



BioAtlantis
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License Application for Sustainable hand-harvesting of *Ascophyllum nodosum* at Clew Bay (SAC Site Code 1482). In accordance with National Parks & Wildlife Service conservation objectives for marine and coastal habitats and species (2011) and the EU Habitats Directive 92/43/EEC.

Appendix 4: Codes of Practice for *A. nodosum* harvest activities in Clew Bay SAC.

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SECTION 1: Sustainable hand harvest of *A. nodosum*

Introduction and overview

The following rules and best practice guidelines have been developed on the basis of findings from the peer reviewed literature and previous surveys carried out in the Clew Bay Complex. See Section 3.3.5 of the main text document (BioAtlantis Foreshore Licence Application, 2014) for more details. The guidelines described here must be adhered to by all harvesters supplying *A. nodosum* to BioAtlantis Ltd.

The Code of Practice for harvesting *A. nodosum* sustainably.

Certificate to harvest

Harvesters cannot supply *A. nodosum* to BioAtlantis Ltd., unless they have been fully trained in methods which ensure *A. nodosum* recovery and regeneration post-harvest. Training will be provided by BioAtlantis Ltd., prior to harvesters gaining certification for engaging in hand harvest activities in Clew Bay.

Navigation to harvest sites

Harvesters must always follow clearly defined routes according to pre-planned harvest schedules. Schedules will be provided by BioAtlantis in advance of harvest. This will ensure no entry into protected areas of the SAC at times which are inappropriate or damaging to species and habitats in the complex. Should any confusion arise, the Resource Manager should be contacted.

Equipment

Several key items should be in your boat in order to complete your duties, both safely and effectively. Before departing for harvest, ensure that vessel is provided with the following equipment

- An efficient marine outboard engine capable of manoeuvring the vessel safely ahead and astern, and steering the vessel at its maximum speed in the fully loaded condition within the limits of the intended area of operation;
- A suitable pair of oars and rowlocks;
- Adequate seating or thwarts for all persons on board;
- A suitable bailer;
- A suitable anchor with rope of length at least equal to four times the length of the boat;
- A permanently rigged suitable painter which shall not exceed the length of the boat and which may also be used as a tow rope;
- Two approved hand-held distress flares or a portable horn;
- A suitable boat hook;
- A suitable waterproof torch
- Carry an approved lifejacket or approved personal flotation device for each person the vessel is declared to carry and shall be worn at all times when on board
- Communication device(s),
- Navigation maps and Compass,

Harvesting equipment

- Sharp blade cutters.
- Measuring tape
- Binoculars (for assessing presence/absence of harbour seals or mudflats, sandflats or intertidal sandy mud areas in the vicinity of the harvest site).
- Harvest Nets
- Hi visibility Bouys

Harvest Records:

The 'Goods Received Note (GRN)' is a vital form and it must be completed to receive payment for a particular harvest. Without a completed GRN, harvested *A. nodosum* may not be accepted. If in doubt, contact the Resource Manager, who will advise on which details which are required for completion of the GRN.

Accident and Incident Reporting:

All accidents, incidents and near misses must be recorded immediately and reported to the Resource Manager. This should be done by completing the Comments/Incidents section of the GRN. Incidents which should be reported include:

- Health and safety accidents or Near Misses:
- Incidents relating to disturbance of seals during navigation.
- Incidents relating to disturbance or damage to any mudflat, sandflat, intertidal sandy mud or fine sand areas during navigation.

En route to the harvest site:

Binoculars must be used to check for the presence of harbour seals at the harvest site. If seals are spotted either on the site or in the water along the shoreline, leave the area immediately and proceed to alternative harvest site. If any disturbance of the seals occurs, e.g. flushing into the water, details of this incident must be recorded in the Incident Report section of the GRN (please see 'Code of Practice for protecting the Harbour seal' for more details).

Arrival at the harvest site:

First, check for the presence of seals, mudflats, sandflats or intertidal sandy mud areas in the harvest location. If these species or habitats are present, leave the site immediately and proceed to alternative harvest site. This is explained in detail in Section 2 and 3 of this Appendix (i.e. Codes of Practise for protecting the Harbour seal and mudflat/sandflat, intertidal sandy mud and fine sand areas respectively).

