

An Assessment of the Socio– Economic Impact of the Sinking of HMS Scylla

**Report prepared for the South West Regional Development Agency
by the South West Economy Centre, University of Plymouth**

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Executive Summary

The aim of this study is to advise the South West Regional Development Agency (SWRDA) as to whether the economic and social benefits of placing HMS Scylla on the seabed in Whitsand Bay are sufficient to warrant their financial support for the project as proposed by ARC. The key points to emerge from the report are:

The ARC Budget Proposals

The costs of financing the project are likely to exceed the original budget projection due to an increase in the cost of purchasing HMS Scylla and other additional costs.

The costs of several key elements of the project remain to be finalised. These include the purchase price, the cost of insurance and mooring costs.

The original budget contains an assumption that certain services are provided freely or undertaken by voluntary labour. However, it is possible that some of these services will need to be purchased on the market.

Until all outstanding issues are resolved, an upper limit of expenditure on the project is impossible to confirm. The final cost is likely to be at least £600,000 and could be substantially more.

The Economic Impact of the Project

ARC's estimate of the economic impact of the sinking of the Scylla suffers from a number of weaknesses in method of calculation and clarity of exposition. A reworking of the ARC calculations based on their underlying assumptions implies an estimate of the economic impact of the project of £0.8m p.a.

Most of the assumptions underlying the ARC assessment of the economic impact of the project are reasonable. However, the analysis contains relatively optimistic assumptions concerning the extent of weekday diving and non-diving expenditure.

SWEC has estimated the impact of the sinking of the Scylla by developing four scenarios based upon alternative assumptions concerning the additional number of diver days arising from the sinking of the Scylla.

SWEC estimates that the placement of Scylla will add between £0.17m (pessimistic scenario) and £0.67m (optimistic scenario) to GDP p.a. and create between 7 and 30 FTE jobs within the South West economy. Most of these benefits are likely to accrue within the Plymouth sub-region.

The experience of other artificial reef projects suggests that successful marketing is likely to be a key factor in determining the overall success of the project.

The Centre of Excellence (COE)

No detailed outline of a COE is contained in the proposal. Consequently, SWERC sought the opinions of a wide variety of organisations and individuals.

Opinion was generally supportive of the development of a COE. However, there were different views as to the nature of any new development. Three main views were articulated. A COE might involve:

- A loose co-ordination of existing diving related activities.
- A specific site acting as a one-stop shop for diving related services such as training and accommodation.
- A specific site, which also acts as the focus for the wider cluster of diving related activities in the sub-region.

Some concern was expressed as to how a COE would impact on existing businesses and also the financial viability of a new site, given the difficulties experienced by Fort Bovisand.

There were divided opinions on the location of a new centre, although Fort Bovisand was the most frequently mentioned option. The funding of a COE is an unresolved issue.

A successful sinking of the Scylla would provide a crucial foundation upon which to base the subsequent development of a COE.

A quantitative estimate of the costs and benefits of a COE is impossible until the nature of a centre, its location and sources of funding are established. Economic benefits from a COE might include the impact of construction work, additional divers attracted to all wrecks in the area, additional tourist numbers, new businesses attracted into the area and expenditure on training courses.

Social Benefits

Potential social benefits arising from the project include the use value of the artificial reef to divers able to use the reef at no direct cost, environmental benefits arising from the creation of a location that will provide a breeding ground for fish and other marine life, enhanced opportunities for disabled diving, increased research possibilities and linking a COE to the wider community and education sector.

SWRDA's Targets

The sinking of the Scylla is, in itself, only likely to make a modest contribution to the achievement of SWRDA's targets. However, benefits could be enhanced over the long term by the development of a COE. Targets to which the project could potentially contribute include the regional outcome targets of sustainable economic performance, employment and enterprise, and the annual core milestones of employment opportunities, brownfield land development and education and skills.

Overview and Recommendations

In absolute terms, the economic benefits of the sinking of the Scylla are modest. However, these benefits are likely to "pay back" the initial investment over a relatively short period of time (2-5 years). The project will also create additional social benefits, make a modest contribution to the achievement of SWRDA's targets,

assist the development of a key urban area and complement the development of the wider marine sector. The Scylla is also a unique project that will help to "put Plymouth on the map" if it attracts substantial media coverage.

Overall, **there is a moderately strong case for SWRDA to fund the project.** However, it is important for SWRDA to recognise that there are a number of issues that create uncertainty concerning the costs of the project. These issues need to be resolved before SWRDA can ascertain the level of financial commitment required.

