

# AQUIFER MANAGEMENT AND THE LAW: AN APPLICATION OF MASLOW'S HIERARCHY OF NEEDS AND SUSTAINABLE DEVELOPMENT GOAL SIX

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## I. INTRODUCTION

The Havelock North drinking water campylobacteriosis incident in 2016 highlighted various issues in relation to aquifer management in New Zealand. The report of the Havelock North Drinking Water Inquiry found that the campylobacteriosis among the affected Havelock North residents was caused by their drinking water being contaminated with campylobacter bacterium.<sup>1</sup> The Report stated that the likely source of the campylobacter bacterium was sheep faeces.<sup>2</sup> Ultimately, sheep faeces had contaminated the water supply at Brookvale Road's bore 1 and 2.<sup>3</sup>

The Report found that there were no criticism to be attributed to the farmers who had sheep grazing in the paddocks near these neighbouring contaminated bores.<sup>4</sup> This was because having their sheep grazing in this area was a permitted activity and therefore did not require a resource consent.<sup>5</sup> Essentially, this finding highlights the issue of classifying the land use activity of sheep grazing in paddocks in close proximity to groundwater used for drinking water supply as a permitted activity. This will be termed the "first issue". This first issue raises the question of whether the land use activity of sheep grazing should be something other than a permitted activity, when there is potential for the activity to adversely affect the quality of groundwater used for drinking water purposes in near proximity.

The Report further stated that the Te Mata aquifer, where the contaminated drinking water was drawn from, was not a "source of aged water".<sup>6</sup> It was noted that this can indicate that pathogens are entering into the aquifer through surface water.<sup>7</sup> This finding highlights the issue of abstracting groundwater that is not a source of aged water for drinking water purposes. This will be referred to as the "second issue". This second issue raises the question of whether groundwater that is young in age should be used for drinking water sources at all.

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1 Government Inquiry into Havelock North Drinking Water *Havelock North Drinking Water Inquiry: Stage 1* (Department of Internal Affairs, May 2017) at [10].

2 Government Inquiry into Havelock North Drinking Water, above n 1, at [10].

3 At [33].

4 At [221].

5 At [221].

6 At [17].

7 Government Inquiry into Havelock North Drinking Water *Havelock North Drinking Water Inquiry: Stage 2* (Department of Internal Affairs, December 2017) at [221].

Paul White has suggested that Maslow's Hierarchy of Needs could potentially be used to improve aquifer management legislation frameworks and policies in New Zealand.<sup>8</sup> This is an interesting proposition in light of the two identified issues relating to aquifer management. In view of these two issues and White's thesis, this article will explore how Maslow's Hierarchy of Needs can be used as a lens to identify aquifer management issues and gaps within current law and policy.

There are six substantive parts. Part II will explain Maslow's Hierarchy of Needs (Maslow's HON). It will provide a brief overview of the different needs encompassed within the hierarchy including the physiological, safety, love, esteem and self-actualisation needs. Part III will discuss Sustainable Development Goal Six (SDG6) The goal's targets and its relevance to aquifer management will be examined in this section. Part IV will explore the state of New Zealand's groundwater and aquifers. It is submitted in this section that New Zealand is arguably not meeting their goals in SDG6 with respect to groundwater. Part V will identify the relevant law and policy associated with the two specified issues. Part VI will utilise Maslow's HON and SDG6 as a lens to identify the gaps within law and policy associated with the two specified issues. In this section it is suggested that there are various gaps within law and policy that need to be addressed in relation to the two issues. Part VII will discuss what the law ought to look like in regard to addressing the issues and gaps identified as a result of using SDG6 and Maslow's HON as a lens. In essence, this section proposes that sheep should not be allowed in paddocks that are in close proximity to underground aquifer sources used for drinking water, or alternatively, the activity should require a resource consent, rather than be a permitted activity. Furthermore, it is recommended that the abstraction of young groundwater used for drinking water purposes should not be allowed. Lastly, this section recommends that Maslow's HON and SDG6 be integrated into New Zealand law and policy associated with aquifer management, particularly in terms of the management of drinking water sources. This supports White's thesis in terms of Maslow's HON.

The findings that are made are significant because they identify where law and policy can be improved in terms of addressing the two specified issues relating to sheep grazing and young groundwater abstraction. Ultimately, the findings can help ensure that Maslow's HON are met, and that SDG6 is achieved in terms of aquifer management.

## II. MASLOW'S HIERARCHY OF NEEDS

In relation to White's thesis, it is submitted that Maslow's Hierarchy of Needs can be related to aquifer management law and policy. How it can be used to address aquifer management legislation and policy gaps and issues will be explored at a later stage. A brief overview of Maslow's HON will now be presented.

Abraham Maslow proposed a theory of human motivation in 1943.<sup>9</sup> In his positive theory, he argued that there are five sets of basic needs, namely: physiological, safety, love, esteem, and self-actualisation needs, which are ordered in a prepotency hierarchy.<sup>10</sup> The prepotency aspect of the hierarchy means that the most prepotent needs, such as physiological needs, must be "fairly well satisfied" before other needs will emerge and "dominate the conscious life".<sup>11</sup> This concept has also

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8 Paul White "Maslow's Hierarchy of Needs and water management" (2020) 59(1) *Journal of Hydrology* 1.

9 Abraham Maslow "A Theory of Human Motivation" (1943) 50 *Psychological Review* 370.

10 At 394.

11 At 395.

been referred to, by Maslow, as the “principle of relative potency”.<sup>12</sup> It is important to mention that the emergence of these other needs is not always sudden, and the satisfaction of the most prepotent needs may be taking place at the same time as the satisfaction of other needs, demonstrating that partial satisfaction of all the basic needs can sometimes occur simultaneously.<sup>13</sup> These five basic needs are not necessarily determinants of behaviour, however, humans may be motivated to want the “most prepotent needs” in the hierarchical framework, rather than other needs when deprived of all needs.<sup>14</sup> This theory is referred to as Maslow’s Hierarchy of Needs. Each set of basic needs will now be considered in turn starting with physiological needs.

Maslow proposed that physiological needs are the “most prepotent needs” of all human needs and they are a major motivator in comparison to other needs.<sup>15</sup> The list of physiological needs is not exhaustive.<sup>16</sup> Physiological needs are not necessarily homeostatic.<sup>17</sup> They fall under the category of “lower” needs as opposed to “higher” needs.<sup>18</sup> An example of a physiological need is food.<sup>19</sup> This is because no other interests exist but food when a man is extremely hungry, according to Maslow.<sup>20</sup>

After the physiological needs have been satisfied to an extent, safety needs become relevant. According to Maslow, depending on the circumstances, safety needs may be more important than physiological needs once physiological needs have been satisfied.<sup>21</sup> The need for safety can be demonstrated through an observation of children’s or infants’ behaviour.<sup>22</sup> For example, infant’s and children’s need for safety is evident through their reaction when they feel endangered due to reasons such as “rough handling” or “inadequate support”.<sup>23</sup> In regard to adults, the need for safety can be drawn from the general preference for “familiar rather than unfamiliar things”.<sup>24</sup> Safety needs in adults can be satisfied through the availability of a society that is peaceful, good and running smoothly.<sup>25</sup>

Love needs are concerned with love, affection and belongingness.<sup>26</sup> After the lower physiological and safety needs have been gratified in some regard, a person will experience a “hunger for affectionate relations with people in general”.<sup>27</sup> Maslow proposed that to have a place in this world is something that a person wants more than anything else at this love needs level.<sup>28</sup>

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12 Abraham Maslow “‘Higher’ and ‘Lower’ Needs” (1948) 25 *The Journal of Psychology* 433 at 433.

