Giant Kelp – Giant Opportunity

Report by Roger Beattie & NZ Kelp

For the benefit of present & future generations.

December 2018

GIANT KELP: INTRODUCTION

Macrocystis pyrifera, (Giant kelp or Bladder kelp) is found in temperate regions of the Pacific Ocean, such as Chile, Australia, California and New Zealand. It is the fastest growing organism on the planet (Schiel & Foster, 2015), growing up to 50cm per day, and reaching adult sizes of up to 60m in length. To put that in perspective, if your lawn grew this quickly, you would have to mow it 7 times a day.

Macrocystis pyrifera floats and blades

In its dried form, it is the world's most concentrated natural source of Iodine. Iodine is an element essential for human and animal health. Giant Kelp is also very high in alginates, a group of compounds used as thickeners and gels, found in toothpastes, ice-cream, and pharmaceuticals. Due to its unique characteristics and commercial applications it has been extensively studied and its biology is well understood. Recent developments in the New Zealand seaweed industry are finding uses beyond traditional alginate products, and towards value added food & beverage products, nutraceuticals, pharmaceuticals, marine farming, pet foods, and biological stimulants for horticultural, arable & pastoral farming.

There are those who want to set up an extremely large marine protected area the South East Marine Protected Area (SEMPA) and completely ban the harvesting of Giant Kelp from Timaru to just north of Dunedin. This is theft of Giant Kelp Individual Transferable Quota Rights by the NZ government.

This is a Co-ordinated Deliberate Misrepresentation of the facts by DOC and MPI Officials and by the Lead Scientist Dr Chris Hepburn regarding Giant Kelp science, research, history and commercial harvesting.

In the following pages we discuss how the banning of Giant Kelp Harvesting is bad for the environment, increases our carbon footprint, and decreases the health and wealth of New Zealanders.

GIANT KELP: BIOLOGY

David Schiel and Michael Foster, two world leading experts in Giant Kelp biology write that it is the

"fastest growing and

most prolific of all plant species

found on earth."

(Schiel & Foster, 2015)

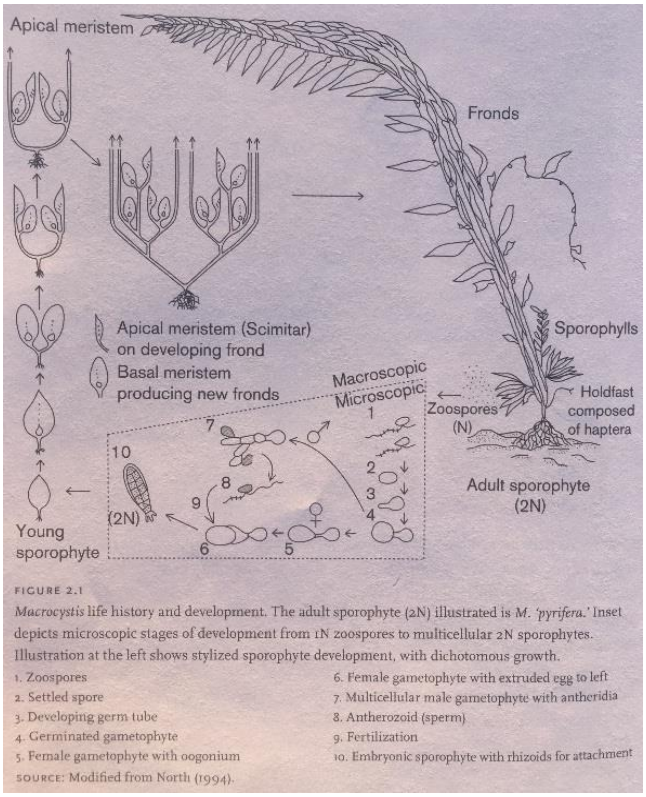


FIGURE 2.1
Macrocystis life history and development. The adult sporophyte (2N) illustrated is *M. 'pyrifera.'* Inset depicts microscopic stages of development from 1N zoospores to multicellular 2N sporophytes. Illustration at the left shows stylized sporophyte development, with dichotomous growth.

1. Zoospores
2. Settled spore
3. Developing germ tube
4. Germinated gametophyte
5. Female gametophyte with oogonium
6. Female gametophyte with extruded egg to left
7. Multicellular male gametophyte with antheridia
8. Antherozoid (sperm)
9. Fertilization
10. Embryonic sporophyte with rhizoids for attachment

SOURCE: Modified from North (1994).

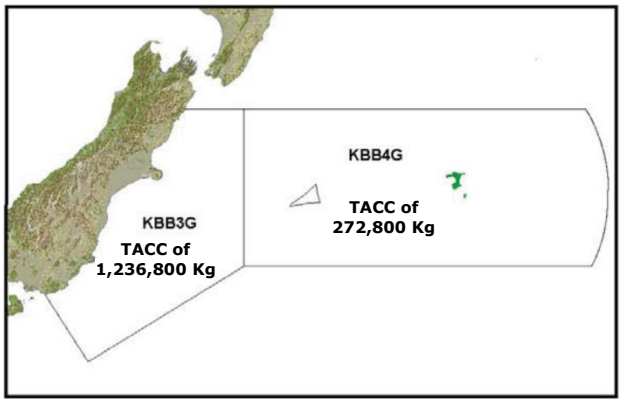
Lifecycle of Macrocystis pyrifera (Schiel & Foster, 2015)

In addition to a fast growth rate, it produces millions of spores that are capable of colonizing rocky substrate in a range of conditions, growing quickly, and becoming reproductive in less than a year.

Uprooted Giant Kelp entangled on mussel lines two days after a storm, approximately 0.5t of dead kelp is on this buoy alone.

