



NORTH BERWICK LOBSTER HATCHERY

FEASIBILITY STUDY

Final Report Executive Summary

By

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In Association with

**Green Blue Fish Ltd and
Simpson and Brown Architects**



This project is being part financed by the Scottish Government, East Lothian Council and the European Community Tyne-Esk LEADER 2007-2013 programme.

October 2009



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EXECUTIVE SUMMARY

Introduction

This report presents a feasibility study to consider the potential for developing a lobster hatchery in North Berwick. The study was commissioned by the Scottish Seabird Centre following representation from the local community, with the support of East Lothian Council, the Leader Programme and the Scottish Government. The study was developed by Jura Consultants, in association with Green Blue Fish Ltd and Simpson and Brown Architects.

Lobster Hatchery Benefits

The development of a lobster hatchery would potentially provide benefits at a local and national level including:

- Maintaining a healthy lobster population – A large female lobster can produce approximately 20,000 eggs. In the wild, a very small number of the juvenile lobsters would survive the first 2 weeks. It is thought that only 1 in 20,000 juveniles will survive to maturity. In a lobster hatchery, over 40% of the young can be expected to survive. This would also therefore help to sustain the local lobster fishery.
- Increasing conservation through improved public knowledge and understanding – The lobster hatchery can also provide a unique opportunity for the public to view the rearing process and creates an educational resource about lobsters, other sea life, as well as marine conservation and sustainability.
- Improving hatchery and industry standards – Having links with further and higher education institutions opens up the possibility of engaging in research on important topics such as disease control and immunology, habitat conservation and recreation, lobster catch policies, and innovative rearing technologies. Research is then fed back into the industry and helps to strengthen lobster fishing in both Scotland and the UK. Additionally, facilities working to a high level of quality can become accredited for their work and subsequently contribute to increasing overall fishing industry and food retail standards.
- Providing an educational and research resource – As well as creating an educational resource about lobsters, sea life, marine conservation and sustainability, the facility also has the potential to provide a research element. Links with schools, colleges and universities are possible to further education and foster good citizenship of the marine environment.

- Boosting sustainable tourism – the facility will encourage sustainable development through tourism, achieving growth in a way which will benefit the natural environment and will support economic and social development. Visitors will benefit from a sustainable approach to tourism through better links with the local community, a high quality tourism experience and a natural environment that is cared for.
- Increasing jobs and visitor spend in the area – the new facility will result in the creation of new jobs (those on site within the new hatchery and off site e.g. more local fishermen becoming involved in lobster fishing). The facility will increase dwell time in the area and encouraging greater levels of spend in the surrounding area.
- Supporting local speciality restaurants and food retailers – sustaining and increasing the local lobster population will result in longer term benefits for local seafood restaurants and food retailers by providing a source of high quality local lobsters.

Scottish Lobster Fishing

The European lobster has been fished in Scotland since the 12th century and is an important species for the Scottish fishing industry. The 3 most important Scottish centres for lobster fishing are the Hebrides, Orkney, and the south east coast (Pittenweem and Eyemouth). North Berwick is associated with the landing district of Eyemouth, but is located between Eyemouth and Pittenweem on the south east coast.

In the Eyemouth district, the most landed and valuable shellfish species is nephrops (langoustine) at 1,835 tonnes worth £4.7 million in 2007. The next most valuable species in this period is lobster at just over £1 million, although recorded landings are lower than scallops and velvet crabs. The same is true of Pittenweem. Landings for lobster in Eyemouth have been historically low from 2001 to 2005 recorded at less than 20 tonnes. In 2006 and 2007, however, landings have seen a significant increase to 73 and 98 tonnes. The same trend is seen for Pittenweem. This south east area, therefore, ranks 3rd overall in terms lobster landings with a combined 182 tonnes (20% of total Scottish lobster landings) and a value of almost £2 million. With lobster populations in the region unknown, it is difficult to judge how long the area will be able to sustain this heightened level of fishing.