13 Maslow, above n 9, at 388.

14 At 387.

15 At 373.

16 At 372.

17 At 372.

18 Paul White, above n 8, at 2.

19 Maslow, above n 9, at 373.

20 At 375.

21 At 376.

22 At 376.

23 At 376.

24 At 379.

25 At 378–379.

26 At 380.

27 At 381.

28 At 381.

In relation to esteem needs, in order to avoid the production of weakness, inferiority, and helplessness feelings, people generally have a need for self-respect and a “high evaluation of themselves” once other needs have been somewhat satisfied.<sup>29</sup> These esteem needs can be achieved through the gratification of the achievement, strength, confidence, freedom, independence, prestige, and reputation desires.<sup>30</sup>

The final need for self-actualisation relates to the individual's need to do “what he is fitted for”, and the desire to be self-fulfilled.<sup>31</sup> This need arises out of the development of “discontent and restlessness” after the other needs have been satisfied.<sup>32</sup> The need for self-actualisation is a “higher” need.<sup>33</sup> People who have achieved a self-actualisation level of living are the ones who most love mankind.<sup>34</sup>

### III. SUSTAINABLE DEVELOPMENT GOAL SIX

It is submitted that no examination of aquifer management would be complete without considering the United Nations' Sustainable Development Goals. This is because the New Zealand Government has committed to the Sustainable Development Goals, including Sustainable Development Goal 6 (SDG6) concerned with clean water and sanitation.<sup>35</sup> In 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development.<sup>36</sup> Within this Agenda is a list of seventeen Sustainable Development Goals.<sup>37</sup> The goals and targets set out in the Agenda aim to build on and achieve what the Millennium Development Goals did not accomplish.<sup>38</sup> The former Millennium Development Goal Seven relating to environmental sustainability was modified into SDG6 in the 2015 Agenda.<sup>39</sup> SDG6 is explicitly related to aquifer management law and policy. An overview of SDG6 and the relevant targets within this goal will now be given. It will be demonstrated why these targets are relevant, thus briefly highlighting the relationship between the target and aquifer management.

The overall goal of SDG6 is to “ensure availability and sustainable management of water and sanitation for all”.<sup>40</sup> Within this overarching goal are certain targets which are aiming to be achieved within specific time frames. Target 6.1 is aimed at achieving “universal and equitable access to safe and affordable drinking water for all” by 2030.<sup>41</sup> This target is relevant to aquifer management because underground aquifers are often a source of drinking water for populations, as

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29 At 381–382.

30 At 381–382.

31 At 382.

32 At 382.

33 Maslow, above n 12, at 434.

34 At 436.

35 United Nations “Goal 6” <<https://sdgs.un.org>>.

36 *Transforming our world: the 2030 Agenda for Sustainable Development* GA Res 70/1 (2015).

37 At 14/35.

38 At Preamble.

39 Sukanya Som and Bimal Prasanna Mohanty “The road from Millennium Development Goals to Sustainable Development Goals: A Transition in Need Hierarchy” (2018) II RDWU Bulletin of Science 24 at 33.

40 *Transforming our world: the 2030 Agenda for Sustainable Development* GA Res 70/1 (2015) at 18/35.

41 United Nations “Goal 6”, above n 35.

demonstrated in the Havelock North case example. Target 6.3 is concerned with improving water quality through specific methods by 2030.<sup>42</sup> These methods include “reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally”.<sup>43</sup> This target is relevant to the quality of water embodied within an underground aquifer, like the Te Mata aquifer. Target 6.4 relates to increasing efficiency in water-use and working towards the reduction of people suffering from water scarcity by 2030.<sup>44</sup> This target is relevant to underground aquifer water usage and allocation. Target 6.6 is aimed at water-related ecosystems’ protection and restoration.<sup>45</sup> This includes “mountains, forests, wetlands, rivers, aquifers and lakes”.<sup>46</sup> This target has a direct relationship with the protection and restoration of underground aquifers. Target 6.a focuses on developing countries in regard to the expansion of international cooperation and capacity building support.<sup>47</sup> This target is relevant to aquifer management in the sense that the need for coordinated and joined up government at all levels is essential. Target 6.b aims at improving sanitation and water management through the participation of local communities in sanitation and water management being supported and strengthened. This target is relevant to the new freshwater planning process and limited appeal rights in New Zealand. Accordingly, SDG6 is relevant to aquifer management in a variety of ways.

It should be noted that governments individually decide on how their national strategies, policies, planning and processes will incorporate the targets in relation to the Sustainable Development Goals.<sup>48</sup> In 2019, the New Zealand Government released a report detailing their progress towards the Sustainable Development Goals.<sup>49</sup> With reference to SDG6, the report stated that a clear priority for New Zealand was the “sustainable development of freshwater” and freshwater quality improvement.<sup>50</sup> Specific key goals of the New Zealand Government, in regard to SDG6, were to “reduce key sources of pollution” from urban land use and farming in relation to water ecosystems, and to create a system which facilitated the meaningful engagement of well-informed communities in “integrated catchment planning” and the “management of water services”.<sup>51</sup> The report also identified that the New Zealand Government had already implemented various initiatives in order to address the targets under SDG6. For example, initiatives included the “review of the Three Waters service regulation”, the creation of a policy development taskforce, the “Essential Freshwater Policy Programme”, and the “Freshwater Improvement Fund” and more.<sup>52</sup> These initiatives and their effectiveness in relation to the two issues will be considered at a later stage.

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42 United Nations “Goal 6”, above n 35.

43 United Nations “Goal 6”, above n 35.

44 United Nations “Goal 6”, above n 35.

45 United Nations “Goal 6”, above n 35.

46 United Nations “Goal 6”, above n 35.

47 United Nations “Goal 6”, above n 35.

48 *Transforming our world: the 2030 Agenda for Sustainable Development*, above n 40, at [55].

49 New Zealand Government *He waka eke noa Towards a better future, together: New Zealand’s progress towards the SDGs – 2019* (July 2019).

50 New Zealand Government, above n 49, at 49–53.

51 At 49.

52 At 51–52.

#### IV. AQUIFERS AND GROUNDWATER

It is briefly worth discussing aquifers and groundwater. This is because according to Raewyn Peart “there is a poor understanding of groundwater resources” in New Zealand, and this is despite the reliance on groundwater resources for drinking water purposes by a third of the people living in New Zealand.<sup>53</sup> In essence, basement or sedimentary aquifers are where groundwater is primarily sourced from.<sup>54</sup> Groundwater around the world is under threat from climate change, contamination and human development.<sup>55</sup> This is concerning because approximately half of all drinking water globally is sourced from groundwater.<sup>56</sup>

In New Zealand, the Ministry for the Environment has identified in the *Our Freshwater 2020* report that many groundwater aquifers around New Zealand are polluted with “unnaturally high levels of nutrients, chemicals, disease-causing pathogens, and sediment”.<sup>57</sup> However, it should be noted that the results regarding groundwater quality are mixed.<sup>58</sup> The Ministry for the Environment has stated that there cannot be an estimation on the “specific effects of land use on groundwater quality”, however, there is an indication that groundwater in certain monitored locations had been “influenced by industrialised agriculture”.<sup>59</sup> This finding is supported by Connie Bollen who found that groundwater in the Waikato region of New Zealand is “subject to higher levels of nutrients than what would normally occur” due to the 3000 dairy herds in the region creating “as much waste as 5 million people”.<sup>60</sup> The Ministry for the Environment has submitted that groundwater pollution “comes from the mosaic of cities, farms, and plantation forests” thus not attributing blame for groundwater pollution and contamination to one single land use activity.<sup>61</sup> Ultimately, the current groundwater quality findings by the Ministry for the Environment indicate that New Zealand has not achieved its goals yet in terms of meeting SDG6, due to an array of reasons.

#### V. RELEVANT LAW

The current relevant law administered by local authorities in the context of the two issues will now be identified. The relevant law will then be applied to the two issues. The Hawke's Bay region will be used as a case example to demonstrate the relevant law in a practical context. Overall, this

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53 Raewyn Peart “Innovative approaches to water resource management: A comparison of the New Zealand and South African approaches” (2001) 5 *New Zealand Journal of Environmental Law* 127 at 149.

