

# Community of Arran Seabed Trust

## The Arran Marine Regeneration Trial

Development of a Community-Based Marine Protected Area

### The Proposals



February 2005

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*"I'm truly sorry man's dominion has broken Nature's social union."*  
Robert Burns

## CONTENTS

EXECUTIVE SUMMARY	3
1. BACKGROUND	5
1.1 Community of Arran Seabed Trust	5
1.2 Arran	6
1.3 Lamlash Bay	7
1.4 Maerl	7
1.5 Context	8
2. OBJECTIVES	9
3. PROGRESS TO DATE	10
3.1 <b>A community lead approach to marine conservation</b>	10
3.1.1 Clachlands maerl No Take Zone	11
3.1.2 Lamlash Bay Marine Protected area	12
3.1.3 Fisheries regeneration	13
3.2 <b>Baseline Biological Surveys</b>	13
3.2.1 Seasearch	13
3.2.2 University Marine Biological Station Millport	14
3.3. <b>Conservation significance of Lamlash Bay</b>	15
3.3.1 Maerl	16
3.3.2 Sea Grass and wider area	19
3.3.3 Commercial and other species in NTZ and MPA	20
4. BENEFITS TO OTHER USERS	20
4.1 Fisheries	20
4.2 Tourism and associated socio-economic benefits	22
5. ACTION PLAN	22
5.1 Arran Marine Regeneration Trial	22
5.2 Monitoring	22
5.3 Funding	24
6. CONCLUSIONS	24
7. REFERENCES	25
8. ACKNOWLEDGEMENTS	27
APPENDIX 1	28
APPENDIX 2	29
APPENDIX 3	30
APPENDIX 4	31
APPENDIX 5	1
APPENDIX 6 and APPENDIX 7	3

## EXECUTIVE SUMMARY

The Community of Arran Seabed Trust (COAST) represents 1350 stakeholders, most of who live on Arran or in the Firth of Clyde area. We believe there are sound ecological and economic arguments for restricting fishing activity in Lamlash Bay. COAST proposes to:

1. Develop and test a **community-led approach** to marine conservation, through consultation with a range of local stakeholders, that can inform similar efforts elsewhere in Britain, specifically by:
  - establishing a **No Take Zone** in the vicinity of Clauchlands to **protect** maerl beds;
  - making Lamlash Bay a **Marine Protected Area** - closed to mobile fishing gear - to **regenerate** and **enhance** local fish and shellfish populations, scallops in particular;
  - investigating the **fishery benefits** of the No Take Zone and Marine Protected Area, particularly with regard to commercial invertebrate species;
  - retaining the *status quo* outside Lamlash Bay.
2. Undertake **baseline biological surveys** against which to assess affects of protection, in collaboration with national initiatives such as Seasearch and local expertise, such as the University Marine Biological Station Millport [UMBSM];
3. Establish the local and national **conservation significance** of Lamlash Bay.

Much of the work towards these objectives has already taken place. COAST has consulted extensively among stakeholders and ~20% of the Arran population are members, with many more anecdotally voicing support for the proposals, and our petition signed by over 700 people, including marine experts, lodged with the Scottish Parliament is currently being followed up by the Petitions Committee.

Diving members of COAST received Seasearch training from the Marine Conservation Society (MCS) Scotland in March 2003 and completed 40 Seasearch records from Lamlash Bay and a further 23 from Whiting Bay, Brodick Bay and Pladda in 2003-2004. A Seasearch report was produced for 2003 and summary report in production for 2004. Among the records returned of conservation significance were extensive sea grass beds in Whiting Bay and patches of >90% live maerl in the vicinity of a proposed sewage outfall in Lamlash Bay.

Discovery of the latter by COAST and subsequent lobbying with support from Scottish Natural Heritage drove the need for Scottish Water to commission a full survey by the University Marine Biological Station Millport (UMBSM). Using photographic and visual observation by SCUBA divers, acoustic ground discrimination techniques and Baird grab sampling, UMBSM undertook remote surveying of the maerl bed beneath the proposed outfall.

The UMBSM report concluded that any damage of the best of the Clauchlands maerl deposits may be affecting perhaps the last >90% live maerl beds in the Clyde sea: *“In our expert view, we would strongly advise that this site be avoided by any development, which impacted in the seabed.”* COAST consider fishing activity a ‘development’ and, since *“scallop dredging can lead to a >70% reduction in live maerl with no signs of recovery over the subsequent four years”* (Hall-Spencer and Moore, 2000), believe the UMBSM conclusion is therefore of major significance.

Funding from the Esmee Fairbairn Foundation has enabled UMBSM to begin conducting a baseline survey of the rest of Lamlash Bay using the above techniques, potentially shedding more light on the conservation significance of the bay. Sidescan sonar and maerl core-sampling has already taken place in 2004 and SCUBA transects will be carried out in 2005.

Having instigated the process that established Lamlash Bay maerl as among the best in the Clyde, COAST feel we have contributed greatly to establishing the bay's marine conservation significance. We therefore urge the Scottish Executive to:

- *ensure that fishing policy takes account of the potential impact of operations with mobile gear on maerl beds and seeks to avoid or minimise operations*

As recommended in the UK Biodiversity Action Plan for maerl ([www.ukbap.org.uk](http://www.ukbap.org.uk)).

COAST has taken initiative at a community-level that contributes to targets in the UK Biodiversity Action plan and, as a result of our Seasearch work, the Ayrshire Coastal and Marine Habitat Action Plan (HAP) now also includes maerl ([www.south-ayrshire.gov.uk/community/LBAP](http://www.south-ayrshire.gov.uk/community/LBAP)). The Ayrshire HAP aims to:

- *maintain and enhance the range of sublittoral sand and gravel communities off the Ayrshire Coast (Main Objective);*
- *propose exceptional or susceptible sites identified from survey sites for legislative protection through designation (Objective 3).*
- *Promote the marine environment through educational programmes aimed at all sectors of the community (Objective 4).*

By identifying susceptible sites for maerl (Lamlash Bay) and seagrass (Whiting Bay) (Objective 3), bringing the Lamlash maerl to the attention of the Firth of Clyde Forum and giving local marine life talks and presentations to schools and community groups (Objective 4), COAST is doing a great deal to further the Ayrshire Coastal and Marine HAP.

The establishment of the Clyde Fisheries Working Group, impending Sustainable Scottish Marine Environment Initiative Phase III Clyde project and Firth of Clyde Forum are excellent opportunities to build on delivery of the UK and Ayrshire BAP targets, among wider fisheries management measures. As Arran residents with aesthetic, economic and recreational stakes in the health of our local marine environment, COAST look forward to working closely through these Clyde initiatives to help establish a sustainable future for our own marine 'back yard' in Lamlash Bay.

COAST believe that our proposal is a modest 'off-the-shelf' opportunity which, when married with other sensible management measures, could help towards maerl and seagrass BAP targets; contribute to Clyde fisheries being conducted in an environmentally sustainable manner and; help fulfill current UK, and therefore Scottish, commitments and recommendations to establish a network of Marine Protected Areas. We would therefore hope that our proposal will be taken forward within the context of a sustainable fisheries management plan for the Firth of Clyde.

This report sets out the background to; work so far towards and the future of the Arran Marine Regeneration Trial.

## 1. BACKGROUND

### 1.1 Community of Arran Seabed Trust

The Community of Arran Seabed Trust (COAST) is a representative local organisation, most of whose 1350 members are based on the Island of Arran, representing ~20% of the population. It is a fully constituted Association with a committee of eight.

COAST was established to give a voice to a group of local stakeholders who felt their interests should be taken into consideration regarding how the marine resources, quite literally on their doorstep, were managed.

**Fig .2 COAST Committee**



The aim of COAST is to protect the maerl in northern Lamlash Bay and, following on from that, to promote natural regeneration of associated invertebrate, particularly scallop, and fish populations in the whole of Lamlash Bay. Possible 'knock-on' effects from the proposal would be spill-over of commercial species such as scallops from the bay into adjacent waters, benefiting local fisheries, and attraction of more visitors and divers to Arran, benefiting the local economy.

COAST has support for the proposals outlined in this document from a broad cross-section of the Arran community, including local commercial fishermen, the Holy Isle owners, the local diving club, community council, local MSPs, MP and MEP, environmental NGOs, visitors to Arran and many other interested parties [Appendix 1] The project has also openly consulted with representatives of the mobile and static fishing communities that use Lamlash Bay.

## 1.2. Arran

Arran is the largest island in the Firth of Clyde, the most southerly fjord in the Northern Hemisphere. It is situated to the west of the Firth, separated from the Kintyre peninsula to the west and northwest by the Kilbranan Sound and from Cowal and Bute to the north and northeast by the Sound of Bute and the mouth of Loch Fyne. The island itself measures 36km along the north-south axis and 22km along the east-west axis and has a population of around 5000.

Due to its diverse scenic landscapes and variety of land-uses, Arran is often known as 'Scotland in Miniature' and is a popular holiday destination for those people particularly interested in outdoor recreation. Many come to climb the mountains, although there is an increasing range of outdoor pursuits to be enjoyed here, from boat trips, cycling, and bird watching to quad-biking. The major sources of revenue in Arran are tourism and farming.