Whole plants live for 2-6 years, during this time they naturally die back in summer and re-grow in the autumn, with individual fronds living for 4-9 months. Dieback is caused by a seasonal reduction in nutrients – warmer summer water holds fewer nutrients than colder winter water. In addition, entire plants are uprooted by the large swells caused by storms. Storms and seasonal dieback are two of the major causes for reductions in biomass. The reproductive, spore-producing blades (called sporophylls) occur at the base of the plant. The high growth rate, short life cycle, in addition to having the sporophylls near the base, make Giant Kelp the most suitable of all kelps for harvesting (Schiel & Foster, 2015). It is like mowing the lawn of the ocean.

GIANT KELP: SCIENTIFICALLY BACKED QUOTA



Roger and the Foundation for Research Science and Technology (FRST) co-funded NZ's largest ever kelp research project, which evaluated the sustainability of Giant Kelp harvesting. Undertaken by Pirker, Schiel, & Lees in 2000, this was a three-and-a-half-year project at a total cost of $380,000. The evidence from the kelp research supported the entry of Giant Kelp into the QMS and was used to set the initial Total Allowable Commercial Catch (TACC). Giant Kelp has been managed under the quota management system (QMS) in New Zealand since 2010. It was introduced into the QMS after Roger Beattie won a 17-year high court battle with the Ministry of Fisheries (fought over matters of law and sustainability).

"Overall there were no negative flow on effects resulting from harvesting the kelp forests."

(Pirker, Schiel, & Lees, 2000).

Only the canopy section of the plants is taken (cut to a maximum depth of 1.2m), with **all** reproductive fronds left behind. We have never harvested reproductive fronds. Removal of canopy fronds increases light penetration in the water column for the rapid regrowth of juvenile fronds and the establishment of new plants.

Harvesting Giant Kelp in Akaroa Harbour

Loading Giant kelp ready to be dried and crushed

There has never been a fishery introduced into the QMS in New Zealand, where more was known about the effects of commercial harvesting before introduction.

GIANT KELP: FORESTS IN BETTER HEALTH

Giant Kelp has lived up to its highly resilient reputation. NZ Kelp has harvested 400,000kg of kelp from Akaroa harbour and Shag Point from April 1st, 2010 up to December 2018, and the health of the Kelp forests is indistinguishable from before commercial harvesting begun. Like any fishing company, NZ Kelp reports all its annual catch to MPI through Catch Effort Landing Returns, who can use this as a proxy to evaluate the health of a fishery. One way this is done is calculating the amount of **effort** (time) required to obtain any given **catch** size (tonnes of kelp). I.e. if it takes 3 hours to obtain 1 tonne of fish, where in the past is only took 1 hour for the same amount, MPI can infer that the fishery is in decline. What does the Catch-Effort ratio look like for Giant Kelp 8 years after the Quota allocation? There has been no change. If anything, it takes less effort to obtain the same catch using the same method, this indicates a strengthening of stocks. This is because kelp quota owners actively *manage* kelp forests. They have a vested interest in conserving and enhancing the kelp fishery.

GIANT KELP: QUOTA OWNERS ARE STEWARDS OF MARINE RESOURCES

Quota owners protect their resource from pollution and harmful effects.

Areas that are less productive are harvested less.

Most harvesting occurs in spring before the big summer die back.

Harvesters can plan to harvest just before a big storm,
when plants would have been ripped out and died anyway

Someone's property is someone's care. No-one's property is no-one's care. Property owners prevent activities that would have a negative impact on their property. In the mid 1990's Roger Beattie fought a planning tribunal court case against a developer who wanted to dump treated human effluent into Akaroa harbour. As part of that, Roger funded an alternative land-based proposal *with his own money*, that has now been implemented by other communities in Akaroa. Roger took this action to protect his marine farm, to protect his PAU3 Paua quota property rights, and to protect his kelp harvesting rights in Akaroa harbour. This environmental gain was made by a commercial quota owner and fisher acting in his best interests. His property rights incentivised him to become a steward of that resource – caring for it, protecting it, and making use of it, like we all do with our most valued property. One wonders what the result would have been if it had been left up to general public or the government to fight the planning tribunal. Would they have even found out about it? How does their level of care to this resource compare with someone who's livelihood and income depends on it?

With the rising demand for seaweed foods and seaweed-based agricultural products, it will become increasingly important that we have our quota owners paying attention to the health of our kelp forests and protecting them from harmful land-based run off and pollution.

CHEMICAL FARMING VS BIOLOGICAL FARMING

Industrialised agriculture has 'worshipped at the altar of productivity' for many decades now, with a myopic view on how best to feed society. Large applications of artificial soluble fertilizer have a negative effect on beneficial bacteria and fungi in the soil. Intense pesticide, fungicide and antibiotic regimes result in a higher yield in initial harvests but usually mask, create and intensify any underlying fertility problems in the soil. Continued stress on soil, plants and animals has led to increased health issues through chemical residues and lower nutrient density in food as a result of soil degradation.

