



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 and the EU Habitats Directive 92/43/EEC.

Appendix 7:

Assessment of cumulative and in-combination effects, as recommended by NPWS on 30/07/2014.

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Date of submission: 04/11/2014

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1. Introduction

Overview: This section provides an assessment of the distribution and extent of existing and planned operations in Clew Bay, which in combination with proposed hand harvesting activities, may have potential to have cumulative effects. This assessment is required to ensure that continuous disturbance of each community type does not exceed an approximate area of 15%, as recommended by NPWS and in adherence to the EU commissions' requirements.

Site Name: Clew Bay Complex (Site Code 1482)

Activity under assessment: Harvesting *A. nodosum* in Clew Bay and it's potential in combination effects with existing and planned activities.

Assessors: Kieran J. Guinan, PhD., and Brian Fanning, BioAtlantis Ltd.

Scope of current assessment:

BioAtlantis have assessed the potential for in combination effects with existing and planned activities, which include: Recreational & Tourism, Existing harvest activities, Aquaculture and Harvesting of invertebrates.

Methodology employed:

- Current activities: A thorough assessment of current activities (Recreational & Tourism, Existing harvest activities, Aquaculture and Harvesting of invertebrates) was undertaken by assessing online resources and relevant literature.
- Planned activities: Assessment of planned activities was undertaken by assessing publications listed on websites belonging to the Mayo County Council, Department of Agriculture and others. Assessment was generally limited to documents published between 2012-2014. Some knowledge is considered common knowledge within the public domain, and is not published.
- Mitigation: In cases where risk was identified, mitigation measures were developed and incorporated in the BioAtlantis "Codes of Practice" for protected the Clew Bay SAC. This ensures that any potential in combination effects do not occur, thereby ensuring disturbances of community types do not exceed 15%.

2. Summary of cumulative and in combination effects & mitigation measures

This section provides a summary of potential in combination effects of existing and planned operations on Annex I habitats and Annex II species and protected bird species. Interactions with the coastal and inland environment is deemed unlikely as hand harvest of *A. nodosum* will take place in the marine environment. Risks and mitigation measures are listed in Section 3. Detailed decision tables are provided in Section 4. All mitigation measures have been incorporated in the BioAtlantis "Codes of Practice" (see Appendix 4). Key: "*No. risks", refers to the number of different types of risks identified in Appendix 7. The figures of 0% are assigned to areas where *A. nodosum* does not grow or where BioAtlantis have specifically avoided in this application due to the sensitive nature of some of these areas.

(a) Marine community types summary

Marine community types (Clew Bay SAC)	Total Area in Clew Bay SAC (m ²)	Area affected by harvest activities/annum		Potential in-combination effects				Do mitigation measures prevent in-combination effects? (Y/N)
				Existing Operations		Planned Operations		
		(m ²)	(%)	Type	No. of risks	Type	No. of risks	
Zostera Community	1,423,891	0	0.0%	0	0		0	n/a
Shingle	1,855,000	235,549	12.7%	• Recreation & Tourism • Existing harvest activities	2 3	• Recreation & Tourism • Harvest activities	2 0	Yes. See Appendix 4, “Codes of Practice”.
Reef	26,870,000	1,331,699	4.9%	• Existing aquaculture • Invertebrate harvesting	0 3	• Aquaculture • Invertebrate harvesting	0 0	
Maerl Dominated community	2,878,607	0	0.0%	0	0	0	0	n/a
Fine Sands Dominated by <i>Nephtys cirrosa</i> community	2,950,308	0	0.0%	0	0	0	0	n/a
Intertidal sandymud with <i>Tubificoides benedii</i> and <i>Pygospio elegans</i> community complex	7,817,100	0	0.0%	• Recreation & Tourism • Existing harvest activities • Existing aquaculture • Invertebrate harvesting	0 0 1 0	0	0	Yes. See Appendix 4, “Codes of Practice”.
Mudflats & sandflats not covered by seawater at low tide	12,541,069	0	0.0%	• Recreation & Tourism • Existing harvest activities • Existing aquaculture • Invertebrate harvesting	0 0 1 0	0	0	

(b) Annex II Species & protected bird species summary

Key: “*No. risks”, refers to the number of different types of risks identified in Appendix 7.

Species	Potential in-combination effects identified				Mitigation measures
	Existing Operations		Planned Operations		Do measures prevent in-combination effects? (Y/N)
	Type	No. of risks	Type	No. of risks	
Harbour seals	<ul style="list-style-type: none"> • Recreation & Tourism • Existing harvest activities • Existing aquaculture • Invertebrate harvesting 	1 0 0 0	<ul style="list-style-type: none"> • Recreation & Tourism • Harvest activities • Aquaculture • Invertebrate harvesting 	0 0 1 0	Yes. See Appendix 4, “Codes of Practice
Protected bird species	<ul style="list-style-type: none"> • Recreation & Tourism • Existing harvest activities • Existing aquaculture • Invertebrate harvesting 	1 0 0 0	<ul style="list-style-type: none"> • Recreation & Tourism • Harvest activities • Aquaculture • Invertebrate harvesting 	0 0 1 0	Yes. See Appendix 4, “Codes of Practice”.
Otter	<ul style="list-style-type: none"> • Recreation & Tourism • Existing harvest activities • Existing aquaculture • Invertebrate harvesting 	0 0 0 0	<ul style="list-style-type: none"> • Recreation & Tourism • Harvest activities • Aquaculture • Invertebrate harvesting 	0 0 0 0	Not applicable, as no in-combination risk have been identified.

(c) Risks from existing operations and appropriate mitigation measures

- **Recreation & Tourism:**

Risks:

- There are two major tourists sites at Collanmore and Mulranny. During peak tourist season, there is an increased potential for in combination effects associated with increased anthropogenic disturbances, in general.
- There are several small bases throughout the bay, used for commercial recreation activities such as Dinghy, Kayaks. In some cases, transference of equipment from bases into the water may give rise to small patches which contain reduced density of intertidal seaweed, thus raising the potential for in combination effects.
- Marine-based activities may cause disturbance to harbour seals and birds at sensitive sites. In Clew Bay, such activities include power boat trips, sea trampoline, sit on top kayaking, waterskiing, sea kayaking, windsurfing, kite surfing, dinghy sailing and visits to “seal colonies”.

Mitigation:

- As a general policy, hand harvesters will avoid sites where tourism and recreation activities are taking place. This will be determined on a day-to-day basis.
- Harvest will not take place at Mulranny. Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur during summer due to increased numbers of tourists on the island.
- Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
- Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring.

