

**IN THE MATTER** of the Resource Management  
Act 1991

**AND**

**IN THE MATTER** Resource Consent Application  
APP-302625-01 to discharge  
treated wastewater onto land  
from the Te Anau Wastewater  
Treatment Plant and discharge  
odour to air associated with the  
discharge of treated wastewater  
onto land.

**BY** Southland District Council

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**SUBMISSIONS FOR FISH AND GAME NEW ZEALAND – SOUTHLAND REGION**

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## **Introduction**

1. My name is Jacob Smyth. I am employed by Fish & Game New Zealand – Southland Region ('Fish & Game') as a Resource Management Officer based in Invercargill and have held this position since September 2008.
2. I hold a Bachelor of Arts in history and a Bachelor of Law from the University of Otago (2001). I have been admitted as a Barrister and Solicitor by the High Court of New Zealand (May 2001).
3. My job entails assessing non notified and notified resource consent applications, regional policy statements and regional and district plans, for their effect on the game bird, trout and salmon fishery, and recreational hunting and angling values within the Southland region.

## **Statutory functions of Fish and Game Councils**

4. The Southland Fish and Game Council is the statutory manager of sports fish and game birds within Southland Fish and Game Region under Parts 5A and 5B of the Conservation Act 1987 and Part II of the Wildlife Act 1953 and their associated regulations and notices. The Southland Fish and Game Council is comprised of 12 members elected from licence holders in the Southland Fish and Game Region.
5. Fish and Game Councils are statutory body established under the Conservation Act 1987 to:
  - a. Manage, maintain and enhance the sports fish and game resource in the recreational interests of anglers and hunters (s 26Q(1));
  - b. Assess and monitor the condition and trend of ecosystems as habitats for sports fish and game (s 26Q(1)(a)(iii));
  - c. Represent the interests and aspirations of anglers and hunters in the statutory planning process (s 26Q(1)(e)(i)); and
  - d. Advocate the interests of the Council, including its interests in habitats. (S 26Q(1)(e)(vii)).

## **The application**

6. The applicant seeks a discharge permit from the Southland Regional Council, commonly known as 'Environment Southland, of 35 years duration to:
  - a. Discharge treated wastewater from the Te Anau Wastewater Treatment Plant onto land via spray irrigation using two centre pivot irrigators at the following rates:
    - i. From 1 September – 30 April at an average rate of 3,000m<sup>3</sup>/day and a maximum rate of 4,5000m<sup>3</sup>/day; and
    - ii. From 1 May – 30 August at average rate of 1,350m<sup>3</sup>/day and a maximum rate of 2,0000m<sup>3</sup>/day.

The activity has been assessed as discretionary under Rule 5.2.1 of the Regional Effluent Land Application Plan.

- b. Discharge odour to air associated with the discharge of treated wastewater onto land.

The activity has been assessed as discretionary under Rule 5.5.2(16) of the Regional Air Quality Plan.

#### **Location of the proposed irrigation site**

- 7. The irrigation site is known as the 'Kepler Block' and located to the north of Te Anau airport runway, at or about NZMS260 D43:927-063. The site is located approximately 18km south of Te Anau Township, 5km north of Manapouri Township and approximately 500m east of Manapouri – Te Anau Highway.
- 8. Surface water in the locality of the irrigation site includes:
  - a. Kepler Mire, a regionally significant wetland which forms part of the Te Anau Basin wetland complex<sup>1</sup> and is one of the longest string bogs in New Zealand, is located east of the irrigation area;
  - b. Approximately 800m south of the irrigation area is Home Creek, which is bordered by extensive wetland margins that are contiguous with the Kepler Mire complex; and
  - c. West of the irrigation area is the Upper Waiau River, which runs between Lakes Te Anau and Manapouri, and Lake Manapouri.

#### **Fish and game values**

- 9. As set out in Fish & Game's submissions of 14 February 2014, the Waiau catchment is the largest in Southland and runs from the headwater tributaries of Lakes Mavora, Te Anau, Manapouri and Monowai to Te Wae Bay via the upper and lower Waiau River. The Waiau catchment has significant fish and game values for the following reasons:
  - a. It supports a significant sports fishery which offers both lake and river angling opportunities for brown trout, rainbow trout and Chinook salmon. Specifically:
    - i. The Upper Waiau River provides significant habitat for brown and rainbow trout and low numbers of Chinook salmon. Spawning of mature brown and rainbow trout occurs in the upper Waiau River. In recent years small numbers of chinook salmon have ascended the lower and upper Waiau River and been caught in Lakes Manapouri and Te Anau.
    - ii. The Waiau catchment is an increasing popular angling destination for both local and non-resident sports fish anglers.

