FLAG FIELD TRIP NOTES: 6TH March 2015

Purpose:	Takaka Freshwater and Land Advisory Group (FLAG)– Meeting 7 Field Trip
Date:	6th March 2015
Time:	8.30am-4.30pm
Present:	**FLAG members:** Graham Ball Greg Anderson Mirka Langford Tony Reilly Mik Symmons Mike Newman Kirsty Joynt Piers MacLaren Matt Rountree Martine Bouillir **Apologies** Margie Little Neil Murray **Staff:** Mary-Anne Baker - Environmental Policy Planner) Glen Stevens (– Resource Scientist) Joseph Thomas (-Resource Scientist - Water & Special Projects) Trevor James (Resource Scientist – Freshwater & Environmental Quality) Clair Webster (Education & Partnerships Officer) Graeme Fox (TDC Technical Officer - Water and Wastewater) **Other Attendees and Presenters** Rochelle Selby-Neal (Independent Facilitator) Andrew Fenemor (Landcare Research) Julian Weir (Aqualinc) Kirsten Forsyth (Ministry for the Environment) Will Gauntlett (Ministry for the Environment) Peter Lilly (Trustpower) Lawson Davey (Fish and Game Council) Thomas Marchant (Fonterra Environmental Team Lead) Mark Manson (Dairy Farmer – East Takaka) Corrigan Sowman (Dairy Farmer –Upper Takaka) Nigel Harwood (Dairy Farmer –Upper Takaka)
Apologies:	Neil Murray Margie Little
Notes taken by:	Mary-Anne Baker (supplemented by presenters and handouts)
Note: records of discussion points have been grouped into similar topics and are not necessarily in the order discussed at the meeting.	
FLAG MEMBERS PLEASE NOTE: If you have any questions or need anything between meetings, then please contact Mary-Anne Baker by email: marya@tasman.govt.nz or by phone ddi 03 543 8486.	

Purpose of Field Trip

Desired outcomes/information sought:

- Understanding dairy farm systems in the catchment, including in relation to
  - water and nutrient management
  - effluent management systems and options
  - different types of irrigation practices
  - riparian management
- Understanding catchment connections: upstream – downstream changes/impacts, water pathways and aquatic ecosystems
- Understanding the Fonterra manufacturing site and how discharges onto land and into water are dealt with.
- Understanding the Takaka wastewater plant operation and current upgrades.

The itinerary for the day in attachment 1.

Stop 1- Fonterra Plant, Motupipi St

Thomas Marchant provided a brief overview of the plant's effluent management system. The product mix at the plant is now limited to bulk milk powder and the wastewater is primarily condensate from this process along with some cleaning products. The wastewater is neutralised before discharge.

Storage capacity for wastewater is 800,000l and ensures irrigation onto neighbouring dairy farms does not occur when soils are too wet. The plant holds an emergency wet weather consent that also allows discharge direct to the Takaka R when it is in flood. Recent recycling efforts have led to 200m^3 per day reduction in waste water production.

Irrigation pods are moved several times a day and there is an intensive monitoring programme in place – of wastewater as well as the soils – with monitoring carried out 4 times per year.

All discharges are subject to resource consent and monitoring is audited by the TDC.

Stop 2- TDC Wastewater Plant

Normal flows are around 450 m^3 per day and manage wastewater from about 2000 people. In summer this rises to 4500 people and the flow rises to 700m^3/day. Water infiltration during heavy rain can increase wastewater inflows to 3000m^3 /day

Wastewater enters the plant through a screen and enters the first large oxidation pond (normal retention time is 25 days) with aerators and then to a second oxidation pond (normal retention time is 22 days). The plant had included a series of marshlands where plants were intended to be used to provide a high level of tertiary treatment. However, build up of algae in the beds as well as frequent flooding and high groundwater levels meant the establishment of plants was not as intended. The marsh treatment was ineffective and the plant had frequent issues with faecal bacteria limits being exceeded.