- **Existing harvest activities:**

Risks:

- In recent years, 2-3 companies have sourced significant quantities of *A. nodosum* from local hand harvesters.
- Some hotels, health Spas and others provide seaweed baths and related services, raw materials of which may be sourced from Clew Bay.
- Mulranny Tourism Office have advertised “Seaweed Harvesting Discovery Days” in the past.

Mitigation:

- With an exclusive licence, BioAtlantis will be responsible for all aspects of commercial harvesting. To ensure compliance with the conservation objectives for the site, the following is required of the Resource Manager:
 - Any instance of large-scale unlicensed harvesting must be recorded as a non-conformance. The corrective action will be determined on a case by case basis, depending on the severity of the unlicensed activity. This may involve reporting to the Dept. of the Environment who will be responsible for enforcement.
 - BioAtlantis will permit low-scale removal of <0.5 tonnes, for personal usage. This will be reviewed in the case of abuse.
- Any commercial user having small requirements of >0.5 tonnes per annum (e.g. hotels, health Spas), will be approached by BioAtlantis to discuss their requirements and assess

whether there are potential in combination effects. Appropriate action will be taken on a case-by-case basis to ensure that potential in combination effects are avoided.

- BioAtlantis will not harvest beyond Rossmurvagh, thus avoiding much of the Mulranny area. This avoids in combination effects which excursions in the area.

- **Existing aquaculture:**

Risks:

- Hand harvest activities could exacerbate existing effects attributed to licensed aquaculture activities, e.g. disturbance of mudflats and sandflats.

Mitigation:

- Code of practice for environmentally safe navigation must be followed to ensure no in combination effects which would damage mudflats and sandflats.

- **Invertebrate harvesting:**

Risks:

- Periwinkle harvesting in Clew Bay causes some reductions in periwinkle population numbers due to removal and anthropogenic disturbances caused by trampling. There is potential for in-combination effects on periwinkles associated with *A. nodosum* hand harvest as *A. nodosum* represents an important biotope for these species.
- Potential impacts of cockle gathering in Clew Bay include impacts on intertidal sedimentary communities (Mudflats and sandflats not covered by seawater at low tide [1140]). There is potential for in-combination effects associated with *A. nodosum* hand harvest activities and cockle hand gathering, as seaweed hand harvesting may involve activities along the rock shoreline beyond mudflats and sandflats.
- There is a risk that hand harvesting may impact on slow moving invertebrates in general given that nets are used along the intertidal zone.

Mitigation:

- Harvest of *A. nodosum*: Harvesters will be taught to leave between 8-12 inches of the crop behind. Cutting below 8 inches will be forbidden and could lead to disciplinary procedures. This standard will be monitored by the Resource Manager. This approach avoids:
 - (a) extensive removal of *A. nodosum* canopy coverage and damage to the ecosystem,
 - (b) avoids interactions with or by-catch of dormant or resting periwinkles positioned at the base of the *A. nodosum* canopy and
 - (c) ensures that on development into free-living forms, *L. Littorina* species are able to settle and establish within the intact canopy.
- *L. obtusata* eggs: Harvesters must work to avoid *A. nodosum* plants which contain visible *L. obtusata* egg masses. This is important to prevent harvest of viable eggs, thereby promoting maintenance of population size.
- Do not harvest Fucus: Fucus content of harvested *A. nodosum* will be limited to <1%, thus preventing removal of an additional canopy source which supports periwinkles and other species.
- Inadvertent co-removal of periwinkles on the collection vessel will assessed, with species collected and returned to the water.
- A code of practice is in place to ensure that (a) seaweed must be harvested in nets with mesh space large enough to allow for Amphipods, isopods or other by-catch to escape. Typically, 2 hours will be available for animals to migrate out of the nets before transfer to the collection vessel. Inadvertent co-removal of Animalia identified on the collection vessel must be collected and returned to the water.
- A code of practice is in place to ensure environmentally safe navigation when operating mudflats and sandflat areas. This will prevent any impact on intertidal sedimentary communities (See Appendix 4).

(d) Risks from planned operations and appropriate mitigation measures

- **Recreation & Tourism**

Risks:

- Westport Towns and Environs Development Plan 2010-2016: Roman Island has been targeted for considerable development in terms of marine-based activities and tourism (ref: Mayo County Council 2010), thus raising the potential for interaction between hand harvesting (e.g. increased anthropogenic disturbances). Increased numbers of small bases may be developed at Roman Island for commercial recreation activities such (Dinghy, Kayaks). In some cases, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed, thus raising the potential for in combination effects.
- Mayo County Council 2014 Budget (ref: Hynes, 2014): funding has been granted for new marine tourism/leisure infrastructure at Westport Harbour, thus raising the potential for interaction between hand harvesting and increased tourism-related activities at Westport Quay (e.g. increased anthropogenic disturbances).

Mitigation:

- Hand harvesters will not work at Roman Island or Westport harbour between May and August. This prevents any in combination effects from occurring during peak season.
- Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.

- **Harvest activities:** no planned operations identified

- **Aquaculture**

Risks: Hand harvest activities may exacerbate existing effects attributed to licensed aquaculture activities, e.g. disturbance at sites relevant to harbour seals. Overall the risk of such interactions is considered low (Marine Institute, 2014). Impacts on Otter (*Lutra lutra*) is deemed not significant. However, the Marine Institute cannot rule out potential effects of a proposed future Abalone culture on seal behaviour at Inishcorky and potentially neighbouring sites: Inishdeashmore, Inishdeadbeag, unnamed neighbouring island of Inishdeadbeag and Inishnacross (pg. 78, Marine Institute, 2014).

Mitigation:

Seasonal avoidance of sensitive harbour seal sites must be adhered to for all haul out sites, including Inishcorky. This will ensure that harbour seals are unaffected (Code of Practice, appendix 4).

- **Invertebrate harvesting:** no planned operations identified

3. Detailed assessment of in combination effects & mitigation measures

(a) Existing Operations

- i. Recreation & Tourism.
- ii. Harvest activities
- iii. Aquaculture
- iv. Harvesting of invertebrates

(i) Recreational & Tourism

There are many recreation and tourism activities in the Clew Bay area, including a wide range of land and marine-based activities.

Recreational/Tourism Activity	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Equestrian Centres	Failte Ireland (2012)	3	Inland (Achill island, Westport)	No interaction.
Golf Courses	Failte Ireland (2012)	6	Inland (Achill island, Ballinrobe, Castlebar)	No interaction.
Visitor Centres	Failte Ireland (2012)	13	Inland (inc. Westport, Murrisk & Louisburgh)	No interaction.
Bike Hire	Failte Ireland (2012)	9	Inland (including Westport and Achill island)	No interaction.
Cycle Routes	Failte Ireland (2012)	6	<ul style="list-style-type: none"> Achill cycle hub Great western Greenway (walking & cycling) Louisburgh cycle hub National coastal route (Westport-Murrisk) Wesport cycle hub Granuaile cycle trail (Achil island – Mulranny, Rockfleet, Carraighowley, Wesport house, Louisburgh, Roonagh Pier) 	<p>No interaction.</p> <p>Seasonal mitigation measures are in place for hand harvest activities to ensure that there is no disturbance to sensitive harbour seal and bird populations. This also prevents any in combination impacts which could arise due to the presence of cyclists along routes close to these sites.</p>
Great Western	http://www.greenway.ie	Extensive	An extensive 42 kilometres (26 miles) long rail	No interaction.