The development of a COE will change the economic benefits and costs of the project. However, these costs and benefits are uncertain until a detailed proposal is presented. There are some concerns including the impact of the centre on existing businesses and its financial viability.

Given the uncertainties surrounding a COE, SWRDA may wish to **establish a framework for bringing together those organisations that are interested in the development of a centre to elaborate more detailed proposals, whilst monitoring the actual impact of the sinking of the Scylla.** This would also allow time for a more detailed investigation of alternative sites and sources of **funding.** This approach would effectively regard the development of a COE as a medium or long-term option.

1. Introduction

- 1.1. The aim of this study is to advise the South West Regional Development Agency (SWRDA) as to whether the economic and social benefits of placing HMS Scylla on the seabed in Whitsand Bay are sufficient to warrant their financial support for the project. Within this context, the study has two specific objectives.
 - To provide an analysis of the potential social and economic impacts of the placement of HMS Scylla and to evaluate the effect that the development of a diving Centre of Excellence could have on these impacts.
 - To evaluate the placement of HMS Scylla against SWRDA's targetary framework, and to provide an analysis of the costs and benefits of the likely outputs of the project.
- 1.2. A variety of information sources were utilised to conduct the study. These include:
 - Documents provided by SWRDA and ARC concerning the proposals.
 - Existing research concerned with the economic impact of artificial reefs and the diving industry.
 - Interviews with a wide variety of organisations potentially involved with or affected by the proposals.
 - An e-mail survey of members of the British Sub-Aqua Club.
 - Interviews with participants at the 2003 London Diving Show.
- 1.3. An evaluation of the economic impact of the development was conducted utilising the input-output model of the South West Economy Centre.
- 1.4. Section 6 presents the economic impact projections of the SWEC model and assesses the wider social benefits and costs of the project. Section 7 examines the project within the context of SWRDA's targets and milestones. The conclusion summarises the key points and recommendations to arise from the analysis.
- 1.5. The aim of this study is to advise the South West Regional Development Agency (SWRDA) as to whether the economic and social benefits of placing HMS Scylla on the seabed in Whitsand Bay are sufficient to warrant their financial support for the project. Within this context, the study has two specific objectives.

2. Background

- 2.1. Modern artificial reefs serve a variety of purposes including promoting marine life, commercial and sport fishing, diving, education and research. The use of reefs for recreational diving is a relatively modern development that has occurred since World War Two as a consequence of the development of reliable scuba-diving equipment. Whilst artificial reefs can be constructed in a variety of ways, there has been an increasing trend to utilising decommissioned warships. This type of artificial reef has been developed in a number of countries including the USA, Japan, Canada, Australia, New Zealand and the Cayman Islands.
- 2.2. There are a number of significant advantages to utilising ships as the basis for artificial reefs. These include:
 - Divers place a high value on exploring wrecks that “look like ships” but many historical wrecks have deteriorated over time.
 - The ships can be prepared with safety considerations in mind.
 - The ships can be prepared for novice/disabled divers.
 - The location of the site can be chosen to promote local industry and tourism and minimise any adverse ecological impacts.
 - Reefs can provide a breeding ground for fish and other marine life.
 - Artificial reefs are often viewed as a relatively cost effective way of disposing of surplus vessels.
- 2.3. The proposal considered in this study involves the purchasing, cleaning and sinking of HMS Scylla in Whitsand Bay off the coast of South East Cornwall close to Plymouth. HMS Scylla is a Leander class frigate currently awaiting disposal by the Ministry of Defence (MOD). The development would be a unique attraction being the first artificial reef constructed from a decommissioned warship in the UK. It is envisaged that the project would consist of three phases. The first phase would involve purchasing HMS Scylla. This would be followed by the preparation, cleaning and sinking of the vessel. The final phase would involve the development of a Centre of Excellence for diving.
- 2.4. There are a number of potential advantages to the proposed site for the HMS Scylla:
 - The South West is already an extremely popular destination for sport diving. Indeed, tourism data suggests that there are around 200,000 trips every year to the region that involve scuba-diving.
 - The site is close to the popular James Eagan Layne wreck site and a number of other historical wrecks that already attract a large number of divers.

