

**2009 ROCKWEED (*Ascophyllum nodosum*)
HARVEST PLAN
FOR COBSCOOK BAY, MAINE**

**Submitted to:
DEPARTMENT OF MARINE RESOURCES
Government of the State of Maine
Augusta, Maine**

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INTRODUCTION

This plan outlines Acadian Seaplants Limited (ASL's) plans to conduct a Rockweed (*Ascophyllum nodosum*) harvest in Cobscook Bay, Maine during the 2009 season. This plan will identify ASL's goals and objectives for the orderly development of a sustainable harvest in Cobscook Bay.

One of ASL's core values is to carry out our operations in a sustainable manner and recognize, co-operate and communicate with all stakeholders while generating long-term, sustainable local employment.

During 2009 ASL will continue to harvest at an average rate of 17% or less based on a sector-by-sector assessment of total harvestable biomass. This rate of harvest has been scientifically determined to be well below the rate at which the Rockweed resource is sustainable without any detrimental impact on the habitat.

RESOURCE MANAGEMENT TEAM

This season, ASL will continue with its team of experienced and qualified Resource Management professionals to implement the 2009 sustainable harvest of the Cobscook Bay Rockweed resource. The team approach to harvest management, planning, execution and problem solving begins at the company head office in Dartmouth, Nova Scotia. Monthly meetings are arranged for the Resource Management and Research teams. These meetings are under the leadership of Jean-Paul Deveau, President of ASL. The team is comprised of Resource Management personnel from ASL operations throughout the Maritime Provinces and Maine. These meetings provide a forum for the exchange of ideas, experiences and challenges faced during the harvest season. The Resource Managers, as well as the company benefit from the feedback and information exchange provided at these meetings.

The company's Resource Department, is led by the Vice-President Resource, Rex Hunter. Mr. Hunter has many years of senior-level experience with Federal and Provincial Fisheries. His more than 30 years fisheries experience and eight years experience in the overall management of the Rockweed harvest in Canada and the US augments the company's expertise and strengthens its steadfast commitment to sound and sustainable resource management.

The Resource Manager in Nova Scotia, Kenny Murphy has 30 plus years experience in the rockweed fishery and has been with the company for the pass 16 years. His experience in the Rockweed fishery is an asset to the Resource Management team.

The Resource Manager for mainland New Brunswick, Robert (Rob) Marvin is based at the company's Pennfield, New Brunswick operation. Rob has extensive marine resource management experience and has a broad knowledge related to marine activities in the Bay of Fundy.

Resource Management on Grand Manan is under Mr. Zane Benson. Zane is a resident of Grand Manan and has been the Resource Manager for the past three years. Zane had participated in the Rockweed harvest for a few years prior to being the Resource Manager for Grand Manan.

Zane's experience and knowledge of the Rockweed fishery is an asset to the resource management team.

As part of ASL'S commitment to the development of a viable Rockweed Fishery in Maine the company has hired Mr. Dennis Bryant of Charlotte, Maine as Director of Rockweed Operations for Maine.

Mr. Bryant has been politically active in Washington County for the past 17 years and has decades of management experience in the forestry industry. Mr. Bryant's role will be to develop the harvest operation and infrastructure in the State of Maine under the direction of the Vice-President of Resource, Mr. Rex Hunter. Dennis has been trained by the company's Resource Scientist and Senior Resource Management personnel on all aspects of sustainable resource management and Rockweed harvest activity.

The company's Marine Scientist, Dr. Raul Ugarte, based in Saint John, New Brunswick, leads the scientific research work and is an integral part of the management team. He is responsible for the management of the resource, which includes biomass assessment, sector allocation and scientific monitoring and research. Dr. Ugarte's responsibilities also include interaction with the local scientific community, government scientists and university researchers.

In addition, Paul Gallant, Senior Resource Advisor and Louis Deveau, Chairman of ASL, both have long-standing careers in and knowledge of the marine plants industry. Their experience will be available to assist the Resource Management team as advisors. Mr. Gallant is based in Southern New Brunswick and Mr. Deveau is based in Dartmouth, Nova Scotia at the company head office. They will be able to provide the Resource Management team with timely advice during the harvest season through daily contact and effectively monitored harvest operations.

RESOURCE CONSERVATION AND ASSESSMENT

Biomass Assessment

The conservation of the Rockweed resource and marine habitat is a priority objective in all jurisdictions where the company conducts harvest activities. As a company we recognized that our success is entirely dependant on the proper management of the Rockweed resource while working in concert with other stakeholders.

Prior to harvesting, detailed Biomass assessments were conducted by ASL along the entire coastline of Washington County with the most recent assessments conducted in 2008 in Cobscook Bay. To determine the biomass of Rockweed the company has developed a biomass assessment program that integrates both aerial photographs analysis and extensive ground truthing. Color aerial photographs with a scale 1: 12,000 were provided by DMR Office at Booth Bay Harbour, and were used to identify and estimate the area covered by the resource using an image analysis computer software program.