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Greenway	/Trail-Map-01.html	range	trail, beginning in Westport and ending in Achill. It runs along the coast of Clew Bay and passes through Newport and Mulranny.	As above.
Playareas	Failte Ireland (2012)	~10	Inland	No interaction.
Leisure Centres	Failte Ireland (2012)	2	Inland	No interaction.
Farmers Markets:	Failte Ireland (2012)	4	Inland	No interaction.
Walking Guides Tourism Pure Walking Holidays, Castlebar. www.tourismpurewalking.com Croagh Patrick Walking Tours, Belclare, Westport www.walkingguideireland.com	Failte Ireland (2012)	2	Inland	No interaction.
Walking Routes	Failte Ireland (2012)	~20	Bothy Loop, Newport Bunnahowna Loop, Mulranny Dooagh Loop, Achill Island Enniscoe House Loop, Crossmolina Great Western Greenway – linear route from Westport Quay to Achill Sound Keenagh Loop, Newport Letterkeen Loop, Newport Lettermaghera Loop, Newport Lookout Hill Loop, Mulranny Lough Aroher Loop, Newport National Coastal Route – linear route from Westport town to Murrisk Abbey The Western Way (Mayo)	No interaction. Seasonal mitigation measures are in place for hand harvest activities to ensure that there is no disturbance to sensitive harbour seal and bird populations. This also prevents any in combination impacts which could arise due to the presence of people walking in routes close to these sites.
Recreational/Tourism Activity	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interactions with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Blue Flag beaches	http://destinationwestport.com	~10	Old Head Blue Flag Beach	No interaction, as beaches will not be subject to hand harvest

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(general)		ort.com/places-to-visit/natural-beauty/beaches-ireland-mayo/		Carrowmore Blue Flag Beach Clare Island Blue Flag Beach Elly Bay Blue Flag Beach Mullaghroe Blue Flag Beach Golden Strand Blue Flag Beach, Achill Keem Blue Flag Beach, Achill Keel Blue Flag Beach, Achill Dugort Blue Flag Beach, Achill Dooega Blue Flag Beach, Achill	activities. Also, beaches associated with Achill are beyond the scope of this application.
Bertra Blue Flag Beach		http://destinationwestport.com/places-to-visit/natural-beauty/beaches-ireland-mayo/	1	Activities include walking and bird-watching, as well as kite-surfing and windsurfing.	No interaction, as beaches will not be subject to hand harvest activities.
Carrowniskey Green Coast beach		http://destinationwestport.com/places-to-visit/natural-beauty/beaches-ireland-mayo/	1	Surfing and surfing schools	No interaction, as beaches will not be subject to hand harvest activities.
Mulranny Blue Flag beach		http://destinationwestport.com/places-to-visit/natural-beauty/beaches-ireland-mayo/	1	A rare large saltwater marsh is located inland from the beach.	No interaction, as beaches will not be subject to hand harvest activities.
The Adventure Islands (Westport Company)		www.theadventureislands.com	3 main sites	Westport, Achill, Collanmore, Clare Island	There are potential interactions which may require mitigation (see below)
	Deep sea fishing	www.theadventureislands.com	Several	Takes place en route to Clare island	No interaction.
	Sea Safari (Power Boat Trips)	www.theadventureislands.com	Several	To Dornish Island, Inish Gort Lighthouse and several islands in the bay. May involve stop-offs on various island beaches.	Annex II species: Harbour seal and Birds: Speed boat activity can cause disturbance to harbour seals and birds at sensitive sites. Anthropogenic disturbances: unlikely as activity is largely water-based, with entry into the water being typically from established locations. However, transference of equipment

				<p>from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at harbour seal and bird sites at sensitive times of the year, thus preventing any in combination effects. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	“Sea Trampoline”	http://www.theadventur eislands.com/Water-Power/sea-trampoline-at-tai-water-park.html	Several	<p>At TAI Water Park, Westport. May take place in proximity to the rocky shorelines</p> <p>Annex II species (Harbour seal and Birds): Human activity associated with sea trampoline may cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Sea trampoline activity can take place in waters adjacent to rocky shorelines containing <i>A. nodosum</i>. Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at harbour seal and bird sites at sensitive times of the year, thus preventing any in combination effects. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	“Sit On Top Kayaking”	http://www.theadventur eislands.com/Water-Power/sit-on-top-kayaking.html	Several	<p>Collanmore Island base</p> <p>Annex II species (Harbour seal and Birds): Collanmore is not considered a site for sensitive harbour seals or protected bird species.</p> <p>Anthropogenic disturbances: Collanmore is a very active destination for recreation tourists. ‘Sit On Top Kayaking’ is marine based, with activities starting from established bases on the island. However, by virtue of increased number of recreation tourists in general,</p>

					<p>there is a chance for increases in anthropogenic disturbances. Individuals may also rest their kayaks on shingle or rocky shorelines containing <i>A. nodosum</i>. Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur during summer due to increased numbers of tourists on the island. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	Snorkelling	http://www.theadventur eislands.com/Water-Powered-Activities/snorkeling-clew-bay.html	Several	Throughout Clew Bay	<p>Annex II species (Harbour seal and Birds): Increased human presence in the form of snorkelling along the shore, may cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Unlikely to be affected by snorkelling. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	Wakeboarding	http://www.theadventur eislands.com/Water-	1	Collanmore Island	<p>Annex II species (Harbour seal and Birds): Collanmore is not considered a site for sensitive harbour</p>

		Powered-Activities/wakeboarding.html			<p>seals or protected bird species.</p> <p>Anthropogenic disturbances: Unlikely to be affected by wakeboarding. Collanmore is a very active tourist destination and by virtue of increased number people, there is a chance for increases in anthropogenic disturbances. Also, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur during summer due to increased numbers of tourists on the island. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	Waterskiing	http://www.theadventur eislands.com/Water-Powered-Activities/waterskiing.html	Several	Clew bay bases	<p>Annex II species: Harbour seal and Birds: Waterskiing activity can cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: unlikely as activity is largely water-based, with entry into the water being typically from established locations. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at harbour seal and bird sites at sensitive times of the year, thus preventing any in combination effects. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.