Current upgrades to the plant include construction of Rapid Infiltration Beds which provide for a dispersed disposal of the wastewater to groundwater. The new beds mean the plant is protected from floods up to 1 in 50year frequency. Concerns about impact on groundwater quality for other water users have resulted in extensive water quality monitoring to determine base line water quality levels and enable measurement of any effect on groundwater quality. http://www.tasman.govt.nz/tasman/projects/infrastructure-projects/takaka-wastewater-treatment-project/

There is also on-going work to upgrade pipe-work across the network to manage the high infiltration issues. In addition, Council is looking to reduce the amount of stormwater infiltration through domestic gully traps. It will be introducing a bylaw later this year that establishes a minimum height above ground for gully traps.

Te Kakau Stream

This small spring fed stream to the west of Takaka township is crossed by a ford on Haldane Rd.
The waterway has suffered from aquatic weed invasion (particularly Lagarosiphon), pollution and neglect. Water quality investigations and fish surveys show very low dissolved oxygen in summer, due mostly to the rampant exotic aquatic weed growth.

Work to improve the stream has included revegetation along the banks, rubbish removal, managing contaminant run-off and weed control.

Different methods of aquatic weed control were trialled The most effective was layers of weed mat but this proved to be very expensive. The cheapest effective method is shading by streamside plantings. Council reserve land adjacent to the waterway has been largely planted as well as several private properties.

Council has offered native trees for planting along the stream.

Stop 3- Manson's Farm

This dairy farm is on 157ha of land and generally runs about 300 cows plus replacements. Because of this summer's dry weather and lack of access to irrigation water the cow numbers have been reduced to 250 cows. Reduces to once/day milking to cope with reducing feed supply as summer progresses. Results in fewer staff being needed.

Effluent is pumped from storage ponds to land via K-line irrigation.
A variety of crops are grown to provide both summer feed and additional feed for winter, including adding chicory, clover and plantain to summer pasture. Lucerne is being cut/carried to supplement summer feed currently and may be strip grazed later in the season. (Cows are prone to health issues when feeding lucerne so care is needed). Maize is also grown to supplement feed.

Good management of soil is a high priority to ensure good structure and water holding capacity. Nutrient balance very important. Uses about 62units nitrogen per ha per year. N leaching figures are low as the farm has lower than average cow numbers as well as low N use.

The unfortunate timing of a particularly drenching rain (which was very welcome to the farmers) meant the farm visit was cut somewhat short.

Stop 4- Upper Takaka Country Club

The catchment overview and presentation by Peter Lilly at Lindsay's Bridge were cancelled because of the weather. The group moved on to the Upper Takaka Country Club for further presentations.

Trevor James –Resource Scientist (Freshwater)

A demonstration of the council's water quality monitoring was provided along with information about what different parameters were measured and why. More information available here http://www.tasman.govt.nz/environment/water/rivers/river-water-quality/

An invitation for FLAG members to accompany council staff when carrying out monitoring was issued.

Trevor provided an overview of the freshwater ecology and native fisheries. A special mention was made of the western coastal streams which contain the highest number of freshwater fish species anywhere in NZ (13 species had been found in the Onahau R and is a NZ record)

Lawson Davey Fish and Game Council

Lawson observed that trout were visual feeders and need clean water to see their food. Water clarity in Takaka was generally very good but sediment deposition can be an issue as it has a significant effect on the invertebrates that fish eat.

Trout are sensitive to warm water (above 19degrees) but unlike eels they will move to find cooler water. Eels are more resilient to warm temperatures but they can suffer more when it is warm because they don't readily move to cool water.

The trout fishery is low to moderate significance in the Takaka catchment and while the numbers of fish can be low – the size can be good (except in the Cobb reservoir which has limited food for trout and the altitude reduces fish size).

Mirka Langford - Fonterra

A summary sheet (attachment 1) – provided summary data for dairy farm production in the catchment.
A farm with less than 200 cows would be struggling to be an economic unit.

The Top of the South dairy farms had the highest debt loads compared to elsewhere in NZ. Payout was “drip fed” between seasons and affected income and production in subsequent years.

Management of nutrients requires understanding of complex systems and use of advanced techniques and tools. The management of nutrients on dairy farms is being addressed by the industry through use of Overseer as well as support and training in nutrient management and includes working with fertiliser companies. Overseer is currently considered to be especially helpful in determining relative nitrogen management performance – not absolute in relation to actual numbers.