- Plymouth and its surrounding area have a significant diving infrastructure that could potentially provide the services required to support an increased level of diving activity.
 - Local students/academics may be able to use the reef for diving/research.
 - There is an existing disabled diver facility at Mount Batten that can make use of the Scylla.
 - The development could potentially link in with a number of marine-related organisations in the area including research facilities and the National Marine Aquarium.
 - The development would accord with the wider strategy of promoting the marine and tourism sectors in the area.
- 2.5. A major impediment to the development of any artificial reef is the funding requirement. The ARC consortium has approached SWRDA with a request for funding to acquire the vessel. Funding will also be required to prepare, clean and sink the vessel. The experience of other artificial reef projects throughout the world suggests that public sector funding is crucial to the development of a project. In a review of the funding issues involved in artificial reefs, Tex Enemark of the Artificial Reef Society of British Columbia (ARSBC) documents the difficulties involved in acquiring funds from local businesses and other organisations that could potentially benefit from the reef. He concludes that "... in the absence of public subsidy, it is nearly impossible to finance the preparation and placement of a large, complex ship." (Enemark, 2001). Having said this, some projects have obtained funds from the private sector and made extensive use of volunteer labour. In the case of the HMCS SASKATCHEWAN in Canada, for example, three local dive shops together provided significant funding for the project. The current proposals contain some elements of volunteer labour and freely provided private services, but the main source of funding is likely to be the public sector. The further development of a Centre for Excellence for diving is also likely to require substantial funding from public sector agencies.

3. Analysis of the ARC Proposals

- 3.1. ARC has produced a draft budget for the first two phases of the project as of December 2002, suggesting that the funding requirement net of anticipated revenues would be £472,000. This estimate comprises £80,000 for the purchase of the vessel, £312,000 for preparation, cleaning and sinking, and, £111,000 post-sinking costs including insurance. These costs are partially offset by projections of income of £31,000. However, it is clear from a number of subsequent documents that some elements of this budget are now outdated. Consequently, further research was undertaken and a representative of ARC was interviewed to ascertain their current projections and sources of information. The following key points have emerged from this process of investigation.

Cost of Purchasing the Scylla

- 3.2. In the original bidding process, ARC offered £80,000 for HMS Scylla. However, it is now accepted that this original bid was too low and significantly below other bids for the ship. In the current round of bidding, there is considerable interest in the wreck including bids from a scrap metal consortium, the Cayman Islands and possible interest in turning the ship into a museum. Clearly, confidentiality implies that the MOD will not reveal the value of other bids. However, information gathered through informal contacts suggests that a bid of £150,000 is likely to be too low to obtain the vessel.
- 3.3. The possibility of the ARC bid being given preferential bidding status in the light of the social and economic benefits of the project to the South West has been investigated. However, it is clear that the MOD's view is that it is charged with trying to obtain the best price possible for the vessel and every bid must be allowed an equal opportunity. Of course, there is always the possibility that lobbying may influence the decision. However, in order to ensure obtaining the vessel a bid reflecting the true market value of the Scylla would have to be made. In simple terms, the market value is what other bidders are prepared to pay. This implies a bid of over £150,000, considerably in excess of the original estimate.
- 3.4. If the ARC bid for Scylla was successful but the sinking did not proceed, SWRDA would wish to recoup some of its outlay through selling the vessel for scrap. Ascertaining scrap value is difficult, as this is the first warship of its type to be offered on the open market. ARC is pursuing the possibility of a memorandum of understanding with a scrap company to purchase the vessel in this eventuality. A successful conclusion to this is important, as it would help to reduce the risk faced by the SWRDA if the sinking did not go ahead.

Costs of Preparing and Sinking the Scylla

- 3.5. The ARC budget contains a breakdown of the costs involved in preparing, cleaning and sinking the vessel. The original estimate of these costs is approximately £312,000. An interview with a representative of the consortium ascertained that these costs were based on an understanding of the costs involved in other similar projects throughout the world. Representatives of other reef consortia who had reviewed the figures on an informal basis had concluded that the budget was a reasonable reflection of the likely costs. Unfortunately, detailed breakdowns of costs for comparable projects are not readily available. SWEC has obtained some general information on the costs of the sinking of the HMS WAIKATO. The overall costs in this budget appear to be lower than that proposed by ARC, but it is difficult to make accurate comparisons, as it is not clear if all comparable costs are contained in the budget. Moreover, the breakdown is too general to match many individual items to those contained in the ARC budget. In addition, costs differ across countries and individual projects make varied use of free services or volunteer labour.
- 3.6. ARC has indicated that its cost estimates are based on the assumption that a number of services are provided gratis by local businesses and that much of the labour on the project is provided by volunteers. According to ARC, these offers of help are of an informal nature and there are no firm agreements in place. ARC has acknowledged that the budget could be considerably higher if these services were not freely provided. Given that some of the free services have been offered on the assumption that the ship is moored at Plymouth, mooring the ship elsewhere may increase costs. At present, there is no agreement to moor at Plymouth and another location appears likely. As far as volunteer labour is concerned, the experience of other projects throughout the world suggests that volunteer labour is reasonably easy to recruit. However, the extent and nature of such assistance is by its nature difficult to predict. Moreover, some potential mooring locations have indicated that they would not allow volunteer labour to work on the vessels, presumably for safety considerations. Once a mooring site has been determined, it may hence be necessary to obtain a professional quote for the cleaning and preparation of the vessel.
- 3.7. The above points suggest that the costs indicated in the ARC budget are likely to be the minimum costs of the project. The final costs are uncertain and will depend upon where the ship is moored and the extent to which the promises of free services are realised. This creates considerable uncertainty as to the funding requirement for the project. Once the mooring issue is resolved, the nature of these costs should become clearer.