Lobster Hatchery Operations

Lobster hatcheries work to sustain local off-shore lobster populations by rearing lobsters from egg to a juvenile stage in captivity, before releasing them back into the water to grow and develop. Local fishermen bring the berried hens (pregnant female lobsters) they have caught into the hatchery. The female lobster will be kept until the eggs hatch, giving them a chance to release their delicate offspring in captivity, where there are no predators. Hatched larvae are then transferred to special rearing tanks where they are fed on plankton and are reared for 2-3 months until they reach a reasonable size for release. They are then taken

to carefully selected sites around the coast where they have the best chance of survival and released back into the wild. It takes approximately 5 to 7 years for the juvenile lobsters to reach maturity and an adequate size for fishermen to land.

Strategic Review

A number of relevant strategies and policies were reviewed including those relating to tourism, planning, education, biodiversity and marine legislation. It was determined that the proposed lobster hatchery address a number of the strategies, policies and plans affecting the Forth Estuary, the Lothians and Fife. Also, there is a natural fit with the charitable aims of the Scottish Seabird Centre and its role in promoting interest and involvement in the marine environment.

Consultation

Feedback on the proposed lobster hatchery has been channelled through interviews, a public forum and questionnaires and received input from a variety of groups and individuals including fishermen, local businesses, local residents, local authority officials, general visitors and education providers. Feedback on the whole was very positive regarding the development of a lobster hatchery in North Berwick. Respondents recognised that it was a unique idea and that the SSC would be well placed to develop the project. A distinct rationale could be seen for this approach, primarily its advantageous location in the harbour area, economies of scale by sharing resources, its reputation and propensity to attract visitors, and its ability to secure funding. Benefits for North Berwick were observed by the respondents who cited the improvement to the town's tourism offer, the attraction of more visitors and the potential to increase the time existing visitors spent in North Berwick, the sustainability of the lobster population, and improving the area's fishing industry, education, and employment.

The operation of a lobster hatchery was frequently misunderstood with comparisons drawn with salmon farms with the associated infrastructure and the keeping of stock until it had matured. When the concept was explained that the hatchery would be housed in a building and the lobsters released as juveniles some months old to mature in the wild, respondents were more interested in the concept as a tourism and an environmental project. However many questioned whether lobster populations in the area were low and the subsequent effect on the ecosystem of adding a further 20,000 – 40,000 lobsters to the local waters.

The consensus was that a lobster hatchery would be most appropriately located in the harbour area, preferably adjacent to the SSC, with the following facilities;

- A range of sea creatures such as crabs, fish, oysters, langoustine etc. in addition to lobsters
- Viewing tanks and viewing windows to operations
- Remote cameras – 'Lobster Cam'
- Interactive and hands-on exhibits

- Aquarium exhibits to illustrate underwater habitats
- Lobster release programme
- Research/educational facilities

Feedback from higher education institutions with marine biology programmes produced great support for the concept. Three institutions showed an interest in involvement and collaboration through research, teaching and student projects. There were several areas of study mentioned, including disease control and immunology, the reintroduction of native oysters to develop suitable release sites, creation of new and sustainable habitats, and population monitoring.

Technical Appraisal

Anecdotal evidence from local fishermen shows that the lobster fishing industry on the east coast at present is relatively healthy even with the considerable fishing effort particularly to the south of the Forth. However, a good supply of lobster should not be considered a reason to discount the additional recruitment to that fishery provided by a hatchery.

It was recommended that the proposed hatchery consider Marine Stewardship Council (MSC) accreditation. A hatchery in North Berwick could achieve wider benefit to the overall lobster industry in the region as it could help achieve standards and certification showing that the fishery is sustainable and managed effectively. As a result, the product may command a greater price through traceability and marketing of the lobsters caught locally.

To check the suitability of the raw seawater available at North Berwick a sample was collected and compared against recommended parameters for the culture of larval lobsters. The sample was collected near high tide from a point behind the Seabird Centre cafe deck at the point suggested for the seawater intake pipeline. On site analysis was carried out using a Hanna instruments 9828 multi parameter probe for Temperature, pH, Redox potential, Salinity, Total Dissolved Solids and Oxygen. A sample was also collected for later analysis for Ammonia, Nitrate, Nitrite and Phosphate using a Hanna C200 Spectrometer. The results indicated that the seawater available at North Berwick is of good quality and suitable for use to supply the needs of the hatchery. Due to the exposed nature of the site and the absence of any major rivers at this point it was suggested that the water quality here should be adequate all year round other than when sand and particulates are stirred up in the water during rough weather, these can be filtered on the intake line. These parameters will of course change when the water is in the hatchery and holding livestock and as such a correctly designed and operated filtration system is required to maintain the recommended water parameters. The only concerns regarding the use of seawater from North Berwick in the hatchery would be that the supply is not taken from inside or close to the harbour area as this could be contaminated with oil etc from the boats operating there.