Fonterra also ensures their suppliers conform with industry best practice through annual farm checks and will respond immediately where non-compliance is an issue. Fonterra works closely with TDC in addressing non-compliance with consents or plan rules.

Information about rates of compliance with industry best practice was also provided.

Kirsten Forsyth – Will Gauntlett – Ministry for the Environment

The opportunity to attend the field trip with the FLAG was welcomed by the Ministry. The ministry is keen to see effective management of water resources in NZ and supports collaborative type processes such as the Takaka FLAG.

Summary material about what Water Conservation Orders and Plan provisions can and must provide was provided to the group (attachment 2). The ministry officials encouraged the FLAG to have an open dialogue with WCO applicants in relation to the outcomes both groups are seeking for the springs. They supported suggestions that the parties currently involved in water management in the Takaka catchment meet and discuss the options and opportunities both in terms of process and the tools available.

Corrigan Sowman and Nigel Harwood

An overview of the dairy farm operations in upper Takaka was provided in advance of visiting these farms.

Harwood’s farm included a range of farm systems including deer, sheep and beef as well as a 920 cow dairy farm.

The dairy platform was partly irrigated (70%) with centre pivot irrigators. The system uses up-to-date computer technology including soil moisture sensors and variable rate water application to ensure optimal efficiency of available water. Water demand and soil moisture

levels are monitored in real time and water applied in such a way as to maximise any rainfall that might fall.

Nutrient inputs based on soil tests and nutrient plans from Ravensdown are carefully controlled and applied little and often to maximise uptake. About 176 units of N per ha are applied annually. Our Phosphate is applied 4 times per year to minimise risk of high rain fall events washing fertiliser off. Also Pakihi does not hold P like other soils so 5 small dressings applied to lessen the risk of runoff.

Over the past 5 years the number of irrigation days has varied from 40-120. In the last two years 120 days irrigation has allowed pasture to be grown during the summer dry when cows would otherwise reduce production or be dried off.

Irrigation would be programmed during the night when possible to reduce the high power costs – this is more likely when soil moisture levels can be maintained . Harwoods also manage irrigation according to the costs of power at any time. They follow soil moisture metres to make decisions on when and when not to irrigate. Around mid Feb these metres show us that a move to night only irrigation can be made. This is seasonal as wind etc would also have an effect. There are fewer options to take from the Takaka River as abstracters are dependent on Cobb's generation profile.

Irrigation means all cows and replacements can be pasture fed on this property. The cost of buying in additional feed is very high and is avoided. This is an important point - irrigation is important and gives farmers reliability. But hardwoods constantly watch economics. It's $90 ton to get feed into GB and this takes the gloss off high imported feed models. Most farmers I know are heading to lower 3.1 cow / hectare systems to remain pasture based farms.

Harwood's farm has over 500 in native bush mostly unfenced. 200 ha north west coast and 260 on top of the Takaka Hill are included in the QE2 covenant. The remainder is fenced bush blocks, riparian areas and wetlands inside the farm boundary

Both farms fully complied with council rules concerning effluent and industry best practice - Industry requirements are specified formally through the Sustainable Dairying Accord described in the attached industry information handout (Mirka's summary, attachment 1).

Their on-farm practice generally exceeded industry minimums especially in relation to nutrient management, riparian planting and stock crossings. Probably the work Nigel is most proud of is the nutrient sinks or constructed wetlands on the non permanent waterways. He believe these initiatives are critical to lessening our farms impact on the environment. Likewise the constructed wetlands and weirs below the effluent ponds. Hardwoods farm is trying to mitigate impact where it can. It is a simple question 'how can we slow down our runoff to give the environment a chance to deal with it'.

Uruwhenua farm is a family farm with an 800 cow herd and about 50% of the overall farm being irrigated.

The Sowmans have upgraded most of their irrigation system from K-line to much more efficient and solid set fixed sprinkler irrigation. 83ha is still being K-line irrigated – the staff resources needed to move the K-line system regularly enough to ensure good irrigation coverage is significant and this system is planned for replacement by the fixed sprinkler system as well.