**Fig.3 Arran**



## 1.3. Lamlash Bay

On the southern east coast of the island of Arran in North Ayrshire, Lamlash Bay is approximately 5km long and bounded by the headlands of Clauclands Point to the north and Kingscross Point to the south. Situated 3 miles (5km) south of Brodick, the main settlement of the bay is Lamlash (Gazetteer for Scotland, 2003), the second largest settlement on Arran. At its deepest, the bay is marked on Admiralty Charts as 38m below chart datum (bcd) and characterised as shell gravel. Rocky coast is present around the northern and southern margins of the bay. The south western coast of Holy Island consists of a steep rocky slope that descends to 20m bcd. At the northern and southern entrances to Lamlash Bay, either side of Holy Isle, shallower sills have formed. The northern sill consists of a deep, though in places degraded, maerl bed (COAST *pers comm* 2003).

Lamlash Bay is used by a number of local stakeholders including the Holy Isle ferry operator, the RNLI, the salmon and mussel farms, yachtsmen, boatmen, anglers, divers and practitioners of other leisure activities. To the east of Lamlash Bay lies Holy Isle, approximately 3km long by 1.5km wide and owned by the Kagyu Samye Ling Tibetan Buddhists.

**Fig 4. Lamlash Bay**



#### **1.4 Maerl**

Maerl is a collective term for certain coralline red algae that grow unattached on a clean, tidal or wave swept seabed, and may accumulate to form carbonate-rich beds. It is slow growing (0.55 mm/year: Adey and McKibbin, 1970), but over long periods dead calcareous maerl skeleton accumulates into deep deposits (to ~30m in British Isles and ~120m in the Mediterranean) overlain by a thin layer of pink, living maerl (Hall-Spencer and Moore, 2000). Deposits can be classified according to the proportion of maerl to other substrates such as sands and gravels (Kamenos *et al* 2004). Although maerl deposits consisting solely of maerl do occur, they are not common, certainly not in the Firth of Clyde.

A complex of algae species including *Phymatolithon calcareum*, and *Lithothamnion coralloides* make up the maerl beds, supporting a rich associated fauna and flora of up to 150 macroalgal species (Birkett *et al*, 1998) and over 400 benthic faunal species (Scott and Moore, 1996). Nests of the delicate bivalve *Limaria hians* are often found in maerl beds and themselves can be cumulatively associated with up to 19 species of alga and 265 species of invertebrate (Hall-Spencer and Moore, 2000).

Maerl grounds can also act as nursery areas for commercially important species such as queen scallops (*Aequpecten opercularis*) as well as increasing the carrying capacity of heterogeneous inshore nursery areas for juvenile cod (*Gadus morhua*), saithe (*Pollachius virens*) and pollack (*Pollachius pollachius*) by providing a plentiful supply of invertebrate food (Kamenos *et al*, 2004).

**Fig 5. Maerl**



#### **1.5 Context**

Some COAST committee members are SCUBA divers. As a result they have seen first-hand the banks of maerl situated between Clauchlands Point and the northern end of Holy Isle. Although a habitat known to be present in the Clyde, maerl had not been recorded on Arran as part of the JNCC Marine Nature Conservation Review ([www.jncc.gov.uk/mermaid](http://www.jncc.gov.uk/mermaid)), therefore the COAST divers may have been among the first to record maerl here.

Following a diving trip to the pristine maerl beds of upper Loch Torridon, the COAST divers came to fully appreciate the degree to which the bed in Lamlash Bay had been denuded, probably as a result of repeated scallop dredging.

Furthermore, many COAST members recalled the Lamlash Bay Fishing Festival held annually by the Arran Sea-Angling Association over two days. In 1968 the festival resulted in total catches fish weighing up to 17,000 lbs but by the 1980s the catch fell to less than a tenth of this. By 1994, the final year of the festival, the catch was below 135 lbs [Arran Sea Angling Association *pers comm.*] Such a successful annual event was once a huge economic boost to the island.



The drastic decrease in fin fish stocks and the denudation of the maerl beds galvanized COAST into considering how best to regenerate the marine life of Lamlash Bay and measure that regeneration.

COAST recognise that the following proposals have been put forward during a period of intensive consultation on Scotland's marine environment by the Scottish Executive. We responded to the Strategic Framework for Scotland's Marine Environment consultation and await the outcome with great interest. COAST is also aware of the Strategic Framework for Aquaculture, Inshore Fisheries Strategy, Strategy for Scotland's Coasts and Seas and Scottish Biodiversity Strategy Marine Implementation Plan. All this Scottish consultation activity takes place against a backdrop of increasing political pressure to establish Marine Protected Areas in the UK (See Table 1).

**Table 1. Recent political commitments and policy advice towards establishing Marine Protected Areas in UK waters.**

Year	Source	Recommended Action
2004	Review of Marine Nature Conservation	<b>Recommendation 8:</b> an ecologically-coherent and representative network of marine protected areas should be identified and established, and appropriate and proportionate measures applied to ensure their conservation needs are met.
2004	Prime Ministers Strategy Unit 'Net Benefits' Report	<b>Recommendation 31:</b> The UK Government and devolved administrations should develop an experimental programme of Marine Protected Areas focusing initially on areas which provide benefits to multiple users (commercial fishermen, tourism, environment, recreational fishermen etc).
2004	Draft Scottish	<b>Action Point 3.2</b> Consider the role of and need for marine

	Biodiversity Strategy Marine Plan	protected areas in Scotland – including marine National Parks, Natura sites and measures to safeguard nationally & internationally important sites and species.
2004	Scottish Coastal Forum Strategy for Scotland's Coasts and Seas	<b>Annex 1</b> Section 8.6.5 Bullet point 4 <i>Develop a suite of marine protected areas for Scotland building on current work in this field.</i>
		<b>Existing Commitment</b>
2002	SNH Natural Heritage Futures 'Coasts and Seas'	<b>Objective 3</b> , bullet 4: Medium-term commitment to <i>Safeguard up to 15% of the sea and coast within areas of special care and protection.</i>
2002	Bergen Declaration 5 <sup>th</sup> North Sea Conference & 2003 OSPAR commission	UK commitment to ensure the protection of whole ecosystems, establishing marine spatial planning and a network of <b>marine protected areas</b> throughout the North Sea & NE Atlantic respectively by 2010.
2002	World Summit on Sustainable Development (WSSD)	UK commitment to establish representative networks of <b>marine protected areas</b> by 2012 and to restore fish stocks by 2015.

On a Clyde Sea scale, we are also aware of the move to establish a Clyde Working Group for fisheries management, the existing Firth of Clyde Forum ([www.clydeforum.org](http://www.clydeforum.org)) and the upcoming Clyde component of Phase III of the Sustainable Scottish Marine Environment Initiative ([www.scottish-marine-sustainability.co.uk](http://www.scottish-marine-sustainability.co.uk)), all projects that COAST anticipate must overlap significantly with one another.

COAST believes the proposals outlined below represent an excellent 'off-the-shelf' opportunity to help fulfil some of the objectives of the above Clyde-wide initiatives, UK and therefore Scottish requirements to establish Marine Protected Areas and Local and National Biodiversity Action Plans for maerl and sea grass. We would therefore like to emphasise our willingness to be involved as major stakeholders, representing as we do over 1000 inhabitants of the Firth of Clyde area, and put forward the proposals for one small corner of the Clyde.

## 2 OBJECTIVES

**Some of the work towards the following objectives of the Arran Marine Regeneration Trial has already been carried out, however it is worth stating them again and putting them into context. COAST was established to:**

- develop and test a **community-led approach** to marine conservation, through consultation with a range of local stakeholders, that can inform similar efforts elsewhere in Britain;
- undertake and initiate **baseline biological surveys** against which to assess affects of protection, in collaboration with national initiatives such as Seasearch and local expertise, such as the University Marine Biological Station Millport;
- establish the local and national **conservation significance** of Lamlash Bay.

It is recognised that the scope of the proposed trial is limited to Lamlash Bay but we believe that the local benefits will provide inspiration and example for other community groups throughout the UK and ultimately contribute to a more environmentally sustainable approach to fisheries management in the Firth of Clyde (see 4.1).

Progress towards each of the Objectives listed above will now be considered.

### 3 PROGRESS TO DATE

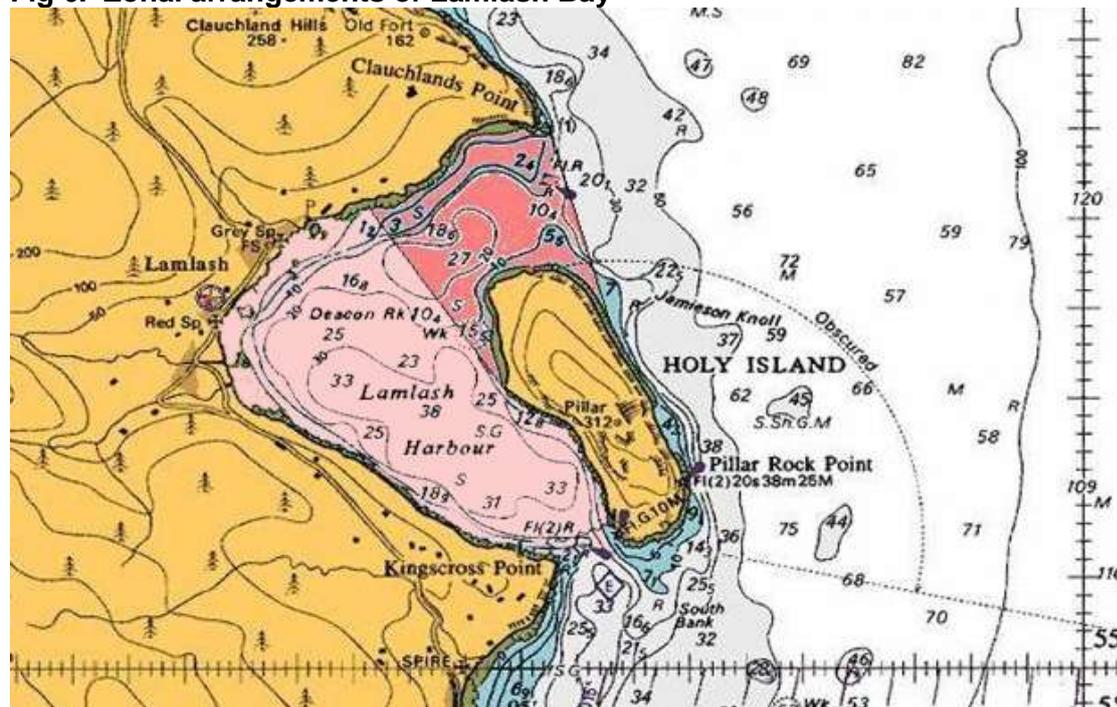
#### 3.1 A community-led approach to marine conservation