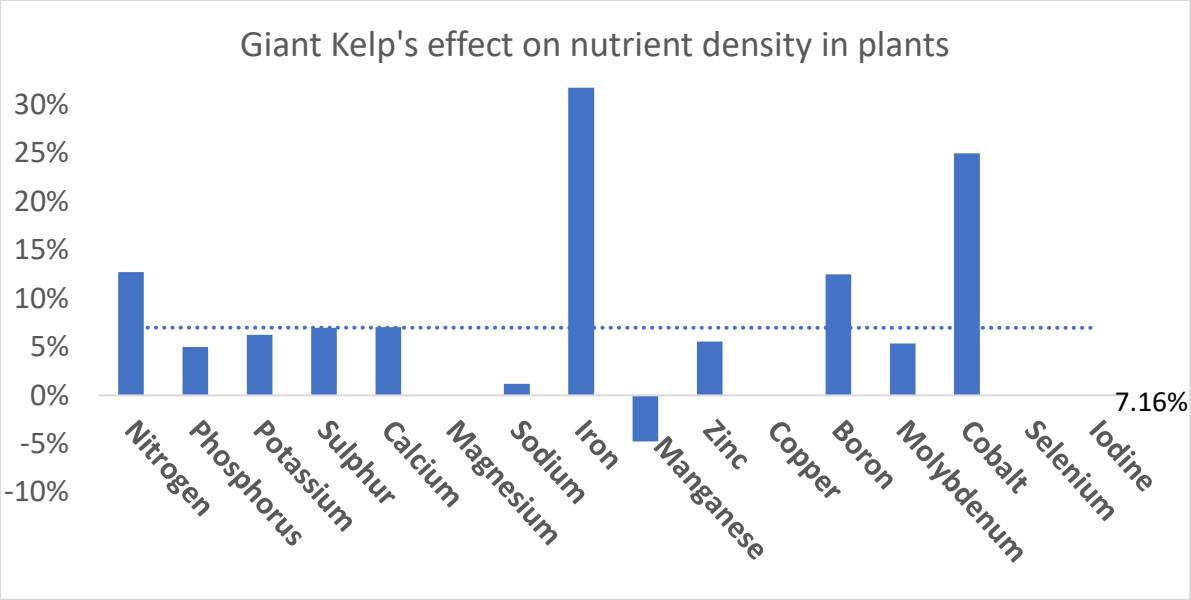
Instead of fighting against biology we should be working with it. It is a well-known phenomenon in ecology that diversity increases the biomass potential and provides resilience to environmental stress (Cardinale, et al., 2011) (Doak, et al., 1998). We should be creating an environment in our soils that can harbour productivity perpetually. Applying kelp to soils improves its health, increases the production per hectare and improves the resilience. The picture of barley above shows that Giant Kelp helps support the microbe relationships in the soil between the plant roots and mycorrhizal fungi. Plant exudates are secretions of sugars, enzymes and carbon, and are a sign of a healthy plant-microbe relationship.

Barley trial with control on the left and Giant Kelp on the right.

This is shown as a thick covering of soil on the roots. The plant on the left that received no kelp has bare roots, while the plant on the right that received kelp has its roots extensively covered in

exudate. This result was after an application of 10kg/ha of dried kelp. The Giant Kelp helped the soil biology and the plant.

Leaf tests at the late tiller stage showed an average increase of 7.16% in key plant nutrients when the Giant Kelp was applied. The Giant Kelp had a beneficial effect on 11 nutrients, neutral effect on 4, and negative effect on 1.



A 10Kg/ha application of Giant Kelp improved the nutrient density of barley by an average of 7.16% when compared to the control. (Test performed by Hills Labs). This translated into a 14% increase in overall yield at harvest time.

A high brix level in plants means that the sugar levels are high. If sugar levels are high, the plant can give away more sugar to mycorrhizal fungi in exchange for minerals, allowing both fungi and plant to flourish.

According to one of New Zealand's top consultants in biological farming, Rob Flynn, the number of biological farmers has grown from 1% ten years ago to 10% of farmers today. This is the equivalent of a 26% average compound growth rate over ten years. Rob predicts that in another ten years 30% of New Zealand farmers will be biological.

GIANT KELP IS CHANGING THE FACE OF FARMING

Giant kelp is helping transform modern agriculture as a part of the biological farming movement. Farmers are now discovering the importance of farming the **biology** in the soil, rather than constantly supplementing the plants with chemicals. Agrichemicals such as urea are damaging to soil ecosystems and to New Zealand's waterways. The major decline in our rivers is due to a combination of factors, but most of the causes can be traced back to one problem – intensive chemical farming. Giant Kelp is part of a movement of shifting people away from this unsustainable style of farming. For example, Nigel Greenwood, a horticultural farmer in Leeston has reduced his urea input by over 90% by using Giant Kelp and other biological farming products. Giant Kelp is high in plant growth hormones and natural stimulants. Nigel now uses 10x less than the 'recommended' quantity of urea, while consistently getting yields in the upper quartile. Without Giant Kelp, farmers such as Nigel will be forced to use more urea.

Stealing Giant Kelp ITQ will increase the use of harmful agrichemicals.

GIANT KELP HARVESTING MITIGATES CLIMATE CHANGE

Giant Kelp mitigates Climate Change in at least two ways.

Methane Reduction

The first is that Kelp and seaweeds can reduce the amount of methane produced by ruminating animals (Foodtank, 2017). Methane traps 30 times heat more than CO_2 so reducing methane emissions is a highly effective way of mitigating climate change.

Biological farming stores more carbon

The second is by accelerating the movement towards biological farming. The biological approach to farming builds more humus, thereby storing more carbon in the soil (Ghabbour, 2017). Chemical farming practices degrade the soil and damage the microbes involved in the carbon cycle, releasing carbon into the atmosphere rather than sequestering carbon.

Giant Kelp is increasingly used as an essential ingredient in biological and organic farming regimes. Giant kelp is a catalyst in the soil/carbon building process.

"The formation of humus is an anabolic process, that is, a building-up process. Rather than sugar being the end point, sugar is the start point. Soil microbes use sugars to create complex, stable forms of carbon, including humus."

(Dr Christine Jones, Acres USA, March 2015)

Giant Kelp is high in sugars and carbon, and when we harvest Giant Kelp and apply it to land with Biological farming methods, we store more carbon in the soil – removing it from the atmosphere and locking it in the land. In the areas that were sustainably harvested, the growth of Giant Kelp proliferates, further removing carbon from the ocean & atmosphere.