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<sup>1</sup> Appendices - Appendix B 'Regionally Significant Wetlands in Southland' of the Regional Water Plan for Southland

The 2007 / 2008 National Angling Survey<sup>2</sup> provides that 65,170 ± 4,100 angler days were spent in the Waiau catchment during the 2007 - 2008 angling season. By way of comparison the 2001 / 2002 National Angling Survey provides that 53,490 ± 3,160 angler days were spent in the Waiau catchment during the 2001-2002 angling season.

- b. It supports a significant population of native and introduced waterfowl, including game species such as Canada geese, mallard duck, New Zealand shoveller duck and paradise shelduck which are actively hunted during the annual game bird hunting season.
10. Although trout and salmon are introduced fish, their valued fisheries status is recognised by statute in s 26B of the Conservation Act and s 7(h) of the Resource Management Act. The statutory inclusion of the protection trout and salmon in s 7(h) of the Resource Management Act is in recognition of the national importance of these species.

**Position on the Application:**

11. The proposal represents an improvement on the status quo with respect to existing sewage disposal from Te Anau and is consistent with Environment Southland's preference for discharges to land in Policy WQUAL 5 of the Proposed Regional Policy Statement 2012 ('the PRPS'). However, the potential adverse effects of the activity is a key issue for Fish & Game. Specifically, the proposal raises issues with respect to:
- a. Effects on ground water quality;
  - b. Effects on surface water quality and monitoring; and
  - c. Consent duration.

**Effects on ground and surface water quality**

12. The proposal is to irrigate treated wastewater containing organic matter, nutrients and micro-organisms from the Te Anau Wastewater Treatment Plant onto land which is underlain by Monowai soils. Soil information on the Environment Southland website provides that Monowai soils:
- a. Are generally stony and have a high P-retention, with few pasture roots below 50cm because of gravel;
  - b. Have a moderate vulnerability of leaching to groundwater, which reflects the low clay content and well-drained nature of the topsoil; and
  - c. Have a slight vulnerability to waterlogging during wet periods, which reflects the good drainage and shallow depth.<sup>3</sup>

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<sup>2</sup> Unwin M. (April 2009), *Angler usage of lake and river fisheries managed by Fish & Game New Zealand: results from the 2001/02 National Angling Survey*, NIWA, Appendix 1 – Southland Region.

<sup>3</sup> Topoclimate Southland Soil Information Sheets: No. 18 – Soil name: Monowai.

## Groundwater quality

13. Potential effects of the proposed activity include effects on groundwater quality due to leaching of nutrients such as nitrate and phosphorus and other microbial contaminants such as E-coli in the treated wastewater.

The evidence of Simon East (dated 27 June 2014) for Southland District Council with respect to Overseer modelling provides at paragraphs 67 - 72 that:

- a. The estimated nitrogen mass loading from the irrigation areas (CP1 (37.4ha) + CP2 (32.9ha) = 70.3ha) is approximately 180 kg N/ha/year, or 121 kg N/ha/year as a spatial average over the 105.4ha area (CP1 (37.4ha) + CP2 (32.9ha) + corners (30.6ha) + fenced wetland (4.5ha) = 105.4ha).

Fish & Game notes that:

- i. 180 kg/ha/year loss of N to groundwater over the irrigated area is approximately 4 - 6 times that of a typical dairy grazing platform (approximately 30 – 45 kg N/ha/year); and
- ii. 121 kg/ha/year loss of N to groundwater over the entire area is about 3 times the average loss from a dairy farm, and about 1.5 - 2 time the loss from a winter grazing situation (approximately 60 – 80 kg N/ha/year).
- b. The estimated nitrogen concentration in drainage is 10.6 mg/L beneath the irrigation areas, averaging to approximately 7.3 mg/L beneath the whole activity boundary, due to the lower nitrogen leaching occurring in the non-irrigated areas such as the corners and fenced wetland.

Fish & Game notes that 7.3mg/L and 10.6mg/L represent 64.6% and 93.8% of the maximum allowable value for drinking water in New Zealand (75<sup>th</sup> percent = 8.5mg/L, maximum = 11.3mg/L).