Following consultation with, among others, local commercial fishermen and Dr Bill Ballantyne of Leigh Marine Laboratory New Zealand, COAST conceived a zoned approach to marine regeneration (see Figure 6). Members of the COAST committee were also invited to Carradale to meet the fishermen of the Clyde Fishermen's Association and explain the Trial. Notes and follow up correspondence are available on request. One of our COAST members spent a full day on a Carradale fishing boat, giving us a chance to get a fisherman's opinion and to fully understand their problems.

The following proposals have been agreed by the COAST membership. Furthermore, following the BBC 2 series 'A Bee in their Bonnet' in the first episode of which COAST featured, membership almost quadrupled, giving the proposals even greater local credence:

- establish a **No Take Zone** in the vicinity of Clauchlands to **protect** the maerl beds;
- make all of Lamlash Bay a **Marine Protected Area**, closed to mobile fishing gear to **regenerate** and **enhance** commercial fish and shellfish populations, scallops in particular;
- investigate the **fishery benefits** of the No Take Zone and Marine Protected Area, particularly with regard commercial invertebrate species;
- keep the *status quo* outside Lamlash Bay.

Fig 6. Zonal arrangements of Lamlash Bay



 No Take Zone    Marine Protected Area    Area Outside of Trial area

It is envisaged that the trial would **protect** the maerl beds of Lamlash Bay; help **regenerate** associated forms of marine life including commercial bivalves, particularly scallops, and flatfish throughout Lamlash Bay consequently leading to over-spill of mobile species into the sea adjacent to the bay. By zoning the trial, effectively using the No-Take Zone as a control, and monitoring a range of biological variables (see Section 5) it will be possible to demonstrate the success of the project.

### 3.1.1 Clauchlands maerl No Take Zone

**No Take Zone (NTZ)** *an area of sea and seabed from which no marine life can be removed by any method, including mobile and static fishing gear or hand-collection by divers.*

#### **Aim: To protect Lamlash Bay maerl beds.**

The protection of maerl beds from scallop-dredging damage is a simple, self-explanatory end in itself, as common-sense as protecting raised bogs from peat extraction or Caledonian pine forest from timber felling on land. This would be equivalent to a Category I Marine Protected Area as defined by IUCN (IUCN, 1999).

Following consultation with local fishermen, COAST proposed establishing a No-Take Zone in a wedge of north Lamlash Bay measuring approximately 240 hectares, excluding mobile and static fishing gear, sea-angling, diver-harvesting and any other extractive activity in the vicinity of the Clauchlands maerl bed.

By excluding these activities, the patch of >90% live maerl recorded by the University Marine Biological Station Millport (UMBSM) following Seasearch by COAST will be directly protected and the remaining denuded maerl bed in the northern channel entrance given protection and the opportunity to regenerate.

#### **The Measure of Success:**

the successful exclusion of all forms of extractive activity from the proposed NTZ will be a successful end in itself. For monitoring information please see section 5.

By protecting the maerl beds from mobile fishing gear and all other extractive activities, the No-Take Zone would simultaneously allow regeneration of a full range of associated fish, invertebrate and algal species, albeit on a small scale.

The fact that well-managed No-Take Zones have provided positive results for marine life and dependant fisheries throughout the world (see Table 2) is a major incentive to implement the COAST proposal. Maria Island marine reserve in Tasmania is of comparable size to Lamlash Bay and the fisheries restrictions there led to a 260% increase in rock lobster populations. The work at Port Errin on the Isle of Man [see Appendix 7] is also of particular significance since closure to scallop dredging led to a more than seven-fold increase in scallop density. Furthermore, after studying 89 reserves across the globe, Halpern (2003) discovered that, on average, species within marine reserves were twice as abundant, a third larger, had a three-fold biomass increase and showed an increase in diversity by a third.

These figures were an average and will be larger in areas with better compliance to marine reserve law.

**Table 2. Examples from around the world demonstrating that where areas of sea are set aside for marine regeneration they protect and enhance marine wildlife (after Howdon, 2004 [ See Appendix 2])**

Location	Size/km <sup>2</sup>	Estd.	Conservation evidence
Edmonds Underwater Park, Puget Sound Washington	0.1	1970	Fish numbers inside reserve 15 times greater than at fished sites (Palsson and Pacunski, 1995)
Isle of Man	2	1989	Scallop populations increased from <2/200m <sup>2</sup> to 15/200m <sup>2</sup> between 1989 and 2000 (Bradshaw <i>et al</i> , 2001)
Cape Rodney to Okakari Point Marine Reserve, New Zealand	5.5	1975	Denser kelp beds with greater species diversity.  13 years after establishment, abundances of snapper, blue cod, red moki, rock lobster all increased (Cole <i>et al</i> , 1990).  Snapper eight times more abundant within reserve than outside and averaged ~100% greater length (Babcock <i>et al</i> , 1999).  Rock lobster population 280% greater inside reserve eight years after protection (Kelly <i>et al</i> , 2000).
Various, New Zealand	N/A	3-14 years ago	Rock lobster populations increased by 40% (Kelly <i>et al</i> , 2000)
Maria Island, Tasmania	7	1991	Over six years: 240% rise in numbers of large fish 260% increase in rock lobster numbers (Edgar and Barrett, 1999)
Lamlash Bay, Arran	7.9	N/A	N/A
Georges Bank, USA	17,000	Dec 1994	Scallop biomass increased 14-fold within closed area over a five year period (Murawski <i>et al</i> , 2000)

### 3.1.2 Lamlash Bay Marine Protected Area

**Marine Protected Area** – any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment. (Kelleher and Kenchington, 1991).

**AIM:** help **regenerate** and **enhance** commercial shellfish and fish populations in Lamlash Bay, particularly scallops by prohibiting use of mobile fishing gear. This would be equivalent to a Category II Marine Protected Area as defined by IUCN (IUCN, 1999).

COAST proposes that a **Marine Protected Area** measuring approximately 550 hectares should be established in Lamlash Bay, from which mobile fishing gear and commercial

scallop diving should be excluded. Static gear fishing, for example creeling for lobsters and crabs, would be allowed.

### 3.1.3 Fisheries Regeneration

**AIM:** investigate the **fisheries benefits** of establishing a No-Take Zone and Marine Protected Area within Lamlash Bay.

The investigation would specifically regard the indigenous wild stock of king scallop (*Pecten maximus*), building on work carried out by Port Erin Marine Laboratory, University of Liverpool, Port Erin, Isle of Man, on the benefits of closed area protection for a population of scallops (Appendix 7] If there were capacity it would be useful to look at other commercial species including razor fish (*Ensis Siliqua*).

*“A common problem with studying fishing disturbance is the lack of good control sites.”*  
(Bradshaw *et al*, 2001)

The Arran trial would be an ideal opportunity to study the effects of fishing disturbance in shallow inshore sea beds of the Clyde sea by providing a control, in the form of the No-Take Zone, for comparison with other zones of increasing fisheries pressure, namely the Marine Protected Area (no dredging or trawling) and outside the bay (full fishing activity).

Success of the trial would be assessed by monitoring dispersal and settlement of larvae from the NTZ and Marine Protected Area and their subsequent success in re-colonising adjacent areas of seabed.

## 3.2 Baseline Biological Surveys

*‘If we decided to have places in the sea as undisturbed and natural as possible, we could learn what was natural, instead of just trying to imagine it. If we had some natural baselines, we could measure the effects of our activities, instead of just arguing about them’* Bill Ballantine (Ballantine, 1995)

As part of the Joint Nature Conservation Committee (JNCC) Marine Nature Conservation Review, very little survey work had been carried out on Arran, and most of this was in the littoral zone (see ([www.jncc.gov.uk/mermaid](http://www.jncc.gov.uk/mermaid)]) Following discussion with Scottish Natural Heritage in 2002 regarding their proposals, COAST were recommended to arrange Seasearch training with the Marine Conservation Society (MCS) in Scotland.

### 3.2.1 Seasearch

Seasearch is a programme of Phase 1 marine biology survey, developed by the Marine Conservation Society [MCS] and the JNCC, designed to give sports divers an opportunity to participate in marine biology surveys and to contribute to the marine life information from an area by recording species and habitats.

