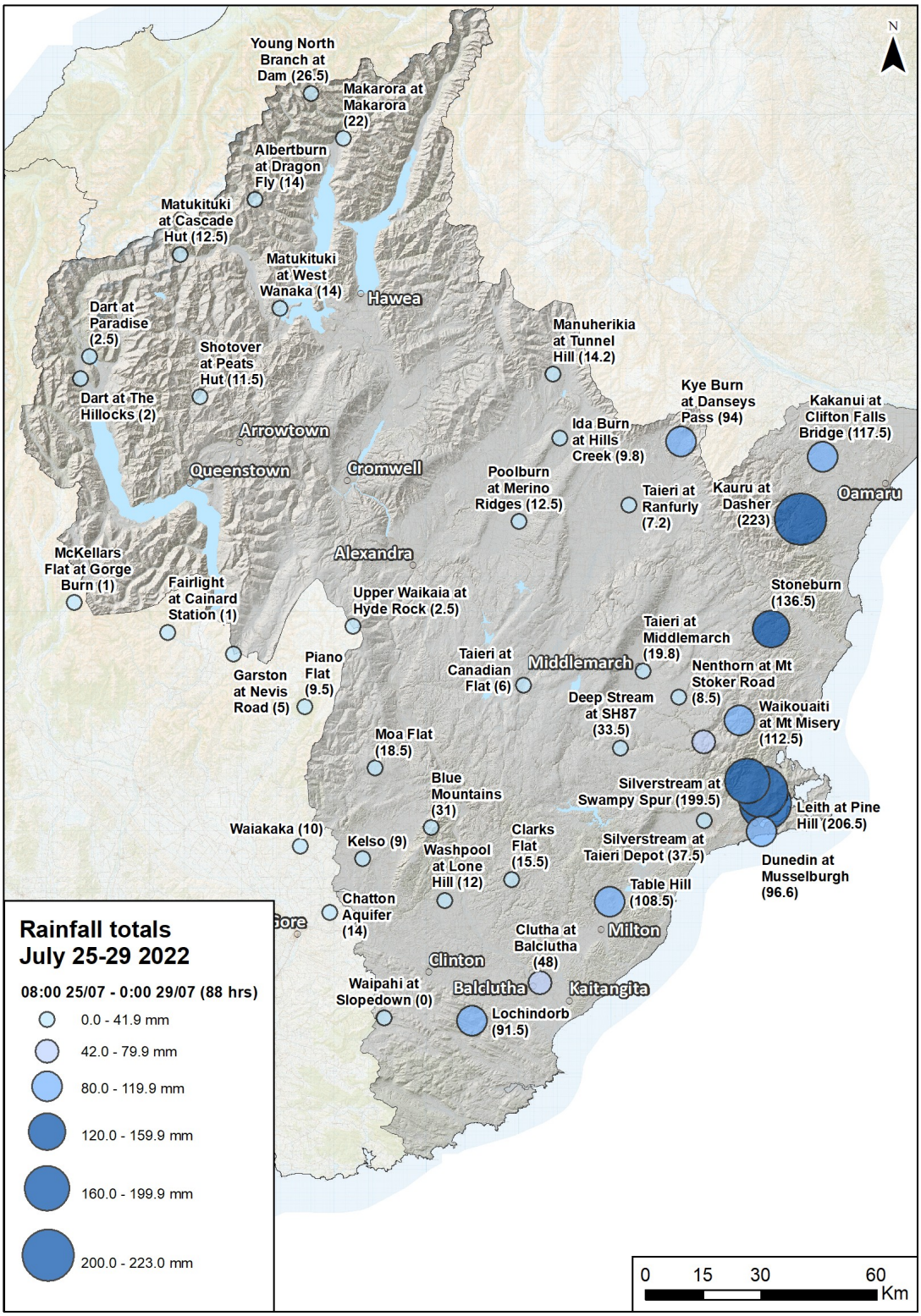
ATTACHMENTS

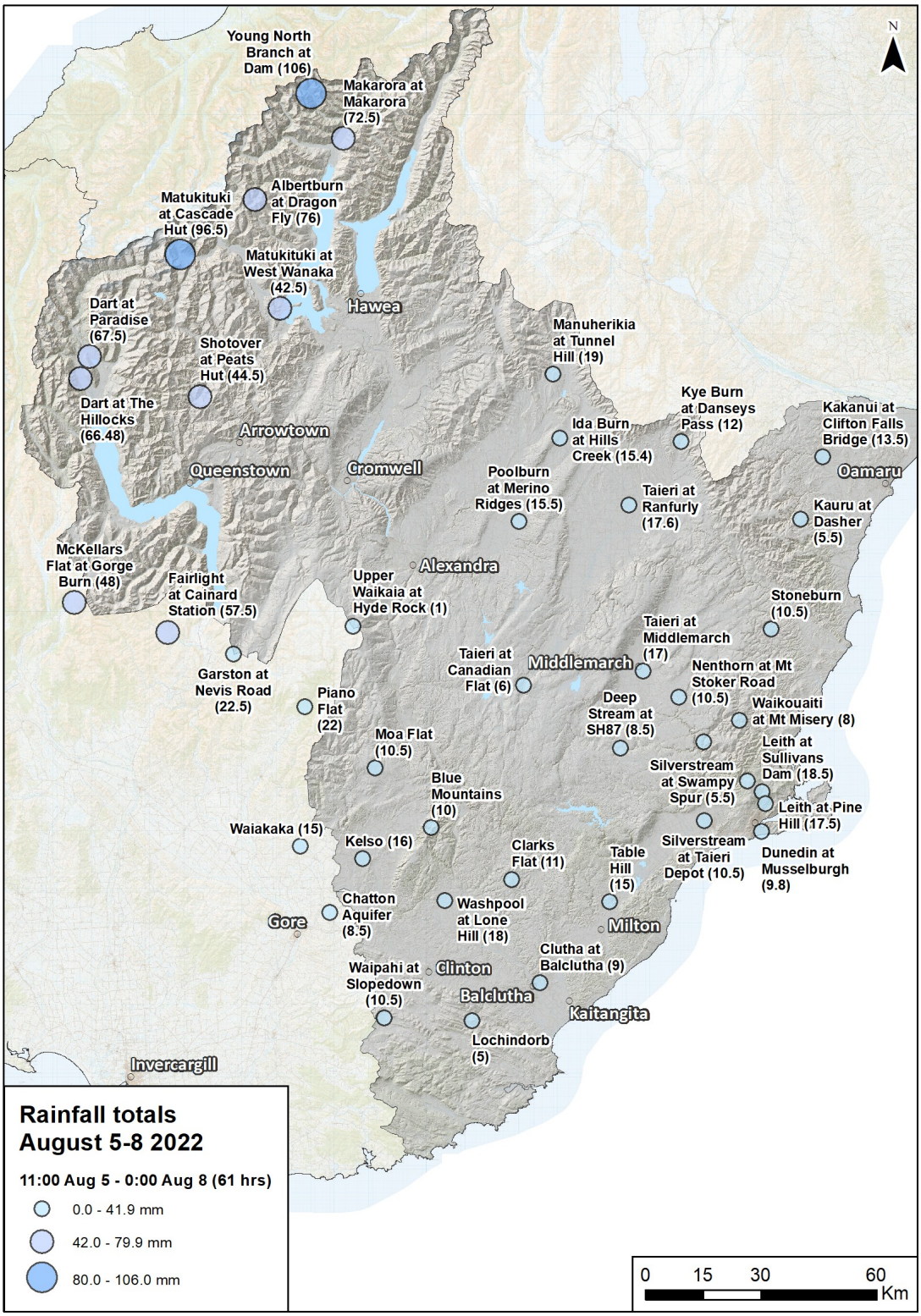
1. Appendix 1 July August 2022 Rainfall Distributions [**6.1.1** - 4 pages]
2. Appendix 2 July 2022 Flood Recovery repairs [**6.1.2** - 7 pages]
3. Appendix 2a Feb 2020 Flood Recovery repairs [**6.1.3** - 2 pages]
4. Appendix 3 FPS Background and maps [**6.1.4** - 4 pages]
5. Appendix 4 July August 2022 Recovery Details [**6.1.5** - 2 pages]
6. Appendix 5 River Management LoS Reporting [**6.1.6** - 4 pages]

Appendix 1: July/August 2022 Weather Events – Rainfall Distributions




N
Young North Branch at Dam (366.5)
Albertburn at Dragon Fly (213.5)
Makarora at Makarora (200)
Matukituki at Cascade Hut (202.5)
Matukituki at West Wanaka (103.5)
Hawea
Dart at Paradise (157.5)
Shotover at Peats Hut (68)
Dart at The Hillocks (157.02)
Arrowtown
Queenstown
Cromwell
Manuherikia at Tunnel Hill (93.4)
Kye Burn at Danseys Pass (99)
Ida Burn at Hills Creek (54.2)
Kakanui at Clifton Falls Bridge (19.5)
Oamaru
Poolburn at Merino Ridges (28)
Taieri at Ranfurly (37.8)
Kauru at Dasher (16.5)
McKellars Flat at Gorge Burn (68.5)
Alexandra
Fairlight at Cainard Station (63.5)
Upper Waikaia at Hyde Rock (0.5)
Stoneburn (21)
Garston at Nevis Road (58)
Taieri at Middlemarch (19.6)
Taieri at Canadian Flat (11.5)
Middlemarch
Nenthorn at Mt Stoker Road (14)
Waikouaiti at Mt Misery (13)
Piano Flat (33.5)
Deep Stream at SH87 (9.5)
Leith at Sullivans Dam (20)
Moa Flat (16)
Silverstream at Swampy Spur (20.5)
Blue Mountains (29)
Leith at Pine Hill (16.5)
Kelso (13)
Clarks Flat (10.5)
Silverstream at Taieri Depot (13.5)
Table Hill (10)
Dunedin at Musselburgh (7)
Chatton Aquifer (14)
Washpool at Lone Hill (53)
Milton
Clutha at Balclutha (7)
Clinton
Waipahi at Slopedown (2.05)
Lochindorb (10)
Kaitangita
Rainfall totals
July 17-20 2022
06:00 17/07- 19:00 20/07 (85 hrs)
0.0 - 41.9
42.0 - 79.9 mm
80.0 - 119.9 mm
120.0 - 159.9 mm
160.0 - 199.9 mm
200.0 - 239.9 mm
240.0 - 279.9 mm
280.0 - 366.5 mm
0 15 30 60
Km