Costs Post-Sinking

- 3.8. The project will incur a number of unavoidable costs after sinking has taken place:

- **Insurance liability for public insurance/pollution:** the Scylla cannot be placed on the seabed in Whitsand Bay without the permission of Crown Estates who insist that the project must acquire unlimited liability insurance to indemnify the Crown against any claims. In addition, it appears that Crown Estates are likely to insist that the project is underwritten by a local authority or government body, rather than a private organisation such as ARC. In the provisional budget, it was assumed that that this insurance would involve the deposit of a bond of £100,000, although it might alternatively involve a regular premium. At the time of writing this report, ARC was still investigating the availability and cost of such insurance. **This remains an unresolved issue and could affect the viability of the whole project.**
- **Annual maintenance of buoy and signage:** the cost of this was £1,950 in the initial budget. However, ARC has indicated that this cost has not yet been finalised.
- **Environmental monitoring:** as a condition of awarding a licence to put the Scylla on the seabed, DEFRA require a ten-year environmental monitoring programme. A figure of £6,500 was included in the original budget for such a study. However, a written indication of the potential cost from the Marine Biological Association provided to ARC indicates a cost of approximately £38,000 for such a programme.
- **An annual licence renewal payment over a ten year period:** in the original budget the cost of this was estimated at £250 per annum. ARC has indicated that this remains the current position, although there could be some minor changes to this figure. The best estimate is hence a minimum cost of £2,500 over the ten year period.

Project Income

3.9. ARC's budget contains estimates of a number of potential sources of revenue for the project that might help to offset the costs. These total £31,000 up to and including the period in which the ship is sunk. The major items of anticipated revenue are as follows:

- **The sale of ferrous and non-ferrous materials from the ship:** the budget indicates that around £5,000 could be earned from these sales. ARC has indicated that these estimates were accurate as of two years ago. Whilst there will undoubtedly be some revenue from these sales, the value is difficult to predict as the value of scrap changes over time and the exact quantity of material available is not known.
- **Media:** there is interest from the media in filming the preparing and sinking of the vessel possibly as part of a documentary series. The provisional budget anticipates £13,500 from this source. These estimates are based on informal discussions with the media rather than specific quotes. The experience of other projects suggests that there will be considerable media interest and this is likely to raise revenue.

Such interest could provide considerable publicity and assist in increasing the number of divers visiting Scylla.

- **Clothing:** projections of clothing sales of approximately £2,000 are made in the budget. However, no precise details of the plans for this merchandising are available.
- **Fund raising and raffles:** many reef projects have been successful in obtaining donations and funds from raffles. Projections of revenue from these sources of approximately £10,000 are contained in the budget. The WAIKATO budget shows donations and raffle income totalling £13,000 and hence this projection does not appear to be unreasonable.

3.10. In general, there is no doubt that the project has the potential to generate revenue from all of the sources listed by ARC and the projected revenue in the budget is relatively modest. However, in the absence of any specific information or plans, the estimates are difficult to appraise. To a certain extent, these uncertainties are inevitable at this stage of planning. Failure to achieve these projections would only imply a relatively small increase in the funding requirement of the project.

Environmental Costs

3.11. A detailed examination of any environmental costs arising from the project is beyond the scope of the current report. However, we are not aware of any major environmental costs that would be associated with the sinking if the ship is properly prepared and cleaned to the required standards. Presumably, any adverse impact on the marine environment would be monitored by the environmental monitoring programme and appropriate action taken.

Summary of Budget Issues

3.12. The following key points emerge from the analysis of the ARC budget.

- Many of the key costs of the project are not yet finalised. In particular the costs of insurance, cleaning and mooring are uncertain.
- The cost estimates rely upon an assumption of certain services and labour being freely provided. Costs will inevitably rise if these services have to be purchased on the market.
- Whilst there will undoubtedly be some revenue from the project, the current projections are largely speculative rather than projections of revenue based on firm plans. However, the anticipated revenue streams do not appear unreasonable and are relatively small within the context of the overall project budget.

