Setting limits for nutrient loss: Implications for science, resource requirements and capability building in Otago

By
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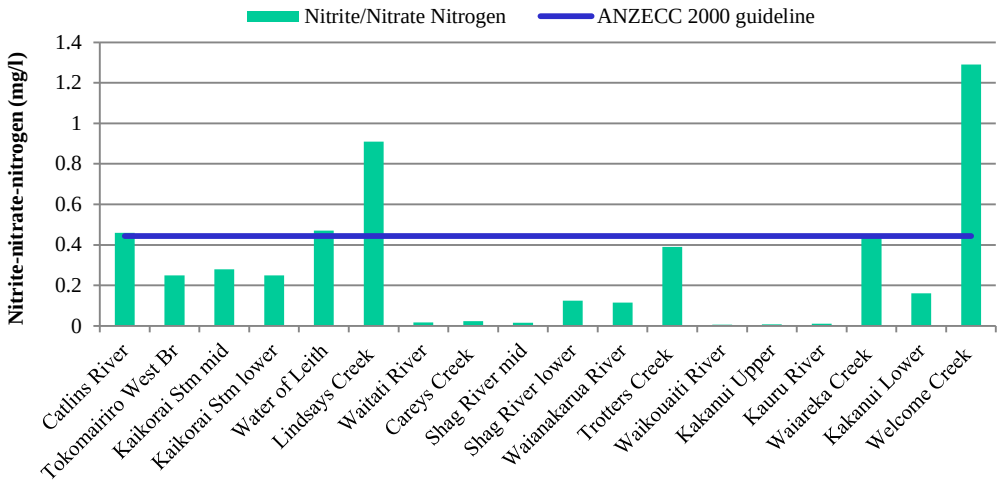
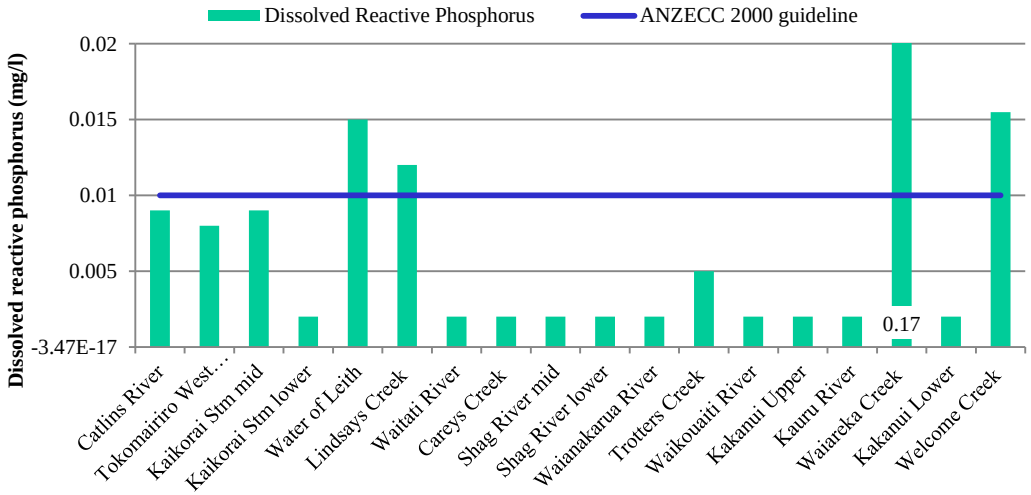
Otago Regional Council