In comparison:

- a. The nitrogen mass loading from the existing pastoral farming scenario (dairy and beef grazing on 100.9ha) is approximately 12 kg N/ha/year, or 11.6 kg N/ha/year as a spatial average over the 105.4ha area (pastoral grazing (100.9ha) + fenced wetland (4.5ha) = 105.4ha); and
- b. The nitrogen concentration in drainage is approximately 2.2 mg/L from the existing pastoral farming scenario (100.9ha).

Fish & Game notes that 2.2 mg/L represents 19.5% of the maximum allowable value for drinking water in New Zealand.

Accordingly, the proposed discharge represents a tenfold (1043%) increase in the annual average nitrogen leaching to groundwater over the entire 105.4ha area.

14. In addition, the application provides that on a monthly basis the minimum and maximum nitrogen will be 1.8 – 18.6mg/L, with peak drainage water concentrations of up to 18 mg/L during the winter months, i.e. on a monthly basis it will exceed the maximum value for drinking water in New Zealand notwithstanding the reduced volume which will be irrigated during the autumn / winter period 1 May – 30 August (average rate of 1,350m<sup>3</sup>/day and maximum rate of 2,000m<sup>3</sup>/day).

In comparison, water quality results from the Manapouri Airport well represent background or pre-development groundwater quality and range from 0.38 – 1.38mg/L, which are typical of groundwater systems showing a minor influence from agricultural land use.

15. Fish & Game submits that:

- a. The effects of the discharge onto land on groundwater quality in the immediate vicinity of the irrigation area is likely to be more than minor.
- b. If granted, measures are required to:
- i. Reduce nitrogen leaching to groundwater.

Leaching to groundwater of approximately 180 kg N/ha/year over the irrigated area or 121 kg N/ha/year as a spatial average over the entire 105.4ha is very high compared to existing losses of 12 kg N/ha/year and inconsistent with other land discharge activities that require a consent, such as farm dairy effluent discharges.

- ii. Monitoring of the effect of the discharge on groundwater.

Reduction in leaching to groundwater could be achieved in a number of ways, such as:

- i. Reducing the amount of nitrogen in the wastewater through additional treatment of it prior to discharge to the irrigation site.
- ii. Prohibiting the application of nitrogen based fertilizer to both the irrigation and surrounding non-irrigated areas, such as the corners.
- iii. Reducing the instantaneous irrigation rate, daily average volume and maximum daily volume, particularly when soil conditions were unsuitable, would reduce losses. However, a larger area of land underlain by suitable soil type(s) to irrigate to and increased storage would be likely to be required.
- iv. Purchasing additional land in the vicinity of the irrigation site and reserving it as a low N loss area. This could be a wetland or areas used for low intensity stocking so that overall the losses from that area were around the existing (pre disposal field) loss concentration of 12 kg/ha/year loss of N to groundwater.

- v. Increasing storage capacity to avoid discharging waste water when soil moisture levels within the irrigation area are at or above field capacity to avoid adverse environmental effects such as ponding, overland flow and accelerated leaching to groundwater.

As presented, the applicant has very limited ability to store treated wastewater for deferred discharge when soil moisture levels within the irrigation area are at or above field capacity. Specifically, the existing waste water treatment plant oxidation ponds has 4,500m<sup>3</sup> of storage, which equates to:

- 1 day storage at the proposed maximum discharge rate (4,500m<sup>3</sup>/day) or 1.5 days storage at the average proposed discharge rate (3,000m<sup>3</sup>/day) during the period 1 September – 30 April; or
- 2.25 days storage at the maximum proposed discharge rate (2,000m<sup>3</sup>/day) or 3.33 days storage at the average proposed discharge rate (1,350m<sup>3</sup>/day) during the period 1 May – 30 August.

The proposed very limited storage proposed is inconsistent with similar consents providing for discharge of contaminants to land. For example, farm dairy effluent discharge permits typically require a minimum of 40 – 90 day storage capacity, depending upon proposed application rates / methods and the suitability of the underlying soils / topography to avoid adverse environmental effects associated with discharging when soils are at or above field capacity.

- c. There is a requirement for high level of management and certainty to ensure the wastewater treatment and discharge system works as designed. In this case:
- i. In the 2012-13 reporting year the existing SDC managed sewage schemes were non-compliant on a number of occasions according to the ES compliance report. For the 18 discharges 12 of these were non-complaint on one occasion or more. Reporting to ES as required was described as good or very good rather than excellent.
  - ii. Groundwater monitoring is proposed but with the infrastructure in place there will be little that can be done to reverse any adverse effects on groundwater quality.