Density of seaweed on site (Low/ Medium / High): Harvest can only occur at sites which contain high density of *A. nodosum* and which have been approved BioAtlantis Ltd. This will be determined initially by the Science and Engineering teams BioAtlantis Ltd. However, on arrival, the harvesters must determine whether or not the site is suitable for harvest. This can be determined through use of binoculars from the boat but in most cases this will require direct landing, followed by visual inspection. Harvesters will receive training by BioAtlantis as to the criteria required in conducting the assessment.

Harvest of *A. nodosum*:

Once a site has been approved for harvest, the following details must be recorded:

- Date & time of harvest, site name and location within the site (i.e. northern shore, etc). This information is required for completing the GRN.
- When cutting *A. nodosum*, at least 300mm of material must be left behind.
- The holdfast or 'root' of the *A. nodosum*, must be left fully intact and attached to the underlying rock, stone or growth substrate so as to allow for recovery and re-growth in subsequent years.
- Ensure that no other types of seaweed other than *A. nodosum* are harvested and/or placed into harvest nets. Inspections will be carried out at both the pick-up point in Clew Bay and also at production facilities in Kanturk, Co. Cork. The presence of these contaminants may result in potential non-payment, re-training or disciplinary action, depending on the severity of the non-conformance.

- When cutting the weed and filling the harvest nets, ensure that there is absolutely no sand, shingle, pebbles, stones or *A. nodosum* holdfasts inadvertently included. As indicated above, penalties may be incurred due to such non-conformances.

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Completion of harvest and subsequent pick-up:

The following must be recorded on the GRN. :

- Date:
- Harvester Name / No.:
- Pick-up location:
- Harvest Location
 - Site name
 - Region (i.e.. northern shore)

For a copy of the GRN, see Appendix 3 of BioAtlantis Foreshore Licence Application, 2014.

Quality Check:

Is seaweed free of the following:

- Sand, gravel, stones or debris
- *A. nodosum* holdfasts.
- Other species (e.g. *Fucus*)

Assessment of harvest operations

Have harvesters worked to ensure:

1. Cutting of *A. nodosum* ≥ 300 mm above holdfast
2. No more than 20% of area is harvested
3. Activities only take place at approved sites
4. Health and safety requirements are adhered to

Harvest Quantity

Quantity of harvest (no. bags and weight per bag).

Time and data of harvest

BioAtlantis batch code

Inspection check (pass: Y/N)

Health and safety:

All necessary health and safety equipment must be maintained by harvesters. Adherence to health and safety practices will be checked by the Resource Manager and noted in the GRN.

Communicating with BioAtlantis:

BioAtlantis require harvesters to keep in regular contact and report their activities as required. In most cases reporting to BioAtlantis will be via GRN. However, harvest plans will be communicated regularly over the phone or via email or post to designated harvesters and to the Resource Manager.

SECTION 2: Protection of the Harbour Seal, Birds & Otters

Introduction

It is well established that harbour seals are highly sensitive to human behaviour. Therefore, the key objective of the BioAtlantis Code of Practice for hand harvesting of *A. nodosum* is to ensure that "Disturbance events" do not occur. In addition, certain species of breeding and wintering birds can also be disturbed by human presence. Some bird species and otters may also be sensitive to alterations of food source and supply. Therefore, this Code of Practice will also work to ensure that behaviour and food supply to these protected species is also unaffected by harvest activities.

Harbour Seals

Disturbance events are caused by factors which result in alterations to seal behaviour, particularly during breeding, moulting and resting periods. This can culminate in significant numbers leaving haul-out sites during periods of time important to their life-cycle. Recent analysis of anthropogenic disturbances on seals in Clew Bay and other regions have provided an important platform in which to make informed management decisions which prevent harmful or potentially harmful activities from occurring. Assessments in Clew Bay are being undertaken by the NPWS on an ongoing basis as part of the "Harbour Seal Pilot Monitoring Project". The overall benefits of assessments of harbour seal behaviour is that they establish the impact of human activity on behavioural responses and in doing so, provide crucial practical information. In turn, they provide a platform for more informed management decisions which are based on both science and the practicalities of modern life. These studies often provide information on:

1. Characterisation of human causes (human activities), and their effects on wildlife behaviour
2. Characterisation of long-term biological significance of short-term responses.

Important aspects of seal behaviour, sensitivity, tolerance, recovery and habituation are described below. On the basis of this data and others, a code of practice has been developed to ensure that harvesters are fully informed and equipped with best practice knowledge on how to ensure that disturbances of seal behaviour does not occur.