North and Coastal Otago - N & P in surface water





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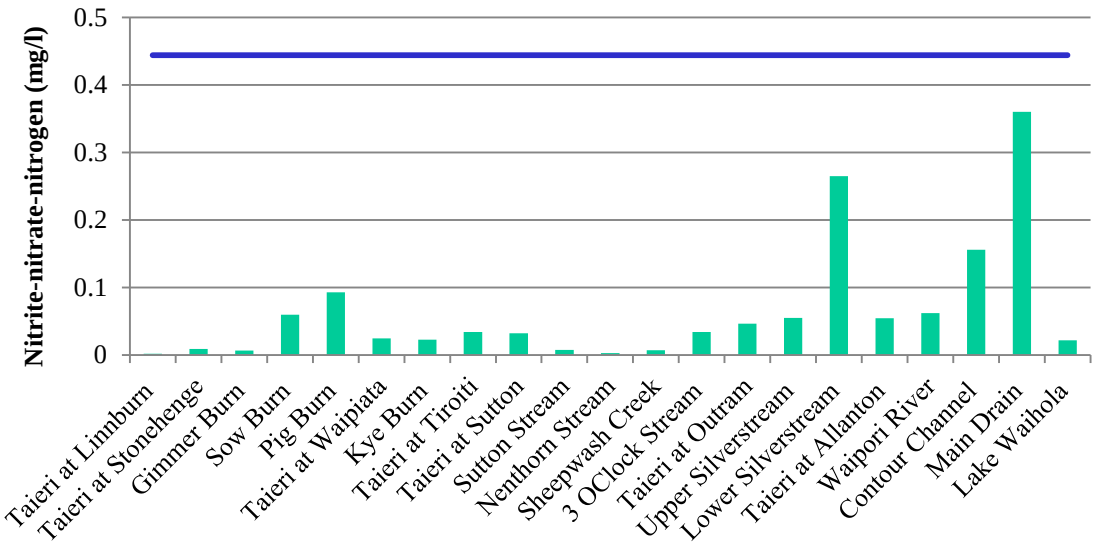
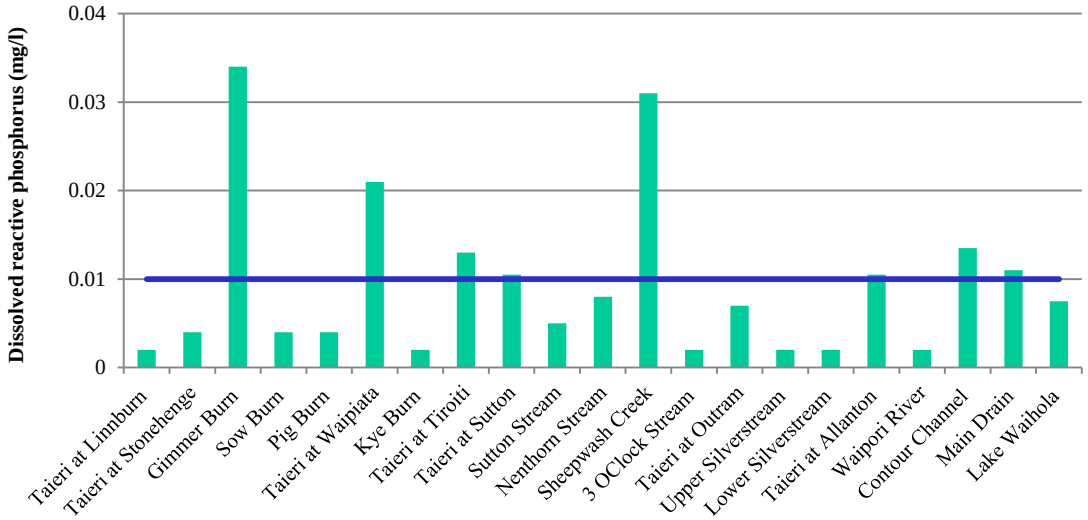
Taieri River Catchment - N & P in surface water