Following advice from Scottish Natural Heritage, COAST approached the Marine Conservation Society Scottish Officer for Seasearch training. On 22 March 2003 eight diving members of COAST were trained by MCS Scotland to Seasearch Observer level at a course in Lamlash School (Seasearch Course No. 0302).

No records existed for Lamlash Bay within the Marine Nature Conservation Review database, the nearest site, Whiting Bay having only been surveyed remotely using box core

samples (see Table 3). Whilst the importance of the intertidal and scenic value of the southern tip of Arran was recognised, the sublittoral data upon which to make any value judgement simply did not exist. Since no records existed for Lamlash Bay, diving COAST participants from the March Seasearch course conducted Seasearch dives throughout the bay during summer 2003 to build a simple sublittoral baseline for the area.

**Table 3. MNCR sampling sites 33, 34 and 35 from 1978-79 Clyde Sea littoral survey by the Paisley College of Technology ([www.jncc.gov.uk/mermaid](http://www.jncc.gov.uk/mermaid))**

Name	Position	Sampling type	Habitat
Sandbraes, Whiting Bay	NS 048 273	Box core	Sand shore
Creag Dubh, Whiting Bay	NS 050 250	MNCR Littoral	'Fantastically dull' storm beach with rock outcrops
Porta Buidhe, Kildonan	NS 015 210	MNCR Littoral	'Particularly rich site in terms of fauna, flora and views... <i>Zostera marina</i> present over large areas of the shore, particularly in pools...The whole southern tip of Arran around Bennan Head can be expected to be similarly rich and might later provide an excellent intertidal SSSI.'

Seasearch Observation forms were completed for 21 sites (See Appendix 4) a Seasearch summary report produced (see [www.seasearch.org.uk](http://www.seasearch.org.uk)) and the data entered into the NBN Marine Recorder database by the MCS Scottish Officer and Seasearch Scotland coordinator. A simple species list has been compiled and a CD-Rom of photographs produced. A summary report from Seasearch Lamlash Bay 2003 has been included in [Appendix 6]

Most of the seabed in Lamlash Bay is composed of soft substrate, including patches of seagrass. However, areas of sublittoral rock, with kelp communities are also present along the northern coast and also adjacent to the northern channel, which reaches about 25m bcd. A deep maerl bed in the North Channel entrance to Lamlash Bay still contains significant live maerl, despite extensive damage by scallop dredging since the 1970's

In summer 2004, COAST divers conducted a further 42 Seasearch Observation dives in Brodick Bay, Lamlash Bay, Whiting Bay and around Pladda and submitted the forms to MCS. Of particular interest were the maerl discovered in the vicinity of the proposed site for a Long Sea Sewage Outfall (see 2.2.2) and the large extent of seagrass beds in Whiting Bay. Seasearch Arran COAST 2004 data has been entered into Marine Recorder at MCS Scotland and a Seasearch Arran 2004 summary report is in production.

### **3.2.2. University Marine Biological Station Millport**

Funding of £10,000 is available from the Esmee Fairbairn Foundation for University Marine Biological Station Millport (UMBSM) to conduct a baseline survey of the rest of Lamlash Bay using sidescan sonar and video sledge, potentially shedding more light on its conservation significance (see 5). A sidescan sonar survey of the bay and core sampling of maerl to analyse meiofauna took place in 2004, although due to inclement weather SCUBA-diver ground-truthing could not take place and has been postponed until summer 2005. Nonetheless, combined sonar and SCUBA work by UMBSM has already taken place in one section of the bay.

Following the discovery of maerl by COAST divers conducting Seasearch in the vicinity of the proposed Long Sea Outfall, COAST objected to the Scottish Water plans. After some considerable effort, COAST, with the support of Scottish Natural Heritage, persuaded Scottish Water to contract University Marine Biological Station, Millport (UMBSM) to undertake a scientific survey of the immediate area using their “state of the art” vessel R.V. Aora and diving tender (Kamenos *et al*, 2004).

Perpendicular SCUBA transects were conducted either side of the proposed pipeline during which pictures were taken and observations made. In addition proposed and likely outfall areas were surveyed remotely by ship using ground discrimination techniques, subsequently ground-truthed with a Baird grab.

The UMBSM survey reported that high invertebrate macrobenthic numbers and diversity were present, usually associated with maerl in pristine condition, with maerl in some areas 85% - 95% live (pink). However, Clyde Sea maerl beds characteristically contain only between 5% -10% live maerl due to extensive impacts of scallop dredging. Therefore, in terms of the Clyde Sea, UMBSM concluded that the area this is highly unusual and any damage of that deposit may be affecting one of, if not the last >90% live maerl bed in the Clyde sea area.

The report stated that:

***“In our expert view, we would strongly advise that this site be avoided by any development, which impacted in the seabed.”***

Following this conclusion the route of a proposed Long Sea Sewage Outfall into Lamlash Bay was changed to avoid damage to the maerl.

COAST consider fishing activity a ‘development’ and, since “*scallop dredging can lead to a >70% reduction in live maerl with no signs of recovery over the subsequent four years*” (Hall-Spencer and Moore, 2000), believe the above UMBSM conclusion is therefore of major significance.

Similar studies have recommended protecting all maerl grounds from hydraulic dredging and establishing them as reservoirs to allow for recruitment of commercial bivalve populations (Hauton *et al*, 2003).

COAST has serious concerns about the impacts of scallop dredging on maerl beds, other sedimentary habitats and scallop populations and will now make the case for the conservation significance of Lamlash Bay.

### **3.3 Conservation significance of Lamlash Bay**

It was suggested by the Scottish Executive Inshore Fisheries Department [letter of 2<sup>nd</sup> September 2004 refers] that the seabed habitats of Lamlash Bay were not of significant importance to merit protection from fishing. Arguably such thinking results from a lack of knowledge about the marine ecology of Arran and its relative importance on a Clyde Sea scale, particularly since no sublittoral sampling of any kind had taken place in Lamlash Bay or indeed Arran as a whole (see 3.2.1). COAST believe that on a Clyde Sea scale there is merit in affording protection to the Lamlash Bay maerl beds, as has already been proven in the re-routing of a Long Sea Sewage Outfall (see 3.2.2). COAST has therefore already gone some way to establish that there is some marine conservation significance within Lamlash Bay.

### 3.3.1 Maerl

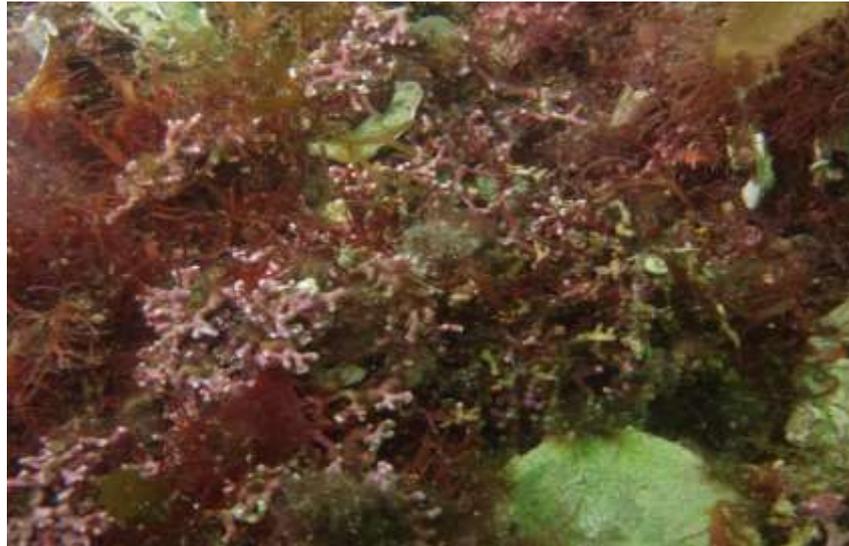
Although maerl is not listed for protection under the UK Wildlife and Countryside Act (1981), four different habitat types in Annex I of the EC Habitats Directive apply to maerl beds: 'Sandbanks which are slightly covered by seawater at all times'; 'Large shallow bays and inlets'; 'Estuaries' and the priority habitat 'Lagoons'. JNCC specifically mentions maerl beds for the first of these, for which Special Areas of Conservation (SACs) have been selected to cover the geographical and ecological range of variation, for example the Sound of Arisaig SAC (after [www.ukbap.org.uk](http://www.ukbap.org.uk)). Of perhaps greatest significance given that the UK has agreed to establish a network of Marine Protected Areas by 2010 under the OSPAR convention, maerl was added to the OSPAR list of threatened and/or declining species and habitats in summer 2004 (OSPAR, 2004).

Although a UK Biodiversity Action Plan report concluded that the UK and Scottish status of maerl was 'stable' ([www.ukbap.org.uk/asp/2002\\_main.asp](http://www.ukbap.org.uk/asp/2002_main.asp)), a recent report by the Marine Biological Association for WWF (Hiscock *et al*, 2005) concluded otherwise, that maerl 'had declined significantly in the last 50 years'. It states that 'the spatial extent (or density of key structural or functional species) has reduced by 25%'. Such conclusions only serve to heighten the relative marine conservation significance of the Lamlash Bay maerl, particularly when considered in a Clyde Sea context.

Two maerl species, *Lithothamnium (sic) corallioides* and *Phymatolithon calcareum*, are listed under Annex V of the EC Habitats Directive as species of community interest whose taking in the wild and exploitation may be subject to management measures. However, *Lithothamnion glaciale*, an important constituent of maerl beds in the north, is not included in Annex V.

