

BEFORE INDEPENDENT HEARING COMISIONERS

IN THE MATTER

AND

IN THE MATTER

of the Resource Management Act 1991

Proposed Waikato Regional Plan Change 1:
Waikato and Waipa River Catchment

Statement of Primary Evidence of
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Submitter 74056

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Qualifications and Experience

1. My full name is Shane Lowell Mark Croft.
2. I'm self employed, independent Farm Consultant.
3. I hold a Bachelor of Commerce in Agricultural (1995) major Farm Management from Lincoln University. I have also completed and passed both the Intermediate (2016) and Advance (2017) Nutrient Management Courses through Massey University. I'm also a Kinsey Soil Consultant, based on the Albrecht Principles of Soil Fertility.
4. I was employed for 9 years (1995) with Livestock Improvement Advisory as a Consulting Officer, now DairyNZ. Since February 2004 I have been an independent Farm Consultant primarily working in the Dairy Sector. I have also worked overseas in Uruguay for New Zealand Farming Systems (2010) as a dairy systems specialist overseeing total farm feeding and milk production (50,000 Hectares farmed and 50,000 Cows). From 2012, I have started to move more into soil and nutrient consultancy. I am currently moving into Regenerative Agriculture.

Scope of Evidence

5. My evidence pertains to Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments (PC1). I am giving evidence in relation to:
 - a. Overseer
 - b. Four contaminants – Nitrogen, Phosphorus, E.coli and Sediment.
 - c. Nitrogen Management / Nitrogen Reference Points (NRP)
 - d. Cultivation, slope and set back
 - e. Treaty Settlement and Maori Ancestral Land
 - f. Urban/point source discharges
 - g. Farm Environment Plans
 - h. Options
6. **Overseer.** I support the proposal of the Parliamentary Commissioner for the Environment, Simon Upton for a complete peer review of Overseer.
 - a. Does a natural ecosystem leach nitrogen, if yes, then is nature polluting?
7. **The Four Contaminants – Nitrogen, Phosphorus, E.Coli and Sediment.**
 - a. **Nitrogen.** Usage has increased significantly over the last 20 years in NZ agriculture. This has been encouraged by the majority of Agricultural Institutions. I agree that we need to address the excess use of Nitrogen and nitrogen entering water bodies. But not all nitrogen is bad. There are different forms of Nitrogen fertiliser, Sulphate of Ammonia (SoA), Slow Release Nitrogen fertiliser (Smart Fertilisers). Research now shows that plants can uptake inorganic forms of nitrogen (ingesting bacteria – Dr Christine Jones). Nitrogen by itself in the water body will not cause algae blooms, or result in the water being unswimmable. If the nitrogen levels get high this will result in the water becoming undrinkable and unable to support aqua living organisms. We need to encourage the farming community to reduce Nitrogen usage and “wean” the soil & farmer off Nitrogen. There are research centers showing that productive can be maintained without the use of Nitrogen and many other fertiliser inputs. Rodale www.rodaleinstitute.org The Jena Experiment www.the-jena-experiment.de
 - b. **Phosphate.** In the water is a the key reason why we see algae blooms. When there is phosphate present this also means there are soil particles in the water. Over the past 20 years it is common to see farmers apply more phosphate than required, once again encourage by Agricultural Institutions.
 - i. Target Olsen P levels – Fertiliser Use on NZ Dairy Farms – pg 27. There are clear levels but most NZ Dairy Farms they are a lot higher. Why?