Young North Branch at Dam (26.5)
Makarora at Makarora (22)
Albertburn at Dragon Fly (14)
Matukituki at Cascade Hut (12.5)
Matukituki at West Wanaka (14)
Hawea
Dart at Paradise (2.5)
Dart at The Hillocks (2)
Shotover at Peats Hut (11.5)
Arrowtown
Queenstown
Cromwell
Manuherikia at Tunnel Hill (14.2)
Ida Burn at Hills Creek (9.8)
Kye Burn at Danseys Pass (94)
Kakanui at Clifton Falls Bridge (117.5)
Poolburn at Merino Ridges (12.5)
Taieri at Ranfurly (7.2)
Kauru at Dasher (223)
Oamaru
McKellars Flat at Gorge Burn (1)
Fairlight at Cainard Station (1)
Alexandra
Upper Waikaia at Hyde Rock (2.5)
Stoneburn (136.5)
Taieri at Middlemarch (19.8)
Garston at Nevis Road (5)
Piano Flat (9.5)
Taieri at Canadian Flat (6)
Middlemarch
Nenthorn at Mt Stoker Road (8.5)
Deep Stream at SH87 (33.5)
Waikouaiti at Mt Misery (112.5)
Moa Flat (18.5)
Blue Mountains (31)
Silverstream at Swampy Spur (199.5)
Leith at Pine Hill (206.5)
Waiakaka (10)
Kelso (9)
Washpool at Lone Hill (12)
Clarks Flat (15.5)
Silverstream at Taieri Depot (37.5)
Dunedin at Musselburgh (96.6)
Table Hill (108.5)
Chatton Aquifer (14)
Clutha at Balclutha (48)
Milton
Clinton
Waipahi at Slopedown (0)
Balclutha
Kaitangata
Lochindorb (91.5)
Rainfall totals
July 25-29 2022
08:00 25/07 - 0:00 29/07 (88 hrs)
0.0 - 41.9 mm
42.0 - 79.9 mm
80.0 - 119.9 mm
120.0 - 159.9 mm
160.0 - 199.9 mm
200.0 - 223.0 mm
0 15 30 60
Km
N


Young North Branch at Dam (106)
Makarora at Makarora (72.5)
Albertburn at Dragon Fly (76)
Matukituki at Cascade Hut (96.5)
Matukituki at West Wanaka (42.5)
Hawea
Dart at Paradise (67.5)
Shotover at Peats Hut (44.5)
Dart at The Hillocks (66.48)
Arrowtown
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Cromwell
Manuherikia at Tunnel Hill (19)
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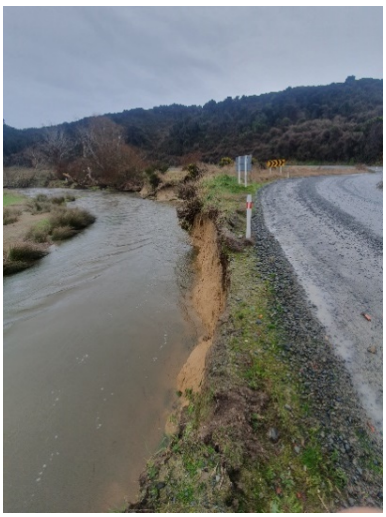
Kakanui at Clifton Falls Bridge (13.5)
Oamaru
Poolburn at Merino Ridges (15.5)
Taieri at Ranfurly (17.6)
Kauru at Dasher (5.5)
McKellars Flat at Gorge Burn (48)
Fairlight at Cainard Station (57.5)
Alexandra
Upper Waikaia at Hyde Rock (1)
Stoneburn (10.5)
Taieri at Middlemarch (17)
Garston at Nevis Road (22.5)
Taieri at Canadian Flat (6)
Middlemarch
Nenthorn at Mt Stoker Road (10.5)
Piano Flat (22)
Deep Stream at SH87 (8.5)
Waikouaiti at Mt Misery (8)
Moa Flat (10.5)
Leith at Sullivans Dam (18.5)
Silverstream at Swampy Spur (5.5)
Blue Mountains (10)
Leith at Pine Hill (17.5)
Waiakaka (15)
Kelso (16)
Clarks Flat (11)
Table Hill (15)
Silverstream at Taieri Depot (10.5)
Dunedin at Musselburgh (9.8)
Chatton Aquifer (8.5)
Washpool at Lone Hill (18)
Gore
Milton
Clutha at Balclutha (9)
Waipahi at Slopedown (10.5)
Clinton
Balclutha
Kaitangita
Lochindorb (5)
Invercargill
Rainfall totals
August 5-8 2022
11:00 Aug 5 - 0:00 Aug 8 (61 hrs)
0.0 - 41.9 mm
42.0 - 79.9 mm
80.0 - 106.0 mm
N
0 15 30 60
Km

Appendix 2: July 2022 Flood Recovery

The below table is an example of some of the recovery sites, and including some completed works which are mapped on the website: [Flood Repair Programme | Otago Regional Council (orc.govt.nz)]
This table does not reflect every site identified.

Site Photo/Location
    Clutha River, Matau branch, True Left bank.
 Clutha River, Koau branch, True Left bank.
  Kaitangata canal 

Site Photo/Location
 Kaitangata canal
 Clutha Depot, Clutha River, Matau Branch
  Tokomairiro River, Toko Mouth Road, downstream from Coal Gully Road junction

Site Photo/Location
   Clutha River, Koau Branch, True Right, between Sale yards and Finegand plant
 Tokomariro River, West Branch, 300m upstream from SH Bridge
 Salmon Creek, Tokomariro Scheme, ORC scheduled drain

Site Photo/Location
  Taieri River; Debris Cleanup (L) and Bank erosion (R)
 Taieri River; Slip at end of Lyndsey Rd near main flood bank.

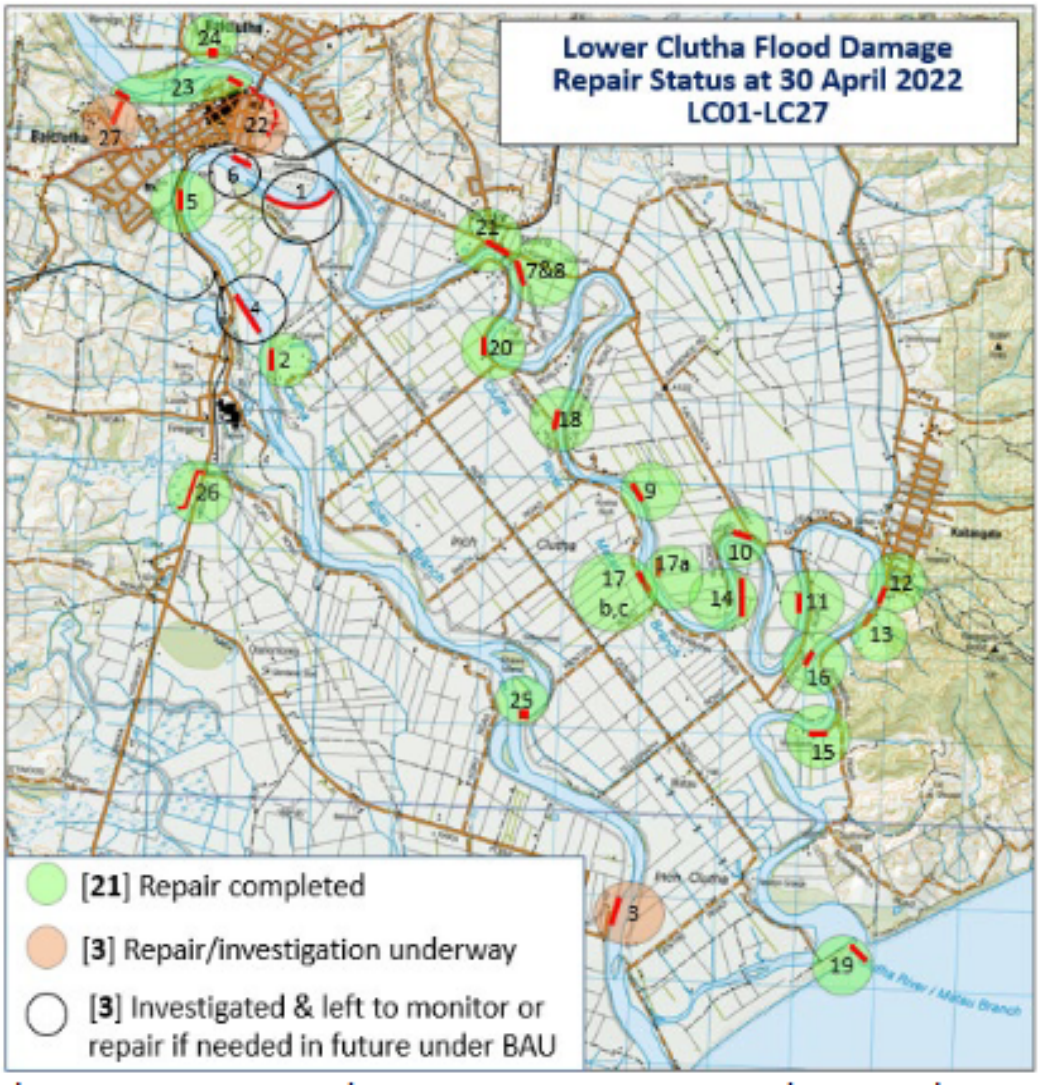
Site Photo/Location

East Taieri, Cemetery Rd ORC, Scheduled Drain O5

Site Photo/Location
Kakanui River, North Otago *Erosion and breakouts at several locations along the Kakanui River.*    

Site Photo/Location
Kakanui River, North Otago *Erosion and breakouts at several locations along the Kakanui River.*  **Shag River, North Otago** Fallen trees creating a debris hazard for future high flow events. 