As discussed, N losses are predicted to substantially increase the concentration of N in the underlying aquifer to well above existing concentrations, which is inconsistent with the Region's need to set limits for losses of contaminants into the environment. Little is known about travel times in the aquifer so if remedial action was taken to reduce losses it is not known how long this would take to have an effect on groundwater quality.

- d. As presented, in terms of effects upon groundwater quality, the proposed discharge is inconsistent with:
  - i. Section 7(aa), (b), (c) and (f) of the Resource Management Act;
  - ii. Policies A4 and C1 of the National Policy Statement for Freshwater Management 2011;
  - iii. Objective 8 and Policy 25 of the Regional Water Plan for Southland;
  - iv. Objectives 4.1.2, 4.1.3 and 5.2 and Policies 4.1.2, 4.1.3, 4.2.2, 4.2.3, 4.2.4 and 5.5 of The Effluent Land Application Plan for Southland; and
  - v. Objective WQUAL.1 and Policies WQUAL.1 and .2 of the Proposed Southland Regional Policy Statement 2012.

#### Surface water quality

- 16. The proposed discharge to land will reduce the losses of faecal bacteria, suspended sediment, nitrate and phosphorus associated with the existing discharge of treated wastewater by SDC from the Te Anau Wastewater Treatment Plant to the Upkurerora River and Lake Te Anau, which is supported by Fish & Game. However, the potential effects of the proposed discharge to land include leaching of contaminated groundwater into surface water.
- 17. As set out in paragraph 8 of this submission, surface water in the locality of the irrigation site includes: the Kepler Mire, Home Creek, the Upper Waiau River and Lake Manapouri.

The Regional Water Plan for Southland<sup>4</sup> provides the following classifications with respect to water quality in the above surface water bodies:

- a. Kepler Mire – Lowland / coastal lakes and wetlands;
- b. Home Creek – spring fed; and
- c. Upper Waiau River and Lake Manaporui - natural state.

The above surface water bodies have high habitat, ecology, biodiversity and recreational values.

- 18. In terms of recreational values:
  - a. The 2007 / 2008 National Angling Survey<sup>5</sup> provides that:

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<sup>4</sup> See 'Map 4 – Water Quality' of the Regional Water Plan for Southland.

<sup>5</sup> Unwin M. (April 2009), *Angler usage of lake and river fisheries managed by Fish & Game New Zealand: results from the 2001/02 National Angling Survey*, NIWA, Appendix 1 – Southland Region.



- i. 7,760 ± 1,200 angler days were spent on the upper Waiau River during the 2007 – 2008 angling season; and
- ii. 7,830 ± 1,170 angler days were spent on Lake Manapouri during the 2007 – 2008 angling season.

In addition, the Upper Waiau River and Lake Manapouri is a significant resource for other recreational pursuits such boating, swimming, walking, picnicking and camping (where permitted) along the shore line.

- b. Home Creek is a spring creek fishery which has a low level of use but is highly valued by those who are aware of it; and
- c. Kepler Mire is heavily utilised by waterfowl but receives relatively low recreational game bird hunting use due to difficult access.

19. The application identifies that:

- a. The groundwater contamination plume is most likely to flow in the direction of the Waiau River;
- b. The flow of the contamination plume toward Lake Manapouri is unlikely; and
- c. The potential for the contamination plume to flow towards Kepler Mire and Home Creek is extremely low.

20. Mr Hammond's Staff Report does not propose any surface water quality monitoring, principally on the basis that:

- a. The majority of contaminants would be largely removed by attenuation through the proposed pasture management regime and dilution in the groundwater system;
- b. Modelling, which includes a number of conservative assumptions, predicts very small total nitrogen increases in the Waiau River and Lake Manapouri; and
- c. Kepler Mire and Home Creek are located away from identified groundwater flow paths

21. Fish & Game submits that:

- a. Objective 1 of the Regional Water Plan for Southland provides that the natural quality of natural state waters should not be altered after a zone of reasonable mixing.
- b. Objective 3 of the Regional Water Plan for Southland provides for the maintenance and enhancement of the quality of surface water bodies outside natural state water so that identified values are protected where water quality is already suitable for them, and where water quality is not currently suitable, measurable progress is achieved toward making it suitable for them.

Appendix G of the Regional Water Plan for Southland details the water quality parameters and relevant standards that have been identified as being necessary to protect those values by focusing on the critical or most sensitive value for each water body. These 'critical values' having been agreed through the consultative process.