54 Chihurumanya Belema Nwankwo and others “Groundwater Constituents and Trace Elements in the Basement Aquifers of Africa and Sedimentary Aquifers of Asia: Medical Hydrogeology of Drinking Water Minerals and Toxicants” (2020) 4 *Earth Systems and Environment* 369 at 369.

55 Upmanu Lall, Laureline Josset and Tess Russo “A Snapshot of the World's Groundwater Challenges” (2020) 45 *Annual Review of Environment and Resources* 171 at 171.

56 Daniel Smith and others “A multi-approach assessment of land use effects on groundwater quality in a karstic aquifer” (2020) 6 *Heliyon* 1 at 1.

57 Ministry for the Environment *Our Freshwater 2020* (April 2020) at 29.

58 At 39.

59 At 39.

60 Connie Bollen “Managing the Adverse Effects of Intensive Farming on Waterways in New Zealand – Regional Approaches to the Management of Non-point Source Pollution” (2015) 19 *New Zealand Journal of Environmental Law* 207 at 211.

61 Ministry for the Environment, above n 57, at 29.

section will consider a variety of pieces of legislation and policy, beginning with the Resource Management Act 1991.

### A. *Resource Management Act 1991*

Section 9 of the Resource Management Act 1991 (RMA) is a good starting point in terms of the relevant law because it sets out certain restrictions in relation to the use of land.<sup>62</sup> Taking into account s 9, provided that a person does not contravene a national environmental standard, regional rule or district rule in relation to the use of land, essentially “any use of land is allowed” in accordance with the RMA.<sup>63</sup> However, a resource consent may expressly allow a person to use land in a manner that contravenes a national environmental standard, regional rule or district rule.<sup>64</sup> A resource consent is not required for activities described as “permitted” in Acts, regulations, national environmental standards, plans or proposed plans.<sup>65</sup> A resource consent is required for activities described as “controlled”, “restricted discretionary”, “discretionary” or “non-complying”.<sup>66</sup> When an activity is described as “prohibited”, no resource consent can be granted.<sup>67</sup> In relation to the information required in an application for a resource consent, s 88 and sch 4 of the RMA sets out that an “assessment of the activity’s effects on the environment” is required.<sup>68</sup> These aspects of the RMA can be applied to the first issue because, if sheep grazing in a paddock near groundwater is categorised as a permitted activity, like what happened in the Havelock North incident, then essentially the activity is allowed and no assessment of environmental effects or resource consent application is required under s 88 and sch 4 of the RMA. This arguably leaves groundwater in near proximity open to being adversely affected by the consequences associated with sheep grazing.

Sections 30 and 31 of the RMA are worth considering in terms of relevant law because they set out the jurisdiction of regional councils and territorial authorities in relation to land use, among other things.<sup>69</sup> Under s 30 of the RMA, regional councils have “limited responsibility for land use”.<sup>70</sup> Essentially, s 30 stipulates that regional councils have the function of controlling the use of land for the purposes set out in s 30(1)(c) of the RMA in relation to the “purpose of giving effect to” the RMA in its own specific region.<sup>71</sup> Regional councils can “control the use of land” for the purpose of “the maintenance and enhancement of the quality of water in water bodies”<sup>72</sup> and “the maintenance of the quantity of water in water bodies”.<sup>73</sup> These functions relate to groundwater and aquifers because the RMA defines “water body” as “fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the

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62 Resource Management Act 1991, s 9.

63 Derek Nolan (ed) *Environmental and Resource Management Law* (online ed, LexisNexis) at [4.2].

64 Derek Nolan (ed), above n 63, at [4.2]; Resource Management Act 1991, s 9.

65 Resource Management Act 1991, s 87A.

66 Section 87A.

67 Section 87A(6).

68 Schedule 4.

69 Section 30; Section 31.

70 Derek Nolan (ed), above n 63, at [4.4].

71 Resource Management Act 1991, s 30.

72 Section 30(c)(ii).

73 Section 30(c)(iii).

coastal marine area”.<sup>74</sup> Therefore, this function includes aquifers. In the Government Inquiry into the Havelock North drinking water incident, it was recommended, that within s 30 of the RMA, there should be a specific function of regional councils to protect and manage sources of drinking water.<sup>75</sup> This recommendation has not been implemented. Section 30 can be applied to the first issue because in terms of the maintenance and enhancement of groundwater quality, as per s 30, Regional councils can control the use of land. This means that Regional councils can control the land on which sheep graze, in order to maintain and enhance the groundwater in the area, as per s 30 by including rules in regional plans.

Under s 31 of the RMA, territorial authorities have the function of “the control of any actual or potential effects of the use, development, or protection of land”.<sup>76</sup> Essentially, territorial authorities are “responsible within their respective districts for land use”.<sup>77</sup> Evidently, there is some overlap regarding the jurisdiction of land use between regional councils and territorial authorities. Ultimately, this section relates to the first issue in terms of land use and sheep grazing.

Section 15 of the RMA deals with discharges of contaminants into the environment.<sup>78</sup> Under this section, no person is allowed to discharge contaminants into the environment unless the discharge is expressly allowed by resource consents, rules in regional plans or national environmental standards or regulations.<sup>79</sup> This section is applicable to the first issue because there may be diffuse discharges, like animal waste, that result from sheep grazing in paddocks. These diffuse discharges may then enter groundwater and adversely affect its quality. This raises the question of whether s 15 adequately deals with the first issue in terms of discharges of animal waste into the environment absent rule making or enforcement by regional councils.

The RMA additionally sets out the requirements regarding the preparation of regional plans, and the rules within the regional plans. This explicitly relates to regional councils. Sections 66, 67, 68, 69 and 70 are relevant sections relating to regional plans. In terms of s 66, this section outlines that a regional plan must be prepared and changed by a regional council “in accordance with its functions under section 30”.<sup>80</sup> This includes the previously mentioned s 30 functions relating to land use and groundwater. Section 68 specifies that when a regional council makes a rule in a regional plan, they “shall have regard to the actual or potential effect on the environment of activities, including, in particular, any adverse effect”.<sup>81</sup> Section 3 of the RMA defines what the meaning of “effect” is.<sup>82</sup> The scope of “effect” includes any “positive”, “adverse”, “temporary”, “permanent”, “past”, “present”, “future”, and “cumulative” effect, along with any “potential effect of high probability” and “potential effect of low probability which has a high potential impact”.<sup>83</sup> Furthermore, s 69 stipulates requirements around regional rules relating to water quality.<sup>84</sup> These

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74 Section 2(1).

75 Government Inquiry into Havelock North Drinking Water, above n 7, at [622].

76 Resource Management Act 1991, s 31(1)(b).

77 Derek Nolan (ed), above n 63, at [4.4].

78 Resource Management Act 1991, s 15.

79 Section 15.

80 Section 66(1).

81 Section 68(3).

82 Section 3.

83 Section 3.

84 Section 69.



sections of the RMA are relevant to the first issue because the regional council could have regard to these sections to justify including the rules regarding sheep grazing in paddocks in their plan. Likewise for the second issue.

The RMA additionally deals with water takes and abstraction, which relates to the second issue being young groundwater abstraction for drinking water purposes. Section 14 of the RMA is relevant.<sup>85</sup> The basic position under the RMA is that prior consent is required unless one of the s 14(3) exceptions apply or the take is permitted by a plan rule or regulation.<sup>86</sup> In light of this section of the RMA, questions should be raised. For example, why either consent is granted for young groundwater abstraction, or why young groundwater abstraction is permitted by plan rules or regulations, as was demonstrated in the Havelock North incident, especially since young groundwater can be an indication of contamination of the groundwater source. Ultimately, s 14 can be applied to the second issue because it sets out parameters regarding water abstraction that can be regulated by (inter alia) regional plan rules.