Appendix 2: February 2020 Flood Repairs



Riverbank stabilization repair, Lower Clutha Flood Protection Scheme, MBIE Climate Resilience Project (below)

Site LC21, Riverbank stabilisation before (left) and after (right)

Albert Town riverbank repair, Wanaka River Management (below)

Riverbank stabilisation before (left) and after (right)

APPENDIX 3

FLOOD PROECTION SCHEME MAPS AND BACKGROUND INFORMATION

Otago Regional Council owns, operates and maintains infrastructure across Otago in Flood Protection and Drainage Schemes as shown below Table 1. Further detail and background on the Lower Clutha and Taieri Schemes is provided thereafter.

Flood Protection and Drainage Schemes							
Region	Location	Flood Protection Schemes		No. of Floodways	Scheduled Drains		No. of
		No.	Length of Floodbanks (km)	(F) and Ponding (P) Areas	No.	Length (km)	Pump Stations
Central Otago	Alexandra	1	1	0	0	-	3
Dunedin	Taieri Plain	1	107	7 (5 x F, 2 x P)	170 (WT 95, ET 75)	269	6
	Dunedin City	1	0	0	0	-	0
	Tokomiriro	0	-	-	66	110	0
Lower Clutha	Balclutha to sea	1	110	1	0	153	5
Waitaki	18km to sea	-	-	3	0	-	0
Queenstown Lakes District	Shotover Delta	One training line – to control the direction of the Shotover River					

Table 1. ORC Flood Protection and Land Drainage Infrastructure

1. Lower Clutha Flood Protection Scheme

The Clutha River is New Zealand's second longest river and largest river by volume of flow. The Lower Clutha Flood Protection Scheme (Figure 1) protects and drains an area of approximately 9,300 ha in the Clutha delta from high Clutha River flows, downstream of Balclutha. The majority of the protected area is farmland but also includes the towns of Balclutha and Kaitangata.

Different flood protection standards specified in terms of Clutha River flow at Balclutha are provided within the Scheme as shown in Figure 1.

The Lower Clutha catchment has historically been at risk of flooding, with the Clutha River/Mata-Au delta area particularly vulnerable to flooding. The February 2020 peak flow ranked as the 9th highest flow on record as shown in Table 2 below.

Rank	Flood Date	Peak flow at Balclutha (m^3/s)
1	September 1878	5,600
2	October 1978	4,580
3	November 1999	4,160
4	January 1919	3,950
5	January 1866	3,700
6	December 1995	3,420
7	May 1917	3,350
8	November 1957	3,190
9	February 2020	3,175
10	July 2022	1,636

Table 2. Clutha River flood history (recording started in 1954, peak flows prior to 1954 are estimated)

The February 2020 flood event came soon after the November/December 2019 flood event. The Scheme performed very well providing the design level of flood protection, however flood damage was sustained in a number of areas. Whilst the July 2022 event was not a major flow event, the repeated wet weather during the winter months had made some sections of the river susceptible to erosional damage.

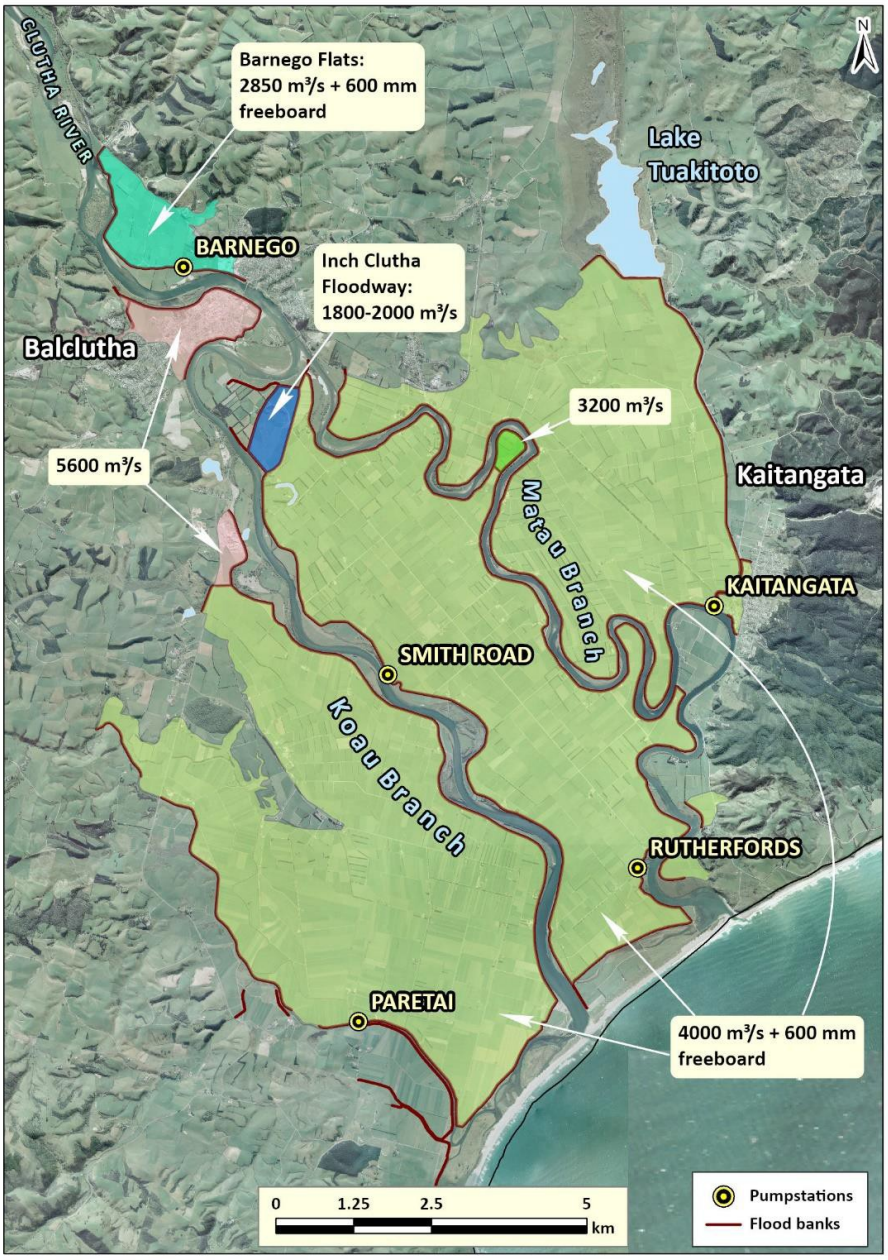


Figure 1. Lower Clutha Flood Protection Scheme

2. Taieri Flood Protection Scheme

The Lower Taieri Flood Control Scheme (Figure 2) provides flood protection to an area of approximately 18,000 ha of the Taieri Plain. The Scheme provides important protection to the predominant Taieri farming area, along with the townships of Mosgiel, Outram, Momona, Outram, and the Dunedin Airport.

The land is very low-lying, with some West Taieri farmland being slightly below mean sea level. Dunedin Airport is about one metre above sea level, and Mosgiel some 15 m above sea level.

The Scheme includes the Taieri River and several tributaries. Scheme assets include 107km of flood protection banks (floodbanks), 2 major flood ponding areas, 269km of drains, 6 pump stations, and a number of outfall structures, bridges, and numerous culverts.

The Lower Taieri Plain has a long history of flooding, and development of drainage and flood protection works goes back to the early 1900's. The largest 7 recorded peak flows are shown in Table 3 below.

Rank	Flood Date	Peak flow at Outram (m^3/s)
1	June 1980	2,520
2	February 1868	2,200
3	May 1957	2,000
4	May 1940	1,800
5	April 1944	1,750
6	May 1923	1,750
7	July 2017	1,690
8	July 2022	518

Table 3. Taieri River flood history (recording started in 1968, peak flows prior to 1968 are estimated)

Recent flooding on the Taieri Plains, particularly in July 2017, significantly tested the Scheme flood and local drainage systems, and highlighted concerns on the performance of the Scheme and local drainage networks. A full review of the Scheme is currently being undertaken, and will be further reported to Council during 2023.

