COMMERCIALIZATION AND HARVEST MANAGEMENT PLAN
LEASE #6048

for the
Province of Nova Scotia

Submitted To:

Nova Scotia Department of Fisheries and Aquaculture

by:

Acadian Seaplants Limited

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INTRODUCTION

The 2024 Harvest Season marks the forty-third year of commercial operation for Acadian Seaplants Limited (ASL) in Nova Scotia.

It began as a small operation in Nova Scotia and by making the necessary investments in market and product development, resource science and people, it is now a global, multi-faceted company renowned world-wide for its technical, premium seaweed products, and the sustainable management of the valuable marine resource. Additionally, the company's world-leading Research and Development (R&D) Program is essential to its success.

Acadian Seaplants' research on the Rockweed *(Ascophyllum nodosum)* resource within the company leases in Nova Scotia is a long-term commitment. Several studies have been published in international peer-reviewed scientific journals and presented in several international symposia. In 2021, our scientists published a peer-reviewed article in the Journal of Applied Phycology. They used data collected by Acadian Seaplants over the last 25 years to show that the biomass of *Ascophyllum* has remained constant within leased areas harvested by Acadian Seaplants in Nova Scotia and New Brunswick during that period.

The accurate biomass assessments, scientific information gathered, and experience gained by the company over the last 42 years has provided detailed information regarding the intricacies of developing a sustainable Rockweed harvest fishery in Nova Scotia that is recognized world-wide.

The commercial harvest of Rockweed in Nova Scotia has long been a traditional fishery working well with all stakeholders in all harvest areas. Acadian Seaplants will continue to follow all regulations as outlined in the Rock Weed Harvesting Regulations as per the Fisheries and Coastal Marine Act of Nova Scotia. Note that this Lease #6048 (formerly identified as Lease #6008) has been held by Acadian Seaplants for the last 15 years and its resource has been managed sustainably.

Acadian Seaplants will continue to make the necessary investments in harvesting infrastructure, trucking, recruitment, and training of harvesters within the lease area and surrounding communities. Acadian Seaplants Limited's resource scientists have conducted a biomass assessment of the area and will be made available to the province before harvest takes place in Lease # 6048.

Long-term leases, a sustainable resource base, viable harvest volumes, and a dedicated professional harvesting force are crucial to Acadian Seaplants continued success in Nova Scotia. Sustainable employment, infrastructure development, and local economic benefits are key considerations for the company. Acadian Seaplants will continue its leadership role in seaweed research, global export market development and sustainable resource management, with a co-operative effort between DFO, NSDFA and local communities. With this type of working relationship and team effort, all groups benefit, and the synergies created in local economies ensure economic stability and viability for the present and future.

HARVEST MANAGEMENT

This season, Acadian Seaplants will continue to use its team of experienced and qualified Resource Management professionals to implement the sustainable harvest of the Nova Scotia Rockweed resource in Lease #6048.

HARVEST QUANTITIES

A complete biomass assessment of Lease #6048 was completed in 2023. The *Ascophyllum nodosum* total bed area for each sector was calculated from SPOT satellite imagery. The harvestability of each bed was evaluated to calculate a harvestable *Ascophyllum nodosum* bed area in each sector. Bed area was combined with the average biomass (kg/m^2) of each sector obtained from field surveys to calculate the Harvestable *Ascophyllum nodosum* Biomass, and the Yearly Maximum Harvest for each sector within the Lease. This robust resource assessment process ensures that a sustainable *Ascophyllum nodosum* harvest in Nova Scotia will continue to be undertaken by Acadian Seaplants Limited. The results from this exercise are as follows:

[redacted]

The 2024 projected harvest of Rockweed for Lease #6048 in Nova Scotia is [redacted]. The projected 2024 harvest by Sector is as follows:

[redacted]

HARVESTER TRAINING AND RECRUITMENT

The harvest in Lease #6048 will be comprised mainly of the same professional fishermen with little new recruitment expected. A pre-harvest meeting will familiarize all harvesters with the seaweed industry, seaweed biology, weather, tides, safety guidelines, coastal geology, assessment, harvesting guidelines and regulations, sector boundaries, study sites, compliance, reporting, record keeping, material flow, and maintenance of harvesting tools and equipment. It will be reiterated to all harvesters that training and proper safety are critical to the success of the harvest season. Various Government Agencies and Departments will be notified of the date and location of this meeting and their representatives are invited to attend and participate.

