

Portfolio	Freshwater Management
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Regional Water Infrastructure Work Programme

The CWMS identifies infrastructure as a means to contribute to all CWMS target areas, not just the supply of water for irrigation and hydro-electricity. Infrastructure can also address future-proofing issues such as ecosystem support in a changing climate and water quality management through enhanced reliability and distribution efficiency.

While the CWMS is a collaborative process involving all councils across Canterbury, infrastructure development is based on cooperation and coordination, while recognising the commercial goals of the parties involved. Infrastructure options are being considered and progressed with a vision for an integrated water infrastructure across Canterbury.

Environment Canterbury's CWMS Infrastructure Team continues to facilitate the development of a regional infrastructure solution that aligns with all the targets of the CWMS and the recommendations in the zone and regional implementation programmes.

Regional Water Infrastructure Work Programme - Annual Summary

To provide updates regarding CWMS infrastructure activities and opportunities.

Node/Zone	Projects	Quarter 1: Update	Quarter 2: Update	Quarter 3: Update	Quarter 4: Update
1. HURUNUI-WAIAU/KAIKOURA	1) Amuri Irrigation Corporation (AIC). 2) Emu Plain (EP) 3) Hurunui Water Project (HWP)	<ul style="list-style-type: none"> Amuri Irrigation Corporation (AIC) considering HWRR Plan Change application for Glenrae (Zone B to Zone C) - on hold until December. Emu Plains Irrigation consent applications to divert, take & discharge are in process (working through technical issues). Hurunui Water Project extended Product Disclosure Statement (PDS) to end of September. Storage consent application in process. Waipara discharge consent application suspended until 23 October to allow for more consultation with Ngāi Tahu/Ngāi Tūāhuriri. 	<ul style="list-style-type: none"> Amuri Irrigation Corporation (AIC) considering HWRR Plan Change application for Glenrae (Zone B to Zone C) - on hold until December. Emu Plains Irrigation consent applications to divert, take & discharge are in process (proponents are currently providing additional analysis of water quality effects). Hurunui Water Project shareholders have voted unanimously to sell their project consents to Amuri Irrigation Company (AIC). AIC is working through this process. The project's Waipara discharge consent application was heard on 23/24 October; the decision timeframe is unknown. 	<ul style="list-style-type: none"> Amuri Irrigation Corporation (AIC) pipeline project completed. Potential HWRR Plan Change application for Glenrae (Zone B to Zone C) now considered very unlikely in the near future, though could still feature in 2022 plan review considerations. Emu Plains Irrigation consent applications to divert, take & discharge are in process. Proponents currently providing additional analysis of water quality effects. Hurunui Water Project shareholders have voted unanimously to sell the project consents to AIC. AIC working through process, with a take-over proposal for HWP and AIC shareholders expected mid-March. 	<ul style="list-style-type: none"> Amuri Irrigation Corporation (AIC) - considering additional groundwater nutrient management options such as Managed Aquifer Recharge. Emu Plains Irrigation consent applications to divert, take & discharge are in process. Proponents still working on mitigations for water quality effects. Hurunui Water Project - AIC take-over proposal approved by HWP and AIC.