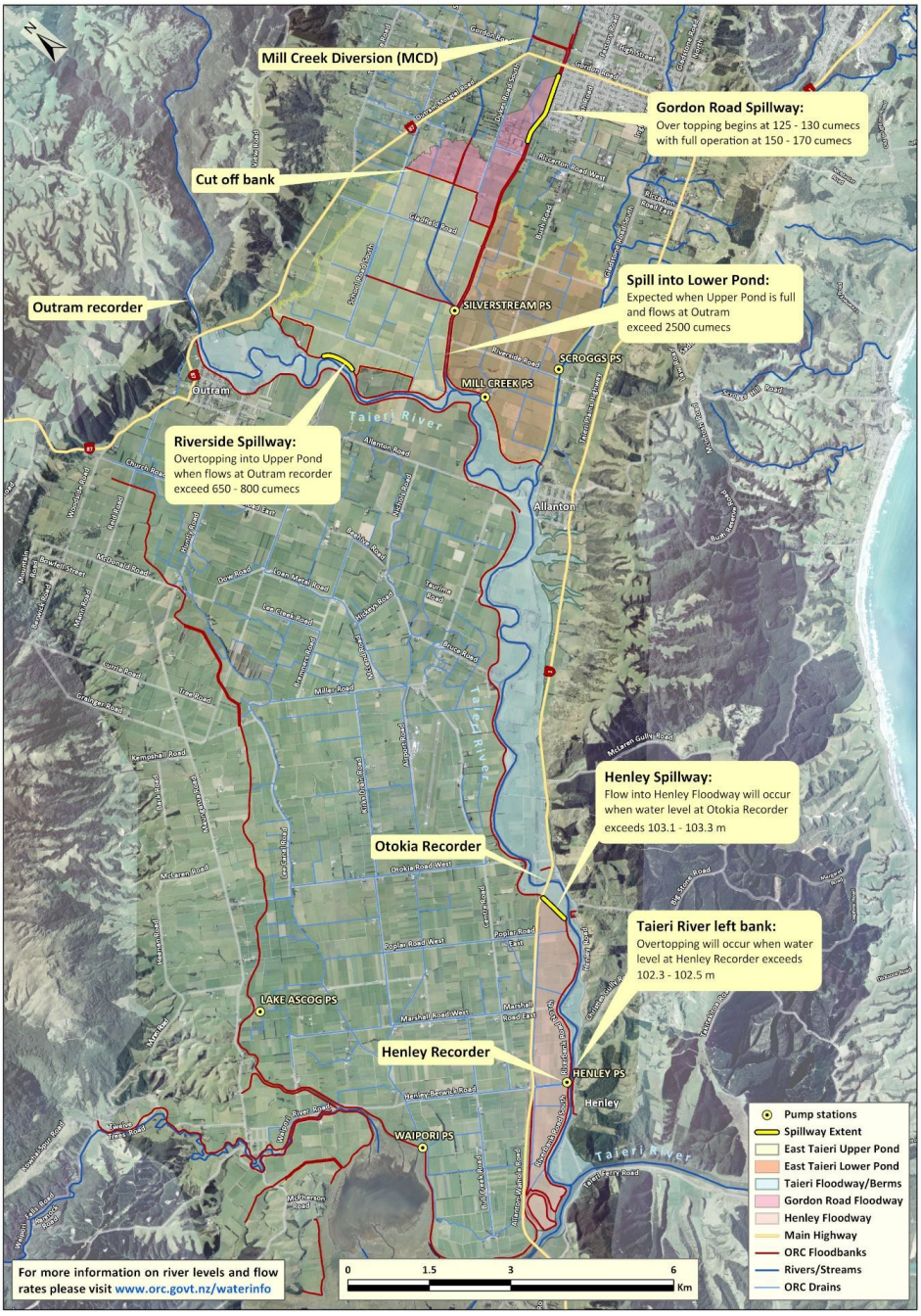


Figure 2. Taieri Flood Protection Scheme

Appendix 5: July 2022 Flood Recovery Scheme Management

SiteID	Location	Scheme/River	WaterwayName	ShortDescription	LongDescription	Priority	EstimatedCost	Status	PlannedResolution
ET1	East Taieri Drainage Scheme	Scheme	Schedule Drain 05A	Erosion	Erosion to approx 20m to the true left bank of drain 05A East Taieri Cemetery, adjacent to cemetery access way	Moderate		Work completed	Nov 2022
LC15	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 85m of bank, true left bank on an outside bend,CH M47-51	Urgent	$ 100,000.00	Work scheduled/underway	Mar-23
LC17	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion/dropout to approx 50m of bank, year 2020 flood recovery site LC17 b, c,	Moderate		Monitoring	June 2023
LC28	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	scour approx 20m, true left bank, CH M11-12	Low	$ 1,000.00	Monitoring	Sep-24
LC29	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	scour, true left bank CH M30	Low	$ 1,000.00	Monitoring	Sep-24
LC30	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 50m of bank, true right, outside bend, CH M40-41	Low	$ 1,000.00	Monitoring	Sep-24
LC31	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 25m of bank Summer Hill Road, CH M54 true left bank	Low	$ 20,000.00	Monitoring	Sep-24
LC32	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 140m of bank, CH M77-80, true left bank, outside bend, bank has slipped away due to the bank being sprayed, the riverside face of the ORC flood bank has fallen away	Urgent	$ 200,000.00	Investigation	Sep-24
LC33	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Kaitangata Creek	Erosion	Approx. 100m true left and true right of Kai channel between between St Albans st & St Catrhines st Kaitangata	Low	$ 60,000.00	Monitoring	May-24
LC34	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 20m of bank, true left, CH M260	Low	$ 40,000.00	Monitoring	May-24
LC35	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Koau	Erosion	Erosion/dropot to approx 100m of bank true left, CH C150-152	Low	$ 100,000.00	Monitoring	May-24
LC36	Lower Clutha Flood Protection & Drainage Scheme	Scheme	Matau	Erosion	Erosion to approx 30m of bank, CH C171-172, true left just down stream from Clutha depot	Low	$ 100,000.00	Monitoring	Sep-24
LL01	Leith Flood Protection Scheme	Scheme	Leith	Erosion	Erosion of river bank	Moderate	$ 50,000.00	Investigation	June 2023
LT1	Lower Taieri Flood Protection Scheme	Scheme	Taieri River	Erosion	Multiple sites throughout the schemes river banks and berms	Moderate		Work completed	Nov 2022
LT2	Lower Taieri Flood Protection Scheme	Scheme	Taieri River	Erosion	Erosion to approx 80m of bank, True right upstream/at top of shoot	Low	$ 80,000.00	Monitoring	May-24
LT3	Lower Taieri Flood Protection Scheme	Scheme	Taieri River	Erosion	Erosion to approx 50m of bank, true left, at the end of Lyndsay Road	Moderate	$ 60,000.00	Monitoring	May-24
LT4	Lower Taieri Flood Protection Scheme	Scheme	Lower Taieri Flood Scheme	Erosion	Voids were discovered on the river side of the flood bank, Geosolve have investigated, and a repair option has been recommended	Moderate		Work completed	Sep 2022
LT5	Lower Taieri Flood Protection Scheme	Scheme	Taieri River	Erosion	Erosion to approx 150m of bank, true right 150m downstream from SH87 bridge	Low	$ 1,000.00	Monitoring	Aug-23
LT6	Lower Taieri Flood Protection Scheme	Scheme	Silverstream	Erosion	Along the Silverstream banks and berms	Moderate		Work completed	Nov 2022
LT7	Lower Taieri Flood Protection Scheme	Scheme	Lower Taieri Flood scheme Contou	Erosion	Damage to true right flood bank, suspected collapsed culvert has exacerbated bank erosion causing signifficient damage	Moderate	$ 50,000.00	Monitoring	May-24
LT8	Lower Taieri Flood Protection Scheme	Scheme	Waipori River	Erosion	Combined distance of 100m of erosion on the true right and true left banks, Waipori River Road	Moderate	$ 200,000.00	Monitoring	Mar-23
T3	Tokomairiro Drainage Scheme	Scheme	Schedule Drain SO	Erosion	Erosion to approx 20m of bank, true right bank, upstream from Allison Road bridge where drain crosses under	Low	$ 10,000.00	Monitoring	May-24
T4	Tokomairiro Drainage Scheme	Scheme	Schedule Drain S (Salmon Creek)	Erosion	Erosion to approx 50m of bank, true left, directly upstream of bridge on Back Road the stream passes under,	Low	$ 60,000.00	Monitoring	May-24
						Value of completed works (actuals)	**$ 55,000.00**		
						Total	**$ 1,189,000.00**		