3.13. The above analysis implies that the final costs that SWRDA would face in financing the project are subject to considerable uncertainty. The provisional budget assumes a net financing requirement of £470,000

(including a £100,000 bond for insurance). To this initial cost must be added the extra cost of purchasing the vessel and environmental monitoring compared to the original project. If the bid for the vessel was, say, £180,000 then this together with the expenditure on monitoring would take the project costs up to around £600,000. To this would have to be added any services that were not freely provided, for example, due to additional mooring and cleaning costs. A representative of ARC mentioned a possible final cost of £800,000 for the project if all services had to be paid for. Interestingly, this is the approximate cost per ship incurred by the Australian government which has born all the financial costs involved in sinking a number of ships. However, until all outstanding issues are resolved an upper limit of expenditure on the project is impossible to confirm.

4. An Analysis of the ARC Economic Impact Forecasts

- 4.1. An analysis of the economic impact of the Scylla is difficult as little detailed information is available concerning the local diving industry. In its general business plan, ARC estimate the revenue that may be generated by the artificial reef on the basis of a number of assumptions and information derived from a small questionnaire survey. The method involves a number of stages. First, ARC estimate the weekend diving revenue accruing to the hard boats currently involved with the local recreational diving industry during the main season. This is followed by an assessment of the weekend non-diving expenditure of divers and partners/dependants based upon questionnaire data. ARC then assesses the impact of a 40% increase in business generated by the reef. Finally, ARC incorporates an assessment of weekday revenue to obtain a final value of the economic impact of the reef.
- 4.2. The main stages in the ARC analysis are now examined in detail.

Calculation of the weekend diving revenue accruing to the hard boats currently involved with the local recreational diving industry during the main season.

- 4.3. Divers currently setting out from Plymouth typically make use of a number of registered local hard boats. ARC calculates the revenue received by these boat owners assuming that the boats are at full capacity and make 2 trips per day over the weekend during a 28 week season. At £35 per diver per day, this results in revenue of approximately £176,000. In order to check this data, SWEC gathered information from the current hard boat operators through telephone conversations. In general, these confirmed the boat capacity, cost per day calculations and length of season assumptions made by ARC. The operators generally indicated that they had high levels of bookings during weekends in the main season. The ARC revenue calculation would thus seem to be a reasonable estimate of the current diving revenue generated by hard boats at weekends. However, it clearly omits some sources of additional revenue including hiring of Rigid Inflatable Boats (RIB's) and diving outside of the main season.

Assessment of the weekend non-diving expenditure of divers and partners/dependants.

- 4.4. In addition to revenue accruing to boat owners, the local economy will benefit from other types of spending by visiting divers and partners/dependants. The ARC calculations assume that a diver plus partner spend £80 per diving day on items such as accommodation, food and drink. An estimate of £15 per day for dependants is also presented although this figure does not appear to be used in subsequent calculations. According to ARC, these data are based on information from a survey of divers that was undertaken in September 2002. SWEC has examined this survey and, excluding one return which appears to be made for a group rather than an

individual, the average non-diving spend per day is £97. On this basis the £80 a day included in the calculations is a reasonable figure, erring on the side of caution. However, this was a small scale survey and it is not clear how representative it is of the wider diving population. In particular, the majority of the ARC respondents were visiting for a week or two weeks and were likely to be accompanied by dependants. However, discussions with the local diving industry have indicated that much diving activity is undertaken at the weekends by enthusiasts, many of whom are not accompanied by dependants.