Resource personnel will conduct training of new harvesters in the field. This includes familiarization with assigned harvest areas, harvesting tool maintenance, harvesting technique and safety equipment.

Training will also be conducted through placement with experienced harvesters to provide knowledge concerning tides and currents, boat handling at the harvest site, proper boat loading procedures, and transportation of harvest safely to the landing site.

Harvester's health and safety is the number one priority of all parties involved. Acadian Seaplants will ensure that all harvesters are certified to the required Transport Canada Marine Standards. Also, the company's Manager of Safety and Environment, with the Nova Scotia Department of Labour and Advanced Education, works with harvesters to educate and encourage them to have their equipment meet required safety specifications. Compliance monitoring of harvesters and tools will be conducted weekly, randomly by Resource Management and Manufacturing staff.

HARVEST COMPLIANCE

Acadian Seaplants will continue its compliance program in Lease #6048 in accordance with Government Regulations and Company Guidelines. ASL will continue its program of conducting 'on-the-water' inspections in all leased areas. The Resource Manager will remain in close contact with all harvesters to ensure that responsible and compliant harvest activities are followed. ASL will also continue enforcing harvester compliance and their weekly reporting requirements through random inspections of harvesting tools and harvest activity locations. Any incidence of non-compliance is reported, followed by corrective or disciplinary actions in accordance with ASL's Disciplinary Policy. These compliance reports will be reviewed weekly and monthly by senior management.

RESOURCE MANAGEMENT AND ASSESSMENT

Scientific surveys and biomass assessments in Nova Scotia are the responsibility of Dr. Bryan Morse. Dr. Morse joined Acadian Seaplants in 2018 and brings a variety of field research experience in the marine environment to his role at Acadian Seaplants. He is responsible for Resource Science in North America. He has published a number of scientific manuscripts in leading marine journals from his wealth of work and experience.

Since 1995, Acadian Seaplants has developed an intensive assessment program to improve its knowledge on availability of total and harvestable rockweed biomass which is essential to creating a viable fishery and effective management plan. Each year new assessment work, based on scientific sampling procedures, extensive ground-truthing, sector bed mapping by different remote sensing

techniques, and harvest experience has provided more complete and accurate biomass data for Nova Scotia. To date, an extensive amount of knowledge on resource biomass and distribution has been gathered at a high level of resolution (bed level) and stored in a GIS database. This data assists Acadian Seaplants in responding to small-scale ecological concerns as part of its real-time management of the resource. Any issues relevant to the resource and habitat are quickly addressed by adjusting the harvestable biomass accordingly.

HARVEST SUSTAINABILITY

Ascophyllum nodosum is a productive seaweed and extensive work has been conducted on its growth in Nova Scotia (Cousens 1984, 1986, Ugarte et al 2006, Lauzon-Guay et al 2022, in prep), and in the region (Vadas et al 2014) over the last 40 years. Furthermore, it has been recently established that most estimates of growth greatly underestimate the true productivity of the species (Lauzon-Guay et al 2022). The current harvest levels represent significantly less than the annual growth (Lauzon-Guay et al 2022). Furthermore, harvesting increases growth of *A. nodosum* (Walker 1948, Lazo and Chapman 1996, Ugarte et al. 2006), resulting in a smaller proportion of the annual growth removed during harvest.

The harvest of A. nodosum has been extensively studied in Canada, the United States and in Europe, with Nova Scotia having a long history of research done over the last 80 years. It is well established that A. nodosum beds recover very rapidly after harvest (Ugarte et al 2006, Johnston et al 2023). Long-term studies have found no impact of the harvest on the biomass and morphology of *A. nodosum* even after 20 years of continuous commercial harvesting (Lauzon-Guay et al 2021, 2023). Given the rapid recovery and the absence of long-term changes in the morphology or biomass of A. nodosum, impacts on associated communities are very unlikely. Short-term studies looking at the impact of the harvest on ichthyoplankton (Van Guelpen and Pohle 2014) or invertebrates (Fegley 2001, Hamiltom and Nudds 2003, Trott and Larsen 2012, Phillippi et al 2014) have found either no or only short-term impact of the harvest. In a literature review prepared for the Maine Department of Marine Resources' Rockweed Working Group, Beal (2015) concluded that "any negative effects on habitat and invertebrate densities due to removal/harvesting of rockweed are short-lived or were not statistically detectable" and that based on the information available, "… there is no reason to adopt a precautionary approach."