River Management

SiteID	Location	Scheme/River	WaterwayName	ShortDescription	LongDescription	Priority	EstimatedCost	Status	PlannedResolution
CA01	Dunedin	River	Careys Creek	Erosion	Bank edge repair	Medium	$ 10,000.00	Investigation	Nov-23
IDA01	Central Otago	River	Ida Burn	Channel management	Ida Burn - Channel alignment two sections at Barneys	Moderate	$ 15,000.00	Work scheduled/underway	Apr-23
KAK01	Waitaki	River	Kakanui	Debris	Tree debris on Kiwirail bridge upstream of SH1. Kiwirail responsibility to remove.	N/A	N/A	Monitoring	N/A
KAK02	Waitaki	River	Kakanui	Erosion	Mill Dam recorder site. New erosion bay on river TR upstream of previous prepair. Erosion due to excessive gravel height on adjacent island that requires lowering through redistribution or partial removal.	Low	$ 10,000.00	Investigation	Nov-23
KAK03	Waitaki	River	Kakanui	Channel management	Lowering of gravel beach on river true left to restore flood capacity and take pressure off Maheno floodbank and spillway where spillway scouring and bank failure occurred in 2014 flood event.	Moderate	N/A	Investigation	N/A
KAK04	Waitaki	River	Kakanui	Erosion	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	$ 15,000.00	Work scheduled/underway	Apr-23
KAK05	Waitaki	River	Kakanui	Erosion	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	$ 15,000.00	Work scheduled/underway	Apr-23
KAK06	Waitaki	River	Kakanui	Erosion	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	$ 15,000.00	Work scheduled/underway	Apr-23
KAK07	Waitaki	River	Kakanui	Erosion	Repairs to bank edge by pushing up gravel fan material to fill in erosion bites and minimise risk of river overflowing onto terraces.	Moderate	$ 15,000.00	Work scheduled/underway	Apr-23
KAK08	Waitaki	River	Kakanui	Erosion	River true right bank erosion needs bite filled.	Moderate	TBC	Investigation	Apr-23
KAK09	Waitaki	River	Kakanui	Channel management	Robb Crossing gravel beach. Gravel management required. Accumulation of gravel, ongoing issue in this area but exacerbated by event.	Moderate	TBC	Investigation	Apr-24
KAK10	Waitaki	River	Kakanui	Channel management	Confluence of Kakanui and Kauru rivers. Bank blowout on true right bend has caused river to enter and old channel bed, split flows and creating an island.	Moderate	TBC	Investigation	Apr-24
KAK11	Waitaki	River	Kakanui	Channel management	Johnstons bend at Frenches Rd, erosion and gravel accumulation.	Urgent	$ 30,000.00	Work scheduled/underway	Nov-23
KAU01	Waitaki	River	Kauru River	Erosion	True left bank upstream of Kakanui Valley Rd bridge, erosion bite exacerbated by flood events.	Moderate	$ 500,000.00	Investigation	Apr-24
MAN01	Central Otago	River	Dunstan Creek	Erosion	Dunstan Creek at Docherty's - bank erosion	Moderate		Work completed	Apr-23
MAN02	Central Otago	River	Woolshed Creek	Erosion	Woolshed Creek - bank erosion	Moderate	TBC	Investigation	Apr-23
MAN03	Central Otago	River	Dunstan Creek	Erosion	Dunstan Creek - bank erosion	Moderate	$ 10,000.00	Investigation	Apr-23
MAN04	Central Otago	River	Manuherikia River	Erosion	Manuherikia - bank repair	Moderate	TBC	Investigation	Apr-23
MAN05	Central Otago	River	Manuherikia River	Debris	Removing debris from fairway	Moderate		Work completed	Nov-22
MAN06	Central Otago	River	Manuherikia River	Erosion	Fisher Lane - bank rebuild	Moderate	$ 30,000.00	Investigation	Apr-23
MAN07	Central Otago	River	Manuherikia River	Channel management	Manuherikia at Vercoe's - bank rebuild and gravel realignment	Moderate	TBC	Work completed	Sep-22
MAN08	Central Otago	River	Manuherikia River	Channel management	Manuherekia - Channel alignment upstream of St Bathans Rd bridge.	Moderate	$ 10,000.00	Investigation	Apr-23
MAN09	Central Otago	River	Hills Creek	Debris	Hills Creek - Remove willows obstructing channel	Moderate	$ 15,000.00	Investigation	Apr-23
SHA01	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA02	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA03	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA04	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA05	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA06	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA07	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA08	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent	$ 2,000.00	Work scheduled/underway	Jan-23
SHA09	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA10	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA11	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA12	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA13	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA14	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA15	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA16	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA17	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA18	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
SHA19	Waitaki	River	Shag River	Debris	Tree debris to be removed.	Urgent		Work completed	Jan-23
T1	Clutha	River	Tokomairiro River	Erosion	Erosion to approx 80m of bank, 200m downstream of Coal Gully rd bridge, true right	Moderate	$ 100,000.00	Monitoring	Mar-23
T2	Clutha	River	Tokomairiro River West Branch	Erosion	Erosion to approx 20m of bank, 300m upstream from SH1 bridge	Low	$ 10,000.00	Monitoring	Mar-23
WAI01	Waitaki	River	Waikoura Floodway	Erosion	Erosion. Channel need re-centering and bank batter reprofiled. Channel dries out in summer and best time to do works.	Moderate	$ 60,000.00	Investigation	Apr-24
WAN01	Wanaka	River	Cardrona River	Erosion	Cardrona River at The Larches, 2 sections of repair.	Moderate		Work completed	Apr-23
WAN02	Wanaka	River	Lindis River	Erosion	Lindis - Downstream of Ardgour Rd bridge.	Moderate	$ 10,000.00	Investigation	Apr-23
WAN03	Central Otago	River	Lindis River	Debris	Fallen trees	Urgent		Work completed	Oct-22
WAN04	Central Otago	River	Lindis River	Debris	Fallen trees	Urgent		Work completed	Oct-22
					Value of completed works (actuals)		**$ 67,000.00**		
					Total		**$ 939,000.00**		

Appendix 5: RIVER MANAGEMENT LEVEL OF SERVICE REPORTING

SCHEME AND RIVER OVERVIEW

Scheme Overview

[1] ORC's flood protection schemes provide flood protection to reduce flood risk for approximately 27,300ha of land.

[2] The Lower Clutha Flood Protection and Drainage Scheme protects approximately 9,300 ha of agricultural land on the Clutha delta, the townships of Balclutha and Kaitangata and State Highway One from flooding (see Appendix 3 for detail).

[3] The Lower Taieri Flood Protection Scheme protects approximately 18,000 ha of high value agricultural land and industrial land including the townships of Mosgiel and Outram and Dunedin International Airport (See Appendix 3 for detail).

[4] ORC's flood protection schemes provide flood protection to reduce flood risk for approximately 27,300ha of land. This includes approximately 18,000ha on the Taieri and 9,300ha in the Lower Clutha. Overall, the schemes performed to expected levels of service in the 2019/20 flood events, however some assets were damaged and require repair. Until flood damage repairs are completed, there remains a residual risk of breach of the flood defences, particularly in areas where damage has been sustained or the integrity of floodbanks compromised.

[5] Refer to Appendix 3 for maps and details of the Lower Taieri Flood Protection Scheme and the Lower Clutha Flood Protection and Drainage Scheme, including flood flow records.

River Management Overview

[6] Otago has an extensive and diverse network of rivers, extending from the rivers to the sea. Many of the rivers are characterised by high rates of sediment supply and mobile beds. Some of the rivers are still responding to the effects of historical activities such as 19th Century alluvial gold mining, construction of hydroelectric dams, channel realignment and commercial gravel extraction.

[7] ORC has a river management function which is based on the district boundaries and rated accordingly within those districts across all parts of Otago (Figure 1).

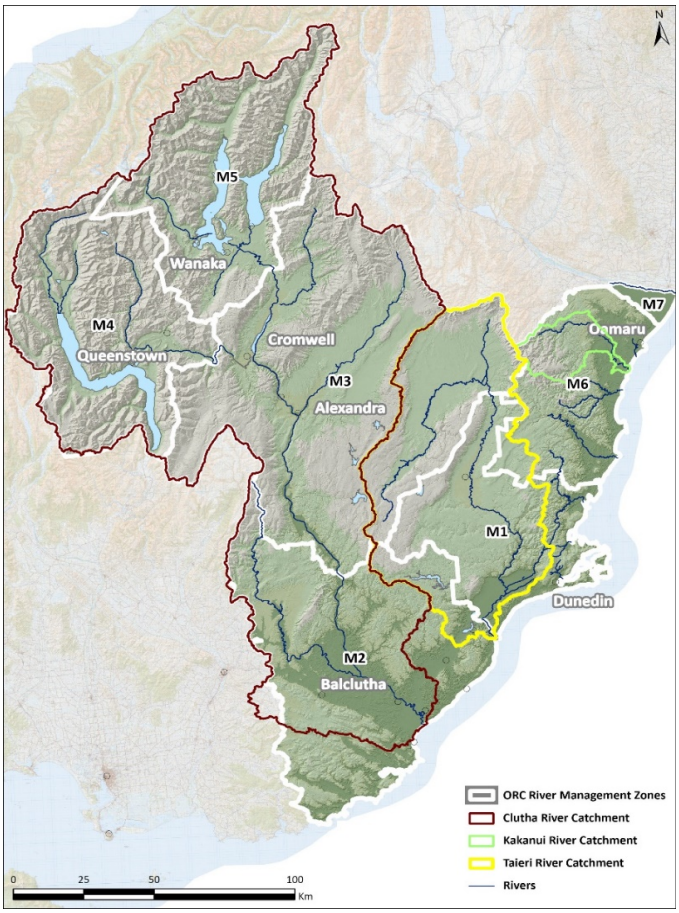


Figure 1: Map of ORC's River Management (M) Rating Districts of some of the rivers across Otago where river management activities are undertaken.

[8] Typical river management work types that are programmed annually include the following:

- On foot Inspections
- Aerial Inspections
- Asset Inspections
- Mechanical cleaning
- Gravel re-distribution
- Erosion management
- Willow removal and trimming
- Vegetation removal
- Spraying (aerial and ground)
- Asset (i.e., rock groynes, training lines) repairs

[9] The planning cycle for river management activities is shown in Figure 2.

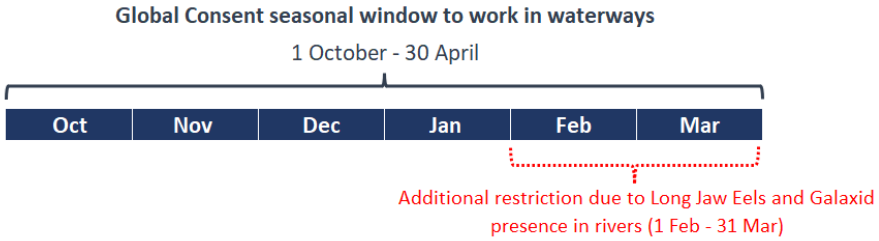


Figure 2: Summary of River Management 'Year', when working in waterways can occur annually.

[10] The delivery of planned river management activities is dependent on factors which include:

a. Weather/seasonal variations.
b. River levels.
c. Land access.
d. Stakeholder approvals.
e. Internal and external resources.
f. Unplanned activities from customer queries.
g. Flood events.
h. Other restrictions (e.g., Covid-19).

RIVER MANAGEMENT LEVEL OF SERVICE REPORTING

[11] The Level of Service Statement for the River Management activity is "Maintain channel capacity and stability, while balancing environmental outcomes and recognising mana whenua values in rivers" (ORC Long-Term Plan 2021-2031). Figure 3 shows the performance measures and targets defined within this Level of Service Statement.

PERFORMANCE MEASURES	BASELINE RESULTS	2021/22 TARGET	2022/23 TARGET	2023/24 TARGET	2024-31 TARGET
Percentage of identified and reported issues that have been investigated and appropriate action determined and communicated to affected landholders within 20 working days	*2019-20: 100%*	100%	100%	100%	100%
Percentage of planned maintenance actions achieved each year	*New measure*	≥90%	≥90%	≥90%	≥90%

Figure 3: Performance measures and targets as defined in the ORC Long-term Plan 2021-2031.

[12] Performance to the end of Quarter 2 for financial year 2022/23, in relation to communicating back to affected landowners on identified and reported issues within 20 working days, is summarised in Figure 4 below. 100% (63 out of 63) of identified and reported issues have been investigated and the appropriate action determined and communicated back to affected landowners within 20 working days. The average response time in relation to these queries was less than five working days.