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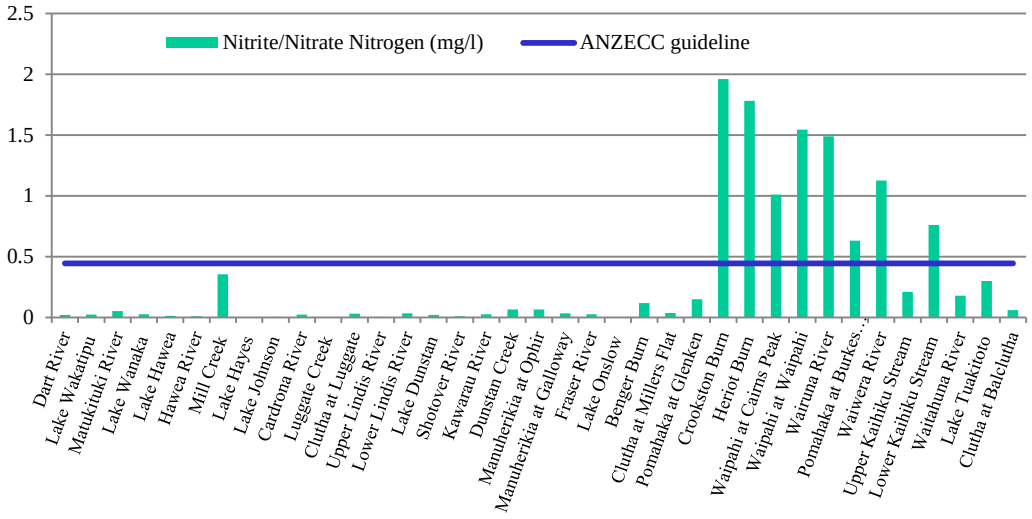
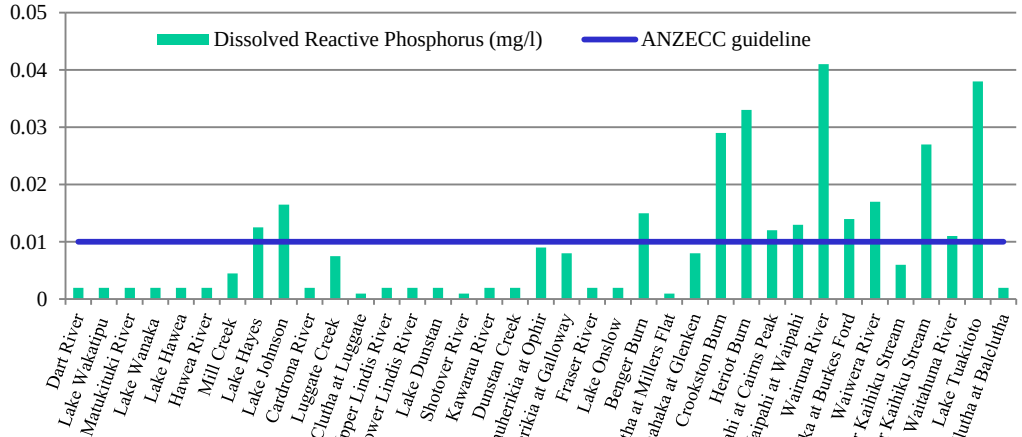
Clutha River Catchment- N & P in surface water