Sea Water Park (trampoline Water Slides, Water Swings, Water Tumblers)	<a href="http://www.theadventur
eislands.com/Westport-
Activities-Packages/sea-
water-park.html">http://www.theadventur eislands.com/Westport- Activities-Packages/sea- water-park.html	1	Collanmore Island	<p>Annex II species (Harbour seal and Birds): Unlikely to be affected as Collanmore Island is not considered a site for sensitive harbour seal and bird species.</p> <p>Anthropogenic disturbances: activity can takes place in waters adjacent to rocky shorelines containing <i>A. nodosum</i>. Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Sea Kayaking	<a href="http://www.theadventur
eislands.com/Wind-
Wave/sea-kayaking.html">http://www.theadventur eislands.com/Wind- Wave/sea-kayaking.html	Several	Various islands near Clew Bay (none specified)	<p>Annex II species (Harbour seal and Birds): Increased human presence in the form of Sea Kayaking, may cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: While individuals may rest their kayaks on shingle or rocky shorelines containing <i>A. nodosum</i>, this is likely to be brief and unlikely to have any significant impact on the biotope. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Windsurfing	<a href="http://www.theadventur
eislands.com/Water-">http://www.theadventur eislands.com/Water-	Several	Unknown	<p>Annex II species (Harbour seal and Birds): Windsurfing may cause a level of disturbance to harbour</p>

	Powered-Activities/windsurfing.html			<p>seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Unlikely to be affected by windsurfing. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Kitesurfing	http://www.theadventur eislands.com/Wind-Wave/kitesurfing.html	~2	Westport and Achill Island	<p>Annex II species (Harbour seal and Birds): Kitesurfing may take place along beaches, single or occasionally in proximity to rock shorelines. This may cause a level of disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Unlikely to be affected by windsurfing. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Dinghy Sailing	http://www.theadventur eislands.com/Wind-	~2	Lessons at Rosmoney Pier and Collanmore island.	<p>Annex II species (Harbour seal and Birds): Collanmore is not considered a site for sensitive harbour</p>

		Wave/dinghy-sailing.html			<p>seals or protected bird species.</p> <p>Anthropogenic disturbances: Collanmore is a very active destination for recreation tourists. 'Dinghy Sailing' is marine based, with activities starting from established bases on the island. However, by virtue of increased number of recreation tourists in general, there is a chance for increases in anthropogenic disturbances. Individuals may also rest their kayaks on shingle or rocky shorelines containing <i>A. nodosum</i>. Also, there is evidence in Rosmoney that the process involved in introducing dinghys from bases into the water, can give rise to small patches which contain low density of intertidal seaweed (http://www.theadventureislands.com/images/thingsToDoInWestport/Dinghy%20Sailing/Sailing-Rosmoney-13.jpg) .</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur during summer due to increased numbers of tourists on the island. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	"Stand Up Paddle Boarding"	http://www.theadventureislands.com/Wind-Wave/stand-up-paddle-boarding.html	Several	Various Clew Bay locations: Collanmore Island, Rosmoney and on lake at Westport House location	<p>Annex II species (Harbour seal and Birds): Collanmore and Rosmoney are not considered as sites for sensitive harbour seals or protected bird species. However, "Stand Up Paddle Boarding" may involve other areas of relevance to seals or birds.</p> <p>Anthropogenic disturbances: Collanmore is a very active destination for recreation tourists. "Stand Up Paddle Boarding" is marine based, with activities starting from established bases on the island. However, by virtue of increased number of recreation</p>

				<p>tourists in general, there is a chance for increases in anthropogenic disturbances. Also, it is possible that the process involved in introducing Paddle Boards from bases into the water, may give rise to small patches which contain low density of intertidal seaweed</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur during summer due to increased numbers of tourists on the island. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	<p>“Keel Boat Sailing”</p> <p>http://www.theadventureislands.com/Wind-Wave/keel-boat-sailing.html</p>	Several	Sessions begin at Rosmoney Pier	<p>Annex II species (Harbour seal and Birds):</p> <p>“Keel Boat Sailing” may takes place in deeper waters. However, this may involve coming in close proximity with sensitive seal or bird sites.</p> <p>Anthropogenic disturbances:</p> <p>Unlikely to be affected by Keel Boat Sailing. However, it is possible that the process involved in introducing equipment from bases into the water, may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
	<p>Surfing</p> <p>www.theadventureislands.com</p>	Several	Sessions at surf spots in Westport and Clew Bay areas. This includes Carrownisky Strand and Achill island.	<p>No interaction. Surfing areas will not be targeted for hand harvesting activities.</p>

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				Belmullet, Achill Island and the beaches around in the Westport/Louisburgh area.	
	"Westport Island Guided Walks"	www.theadventureislands.com	<u>1</u>	Hiking on Collanmore Island.	<p>Annex II species (Harbour seal and Birds): Collanmore is not considered a sensitive site for harbour seals or protected bird species.</p> <p>Anthropogenic disturbances: Given the increased presence of people on the island during the summer, there is an increased chance for anthropogenic disturbances to occur.</p> <p>Mitigation: Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects.</p>
	Achill Island Scuba Dive Centre,	www.achilldivecentre.com		Several dive sites around Achill island	No interaction. Achill is out of the scope of the current application
	Achill Outdoor Education Centre. Canoeing, Archery, Body Boarding Campcraft, Dinghy Sailing, Group Challenge, Hillwalking, Kayaking, Navigation Skills, Powerboating, Raft Building, Rockclimbing, Surfing, Traditional Sailing, Team Building, Windsurfing, Coasteering	www.achilloutdoor.com		Achill	No interaction. Achill is out of the scope of the current application
	Achill Surf & Kayak,	http://www.achillsurf.com/		Achill	No interaction. Achill is out of the scope of the current application
	Allplay Windsurfing,	http://www.discoverireland.ie/Activities-Adventure/allplay-windsurfing/74660		Bertra Strand, Murrisk	<p>Annex II species (Harbour seal and Birds): Windsurfing may cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: It is possible that the process involved in introducing equipment from bases into the water, may give rise to small</p>

				<p>patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
<p>Atlantic Adventure Centre Canoeing, Bogie Boarding, Rock Climbing, Abseiling, Mountain Climbing, Orienteering, Pier Jumping, Hill Walking, Shore Fishing, Gaisce Award Training, Outback Camping Trips</p>	http://www.atlanticadventurecentre.com/		Westport. <i>Blue-Flag beaches</i> of Old Head, Bertra and Carramore,	<p>No interaction. Marine based activities listed generally take place at beach sites. Hand harvest will not take place at beaches.</p>
<p>Glenans Irish Sailing Centre</p>	T: 01 6611481		Collanmore Island, Rosmoney Pier, Westport	<p>Annex II species (Harbour seal and Birds): Collanmore is not considered a site for sensitive harbour seals or protected bird species.</p> <p>Anthropogenic disturbances: Collanmore is a very active destination for recreation tourists. By virtue of increased number of recreation tourists in general, there is a chance for increases in anthropogenic disturbances. It is possible that the process involved in introducing equipment from bases into the water, may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will only occur on Collanmore between Sept-April. This prevents any in combination effects associated with increased anthropogenic disturbances which may occur