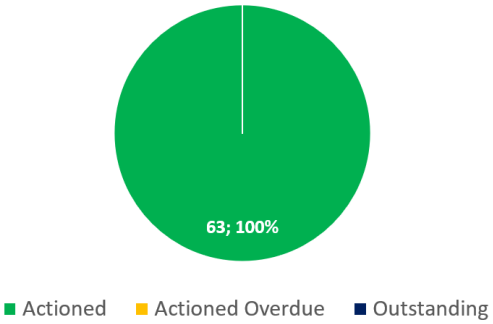


Figure 4: Status of performance to end of Quarter 2 FY 2022/23 for Performance Measure; Percentage of identified and reported issues that have been investigated and appropriate action determined and communicated back to affected landowners within 20 working days. Outstanding queries were yet to be responded to but were still within the KPI timeframe for a response to be provided.

[13] Performance to end of Quarter 2 for financial year 2022/23, in relation to percentage of planned maintenance actions achieved, is summarised is Figure 5 below. 38% of the river engineering programme (270 out of 710 jobs) has been completed to the end of Quarter 2.

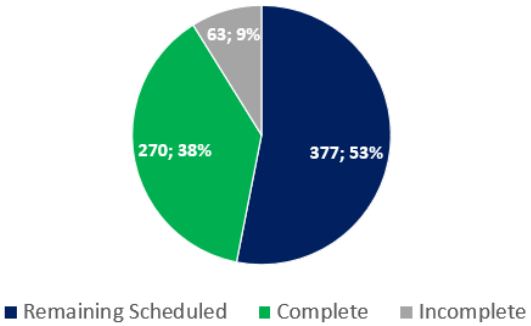


Figure 5: Status of performance to end of Quarter 4 FY 2021/22 for Performance Measure: Percentage of planned maintenance actions achieved each year.

[14] The 2022/23 work programme has been developed, with inspections through winter and helicopter inspections assisting in finalising this work programme. Ongoing inspections and investigations into customer queries also add to the programme throughout the year. This work programme has not been shown on ORC's website.

6.2. Civil Defence Emergency Management (CDEM) quarterly update

Prepared for:	Safety and Resilience Comm
Report No.	OPS2263
Activity:	Governance Report
Author:	Matt Alley – Manager, Emergency Management Otago
Endorsed by:	Gavin Palmer, General Manager Operations
Date:	23 February 2023

PURPOSE

[1] To explain the CDEM (Civil Defence Emergency Management) framework and how the ORC fits into that and to provide a summary of CDEM group activity across the group's three areas of focus: Managing risk, Effective response to and Recovering from Emergencies, and Enabling, Empowering and Supporting Community Resilience.

EXECUTIVE SUMMARY

[2] This report defines the legislative context of CDEM in New Zealand, CDEM arrangements in Otago and the ORC's responsibilities both as member of the CDEM Group and Administering Authority. An update is provided on projects and matters that may impact both financially and with workplan delivery.

RECOMMENDATION

That the Committee:

1) ***Notes*** *this report.*
2) ***Notes*** *the updates in relation to the Alpine Fault Project (AF8), TRIFECTA, Catastrophic event planning (CAT Plan)*

BACKGROUND

[3] Emergency Management Otago was formed in 2016 as a shared service entity to meet Otago's responsibilities under the CDEM Act 2002.

[4] Every region in New Zealand is required to have a CDEM Group. The 'Group' is defined as a Joint Standing Committee with elected representatives from each territorial local authority in the region. These representatives have joint and individual responsibility for CDEM activity in their region.

[5] The Otago Regional Council has two formalised roles within this arrangement, the first being as a member of the group: meeting their individual and collective responsibility under the Act i.e., the provision of a suitable facility ECC (Emergency Coordination Centre) to coordinate a regional response, with sufficiently trained and capable people to staff it. The second being the ORC's role as the administering authority i.e., funding the activity, employment of CDEM staff and provision of equipment and administrative support.

[6] To date the ECC has activated (or should have activated) 15 times in the last 12 years. In most instances this was to support or coordinate local states of emergency. In 2020 the emergency coordination centre was activated following a national declared state of emergency for the COVID 19 pandemic.

Month / year	District(s)	Event	Activation / declaration	Emergency Coordination Centre Activated / should have / not required
July 2022	Coastal TAs	Flooding	EOC Activated	Activated
July 2022	Dunedin	Flooding	EOC Activated	Activated
July 2022	Waitaki	Flooding	EOC Activated	Activated
Jan 2021	Dunedin	Flooding	EOC Activated	Should have
Dec 2020	QLDC / CODC	Flooding	EOC Partial activation	Should have
March 2020	All	COVID	EOCs Activated National declaration	Activated
Feb 2020	Dunedin / Clutha / QLDC	Flooding	EOCs Activated	Activated
Sep 2019	Dunedin	Fire - evacuations	EOC Activated	not required
Nov 2018	Dunedin / Clutha	Flooding – Taieri	EOC Activated	Should have
Feb 2018	Dunedin / Waitaki / Central	Flooding – ex TC 'Fehi'	Declaration	Activated
Jan 2018	Dunedin	Fire - evacuations	EOC Activated	not required
Aug 2017	Dunedin	Water contamination	EOC Activated	not required
July 2017	Dunedin / Clutha / CODC	Flooding	Declaration	Activated
Apr 2017	Dunedin	Heavy rain warning	EOC Activated	not required
Nov 2016	All coastal TAs	Tsunami	Declaration (Dunedin)	Should have (Group Controller in DCC EOC)
June 2015	Dunedin	Flooding	EOC Activated	Should have
May 2011	Dunedin	Tsunami (Japan earthquake)	Partial activation	Should have
May 2010	Dunedin	Flooding / landslips	EOC Activated	Should have

Table 1 – Otago Emergency Activations

[7] The CDEM team have a legislative responsibility to two external committees in Otago, the Coordinating Executive Group (CEG), which consists of all Otago council Chief Executives as well as ranking officers from Fire and Emergency NZ, Police, St Johns, Tu Whatu Ora – Southern, Ministry of Social Development and Mana Whenua. This committee is currently chaired by Steve Hill (CE Clutha DC). The CDEM Joint Committee (JC) comprises of all of Otago's Mayors, the Chair of the Regional Council and Mana Whenua. This committee is currently chaired by Cr Gretchen Robertson. Table 1 below shows committee structure including the reporting, direction, and advice / support pathways.

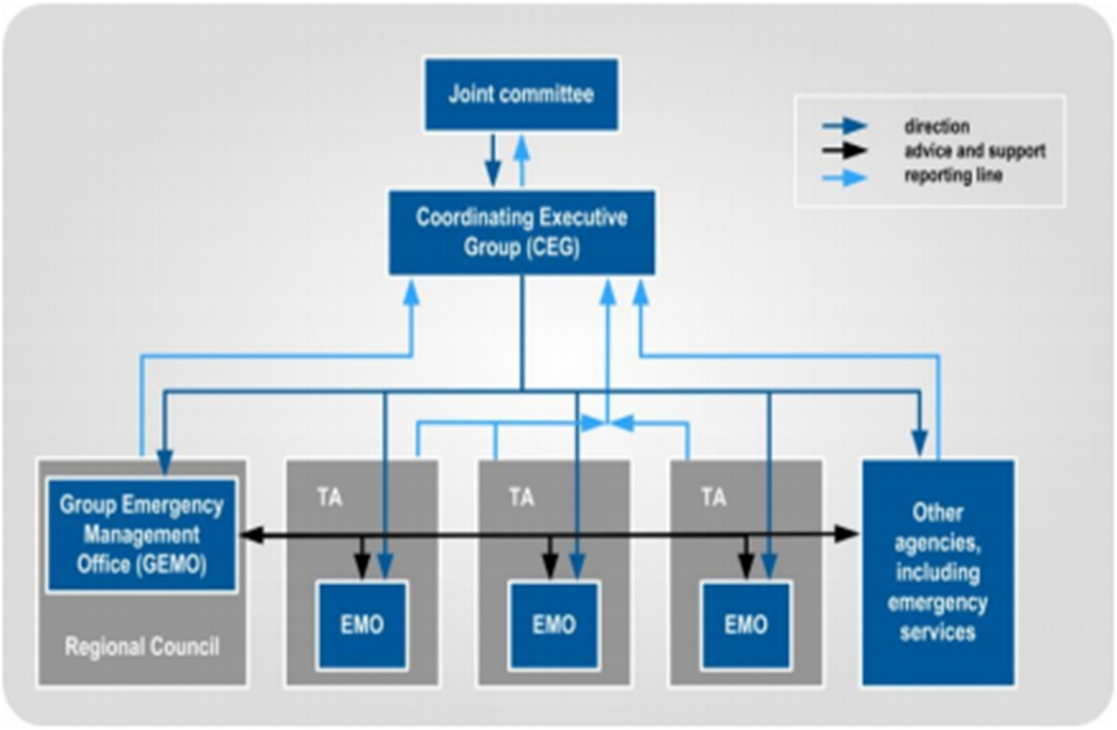


Figure 1 – CDEM Committee Structure

[8] CDEM activity for Otago is defined in the Group Plan, a long-term planning document that spans ten years with a formal review required after 5 years. The plan is due for review in August 2024.

[9] CDEM responsibilities and activities are nationally defined by the CDEM Act 2002, The National CDEM Plan 2015, National Emergency Management Agency (NEMA) Directors Guidelines (DGL) and the National Disaster Resilience Strategy (NDRS).

[10] Last year (2022) Council passed a motion reaffirming support for the partnership arrangement. This was supported by Central Otago District Council, Clutha District Council, Queenstown-Lakes District Council and Waitaki District Council who also passed motions within their respective councils reaffirming support of the current arrangement.