### *B. Health Act 1956*

The Health Act 1956 (HA) is relevant to local authorities in relation to their role as suppliers of drinking water.<sup>87</sup> In particular, pt 2A of the HA is relevant because it deals specifically with drinking water and drinking-water suppliers.<sup>88</sup> Under 69A(2)(c) of the HA, there are a range of duties imposed on drinking water suppliers, including the duty to “take all practicable steps to comply with the drinking-water standards”.<sup>89</sup> The provisions set out in pt 2A of the HA can be applied to the identified issues because these provisions relate to the safety of drinking water and ultimately both the first and second issue pose a risk to the safety of drinking water. It should be noted that the Water Services Act 2021 (WSA) was enacted on 4 October 2021, and therefore will change the law relating to drinking water and drinking-water suppliers. The WSA and its applicability to the two overall issues will now be examined.

### *C. Water Services Act 2021*

The WSA has a purpose of ensuring that safe drinking water is provided by drinking water suppliers to consumers under s 3.<sup>90</sup> The WSA therefore imposes an array of obligations and duties on drinking water suppliers in relation to drinking water. A few notable differences between the HA and the WSA are as follows. The WSA under s 22 imposes a duty on drinking water suppliers to comply with the drinking water standards, whereas the HA merely imposes a requirement that the drinking water suppliers take all practicable steps to comply under s 69A.<sup>91</sup> The WSA imposes a duty on drinking water suppliers to prepare and implement source water risk management plans under s 43 as part of their overall drinking water safety plan, whereas the HA did not impose this

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85 Section 14.

86 Section 14(3).

87 Health Act 1956.

88 Health Act 1956, pt 2A.

89 Health Act 1956, s 69A(2)(c)(ii).

90 Water Services Act 2021, s 3.

91 Water Services Act 2021, s 21.

duty.<sup>92</sup> The WSA also requires regional councils to publish source water information under s 46, whereas the HA did not.<sup>93</sup> Overall, the statutory duties and water planning requirements imposed on water suppliers and regional councils could affect the current situation relating to drinking water in a variety of ways. However, arguably, the WSA imposes more stringent requirements on local authorities in relation to drinking water safety, and thus more resources may need to be allocated in this area. Like the HA, the WSA can be applied to the two overall issues because it deals with drinking water safety, and therefore is relevant to the management of the two issues.

#### *D. Essential Freshwater Package*

As mentioned, initiatives that the Government have undertaken as part of SDG6 include the review of the Three Waters service regulation, and the Essential Freshwater Policy Programme.<sup>94</sup> Included within the Essential Freshwater package are new rules and regulations, such as the National Policy Statement for Freshwater Management 2020,<sup>95</sup> Resource Management (National Environmental Standards for Freshwater) Regulations 2020,<sup>96</sup> Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020,<sup>97</sup> and the Resource Management (Stock Exclusion) Regulations 2020.<sup>98</sup> These policies and regulations can be applied to the identified issues because they are associated with freshwater, and some groundwater is freshwater.

In relation to the National Policy Statement for Freshwater Management 2020 (“NPSFM”), this policy statement is applicable to groundwater.<sup>99</sup> Under pt 3 of the NPSFM, local authorities are supplied with a “non-exhaustive list of things” that they must do in order “to give effect to the objective and policies in Part 2” of the national policy statement.<sup>100</sup> A notable requirement of local authorities under paragraph 3.5 of the NPSFM is for local authorities to manage freshwater and land use in an “integrated and sustainable way” and this is for the purpose of avoiding, remedying or mitigating “adverse effects” on water bodies’ “health and well-being”.<sup>101</sup> Taking into account this requirement, the NPSFM is applicable to the first issue because essentially the NPSFM tries to deal with this first issue through local authorities in an “integrated and sustainable way”, as per paragraph 3.5. Under pt 4 of the NPSFM, as soon as reasonably practicable, every local authority must give effect to the NPSFM.<sup>102</sup>

In terms of the Resource Management (National Environmental Standards for Freshwater) Regulations 2020, these regulations are associated with the already specified functions of regional councils under s 30 of the RMA.<sup>103</sup> These regulations do not refer to groundwater aquifers

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92 Water Services Act 2021, s 43.

93 Water Services Act 2021, s 46.

94 New Zealand Government, above n 49, at 51–52.

95 National Policy Statement for Freshwater Management 2020.

96 Resource Management (National Environmental Standards for Freshwater) Regulations 2020.

97 Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020.

98 Resource Management (Stock Exclusion) Regulations 2020.

99 National Policy Statement for Freshwater Management 2020 at [1.5].

100 At [3.1].

101 At [3.5].

102 At [4.1].

103 Resource Management (National Environmental Standards for Freshwater) Regulations 2020, reg 5.

specifically, despite referring to other kinds of freshwater bodies, such as rivers. This is arguably a gap within the law. However, they do refer to discharges of contaminants onto land and then into water from feedlots under reg 9.<sup>104</sup> This could include groundwater. Unfortunately reg 9 deals with cattle feedlots and not sheep feedlots, so these regulations as part of the Essential Freshwater Package do not address the first issue regarding sheep grazing in paddocks near groundwater aquifers.

The Resource Management (Stock Exclusion) Regulations 2020 deal with stock exclusion from various water bodies including lakes, wide rivers, and natural wetlands.<sup>105</sup> They do not deal with the exclusion of sheep from land near groundwater, and therefore are prima facie not applicable to the two identified issues. This is ostensibly a gap within the current law. However, they provide an analogy in favour of exclusion of sheep from freshwater bodies and land near groundwater aquifers. Essentially, the regulations impose a three-metre setback of stock from lakes and rivers under reg 8.<sup>106</sup>

Overall, after considering various components of the Essential Freshwater Package, it is argued that the package does not adequately address the two issues relating to sheep grazing and young groundwater abstraction. Recommendations will be made at a later stage.

#### *E. Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007*

The Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007 are applicable to the identified issues. These regulations deal with water permits, discharge permits and permitted activity rules in relation to “activities with potential to affect certain drinking-water supplies”.<sup>107</sup> This is applicable to the first issue relating to sheep grazing because this activity has the potential to affect groundwater drinking-water supplies.

Regulation 10 stipulates that a regional council must not include in its regional plan “a rule or amend a rule” that allows a permitted activity which is “upstream of an abstraction point” under ss 9, 13, 14 or 15 of the RMA.<sup>108</sup> In terms of aquifers and groundwater, “upstream of an abstraction point” means “up-gradient of the abstraction point”.<sup>109</sup> They must not include these rules unless the regional council can be “satisfied” that the permitted activity is not likely “to introduce or increase the concentration of any determinands in the drinking water” and in which results in the drinking water not meeting the “health quality criteria” after “existing treatment”.<sup>110</sup> This regulation is applicable to the first issue because sheep can excrete determinands onto land that are then introduced into drinking water, as demonstrated in the Havelock North drinking water incident. If the sheep grazing is up-gradient of the groundwater abstraction point, this regulation could apply.

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104 Regulation 9.

105 Resource Management (Stock Exclusion) Regulations 2020.

106 Regulation 8.

107 Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007.

108 Regulation 10.

109 Regulation 3.

110 Regulation 10.

### *F. Drinking-water Standards for New Zealand 2005*

The DWS 2005 were revised in 2018.<sup>111</sup> As per s 69A of the HA, drinking water standards can be issued or adopted by the Minister of Health.<sup>112</sup> The DWS 2005 operate on a "secure" and "non-secure" classification system when it comes to the treatment of groundwater in bores used for drinking water purposes.<sup>113</sup> If bore water supplies are classified as "secure", then no treatment is required.<sup>114</sup> Essentially, bore water supplies are classified as "secure" when the "bore water is not directly affected by surface or climate influences" and therefore, "it can be demonstrated that contamination by pathogenic organisms is unlikely".<sup>115</sup> Ultimately, this secure classification system relates to both confined and unconfined aquifers in the sense that interim bore water security is applicable to confined aquifers and unconfined aquifers more than 30 metres deep for the first 12 months of operation.<sup>116</sup> Essentially, both confined and unconfined aquifers can be classified as secure, provided that certain conditions are met.