Sensitivity

The Harbour Seal Pilot Monitoring Project, 2010 (NPWS 2011C) has identified a number of activities which led to disturbance of the harbour seals in selected sites in Ireland, including: occupation of shorelines adjacent to hauled out seals (e.g. by shellfish harvesters), quad bike activity on sandflats, approach of a low-flying aircraft, wildlife tour vessels, sea kayak activity, presence of small inshore fishing vessels, people walking recreationally, passing small fishing/angling boats, horse riders and dogs. NPWS also recorded instances where even members of scientific survey teams impacted on seal behaviour. The effectiveness of reserves to prevent human-induced disturbances to harbour seal population were recently evaluated in the Anholt seal reserve of Denmark (Andersen et al., 2011 & 2012). In this study, harbour seals were found to be alerted by boats at a distance of 560–850m and pedestrians at a distance of 200–425m. Flight initiation was observed at 510–830m for boats and 165–260m for pedestrians. These studies highlight the sensitivity of harbour seals to human presence. However, harbour seal behaviour is highly complex and seals are known to exhibit varying levels of tolerance to human, depending on the nature of the contact and the time of year.

Varying levels of tolerance to human activities

Tolerance is defined as 'the intensity of disturbance that an individual tolerates without responding in a defined way' (Bejder et al., 2009 and references therein) and is measured over short term periods. Tolerance is distinct from processes of habituation or sensitisation which are only measurable over the long term. For example, during habituation, individual tolerance levels increase, while during sensitisation, tolerance levels will decrease (Bejder et al., 2009). Habituation may occur following

repeated exposure to a specific stimulus. In the case of the harbour seal, several studies indicate varying levels of tolerance to human activities.

Boat Traffic

Henry et al., (2001) demonstrated that boat traffic in Métis Bay area of Canada have only a temporary effect on the haul-out behaviour of harbour seals. Several studies point to slow moving or stopped vessels such as kayaks as causing the most severe disturbance to seals (Johnson et al., 2007, Allen et al., 1984, Suryan and Harvey 1999, Henry and Hammill 2001). In particular, Johnson et al., (2007) demonstrate that seals were disturbed by kayaks and by stopped powerboats at distances of >91m from haul out sites, while being unaffected by moving powerboats approaching as close as 39m. Effects of Kayak activities have also been reported in Ireland by the NPWS (2011C). This data suggests tolerance to brief and passing presence of vessels which do not pay attention to the seals themselves (Johnson et al., 2007), while disturbances are mainly caused by vessels that linger or move at slow pace (e.g. kayaks and stalled boats) along haul out sites. These effects were reported by Allen et al., (1984), Suryan and Harvey (1999), Henry and Hammill (2001). These findings indicate that boating activities themselves will have minimal impacts on seal populations, provided that boats refrain from running at low speed for prolonged durations or stall. In order to minimise the effects of boats on the behaviour of seals in Clew Bay in general, best practice for boating activities will require that harvesters:

- Work in accordance with pre-planned schedules.
- Avoid stalling or slowing down unnecessarily en route to harvest locations or pick up points (pier, etc).

These preventative measures will reduce the risk of being noticed by seals at haul out sites, not subject to harvest activities at a given time.

Seasonal tolerance

Henry et al., (2001) demonstrate that seals were less affected during August, potentially due to increased tolerance associated with hormonal and physiological changes which occur during moulting (Ashwell-Erickson et al., 1986). Greater motivation to remain hauled out was also observed during moulting periods. Seasonal tolerance was also observed in a study of the Anholt seal reserve of Denmark (Andersen et al., 2011 & 2012) in which an increased tendency to return to haul out sites following disturbance during the breeding season was identified. However, tolerance was not identified before or after the breeding period, therefore suggesting that the tolerance did not give rise to habituation. Harbour seals are also more sensitive to human activities during obligate resting periods (October to April). In the context of seasonal variation, best practice for harvest activities will require that:

- Activities are prohibited at breeding and moulting sites during the periods of approx. May-July and August-September respectively.
- Activities permitted during these times will be limited to sites not associated with moulting or breeding, i.e. resting sites.

Recovery

Data from Henry et al., (2001) indicates a limited effect of disturbance on the recovery of seal numbers on haul out sites to pre-disturbance levels. Johnson et al., (2007), also reported that seals quickly recover from disturbance, returning back to haul out sites in less than 1 hour. In only 21% of disturbance cases did seal numbers not reach pre-disturbance levels.