We are removing carbon from the atmosphere directly through harvesting and indirectly through feeding soil microbes that store more carbon than they consume.

GIANT KELP: IODINE SUPERFOOD

Chemical Composition of Dried Giant kelp

Macronutrients			Micronutrients		
N	*%*	*1.68*	***Fe***	*ppm*	*117.00*
P	*%*	*.25*	***Mn***	*ppm*	*6.00*
K	*%*	*10.45*	***Cu***	*ppm*	*.76*
S	*%*	*1.07*	***Zn***	*ppm*	*16.65*
Ca	*%*	*1.16*	***B***	*ppm*	*153.00*
Mg	*%*	*.67*	***Co***	*ppm*	*.22*
Na	*%*	*3.46*	***Se***	*ppm*	*.28*
			Mo	*ppm*	*.46*
			I	***ppm***	***2678.00***

Dry matter (DM) %	*90.00*		
Ash (Minerals) %	*35.71*		
Protein %	*13.35*	*Metabolizable Energy (ME)*	*11.43*

Averages of chemical composition analysis run by NZ kelp

The ocean has a lot of iodine compared to the land. This means food from the ocean is the most iodine-rich. Giant kelp has the highest amount of iodine of any organism on the planet.

Based on chemical composition above, a level teaspoon (1g) of dried Giant kelp has approximately 2678μg (or 2.678mg) of iodine. An 85g serving of cod (also considered a high iodine food) has 99μg of iodine. The recommended daily intake (RDI) of iodine for adults is 150μg (NIH, 2018). To meet your RDI of Iodine you can either have 128g of cod (Atlantic Cod), or 0.05g (1/18th of a tsp) of Giant Kelp. *Giant kelp is 2500 x higher in Iodine than Cod.*

GIANT KELP: HUMAN HEALTH BENEFITS

Giant kelp is the ideal plant to naturally supplement and prevent iodine deficiency in the diet. Iodine is needed in the thyroid gland to produce hormones that affect the function of virtually all our organs.

"Iodine deficiency is the world's most prevalent, yet easily preventable, cause of brain damage."

(UN World Health Organization).

Iodine deficiency is associated with a multitude of disorders, most notably goitre (enlargement of the thyroid gland) and cretinism which causes stunted physical and mental growth. Iodine deficiency has also been associated with lethargy, weight gain, suppressed immune system, depression and anxiety (Dr Edward Group DC, 2015). The most severe disease associated with iodine deficiency is cretinism and this has been successfully eradicated from affluent countries, primarily due to widespread iodisation of salt. It is however, still prevalent in some poorer regions of the globe and is still estimated to effect 2 million children globally each year (Zimmerman & Anderson, 2012). One study of iodine supplementation showed a 50% reduction in the number of infant deaths, and an average increase in IQ of 16 points.

Iodine deficiency is *still* prevalent in New Zealand.

"91% of New Zealanders are deficient in iodine."

(Ben Warren - Nutritionist, April 2018).

This is because NZ soils are extremely low in Iodine, which causes the food we produce to also be low in Iodine. With growing demand for natural salts, the role of Giant Kelp in preventing Iodine deficiency with become increasingly important. Harvesting of Giant kelp for human consumption could help alleviate iodine deficiency diseases which are still an issue today. By supplementing grazing animals with Giant Kelp and applying Giant Kelp directly to pasture or crops we are increasing the amount of iodine in the overall population's diet.

GIANT KELP: ANIMAL HEALTH

"If an animal is deficient in iodine, no matter what vitamins or minerals are given, they will not be assimilated properly until the iodine requirements have been met."

(Pat Colby – Natural farming)

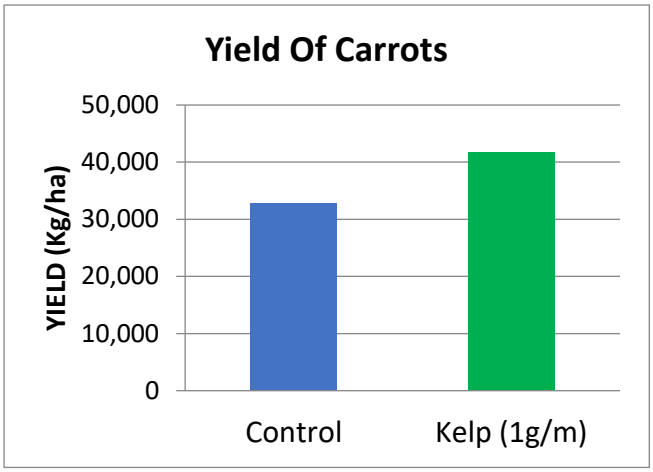
Murray grey cow eating Giant Kelp

Low levels of iodine in the soil affects the growth and health of plants, and health of the animals that eat those plants. Iodine deficiency affects animals as well as humans. Administering kelp to stock can greatly improve the vitality and virility of animals. Feeding kelp to stock has a range of benefits including; enhanced immune function, longer cycles of reproductive activity, better conception, healthier offspring, fatter animals, faster growth rates, improved feed conversion efficiency, greater resilience to stress, slicker more lustrous coats, lower somatic cell counts, reduced lice problems, less fly pressure, fewer internal parasites, less pink eye, less foot/hoof problems and a better functioning endocrine system.