The DWS 2005 sets out three criteria that must be met in order to demonstrate that a groundwater bore water supply is secure. In essence, the first criterion mandates that in order to demonstrate that "bore water is not directly affected by surface or climate influences", it must be shown that "water younger than one year" is not detectable within the aquifer or "the lack of significant variability in determinands that are linked to surface effects".<sup>117</sup> The second criterion stipulates that there must be satisfactory protection provided to the bore head.<sup>118</sup> A point to note is that under this category, "animals must be excluded from within 5 m of the bore head".<sup>119</sup> The third criterion is that "Escherichia coli must be absent from bore water".<sup>120</sup> The DWS 2005 sets out "ongoing monitoring compliance requirements" for secure bore water sources.<sup>121</sup> If bore water supplies are classified as "non-secure" then treatment is required because, according to the DWS 2005, it is likely that micro-organisms have contaminated the water.<sup>122</sup> It is worth noting that the Government Inquiry into the Havelock North drinking water incident found that "the concept of a "secure" supply of drinking water was "unsafe and unsound" and further concluded that in relation to drinking water, "universal treatment is necessary".<sup>123</sup> The DWS 2005 is applicable to the first issue because it sets out a small exclusion zone of sheep from the bore head in order to impose "secure" status of the water extracted from the bore. This relates to regulating land use around the groundwater bore head. The DWS 2005 relates to the abstraction of young groundwater for drinking water purposes,

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111 Ministry of Health *Drinking-water Standards for New Zealand 2005 (Revised 2018)* (19 December 2018) <[www.health.govt.nz](http://www.health.govt.nz)>.

112 Health Act 1956, s 69A(2)(b).

113 *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111.

114 At [10.3.2.2].

115 At [4.4.1].

116 At 115.

117 At [4.4.2].

118 At [4.4.3].

119 At [4.4.3].

120 At [4.4.4].

121 At [4.4.1].

122 At [10.3.2.2].

123 Government Inquiry into Havelock North Drinking Water, above n 78, at [145].

being the second issue, because it allows the abstraction of young groundwater provided that there is a “lack of significant variability in determinands that are linked to surface effects” under the first criterion.<sup>124</sup>

### G. Reforms to the RMA

It should be mentioned that in June 2020, the Resource Management Review panel, chaired by Hon Tony Randerson QC, published the report titled *New Directions for Resource Management in New Zealand*.<sup>125</sup> Based on this review, the Government has made the decision to repeal and replace the Resource Management Act 1991.<sup>126</sup> The three proposed new pieces of legislation arising out of the reform are the Natural and Built Environments Act, Strategic Planning Act and the Climate Change Adaptation Act.<sup>127</sup> These reforms are applicable to the two issues because ultimately the new legislation may influence whether or not these issues are addressed. The *New Directions for Resource Management in New Zealand* report did not recommend many changes to the consenting and approval process, which indicates that these issues may not be addressed despite the RMA reforms.<sup>128</sup>

### H. Case Example: Hawke’s Bay

The Hawke’s Bay region will now be used as a case example to demonstrate how local authorities within a region of New Zealand have or have not integrated the relevant law into regional and district plans in order to address the two issues. For this case example, the local authorities of the Hawke’s Bay Regional Council (HBRC) and the Hastings District Council (HDC) will be utilised.

#### 1. HBRC regional plan

In terms of resource planning documents under the RMA for the Hawke’s Bay region, the Regional Resource Management Plan (RRMP) is the “most extensive resource planning document”.<sup>129</sup> It became operative on 28 August 2006.<sup>130</sup> In relation to groundwater, the RRMP stipulates that groundwater is relied upon “as a dependable and safe supply for domestic” purposes.<sup>131</sup> The RRMP notes at paragraph 1.4.6 that groundwater within the region is “at risk from various activities” including “intensive primary production” among other activities.<sup>132</sup>

A rule in the RRMP prevails over a standard if it is more stringent than a standard.<sup>133</sup> In regard to land use activity rules under the RRMP, there are certain rules that relate to groundwater, contamination and aquifers. For example, under r 5 of the RRMP, the use of land for feedlots is

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124 At [4.4.2].

125 Resource Management Review Panel *New Directions for Resource Management in New Zealand* (June 2020).

126 New Zealand Government “RMA to be repealed and replaced” (10 February 2032) <[www.beehive.govt.nz](http://www.beehive.govt.nz)>.

127 Ministry for the Environment *Overview of the resource management reforms* (June 2021) <[www.environment.govt.nz](http://www.environment.govt.nz)>.

128 *New Directions for Resource Management in New Zealand*, above n 125, at 292.

129 Hawke’s Bay Regional Council “About policies, plans and strategies” <[www.hbrc.govt.nz](http://www.hbrc.govt.nz)>.

130 Hawke’s Bay Regional Council *Regional Resource Management Plan* (14 August 2021) <[www.hbrc.govt.nz](http://www.hbrc.govt.nz)>.

131 At [1.4.6.4].

132 At [1.4.6.6].

133 At 119.

a permitted activity if it meets the condition of being “managed in a manner that prevents any seepage of contaminants into groundwater”.<sup>134</sup> If the feedlot does not comply with r 5, under r 6 it is a restricted discretionary activity.<sup>135</sup> The RRMP defines a “feedlot” as an “an area of land upon which animals are kept and fed, for more than 15 days in any 30 day period” and “where the stocking density or feedlot structure (e.g. a concrete pad) precludes the maintenance of pasture or ground cover”.<sup>136</sup> Drawing on this definition, it can be inferred that some paddocks can fit within the definition of feedlot and thus can be considered as feedlots for sheep. Essentially, this rule would then be applicable to the first issue regarding sheep in paddocks close to groundwater used for drinking water sources, if the area was consistent with the definition of feedlot in the RRMP. Arguably, the rule would work towards addressing the issue. It should be noted that the definition of “feedlot” is not consistent across regional council plans in New Zealand.<sup>137</sup>

There are seemingly no other rules that explicitly restrict land use in close proximity to aquifers, such as restricting sheep grazing in paddocks other than feedlots. Therefore, it seems that the first issue is not comprehensively addressed in the RRMP rules. However, footnote 23 of the RRMP does state that the “discharge of contaminants associated with the operation of a feedlot” such as “the runoff of manure during heavy rainfall” is covered under “Rules in Sections 6.4 and 6.6” of the RRMP.<sup>138</sup> These sections regulate discharges to air, land and water and relevant will now be considered.

In relation to the discharge rules under the RRMP, some rules are associated with groundwater, contamination and aquifers. One notable rule is r 14 dealing with animal effluent.<sup>139</sup> Whilst this rule only deals with animal effluent, being animal excreta, that is collected and managed by humans, it is considered a controlled activity, and there is a stipulated condition that there “be no discharge within 30 m of any bore or well”.<sup>140</sup> This rule deals with point source regulation, but in terms of the first issue, this is to do with diffuse discharge, so this rule is not extremely applicable to the first issue.

The discharge of animal effluent that is collected and managed by humans into sensitive catchments such as the Heretaunga Plains unconfined aquifer is captured under r 15. Here, the discharge is a discretionary activity.<sup>141</sup> This rule categorises the Heretaunga Plains unconfined aquifer as a sensitive catchment. The Te Mata aquifer is not captured under this rule as a sensitive catchment. Ultimately, it is questionable whether this rule is applicable to the first issue.

Another notable rule relating to discharges is r 49. This rule deals with discharges to land that may enter water.<sup>142</sup> This is a permitted activity, however, there are certain conditions associated with groundwater aquifers in the rule. One condition is that “there shall be no discharge within 30 m of any bore drawing groundwater from an unconfined aquifer into which any contaminant may

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134 At 124.

135 At 124.

136 At 124.

137 Jesse Brennan *Feedlots and Intensive Winter Grazing* (Horizons Regional Council, 2017) at 2.

138 At 124.

139 At 133.

140 At 133.

141 At 134.

142 At 173.

enter as a result of the discharge”.<sup>143</sup> It is unfortunate that this condition is restricted to unconfined aquifers, however the rule does state that “for other aquifers, the discharge shall not cause or contribute to a breach” of the DWS 2005. This rule is applicable to the first issue because it could be associated with the discharges and contaminants released from sheep grazing in paddocks near groundwater bores, as the rule is located under the “generic discharges” section.