As demonstrated above and based on all available research, the current harvest of and management of *A. nodosum* in Nova Scotia is sustainable and is a model of sustainable management used by other jurisdictions and Acadian Seaplants will continue to sustainably harvest lease #6048 following the same regulations that have led to this continued success.

COMMERCIALIZATION

Acadian Seaplants Limited develops products tailored for plants, animals, and humans, recognized for their commercial value amidst the rising demand for sustainable solutions. Operating globally, we provide sustainable, top-tier solutions backed by research across more than 80 countries.

Within our organization, Acadian Plant Health™, a branch of Acadian Seaplants Limited, utilizes *Ascophyllum nodosum* seaweed to formulate biostimulants crucial to modern agricultural practices. Biostimulants, such as seaweed extracts, are applied to plants or soil to enhance growth, development, and resilience to environmental stressors. Given the current climate volatility marked by events like droughts, floods, extreme temperatures, and heightened salinity, the agricultural sector seeks natural solutions. The demand for agricultural products derived from seaweed is surging as it offers a sustainable remedy to the challenges farmers face worldwide. We believe there is a symbiotic relationship between a blue economy on the ocean and a green economy on land.

Moreover, our products exhibit notable benefits for both people and animals, driving continuous and escalating demand. To meet this demand, significant capital investments have been directed towards our three manufacturing facilities in Nova Scotia. Notably, our Cornwallis facility is undergoing extensive renovations to accommodate future growth and expansion.

Acadian Seaplants plays a pivotal role in advancing the blue economy through its sustainable utilization of marine resources. By harnessing the power of seaweed, we contribute to the development of innovative products and solutions that promote environmental stewardship and economic growth. Our practices support marine biodiversity and ecosystem health, while also generating employment opportunities and fostering economic resilience in coastal communities. Through responsible

harvesting, research-based initiatives, and global partnerships, Acadian Seaplants exemplifies the principles of the blue economy by creating value from the ocean in a sustainable and equitable manner.

Acadian Seaplants serves as a key employer in rural communities throughout Nova Scotia. With operational centers located in Yarmouth, Charlesville, and Cornwallis, we play a vital role in bolstering the rural economies of the region.

LEASE AMENDMENT

In Section 15, subsection (1) of the Province's recent leases, the following is written: "the Lessee shall satisfy all of the following requirements for the processing of rockweed harvested pursuant to this lease:

a. Chopping the rock weed;
b. Drying the rock weed to a moisture level of 15% or less;
c. Packing the rock weed for the purpose of transport, storage, or sale.(2) Upon the written request of the Lessee, the Province may approve modifications or alternatives to the requirements set out in subsection (1), in order to better reflect any practices established by the Lessee for the processing of rock weed."

Acadian Seaplants would like to inform the Province that the rockweed harvested in Lease #6048 could be shipped to Yarmouth to be processed into meal products or to Cornwallis where it will be processed into extract products. While the rockweed sent to Yarmouth for processing complies with subsection (1) a, b, and c; the rockweed sent to Cornwallis involves a different process from that identified in b and c above.

As such, we are seeking approval to modify the recent lease requirements as set out in subsection (1) b and c, to reflect how we process rockweed for extraction at our Cornwallis production facility.

d. Cooking the rockweed to obtain extractions
e. Packaging the extract for the purpose of transport, storage or sale.

CONCLUSIONS & CONSIDERATIONS

Acadian Seaplants has harvested *Ascophyllum nodosum* in a sustainable manner since 1981 and will continue to do so in the future. The harvesting of *Ascophyllum* in Nova Scotia is extremely well managed and employment in the value-added sector of manufacturing and processing generates tens of millions of dollars to Nova Scotia's economy – which translates into schools, hospitals and other community supports.

