Annexure 5: Water Quantity

[1] In this section of our decision we provide an overview of water quantity issues for the Otago region in the context of PC7.

[2] The region has been subdivided into nine FMUs/rohe based on major and minor catchment boundaries. The largest of these is the Clutha/Mata-Au FMU which covers 67% of the region with 88% of its mean flows coming from major sources in the Southern Alps. The mean flows in the five rohe which make up this FMU (as percentages of the total) are Upper Lakes 72%, Dunstan 15%, Roxburgh 4%, Manuherekia 3% and Lower Clutha 6%.[1]

[3] The significantly drier Roxburgh and Manuherekia rohe have a combined area about the same as the Upper Lakes rohe but with a combined mean flow of about one-tenth of the mean flow of the Upper Lakes rohe.[2]

[4] Water use across the region as indicated from the ORC consents database[3] has a total maximum rate of 155 m^3/s from 1638 consents.[4] This total includes 309 deemed permits[5] totalling 41.3 m^3/s mostly concentrated in the Dunstan, Manuherekia and Roxburgh rohe and Taieri FMU.

[5] Mr T De Pelsemaeker highlighted the need for a comprehensive reassessment of the current limits and environmental flows/levels and the objectives and policies that guide their setting as part of:

(a) a full review of the operative Regional Plan: Water for Otago under s 79 of the RMA;

---

[1] Henderson, EiC at [47].
[2] Henderson, EiC at [48].
[3] As at December 2020.
[4] Henderson, EiC at [50].
[5] For consumptive water.

(b) the development of a new framework for managing land and freshwater, including region-wide objectives, policies and methods; and

(c) the staged development of chapters for individual FMUs/rohe.[6]

[6] He advised that the levels of allocation for some freshwater bodies in the region are high in comparison with the current primary allocation limits set in the RWP. For example, the Schedule 2A Primary Allocation Limit for the Luggate Catchment is 500 l/s compared with a Consented Primary Allocation of 1,100.39 l/s; for the Manuherekia Catchment 3,200 l/s compared with 28,986.271 l/s and for the Taieri Catchment 4,860 l/s compared with 24,748.78 l/s.[7]

[7] He used these examples to support a precautionary approach being taken in the renewal of existing consents for surface water takes until such time as the Council has completed the steps required under the NPS-FM 2020 for setting take limits.[8]

[8] Mr De Pelsemaeker also highlighted that both water demand and water availability would be impacted by climate change as a result of changes in precipitation patterns with temperature rises, reduced snowfalls, particularly at lower levels, and earlier spring melts potentially affecting seasonal river flows.[9]

[9] Mr R Henderson for the Regional Council advised that there are a range of issues affecting the current coverage and continuity of flow recording in the region. These include a lack of monitoring in some catchments/sub-catchments, little or no measurements for smaller tributaries, diversions into and out of catchments,

---

[6] De Pelsemaeker, EiC dated 7 December 2020 at [67].
[7] De Pelsemaeker, EiC dated 7 December 2020 at [70]-[71].
[8] De Pelsemaeker, EiC dated 7 December 2020 at [74].
[9] De Pelsemaeker, EiC dated 7 December 2020 at [99].

abstractions for out of stream use and storage manipulation of flows. All of these create uncertainty in the flow data when allocating water for competing uses.

[10] Using the Manuherekia catchment as an example, he said that major points of difficulty for achieving a water balance[10] include:

(a) discontinuous flow data;
(b) few flow records unaffected by abstraction;
(c) incomplete records from storage reservoirs;
(d) uncertainty around rainfall in the catchment;
(e) extensive redistribution of water from more than 600 km of water races which not only intercept streams but also discharge water in a variety of generally unmeasured ways, such as the discharge of water at the end of a race system into a stream, leakage of water downstream of a metered location, the re-entry of water from overland run-off or seepage and the absence of a requirement to monitor takes of less than 5 l/s.

[11] The summed meter data in the Manuherekia is therefore higher than the total water used with the consequence that this overestimates natural flows for the catchment.

[12] Given the problems with the existing water modelling systems, the need to give effect to NPS-FM 2020 and the time constraints being faced by the Regional Council, the National Institute of Water and Atmospheric Research has been engaged to undertake a staged water resource assessment approach for the region as a whole.

[13] Mr Henderson said that this approach involves:

---

[10] Transcript Dunedin WKS 1-3 (Henderson) at 78: Water balance relates the volume of water coming into a catchment to the volume exiting the catchment.

(a) using national models calibrated for Otago in those catchments where water use is small relative to the resource or and/or where flow data is sparse or absent;

(b) using the approach adopted for the Lindis, Cardrona and Arrow catchments where there is better data availability and water use pressures are more acute;

(c) where complexity, pressure and data issues combine, adopting a more detailed approach based on rainfall runoff, water system modelling and inputs from information in consent applications such as those provided for the Taieri Catchment.

[14] To model behaviours in complex catchments such as the Manuherekia and Taieri which include irrigation applications, water storage and a network of water races, an analysis tool known as GOLDSIM is favoured. A bespoke version of GOLDSIM used some 12 years ago for the Manuherekia Catchment has recently been re-written by a collaborative group of hydrologists and is now at the testing stage, although not yet implemented. Mr Henderson advised that this has taken around a year to get to the current stage.

[15] Mr Henderson suggested there was a need for an equivalent bespoke model to be written for the Taieri catchment, although this had not been commissioned by the Council.[11]

[16] Mr M Hickey, for OWRUG, disputed Mr De Pelsemaeker's evidence that the Council had insufficient knowledge to implement the NPS-FM 2020 now. He argued that the time between February 2021 (when he wrote his evidence) and the December 2023 notification date for a new regional plan did not give the Regional Council time to rectify the data gaps identified by Mr De Pelsemaeker. He considered that where deemed permits dominated, there was already sufficient information to implement NPS-FM 2020 without the delay of PC7. This existing

[11] Transcript Dunedin WKS 1-3 (Henderson) at 87.

information was not confined to water quantity issues but extended across the range of ecological issues to be addressed under the policy statement.[12] In his opinion, the Manuherekia catchment existing data sets are already an adequate basis on which to build hydrological models and that the modelling work had effectively been done.

[17] Finally, Mr Hickey, noting Mr Henderson's evidence that in complex catchments, hydrological modelling can take two to three years to develop and complete, thought it unlikely that hydrological modelling for the Taieri and Kakanui catchments would be completed before notification of a new regional plan.[13]

Consideration

[18] There is, we find, a high degree of uncertainty in the reliability of the existing water quantity information held by the Regional Council. However, we do not find it necessary to take a view one way or the other as to whether the Regional Council's water resource assessment programme can be completed by the time of the notification of a new regional plan. Of more importance are our findings that the operative regional plan does not give effect to the three relevant national policy statements and likewise, also, the operative regional policy statement. Te Mana o te Wai is not an integral part of freshwater management in Otago and the weakly drawn objectives of the RWP provide no direction on outcomes for the environment (people and communities included).

[12] Hickey, EiC at 2 (Summary).
[13] Hickey, EiC at [55].