- 4.5. In order to address the expenditure issue in more detail, SWEC obtained the permission of the British Sub-Aqua Club (BSAC) to undertake a short e-mail survey of their branch members. In total, 73 completed questionnaires were received. It is difficult to ascertain how representative this survey is, as it only covers members who have access to e-mail and respondents may be those with a particular interest in this project. Nevertheless, it represents a substantially larger sample than the ARC survey.
- 4.6. The survey results indicated that the average total spend on diving and non-diving activities of the respondents was much lower than the ARC survey at £63 per day. Excluding daily diving expenditure of £35, this implies a non-diving spend of £28 in contrast to the ARC assumption of £80. There are a number of reasons that could account for the discrepancy of the results. First, most of the ARC respondents were from outside the South West region and consequently were likely to be staying in local accommodation. However, approximately half of the respondents in the BSAC survey were from the South West and may not require overnight accommodation for dives within the region. A more detailed examination of the BSAC data lent some credence to this hypothesis as South West residents were on average spending £20 a diving day less than those divers originating outside the South West. In addition, as has already been noted, the ARC survey was dominated by 7 and 14 day visitors, many of whom are likely to have been holidaying with dependants. The BSAC respondents were generally weekend diving enthusiasts whose typical trip might be on their own. Thus, the BSAC and ARC surveys could be reflecting the expenditure of different types of diver.
- 4.7. Unfortunately, no detailed breakdown of the type of diver visiting Plymouth is available and hence it is impossible to provide a precise estimate of the average spend per day of a typical diving trip. However, given the importance of weekend diving and the evidence of the BSAC survey, it would appear likely that the ARC estimate overstates the spending per day of the typical diving visit.

Estimation of the increase in business generated by the reef.

- 4.8. The third stage in the ARC method is to assess the increase in local spending that would arise as a consequence of the sinking of the Scylla. The ARC assumption is that the new artificial reef will generate an increase in

business of 40%. This appears to be based on the experience of HMNZS WAIKATO, a Leander class frigate sunk in New Zealand. In order to ascertain whether the WAIKATO example is representative of other projects, SWEC undertook a literature search to gather information from projects throughout the world. Most of the available information is from the web-sites of artificial reef organisations or related diving web-sites. Some of the major studies that have been identified are listed below. As the economic impact figures are usually given in term of local currency, the data has been converted into UK currency at current exchange rates.

- HMS WAIKATO: this vessel was sunk in New Zealand in 2000 in close proximity to the HMS TUI, which was sunk in 1999. The two vessels are now being marketed together as the "Twin Wreck Steel Adventure". According to Divewreck, the HMS TUI is estimated to have generated diver numbers of 3,000 p.a. whilst the sinking of the WAIKATO has resulted in an extra 12,000 divers p.a. visiting the local area. The economic impact is estimated at around £1.9m p.a. and related local businesses are reported to have increased their business by 30–40%.
- HMS YUKON: this destroyer was sunk off the coast of San Diego in 2000. A projection by the Artificial Reef Society of British Columbia prior to the sinking of the vessel indicated that up to 20,000 divers a year might be expected to visit the wreck. The sinking was hailed as an instant success, swamping diving and fishing businesses in the city. It has been estimated by the San Diego Ocean Foundation that the immediate direct benefits were approximately £2m p.a.
- HMS SWAN: this vessel, similar to a Leander class frigate, was sunk in Australia in a remote area of Perth in 1997. According to the Geographe Bay Artificial Reef Society, it has attracted 10,000 divers a year, resulting in a benefit of £0.8m p.a. to the region.
- HMCS SASKATCHEWAN: this destroyer was sunk in Canada in 1997. According to the Artificial Reef Society of British Columbia, it has generated £0.67m – £0.9m p.a. for the local area. The success of this project has led to the creation of a second reef, with the sinking of the HMCS CAPE BRETON in 2001. A third ship, the RIVTOV LION is scheduled for sinking in spring 2003. According to detailed information provided by the main local charter operator, Ocean Explorers Diving, the SASKATCHEWAN attracted 2200 diving days with the company in 2002 generating a local income (including accommodation etc.) of £0.2m.
- HMAS HOBART: this vessel was recently sunk in Australia. A study prior to sinking estimated that the sinking would generate 16,000 divers per annum creating £4.1m p.a. and 127 jobs. This optimistic projection implies a very high level of income generated per diver compared to the other studies.