"Iodine is the most important mineral for the human or cattle. The most important hormone in the body is the thyroid hormone and the thyroid needs iodine"

(Dr Paul Dettloff - Acres USA, June 2011)

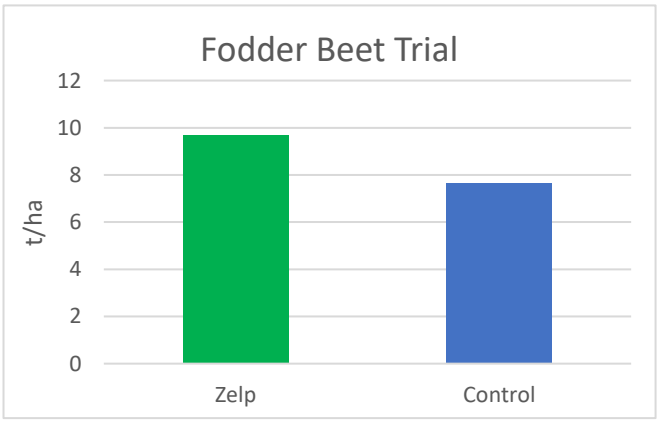
GIANT KELP: CROPPING TRIALS

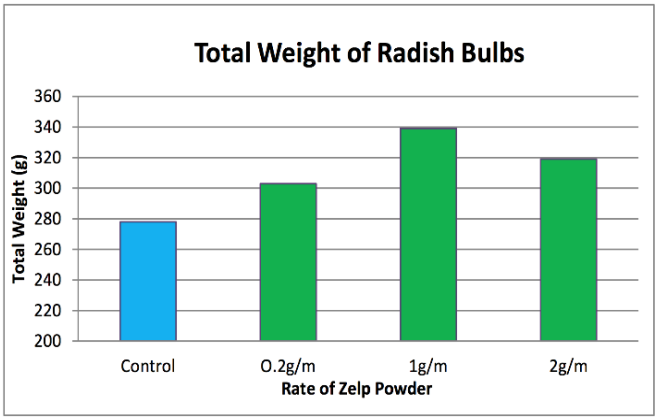


NZ Kelp have run and had products involved in numerous trials for a range of crops showing positive effects with different crops. This includes: increased yield, faster growth, improved germination, greater resistance to disease & pests, greater resilience to drought, improved quality, higher brix levels, higher nutrient density, higher palatability, better colour, and more uniformity of size.

Results from the trial above show that adding Giant Kelp at 1g/m (23Kg/ha) was highly effective, with a 27% increase in yield of first grade carrots compared to the control. From an economic point of view, $483/ha spent on Giant Kelp resulted in $7,897/hectare more revenue. This is a 16x return on investment in kelp for the farmer.

Several other experiments (shown below) on cropping products show the benefits Giant Kelp has for agriculture. Results shown are comparing crops sown with Giant Kelp against control crops (no Giant Kelp applied). All these results are for bare untreated seed.





Crop type	Increased yield with Giant Kelp	General notes
Radishes	**20%** increase with 10kg/ha of Giant Kelp.	Dramatically less insect attack.
Three Brassicas: Rape, Turnip, Mustard	**49%** increase with 2kg/ha of Giant Kelp.	Notably more germination of turnip and mustard with Giant Kelp.
Carrots	**27%** increase (trial 1) with 1g/m per row (23kg/ha). **33%** increase (trial 2) with 1g/m per row.	"More orange, more even in size and were denser"
Barley	**14%** increase in yield with 10kg/ha of Giant Kelp. **7.16%** increase in nutrient density with 10Kg/ha of Giant Kelp	"Plants in better condition." "Impressive exudate structure."
Onions	**15%** increase with 5kg/ha of Giant Kelp.	5% greater average onion diameter.
Swedes	**21%** increase (trial 1) with 2kg/ha of Giant Kelp. **34%** average (trial 2) increase in yield across 3 paddocks with 2kg/ha of Giant Kelp.	Sheep preferentially grazed the swedes on the Giant Kelp side of trial
Fodder Beet	**5.5%** increase (trial 1) with 2kg/ha of Giant Kelp. **27%** increase (trial 2) with 2kg/ha of Giant Kelp.	20% better germination "More leaf and more bulb"

Giant Kelp has improved farmers productivity and profitability. For example, the 14% increase in barley yield only required 10kg/ha of Giant Kelp. From an economic point of view, $180/ha spent on Giant Kelp resulted in $528/hectare more revenue, this is a 3x return on investment for the farmer.

"I got higher yield, with larger grains, and the plants were in better condition. The tissue sample showed higher levels of nutrients in plants given Giant kelp."

(Nigel Greenwood, Farmer)

"I will definitely use Giant Kelp again, with Giant Kelp the fodder beet established more quickly and grew more leaf and more bulb."