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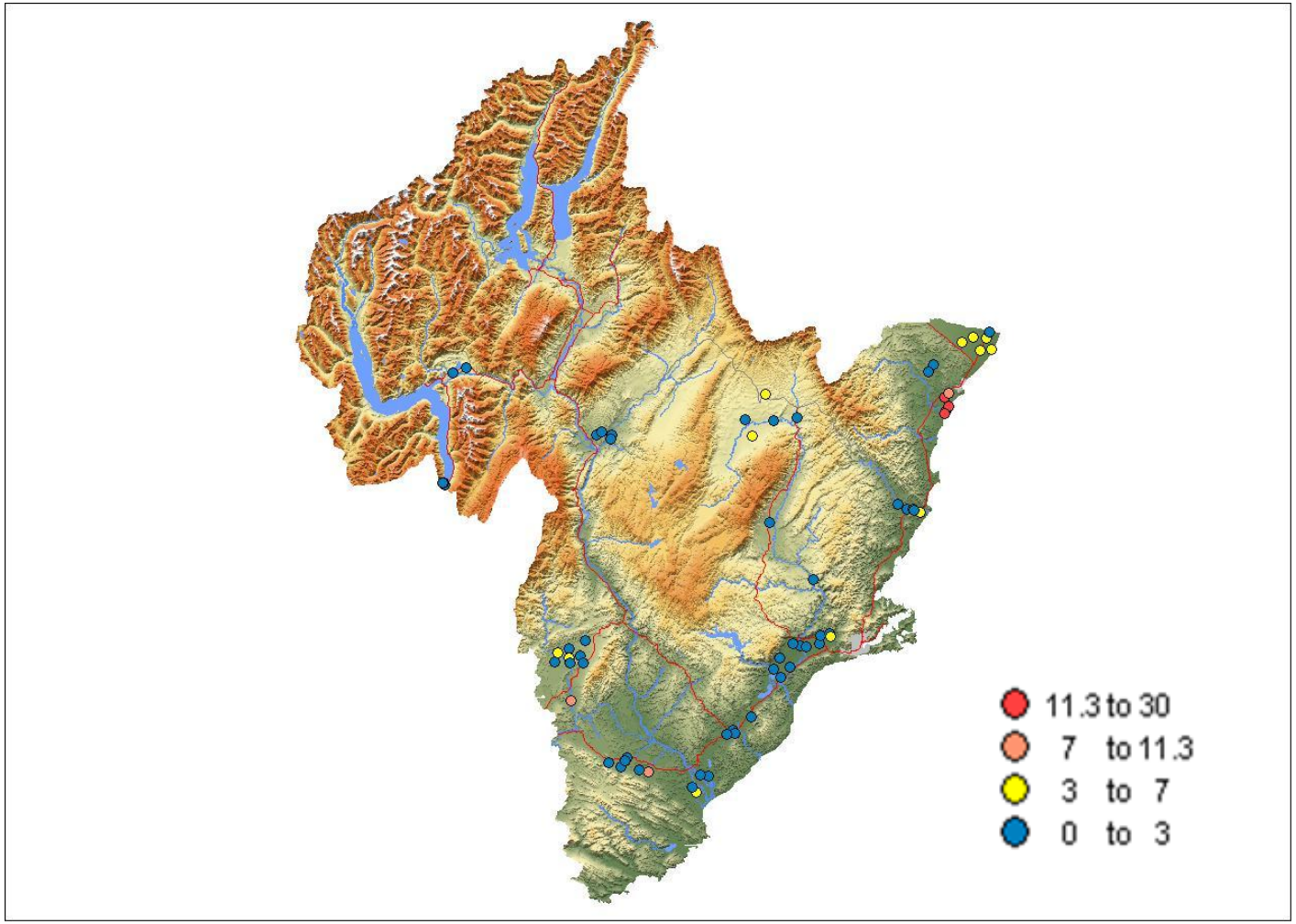
Mean Nitrate-N Concentrations in Otago Groundwater gN/m^3



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Proposed Plan Change 6 A process

- Community consultation 2010-2011
- Notification – 31 March 2012
- Submission closed - 2 May 2012
- Summary of decisions released for further submissions - 2 June 2012
- Further submissions closed - 18 June 2012
- Hearings from 10 September to 25 October 2012
- Current status - deliberations

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Basis for surface water discharge limits

- Avoidance of cumulative adverse effects
- No complex catchment scale modelling
- No mixing zones for poor discharges
- Complying discharges are permitted activities

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Proposed Plan Change 6A (Water Quality)
Regional Plan: Water for Otago

"12.C.1 Permitted activities: No resource consent required

12.C.1.1 The discharge of water or any contaminant to water is a ***permitted*** activity, providing:

(b) Any contaminant listed in Schedule 16 does not exceed the limits given in that schedule, more than twelve hours after rain has ceased on the site, where the contaminant is about to enter water; and…"

"12.C.1.3 The discharge of nitrogen[1] from land to groundwater, is a *permitted* activity, providing:

(a) From 31 March 2019, nitrogen leaching calculated by the Council using OVERSEER® version 6.0, does not exceed an average of:

(i) 10 kilograms nitrogen per hectare per year over any nitrogen sensitive zone identified in Maps I5-I6; and

(ii) 20 kilograms nitrogen per hectare per year over any nitrogen sensitive zone identified in Maps I1-I4

(iii) 30 kilograms nitrogen per hectare per year elsewhere in Otago; and

(b) Upon request, the person with responsibility for the management of the land will supply the Council with all necessary annual input data to run OVERSEER® version 6.0."