DISCUSSION

[11] The Otago CDEM Group Plan 2018-28 defines seven (7) objectives as a focus for activity:

1. Establish the priorities for coordinated risk management and improvements in resilience in Otago
2. Improve people's knowledge of the region's vulnerability to hazards
3. Collaboratively plan and implement reduction and or mitigation measures for risk priorities
4. In partnership with local councils support and assist communities with emergency planning
5. Collaboratively develop plans for emergencies
6. Identify and apply lessons from events outside and within Otago
7. Through governance, cooperation, coordination, and resource provision provide for adequate capability and capacity

[12] Activity / objectives have been categorised into three broader areas of work as defined in the NDRS. Updates for discussion have been grouped into these areas.

Managing Risk

[13] We have commenced a 4-month pilot (Resilient Otago) with Otago Access Radio (OAR) where we discuss the various aspects of emergency preparedness for 30 minutes once a month. The Manager Emergency Management Otago started the ball rolling with our first interview explaining who we are and what we do. The next 3 interviews will cover hazard awareness, community resilience and Iwi Māori in Emergency Management. A decision will be made at the completion of the pilot as to whether this project can be sustained.

[14] The Emergency Managment Team continue to work collectively with the ORC Natural Hazards Unit often working collaboratively across projects and within the community and stakeholders. Current examples include Glenorchy, Gibbston Valley and Outram.

[15] Efforts continue to build our profile by maintaining our digital presence via our website and on social media, with over 12,000 people following us on Facebook, we are aiming to grow this presence by 10% this year.

[16] This year we have also sought to re-invigorate our Lifelines programme with the employment of a Program Lead on a 12-month fixed term contract. 'Lifelines' is a term defined in the CDEM Act and is the broader title given to critical infrastructure owners / suppliers. These organisations are required by legislation to participate in this group. Flood protection infrastructure is not included in the current definition of "lifelines".

[17] The purpose of this group is twofold. The first is to ensure standard operating procedures are created and tested to ensure seamless communication during any emergency. The second is to work collaboratively with other stakeholders to identify frailties within their infrastructure and take active steps to resolve these.

[18] The Lifelines Programme lead will focus their energy in two key areas initially. Ensure the sector is well connected and engaged and to undertake a 'Priority Routes' project.

[19] The Priority Routes Project will focus on identifying key locations and understanding the resilience of these structures. Once these have been mapped, we will overlay hazard data to understand the exposure of the locations and the routes that allow access. Workshops will be held with location owners to work through the ramifications of any fragility that is uncovered. This is a part of a larger project that is running South Island wide under the auspices of the Alpine Fault (AF8) project (discussed later in this report).

[20] Work is underway to finalise a Community Education strategy that will fit within a broader resilience strategy. We are planning to have this before CEG in June 2023.

Effective Response to and Recovery from Emergencies

[21] Roles and responsibilities in an emergency response are clearly defined within national CDEM structure. As defined in Figure 2 below the ORC is responsible for regional coordination whilst councils are responsible for matters at an incident and operational level. Emergency Management Otago staff act as a common thread between these various levels both in leadership roles within the ECC and provide subject matter

expertise within district Emergency Operations Centres (EOC's) and Incident Control Points (ICP's).

Figure 2: National Response Structure

[22] ICP's are based at a community level and are a location where professional responders can come together to manage the work on the ground. EOC's are based at a district level and own the operational response to that district, across multiple ICP's depending on the scale of the event.

[23] The ECC has several responsibilities when activated, which include, monitoring EOC's when activated to ensure they have all available assistance required. Acting as a portal to Central Government to communicate the scale and impact of any event in our region and escalate with central agencies' if required. If multiple EOC's are activated, it is the ECC's responsibility to manage critical resources between the EOC's (Emergency Operations Centres) and when necessary direct local responses in a direction that supports regional benefit.

[24] In terms of the ORC facility, (within the annex building at Stafford Street). We have found the building to be of sound structure with suitable alternative communication capability. We can plug in a generator to meet our power needs in an outage; however, one would need to be sourced off site and installed meaning any coordination from our facility would be stalled during any event involving a power outage.

[25] Following a significant seismic event our water and wastewater needs would need to be met via a tanked external supply and the use of 'Porta Loos.'

[26] Our current ECC has been outfitted with 15 monitors that provide live feeds from all Otago Councils, key stakeholders, and national agencies. The room is configured operationally to enable instant activation. Having this equipment preconfigured and ready to go is crucial in providing situational awareness and reduces the lead in time required when responding to a sudden impact event.

[27] The room has been configured to be able to meet the broader operational needs of ORC. As an example, Photograph 1 below depicts an oil spill exercise that the Harbour Master ran from the ECC in January 2023.

Photograph 1 – Oil Spill Exercise January 2023

[28] Previously the ORC's ability to fulfil its role as a coordinator has been significantly hampered by not having a fit for purpose facility, with emergency management staff having to coordinate events from their desks in a shared office environment. This has proved disruptive to both the EM (Emergency Management) professionals and the ORC staff undertaking their business-as-usual responsibilities.

[29] A second solution has also been trialled with emergency management staff utilising a large meeting room and configuring it post activation. This was the case for the COVID event and proved to have a significant impact on our response initially.

[30] A third solution has also been trialled during the 2017 floods where the ECC was collocated with the Dunedin EOC, this created operational confusion with two response structures in the same space and led to several poor response outcomes.

[31] We continue to deliver on our training and capability framework. The Figure 3 shows levels of trained staff across all six councils (as of February 2023). Recommended staffing levels are suggested to support any facility to run 24hrs a day for three days (until surge support arrives).

[32] We are reliant on these council staff to provide the bulk of the resource when responding to any event.

[33] Like all other CDEM groups and response organisations EM (Emergency Management) Otago utilise the Coordinated Incident Management System (CIMS). Within this framework there are three clearly defined hierarchical layers within any coordination centre, team member, function lead and controller. We have aligned our training pathway to match this framework.

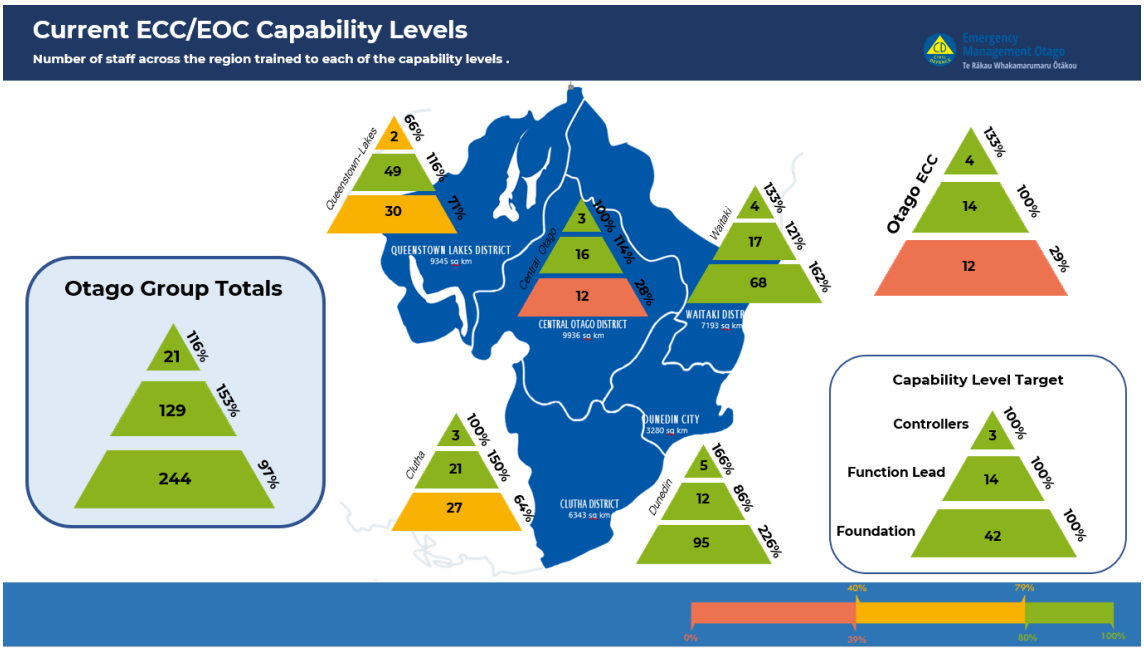


Figure 3 – Regional Response Staff Capability – Feb 2023

[34] Although as a collective we are well placed in terms of trained and available staff there are some areas that are not meeting the recommended capability levels. Foundation staff in the ECC are running at 29% capacity, due to staff turnover. Replacement staff have been identified and training is planned to rectify this.

[35] A regional approach to training and capability has benefited Otago by creating a large cadre of trained and available staff who are all conversant with the same systems. This now creates a deployable resource across council boundaries.

[36] Recent years have seen EM Otago staff deployed into Nelson Tasman (wildfire), West Coast (numerous floods), Canterbury (floods), Southland (floods) and most recently Auckland (floods).

[37] Work has also been completed this quarter on refining our regional registration and needs assessment tool. CDEM has the responsibility to register the needs of all people in an emergency (that require rapid relief), assess those needs and either refer them to an appropriate agency or meet the needs in the areas we are mandated to deliver (household goods and services and/or emergency shelter). Figure 4 depicts the needs registration dashboard and figure 5 depicts our regional assessment dashboard.

[38] These tools enable all Otago councils to work together seamlessly whilst giving the CDEM group the ability to understand the size and scale of any regional need.