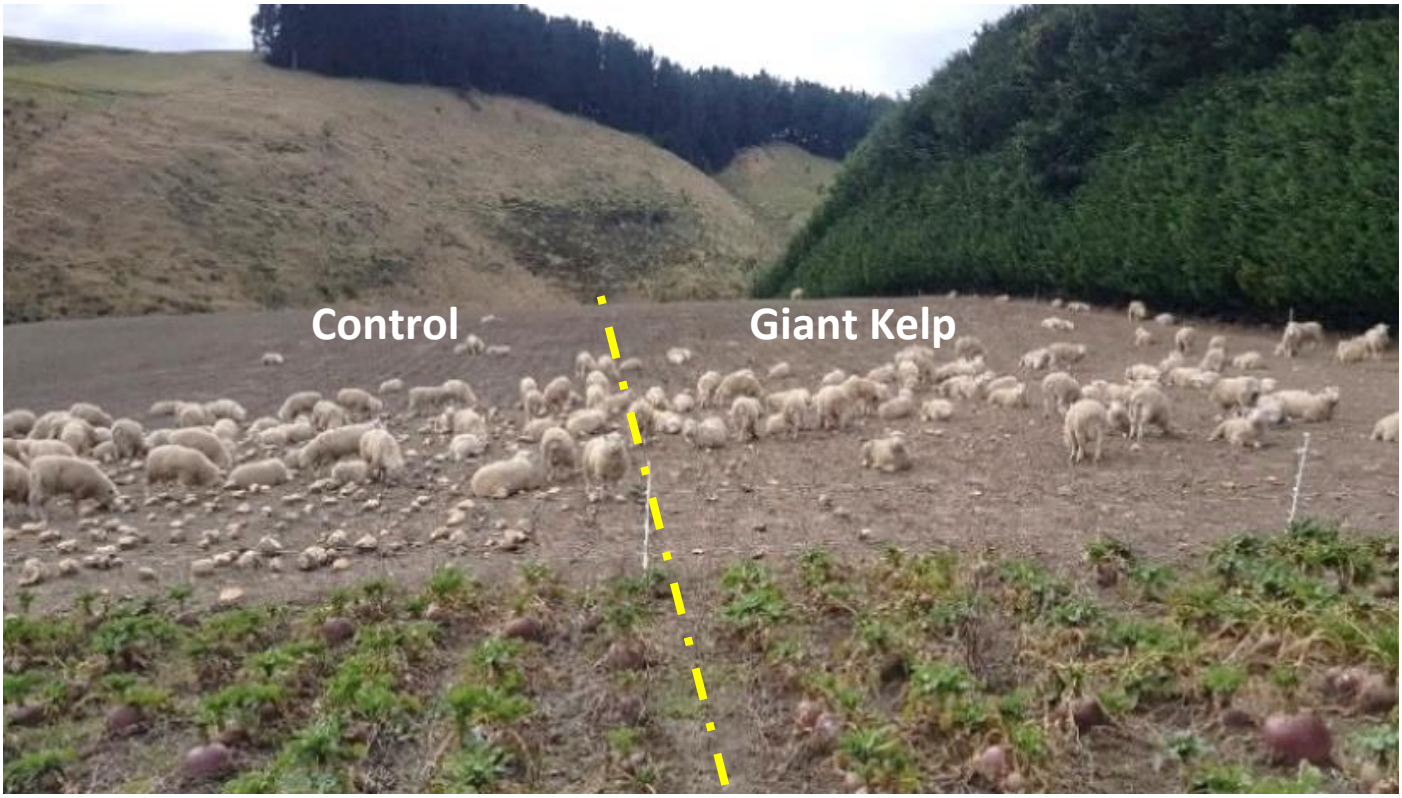
(Allan Richardson, Farmer)

Depending on the type of crop grown NZ Kelp recommends applying between 2-20kg of product per hectare. For bulb brassica's i.e. turnips, swedes, and fodder beet, 2kg/ha is recommended as evident above. For cereals (wheat, barley and oats) 10kg/ha. For carrots 20kg/ha.

These recommendations are to increase profitability, based on the cost of Giant Kelp, return on investment (from increased productivity) and prices of crops. Giant Kelp should not be thought of as a fertilizer, in farming and horticulture settings it is used to support the soil biology and plant life which enhances production. The exact mechanisms by which Giant Kelp increases yield is unknown but it is suspected to be a combination of the following:

1) It is high in natural growth hormones – Auxins, Cytokinins and Gibberellins which boost cell growth and mitosis.
2) It has very high antimicrobial properties that help protect plants from the harmful types of bacteria and fungi.
3) Giant Kelp has the highest Iodine content of any plant and has 29 micronutrients that are essential for healthy soils, plants and stock.
4) It is high in complex polysaccharides (sugars), which feed symbiotic beneficial fungi
5) Giant Kelp is hygroscopic – it sucks in moisture from the soil and atmosphere, keeping the kelp and the surrounding area moister than it otherwise would be. Moist environments help soil biology function better than dry environments.
6) As a catalyst helping the soil biology hunt for minerals for plants in exchange for sugar, and creating more humus and soil carbon
7) As a catalyst strengthening the plant root-soil microbe bridge. Where the soil biology (principally mycorrhizal fungi) hunts for and exchanges minerals to plant roots in exchange for sugars created by the plant from sunlight, CO2 and water. By feeding the fungi with Giant Kelp, otherwise unavailable nutrients become available to plants and more humus is created. No one ever cursed the soil for having too much humus.

NZ Kelp also sells Giant Kelp as an Iodine supplement to lift the performance of healthy stock and remedy unhealthy stock. Many farmers have relayed stories back to NZ kelp of surprise at how their animals have responded favorably to being feed Giant kelp.



Several days after grazing, the sheep had eaten all the swedes on the Giant Kelp side, and very little from the control

THE SOUTH EAST MARINE PROTECTION FORUM

Recommended marine protected areas by the SEMPF (kelp forest protection in green encompasses 80% of Giant Kelp in KBB3G)

Despite the current and future value of the Giant Kelp industry to New Zealanders and the environment, there are some people who want to stop the harvesting of Giant kelp along the south east coast of New Zealand. As well intentioned as this may be, the biggest restriction of all would be on the harvesting of Giant Kelp, which is the most sustainable of all the fisheries in New Zealand. Banning Giant Kelp harvesting will put the kelp forests at risk of the real threats here - which are changes in level and type of sedimentation, global change in ocean conditions (acidification & climate change), and chemical runoff (e.g. fertilization, zinc roofing, asphalt and waste discharge). The implementation of a ban on commercial harvesting of Giant Kelp is nothing but a false consolation, giving the *illusion of protection.* The SEMPF argues that the kelp forests currently have no protection. This is false. Quota owners care more for these resources than anyone else. To most fisherman, Quota is their biggest asset. Their living depends upon kelp being there next year, 10 years and 50 years into the future. They monitor their health and viability on a regular basis – no one else does. Quota owners are the first to learn of *real* threats. They are the strongest advocate against these threats. This is evidenced by Roger Beattie's action to stop treated human effluent being

dumped into Akaroa harbour, and his personal funding of an alternative land-based proposal (*This is mentioned in the earlier section: Quota owners are stewards of marine resources)*.