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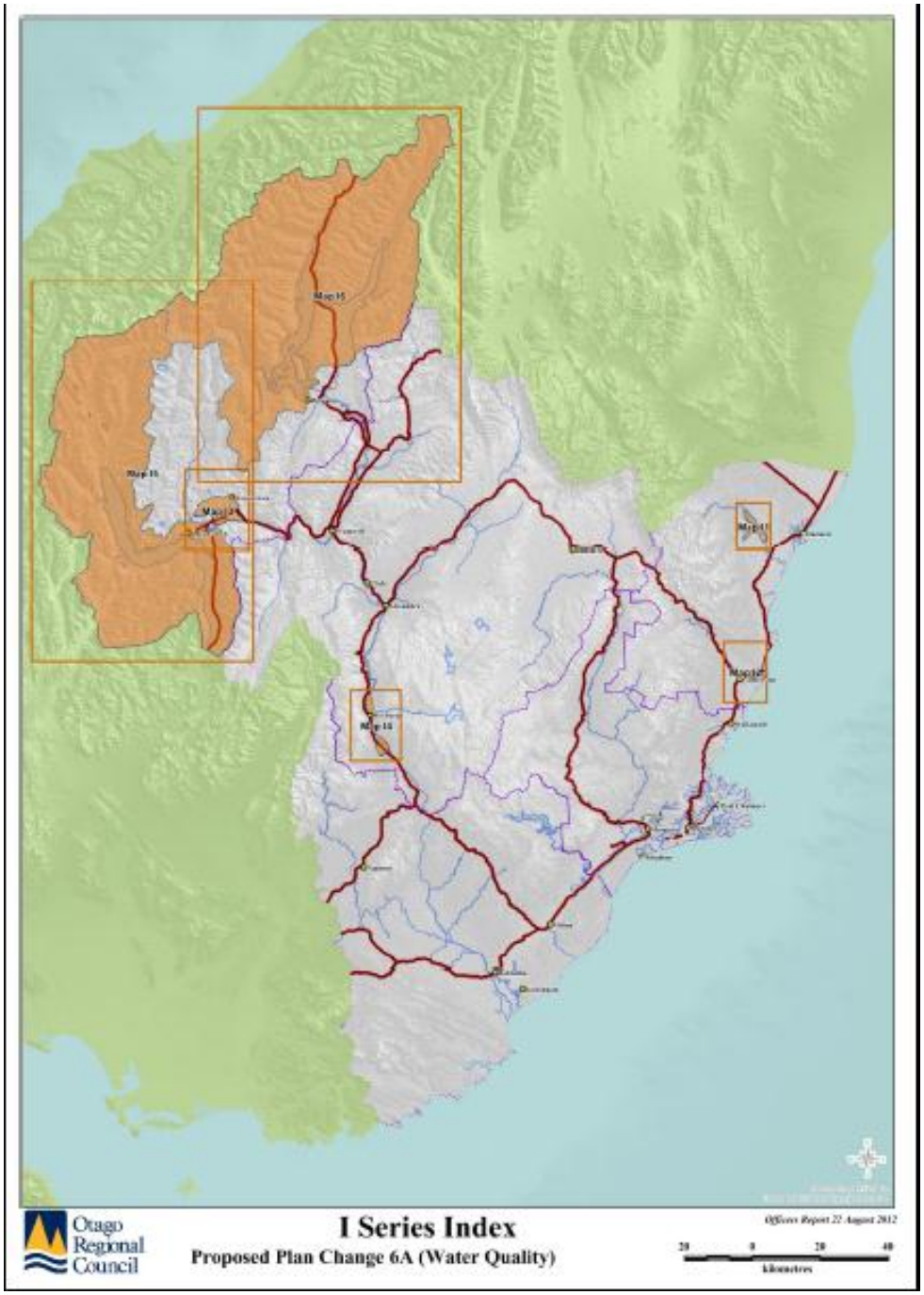

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Schedule 16 Schedule of discharge limits for water quality

Discharge Limit **Area 1** [1]	**Nitrate-nitrite nitrogen**	**Dissolved reactive phosphorus**	**Ammoniacal nitrogen**	***Escherichia coli***
Timeframe	31 March 2019	31 March 2017		
▪ Catlins ▪ Carey's Creek ▪ Kaikorai ▪ Leith ▪ Mokoreta (within Otago) ▪ Owaka ▪ Pomahaka ▪ Tahakopa ▪ Tokomairiro ▪ Tuapeka ▪ Waitahuna ▪ Waitati ▪ Waiwera ▪ Any other unlisted tributary on the true right bank of the Clutha/Mata-Au, south of Judge Creek ▪ Any other unlisted catchment that discharges to the coast, south of Taieri Mouth ▪ Any other unlisted tributary on the true left bank of the Clutha/Mata-Au, south of the Tuapeka catchment	2 mg/l	0.045 mg/l	0.1 mg/l	260 cfu/100 ml