In regard to water takes and uses of water rules under the RRMP, minor takes and uses of groundwater are covered under r 53.<sup>144</sup> They are a permitted activity.<sup>145</sup> Under this rule, the minor take cannot exceed “10 l/s”.<sup>146</sup> In regard to take volumes, it was difficult to locate the current statistics regarding takes for Havelock North, and so it cannot be stated whether the Havelock North incident take was minor, and under this permitted category. Other takes of groundwater are covered under r 55 and are classified as a discretionary activity.<sup>147</sup> Rule 55 does not specify any restrictions, conditions or terms relating to the abstraction of young groundwater. These rules are applicable to the second issue regarding groundwater abstraction because they deal with what type of consent may be required for groundwater abstraction, dependent on take volume.

## 2. *HDC District Plan*

The Hastings District Council’s District Plan (DCDP) is partly operative.<sup>148</sup> Within the DCDP, it states that the purpose of the DCDP is to guide and control “how land is used, developed or protected in order to avoid or lessen the impact of any adverse effects”.<sup>149</sup> In relation to land use activities and the aquifer zone, the DCDP provides seemingly limited information on this topic, for example, the DCDP does discuss riparian land management rules, but this is more related to surface water.<sup>150</sup>

It is worth noting that the DCDP does discuss hazardous substances rules in areas other than within the Heretaunga Plains unconfined aquifer under rule HS1.<sup>151</sup> For example, rule HS1 states that “The Storage, Handling or Use of Hazardous Substances in areas other than within the Heretaunga Plains Unconfined Aquifer Overlay” is a permitted activity.<sup>152</sup> However, this is not necessarily relevant to the two issues because it is associated with the “storage, handling and use” of substances which are classified as hazardous, and not necessarily the discharge of sheep faeces in paddocks. It is additionally seemingly vague whether “hazardous substances” could include sheep faeces within this rule anyway because under the plan “hazardous substances” can include “organic matter which contains animal waste” but only where the provision relates to the Heretaunga Plains Unconfined Aquifer.<sup>153</sup> Therefore, arguably this rule does not address the two issues.

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143 At 173.

144 At 176.

145 At 176.

146 At 176.

147 At 178.

148 Hastings District Council “2003 Hastings District Plan” <[www.hastingsdc.govt.nz](http://www.hastingsdc.govt.nz)>.

149 Hastings District Council *Hastings District Plan* (March 2020) at [1.1.1].

150 At [19.1.5].

151 At [29.1.5].

152 At [29.1.5].

153 At [33.1.2].

Overall, no DCDP rules relating to regulating land use around the aquifer zone in the context of the first issue could be identified. Therefore, since there are seemingly no relevant rules, it seems that sheep grazing in paddocks in close proximity to groundwater used for drinking water supply is a permitted activity, and no consent is required under the DCDP, taking into account s 9 of the RMA. No DCDP rules relating to young groundwater abstraction could be identified.

### *I. Concluded View of Relevant Law*

Under existing relevant law, it seems that there are currently limited legal restrictions placed on sheep grazing in paddocks in close proximity to groundwater used for drinking water supply, and the abstraction of young groundwater for drinking water purposes. In terms of the Hawke's Bay case example, under the RRMP it was identified that consent is only required in terms of land use, discharges, and water takes in limited circumstances. Furthermore, under the DCDP it seemed that this plan was silent in terms of addressing the two issues. Evidently, in the Hawke's Bay area, under existing law, it is likely that generally consent is not required for sheep grazing in paddocks in close proximity to groundwater used for drinking water supply. It is also likely that the abstraction of young groundwater for drinking water purposes is a permitted activity in certain circumstances, such as if the take is minor under r 53 of the RRMP.<sup>154</sup> In relation to the Havelock North incident, perhaps a different outcome may have resulted if consent was required in relation to the sheep grazing in the paddocks close to the contaminated bores, and consent was required or conditions were imposed in regard to the abstraction of the young groundwater. Ultimately, the relevant law as it currently stands does not really address the two issues effectively. Gaps within the law in the context of the two issues will now be explored.

## VI. ANALYSIS

In this section, there will be an analysis of the current gaps within the identified relevant law relating to the two specified issues. As mentioned previously, Maslow's HON and SDG6 are arguably related to aquifer management law and policy. Therefore, these two concepts will be utilised as a lens to assess where the gaps and issues are located within the current law and policy in the context of the two specified issues.

### *A. Resource Consent Gap*

Resource consents may not be required for sheep grazing in paddocks in close proximity to groundwater used for drinking water supply, and the abstraction of young groundwater for drinking water purposes. This is because they may be considered permitted activities under the RMA and local authority plans. Taking into account the safety needs within Maslow's HON and Target 6.3 of SDG6, the lack of resource consents required is arguably a gap within the current law because these two issues both could adversely affect the quality and safety of drinking water that is consumed by people. It has been submitted by Rob Collins and others that "grazing livestock are considered to be the dominant source of faecal contamination to New Zealand's freshwaters", and therefore

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<sup>154</sup> *Regional Resource Management Plan*, above n 130, at 176.



this specific issue is very concerning.<sup>155</sup> Not requiring resource consents for these activities could essentially pose a threat to the satisfaction of the safety needs within Maslow's HON. Requiring resource consents would ensure that an assessment of the activity's effects on the environment is undertaken, which would mean that the discharges of contaminants associated with the first issue, and its relationship with groundwater, are considered. Additionally, requiring resource consents or permits in relation to young water abstraction would ensure that there is more regulation in place to ensure safety. Interestingly in other jurisdictions, such as India, the courts have held that it is a violation of the right to life for the state to fail to provide safe drinking water.<sup>156</sup> Since there can be either negative or positive rights under law, this could explain the differences in approaches.<sup>157</sup> To summarise, consent requirements could help to ensure that the safety needs in Maslow's HON are met, and that the issues are addressed.

### B. RMA Gap

In 2012, Ezekiel Hudspith submitted that in New Zealand "land use has not been adequately managed in order to account for its effect on adjacent water bodies".<sup>158</sup> Hudspith dealt with surface water, but an analogy can be drawn for groundwater due to the statistics provided by Stats NZ in relation to groundwater quality. According to Stats NZ, in relation to the period of 2014–2018 "68 percent of 364 sites failed to meet the E.coli drinking water standards" in regard to groundwater quality.<sup>159</sup> In terms of the period of 2009–2018, 50 percent of sites had worsening trends in relation to E.coli.<sup>160</sup> Taking into account these statistics, an argument can be made that E.coli in groundwater sources, such as underground aquifers used for drinking water purposes, is still a current, and ongoing issue in New Zealand. When E.coli is detected in samples of groundwater, this indicates "a connection with a nearby surface environment that is contaminated with animal faeces".<sup>161</sup> These statistics raise the question regarding whether land use is currently being adequately managed in terms of the functions of local authorities under the RMA. Perhaps the functions under the RMA are in need of reform, and need to be more explicit in terms of land use effects on groundwater quality, such as the effects from animal discharges. Adequate management of land with respect to effects on adjacent water bodies would be beneficial for both the physiological and safety needs under Maslow's HON and Targets 6.1 and 6.3 in SDG6.

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155 Rob Collins and others "Best management practices to mitigate faecal contamination by livestock of New Zealand waters" (2007) 50 *New Zealand Journal of Agricultural Research* 267 at 268.

156 Phillipe Cullet "Groundwater law in India: Towards a framework for ensuring equitable access and aquifer protection" (2014) 26 *Journal of Environmental Law* 55 at 70.

157 Paul Rishworth "Human rights: The background" (June 2012) *Te Ara – the Encyclopaedia of New Zealand* <www.TeAra.govt.nz>.

158 Ezekiel Hudspith "Freshwater management in New Zealand: A challenge for ecology, equity, and economic efficiency" (2012) 16 *New Zealand Journal of Environmental Law* 277 at 289.