No marine SACs have been designated in the Clyde Sea. However, the UK maerl Biodiversity Action Plan is open to inclusion of maerl beds under the EC Habitats Directive when the opportunity arises (see Table 4). Furthermore, there is also a proposed action to ensure that fishing policy takes account of the potential impact of mobile gear on maerl beds and seek to avoid or minimise operations. COAST would argue that the verb 'seek' places the onus on those bodes identified in the action plan to take action to minimise the affects on maerl, which in Scotland falls to the Scottish Executive. The only way to mitigate the impacts of fishing gear on maerl is to stop fishing in the vicinity of maerl

### Fig 7. Maerl



**Table 4. Selected action points from UK Maerl Habitat Action Plan ([www.ukbap.org.uk](http://www.ukbap.org.uk))**

<b>Proposed Action Points from UK Biodiversity Action Plan for Maerl</b>
<p><b>Policy and legislation</b></p> <ul style="list-style-type: none"> <li>• Give consideration to proposing the inclusion of maerl beds under Annex 1 of the EC Habitats Directive when the opportunity arises. This could be in their own right or as a specific component of large shallow inlets and bays. Protection can be afforded to a limited number of sites at present using the existing Habitats Directive categories (large shallow bays and inlets; estuaries; sandbanks slightly covered with water all the time; lagoons). (ACTION: JNCC)</li> <li>• Ensure that fishing policy takes account of the potential impact of operations with mobile gear on maerl beds and seeks to avoid or minimise operations. (ACTION: DANI, EHS, MAFF, NAW, SE, SFCs)</li> </ul>
<p><b>Site safeguard and management</b></p> <ul style="list-style-type: none"> <li>• Take account of the conservation requirements for maerl bed communities in the development and implementation of coastal zone management plans and ensure they are not managed in isolation from other habitats and communities in these areas. (ACTION: All relevant authorities)</li> </ul>

As a result of conducting Seasearch and taking underwater photographs in Lamlash Bay, COAST gathered evidence to ensure maerl and the north channel entrance to Lamlash Bay were recognised on the Ayrshire Local Biodiversity Action Plan (LBAP) (See Table 5).

**Table 5. Key sites and species in Ayrshire Coastal and Marine Habitat Action Plan**

<b>Key Sites</b>	<b>Key Species</b>
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South Coast of Arran SSSI	Herring ( <i>Clupea harengus</i> ) Cod ( <i>Gadus morhua</i> ) Haddock ( <i>Melanogrammus aeglefinus</i> ) Whiting ( <i>Merlangius merlangus</i> ) Norway Lobster ( <i>Nephrops norvegicus</i> ) Queen scallop ( <i>Aequipecten opercularis</i> ) Great Scallop ( <i>Pecten maximus</i> ) <i>Mastocarpus stellatus</i> <i>Lithothamnion coralloides</i> (maerl)
Tidal Rip between Arran and Pladda, and channel between Arran and Holy Isle (maerl grounds)	

As a result of maerl being included on the Ayrshire Coastal and Marine HAP, the objectives summarised in Table 6 are relevant to Lamlash Bay and the COAST proposals.

**Table 6. Ayrshire Coastal and Marine Habitat Action Plan**

	<b>OBJECTIVE</b>	<b>TARGET</b>
<b>Main Objectives</b>	Maintain and enhance the range of sublittoral sand and gravel communities off the Ayrshire Coast.	Active involvement of LBAP partners, whilst ensuring no loss in quality of habitat
<b>Objective 1</b>	Within the planning context seek to conserve and enhance the biodiversity value of the benthic zone.	Develop joint monitoring policy between LBAP, SEPA and SFPA by 2003
<b>Objective 2</b>	Undertake survey work for key sites within the benthic zone	For key sites put monitoring in place.
<b>Objective 3</b>	Propose exceptional or susceptible sites identified from survey sites for legislative protection through designation.	Designate key sites wherever possible.
<b>Objective 4</b>	Promote the marine environment through educational programmes aimed at all sectors of the community.	Expand promotional and educational programmes, ensure resource directory reaches all schools by 2003.

COAST has either taken significant community-level action or helped initiate other action that contributes to the UK Biodiversity Action plan and, at a Clyde Sea scale, targets in the Ayrshire Coastal and Marine Habitat Action Plan. In fact there is a marked correspondence between the Objectives of the Ayrshire Coastal and Marine HAP and the Objectives of coast set out in Section 2 (See Table 7).

**Table 7. COAST related action that contributes to Ayrshire HAP targets**

Action	Objective contributed to
Trained in Seasearch and during 2003-2004 submitted 63 Seasearch Observation records to MCS for Lamlash Bay, Whiting Bay and Pladda, identifying previously unrecorded beds of maerl and seagrass	<b>Objective 2</b>
Collaborated with UMBSM towards getting Esmee Fairbairn Foundation funding to enable UMBSM to undertake baseline survey of Lamlash Bay.	
Through Seasearch records and photographs driven need for seabed discrimination and ground-truthing survey by UMBSM in relation to plans by Scottish Water to put a sewage outfall in Lamlash Bay. Outfall moved outside bay.	<b>Objectives 2/3</b>
Demonstrated community support for COAST proposals (~20% of Arran residents members)	<b>Objective 4</b>
Produced a promotional video highlighting marine life in Lamlash Bay. Now shown on CalMac crossing to Arran.	
Given 30 local marine life talks and presentations to schools and community groups and brought the Lamlash maerl to the attention of the Firth of Clyde Forum	

The work of COAST, through collaboration with UMBSM, has ultimately led to the identification of perhaps the last remaining >90% live maerl bed in the Clyde Sea (Kamenos *et al*, 2004). This must qualify as an ‘exceptional or susceptible site’ under the Ayrshire Coastal and Marine Habitat Action Plan (See Table 6) therefore COAST call upon the maerl bed to be designated as a ‘key site’. Our proposal for a No-Take Zone would thus help fulfil Objective 3 of the Ayrshire Marine and Coastal HAP.

Indeed, the BIOMAERL team (BIOMAERL, 2003) concluded that key conservation and management measures proposed for maerl should include: recognition that maerl beds are non-renewable resources unable to sustain direct exploitation; prohibition on the use of towed gear on maerl grounds; moratoria on the issue of further permits for the siting of aquaculture units above maerl grounds; monitoring of existing exploited or impacted maerl beds and the designation of ‘no-take’ reserves.

It is only by introducing measures such as the above, as also recommended by COAST through establishment of a No-Take Zone (3.1.1), that the Main Objective of the Ayrshire Coastal and Marine HAP can be met. The COAST project provides an “off-the-shelf” opportunity to meet this objective, and many others, for which much of the groundwork has already been done.

### **3.3.2 Sea grass and wider area**

COAST recorded a small patch of sea grass in the north of Lamlash Bay in 2003. However of more significance, Seasearch survey work undertaken in 2004 in Whiting Bay revealed a 4km expanse of, albeit patchy, sea grass bed. Whilst the scope of this report is restricted to Lamlash Bay, as more Seasearch information and photographs are gathered by COAST about the sublittoral environment around Arran, it cannot help but lead to a reappraisal of the importance of this corner of Scotland’s marine environment, not only on a Clyde Sea scale but on a Scotland, UK and European scale. The Whiting Bay records are particularly significant since it is estimated that on a UK scale sea grass beds are in ‘severe decline’ with

'more than 75% of the spatial extent (or density of key structural or key functional species) of the habitat lost' (Hiscock *et al*, 2005).

Although areas of seagrass are included in some coastal ASSIs/SSSIs, Ramsar sites, SPAs (under the EC Birds Directive), voluntary marine protected areas and two out of the three UK Marine Nature Reserves, the habitat is not explicitly listed in the European Habitats Directive (from [www.ukbap.org.uk](http://www.ukbap.org.uk)). It is included in a number of areas proposed as European Special Areas of Conservation under categories such as sandbanks, estuaries, lagoons and large shallow inlets and bays. Sea grass is not currently listed on the Ayrshire Coastal and Marine Habitat Action Plan but COAST hope that the Seasearch records from Whiting Bay merit inclusion of this vulnerable habitat on the Ayrshire HAP. Again, of perhaps greatest significance given the UK commitment to the OSPAR convention (see 3.3.1), *Zostera* (sea grass) beds were also added to the OSPAR list of threatened and/or declining species and habitats in summer 2004 (OSPAR, 2004).

COAST believe the conservation significance of Lamlash Bay on a Clyde Sea scale has already been demonstrated and, with the recording of sea grass in Whiting Bay and the spectacular shore and reefs off the southern tip of Arran, believe the marine conservation significance of the area extends even further round the Arran coast.

### 3.3.3 Commercial and other species in NTZ and Marine Protected Area

*"Reserves worldwide have led to increases in abundance, body size, biomass and reproductive output of exploited species"* (Roberts and Gell, 2004).

Whilst the first priority of the No-Take Zone is to protect the maerl beds from direct extractive impacts, a secondary and equally beneficial effect will be affording associated species such as scallops protection and an opportunity to recover. The Marine Protected Area will provide a buffer zone between the No-Take Zone and the full multi-use area outside Lamlash Bay, but will of course also afford protection to the benthic environment and mobile species such as scallops and fish.

At present, the shoreline on Holy Island is already a Voluntary Nature Reserve and the Clachland's Shore is proposed as a Local Nature Reserve. Potentially, any increase in marine fish and invertebrate life could also have knock-on benefits for the existing wild bird colonies on the shores of Lamlash Bay.