One of the reasons for choosing a solid set system was to protect totara trees on the property – while efficient and relatively simple to operate and maintain, a centre pivot would have required removal of trees to allow the pivot to travel across the farm..

The cows and replacements are all fed on farm and the irrigation allows for production to continue during dry periods. Corrigan noted that a combination of efficiency gains across the

farm, including lifting the herd genetic potential and reducing stock replacement meant that the farm was able to reduce stock numbers by 20% and also significantly increase pasture production.

Nutrient inputs are carefully managed by use of a range of tools and measures including regular soil tests and use of Overseer to calculate nutrient requirements. Any fertiliser is applied little and often and only at times when the pasture is actually growing. GPS application ensures fertiliser is applied accurately.

Both farms fully complied with council rules concerning effluent and industry best practice - Industry requirements are specified formally through the Sustainable Dairying Accord described in the attached industry information handout (*Mirka's summary*).

Their on-farm practice generally exceeded industry minimums especially in relation to nutrient management, riparian planting and stock crossings. Tomos on the Uruwhenua farm are also fenced.

Irrigation systems include soil moisture monitoring, weather stations to monitor evapo-transpiration and rainfall, telemeter water meters, variable speed pumps. They use GPS for proof of effluent and fertiliser placement and individual computerised cow management.

Infrastructure costs for irrigation systems were estimated as
$4,000 - $4500/ha for K-line
$7,000 – 8,000/ha for centre pivot
$10,000 – for solid set systems
Application efficiency also improved with centre pivot and solid set systems over K-Line. While night time irrigation would be preferred by all landowners because of cheaper power, it is not possible to irrigate the areas involved because of system size and allocation constraints. Watering the same area in half the time means doubling the instantaneous rate of take; this has significant adverse environmental effects.

Irrigation on both farms is further constrained by only being allowed to abstract water when flows in the Takaka R were above the specified minimum flow of 1.6cumecs (usually only when the Cobb was releasing water)

Upper Takaka Recorder

The tour made a brief stop at the Upper Takaka Recorder and Joseph T gave an overview of the recorder system. This recorder relays flow information to the TDC and provides real time flow data on the TDC website.

The river was flowing quite high following the morning's rain, and given the drought conditions that existed just prior to the field trip, showed how quickly the river responds to rainfall.

The irrigators taking water from the Takaka above Lindsays Bridge were all regulated by a separate recorder at this site. Practical and technical difficulties in ensuring alarms operated at the right flows have been worked through and it is likely that the irrigators will link to the TDC recorder to help manage water takes more accurately. Peter L noted an opportunity existed for irrigators to work with Trustpower who could provide them advance warning about when there was water release from the dam. This would assist the farmers' in getting better data to manage their abstractions within their consent conditions.

Information and resource documents identified during meeting

Date	Title	Author/Source
5/3/15	Dairying in the Takaka catchment	M Langford, Fonterra
5/3/15	WCOs and regional plans	K Forsyth, MfE
5/3/15	Field trip itinerary	

**Key documents available electronically will be added to the online PDF document bibliography.*

Dairying in the Takaka Catchment

Some Figures:

44 Dairy Farms 14465 cows 4968 ha

Production last season (14/15): 5674516 MS (Milk Solids) about 129000 MS per farm

	Takaka Catchment	National average	South Island average
Stocking Rate	2.9 cows/ha	2.85	3.01
Production	1142 MS/ha	988	1137
Herd size	328 Cows	402	614

Average farm working expenses (DairyNZ economic survey 2012/13):

Cash FWE	**$/KG MS**	**Total spend Takaka $**
Wages	0.61	3461454.76
Animal Health	0.56	3177728.96
Feed	0.83	4709848.28
Grazing	0.52	2950748.32
Fertiliser, Irrigation, re grassing	0.69	3915416.04
Maintenance	0.58	3291219.28
Overheads	0.31	1759099.96
Interest/rent	1.39	7887577.24
	5.49	31153092.84

(The above does not include any drawings or money spend on capital improvements and developments.)