- ii. **Appropriate Phosphate Soil Test.** The Olsen P test was adopted in the late 1970's but was designed for a soil that is alkaline (test designed for pH 7.4 or greater). Even though NZ has a lot of data for this test it is still the wrong test. Even if we continue to use this test it should also be used in conjunction with other Soil P tests. E.g Bray - P2, Mehlich and Total P. Most of NZ soils are acidic (pH < 7.0). By using Olsen P in acidic soils the results can underestimate plant available P and result in more phosphate being applied. It doesn't measure phosphate that is organic (decaying materials – manure, plants, organisms). The same applies to other Soil P tests in alkali soils they can underestimate plant available P. By applying more phosphate than required, and we have, we have set up the future to have more potential water quality issues, as phosphate tends to be attached to soil particles. Therefore soil entering into water bodies we will probably see more algae growth.
- c. **Nutrient Uptake by plants.** Plant roots only have direct soil contact with about 1-2% of the soil. Approximately 98% of the root surface is in contact with soil bacteria in a healthy soil. It's the biology that creates the link between the soil and plant and that delivers nutrients to plants. We also need diverse soil biology. We get this diversity through plant diversity. In fact the greater the plant diversity less nutrient is required, as the plant share nutrients. (Burleigh Photo). Monocultures of plants attract limited biology. It's the biology that protects the plants from disease. Without adequate soil organic matter and therefore limited biology the soil becomes more hydroponic and in this situation plants take up nutrients primarily anions (eg. Nitrogen, Potassium and Sulphates), that are in solution often at the expense of cation's (Calcium, Magnesium and many traces). Excess N and K is not good for livestock. Biology also affects nutrient density, and since 1940's this has been declining. The biology regulates everything, including water.
- d. **E.Coli.** This is critical to identify what we are talking about, cow, sheep, bird or human. The data shows that Bovine E.Coli has declined in the Waikato River over the last 5-7 years. But without a clear definition on exactly what E.Coli we are measuring then we will get no progress. Also a significant issue is, if there is no Bovine or Sheep E.Coli leaving a farm (if we could measure this on farm) how does the farmer reduce the E.Coli level? If all contaminants are treated equally and the farmer can't reduce E.Coli then the only other option is to reduce the other 3.
- e. **Sediment.** I agree that there should be no sediment in the water body. But my concern is that "Best Practice" is not the BEST. We assume that we know best. We need to look at Agricultural Options that don't involve cultivation. (Burleigh County Soil Conservation). Organic is not the option if this involves cultivation. There are options that don't include whole paddock cultivation. Direct Drill, strip cultivation. Refer Rodale Institution. The majority of phosphate due to sediment, and E.Coli contamination occurs in flood events, but we don't swim or harvest food in these periods. Periods of floods are very difficult to control. Koi Karp and Canadian Geese are also major contributing factors to sediment, phosphate and E.Coli in water bodies. Canadian Geese, Koi Karp & Spring Hill prison are significant issues for Lake Waikare. It was less than 30 years ago the locals water skied and swam in this water body, but due to Council this is now not the case. Koi Karp are a significant sediment contributor to water quality. Until Koi Karp are controlled in all of the Waikato water ways sediment will continue to be a major issue and we will never meet the Vision and Strategy.
- f. **Options.** We need to mimic nature, build soil carbon. The Jena Experiment is showing that the greater the diversity in our pastures (greater than 8 different species of plants, other farmers and research is showing greater than 10 plus). Rodale Institute has demonstrated for 40 years Regenerative Practices build carbon and reduce nutrient loss and restore nutrient cycles. The key to this is building soil carbon. It's not the amount of nutrient that is in the soil that determines its productivity but the process of biological cycling that governs the speed and availability of those nutrients. Animals are also key element in this process. There is good research now showing that the Hot Water Extractable Organic Carbon soil test is a good test to reflect

soil fertility. Now available through Hills Labs. Refer Dr Christine Jones, www.amazingcarbon.com Walter Jehne on Soil Carbon, Water Cycles and Climate Change.

- g. If the farm is not applying Nitrogen, minimal or no Phosphate and not cultivating the land then under current measurements of PPC1 what can a farmer do? Assuming the farm has FEP and applying Best Practice. The only option then is to stop farming / agriculture. But then in this situation, no farming is the same as the management on farm.

8. Cultivation, slope and set back.

a. **Cultivation.** Based on my reading and research, cultivation only destroys soil structure, biology, mineralizes carbon and organic matter, reduce water infiltration, and leads to the loss of soil to the environment either by wind or water. No-till or strip till really are the keys to restoring the soil and creating the environment for building soil carbon which in turn will restore the water and nutrient cycles. Refer Walter Jehne and Dr Christine Jones.

b. **Slope and Set Back.** This is no longer an issue if there is no cultivation. We will observe less weeds, soil and nutrient loss and increased water use efficiency. Therefore crops can then be grown on any slope that will allow efficient and safe harvest.

9. Treaty Settlement and Maori Ancestral Land. I agree and support Trevor Simpson and PLUG in regards to this issue.

10. Urban/point source discharges. Water quality is all our responsibility. The solution to pollution is not dilution. Any water taken in should be of the same quality or better when it re-enters the water body. How far after a Point Source discharge is the water “good” enough to water/swim/harvest in? If water quality standards are to improve, just because a Council has a resource consent to discharge, that is irrelevant, it is still not meeting the standards. Therefore they must comply with the new standard and not off set this with planting a few trees. As towns/cities grow the discharge is only going to increase.

11. Farm Environment Plans. Yes this is a great idea, but we seasons and situations change in a biological system. If circumstances change, then so must the plan. The challenge I see is if the FEP says one thing which is the theoretically the “BEST” option, BUT what if the circumstances don't allow for the BEST option to happen. Also there is no clear direction as to what is in a FEP.

12. Options. I believe we need to look at Regenerative Agricultural Practices and setting up the Waikato as a region that is seen as a supplier of Regenerative Agricultural food. We are too focused on yield not quality. If the focus is on growing high nutrient density food, building soil carbon and market/consumer demand (No Nitrate in milk, meat – China) then we will do what is required to meet this level of quality. Not high volume commodity products. Then our on farm practices will be as such to meet this goal. The result will then be the Vision and Strategy but also profitable businesses, now everyone wins. This requires different thinking not rules. As one size does not fit all.