				<p>during summer due to increased numbers of tourists on the island.</p> <ul style="list-style-type: none"> • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Horizon Adventure & Education Centre (range of inland, coastal and marine activities)	http://www.horizonireland.com		Westport	<p>Annex II species (Harbour seal and Birds): Some of these activities, such as Kayaking, can cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: While individuals may rest their kayaks on shingle or rocky shorelines containing <i>A. nodosum</i>, this is likely to be brief and unlikely to have any significant impact on the biotope. However, transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Pure Magic Kitesurfing,	www.puremagic.ie		Achill Island	No interaction. Achill is out of the scope of the current application.
Clew Bay Cruises	http://www.clewbaycruises.com/ http://www.mayococo.ie/en/media/Media,25121,en.pdf	<u>1</u>	Involves visits the Clew Bay “seal colonies”. So-called “Clew Bay Heritage Cruises” involve departure from Westport Quay, sailing past sheltered islands, Inishgort lighthouse and Dorinish Island.	<p>Annex II species (Harbour seal and Birds): The presence of cruise boats which in the vicinity of harbour seals sites may cause disturbance.</p> <p>Anthropogenic disturbances: Unlikely.</p> <p>Mitigation: Hand harvest will not take place at sensitive sites at sensitive times of the year. This prevents any in combination effects</p>

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				from occurring.
Clare Island Ferry Company,	http://www.clareislandferry.com/	1	Clare Island and Inishturk or Achill.	No interaction. These sites are out of the scope of the current application.
Mulranny Park Hotel	http://www.mulrannyparkhotel.ie/boat-trips-mayo www.mulrannyparkhotel.ie/kayaking-mayo	1	Advertise a wide range of water sports, Boat Trips, fishing, some of which are provided by outside companies.	<p>Annex II species (Harbour seal and Birds): Some of the proposed water sports and boats trips may cause a level of disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Harvest will not take place at known seal or bird sites in the vicinity of Mulranny at sensitive times of the year, thus preventing in combination effects with increased human activities at such sites. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Surf Mayo	www.surfmayo.com	1	Carrownisky Strand, Louisburgh, Co. Mayo	No interaction. Surfing areas will not be targeted for hand harvesting activities.
Blackfield Surf School and Surfhire	www.blackfield.com/index.php	1	Closhreed - Achill Island	No interaction. Surfing areas will not be targeted for hand harvesting activities. Achill is also out of the scope of the current application.
Professional Coaching Services	www.professional-coaching-services.com/	1	Sailing , windsurfing, powerboating.	<p>Annex II species (Harbour seal and Birds): Some of these activities, such as sailing, windsurfing, powerboating, can cause disturbance to harbour seals and birds at sensitive sites.</p> <p>Anthropogenic disturbances: Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed.</p>

				Mitigation: <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Ireland West Seakayaking	www.irelandwestseakayaking.com	1	Kayaking Trips	Annex II species (Harbour seal and Birds): Some of these activities, such as Kayaking, can cause disturbance to harbour seals and birds at sensitive sites. Also, some of these activities may involve getting close to seal colonies and birdlife on many islands. Anthropogenic disturbances: Transference of equipment from bases into the water may give rise to small patches which contain low density of intertidal seaweed. Mitigation: <ul style="list-style-type: none"> • Hand harvest will not take place at sites which are relevant to seals or birds at sensitive times of the year. This prevents any in combination effects from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Tomás MacLochlainn - Cursaí Amuigh Faoin Spéir (watersports & walking),	http://www.members.acilltourism.com/tomasmaclochlainn/		Achill	No interaction. Achill is out of the scope of the current application.
The Surf Coach			Achill	No interaction. Achill is out of the scope of the current application.
West Coast Adventure & Surf School	http://www.discoverireland.ie/Activities-Adventure/west-coast-adventure-surf-school/77717		Cross Beach (near Louisburgh)	No interaction. Louisburgh is out of the scope of the current application.

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Sea Angling Operators	Failte Ireland (2012)	≥6	Marine	Interaction with anglers is unlikely to impact on Annex II species or Annex I habitats.
Game Angling Operators	Failte Ireland (2012)	≥2	Marine	Interaction with anglers is unlikely to impact on Annex II species or Annex I habitats.
Ferries to Offshore Islands	Failte Ireland (2012)	≥4	Clare Island Ferry Co Ltd, Clare Island. T: 098 23737 O'Malley Ferries, Clare Island. T: 086 8870814	No interaction. Ferries routes to offshore islands (Clare island, Inishturk, etc) are not included in this application.

(ii) Existing harvest activities

Group	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Commercial <i>A. nodosum</i> harvesting	None. Knowledge is common and/or garnered through word of mouth.	3	Clew Bay	<p>Risk: <i>A. nodosum</i> has been harvested in Clew Bay in recent years by a number of companies, including Arramara. Quantities harvested are unknown. There is a risk for in combination effects of the proposed hand harvesting by BioAtlantis Ltd. and existing harvest activities.</p> <p>Mitigation: BioAtlantis are applying for an exclusive licence for Clew Bay. As sole licence holder, BioAtlantis will be responsible for all aspects of commercial harvesting. Large-scale unlicensed harvesting will not be tolerated and BioAtlantis will document and record and any incident of such activities. Depending on the severity, this issue may be reported to the Department of the Environment. This is to ensure compliance with the conservation objectives for the site, and to ensure adequate record keeping, monitoring of the resource and access to sensitive sites at particular times of the year. In terms of traditional or casual harvesting, BioAtlantis will permit occasional low scale removal of <0.5 tonnes, for</p>