## 4. BENEFITS TO OTHER USERS

By protecting and ultimately regenerating marine life in Lamlash Bay, our own 'back yard', in addition to **reversing** the dramatic decline of finfish stocks in Lamlash Bay, COAST hope ultimately to:

- help **sustain** the livelihoods of those dependent on fishing and tourism
- **increase** the popularity of the area as both diving site and tourist destination
- **educate** future generations on the need for marine conservation

## 4.1 Fisheries

The benefits to fisheries of Marine Protected Areas has already been made at length in direct relation to Lamlash Bay (Howdon, 2004- see Appendix 2) and summarised in Table 1.

It is recognised that *'maintenance of ecosystem services to provide for human needs forms a separate objective for reserves, but will often overlap with conservation and fishery objectives'* (Roberts *et al*, 2003). Indeed, well-documented cases exist for many species spilling out of marine reserves into surrounding waters from over twelve countries worldwide (Roberts and Gell, 2004). 'Fishing-the-line' at the boundary allows fisheries to benefit from this overspill, most famously perhaps at the Cape Rodney to Okakari Point Marine Reserve at Leigh, New Zealand. Less well known but closer to home are anecdotal accounts of *Nephrops norvegicus* (Norway lobster or langoustine) fishermen catching more and larger animals along the boundary of the British Underwater Test and Evaluation Centre (BUTEC) in the Inner Sound between Applecross and Skye (Marine Conservation Society, 1998).

Compelling evidence also exists of the benefits of closed areas to scallop populations, ultimately of course benefiting the fisheries themselves. The results published by Bradshaw *et al* (2001) from Port Errin on the Isle of Man *"present strong evidence that scallop dredging alters benthic communities and suggest that the closure of areas to commercial dredging may...permit the populations of some species to increase."*

**Fig 8. COAST members at Clyde Fisheries Workshop.**



Following the Clyde Fisheries Workshop on 6-7 February 2004 (Ormond and Lart, 2004) it was agreed that *'a local approach to fisheries management and development would be desirable'*. It was agreed that a development strategy was needed for the area, implemented by a Project Officer who was steered by the Clyde Working Group. The strategy should contain the following elements:

- a better science base drawing on scientific and fishermen's data

- improved conservation and quality
- ultimately a marketing strategy based on conservation and quality

COAST believe establishing a No-Take Zone within a Marine Protected Area in Lamlash Bay would be a bold step towards 'improved conservation and quality' of scallop fisheries in the Clyde. We recognise that reserves are rarely adequate as stand alone marine management measures (Roberts and Gell, 2004) and consequently that the Marine Regeneration Trial in Lamlash Bay could only make a small contribution to sustainable fisheries management in the Clyde Sea. We do not have delusions of grandeur and are principally concerned with sustaining our own marine 'back yard'. However, the COAST proposal is one 'off-the-shelf' opportunity which, if married with other management measures, could help ensure that Clyde fisheries are conducted in an environmentally sustainable manner.

Effective Marine Spatial Planning is required to manage Clyde fisheries in truly sustainable manner. COAST would argue that a Clyde plan should include further No Take Zones and fishery restrictions in other parts of the Clyde, such as the sea lochs and the reefs off Sanda and Pladda. Of course, these are discussions that need to take place at length through the Clyde Fisheries Working Group, the Firth of Clyde Forum and the Sustainable Scottish Marine Environment Initiative Phase III Clyde pilot.

Marketing Clyde fish and shellfish as 'conservation-grade', 'environmentally sustainable' or equivalent requires a commitment by the respective fisheries to introduce and adhere to appropriate conservation measures, including protection of important features such as the Lamlash Bay maerl and setting up regeneration areas for commercial species such as scallops. In such a fisheries management context, the COAST proposal provides a significant opportunity for both shellfisheries and marine conservation.

#### **4.2 Tourism and associated socio-economic benefits**

Tourism plays a major part in the Islands economy. COAST has undertaken extensive public consultation and worked closely with the Arran Tourist Office on the Arran Marine Regeneration Trial promotional video. It is anticipated that the publicity generated by the COAST Trial will lead to considerable tourist interest, weaving yet another strand into the Arran eco-tourism experience. Based on examples in New Zealand (C Cocklin and S Flood,) when the Trial is fully promoted it is envisaged that there will be at least a 3% increase in island tourism from extra visitors and SCUBA divers. This could give an annual increase of £580,000 to the islands economy.

COAST is also in discussion with the Conservation & Development in Sparsely Populated Areas project (CADISPA) at Strathclyde University and the Firth of Clyde Forum to commission a report on the possible socio-economic benefits of Marine Protected Areas to the Clyde area.

#### **4.3 Education**

COAST have been giving Presentations to local organisations, local school children, visiting school children and local and visiting outdoor recreational groups. North Ayrshire Council's Arran Education Resource asked COAST to give presentations on marine life, especially maerl, to their visiting pupils. This has been done every week since September 2004. We found them to be well received [see correspondence]. All were delivered without cost, by members of our committee. Last year COAST presented to over 1,300 members of the public.

### **5. ACTION PLAN**

## **5.1 Arran Marine Regeneration Trial**

COAST feel, given the fragility and Clyde-wide importance of the local maerl beds and the loss to the local economy from the collapse of the Arran sea-angling festival, that a legislative solution is most appropriate for ensuring the success of the Arran Marine Regeneration Trial. We understand that appropriate measures can be put in place under the Inshore Fishing (Scotland) Act 1984 and urge that the Trial be implemented immediately. Once the Trial is underway it would be reviewed periodically with a final conclusion about its viability after 10 years (see Table 8)

## **5.2 Monitoring**

Once instigated, the Arran Marine Regeneration Trial will be monitored locally by COAST and externally in partnership with scientific academic bodies. COAST is in discussion with the Port Erin Marine Laboratory and Lundy Marine Reserve No Take Zone initiatives to adopt best-practice methodology for establishing and monitoring their marine protected areas (Appendix 6). COAST divers will continue to conduct baseline Seasearch surveys, as they have done successfully to date, and, if suitable funding is found, UMBSM will conduct more detailed baseline and monitoring work based on the experiences of Port Erin and Lundy. All data and methodology adopted by COAST will be available to all. Enforcement will be helped by:

- Signage and public notices
- Local community 'Shore Reporting Hotline'
- Scottish Fisheries Protection Agency.
- Satellite Tracking Systems on fishing boats
- Communal agreement among the fishermen.

**Table 8. Suggested Action Plan for the COAST Arran Marine Regeneration Trial, associated outreach and monitoring.**

Key for action timeline: **COMPLETED**; **PRIORITY 1**; **PRIORITY 2**

Work area	Lead	Action	Year (2000-1014)															
			00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	
Outreach	COAST	Consult local fishermen/stakeholders	COMPLETED	COMPLETED	COMPLETED	COMPLETED	COMPLETED	PRIORITY 1	PRIORITY 2									
		Deliver talks to local schools and other interests				COMPLETED	COMPLETED	PRIORITY 1	PRIORITY 2									
		Produce and show promotional video					COMPLETED	PRIORITY 2										
		Produce calendar and sign boards for shore						PRIORITY 1	PRIORITY 1	PRIORITY 2								
Baseline surveying and initial monitoring	COAST	Seasearch Observer Training				COMPLETED	COMPLETED	PRIORITY 1	PRIORITY 2									
		Seasearch Observation survey of Lamlash Bay				COMPLETED	COMPLETED	PRIORITY 1	PRIORITY 2									
	UMBSM	Sidescan sonar mapping of Lamlash Bay					COMPLETED	PRIORITY 2										
		Comparative meiofaunal analysis of maerl deposits in Lamlash Bay					COMPLETED	PRIORITY 2										
		Complete baseline survey of Lamlash Bay with SCUBA transects						PRIORITY 1	PRIORITY 2									
		Report on baseline survey of Lamlash Bay						PRIORITY 1	PRIORITY 2									
Repeat monitoring at key sites after 2 years									PRIORITY 1	PRIORITY 2								
Ayrshire Coastal and Marine HAP	COAST	Maerl on Ayrshire Coastal and Marine HAP				COMPLETED	PRIORITY 2											
		Seagrass on Ayrshire Coastal and Marine HAP						PRIORITY 1	PRIORITY 2									
	Ayrshire HAP	COAST work with SSMEI, Scottish Executive, SNH to fulfil BAP/LBAP for maerl and seagrass						PRIORITY 1	PRIORITY 1	PRIORITY 1	PRIORITY 2							
COAST SNH	Discuss future marine conservation designations for south Arran eg. SAC								PRIORITY 2									
Arran Marine Regeneration Trial	COAST	Agreement reached to instigate Arran Marine Regeneration Trial						PRIORITY 1	PRIORITY 2									
		Input to fisheries development strategy for the Firth of Clyde via the Clyde Working Group						PRIORITY 1	PRIORITY 2									
		'Shore Reporting hotline' / SFPA monitoring								PRIORITY 2								
		All Trial data and conclusions publicly posted on COAST website as they become available ( <a href="http://www.arrancoast.co.uk">www.arrancoast.co.uk</a> )									PRIORITY 2	PRIORITY 1						
	Various	Seek further funding for COAST/UMBSM/SNH to monitor Arran Regeneration Trial									PRIORITY 1	PRIORITY 2						

### 5.3 Funding

Until February 2003 the COAST campaign was funded with committee members own money. In March 2003 COAST was awarded a grant of £3500 from Awards for All (National Lottery Fund) which was used to finance public meetings, exhibitions, travel expenses, stationery, printing and other 'set up' costs. In October 2003, Scottish Natural Heritage also awarded COAST £2000.