Releases from U.K hatcheries are generally in the region of 16,000 to 60,000 per year, with the main limiting factor being labour and space for the individual culture cells for the juveniles within the hatchery. The aim of the proposed North Berwick lobster hatchery is to release between 20,000 – 40,000 juvenile lobsters every year back into the North Sea. It is felt that this is an achievable target.

As larval hatching takes place between April/May through to September, depending on location, a lobster hatchery is normally empty for several months (November to March) of the year after the last juveniles are released and before the next seasons berried females are available. Solutions put forward included maintenance of a captive broodstock of lobster which can be conditioned by photoperiod and temperature control to reproduce out of season and multi-species production. It was felt that multi-species production provided another opportunity which may also increase the chances of MSC accreditation, as well as receiving funding through various sources. It is considered that brown crab and nephrops (langoustine) would be the most suitable in this respect.

It was suggested that the proposed hatchery in North Berwick rear juvenile lobsters to at least stage IV and should release them on suitable seabed habitat in an area from Arbroath in the north to Berwick upon Tweed in the south. Preferred release techniques included the low tide shore release onto suitable habitat and the timed release from the containers, although it is felt that adult lobster landing grounds are not necessarily the most suitable habitat for the juveniles.

Facility requirements recommended the use of the Aquahive system to ensure high production levels for the limited floor area available. Where possible, energy efficient pumps should be used to reduce electricity usage for the 24-hour operation of the facility. A number of aquarium exhibits topics were also suggested including the 3 stages of lobster rearing, native shellfish and crustaceans, sand eels and native fish. A holding system for use by the local fishermen was also thought to be a great benefit to the fishermen and to the hatchery. This suggestion was made by local fishermen during the consultation process.

Site Options

A long list of five options was considered by the study team in response to feedback from stakeholders and consultation with the public. The following site options were developed following the initial strategic review, market review and consultations:

- Option 1: Do minimum - Incorporate within SSC (“The Flyway” & “Environment Zone”/Harbour Cafe)
- Option 2: Develop Changing Rooms (North SSC)
- Option 3: (a) Develop Changing Rooms & (b) Pump Room (West SSC)
- Option 4: East Beach Water Treatment Works
- Option 5: Develop Area to the North East SSC

Visitor Facilities

The following facilities are recommended to support use of the lobster hatchery by visitors, education groups and researchers.

- Welcome/reception area: This area will provide orientation to the facility and introductory information about lobsters and operations (i.e. life cycle, population, how the facility works). For a co-located option this can be achieved through simple interpretation, for a stand alone option this area may require a member of staff to issue/check tickets.
- Exhibition area: A range of exhibitions would help visitors to engage with and understand the role and purpose of the lobster hatchery and its wider context. This area will be relatively simple such as a black box. Feedback has emphasised the desire for aquariums, hands-on activities and interpretation boards. Suggestions on aquarium exhibits were made in the technical report provided by Green Blue Fish Ltd.
- Education space: This area would provide a valuable resource for school groups making visitors to the facility. As per HLF guidance, minimum education space allocation per person should be 2.8m². For a class of 30 children, any space should be a minimum of 84m². The education space should have a visual connection with either the water or the hatchery operations.
- Toilets: Two sets of toilets would be required, although not at the same level of toilet provision in the main SSC building. 1) located near the education space and able to accommodate expected class size. 2) single unisex fully accessible toilet for staff use. Option 4, however, will require full toilet provision.
- Small office space: 2-3 desks and internet access for visiting researchers.
- Working area for researchers to kill, dissect and extract specimens: can be located within hatchery operations but should be as separate as possible from public area. Storage space should also be provided for equipment and specimen jars.
- Circulation: All options will require a single entry point. Due to site constraints Options 1,2 and 3 will likely have a linear circulation requiring a double capacity corridor to accommodate returning traffic. Option 4 and 5 may also require this unless a circular route is chosen for visitors.
- Retail and catering: Due to the proximity of the harbour options to the existing SSC buildings, it is anticipated that each facility will not require separate retail or catering facilities. Option 4, as a stand alone facility will require a full retail and catering provision.