Although these pictures were taken in 1993, no evidence of changes in the perimeter of the beds was detected in our calibrations during ground truthing.



Figure 1. Aerial photograph showing individual numbered Rockweed beds.

After all beds were identified from the aerial photos, ground truthing was carried out in a representative portion of them (>80 m long) in each harvesting sector. In the field, the assessment team found the specific geographical locations, previously selected in the photos and transects were set horizontally along the bed and random samples were taken using a 0.5 m² quadrat size measuring instrument.

Figure 2. Aerial photo calibration and biomass assessment in Cobscook Bay. During the 2008 re-assessment of Cobscook Bay, 1,118 beds were identified and measured.



The result of this exercise provides the company with the most up-to-date information on the Rockweed biomass and harvest intensity allowable on the resource in Cobscook Bay and elsewhere in Washington County for a sustainable annual harvest.

The formulation of our harvest management plan is based on this up to date information which ensures the long term viability of the harvest and sustainability of the resource.

Harvest Monitoring and Research Program

As in previous years, ASL will establish a monitoring program to evaluate by-catch and holdfast incidence in the harvested material. During 2009, random samples will be taken and assessed directly on the harvested material on the boats and at the landing site in Pennfield.

Also during 2009, ASL will collaborate with local scientists to commence a research program to evaluate the impact of the harvest on the resource and associated fauna in Cobscook Bay under the allowable exploitation rate of 17%.

Harvest Method

The harvest of Rockweed in Maine will be carried out from small boats utilizing unique cutter rakes designed by the company specifically for the Rockweed harvest (Appendix I).



Figure 3. *Hand harvest activity from a boat.*



Figure 4. *Rockweed cutter rake.*

This harvest method has proven to be efficient and sustainable with minimal disturbance to the habitat and influence on associated species.

By nature, this process ensures a low exploitation rate and leaves more than ample canopy for intertidal dwellers, allows for rapid regeneration of harvested plants and suppressed shoots and minimizes the disturbance of the habitat architecture.

HARVEST MANAGEMENT

The management of the harvest activity is made up of various elements that provide for an orderly and sustainable harvest that meets all objectives of the plan.

ASL realizes that to ensure the proper management of company activities in Cobscook Bay will it will require sufficient commitment of personnel and related infrastructure.

As a result of this commitment, ASL has hired an experienced local harvester as a full-time seasonal, on the water supervisor of the harvest activity in Cobscook Bay. This person will be under the supervision of the Director of Rockweed Operations for Maine, with the support of the Resource Management team.

The Director of Rockweed Operations in Maine will be responsible for the implementation of the harvest management plan, recruitment and training of harvesters, supervision of the harvest activity, collection of landings data and serving as the communication liaison with the local community.

The objective is to conduct a successful harvest, with the priorities being sustainability of the resource and safety of harvesters.



As part of this commitment, ASL has established a base of operation in the Pembroke area to better serve the community and to facilitate all harvesting activities. This office will provide storage capacity for harvesting equipment and office space to accommodate harvester meetings and the office of the Director of Rockweed Operations for Maine.

HARVEST AREAS AND HARVEST QUANTITIES

During the 2009 season harvesting will be carried out in selected sectors in Cobscook Bay. (Appendix II). The total projected harvest will be 3,416 short tons (Appendix III). All of the harvesting sectors will be harvested at 17% or less of their total harvestable biomass. Control of the daily harvested amount for each sector is recorded as per ASL's sector landing reporting instructions (Appendix IV).

This will be achieved by recruiting a sufficient number of local harvesters operating for up to twenty weeks from June to the end of September.

Our plan involves harvesters using mobile bagging platforms as boat unloading sites that can be moved to various harvesting locations within the harvesting area.

Success in the recruitment of harvesters within the general area will be paramount in establishing a harvesting force capable of achieving our objective.

Harvester Safety

Prior to the 2009 season, harvesters will be provided with safety training on shore and on the water that will consist of familiarization with US Coast Guard Regulations (Appendix V) for small vessels, the effects of wind and tides and the partnering of inexperienced harvesters with experienced harvesters. ASL will provide harvesters with a copy of its Rockweed Harvesting Safety Guidelines and it will be stressed to all harvesters that good judgment and responsible actions are key elements to safe harvesting (Appendix VI). Small vessel training will be scheduled by ASL on behalf of the harvesters prior to the start of the harvest season. Harvesters will be required to participate in all training sessions sponsored by the company.