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				personal usage. Any commercial user having small requirements of >0.5 tonnes per annum (e.g. hotels, health Spas), will be approached by BioAtlantis to discuss their requirements and assess whether there are potential in combination effects. Appropriate action will be taken on a case-by-case basis to ensure that potential in combination effects are avoided. Any large-scale harvesting must be managed by BioAtlantis.
Traditional hand harvesters	As above	~20 individuals	As above	<p>Risk: as above</p> <p>Mitigation: BioAtlantis will only employ responsible, traditional hand harvesters will work exclusively with BioAtlantis system. This will ensure that traditional hand harvest activities are incorporated seamlessly into a fully licensed system, thus protecting traditional methods, the harvesters themselves and the environment, in tandem. BioAtlantis aim to get the best from the traditional approach but provide improvements which ensure better working conditions and compliance with the SAC objectives.</p>
Hotels, Health SPAs and other local companies (listed below)	Listed below	~12 companies	Clew Bay	<p>Risk: Some local hotels and local businesses may currently source seaweed from harvesters in Clew Bay.</p> <p>Mitigation: Any commercial user having small requirements of >0.5 tonnes per annum (e.g. hotels, health Spas), will be approached by BioAtlantis to discuss their requirements and assess whether there are potential in combination effects. Appropriate action will be taken on a case-by-case basis to ensure that potential in combination effects are avoided.</p>
<ul style="list-style-type: none"> Clew Bay Hotel 	http://www.clewbayhotel.com/spa-specials	1	Westport	<p>Risk: Seaweed bath service is provided. Unknown if seaweed is sourced from Clew Bay or supplied by other companies or commercial products.</p> <p>Mitigation: Any commercial user having small requirements</p>

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				of >0.5 tonnes per annum (e.g. hotels, health Spas), will be approached by BioAtlantis to discuss their requirements and assess whether there are potential in combination effects. Appropriate action will be taken on a case-by-case basis to ensure that potential in combination effects are avoided.
<ul style="list-style-type: none"> Hotel Westport Mill Times Hotel The Carlton Atlantic Coast Hotel Mulranny Park Hotel 	www.hotelwestport.ie www.milltimeshotel.ie www.westportcoasthotel.ie www.mulrannyparkhotel.ie	4	Westport, Mulranny	Risk: Not known if seaweed is used. Mitigation: as above
<ul style="list-style-type: none"> The Castlecourt Hotel 	http://www.castlecourthotel.ie/spa-hotel-westport/download-brochure	1	Westport	Risk: 'Seaweed treatments' service is advertised. Unknown if seaweed is sourced from Clew Bay or supplied by other companies or commercial products. Mitigation: as above
<ul style="list-style-type: none"> The Knockranny House 	http://www.knockrannyhousehotel.ie/uploads/documents/spa%20salveo%20spring%20specials%202012.pdf	1	Westport	Risk: Treatments such as Detox slimming wrap, Spirulina, Laminaria & Marine silts are provided. Unknown if seaweed is sourced from Clew Bay or supplied by other companies or commercial products. Mitigation: as above
<ul style="list-style-type: none"> The Wyatt Hotel 	www.wyathotel.com	1	Westport	No seaweed treatments offered
<ul style="list-style-type: none"> Westport Plaza Hotel 	http://www.westportplazahotel.ie/wp-content/uploads/2011/09/Elevate-your-Time.pdf	1	Westport	Risk: 'Seaweed treatments' service is advertised. Unknown if seaweed is sourced from Clew Bay or supplied by other companies or commercial products. Mitigation: Any commercial user having small requirements of >0.5 tonnes per annum (e.g. hotels, health Spas), will be approached by BioAtlantis to discuss their requirements and assess whether there are potential in combination effects. Appropriate action will be taken on a case-by-case basis to ensure that potential in combination effects are avoided.
<ul style="list-style-type: none"> Westport Woods Hotel 	http://www.westportwoodsshotel.com/images/up	1	Westport	Risk: "Hand harvested" seaweed baths service is provided. Unknown if seaweed is sourced from Clew Bay or supplied by

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	loads/Beauty_Brochure_300dpi.pdf final print version.pdf			other companies or commercial products. Mitigation: as above
• Rosmoney Spa & Seaweed Baths	http://www.discoverspa.com/Ireland/irelandrosmoney.shtml	1	Westport	Risk: 'Traditional Seaweed Baths' service is provided. Unknown if seaweed is sourced from Clew Bay or supplied by other companies or commercial products. Mitigation: as above
Mulranny Tourism Office Seaweed harvesting discovery days	http://www.essenceofmulranny.com/index.php/seaweed-harvesting/23-seaweed-harvesting	1	Mulranny	Risk: Seaweed harvesting discovery days are organized by a number of groups in the Mulranny area. Mitigation: BioAtlantis will not harvest beyond Rossmurvagh, thus avoiding much of the Mulranny area. This avoids in combination effects which excursions in the area.

(iii) Existing Aquaculture

The Marine Institute have characterised the extent of existing aquaculture activities in Clew Bay (2014 report).

Aquaculture activity	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Licensed activities: shellfish species (oyster, mussels, clams), culture of Atlantic Salmon, fish hatchery, etc	Marine Institute (2014)	>30	Clew Bay	Risk: hand harvest activities may exacerbate existing effects attributed to licensed aquaculture activities, e.g. disturbance at sites relevant to harbour seals and effects on mudflats and sandflats. Overall the risk of such interactions is considered low (Marine Institute, 2014). Impacts on Otter (<i>Lutra lutra</i>) is deemed not significant. However, the Marine Institute cannot rule out potential effects of proposed aquaculture on seal behaviour at Inishcorky (pg. 78, Marine Institute, 2014). Mitigation: • Seasonal avoidance of sensitive harbour seal sites must be

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				<p>adhered to for all haul out sites, including those listed above. This will ensure that harbour seals are unaffected (Code of Practice, appendix 4).</p> <ul style="list-style-type: none"> • Code of practice for environmentally safe navigation must be followed to ensure no in combination effects which would damage mudflats and sandflats.
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Data on aquaculture-related activities in proximity to harbour seal haul out sites

There are substantial mollusc production activities in the Clew Bay Complex (see Tables below).

Boundary	Bed name	Species
Area bounded to the south by 53° 52.6'N and to the West by 09° 37'W and to the east by 09° 35.15'W1	Newport Bay	Oysters, mussels
Area within a one nautical mile (1,852 M) radius of Roskeen Pt. (53° 53.46'N, 09° 40.10' W)	Tieranaur Bay	Oysters
Area bounded to the west by a line from Mulranny Pier to Old Head and to the south east by 09° 35.37'W1	Corrie Channel and Rosslaher Beds	Mussels and Oysters.

General distribution of designated Mollusc Production areas in Clew Bay (adapted from The Status of Irish Aquaculture report, Browne *et al.*, 2006).