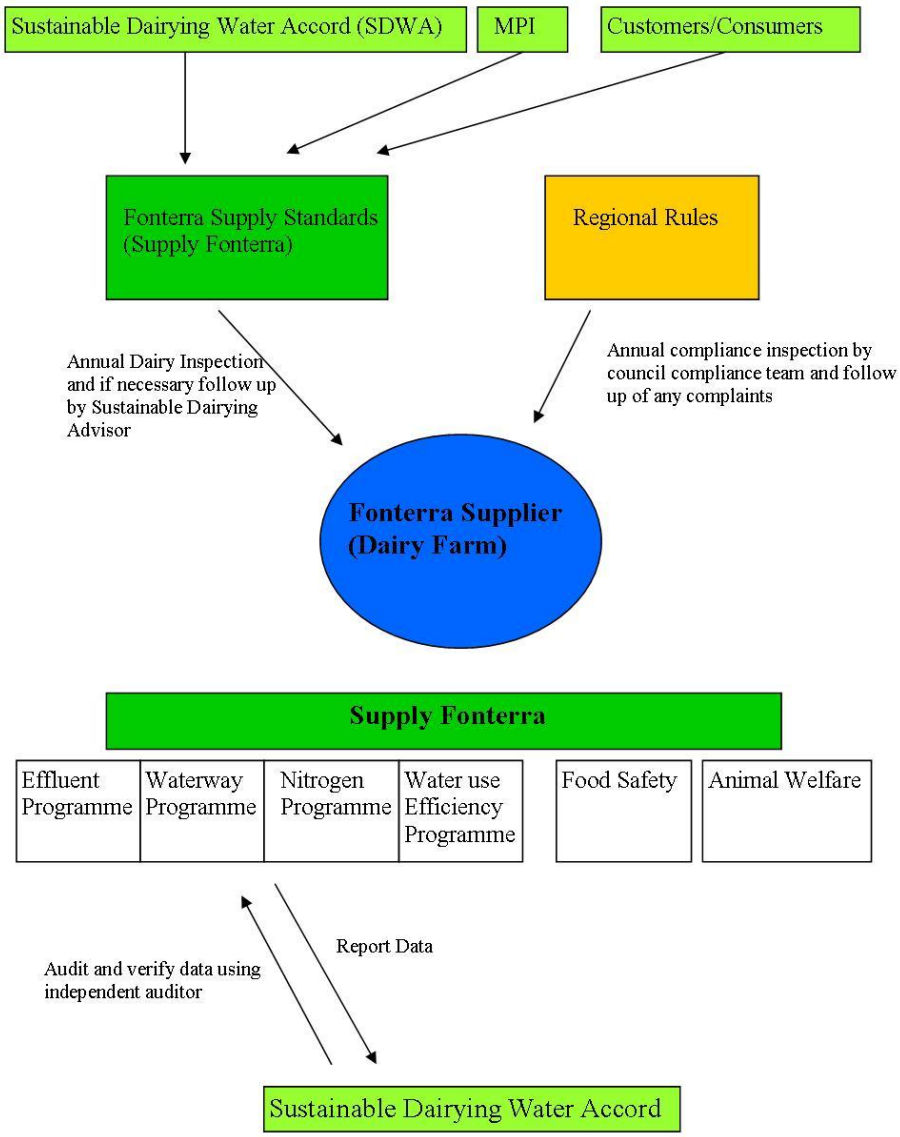
Payout:

Rolling average: $6/kgMS

At a $6 payout this would leave the average farm owner in Takaka with $64000 to pay his own wages as well as any additional capital improvements or developments on farm.

In a year such as this year (predicted payout of $4.7) most farms will run at a substantial loss ($101910 average loss (Takaka) without adding drawings for the farm owner to live on). This loss will have to be repaid for in a high payout year such as last season.

Current environmental regulation on Fonterra Dairy Farms



Effluent Management:

All Suppliers must meet the following minimum requirements:

- All sources of effluent collected on the farm are managed in a manner that complies with the relevant Regional Council resource consent or permitted activity rules, 365 days a year;

Waterway Management:

All Suppliers' must meet the following minimum requirements:

- Stock must be excluded from all waterways that permanently contain water and that are, at any time of the year, wider than 1 meter and deeper than 30cm at any point within or immediately adjacent to the boundary of the farm and all significant wetlands;
- Farm races must include bridges or culverts where stock regularly cross any waterway; (regular is defined as more than twice a week and after 2018 as more than once a month)
- Sediment and/or effluent must not be discharged into any waterways where it is likely to result in a significant adverse effect on the environment

Nitrogen Management:

All Suppliers' must meet the following minimum requirements:

- Provide accurate information to Fonterra about your farm system by 31st May each season; and
- Provide evidence to support those records upon request
- Authorise the release of information about the farm held by the major fertiliser companies to Fonterra for the purpose of the Nitrogen Programme.