Habituation or site-specific tolerance

There is some evidence for habituation of harbour seals to high traffic levels. In a study by Osborn (1985), of an area close to a busy harbour in Elkhorn Slough, Monterey Bay, California, 74% flushing was observed with disturbance at <30m. While habituation may explain these

observations, findings such as these may be attributed to increased tolerance to human activities, such as during the breeding season.

Birds

Clew Bay supports a number of breeding and wintering bird populations of national importance. These species have important breeding, nesting, feeding and wintering requirements and activities during hand harvest of *A. nodosum* should be carried out in a manner which does not impact on their key biological imperatives. Species vary in their dietary requirements, habitats and sensitivity to human disturbance. Several areas of Clew Bay will be designated as inaccessible for certain times of year. See Appendix 6 of BioAtlantis Foreshore Licence Application, 2014 and table 1 below for details.

Otters

Otters occupy both freshwater aquatic, marine aquatic and associated terrestrial habitats. An important requirement of otters is an adequate food supply and unrestricted access to sites and islands throughout Clew Bay. As such, Lough Furnace and the Burrishoole Catchment are designated as inaccessible all year round to harvesters. In addition, the Code of Practice outlines important requirements by harvesters to ensure that otters are unaffected by their presence.

The Code of Practice for the protections of harbour seals, birds & otters

The following rules and guidelines have been developed based on findings from the published peer-reviewed literature, NPWS guidelines and recommendations from organizations such as the Hampshire & Isle of Wight Wildlife Trust (Anon 2013). Furthermore, harvesters will receive in depth training on seal behaviour by biologists and QC personnel at BioAtlantis Ltd., prior to being officially certified to engage in hand harvest activities in Clew Bay. The code of practise is explained as follows:

Seasons: Harbour seals are present throughout the year on both aquatic and terrestrial habitats of Clew Bay SAC, including intertidal shorelines. As such, equal emphasis will be placed on not disturbing the behaviour throughout the year. Important aspects of the annual life cycle includes:

- Breeding (May-July approx.)
- Moulting (August-September approx.)
- Outside the breeding and moulting seasons (i.e., from October-April, 'resting sites').
- In addition, several species of breeding and wintering birds must not be disturbed at established sites during sensitive times. Harvesters will operate on the basis of known locations of established breeding, moulting and resting sites of harbour seals (NPWS, 2011A) and breeding and wintering sites of known relevance to important bird species.

Data Recording: Harvest vessels will not be permitted to land at breeding or moulting sites between May-July and August-September respectively. Harvest location and pick-up points will be recorded on GRNs (see Appendix 3 of BioAtlantis Foreshore Licence Application, 2014). GRNs will be checked by quality personnel by means of regular audits to ensure compliance. Harvesters must report any incidence of seal disturbance by means of the GRN.

Locations and Sites: Clew Bay has been sectioned into distinct areas in the current application to ensure optimal management of harvest activities in the SAC. Each haul out site is assigned a distinct 6-figure grid reference. In cases where haul out sites occur together in numbers, they may be distinguished and defined further by their geographical names or grouped together into single units.

General Measures:

Sites which are not used by seals during breeding and moulting seasons may be accessed between May-September. Several of these sites lie in close proximity to breeding & moulting sites throughout the north of the complex. Harvest vessels must not enter within 100m of breeding and moulting sites during these sensitive times. Likewise, there are a number of established bird sites which cannot be entered at sensitive times of the year.

Site Specific measures:

Inisherkin:

There are a number of breeding/moulting sites (e.g. Inishgowla, Inishnacross and Inishcooa) which lie in close proximity to resting sites at Inisherkin. Between October-April, seals will be resting at Inisherkin. Thus, harvest activities at nearby breeding/moulting sites could potentially impact on resting behaviour. To prevent effects on resting seals, the vessel will not be permitted within less than 100 meters of the resting sites at Inishskerkin.

Inishcull:

There are several islands (Inishpult, Inishfeis and Freaghillaun-luggagh) and a number of small seal breeding sites surrounding the resting site at Inishcull. Between October to April navigation will not be permitted within 100 meters of Inishcull.

Inishturbid-Inishquirk:

Between these two island lies an important resting site for harbour seals. Navigation between October to April will not be permitted within 100 meters of this resting site.