Esmee Fairbairn Foundation awarded £5000 in 2004 for production of interpretive on shore sign boards and a promotional video and to fund formal/informal meetings with fishermen/stakeholders (see Table 9). In 2005, MCS, WWF Scotland, NTS and RPSB Scotland all contributed £200 each towards production of a calendar promoting the marine

**Table 9. Details of Esmee Fairbairn Funding of COAST and UMBSM for 2004-2006**

Awarded to	Aim	Breakdown	Projected Cost	Total
COAST	Interpretive sign boards on shore		£1500	£5000
	Promotional video		£1500	
	Meetings with fishermen/stakeholders		£2000	
UMBSM	Research vessel survey using sidescan sonar and video sledge to develop 3D map of Lamash Bay	3 days vessel hire and 2 days data analysis	£5000	£10,000
		SCUBA baseline survey of key habitat zones	£2500	
		Taxonomic study of invertebrate samples from maerl	£1000	
	Repeat survey monitoring of selected sites after 2 years	3 days/4 divers	£1500	
			<b>TOTAL</b>	<b>£15,000</b>

### CONCLUSION

COAST believe that the proposal we have outlined is an 'off-the-shelf' opportunity which, when married with other sensible management measures, could help towards maerl and seagrass BAP targets; contribute to Clyde fisheries being conducted in an environmentally sustainable manner and; help fulfill current UK, and therefore Scottish, commitments and recommendations to establish a network of Marine Protected Areas.

There is an overwhelming desire by a significant proportion of the Arran population, represented by COAST (1350 members), to see the proposed No-Take Zone, Marine Protected Area and monitoring programme implemented. We look forward to working closely with all stakeholders to help achieve our vision and, in our modest way, contribute to a sustainable future for the Firth of Clyde.

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## ACKNOWLEDGEMENTS

COAST wish to acknowledge the help they had from their many friends and like minded people who have helped in putting this Proposal together, especially Calum Duncan, Scottish Officer for the Marine Conservation Society. COAST is part funded by Scottish Natural Heritage, the Esmee Fairburn Foundation and the Director General, Fish, at the European Union, Brussels.

**Fig 9**

### Species in Lamlash Bay



## APPENDIX 1

COAST has consulted with the following:

- The community of Arran and visitors to Arran
- Arran based commercial fishermen and local anglers
- North Ayrshire Council
- Local Community Council and the Arran Improvements Association
- Scottish Executive, Inshore Fisheries (SEERAD)
- Clyde Fishermen's Association
- Clyde and South West Static Gear Association
- The Arran Sea Anglers Association
- Holy Isle owners
- Marine Conservation Society, specifically Calum Duncan
- Other members of Scottish Environment LINK: RSPB Scotland, WWF Scotland, National Trust for Scotland, Scottish Wildlife Trust
- University Marine Biological Station Millport
- Scottish Natural Heritage
- H.R.H. Prince Charles, The Prince of Wales
- Allan Wilson and Campbell Martin, Rob Gibson (local MSPs), Brian Wilson (MP), and Elspeth Attwooll (MEP)
- Dr. Hall-Spencer [an authority on Maerl]
- Dr Ken Collins, Southampton University (an authority on artificial reefs)
- Prof. Callum Roberts, York University (a leading authority on No Take Zones)
- Members of the Esmee Fairbairn Trust
- The Director General, Fish, EU, Brussels
- Port Erin Marine Laboratory, University of Liverpool
- Tom Howden, Kings College, London
- The Team at the Lundy Isle Project.
- The Strategy Unit, The Cabinet Office, Admiralty Arch, The Mall, London.
- Philippa Hoskin, Marine Development Officer, Cornwall County Council
- Scottish Environment Protection Agency
- Scottish Water
- Charles Clover, Author of "The End of the Line".
- The Arran Tourist Office
- All other stakeholders in Lamlash Bay.



## APPENDIX 2

# The Arran Marine Regeneration Trial: the mechanisms and evidence of fisheries benefits to Marine Protected Areas.



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## APPENDIX 3

### Relevant Scottish and UK marine conservation commitments

2004 *Turning the Tide – Addressing the Impact of Fisheries on the Marine Environment*. Report by the Royal Commission on Environmental Pollution. RCEP recommend that 30% of the UK EEZ is established as marine reserves and closed to commercial fishing.

2004 *Review of Marine Nature Conservation*

**Recommendation 8:** an ecologically-coherent and representative network of marine protected areas should be identified and established, and appropriate and proportionate measures applied to ensure their conservation needs are met.

2004 *Net Benefits: A sustainable and profitable future for UK fishing*

(Report by Prime Ministers Strategy Unit)

**Recommendation 31:** The UK Government and devolved administrations should develop an experimental programme of Marine Protected Areas focusing initially on areas which provide benefits to multiple users (commercial fishermen, tourism, environment, recreational fishermen etc).

2004 Draft *Scottish Biodiversity Strategy Marine Plan*.

Action Point 3.2 Consider the role of and need for marine protected areas in Scotland – including marine National Parks, Natura sites and measures to safeguard nationally & internationally important sites and species.

2004 Greenpeace. *Rescuing the North and Baltic Seas: Marine Reserves – a key tool*.

Proposal constitutes more than 40% of the total sea area.

2004 *Scottish Coastal Forum Strategy for Scotland's Coasts and Seas:*

'Develop a suite of marine protected areas for Scotland building on current work in this field.'  
(*Annex 1 Section 8.6.5 Bullet point 4*)

2002 *Natural Heritage Futures 'Coasts and Seas'* by Scottish Natural Heritage

Medium-term commitment to 'Safeguard up to 15% of the sea and coast within areas of special care and protection'.

2002 *Bergen Declaration 5<sup>th</sup> North Sea Conference & 2003 OSPAR commission*

UK commitment to ensure the protection of whole ecosystems, establishing marine spatial planning and a network of **marine protected areas** throughout the North Sea & NE Atlantic respectively by 2010.

2002 *World Summit on Sustainable Development*

UK commitment to establish representative networks of **marine protected areas** by 2012 and to restore fish stocks by 2015.

2002 DEFRA Marine Stewardship Report 'Safeguarding our Seas', states 'Our vision for the marine environment is clean healthy safe productive and biologically diverse oceans and seas. Within one generation we want to have made a real difference'

## APPENDIX 4

### LIST OF SITES SURVEYED DURING SEASEARCH 2003

**Key: Seabed Types:** **R** – rocky reef; **B** – boulders; **C** – cobbles; **MG** – mixed ground; **S** – sand; **M** – mud; **W** – wreckage; **O** – other

**Cover types:** **KF** – kelp forest; **KP** – kelp park; **MS** – mixed seaweeds; **EPA** – encrusting pink algae; **SAT** – short animal turf; **TAT** – tall animal turf; **ABB** – animal bed brittlestars; **ABM** – animal bed mussels; **ABS** – animal bed scallops; **SLA** – sediment with life apparent; **BS** – barren sediment

Site No.	Date	Site Name	Divers	Depth (m bcd)		Latitude	Longitude	Seabed Type	Seabed Cover Type
				Min	Max				
1	04/08/03	Clauchlands point	Don MacNeish Howard Wood	1.5	11.4	55°32.750 N	5°5.500 W	C; MG	KP; MS; EPA; SAT; TAT; ABS; SLA
2	26/06/03	Shore Road/Oakbank	Don MacNeish Howard Wood	1.9	5.6	55°32.450 N	5°6.100 W	S; M	KP; MS; SAT; SLA
3	31/08/03	Clauchlands No-Take	Don MacNeish Frank Law	5.6	11.6	55°32.800 N	5°4.840 W	B; C; S; M	KF; KP; MS; EPA; SAT; TAT; ABM; ABB; ABS; SLA; BS
4	04/08/03	Clauchlands red buoy (South)	Don MacNeish Frank Law	2.5	12.8	55°32.400 N	5°4.850 W	R; S; O (Maerl)	KP; MS; EPA; SAT; TAT; SLA
5	25/06/03	Clauchlands red buoy (North)	Don MacNeish Howard Wood	3.5	10.4	55°32.800 N	5°4.980 W	B; C; S; M	KF; KP; MS; EPA; SAT; TAT; ABM; ABB; ABS; SLA; BS
6	15/07/03	Deacon Rock	Howard Wood Martin Wood	7.3	14.6	55°31.950 N	5°5.900 W	R; B; <u>MG</u> ; S	KP; MS; SAT; TAT; ABB; ABS; SLA
7	03/08/03	Clauchlands Maerl Bed	Don MacNeish Howard Wood	5.2	9.5	55°32.700 N	5°4.950 W	B; <u>O (Maerl)</u>	KP; ABS; SLA
8	21/09/03	North Channel Buoy	Angus Robson John Ferris	7.4	10.1	55°32.620 N	5°4.700 W	MG	SAT; ABS; SLA
9	20/08/03	St Molios North	John Ferris Karl Amos	+0.5	16.6	55°31.950 N	5°5.400 W	MG	KP; 0MS; EPA; SAT
10	21/09/03	St Molios North	Angus Robson Sean Ferris	5.7	15.8	55°32.100 N	5°5.340 W	MG; S	KP; TAT; ABS
11	14/06/03	Hamilton Rock West	Howard Wood John Ferris	3	7.4	55°32.600 N	5°4.810 W	B; <u>MG</u>	KF; MS; SAT; TAT