Water use Management:

All Suppliers' must meet the following minimum requirements:

- Provide information to Fonterra about the water management practises on farm, when requested.

In the event that the minimum requirement is not met:

- Work with a Sustainable Dairying Advisor(SDA) or farm Dairy Assessor to create an Environmental Improvement Plan (EIP) that sets out the actions required to achieve the minimum standard and the timeframe within which this is to be achieved; and
- Implement the action in that EIP within the timeframes specified

Fonterra may:

- Charge a fee of $200 plus GST for a farm visit
- Require, at suppliers cost, an independent consultant to develop an EIP that will achieve the minimum standard
- Suspend the collection of milk and the supplier must dispose of that milk at his/her own cost

Sustainable Dairying Accord Key commitments and targets

Stock excluded from waterways

- Rivers, streams, drains and springs over one metre wide and 30cms deep that permanently contain water
- All lakes
- Wetlands (if they are identified by a regional council in it's regional plan as being significant)

Target: 90% exclusion by 31 May 2014; 100% exclusion by 31 May 2017; 100% exclusion from significant wetlands by 31 May 2014.

Takaka: 100% excluded
Nationwide: 96%

Stock crossings bridged or culverted

All points on a waterway where cows cross and return more thanonce per month must be either bridged or culverted.

Target: 100% of regular stock crossing points bridged or culverted by 31 May 2018.

Takaka: 100% bridged or culverted
Nationwide: 99%

Riparian management plans

All dairy farms with waterways must prepare a riparian management plan that sets out where riparian planting is to occur.

Target: 100% of farms with Accord waterways will have a riparian management plan by 31 May 2020. Planting is to be completed by 2030.

Implementation starting in Takaka April 2015.

Nutrient management

Farms must supply their dairy company with information that will allow for the modelling of Nitrogen loss and Nitrogen conversion efficiency. Companies will report comparative performance back to farmers to drive continuous improvement in nutrient management.

Target: Data collected and performance benchmarked for 85% of dairy farms by 30 November 2014; 100% of dairy farms by 30 November 2015.

Takaka: 75% submitted
Nationwide: 64%

Effluent management and compliance

All dairy farm effluent systems must be capable of being compliant with the relevant regional council rules and/or their resource consent 365 days per year.

Target: 100% of farms assessed by 31 May 2014.

Takaka: 100% assessed – only two major referrals this season so far

Water use managed and monitored

All farms must comply with all regional rules controlling water takes.

Target: 85% of farms must install water meters by 2020.

Water conservation orders and regional plans under the RMA

Water Conservation Order	
Purpose?	An order made under Part 9 of the RMA to recognise and sustain: a) outstanding amenity or intrinsic values which are afforded by waters in their natural state: b) where waters are no longer in their natural state, the amenity or intrinsic values of those waters which in themselves warrant protection because they are considered outstanding. [Section 199 of the RMA]
What does it do?	**An order** can impose restrictions or prohibitions on the exercise of specified regional councils' powers under the Act (as they relate to water). The specified powers are the control of the taking, use, damming, and diversion of water, and the control of the quantity, level, and flow of water in any water body [section 30(1)(e) of the RMA] and the control of discharges of contaminants into or onto land or water, and discharges of water into water [section 30(1)(f) of the RMA]. Restrictions or prohibitions can relate to— a) the quantity, quality, rate of flow, or level of the water body; and b) the maximum and minimum levels or flow or range of levels or flows, or the rate of change of levels or flows to be sought or permitted for the water body; and c) the maximum allocation for abstraction or maximum contaminant loading consistent with the purposes of the order; and d) the ranges of temperature and pressure in a water body. [Section 200 of the RMA]
Who is it made by?	The Governor-General by Order in Council on recommendation of the Minister.
How is it made?	Any person can apply to the Minister. [Section 201 of the RMA] If an application is accepted, the Minister appoints a special tribunal to hear the application. [Section 202-203 of the RMA] The tribunal publicly notifies the application and any person may make submissions to the tribunal. [Section 204 and 205 of the RMA] The tribunal will hold a hearing. After the hearing the tribunal reports to the Minister for the Environment, and the report can be challenged by any person who submits to the Environment Court. [Sections 208 and 209 of the RMA] If a submission is received, the Environment Court will run an inquiry and then report to the Minister for the Environment. The Minister will make a recommendation to the Governor-General based on the report of the special tribunal (if no submissions to the Environment Court) or the report of the Environment Court.
Does it affect Resource Consents?	Does not affect or restrict any resource consent granted, or lawful use established in respect of the water body, **before** the order is made. [Section 217 of the RMA]

