



Stony Brook University
*School of Marine and
Atmospheric Sciences*

May 19th, 2021

Dear Honorable Fred Thiele,

I am writing this letter in very strong support of Assembly Bill AB7547. As you know, we live in an era of change. During the past several decades, we have collectively witnessed onsite septic systems contaminate our groundwater with high levels of nitrogen that seeps into surface waters where that nitrogen promotes harmful algal blooms (HABs). Those HABs, in turn, shade out and kill off seagrass, a vital marine habitat. When HABs die, they can cause low oxygen and low pH conditions known as acidification which is exacerbated by climate change. All of these conditions (HABs, low oxygen, acidification) have contributed to the collapse of some of NY's most vital fisheries including the bay scallop and hard clam whose 2020 landings were 1% of the peaks observed in the 1970s and early 1980s. As you also know, New York State has begun to invest billions of dollars in clean water infrastructure, including the upgrading of sewage treatment plants and onsite septic systems on Long Island. This is an incredibly important investment, as the majority of the nitrogen entering surface water and triggering the catastrophic cascade of events described above comes from wastewater. Suffolk County's 2020 Subwatersheds Plan to upgrade onsite septic systems is the most aggressive such plan in the nation, seeking to upgrade the large majority of onsite systems (220,000) by 2050. In the meanwhile, 'in the water' nitrogen remediation efforts are sorely needed as a 'parallel track' protect and support Long Island's coastal ecosystems in the intervening years (2021 – 2050). The aquaculture of kelp holds great promise to be the precise 'in the water' nitrogen remediation effort needed.

Via the process of photosynthesis and vegetative growth, kelp removes nitrogen from water bodies. If that kelp is harvested and taken out of the water at the end of its growing season, the nitrogen is 'bioextracted' from the ecosystems. Our recent estimates suggest that a one-acre kelp farm can produce 72,000 lbs of kelp in just five months (January – May), resulting in the removal of up to 200 lbs of nitrogen, the same amount nitrogen removed by 10 or more advanced, low nitrogen septic systems.

Beyond nitrogen, as kelp grows and photosynthesizes, it produces oxygen and removes carbon dioxide. As mentioned above, our bays can have a lack of oxygen and are often oversaturated with carbon dioxide, so the action of kelp helps to correct these problems. Our emerging research at Stony Brook University that these changes in water chemistry induced by kelp (lower carbon dioxide) can be highly beneficial for shellfish that are threatened by ocean acidification

which is caused by the oversaturated of carbon dioxide. We have found that ocean acidification inhibits the growth of shellfish such as clams, oysters, and mussels, but that kelp can alleviate ocean acidification and, in turn, rescue the bivalves from that threat.

Yet another surprising benefit of kelp is its ability to deter the occurrence of harmful algal blooms (HABs). In the spring, the most dangerous of the HABs is *Alexandrium* which produces saxitoxin and causes paralytic shellfish poisoning a potentially lethal syndrome; a man died in Alaska last summer after eating mussels contaminated with saxitoxin. In NY, there have been more than a dozen PSP closures during the past decade at more than seven locations. In good news, in a series of recently completed and soon to be published experiments, my laboratory group has discovered that when the PSP-causing algae, *Alexandrium*, is exposed to kelp, the cells die. We have demonstrated this in the laboratory and in an ecosystem setting. We have also shown the kelp can reduce the saxitoxin content of mussels exposed to *Alexandrium* if those mussels are co-grown with kelp.

Beyond the environmental benefits, kelp has the potential to be a highly valuable crop for aquaculturists. Kelp may be a food item, used as a food additive, and as an additive for other commercial product. Recently, my lab has had success in converting kelp into a plant fertilizer, generating more rapid growth of flowering plants, as well as multiple vegetables such as peppers, tomatoes, and eggplants. Creating a fertilizer from kelp will help stem the need for chemical-based fertilizers on Long Island and will help further reduce nitrogen loading to Long Island Estuaries.

In summary, the aquaculture of kelp is very clearly the precise type of environmental remediation approach Long Island needs right now. As such, the passage of your proposed bill is of critical importance.

Please do not hesitate to contact me if you have any questions about this letter or kelp.

Sincerely,



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