Production area	Species	X coordinates	Y coordinates
Carraholly	Not specified	-9.5933	53.7997
Murrisk	M. edulis	-9.6297	53.7917
Corrie Channel	M. edulis	-9.577	53.861
Rosslaher	C. Gigas	-9.572	53.857
Mynah	C. gigas	-9.584	53.848
Inishlaughil	C. gigas	-9.631	53.863
Inisquirk	C. gigas	-9.6775	53.8856

Classified Mollusc Production Areas 2013 (adapted from Sea Fisheries Protection Authority, 2013)

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The risk of cumulative or in-combination effects of *A. nodosum* harvesting on these activities is very low given that:

- Corrie Channel, Rosslaher, Mynah, Murrisk and Carraholly production areas do not represent documented haul-out sites for harbour seals nor do they lie in close proximity to haul out sites.
- The production site at Inishlaughil does not represent a haul out site, nor does it lie in close proximity to haul out sites. The nearest haul out site to Inishlaughil is over 200 meters away, and is largely shielded from the harbour seal's view by the presence of Inishfeis and Inishpult.

There are two breeding sites located in very close proximity to Inishquirk. Harvest activities will not take place at these sites during breeding season between May and July. Between Oct-April, harvest activities will be undertaken according to the BioAtlantis code of practise for protection of the harbour seal (see Appendix 4), thus ensuring that any potential impact on seal behaviour is averted.

(iv) Harvesting of invertebrates

Invertebrate harvesting	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Periwinkles	Marine Institute (2014)	unknown	Hand gathering of periwinkle occurs within the intertidal zone of Clew Bay, on shores containing <i>A. nodosum</i> and <i>Fucus</i> sp.	<p>Risk: Potential risks associated with periwinkle harvesting are reductions in periwinkle population numbers due to their removal and anthropogenic disturbances caused by trampling. There is potential for in-combination effects associated with <i>A. nodosum</i> hand harvest activities and existing periwinkle harvest activities.</p> <p>Mitigation: The standards developed as part of the Codes of Practice (Appendix 4) reduce the likelihood of any in combination effects associated with existing hand gathering of periwinkles activities.</p> <ul style="list-style-type: none"> • Harvest of <i>A. nodosum</i>: Harvesters will be taught to leave between 8-12 inches of the crop behind. Cutting below 8 inches will be forbidden and could lead to disciplinary procedures. This standard will be monitored by the Resource Manager. This approach (a) avoids extensive removal of <i>A. nodosum</i> canopy coverage and damage to the ecosystem, (b) avoids interactions with or by-catch of dormant or resting periwinkles positioned at the base of the <i>A. nodosum</i> canopy and (c) ensures that on development into free-living forms, <i>L. Littorina</i> species are able to settle and establish within the intact canopy. • <i>L. obtusata</i> eggs: Harvesters must work to avoid <i>A. nodosum</i> plants which contain visible <i>L. obtusata</i> egg masses. This is important to prevent harvest of viable eggs, thereby promoting maintenance of population size.

				<ul style="list-style-type: none"> Do not harvest Fucus: Fucus content of harvested <i>A. nodosum</i> will be limited to <1%, thus preventing removal of an additional canopy source which supports periwinkles and other species. By-catch checks: Inadvertent co-removal of periwinkles on the collection vessel will be assessed, and collected and returned to the water
Cockles There is no commercial dredge fishery for cockles. Hand gathering may occur.	Marine Institute (2014)	Unknown	Cockles are abundant on intertidal muddy sand shores, e.g. east of Mullranny.	<p>Risk: Potential impacts of cockle gathering include impacts on intertidal sedimentary communities (Mudflats and sandflats not covered by seawater at low tide [1140]). There is potential for in-combination effects associated with <i>A. nodosum</i> hand harvest activities and cockle hand gathering, as seaweed hand harvesting may involve activities along the rock shoreline located beyond mudflats and sandflats.</p> <p>Mitigation: A code of practice is in place to ensure environmentally safe navigation when operating mudflats and sandflat areas. This will prevent any impact on intertidal sedimentary communities (See Appendix 4).</p>
Other invertebrates	none	Unknown	e.g. Amphipods, isopods	<p>Risk: Other invertebrates are removed from Clew Bay, many of which are limited to deeper water, thus removing any risk of in-combination effects associated with hand harvesting activities. However, there is a risk that hand harvesting may impact on slow moving invertebrates in general given that nets are used along the intertidal zone</p> <p>Mitigation:</p> <ul style="list-style-type: none"> By-catch: A code of practice is in place to ensure that seaweed must be harvested in nets with mesh space large enough to allow for Amphipods, isopods or other by-catch to escape. Typically, 2 hours will be available for animals to migrate out of the nets before transfer to the collection vessel. Inadvertent co-removal of Animalia identified on the

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				collection vessel must be collected and returned to the water.
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(a) Planned Operations

- i. Recreational & Tourism.
- ii. Harvest activities
- iii. Aquaculture
- iv. Harvesting of invertebrates

(i) Recreation & Tourism:

Planned activity	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Louisburgh	Mayo county council plans for developing Clew Bay, 2014-2020 (Ref: Mayo Council, 2013a)	1	Mayo county council aim to encourage development in the town of Louisburgh	Risk: no risk of in combination effects as Louisburgh is out of the scope of the current application. Mitigation: not required
Newport	Mayo county council plans for developing Clew Bay, 2014-2020 (Ref: Mayo Council, 2013a)	1	Mayo county council aim to: <ul style="list-style-type: none"> • Develop the town. • Enhance existing amenity areas/facilities. E.g. river/estuary, playground, sporting pitches; tennis courts, Grace Kelly Amenity Park and the Great Western Greenway. • Provide adequate waste water and water infrastructure, in line with further growth. • Maintain and develop walking routes and linkages to routes throughout the town. 	Risk: no risk of in combination effects. Mayo County Council have committed to developing Newport with respect to SAC/SPA requirements. Therefore, in combination effects between hand harvesting and future developments are unlikely. Current factors influencing the integrity of cSAC have been identified by Mayo County council (ref: pg.29-30, Mayo County Council, 2013). A statement demonstrating their commitment is as follows: “It is an objective of the Council to implement Article 6 of the EU Habitats Directive, by subjecting any plan or project likely to have significant adverse effects on the integrity of Natura 2000 or European Sites (SACs, SPAs), whether directly (in situ), indirectly (ex-situ) or in combination with other plans or projects, to an appropriate assessment in order to inform decision making” (ref: pg.116, Mayo County Council, 2013).