All harvesting vessels will be equipped with the required safety devices (e.g. life jackets, flares, sound devices, etc.) complying with the US Coast Guard Regulations. Additionally, the company Health and Safety Director will work with harvesters to educate and encourage them to ensure their equipment meets required safety specifications.

Harvester Recruitment and Training

ASL will place a strong emphasis on the hiring of local people who may already have the operational skills and knowledge required for working safely on the water. Other persons interested in Rockweed harvesting will be recruited and trained on the safe operation of a small vessel and all components of the Rockweed harvesting operations with a strong emphasis on safety. It is estimated that 25 jobs will be created related to the harvest activity.

Familiarization of all aspects of Rockweed harvesting will be carried out during the company's pre-harvest kick-off meeting with the seasoned and new harvesters. Training of new harvesters will be conducted via information sessions with company resource personnel and in the field by experienced harvesters who will remain on site for training for as long as necessary. Training will include familiarizing harvesters with proper boat handling, general boat safety, harvesting technique, cutter rake maintenance, boat unloading technique, harvesting regulations and guidelines, harvest data collection and other related information.

Harvesting Regulations and Guidelines

Harvesting will be carried out respecting State Rockweed Regulations (Appendix VII) and company Harvesting Guidelines (Appendix VIII). Proper information will be provided to all harvesters in this regard as well as sector maps (Appendix II), daily harvest landings report sheets (Appendix IX) and other related information.

Public and private conservations areas as well as state and federally owned land, including research areas closed for harvesting, will be respected. Harvesters will be instructed to voluntarily respect the no-cut registry recommendations on intertidal areas adjacent to private land that is properly identified until permission is granted.

Harvester Policing and Compliance

Policing of harvest activity will be conducted on a regular, random basis in order to ensure harvester compliance (Appendix X) with the Cobscook Bay Rockweed harvesting regulations. This policing activity will be carried out by the Resource Manager and has the objective of remaining in close contact with harvesters during the season and be proactive in problem solving. Any incidence of non-compliance will be reported to the resource management department followed by corrective or disciplinary action under ASL's Disciplinary Policy (Appendix XI).

Bycatch

All Rockweed harvesters will be instructed to make every reasonable effort to return to the water any bycatch remaining in the boat after unloading. Harvesters not complying will be subject to ASL's Rockweed Harvester Disciplinary Policy.

Harvest Infrastructure

Harvesters will be provided with proper size boats and motors which will allow them to harvest safely and maximize their daily income.



Figure 5. *Typical five-ton load capacity Rockweed harvesting boat*

To accommodate the unloading of boats in Cobscook Bay, ASL will use strategically placed floating platform units equipped with hydraulic lifting gear. Harvested material is unloaded from boats using these platforms and placed into 2,000 lb. capacity net bags.



Figure 6. *Bagging floating platform unit.*

Transportation

The harvested material in Cobscook Bay will be picked up by barge for transport to Pennfield, NB's solar drying site or moved to shore at high tide for pick up by a local trucking company for immediate transportation to the drying site in Pennfield, NB.



Figure 7. *Barge with harvested material.*



Figure 8. *Unloading harvested material.*

Quality of Harvested Material

This program is designed to monitor and gather information on the quality of harvested material to provide clean and fresh material landed at the solar drying site (Appendix XII). The program is the responsibility of the Director of Maine Operations and plant quality control staff.

Visual checks on the quality of the raw material are made by resource management at sea and at dockside. Checks are also made to ensure harvest cutter rakes are sharp with all guards in place ensuring they meet company standards.

Quality control staff at the plant takes weekly random samples from loads delivered at solar drying site to monitor condition of the material. Samples are also taken to gather data on plant holdfast removal (Appendix XIII), rocks, periwinkles and foreign seaweeds.

The manager of quality control generates weekly raw material inspection reports (Appendix XIV) to be reviewed by resource and plant management personnel. If necessary, corrective actions are carried out in a timely fashion.

HARVEST DATA COLLECTION AND REPORTING

The collection of harvest data is an essential part of managing the harvest activity and is a critical component for achieving planned objectives and resource sustainability.

ASL collects and documents several key data elements throughout the harvesting chain. These elements detail harvested location and sector identification, harvester name, harvest volumes, harvest dates and actual harvest time (Appendix IV). The details of these reports are used to formulate harvester remuneration, landings reports to DMR (Appendix XV), and the overall management of the resource.

Landing weights will be verified by a government-qualified, third-party monitoring company, Atlantic Catch Data of Yarmouth, Nova Scotia.

MATERIAL DRYING AND PROCESSING

All material harvested in Maine will be transported by a local transportation firm or by barge to the company's solar drying site in Pennfield, NB for drying and processing into a variety of value-added products.



Figure 10. *Rockweed animal feed supplement.*



Figure 9. *Pennfield NB solar drying site.*

Thank you.

APPENDICES