GIANT KELP HARVESTING IS SUSTAINABLE

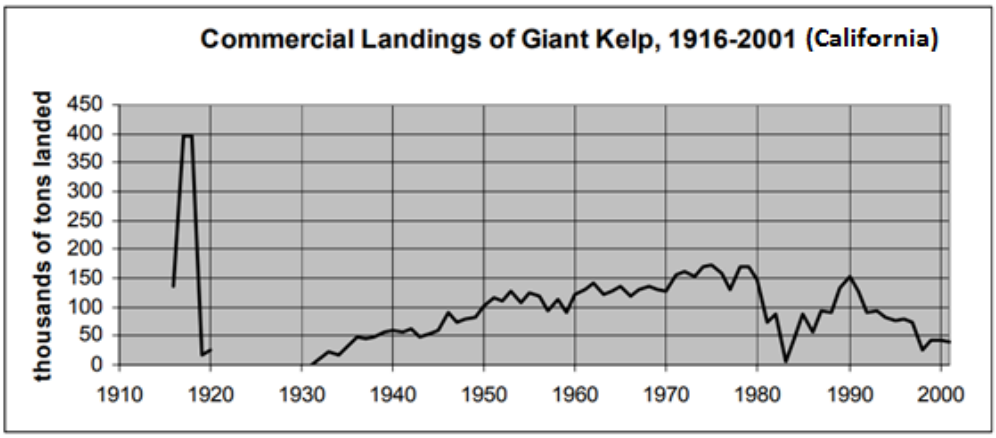


Figure 1.1. Annual commercial landings (tons) of giant kelp from 1916 to 2001. Data source is the Kelp Harvester's Monthly Report (logbook) and data is not available from 1921 to 1930. Kelp landings consist primarily of giant kelp (*Macrocystis pyrifera*).

Harvesting of Giant kelp in California has been sustainable since the early 1900s. Harvesting spiked up to 400,000 tons during WW1 for the creation of potash for gunpowder. Scientists even found that removing the canopy increases light at the bottom which enhances growth and recruitment of new plants (Rosenthal, Clarke, & Dayton, 1974) (Kimura & Foster, 1984). Yet, the SEMPF insists on arguing that kelp is 'slow growing and vulnerable'. This is blatantly false and laughable. The two independent leading experts on Giant Kelp make their stance clear:

"The growth and reproductive characteristics of Macrocystis make it the most suitable of all kelps for harvesting"

(Schiel & Foster, 2015).

In the three-and-a-half-year study that evaluated the sustainability of commercial harvesting of Giant Kelp in NZ they found:

"Overall there were no negative flow on effects resulting from harvesting the kelp forests."

(Pirker, Schiel, & Lees, 2000).

The SEMPF did not cite the Pirker study (NZ's largest and most comprehensive kelp research paper) and it only cited Schiel & Fosters definitive 2015 book on the biology and ecology of Giant Kelp forests once. The SEMPF gave no justification for not properly using these resources.

SEMPF RELIES ON ONE DELIBERATELY MISLEADING SCIENTIFIC PAPER

The SEMPF arguments have relied almost entirely on one poorly conducted piece of science by Geange (Geange, 2014). SEMPF has used Geange's work to deliberately and maliciously spread misinformation about commercial harvesting of Giant Kelp - "The harvest method to remove the surface tissue down to a depth of 1.2m… has been found to reduce the generation of reproductive blades by an average of 86% within New Zealand populations.". The study was conducted with the intention of simulating commercial harvesting. However, the study differed from commercial harvesting in two vital ways. The first is that in the Geange trial they removed all the reproductive blades (sporophylls, see lifecycle diagram) at the base of the plant. **Commercial harvesting never does this**. The second is that Geange spot-harvested plants; the harvested plants were swamped in darkness from other plants – limiting their ability to photosynthesize. **Commercial harvesting does not do this**, it harvests the canopy in an area, giving the cut kelp plenty of access to light and enabling them to photosynthesize and regrow. SEMPF cited the least representative trial of commercial harvesting ever done. Why did the SEMPF exclusively use data from this one simulated trial, and not the decade of real commercial harvesting data held by MPI? Or the 100+ years of data from the Californian Giant Kelp fishery? SEMPF needs to retract and apologize for the damage to scientific and commercial reputation caused by the spreading of this deliberate and calculated misinformation.

NO CONSULATION WITH QUOTA OWNERS

The SEMPF claimed that, "we have taken on broad views expressed to us by each sector." As a matter of fact, none of the six Area 3 Giant Kelp (KBB3G) quota owners were contacted. Roger Beattie found out about the SEMPF through someone else, the day the forum was held in Christchurch. Giant Kelp Quota Owners were deliberately kept in the dark.

STEALING KELP QUOTA IS ILLEGAL

If the SEMPF were to come into effect, it would directly conflict with the high court order to bring kelp into the QMS. The Government would be stealing property (Quota) and justifying this on political terms. Uncertainty like this makes commerce impossible. How can we build a business with the knowledge that the government can just take it all away from us on a whim? We can't. The Government should be forced to buy all quota at full price from all quota owners, before they could abolish the quota themselves. This would make the SEMPF a very expensive exercise, paid for by the taxpayer. If this theft of kelp quota goes through:

1) All property is at risk of political theft
2) All high court judgements become subject to the political process
3) All rights are eroded
4) Privileges replace rights
5) Privilege goes hand in glove with corruption.

The government sold Giant Kelp quota for the whole of Quota Management Area KBB3G. Those who bought Giant Kelp quota from the government have every right to sue the crown if the area is cut back.