159 Stats NZ "Groundwater quality" (16 April 2020) <www.stats.govt.nz>.

160 Stats NZ, above n 159.

161 PF Callander, C Steffans, N Thomas, S Donaldson and M England *E.Coli contamination in "secure" groundwater sourced drinking water supplies* (Water New Zealand, September 2014) at [3.3].

### C. *SDG6 Gap*

It was submitted that certain government initiatives have not been successful in addressing the two issues relating to sheep grazing and young water abstraction. The first issue relates to the quality of groundwater embedded within an aquifer. Using SDG6 as a lens, essentially by not addressing this first issue relating to sheep grazing, Targets within SDG6 are not being met. For example, the first issue can potentially lead to contaminants entering into groundwater, and this means that Target 6.1 relating to access to safe drinking water, and Target 6.3 relating to improving water quality are not being reached. Furthermore, by not addressing the second issue relating to young groundwater abstraction, Target 6.1 relating to access to safe drinking water is not being met because young groundwater may indicate that pathogens are entering into the aquifer through surface water, therefore not making the drinking water safe to drink. Consequently, not taking action to address these issues under SDG6 also ties in with the safety needs in Maslow's HON. By aiming to implement initiatives under the SDG6 with a focus on both of the two issues, progress can be made to ensure that the Targets within SDG6 are achieved, and the issues are addressed.

### D. *Health Gap*

When using Maslow's HON as a lens, one identified health gap is that under s 69A(2)(c)(ii) of the HA, drinking-water suppliers only have a duty of taking "all practicable steps to comply with the drinking-water standards".<sup>162</sup> Essentially, it is not mandatory for drinking-water suppliers to comply with the drinking-water standards; they merely have to demonstrate that they took "all practicable steps" to do so.<sup>163</sup> The relationship between practicability and knowledge is questionable. Although the WSA imposes a more stringent requirement regarding compliance with the DWS 2005, the current s 69A(2)(c)(ii) of the HA is still of concern. This is because the DWS 2005 provide for the "minimum quality standards for drinking-water in New Zealand".<sup>164</sup> Additionally, when pairing this duty with the current Stats NZ data on groundwater quality, the compliance standard seems even more of a concern. Ultimately, s 69A(2)(c)(ii) of the HA is a gap within the current law and is a risk to the safety needs, when using Maslow's HON as a lens to assess this section.

### E. *DWS 2005 Gap*

In relation to the current drinking water standards, it is important to note that the DWS 2005 sets out that in order for bore groundwater to be classified as "secure" that there must be an exclusion of animals "from within 5 m of the bore head".<sup>165</sup> The question should be raised around whether this 5 metre exclusion of animals from a groundwater bore head is enough to ensure that groundwater for drinking water purposes is "secure" from potential contaminants derived from animal discharges in close proximity to the bore head. This is relevant in light of the RRMP where it specifies that "there shall be no discharge within 30 m of any bore drawing groundwater from an unconfined aquifer into which any contaminant may enter as a result of the discharge" under r 49.<sup>166</sup> In order to gain more

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<sup>162</sup> Health Act 1956, s 69A(2)(c)(ii).

<sup>163</sup> Health Act 1956, s 69A(2)(c)(ii).

<sup>164</sup> *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111, at [1.1.1].

<sup>165</sup> *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111, at 38.

<sup>166</sup> *Regional Resource Management Plan*, above n 130, at 173.

consistency in relation to the distance of the exclusion of animals, and their associated discharges from groundwater bore heads, it would perhaps be wise to include one specific exclusion distance within national legislation (and all subsidiary instruments) which is based on scientific evidence. This could be tied in with the requirement for consents. This would help to ensure that Maslow's safety needs are met, and the targets within SDG are achieved because it would be a preventative measure regarding contaminants entering into groundwater.

#### F. Taumata Arowai Gap

Under s 50 of the WSA, Taumata Arowai may issue "acceptable solutions or verification methods for drinking water".<sup>167</sup> In September 2021, Taumata Arowai released a working draft titled *Drinking Water Acceptable Solution for Spring and Bore Drinking Water Supplies*.<sup>168</sup> In relation to bore sources for drinking water supplies, this working draft stipulates that "farm animals must be excluded (e.g. with a fence) from within 5 metres of the headworks" and furthermore, "the headworks must be constructed so water cannot flow towards the bore casing or pond around a spring".<sup>169</sup> Arguably, this is a slightly more stringent requirement than what is briefly set out in the DWS 2005, however, it still continues with the five metre standard, and is arguably not consistent with r 49 in the RRMP. If the recommendation mentioned above was implemented, it could provide more consistency in relation to Taumata Arowai acceptable solutions as well.

#### G. Age of Groundwater Gap

Currently, the DWS 2005 provides guidance in terms of the age of water that should be drawn from "secure" bore water supplies. Under security criterion 1, there is an option for demonstrating that there is a "lack of surface or climate influences" on secure groundwater.<sup>170</sup> Essentially, proving that "water younger than one year" is not detectable in an aquifer is optional in order to establish secure bore water supplies under the DWS 2005.<sup>171</sup> It is argued that this should not be an optional standard, and that it should be possibly be mandatory that young groundwater is not abstracted from an aquifer for drinking water purposes. This is because, as demonstrated by the Havelock North drinking water incident report, young groundwater in an aquifer indicates that there is a risk of contamination from surface water.<sup>172</sup> Furthermore, under the DWS 2005, water abstracted from "secure" bore water supplies does not require treatment, so this could potentially pose a risk to public safety if young groundwater is in fact contaminated and consumed.<sup>173</sup> When using Maslow's HON as a lens, this optional standard is ultimately a threat to the safety needs in the hierarchy. Ultimately, this is arguably a gap with current law and policy.

Interestingly, it has been submitted by Uwe Morgenstern and Christopher J Daughney that there are issues with monitoring groundwater quality using age techniques in wells within

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167 Water Services Act, s 50.

168 Taumata Arowai *Drinking Water Acceptable Solution for Spring and Bore Drinking Water Supplies* (September 2021).

169 Taumata Arowai, above n 168, at [6.2].

170 *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111, at [4.4.2].

171 *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111, at [4.4.2].

172 *Government Inquiry into Havelock North Drinking Water*, above n 7, at [221].

173 *Drinking-water Standards for New Zealand 2005 (Revised 2018)*, above n 111, at [3.1].

agricultural areas.<sup>174</sup> This is because the monitored “well would not yet reflect impacts from later land-use activities” and there could be “significant fractions of old water that was recharged before land-use intensification”.<sup>175</sup> In light of this argument, the question should be asked why there is so much reliance placed on the age of groundwater within the DWS 2005 in order to determine secure bore water status. This area of law could be reviewed.

## *H. Classification Gap*

The DWS 2005 currently operates on a “secure” and “non-secure” classification system in relation to treating groundwater for drinking water purposes. In the Government Inquiry into the Havelock North drinking water incident it was found that this system should be abolished.<sup>176</sup> This was on the grounds that this system is “inherently unsafe”.<sup>177</sup> It is submitted that this argument is important in light of the safety level in Maslow’s HON and Target 6.1 of SDG6. Arguably, there are currently gaps within current law and policy if an official Government Inquiry deems this system “unsafe” and yet it still operates. The Government Inquiry suggested that universal treatment be given to all networked drinking water supplies.<sup>178</sup> This would be beneficial as it would ensure that the safety level of Maslow’s HON is met, and also that SDG6 is achieved with respect to access to safe drinking water.