2. WAIMAKARIRI	4) Waimakariri Irrigation limited (WIL)	<ul style="list-style-type: none"> Waimakariri Irrigation Ltd: Wrights Road storage – Environment Court completed 19 June 2018. Awaiting decision. 	<ul style="list-style-type: none"> Waimakariri Irrigation Ltd: Wrights Road storage – Environment Court completed 19 June 2018. Awaiting decision. Targeted Stream Augmentation and Permeable Reactive Barrier trials are underway in the Silverstream/Kaiapoi River catchment. 	<ul style="list-style-type: none"> Waimakariri Irrigation: Wrights Road storage – awaiting Environment Court decision. Targeted Stream Augmentation and Permeable Reactive Barrier trials are underway (with promising initial results) in the Silverstream/Kaiapoi River catchment. 	<ul style="list-style-type: none"> Waimakariri Irrigation Ltd: Wrights Road storage - interim decision indicates consent will be granted if additional requirements are included in consent conditions. Updated documentation provided as requested. Targeted Stream Augmentation and Permeable Reactive Barrier trials are underway in the Silverstream/Kaiapoi River catchment - promising early results.
3. SELWYN-WAIHORA	5) Central Plains Water (CPW) 6) Targeted Stream Augmentation (TSA) 7) Near River Recharge (NRR) 8) Electric Fish Barrier	<ul style="list-style-type: none"> CPW: Sheffield Scheme up and running. Stage 2+ partly operational while completing commissioning. The Broadacres TSA project: Final habitat enhancements awaiting spring to dry naturally. Mudfish ready for transfer once habitat enhancements are complete. Selwyn/Waikirikiriri Near River Recharge project: <ul style="list-style-type: none"> Stage 1 Off-take construction complete. Initial plantation valuation complete. Land valued at \$185,000 (36.7 ha) and tree Net Present Value at \$170,000 (27.0 ha woodlot). Current Emissions Trading Scheme (ETS) value of \$187,000. Initial recommendation (David Owen) is to not purchase ETS credits. Vendor currently undertaking their own valuations. Engineering design and costs ready for Council confirmation (as per Section 9, Work 	<ul style="list-style-type: none"> CPW: Sheffield and Stage 2+ schemes are now operational. Additional remedial work next winter (Downers). The Broadacres TSA project: Final habitat enhancements awaiting spring to dry naturally. Mudfish ready for transfer once habitat enhancements are complete. Selwyn/Waikirikiriri Near River Recharge project: <ul style="list-style-type: none"> Stage 1 Off-take construction complete. Phase 2 Engineering costs and additional land purchase funding approved by Council on 8 November. Final land valuation assessment received and accepted on 21 November. Sale and Purchase documentation now being finalised. Te Taumutu Kaitiakitanga Portfolio have approved the proposed native planting concept and contractor. Consenting processes on-going. 	<ul style="list-style-type: none"> CPW: Stage 2+ scheme - additional remedial work required winter 2019. The Broadacres TSA project: habitat enhancement being finalised as spring nearly dry. Mudfish ready for transfer once habitat enhancements are complete. Selwyn/Waikirikiriri Near River Recharge project: <ul style="list-style-type: none"> Land purchase – vendors have provided preliminary acceptance of Sale and Purchase documentation, with formal signed offer sent on 11 February. Consenting, construction planning / procurement and background monitoring on-going. Construction underway (11 February) on linked project to install Southern Hemisphere's first electric fish barrier. 	<ul style="list-style-type: none"> Selwyn/Waikirikiriri Near River Recharge project: Land purchased and cleared. Large mechanical components ordered. Construction contracting and land use consents nearly complete. Site blessing on 1 July. Haldon Springs Electric Fish Barrier: Project opened on 7 June. Final site works and certification still to be completed. Broadacres TSA: Temporary weir emplacement approved to enable downstream mudfish release prior to springs drying naturally. Construction and mudfish release planning on-going. The Waikirikiriri/Selwyn River Plan Working Group presented a summary of their draft roadmap proposal to the Selwyn Waihora Zone Committee on 4 June. Water infrastructure projects featured strongly in this roadmap, with additional recommendations including performance monitoring of PC1, managing recreation impacts,