				Mitigation: not required
Westport	Westport Towns and Environs Development Plan 2010-2016 (ref: Mayo County Council, 2010)	1	<p>Mayo county council aim to:</p> <ul style="list-style-type: none"> • Encourage and promote sustainable tourism developments and activities • Facilitate community-led job created schemes. • To support the implementation of the Failte Ireland West: Regional Tourism Development Plan (2008) • Identify suitable development which utilizes Roman Island as a tourism/recreational area for Westport. • To encourage and provide marine related tourism, sport and leisure facilities, bathing area and public access to the shore at Roman Island • Prevent pollution of existing watercourses and Clew Bay by the continuing Maintenance of the Westport drainage sewerage network and waste water treatment plant. 	<p>Risk: There are potential risks of in-combination effects with Westport Towns and Environs Development Plan 2010-2016. However, this is likely to be minimal as Mayo County Council have committed to “sustainable tourism developments and activities”. In particular, they have created a guide which lists 'vulnerable areas' in map format, which will allow them determine which areas are appropriate for development. A map was produced with layers key sensitive areas in Clew Bay. This was done as part of the Strategic Environmental Assessment of the Plan. Given the commitment of Mayo County Council the objectives for Clew Bay SAC, the potential for in combination effects between hand harvesting and planned developments for 2010-2016 are reduced. However, Roman Island has been targeted for considerable development in terms of marine-based activities and tourism. It is important to mitigate against any potential interaction between hand harvesting and increased tourism-related activities, e.g. increased anthropogenic disturbances. Peak tourist season in Westport is defined as July-August.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvesters will not harvest at Roman island between May and August. This prevents any in combination anthropogenic disturbances from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.
Newport, Westport.	Strategic Flood Risk Assessment to the Draft Mayo County Development Plan 2014-2020 (ref: Mayo County Council, 2014)	1	<p>Mayo county council aim to:</p> <p>Minimise risk of flood to people, business, infrastructure and the environment by identifying flood risks (existing and future)</p>	<p>Risk: no risk of in combination effects identified.</p> <p>Mitigation: not required</p>
Mayo	Draft noise action plan	1	<p>Mayo county council aim to:</p>	Risk: no risk of in combination effects identified.

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	2013-2018 (Mayo County Council, 2013b).		Address environmental noise from sections of major roads.	Mitigation: not required
Mayo	Hynes, P. (2014). Adopted Annual Budget for Mayo County Council	1	<p>Mayo County Council have budgeted for the following operations in 2014:</p> <ul style="list-style-type: none"> • NS9 Westport-Newport at Kilbride, Phase I 3 kms. This scheme incorporates a cycle-way, as part of the Great Western Greenway which extends from Westport to Mulranny • Newport: Repair to walls of Newport Quay • Westport harbour: funding for new marine tourism/leisure infrastructure 	<p>Risk: there are no risks of in combination effects between hand harvesting and the cycle way from Westport to Mulranny, or repairs being performed to walls of Newport Pier. However, It is important to mitigate against any potential interaction between hand harvesting and increased tourism-related activities at Westport Quay, e.g. increased anthropogenic disturbances. Peak tourist season in Westport is defined as July-August.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> • Hand harvesters will not harvest at Westport Quay between May and August. This prevents any in combination anthropogenic disturbances from occurring. • Hand harvesters will not work within 50m of bases where equipment or vessels are manually introduced in the water. This ensures that no in combination effects occur.

(ii) Harvest activities

No Plans identified

(iii) Aquaculture

The Dept. of Agriculture, Food & Marine website have published a report by the Marine Institute (2014), which assesses the potential impact of fishing and planned aquaculture activities in Clew Bay. This includes details of planned activities. Planned aquaculture operations are of relevance to the current to the BioAtlantis plan to hand harvest *A. nodosum*, particularly given the potential impacts on Annex II species. Potential risk and mitigation measures are provided below.

Planned Aquaculture activity	Ref./source of information	No. of operators /sites	Locations/extent of operations	Potential interaction with <i>A. nodosum</i> harvesting in Clew Bay (inc. mitigation measure if applicable)
Abalone culture in the vicinity of Inishcorky island and neighbouring islands	Marine Institute (2014)	1 new site proposed	Inishcorky island (North west Clew Bay)	<p>Risk: hand harvest activities may exacerbate existing effects attributed to licensed aquaculture activities, e.g. disturbance at sites relevant to harbour seals. Overall the risk of such interactions is considered low (Marine Institute, 2014). Impacts on Otter (<i>Lutra lutra</i>) is deemed not significant. However, the Marine Institute cannot rule out potential effects of aquaculture on seal behaviour at Inishcorky and potentially neighbouring site: Inishdeashmore, Inishdeadbeag, unnamed neighbouring island of Inishdeadbeag and Inishnacross (pg. 78, Marine Institute, 2014).</p> <p>Mitigation:</p> <ul style="list-style-type: none"> Seasonal avoidance of sensitive harbour seal sites must be adhered to for all haul out sites, including Inishcorky. This will ensure that harbour seals are unaffected (Code of Practice, appendix 4).

(iv) Harvesting of invertebrates

No Plans identified

4. References:

Browne, R., Deegan, B., O'Carroll, T., Norman, M. and Ó'Cinnéide, M., 2007. Status of Irish Aquaculture, 2006. Marine Institute/Bord Iascaigh Mhara/Taighde Mara Teo: 113pp

Faite Ireland (2012). Get Out There Clew Bay Map. Published 08/02/2012. Web: <http://www.mayo.ie/dnn/AboutMayo/AllThingsMayoWiki/ClewBayActivities.aspx#.VBHYiSDqM-> (Accessed 11/09/2014)

Hynes, P. (2014). Adopted Annual Budget for Mayo County Council. Web: http://www.mayococo.ie/lgdocuments/adopted_annual_budget_2014.pdf . Accessed: 16/09/2014.

Marine Institute (2014). Report supporting Appropriate Assessment of Aquaculture and Risk Assessment of Fisheries in Clew Bay Complex SAC (Site Code: 1482). Web: <https://www.agriculture.gov.ie/media/ClewBaySACAA290714.pdf>., accessed: 15/09/2014

Mayo County Council (2010). Westport Towns and Environs Development Plan 2010-2016 (incorporating variation 1, 2 and 3).

Mayo County Council (2013a). Natura Impact Report In support of the Habitats Directive Assessment Of the Draft Mayo County Development Plan 2014 – 2020. Web: <http://www.mayococo.ie/en/Planning/MayoCountyDevelopmentPlan2014-2020/Document4,24889,en.pdf> . Accessed: 16/09/2014.

Mayo County Council (2013b). Draft noise action plan 2013-2018. Web: <http://www.mayococo.ie/en/Services/Environment/DraftNoiseActionPlan/> . Accessed: 16/09/2014.

Mayo County Council (2014). Strategic Flood Risk Assessment to the Draft Mayo County Development Plan 2014 - 2020 incorporating the Proposed Amendments. Web: <http://www.mayococo.ie/en/Planning/DraftMayoCountyDevelopmentPlan2014-2020/Document9,23438,en.pdf> . Accessed: 16/09/2014.

Sea Fisheries Protection Authority (2013). Clew Bay Live Bivalve Mollusc (Classified Production Areas 2013). Web source: <http://www.sfpa.ie/> (accessed 20_09_2013)