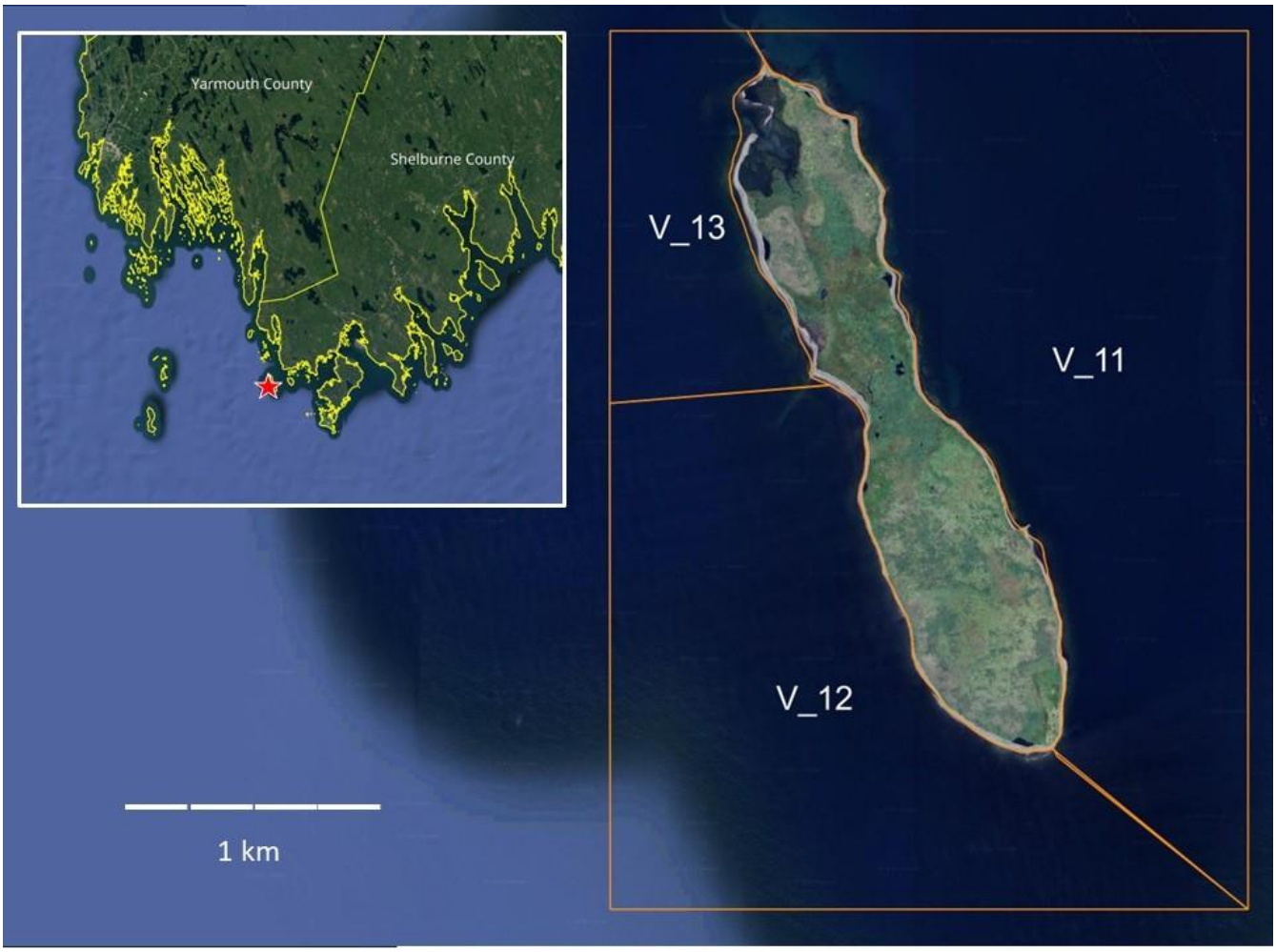
The successful Resource Management model used in Nova Scotia, substantiated by decades of world-class Resource Science, is the envy of other countries challenged with safeguarding their seaweed resources while stimulating commercial development of an under-utilized and renewable natural resource. Acadian Seaplants shares Nova Scotia's successful resource management model with other countries and is proud of the international scientific validation received.

Thank you for your consideration of this application to re-issue Lease # 6048 (formerly #6008) for another 15-year period.

MAP

Lease 6048

Lease #6048 encompasses Outer Island (Bon Portage Island) in Shelburne County, Nova Scotia and is bounded by these coordinates (NAD83 CSRS): 43° 29' 00" N, 065° 46' 00" W; 43° 29' 00" N, 065° 44' 00" W; 43° 27' 00" N, 065° 44' 00" W, 43° 27' 00" N, 065° 46' 00" W. There are three harvesting sectors within Lease #6048: V_11, V_12 and V_13.



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