Space Requirements

A total building size of approximately 350 m² has been estimated for the lobster hatchery based on the following required areas:

Area	Size - m ²	Comments
Education	84	Minimum education space allocation per person of 2.8m ² . For a class of 30 children, any space should be a minimum of 84m ² .
Reception		Co-located - Welcome and orientation interpretation Stand alone - May require a member of staff to issue/check tickets
Exhibition/interpretation	50-100	Relatively simple 'black box' space
Toilets		One toilet near the education space and one single unisex fully accessible toilet for staff use. Full provision for Option 4.
Office		With 2-3 desks for visiting researchers.
Hatchery operations	Broodstock 12, larval rearing 20, live food 9, juvenile rearing 25, plant & equipment 12, plus access to tanks Total 80-100	5 areas requiring; <ul style="list-style-type: none"> • 2 x Broodstock units -tanks 1.6m x 1m linked to filtration units 1m x 1m approx. • 8 x larval rearing tanks approx 1m x 0.8m or 14 x 0.6m diameter. • 3 or 4 juvenile tanks 1.4m x 2.4m (stacking system) or 8 - 3m x 0.8m (standard system)
Research room	10	As separate as possible from public area including storage space.
Keep tanks	20	3-4 separate keep tanks.
Circulation		All options - linear circulation requiring a double capacity corridor to accommodate returning traffic unless a circular route is chosen for visitors.
TOTAL SPACE	300-350	

Initial Options Assessment

Initial options were examined with a number of criteria and areas for consideration, which included:

- Location including proximity to fresh seawater
- Target number of juveniles for release
- Technical requirements for lobster hatchery operation
- Space requirements for the facility
- Facilities required for public use
- Potential number of visitors to the site

- Benefits or constraints of co-location or single site location
- Access arrangements
- Potential cost implications
- Potential impacts on the area and on existing operations

Option 1 provided clear opportunities, including minimal capital cost and synergies with the existing product portfolio. However, due to the limited space available, the displacement of existing facilities, disruption to operations, and the distance to pump fresh seawater this option was not favoured.

Option 2 and 3 presented opportunities in the form of existing infrastructure, and proximity to fresh seawater and the SSC. Serious consideration needed to be given to how the proposed developments might affect the dinghy park as it experienced high demand (100% occupancy) and produced an important income stream for the Harbour Trust. These buildings are also limited in size, aged and weathered, therefore upgrading would be necessary, expensive and could involve complete demolition. Scope for expansion therefore, is seriously constrained by the dinghy park and the need to maintain existing sightlines to the islands in the Firth of Forth. It was considered that Option 2 would experience considerable exposure to the sea and was located at the greatest distance from the SSC; Option 3, therefore, was viewed as the more favourable option. It was suggested that if Option 3 was to be developed, it should consider the potential for incorporating changing rooms into the development for harbour users.

Option 4 was considered, but was not favoured because it was too isolated with limited access, presented no economies of scale, was exposed to the elements, and would have a higher capital cost.

Option 5 presented the greatest opportunity for development as it would provide scope for an appropriately scaled development, would not impact on the esplanade area used as the dinghy park, would integrate with the SSC's current visitor flow and could combine with the SSC's existing facilities and staff.

Based on the initial assessment, two options were identified for detailed assessment as follows:

- Option 3: (a) Develop Changing Rooms & (b) Pump Room (West SSC)
- Options 5: Develop Area to the North East SSC

Assessment of the Preferred Options

Options 3 and 5 both demonstrated a number of opportunities and constraints for the development of the lobster hatchery. These options were considered based on the potential cost of construction, the impact on the existing land, the potential for integration with the SSC and the impact on the visitor experience.