SEMPF WILL INTENSIFY HARVESTING

The South East Coast has the largest and most productive kelp forests in NZ. If the proposed prohibition on harvesting Giant kelp were to happen this would reduce the potential to harvest from the whole of KBB3G by about 80%. This puts a strong incentive to intensify kelp harvesting in other areas – something Quota owners are opposed to. The most sustainable way to harvest kelp is rotational harvesting of the most productive areas, just like farming. This requires access to the south east coast and this is what quota owners want.

STOMPING THE SEEDLING

Global demand for seaweed is rising, and with NZ's isolated geography, relatively clean waters, and world-class QMS, we are in the prime position to capitalize on this opportunity. The NZ seaweed industry is in its nascent stages. For the last two decades NZ Kelp has worked hard to develop the market and distribution channels for this new industry. The number of products is expanding, and sales are increasing, providing sustainable eco-friendly products to a multitude of end users, whilst also providing valuable employment and income for New Zealanders. SEMPF wants to stop this industry in its tracks and limit the health and wealth of New Zealanders, by unthinkingly banning Giant Kelp harvesting.

CONCLUSION

The forum claimed to have worked “in good faith”. This is false. There was no consultation with Quota owners.

The forum grossly underestimates the value of the fishery, by ignoring market trends and future potential, *and completely ignoring the social economic and environmental value of Giant Kelp products to New Zealanders.*

The forum claims Kelp forests are a sensitive habitat, yet they have proven to be highly resilient to commercial harvesting. The actual danger is in land-based pollution and sedimentation.

It is appalling that the SEMPF has not asked NZ’s Giant Kelp harvesting experts or NZ’s Scientific Expert (Distinguished Professor David Schiel) for their data or opinion. Indeed, it seems that have asked everyone what they think of Giant Kelp, except for the ones who care most about it and know most about it!

It is clear that SEMPF has decided on an outcome and then looked for evidence to support it. This is not how science is done! The science supports keeping this fishery open.

The implementation of an MPA simply encourages the public to further turn a blind eye to irresponsible land farming, which is the primary cause of sedimentation and the single greatest threat to kelp forests.

SEMPF says commercial harvesting is a risk. It is not a risk. Harvesting by ITQ owners is a better form of protection than an MPA. They police, monitor and steward the forests.

SEMPF is stereotyping commercial fisherman as exploiters of marine life and have actively excluded Giant Kelp quota owners from conversations about the protection area. SEMPF has not been inclusive.

This confiscation and redistribution are as bad as what is happening to land in South Africa at present.

It is as bad because the rights to harvest kelp were legally obtained through a combination of peer-reviewed scientific research, High Court decree, and negotiation with the Ministry of Fisheries (now Ministry for Primary Industries).

All rights must be protected, or no rights are safe.

Furthermore, the Ministry of Fisheries has sold kelp quota on the open market. (Roger Beattie's High Court win and agreement with the Ministry of Fisheries meant that Roger got 40% of the Giant Kelp quota, Maori got 20% and the crown got 40%). The Crown sold its 40% share of the quota, and now threatens to steal 80% of it back. This will end up back in the High Court if quota rights are taken away. Roger Beattie will take the Ministry for Primary Industries the Department of Conservation and the University of Otago to court. Roger Beattie is also investigating misfeasance in public office. Roger Beattie will continue harvesting Giant Kelp in the SEMPF zones.

If scientific research by the undisputed experts on Giant Kelp is to be ignored, if the High Court is to be ignored, and if the government sells something one day and confiscates it the next (without compensation), then we live in a barbaric country where the rule of law is ignored, where no rights are secure and where theft is sanctioned if it has political appeal.

History teaches us this is the road to the third world.

Roger Beattie
Director NZ Kelp
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Table 1.1. Commercial landings (tons) of giant kelp, 1916-2001

Year	Tons	Year	Tons	Year	Tons	Year	Tons	Year	Tons
1916	134,537	**1933**	21,622	**1950**	100,602	**1967**	131,495	**1984**	46,479
1917	394,974	**1934**	15,880	**1951**	114,760	**1968**	134,853	**1985**	87,300
1918	395,098	**1935**	30,602	**1952**	110,158	**1969**	131,239	**1986**	56,832
1919	16,673	**1936**	49,317	**1953**	126,649	**1970**	127,039	**1987**	93,264
1920	25,464	**1937**	43,954	**1954**	106,215	**1971**	155,559	**1988**	90,615
1921	------	**1938**	47,697	**1955**	124,063	**1972**	162,511	**1989**	132,761
1922	------	**1939**	56,736	**1956**	117,815	**1973**	153,080	**1990**	151,439
1923	------	**1940**	59,004	**1957**	94,207	**1974**	170,181	**1991**	127,505
1924	------	**1941**	55,717	**1958**	114,062	**1975**	171,597	**1992**	91,247
1925	------	**1942**	61,898	**1959**	89,599	**1976**	158,371	**1993**	92,940
1926	------	**1943**	47,958	**1960**	120,300	**1977**	130,597	**1994**	81,006
1927	------	**1944**	53,030	**1961**	129,256	**1978**	169,029	**1995**	77,753
1928	------	**1945**	59,181	**1962**	140,233	**1979**	171,020	**1996**	78,461
1929	------	**1946**	91,069	**1963**	121,032	**1980**	147,636	**1997**	73,165
1930	------	**1947**	74,237	**1964**	127,254	**1981**	73,064	**1998**	25,313
1931	260	**1948**	78,641	**1965**	135,129	**1982**	86,503	**1999**	42,211
1932	10,315	**1949**	83,346	**1966**	119,464	**1983**	5,271	**2000**	41,943
								2001	40,116

------ Landings data not available from 1921 to 1930.
1. Data source: Kelp Harvester's Monthly Report (logbook).
2. Kelp landings consist primarily of giant kelp (*Macrocystis pyrifera*).