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		<p>Programme), but request on hold until plantation purchase information is ready for discussion at the same time.</p> <ul style="list-style-type: none"> Modelling of effects on local groundwater complete (no effects identified) in response to Stage 1 MoU. Stage 2 MoU in draft form awaiting CPW response. Consent documentation and land sub-division processes on-going. Linked project to install Southern Hemisphere's first electric fish barrier. Currently confirming final design and local contractors. <ul style="list-style-type: none"> Sea level rise and Te Waihora catchment effects: latest sea level rise research (Antarctic contribution in particular) suggests increased rate and magnitude over IPCC 2013 forecast. Sea level effects Te Waihora opening levels and lower catchment groundwater levels. 	<ul style="list-style-type: none"> Linked project to install Southern Hemisphere's first electric fish barrier. Design and contractors confirmed. Consenting processes underway 		<p>and additional research on key nuisance and toxic algae.</p>
4. ASHBURTON ZONE	<p>9) Ashburton Hinds Managed Aquifer Recharge (MAR)</p> <p>10) Rangitata Diversion Race (RDR) Klondyke Storage</p> <p>11) Barrhill Chertsey Irrigation (BCI)</p> <p>12) Ashburton Zone Committee (AZC)</p>	<ul style="list-style-type: none"> Ashburton-Hinds Managed Aquifer Recharge (MAR) project (see attached presentation): <ul style="list-style-type: none"> Year 2 reporting now available: www.ecan.govt.nz/Hinds-MAR (Outreach tab) Construction underway or complete at 14 new small-scale infiltration sites, with testing complete on first 6. South Hinds Near River Recharge (now called Hekeao/Hinds River Project) preparing for opening/planting/blessing day on 23 September. The clean water plume from the Lagmhor Pilot site has continued to advance and can be identified close to the southern Tinwald springs. A new deep soakage system has recently been installed to increase recharge rates. RDRML consents (Klondyke storage, high-flow take, fish screen) appealed. ADC have circulated a draft Surface Water Strategy for feedback. 	<ul style="list-style-type: none"> Ashburton-Hinds Managed Aquifer Recharge (MAR) project <ul style="list-style-type: none"> Deep soakage system installed at Lagmhor pilot site. Recharge rates have increased, with commissioning on-going to fine tune. 10 of the 16 new small-scale infiltration sites are now operational. South Hinds Near River Recharge (now called Hekeao/Hinds River Project) is now operational. Cumulative supply to all sites now reaches the 0.5 m3/s current allocation. 4 m3/s total MAR allocation is expected to be required to meet community objectives. Higher than expected nitrate concentrations have been measured in areas not yet influenced by MAR water. New economic analysis for the MAR Business Case has concluded that on-farm and MAR requirements to meet Plan Change 2 nitrate concentration targets are likely to be more challenging than anticipated. A new funding application to the Provincial Growth Fund is through to the full application round and a new community trust (The Hekeao Hinds Water Enhancement Trust) is being set up to lead this project. New BCI 1.5M m3 storage pond at Akarana became operational on 28 October. RDRML consents (Klondyke storage, high-flow take, fish screen) have been appealed and are in mediation. 	<ul style="list-style-type: none"> Ashburton-Hinds Managed Aquifer Recharge (MAR) project <ul style="list-style-type: none"> Deep soakage system installed at Lagmhor pilot site. Recharge rates have increased (to 150 l/s max thus far), with commissioning on-going to fine tune. 11 of the 16 new small-scale infiltration sites are now tested. Stock water race delivery ceased where E. coli levels are generally unacceptable. Delivery swapping to piped / pond supply or site shut down. Hekeao/Hinds River Project delivery infrastructure has been upgraded / automated. DOC consultants are following up on a potentially unique co-habitation of two skink species at the site. Cumulative supply to all sites now reaches the 0.5 m3/s current allocation. 4 m3/s is expected to be required to meet community objectives. Higher than expected nitrate concentrations have been measured in areas not yet influenced by MAR water. New economic analysis for the MAR Business Case has concluded that on-farm and MAR requirements to meet Plan Change 2 nitrate concentration targets are likely to be more challenging than anticipated. A new funding application to the Provincial Growth Fund is through to the full application round for a 30-month project to conclude feasibility assessments. A new community trust (Hekeao Hinds Water Enhancement Trust) is being set up to lead this project, with final Trust document to be confirmed by MAR Governance Group on 22 February. Amendments to ADC's Water Strategy were confirmed on 19 December 2018, including clarification regarding current and potential use of currently allocated stockwater to MAR/TSA. Field trip from 0900 on 20 March available for ADC Councillors, Ashburton Zone Committee and ECan Councillors. RDRML consents (Klondyke storage, high-flow take, fish screen) in mediation. 	<ul style="list-style-type: none"> Hinds Managed Aquifer Recharge (MAR) project: <ul style="list-style-type: none"> Hekeao Hinds Water Enhancement Trust (HHWET) met for the first time on 31 May. 2018 average nitrate-nitrogen concentration for PC2 wells was 12.4 mg/l. Target by 2035 is 6.9 mg/l. Year 3 concluded with over 6 million m3 of clean water recharged (over 12 sites), up from 1.85 million m3 in Year 2 (just Pilot Site). PGF funding application has been held up but is now moving forward. Positive public meetings in April/May. Kahikatea wetland forest planted at Hinds Recharge site in April. RDRML consents: Appeals resolved for Klondyke storage and fish screen, but not high flow take.
5. SOUTH CANTERBURY	<p>10) OTOB Sub-Regional Plan</p> <p>11) Hunter Downs Water (HDI)</p>	<ul style="list-style-type: none"> OTOB Conceptual Infrastructure Design and Costing study: Project concluded late February 2018. Partial or full replacement of current groundwater consents. Technically feasible supply options and pipeline identified, but none are currently considered financially feasible. Follow up 	<ul style="list-style-type: none"> OTOB "New" water: Awaiting outcomes of OTOB ZIP, Rangitata Irrigation Scheme purchase process (expected to conclude early December) and RDRML consent appeals. RSIS purchase (remaining shares) by shareholders confirmed on 	<ul style="list-style-type: none"> Rangitata South Irrigation Scheme (RSIS) purchased by scheme shareholders in late November 2018. This may potentially provide an alternative supply source for some OTOB groundwater users. On-farm storage is still a strong option for other groundwater users. 	<ul style="list-style-type: none"> Rangitata South Irrigation Scheme (RSIS) now owned by scheme shareholders. OTOB water user meeting on 4 June. Support for lower catchment switch to deep groundwater but importance of integrated rather than individual upper catchment solution.