Both options showed capability of accommodating the scale of building required to operate the lobster hatchery and provide visitor and education facilities, estimated to be 350m². Both options also benefit from

proximity to seawater and from their location in the harbour area, close to the existing SSC buildings. One of the key challenges which was presented by Option 3 is the potential impact on the dinghy park within the existing esplanade area. This area is soon to fall under the control of the North Berwick Harbour Trust and provides them with an important income stream. Option 5, however, does not create the same level of difficulties associated with the redevelopment of the buildings on the esplanade area under Option 3, although part of the area will fall under the control of the North Berwick Harbour Trust. The other challenge presented by Option 3 is the isolation of the building from the SSC. By operating the lobster hatchery in association with the SSC, accessible through a combined ticketing process, having a separate building may disrupt and confuse the overall visitor experience. Option 5 on the other hand, is integrated into and accessible from the existing SSC buildings. This offers a more seamless visitor experience, allows a more logical combined ticketing process, and has more potential to encourage longer duration of stay for visitors to the SSC.

As the opportunities presented by Option 5 appear stronger than those for Option 3, it was recommended that Option 5 is developed as the preferred site for the lobster hatchery. This recommendation is subject to further site analysis, costing, and testing of proposals through public consultation which should follow this feasibility study.

Capital Costs

The following table provides an indicative estimate of the capital costs for building a lobster hatchery in the harbour area of North Berwick. Projections are based on industry experience, technical requirements and the quality of materials and finishes used.

Activity	Cost
Construction Cost (350m ² @ £2,500/m ²)	£875,000
Preliminaries/ Contingencies/Fees	£406,875
Enclosed ramping	£100,000
Hatchery Costs	£170,400
Lobster storage	£28,800
Installation	£28,000
Interpretation/Education fit out	£165,000
Total	£1,774,075

Therefore the total capital investment required to build a lobster hatchery (excluding site acquisition) would be approximately £1.7 million. A lower level of capital investment could be achieved if the quality of the build was reduced from £2,500/m² to £1,800/m². With a lower quality build cost of £1,800/m² a total capital investment of £1.3m could be achieved. There are risks, however, with this option as the preferred site is

very exposed to the elements and the sea, causing a less robust building to deteriorate much faster. Also, careful consideration must be given to any build that is directly adjacent to the SSC as it must fit with the existing design in a cohesive manner.

Visitor Projections

Admission projections have been based on an increase in current paid visitor numbers by 15% in Year 1 (from 26,382 to 30,339), decreasing to 12% in Year 2 (33,980) and 10% in Year 3 (37,378). Subsequent years would plateau at 37,378 visitors per annum. Membership projections have been based on annual memberships (calculated from the SSC ticketing system for 2008) in Year 1, increasing by 5% per annum (from 3145) for the next 5 years.

Management and Staffing

Following the recommendations of the technical report, staff salaries and on costs have been calculated based on the employment of a minimum of 4.5 staff including a hatchery manager, 2 technicians and 1.5 FTE interpretation/education staff. Interpretation and education staff have not been included in the salary budget as it was felt that economies could be obtained through shared resources with the SSC such as current staff and the existing volunteer base. It was also thought that taking on research staff at the facility would be beneficial but that these positions would need to be undertaken on a voluntary basis or be funded through research grants.

Most importantly, it was felt that further development of the lobster hatchery project for North Berwick required a considerable amount of co-ordination and planning in terms of site acquisition, capital building, securing appropriate licences and planning permissions, fund raising, overseeing internal fit out etc. It was recommended that a project manager should be hired within the next 6 months (potentially funded by European Fisheries Fund or LIFE European Funding) to oversee the development of the lobster hatchery from planning, through construction until the facility has officially opened to the public and is running smoothly.

Impact Assessment

The potential economic impact of the lobster hatchery has been assessed, along with the potential total economic impact of the SSC and lobster hatchery combined. The impact assessment has identified the direct, indirect and induced impacts which may occur as a result of the lobster hatchery, based on both on site and off site expenditure. Economic impact estimates are based on the total for the first 5 years of operation at the facility.

Based on estimates of expenditure from the forecast visitors to the lobster hatchery, over a 5 year period the project has potential to contribute between £620,000 and £625,000 to the local economy. This could support

additional employment outside the facility of approximately 2.7 jobs, in addition to the 3 FTE staff posts employed at the facility. The overall local impact of the lobster hatchery, including the additional uplift to the SSC and the surrounding community, has been estimated at approximately £2.6 million over the first 5 years. This could support approximately 10.7 jobs in addition to 23 FTE staff posts currently employed at the SSC and equates to a contribution of approximately £520,000 per year into the local economy.