- 4.9. In addition to estimates for individual ships, there are a number of academic studies of regions and sub-regions with multiple artificial reefs in the USA. These studies are of some interest as they use relatively sophisticated methodologies and comprehensive survey information. It should be noted that much of the economic impact of these reefs comes from fishing. However, some studies provide separate estimates for diving. The most extensive studies have been undertaken in Florida. In North West Florida, the direct impact of diving off artificial reefs is estimated to be £8m for the local economy and 188 jobs. In South East Florida, where there is a much higher level of activity, Hazen and Sawyer (2001) estimate that artificial reefs have generated 9.8m person days of diving creating £520m of income for the local economy. This equates to £53 of income for the local economy per diver day. This study constitutes perhaps the most accurate information available on the local economic impact of reefs.
- 4.10. A number of conclusions emerge from an examination of the available literature:
- Artificial reefs have generally been very successful in generating a significant increase in diver numbers and economic benefits for their local communities.
 - The estimates of the benefits of the reefs vary considerably. In the studies of individual ships quoted above, for example, the estimates vary from an extra 3,000 to 20,000 divers and from £0.67m to £4.1m of economic benefits. The studies imply very different estimates of economic benefits per diver, varying from £80 to £250 in the case of HMS Hobart.
 - It is difficult to gauge the accuracy of the estimates for the economic benefits of the reefs as, in most cases, there is little detail given concerning the methods used for their computation. It appears that most estimates are educated guesses made by local reef societies based on the experience of a few local businesses. This is not to say that these estimates are wrong, but it is important to be wary in interpreting the data. The estimates from the SE Florida study, which are at the lower end of the estimates of benefits per diver, are possibly the most accurate information available.
 - Most studies provide data on the absolute rather than proportionate increase in business generated by a reef, making it difficult to appraise the ARC assumption of an increase in business of 40%. However, this increase in business implies an extra 3500 divers generated by the Scylla over the main season (assuming the typical diver undertakes two dives a day over 2 days and taking into account ARC assumptions concerning weekday diving). Given the experience of other locations, this would not seem to be an unreasonable estimate of the increase in diver numbers.

- For most reefs, diver numbers and benefits have tended to be in excess of those expected. The Geographe Bay Society, for example, states that: **“The society has studied the sinking of ships as dive attractions throughout the world, particularly in Canada and Australia. In every case, including WAIKATO, the actual benefits to the local community have exceeded the projections made by the organisers.”**
- Having a tourism plan, local support and media interest is critical in ensuring the success of an artificial reef. For example, the HMCS COLUMBIA was sunk in Canada in 1996 and was expected to generate 5,000 divers a year. However according to the ARSBC it may have only generated 500 divers. They attribute this to a lack of support from local dive operators and the wider community.

Calculation of the economic impact of the reef on weekend diving during the season.

- 4.11. The ARC calculations for the final economic impact of the reef are extremely difficult to follow and appear to contain some errors in calculation and exposition. Consequently SWEC have reworked the calculations to provide an accurate reflection of the assumptions made by ARC.
- 4.12. To obtain the increase in diving expenditure generated by the project, ARC applies a 40% increase to the current annual boat revenue of £176,000. This results in an increase in revenue of £70,400 p.a., although the ARC document reports this increase as £81,000. The document then states that this would yield £1.2m for the local economy over 5 years. However, it is not made clear that this is the impact of new divers plus existing divers. The correct figure for the additional impact over 5 years is $5 \times £70,400 = £352,000$.
- 4.13. ARC calculates an additional £1.2m impact for non-diving expenditure over 5 years. It is difficult to ascertain exactly how this figure was arrived at. However, utilising the ARC data on non-diving spend per person we have tried to reconstruct the method. If all divers are accompanied by partners and stay for two days, this would imply a weekend spending of £160 per diver and a total spend of £403,200 over a season. A 40% increase implies an additional £161,280 p.a. Over 5 years this would imply an increase in revenue of £806,400.
- 4.14. Thus, on the basis of the ARC assumptions, the correct estimate of the additional impact of the artificial reef on weekend diving over 5 years should be £806,400 plus £352,000 which equals £1,158,400 or £231,680 per annum.

Calculation of the final economic impact of the reef.

- 4.15. The previous calculations ignore weekday diving. ARC state that incorporating this factor into its calculations would increase its (incorrect)

estimate of income over 5 years from £2.4m to £10m. It is difficult to see how this figure is arrived at, although ARC has indicated that it assumes that weekday income accrues at the same rate as weekend income. This seems to be an optimistic assumption as local diving organisations have indicated that the level of weekday business is well below that achieved at weekends. Indeed, one interviewee noted that some boats currently had a very low level of charter bookings. More generally, a recent paper produced by the Professional Boatmen's Association has noted the increasing difficulty of obtaining weekday charter business across the industry, as many divers only have leisure time available at weekends.

- 4.16. Even if the ARC assumptions of weekday business are accepted, this would imply multiplying the £2.4m weekend income by 2.5 to take into account the extra 5 weekdays. This implies weekday income of £6m yielding a total of £8.4m rather than £10m accruing from existing and new diving business. If we accept this methodology and multiply the correct additional figure of weekend income of £1.158m by 2.5 to obtain weekday income, this yields a final additional impact of £4.05m over five years or £811,000 per annum. This appears to be the correct estimate of the total additional benefits of the project given the ARC assumptions.