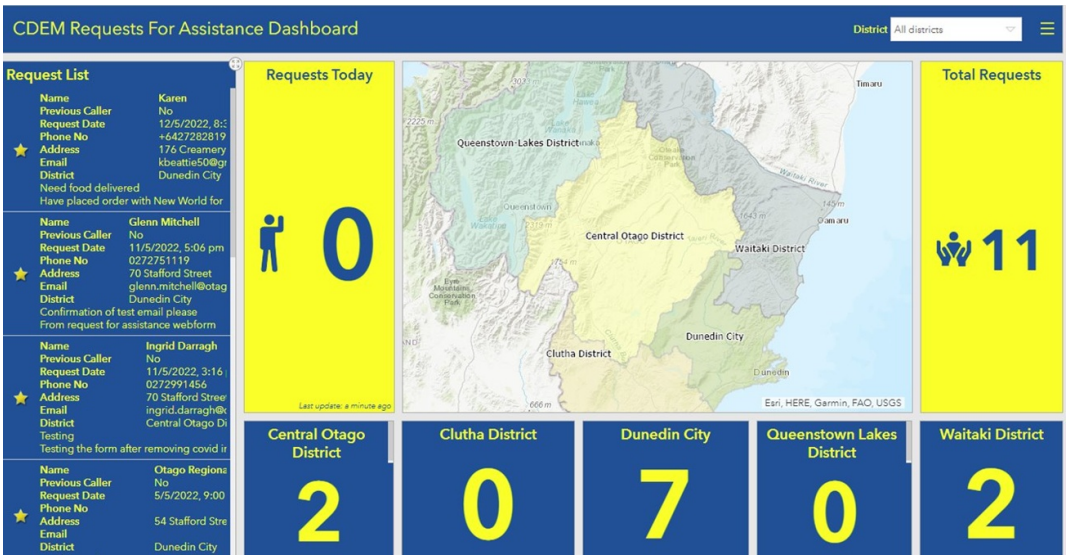


Figure 4 – Registration Dashboard

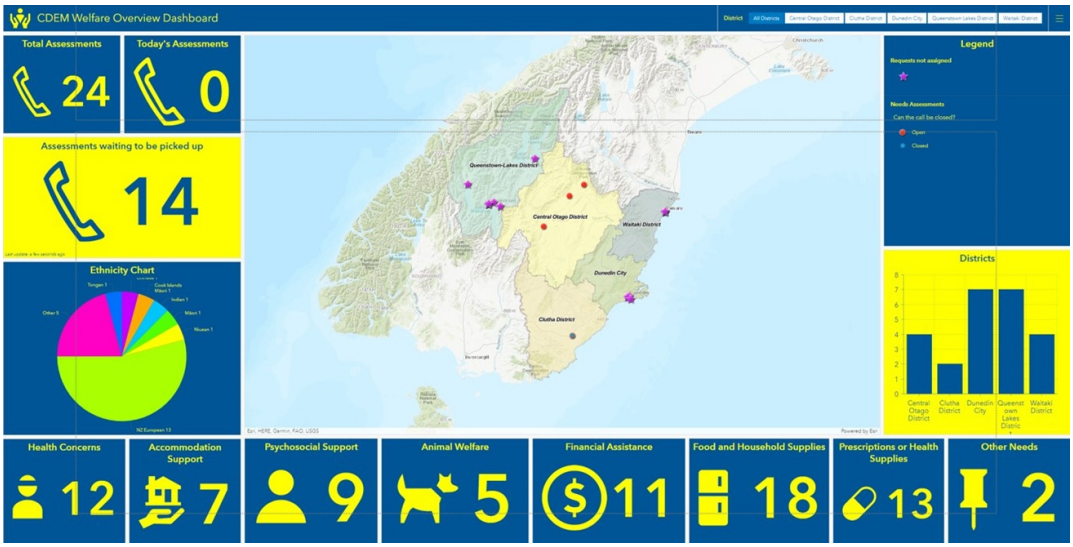


Figure 5 – Registration / Needs Assessment Dashboard

[39] The needs assessment capability was tested during a welfare outreach exercise in December 2022 in concert with our 'Covertex' Shelters (Emergency Habitation Shelters).

[40] We have two of these shelters, one housed inland (Alexandra) and the other on the coast (Taieri Depot). The shelters were gifted to us by NEMA following a resilience fund grant. ORC has constructed two trailers to enable rapid deployment of these resources. The pictures below were taken during the exercise in Alexandra in December.

[41] Once fully developed these will be a completely self-sufficient resource to be used as an incident control point, civil defence centre for a welfare outreach or an emergency shelter, with tested contingencies around power and communication.

Photograph 2 – Covertex Exercise, Pioneer Park – December 2022

Photograph 3 - Covertex exercise, Pioneer Park, Alexandra – December 2022

Enabling, Empowering and Supporting Community Resilience

[42] Work within the community response group (CRG) space continues to account for a sizeable portion of our time and effort. We have spent this quarter embedding our new engagement framework.

[43] This activity has seen a redesign of our process of engagement and supporting documents, to drive a regionally consistent approach. The new process will see all communities that wish to engage with us furnished with a Resilience Guide, depicting the hazardscape particular to their community. An Emergency Hub Guide will define how they could come together and some recommendations around roles and responsibilities. A Response Plan will recommend what they could be doing depending on what hazard communities are facing.

[44] In addition, we have developed a training package that will support this process including the use of VHF (Very High Frequency) radios and the recording and communication of critical communication in an emergency.

[45] At present we are working with around 60 of these groups. Some are more active than others.

[46] Final additions are being put on a Business Continuity Planning (BCP) roadshow that is planned for the 27th – 31st March. In partnership with Resilient Organisation NZ, we will be delivering a workshop in every council district during this time. The workshop attendees will consist of Lifeline services e.g., Service Stations, Supermarkets and Pharmacies.

[47] A second roadshow is being considered for next year with a focus on a different sector group.

EXTERNAL PROJECTS

Alpine Fault Project (AF8)

[48] The Alpine Fault Project was founded seven years ago following a national resilience fund application. Its purpose is to consolidate known science information on the fault, to overlay this on built environment information and develop a framework as to how we would respond to such an event.

[49] Initially funded for three years during which time the 'SAFER' (South Island Alpine Fault Response) Framework was created.

[50] Emergency Managment Otago has been a financial contributor and steering group member of this project since its creation seven years ago. This contribution is around $20,000 per year. Our contribution is likely to increase due to current inflationary pressures.

[51] The project as it exists today has three strategic focus areas.

- Raising Awareness
- Coordinating Intelligence
- Network and collaboration.

[52] Latest peer reviewed science released on the fault indicates a 75% probability of an earthquake occurring in the next 50 years, with a 4 out of 5 chance it will be a magnitude 8+ event.

[53]

[54] COVID has provided some barriers over the last couple of years particularly in raising AF8 awareness. Table 2 below defines engagement and attendance levels for years 1 – 6 of the projects as well as the activity to year 7 in isolation. A new roadshow is planned for this quarter with school and community presentations in Cromwell, Oamaru, and Balclutha.

	Year 1 to date (July 2016 – Sept 2022)	Year 7 (July 2022 – Sept 2022)
Number of events	339	6
Total Audience numbers	20,176	215
Average reception rating	4.7/5	4.8/5

Table 2 – AF8 Roadshow Engagement and Attendance

TRIFECTA

[55] TRIFECTA represents a national body of work that looks to replace or amend the CDEM Act 2002, the National CDEM Plan 2015 and a roadmap for delivering on the National

Disaster Resilience Strategy. As mentioned earlier these are the three documents that define how we deliver CDEM in NZ.

[56] A new CDEM Act has been drafted with sector input over the last 18 months. This is due before Select Committee in the next month. The new legislation deals with changes in four areas.

- The role of Iwi / Māori in Emergency Management
- Responsibilities of Critical Infrastructure Owners / Providers
- Roles and responsibilities of local vs regional government
- A focus on disproportionately impacted communities.

[57] The proposed legislation will not be available to review until the Bill is before the Select Committee. There is a degree of confidence that CDEM Otago is well placed in the role of Iwi / Māori in Emergency Management.

[58] A significant departure is not anticipated from the roles and responsibilities we have already defined in our partnership arrangements, if anything we are slightly ahead of this legislative change as we are well placed with what has been signalled to date.

[59] The last two areas are an unknown and may have some impact on us. There may be a requirement on the CDEM group to perform an auditing function over Critical Infrastructure providers / owners, particularly if there is mandatory reporting on emergency plans etc.

[60] Finally, 'Disproportionately Impacted Communities' is an area where we spend a significant amount of time presently. However, how these groups will be defined and the requirements on us in relation to them is an unknown.

[61] Work will commence this quarter with all councils and stakeholders to complete a consolidated submission from the group on the proposed legislation.

[62] The past two months have seen a shift in focus nationally away from the two remaining areas of the TRIFECTA with renewed focus on 'Catastrophic Event Planning' (CAT Plan). There is no further detail on the remaining TRIFECTA areas currently.

Catastrophic Event Planning (CAT Plan)

[63] In December 2022 NEMA received a directive from the Department of Prime Minister and Cabinet (DPMC), to develop a focussed all of government workstream on two significant threats facing the country. The Hikurangi subduction zone being the first and the Alpine Fault Earthquake being the second.

[64] These work streams will be dealt with in a phased approach with national bodies agreeing their roles and responsibilities first (via a 5-day national workshop), with a view of creating a national response plan. The second phase will involve how that plan is regionalised. The third phase will involve testing the plan with several national and regional exercises. We may be asked to contribute at the first phase and will be fully involved in phases two and three.

[65] Phase one for the Alpine Fault CAT Plan is due to commence in late March with the regionalisation phase expected mid-year.

[66]

CONSIDERATIONS

Strategic Framework and Policy Considerations

[67] There are no policy considerations associated with receiving this report.

Financial Considerations

[68] These have been flagged in the report particularly with an increase our AF8 contribution likely (but not defined).

Significance and Engagement

[69] No matters are arising from this paper.

Legislative and Risk Considerations

[70] ORC operate under the provisions of the CDEM Act 2002.

[71] Changes to this legislation may impact on our annual plan work programme.

Climate Change Considerations

[72] There are no climate change considerations with receiving this report.

Communications Considerations

[73] There are no communications considerations with receiving this report.

[74]

ATTACHMENTS

Nil