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Discharge Limit **Area 2** [1]	**Nitrate-nitrite nitrogen**	**Dissolved reactive phosphorus**	**Ammoniacal nitrogen**	***Escherichia coli***
Timeframe	31 March 2019	31 March 2017		
▪ Cardrona ▪ Kawarau downstream of the Shotover confluence and Clutha/Mata-Au and any other unlisted tributary (Luggate to mouth, including Lakes Dunstan and Roxburgh, and excluding tributaries described in Area 1) ▪ Fraser ▪ Kakanui ▪ Lindis ▪ Luggate ▪ Manuherikia ▪ Mill Creek (tributary to Lake Hayes) ▪ Shag ▪ Shotover ▪ Taieri ▪ Trotters ▪ Waianakarua ▪ Waikouaiti ▪ Waitaki tributaries within Otago ▪ Waipori ▪ Any other unlisted catchment that discharges to the coast, north Taieri Mouth ▪ Lake Hayes ▪ Lake Johnson ▪ Lake Onslow ▪ Lake Tuakitoto ▪ Lake Waihola ▪ Clutha/Mata-Au (above Luggate) ▪ Kawarau upstream of the Shotover confluence	0.5 mg/L	0.035 mg/L	0.1 mg/L	260 cfu/100 ml

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Discharge Limit **Area 3** [1]	**Nitrate-nitrite nitrogen**	**Dissolved reactive phosphorus**	**Ammoniacal nitrogen**	***Escherichia coli***
Timeframe	31 March 2019	31 March 2017		
▪ Any tributaries to Lakes Hawea, Wakatipu, and Wanaka ▪ Lake Hawea ▪ Lake Wakatipu ▪ Lake Wanaka	0.08 mg/l	0.006 mg/l	0.1 mg/l	126 cfu/100 ml

mg/L = milligrams per litre
cfu/100 ml = colony-forming units per 100 millilitres

[1]Areas 1, 2 and 3 are shown on the J series index map, and in Maps J1- J12.

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Benchmarking farming systems

- **Visible discharges to surface water monitored**
- **Use of OVERSEER® to monitor compliance - nitrate leaching- data required on request to run OVERSEER® nitrate leaching model**
- **Promote the use of fertiliser code of practice**
- **Proven nutrient loss mitigation tools (e.g. riparian management, herd homes, nitrification inhibitors, deferred effluent irrigation system, slow rate effluent irrigation system, precise irrigation) to be compiled and promoted on farms exceeding limits**

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Performance/compliance monitoring

- Maintain or develop databases on
  - N inputs and nitrate leaching,
  - Water discharge of N & P
  - P use and P status of soils,
  - Irrigation water use,
  - Land use changes,
  - Riparian management,
  - Ground and surface water quality with more SOE sites in polluted areas.

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Science/Economics Research

- More effective nutrient mitigation tools
- Cost-benefit analysis of all effective mitigation tools
- Simple on-site monitoring tools for N & P in discharge and surface water
- Large scale lysimeters (e.g. 50 m radius)
- Ongoing OVERSEER® buildup/validation (e.g. market gardening crops, accuracy of leaching prediction)

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Resource requirements

- **Education/field testing of nutrient management and mitigation – ORC, FertResearch, Fertiliser Companies, Fonterra, Dairy NZ, Beef & Lamb, Hort NZ, CRIs and Universities**
- **OVERSEER® refinement and buildup**
- **Ongoing government funding for OVERSEER® refinement and research on nutrient management and mitigation and nutrient monitoring tools**
- **Accredited OVERSEER® users/training centres**
- **Increased ORC compliance, consents and science staff resourcing from 2019**

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Capability building

- **Accreditation system to use and train** OVERSEER®
- **Additional** OVERSEER® **training or accreditation centres**
- **Database development for compliance and performance monitoring**
- **Training of ORC, Fertiliser industry, pastoral, cropping and horticultural industries and private consultants to use** OVERSEER®**, and mitigation tools and monitoring of N & P in water**
- **Farmer training/field testing**

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