## *I. NPSFM Gap*

As mentioned above, under the current NPSFM, cl 3.5 stipulates that local authorities are to manage freshwater and land use in an “integrated and sustainable way” and this is for the purpose of avoiding, remedying or mitigating “adverse effects” on water bodies’ “health and well-being”.<sup>179</sup> The question should be asked whether local authorities are currently managing groundwater and the land use activity of sheep grazing in an “integrated and sustainable way” under clause 3.5 because as demonstrated by the Stats NZ statistics, many groundwater sites have failed to meet E.coli drinking water standards, and animal waste is a common source of E.coli.<sup>180</sup> It has been proposed by Abraham J Melloul and Martin L Collin that the planning of groundwater management and land-use can help maintain the sustainability of resources, and so if groundwater and land use can be managed in this “integrated and sustainable way”, as per the NPSFM, then the self-actualisation level of Maslow’s HON maybe achieved.<sup>181</sup> This is because water resource sustainability sits at the top of Maslow’s HON, according to Melloul and Collin.<sup>182</sup>

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174 Uwe Morgenstern and Christopher J Daughney “Groundwater age for intensification of baseline groundwater quality and impacts of land-use intensification – The national groundwater monitoring programme of New Zealand” (2012) 456-457 *Journal of Hydrology* 79 at 80.

175 At 80.

176 Government Inquiry into Havelock North Drinking Water, above n 7, at [688].

177 At [689].

178 At [158].

179 At [3.5].

180 Land Air Water Aotearoa “Factsheet: Faecal Indicators” (September 2021) <[www.lawa.org.nz](http://www.lawa.org.nz)>.

181 Abraham J Melloul and Martin L Collin “Prioritization of sustainable groundwater management needs: the case of Israel’s stressed coastal aquifer” (2002) 4 *Environment, Development and Sustainability* 347 at 360.

182 At 353.

### J. *Changes in New Zealand*

Water reforms in New Zealand are moving the management of drinking water to four new regional entities.<sup>183</sup> There have been an array of concerns presented in relation to this change.<sup>184</sup> Ultimately, it is unlikely that this reform will make a difference in terms of the two specified issues. Arguably, it will not make too much of a difference who the regulator is. Rather, amendment of the relevant substantive law and policy is a better solution to the identified issues relating to sheep grazing and young groundwater abstraction. Law amendment will help address the safety needs in Maslow's HON along with SDG6, and so the focus should be on this, rather than on who the regulator may be.

### K. *RMA Reform*

There are aspects of the RMA that could be reviewed and amended in order to address the two specified issues. As mentioned, the RMA is undergoing reform. Interestingly, the Report *New Directions for Resource Management in New Zealand*, leaves the subject of groundwater fairly much alone.<sup>185</sup> In fact, it only mentions groundwater once and this is in relation to New Zealand's heavily reliance on the resource.<sup>186</sup> Further research could be pursued in regard to the place of groundwater within the RMA reforms, and how the reforms could address the two issues relating to sheep grazing and young groundwater abstraction.

### L. *Concluded View*

Accordingly, when using Maslow's HON and SDG6 as a lens, various gaps within current law and policy can be identified in the context of the two issues relating to sheep grazing and young groundwater abstraction. Amendments to both law and policy are required in order to address both issues, and ensure consistency with Maslow's HON and SDG6 Targets. Recommendations to law and policy are made below with respect to the gaps identified.

## VII. RECOMMENDATIONS

This section will discuss what the law ought to look like, in regard to addressing the issues and gaps identified by using SDG6 and Maslow's HON as a lens. Various recommendations will now be explored.

The first overall recommendation is perhaps quite obvious. In essence, the recommendation is to not allow sheep to be in paddocks that are in close proximity to underground aquifer sources used for drinking water. Alternatively, if sheep are allowed in paddocks in close proximity, it should be a land use activity that requires a resource consent, rather than merely be a permitted activity. This recommendation could mitigate the potential for contaminants from sheep faeces to make its way into underground aquifer water sources used for drinking water. Logically, if sheep are not in close proximity to underground aquifer sources used for drinking water then there is

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183 Russell Palmer "Three waters: what you need to know" (4 October 2021) Radio New Zealand <[www.rnz.co.nz](http://www.rnz.co.nz)>.

184 Christopher Luxon "Three waters, four entities, several problems" (15 September 2021) Stuff NZ <[www.stuff.co.nz](http://www.stuff.co.nz)>.

185 *New Directions for Resource Management in New Zealand*, above n 125.

186 At 15.

limited opportunity for contamination to occur as a result of sheep faeces. If the activity is allowed but requires a resource consent, then the effects of the sheep being in the paddock on groundwater can be controlled. Arguably, this recommendation could address the first issue relating to sheep grazing.

The second overall recommendation is to not allow the abstraction of young groundwater for drinking water purposes. This would eliminate the potential for sickness due to consuming contaminated non-aged drinking water, like in the Havelock North incident. It is submitted that this recommendation could address the second issue.

In relation to law change in general, the following is recommended. First, regulations like the Resource Management (Stock Exclusion) Regulations 2020 could be implemented to control sheep grazing in paddocks in near proximity to aquifers used for drinking water sources. This is because arguably, s 360 of the RMA regulations are more appropriate than using the National Environmental Standard route for all nationally directed regulation. Second, amendment could be made regarding the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 in order to incorporate standards for farming activities that involve sheep grazing in paddocks in near proximity to aquifers used for drinking water sources. Third, further initiatives in relation to SDG6 could be implemented in order to ensure that the two issues are addressed, and New Zealand is on track to achieving the targets within SDG6 in the specified timeframe. Fourth, one exclusion distance within national legislation which is based on scientific evidence could be included to ensure consistency across the board with respect to sheep grazing in paddocks near aquifers used for drinking water sources and their associated discharges. Fifth, the "secure" and "non-secure" classification system in relation to treating groundwater for drinking water purposes could be abolished as it has been found that this system is "inherently unsafe".<sup>187</sup> Last, there should be a focus on addressing the issues in substantive legislation and policy, rather than changing who the regulator may be.

It has been demonstrated that Maslow's HON and SDG6 are relevant and can be used as a lens to assess current law and policy relating to aquifer management. In view of this finding, the final recommendation is that Maslow's HON and SDG6 be integrated into New Zealand law and policy associated with aquifer management, particularly in terms of the management of drinking water sources. Both Maslow's HON and SDG6 and their link to water management have been examined within academic literature.<sup>188</sup> Therefore, it would be worth exploring how Maslow's HON and SDG6 could be used as tools within law and policy to ensure that New Zealand is both meeting their obligations with regards to SDG6, and ensuring that Maslow's HON is met.

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187 Government Inquiry into Havelock North Drinking Water, above n 7, at [689].

188 See Abraham J Melloul and Martin L Collin "A hierarchy of groundwater management, land-use, and social needs integrated for sustainable resource development" (2001) 3 *Environment, Development, Sustainability* 45; Abraham J Melloul and Martin L Collin "A proposal for sustainable groundwater management as influenced by a pyramid of social needs: the case of Israel's coastal aquifer" (2000) 42 *Water Science and Technology* 249; Abraham J Melloul and Martin L Collin "Harmonizing water management and social needs: a necessary condition for sustainable development" (2003) 67 *Journal of Environmental Management* 385; and Abraham J Melloul and Martin L Collin "Prioritization of sustainable groundwater management needs: the case of Israel's stressed coastal aquifer" (2002) 4 *Environment, Development and Sustainability* 347.

### VIII. CONCLUSION

When using Maslow's HON and SDG6 as a lens, it is proposed that law and policy regarding aquifer management in its current form is inadequate in terms of addressing the issues associated with sheep grazing in paddocks near aquifers used for drinking water sources and the abstraction of young groundwater for drinking water purposes. It is submitted that there are various gaps in law and policy relating to resource consents, the RMA, SDG6, health legislation, the DWS 2005, Taumata Arowai, the NPSFM in terms of addressing the two issues and meeting Maslow's HON and SDG6. It is suggested that law and policy be amended in order to address the two issues. The first overall recommendation is to not allow sheep to be in paddocks that are in close proximity to aquifer sources used for drinking water and alternatively, if sheep are allowed in paddocks in close proximity, to make the activity one that requires a resource consent. The second overall recommendation, is to not allow the abstraction of young groundwater for drinking water purposes as this would eliminate the potential for sickness due to consuming contaminated non-aged drinking water. Lastly, it is recommended that Maslow's HON and SDG6 should be integrated into New Zealand law and policy associated with aquifer management, particularly in terms of the management of drinking water sources and groundwater quality.