Additional sites:

An important seal breeding site lies between Derrynish, Lanhoney, and Inishbarnagh. Access to the islands surrounding this breeding site will not be permitted within 100 meters during the breeding season.

Several islands have been identified as important for sensitive breeding and wintering birds (pers. comm. NPWS). These are listed in Table 1, and similar to harbour seal sites, they will be avoided at sensitive times of the year.

Avoidance of sensitive locations:

The Burrishoole Catchment area and mouth of Lough Furnace are out of bounds for harvesters, as are all fresh water habitats. This will ensure that otters are unaffected.

Working summary of the Code of Practice for Protecting the Harbour seals, birds and otters:
Harbour Seals

- Always follow clearly defined routes according to pre-planned harvest schedules provided by BioAtlantis.
- Avoid stalling or slowing down unnecessarily en route to harvest locations or pick up points (pier, etc), as such actions will lead to alterations in nearby seal behaviour (flushing, etc). This is particularly relevant when operating within 100m of haul out sites.
- When navigating within 100m of haul out sites, at least one harvester should observe the sites from a distance using binoculars. If avoidance or disturbed behaviour is observed (e.g. rapid or frequent changes in direction away from the vessel), immediately increase distance between the vessel and the site if possible.
- Never approach seals in a 'bow on' manner. When in proximity to their sites approach from the side and maintain a constant speed.
- If a seal is observed in open water, slow down the vessel to less than 5knts or no-wake speed. To minimise disturbance, ensure that movements are steady and in parallel to the animal.
- In the event that a seal is encountered, ensure that an escape route is provided, avoid 'boxing-in' the animal or blocking narrow channels.

Harvest times (See table 1 for details)

- Seal are highly sensitive during moulting. Harvesting activities are prohibited at moulting sites between August-September, while permitted between October-July.
- Harvesting activities are prohibited at breeding sites between May-July, while permitted between August-April.
- Harvesting activities are prohibited at resting sites between October-April, while permitted between May-September.
- However, in cases where sites serve dual functions (e.g. breeding & moulting), avoidance times may be prolonged.
- In cases where sites serve triple functions of breeding, moulting & resting, these sites must be avoided all year around.

- During times in which a site is prohibited due to the presence of seals, navigation will not be permitted within 100 meters of these sites.
- In the event that seal disturbance is observed, the event must be reported in the GRN.
- Noise must be kept to a minimum, for example, avoid revving of engines or shouting.
- On rare occasions, seals can display curiosity towards humans. In the event that seals approach the vessel, maintain the course at constant speed or remain stationary. Do not approach the seal.
- In the rare event that a mother and her pup are encountered, leave the vicinity immediately and slowly.
- In the rare event that you encounter seals on a site not currently recognised as a seal haul-out site, leave the area promptly and quietly and record the event in the GRN.

Birds (Breeding and Wintering)

- Always follow clearly defined routes according to pre-planned harvest schedules provided by BioAtlantis.

Harvest times

- Harvesting activities are prohibited at a number of important breeding sites for certain periods during Spring/Summer (see table 1 for details).
- Harvest activities are prohibited at a number of wintering sites during certain periods of autumn/winter (see table 1 for details).
- Sites which are out of bounds are indicated in Table 1 below.
- To minimise disturbance of birds, ensure that all activities on islands are maintained within the intertidal *Ascophyllum nodosum* zone.

Otters

- Always follow clearly defined routes according to pre-planned harvest schedules provided by BioAtlantis.
- Harvest areas are defined by BioAtlantis (see Table 1 below)
- Harvest activities are prohibited within the Burrishoole Catchment.
- Harvest activities are prohibited at the mouth of Lough Furnace.
- All freshwater areas are prohibited from harvest activities (e.g. east side of InishGowla South).
- To minimise disturbance of interaction with otters, ensure:
 - All activities are maintained within the intertidal *Ascophyllum nodosum* zone.
 - Never interfere with otter couching sites, holts or access paths/routes.

Table 1: Sensitive ecological receptors within the study area and control measures implemented for mitigation.