- c. Objective 4 of the Regional Water Plan for Southland provides for a minimum of a 10% improvement in the levels of microbiological contaminants, nitrate, phosphorus and clarity in surface water bodies classified as spring fed within 10 years of the plan becoming operative (January 2010).
- d. There is uncertainty around the potential scale, duration and frequency of effects of the discharge in the receiving environment, principally by reason of uncertainties with the groundwater flow pathways and inherent uncertainties with modelling techniques used to identify water quality effects.
- e. Significant in stream and out of stream recreational values are associated with surface water bodies in the vicinity of the proposed irrigation site. Further, there is predicted to be a large increase in N leaching to groundwater from the proposed discharge.
- f. If granted, consent conditions are required providing for:
  - i. Maintenance of water quality in adjoining surface water bodies beyond a zone of reasonable mixing, particularly in the Upper Waiau River and Lake Manapouri which are hydraulically connected to the groundwater aquifer underlying the irrigation area and are classified as 'natural state' water bodies; and
  - ii. Surface water quality monitoring to:
    - To validate modelled estimates of impacts upon surface water quality and provide a means to amending management of wastewater discharge if excessive concentrations are observed; and
    - Ensure compliance with the surface water quality parameters set out in the Regional Water Plan for Southland.

### **Consent duration**

22. The applicant proposes a 35 year term for the discharge to land and associated discharge to air, principally to secure the financial viability of the scheme. In contrast, Mr Hammond recommends in his Staff Report granting the consent sought for a period of 25 years due to uncertainty and adopting a precautionary approach as advocated by Council policy where there is uncertainty.
23. If granted, Fish & Game submits a consent duration of 10 – 15 years should be imposed for the following reasons:

- a. Fish & Game concurs with Mr Hammond at page 59 of his Staff Report that there is uncertainty around the potential scale, duration and frequency of effects of the discharge in the receiving environment, principally by reason of uncertainties with the groundwater flow pathways and inherent uncertainties with modelling techniques used to identify water quality effects.
- b. There is the potential for wastewater disposal technology to change over the proposed 25 – 35 year life of the consent. A 25 year consent term is still a significant duration.
- c. It is acknowledged that the applicant has proposed and Mr Hammond's Staff Report includes a raft of conditions for monitoring the effects of the discharge on the receiving environment, excluding surface water, and review of consent conditions. However:
  - i. The effects of the discharge onto land on groundwater quality in the immediate vicinity of the irrigation area is predicted to substantially increase the concentration of N in the underlying aquifer to well above existing concentrations, which are comparatively low;
  - ii. Little is known about travel times in the underlying aquifer so if remedial action was required to reduce adverse effects on ground and / or surface water quality it is not known how long this would take to have an effect;
  - iii. No monitoring is proposed to validate modelled estimates of impacts upon surface water quality and provide a means to amend management of wastewater discharge if excessive concentrations are observed; and
  - iv. Review of consent conditions cannot be initiated by parties affected by adverse effects associated with the discharge.
- d. The applicant's investment is unlikely to be prejudiced by consent of less than 25 or 35 years duration in circumstances where s 104(2A) of the RMA requires decision makers upon application for renewal to have regard (subject to Part II) to the value of the investment of the existing consent holder, when considering renewal of a resource consent.
- e. There appears to be a measure of discrepancy in the length of consent duration imposed on land discharge consents by Environment Southland. For example, farm dairy effluent consents are typically only granted by Environment Southland for 10 – 15 years duration, notwithstanding the degree of investment in physical infrastructure made by individual applicants.

## Conclusion

24. In summary, key issues are:
- a. Impacts of the proposed discharge upon ground and surface water quality and associated monitoring requirements / water quality parameters; and
  - b. Consent duration.
25. Fish & Game submits that the consent should not be granted as sought. Specifically:
- a. A reduction should be required in N loss to groundwater to much lower levels;
  - b. Surface water quality monitoring is required to validate modelled estimates of impacts upon surface water quality and provide a means to amending management of wastewater discharge if excessive concentrations are observed; and
  - c. A consent term commensurate with the uncertainty of the effects of the application and the need to increase the level of treatment, and reduction in nutrients in the waste to be disposed of as population increases occur. Consent duration of 10-15 years would be more appropriate than 35 years sought or 25 years as recommended by Mr Hammond.

Signed: \_\_\_\_\_



Date: Wednesday, 2 July 2014

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