	Once a water conservation order is operative, a consent authority: [Section 217 of the RMA] a) shall not grant a water permit, coastal permit, or discharge permit if the grant of that permit would be contrary to any restriction or prohibition or any other provision of the order: b) shall not grant a water permit, a coastal permit, or a discharge permit to discharge water or contaminants into water, unless the grant of any such permit or the combined effect of the grant of any such permit and of existing water permits and discharge permits and existing lawful discharges into the water or taking, use, damming, or diversion of the water is such that the provisions of the water conservation order can remain without change or variation: c) shall, in granting any water permit, coastal permit, or discharge permit to discharge water or contaminants into water, impose such conditions as are necessary to ensure that the provisions of the water conservation order are maintained.
How long do they last for?	Until revoked. A person can apply to amend or revoke the order at any time. However, the Minister may not consider any such application until two years after the order is made. [Section 216(1) of the RMA]

Regional Plan	
Purpose?	The purpose of the preparation, implementation, and administration of regional plans is to assist a regional council to carry out any of its functions in order to achieve the purpose of the RMA. [Section 63 of the RMA]

What does it do?	A regional plan must include objectives, policies and rules for a region, and may state a number of other matters as set out in the RMA. [Section 67 of the RMA]
	
	Regional rules are for the purpose of carrying out the regional council functions under the RMA, and achieving the objectives and policies of the plan. [Section 68(1) of the RMA]
	Relevant functions for water include: [Section 30(1) of the RMA]
	• Taking, use damming and diverting of water
	• Discharges of contaminants into or onto land, water
	• Control of the use of land for the purpose of
	  ○ The maintenance and enhancement of the quality of water in water bodies, and
	  ○ The maintenance of the quantity of water in water bodies, and
	  ○ The maintenance and enhancement of the ecosystems in water bodies
	
	Rules can relate to maximum or minimum levels or flows, or the control of the range, or rates of change, of levels or flows of water, or rates of use of

	water, or minimum standards of water quality. [Section 68(7) of the RMA]
Who is it made by?	Regional council or unitary authority
How is it made?	In accordance with the process set out in Schedule 1 of the RMA. [Section 65(2) of the RMA]
Does it affect Resource Consents?	Where a regional plan includes a rule relating to maximum or minimum levels or flows or rates of use of water, or minimum standards of water quality or air quality, or ranges of temperature or pressure of geothermal water, the plan may state, — (a) whether the rule shall affect, under section 130, the exercise of existing resource consents for activities which contravene the rule; and (b) that the holders of resource consents may comply with the terms of the rule, or rules, in stages or over specified periods) [Section 68(7) of the RMA]
How long do they last for?	Regional plans must be reviewed within ten years of being made. [Section 79 (1) of the RMA] Following review, whether it is amended or not, the regional plan or changed regional plan must then by publicly notified and go through the RMA Schedule 1 process. [Section 79(6) and (7) of the RMA]
Relationship to the National Policy Statement for Freshwater Management 2014?	Must give effect to the National Policy Statement for Freshwater Management. [Section 67(3) of the RMA]
Relationship to water conservation orders?	A regional plan must "not be inconsistent with" a water conservation order. [Section 67(4) of the RMA]