Island No.	Site Name	Harbour seals			Birds		Control measures	
		Breeding Site	Moulting Site	Resting Site	Breeding site	Wintering site	Avoidance	Attendance
3	Roslynagh	Yes					May, June, July	Aug to April
5	Inishdasky	Yes					May, June, July	Aug to April
7	Inishtubrid			Yes			Oct to April	May to Sept
17	Moynish More	Yes				Yes	Oct-July	Aug to Sept
21	Inishilra	Yes					May to July	Aug to April
24	Inishdeashbeag	Yes	Yes	Yes			Avoid all year round	
24	Inishdeashmore	Yes	Yes				May to Sept	Oct to April
25	Inishcorky	Yes			Yes		March to Sept	Oct to Feb
26	Inishcarrick	Yes					May to July	Aug to April
28	Muckinish	Yes					May to July	Aug to April
29	Inishdaweel	Yes					May to July	Aug to April
34	Freaghillanluggagh	Yes					May to July	Aug to April
45	Inishcuill			Yes			Oct to April	May to Sept
59	Inishakillew		Yes				Aug, Sept	Oct to July
80	Forilan		Yes				Aug, Sept	Oct to July
82	Ininhgowla South	Yes	Yes				May to Sept	Oct to April
82	Carrickwee	Yes	Yes				May to Sept	Oct to April
-	Carrickawart Island			Yes			Oct to April	May to Sept
-	Stony Island			Yes	Yes		Avoid all year round	
-	Green Islands			Yes	Yes		Avoid all year round	
46	Mauherillan (L920919)				Yes		March to Sept	Oct to Feb
84	Inishimmel (L908857)				Yes		March to Sept	Oct to Feb
18	Moynish Beg (L865938)				Yes		March to Sept	Oct to Feb
85	Dorinish (L9086)				Yes		March to Sept	Oct to Feb
23	Roeillaun (L875930)				Yes		March to Sept	Oct to Feb

Island No.	Site Name	Harbour seals			Birds		Control measures	
		Breeding Site	Moulting Site	Resting Site	Breeding site	Wintering site	Avoidance	Attendance
	Mulranny Saltmarsh (L827963)					Yes	Outside of licence application area. No harvest will take place here.	
	Rosmurrevagh (L852958)					Yes	Oct to March	April to Sept
	Carrowholly (L965850)					Yes	Oct to March	April to Sept
	Bertraw (L903834).					Yes	Oct to March	April to Sept
	Rosturk (L869956),					Yes	Oct to March	April to Sept
93	Inisheeny (L920845)					Yes	Oct to March	April to Sept
	Pigeon Pt. (L949850).					Yes	Oct to March	April to Sept
	Burrishoole Channel						Avoid all year round to ensure no impact on catchment, connected lakes, fish and otters.	

SECTION 3: Environmentally safe navigation

Introduction:

The following rules and guidelines have been developed on the basis of NPWS objectives for ensuring protection of mudflat, sandflat, intertidal sandy mud and fine-sand environs of Clew Bay. These guidelines must be adhered to by all harvesters supplying *A. nodosum* to BioAtlantis Ltd.

The Code of Practice for protecting mudflat, sandflat, intertidal sandy mud, fine-sand and reef areas

Harvesting *A. nodosum* along rocky shorelines located beyond mudflat, sandflat, intertidal sandy mud or fine-sand areas requires that work be done exclusively at high tide. Training will be provided to ensure that all harvesters are aware of their obligations towards protecting these areas and species residing within these habitats in the SAC.

- Advanced preparations will be necessary in advance of work in these locations. Always follow clearly defined routes according to clearly defined harvesting schedules provided by BioAtlantis.
- It is essential not to enter into these areas during low tide. Entry into these areas at low tide will cause serious physical damage to these environs and the associated species. These areas will be indicated clearly in the maps provided.
- If mudflat, sandflat, intertidal sandy mud or fine-sand areas are entered into inadvertently, promptly leave and record details of the incident in the GRN. Report the incident to BioAtlantis immediately.
- When approaching coastal areas in small boats, care must be taken in order to ensure that contact with reef is minimal. This will ensure that no damage is inflicted to either the vessel or reef.
- In smaller boats, always approach the shore at slow pace so as to avoid intertidal reef (i.e. mixed substrate of pebbles and cobbles. Along the western margin of Clew Bay there are small patches of subtidal boulders and cobbles which must be avoided.
- The harvest collection boat will be fitted with a depth sounder to ensure that contact with the reef is avoided. Hard substrate will be encountered between 2-14m and should be avoided. The sonar depth sounder must be in working order during all collection activities.

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