Site No.	Date	Site Name	Divers	Depth (m bcd)		Latitude	Longitude		Seabed Type
				Min.	Max.				
12	10/09/03	The Edge	John Ferris Sean Ferris	4	25.8	55°31.485 N	5°5.190 W	B; C; S	MS; SAT; TAT; ABS
13	08/06/03	O2 Lamlash	Angus Robson Sean Ferris	0.1	9.2	55°32.700 N	5°5.030 W	C; S	KF; KP; MS; R; R; O
14	11/08/03	Gurnard Bay	Sean Ferris	3.2	13.6	55°32.187 N	5°5.291 W	B; S; W	KF; KP; ABS
15	11/08/03	Gurnard Bay 2	John Ferris Karl Amos	1.2	14	55°32.202 N	5°5.237 W	B; <u>S</u> ; M	KP; MS; EPA; SAT; SLA
16	10/08/03	Maerl Bank North of Holy isle	Howard Wood Martin Wood	8.2	13.8	55°32.500 N	5°4.800 W	B; <u>O (Maerl)</u>	SAT; ABS; SLA
17	16/09/03	South Channel Bay	Sean Ferris	7.2	26	55°30.660 N	5°4.512 W	MG; S	SAT; TAT; ABB; ABS
18	31/08/03	Fish Farm Cages	Angus Robson John Ferris	11.7	18.8	55°31.023 N	5°6.113 W	R; O (rubbish)	SAT; SLA
19	25/07/03	Ledges behind fish farm	Howard Wood	1.9	18.9	55°31.050 N	5°6.100 W	R; B; C; <u>MG</u> ; M	KP; MS; EPA; SAT
20	10/08/03	Fullarton Rock	Howard Wood John Ferris	3.3	17.6	55°30.520 N	5°4.600 W	<u>R</u> ; M	KF; KP; MS; EPA; SAT; TAT; ABS; SLA
21	13/09/03	Fish Farm 2	Sean Ferris	3	18.3	55°30.970 N	5°5.927 W	B; MG; S	MS; SAT

## APPENDIX 5

### SEASEARCH LAMLASH BAY 2003 SPECIES LIST

MCS Code Letter No.	Taxon	Common Name	Site Nos.
<b>Porifera</b>			
C 1	<i>Porifera indet.</i>	Sponges	1, 3, 5, 16
<b>Cnidaria</b>			
D 58	<i>Hydrozoa</i>	Hydroids indet.	1, 2, 4, 5, 6, 20
D 463	<i>Nemertesia antennina</i>	Antennae hydroid	16
D 583	<i>Anthozoa</i>	Anemones indet.	8,9,11
D 597	<i>Alcyonium digitatum</i>	Dead Men's Fingers	20
D 632	<i>Cerianthus lloydii</i>	Burrowing anemone	1, 3, 4, 5, 7, 16, 18
D 679	<i>Anemonia viridis</i>	Snakelocks anemone	19
D 710	<i>Metridium senile</i>	Plumose anemone	20
D 743	<i>Adamsia carciniopados</i>	Cloak anemone	1,3,4,5,16
D 783	<i>Caryophyllia smithii</i>	Devonshire Cup Coral	6, 20
<b>Nemertea</b>			
G 26	<i>Tubulanus</i>	Football jersey worm	6, 10
<b>Annelida</b>			
P 18	<i>Aphrodite aculeata</i>	Sea Mouse	16
P 1195	<i>Lanice conchilega</i>	Sandmason	9, 15, 18
P 1256	<i>Sabellida</i>	Tube worm indet.	8, 9
P 1320	<i>Sabella pavonina</i>	Peacock worm	9, 15, 18
<b>Crustacea</b>			
S 1400	<i>Homarus gammarus</i>	European lobster	9, 15, 18, 19, 21
S 1445	<i>Paguridae</i>	Hermit crabs indet.	1, 2, 3, 4, 5, 6, 8, 9, 15, 16
S 1462	<i>Pagurus prideaux</i>		1
S 1469	<i>Galatheidae</i>	Squat Lobsters indet.	6, 16, 17, 19, 20
S 1511	<i>Majoidea</i>	Spider crabs indet.	1, 3, 4, 5, 8, 13, 16
S 1566	<i>Cancer pagurus</i>	Edible crab	4, 7, 8, 9, 18, 19, 20
S 1573	<i>Polybiinae</i>	Swimming crab indet.	5, 6, 7, 16, 19
S 1580	<i>Liocarcinus depurator</i>	Swimming crab	3
S 1589	<i>Necora puber</i>	Velvet swimming crab	20
<b>Mollusca</b>			
W 1243	<i>Nudibranchia</i>	Sea-slugs indet.	13
W 1320	<i>Onchidoris indet</i>	Sea lemon indet.	6
W 1691	<i>Mytilidae</i>	Mussels indet.	3, 5
W 1768	<i>Pectinidae</i>	Scallops indet.	1, 2, 3, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 20
W 1996	<i>Ensis</i>	Razor shell	1, 2
W 2398	<i>Eledone cirrhosa</i>	Curled Octopus	18
<b>Bryozoa</b>			
Y 170	<i>Membranipora membranacea</i>	Sea mat	7
<b>Echinodermata</b>			
ZB 8	<i>Antedonidae</i>	Featherstars	7,16
ZB 18	<i>Asteroidea</i>	Starfish indet.	17
ZB 22	<i>Luidia ciliaris</i>	Seven arm starfish	6, 16
ZB 26	<i>Astropecten irregularis</i>	Sand star	1, 2, 3, 4, 5

ZB	54	<i>Porania pulvillus</i>	Red cushion star	8, 9, 11, 16
<b>MCS Code</b>		<b>Taxon</b>	<b>Common Name</b>	<b>Site Nos.</b>
<b>Letter</b>	<b>No.</b>			
ZB	75	<i>Crossaster papposus</i>	Common sunstar	5, 8, 9, 11
ZB	100	<i>Asterias rubens</i>	Common starfish	8, 9, 11, 15
ZB	115	<i>Ophiurida</i>	Brittlestar indet.	3, 5, 6, 11, 17
ZB	198	<i>Echinus esculentus</i>	Common Urchin	4, 20
<b>Tunicata</b>				
ZD	2	<i>Asciacea</i>	Sea-squirts indet.	6, 9, 10, 19, 20
ZD	7	<i>Clavelina lepadiformis</i>	Light bulb sea-squirt	3, 4, 6, 16
ZD	84	<i>Asciella aspersa</i>		16
<b>Pisces</b>				
ZF	28	<i>Scyliorhinus canicula</i>	Dogfish	1, 3, 5, 7, 9, 11, 17
ZG	17	<i>Conger conger</i>	Conger eel	6, 18, 19
ZG	129	<i>Molva molva</i>	Ling	19
ZG	134	<i>Pollachius</i>	Pollack or Saithe indet.	18
ZG	135	<i>Pollachius pollachius</i>	Pollack	9, 20
ZG	136	<i>Pollachius virens</i>	Saithe	20
ZG	235	<i>Syngnathidae</i>	Pipefish indet.	21
ZG	260	<i>Triglidae</i>	Gurnard indet.	10
ZG	273	<i>Cottidae</i>	Scorpion fish indet.	7, 11, 12
ZG	390	<i>Centrolabrus exoletus</i>	Rock Cook	9, 18
ZG	399	<i>Labrus bergylta</i>	Ballan wrasse	6, 7, 9, 15, 18, 19, 20
ZG	400	<i>Labrus mixtus</i>	Cuckoo wrasse	18, 19, 20
ZG	440	<i>Pholis gunnellus</i>	Butterfish	7
ZG	451	<i>Callionymus</i>	Dragonet	6, 7, 16
ZG	455	<i>Gobiidae</i>	Gobies indet.	11
ZG	470	<i>Gobiusculus flavescens</i>	Two spot goby	7, 20
ZG	483	<i>Thorogobius ephippiatus</i>	Leopard-spotted goby	6, 9, 20
ZG	545	<i>Pleuronectiformes</i>	Flatfish indet.	10, 13, 14, 15, 17, 21
ZG	578	<i>Pleuronectes platessa</i>	Plaice	6
			Indet. fish fry	8, 12, 14
<b>Rhodophycota</b>				
ZM	1	<i>Rhodophycota</i>	Mixed red algae indet.	1, 2, 3, 5, 6, 8, 11, 12
ZM	252	<i>Phymatolithon</i>	Maerl	1, 2, 3, 4, 5, 7, 11, 13, 16
<b>Chromophycota</b>				
ZR	338	<i>Laminariales</i>	Kelp indet.	2, 4, 7, 9, 10, 11, 13, 14, 15, 19, 20
ZR	344	<i>Chordaceae</i>	Sea-whip	1, 2, 4, 5, 14
ZR	354	<i>Laminaria saccharina</i>	Sugar kelp	1, 3, 4, 5, 6, 7
ZR	373	<i>Fucaceae</i>	Wracks indet.	1, 2, 3, 4, 5
<b>Angiosperma</b>				
		<i>Zostera</i>	Eel grass	2

## **APPENDIX 6**

### **Seasearch Lamlash Bay 2003 Summary Report**

**Attached as a separate document**

## **APPENDIX 7**

### **Port Erin Marine Laboratory Report**

#### **'Benefits of a Closed Area for Scallops'**

**Attached as a separate document**