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	12) Kurow-Duntroon Irrigation Scheme 13) Rangitata South Irrigation Scheme (RSIS)	<p>meetings have taken place with local/regional/national governors, OTOP Zone Committee and local shareholders. Lower catchment alternatives are deep groundwater and local storage of currently consented groundwater. New Temuka consent assessment concluded that the catchment is significantly over allocated. No 'spare' Opuha system water.</p> <ul style="list-style-type: none"> Recent OTOP-related climate research suggests: <ul style="list-style-type: none"> o OTOP has highly variable climate due to geography; o Continued declining snowpack due to temperature rate increasing with elevation; o More regular intense rainfall events and river freshes; o Faster sea level rise than previously thought, with impacts on lower catchment ground/surface water and infrastructure (e.g., Seadown Drain area). Hunter Downs Irrigation scheme progressing despite withdrawal of Crown Irrigation Investments Fund from scheme. PDS issued 10 August 2018. 	<p>27/11. New scheme operator is Downers. Further meetings planned to discuss OTOP options.</p> <ul style="list-style-type: none"> Kurow-Duntroon Irrigation scheme is expecting to start construction early 2019 on an ~18-month construction programme. Hunter Downs Irrigation scheme not progressing following insufficient investor funding. Draft protocol ready for Wainono. 	<ul style="list-style-type: none"> Kurow-Duntroon Irrigation scheme began construction in early 2019 on an ~18-month construction programme. Hunter Downs Water (HDW) scheme will not proceed in its current form due to lack of investor funding. 	<ul style="list-style-type: none"> Kurow-Duntroon Irrigation scheme began an ~18-month construction programme in early 2019.
6. REGION WIDE	14) Fish Screens 15) Funding opportunities 16) Three Waters Review 17) Braided River Flow regimes 18) Climate and weather impacts	<ul style="list-style-type: none"> Fish Screen Working Group in place between multiple organisations to provide information to assist private sector to develop options for non-compliant/ineffective current systems. "Future Food Group" has Provincial Growth Fund application in the queue. Concerns about current low flows and general flow regimes in alpine and lower plains rivers influenced by infrastructure from multiple parties. 	<ul style="list-style-type: none"> Fish Screens - Industry focus assisted by compliance programme and aligned concerns (impact of infrastructure on fisheries) in Otago, Waikato and elsewhere. "Future Food Group" has Provincial Growth Fund application in the queue. Three waters. General theme is the need for "Good Infrastructure Practices". Prioritisation matter for the organisations with the infrastructure to work through with Central Government. CWMS input to all 3 waters coordinated with ECan regulatory and Science groups. Water use efficiency. Ongoing indications that there is a large potential to use water more efficiently in irrigation. Water balance model is being developed by ECan science for the Rakaia to give insights into the flow regime resulting from current infrastructure - diversions, abstractions, storage etc. Wide range of stakeholders concerned about both compliance and "outcomes" related to modified flow regimes in Rakaia and other rivers. 	<ul style="list-style-type: none"> Rakaia Water Balance project underway to understand flow regime in Rakaia. External concerns about flow, biological and geomorphological changes in braided rivers - Rakaia and Rangitata Rivers in particular. Evolution of electricity system may lead to changes flow/level variability in waterbodies with hydroelectric infrastructure. Fish Screen Working Group progressing -. Offer of \$105K to match industry funds for information to complement 2007 guidelines from MPI. Fit for the Future process further reinforcing the need for more rigour in water use practices. Three Waters input over role clarity, need for good practices and non-regulatory/ regulatory coordination. 	<ul style="list-style-type: none"> Climate: <ul style="list-style-type: none"> o Climate update and role of water infrastructure for climate adaptation presented to Selwyn Waihora Zone Committee in March and three Hinds MAR community meetings in April / May. o Timaru District Council and Hurunui District Council providing case studies (Pareora River and Hanmer Springs) for consideration in "Deep South" research challenge on risks that future droughts might pose to our drinking water supply systems. o El Niño Southern Oscillation (ENSO) is returning to neutral conditions following a mild El Niño event. Interdecadal Pacific Oscillation (IPO) may have moved into a positive phase following 20 years in negative phase. Historically, a positive IPO phase means increased El Niño dominance for New Zealand and increased acceleration of global temperature. Fish screening <ul style="list-style-type: none"> o Irrigation NZ is leading an MPI Sustainable Food and Fibre Futures ("SFF") fund supported project concept (\$170K) to provide information to improve Fish Screen practices. This work is coordinated with the active ECan Operations programme via CME and Consents. "Understanding Rakaia/Coleridge flows" processes continuing. <ul style="list-style-type: none"> o Initial data has been acquired from Trustpower and is ready for the next stage of engagement with interested parties. Three waters infrastructure. <ul style="list-style-type: none"> o CWMS activities (infrastructure and Zone) are geared to encourage adoption of "Good Infrastructure Practices" by TA's and coordinated with regulatory ECan activities. Stormwater quality improvement is proving the most progressive including kahikatea wetland forests in CCC stormwater detention basins.

Regional Water Infrastructure – vision for integration