Conclusion

- 4.17. The final estimate of a £0.8m p.a. increase in local revenue accruing from the placement of the HMS Scylla on the basis of the ARC assumptions is not unreasonable given the estimates of the impact of other artificial reefs. However, the estimate may be somewhat inflated due to the relatively optimistic assumptions concerning weekday diving and non-diving expenditure. On the other hand, the estimates do not explicitly take into account multiplier effects or diving from private boats and these factors might increase total expenditure. Section 6 provides SWEC's estimates of the impact of the reef based upon an alternative methodology.

5. Centre of Excellence

- 5.1. The ARC proposal envisages that the sinking of the Scylla could be the catalyst for the development of Plymouth as a Centre of Excellence (COE) for Diving, possibly complementing existing 'centres' of surfing in Newquay and sailing in Weymouth. It is also suggested that the project could be linked to local diving organisations such as the Mount Batten Centre, Diving Disease Research Centre (DDRC), University of Plymouth, Marine Biological Association (MBA), Plymouth Marine Laboratories (PML), BSAC, the Professional Association of Diving Instructors (PADI) and other commercial businesses in the region. It is proposed that a site such as Fort Bovisand could be developed to provide a specific focus and location for the centre.
- 5.2. Whilst the proposals provide a brief articulation of the general concept of a COE, no detailed outline of the nature of the centre is contained in the documentation. Consequently, SWEC consulted a number of individuals and organisations with a specific interest in the project as to their views concerning the desirability and nature of such a centre. Opinions were also gathered on other relevant issues such as the possible location and funding of a centre.

What is a Centre of Excellence?

- 5.3. Although the concept of a COE is linked in the documentation with the involvement of Sport England in the project, it is clear that the term is not an official designation with a specific meaning that is conferred on a sporting centre. The Regional Manager of Sport England was personally very supportive of the project but suggested that he would discourage the use of the term for the current project as it is usually used in connection with competitive performance sports. For example, the Weymouth and Portland Sailing Academy, which has been mentioned as a possible model for a diving COE, is regarded as a centre of excellence for sailing and fits this competitive sport model. The Academy was established in 1999 to provide sailing training and facilities for over 40 major national and international championship sailing events each year. It provides large dinghy and car parks together with onshore facilities to cater for regattas with up to 350/400 boats. A diving COE which would not be directly linked to a competitive sport and major championships is clearly very different in nature from the Weymouth concept. Sport England suggested that the term 'focus for diving in the UK' might be a preferable label for the Plymouth development.
- 5.4. It became clear during the consultation process that there are varying views as to the nature of a new centre. However, in broad terms three main views were articulated. First, a COE could signify a loose co-ordination of all existing dive-related facilities in an area, including, for example, the different dive sites and centres in Plymouth, Looe and Salcombe. These organisations could pursue matters of mutual interest and market the area

under the umbrella of a COE. An alternative view was that a centre could comprise a designated site including a number of diving specific facilities such as a diver training school, a shop for sales of equipment, accommodation and a restaurant or bar – prompting some to refer to it as a ‘one-stop shop’ for divers. A third option is that, in addition to a designated site with associated facilities, the centre could also be the focus for a cluster of diving related activities with a co-ordinating office under a project manager. The centre could, for example, link into existing tourist-related organisations, medical research, R&D facilities and education. One interviewee referred to this concept as a ‘centre of expertise’, in the sense that those associated with the centre would all have an excellent reputation in their area of expertise.

- 5.5. The vision of a COE as a loose co-ordinating organisation would have the advantage of being a low cost option. It could potentially act as a pressure group to ensure that diving issues are considered by those organisations involved in planning, economic development and the promotion of tourism in the region. It could also directly build upon existing expertise and provide a forum in which diverse views could be articulated. The COE would effectively be a tool for marketing the region’s existing diving-related activities. However, it could also provide the impetus for future developments such as a designated centre if the sinking of the Scylla and the promotion of diving tourism in the area warranted the development of a specific site. In essence, it would provide a gradualist approach to the development of diving in the area directly taking on board the interests of existing diving related organisations.
- 5.6. Whilst the first view would have clear advantages, there is a danger that it would lack sufficient resources to “kick start” the development of the Plymouth area as a COE. If a specific site was developed, this could provide not only a clear focus for diving related activities, but would also be a direct physical representation of the concept of a COE. Most interviewees who supported the development of a specific site mentioned a small number of core services that could potentially be provided by the site including boats to ferry divers to local wrecks, diver training, accommodation, retail services and a restaurant and bar. Other possible facilities might include information services detailing local wrecks and diving related information and a camera link to the Scylla site.
- 5.7. If a COE with a specific site was developed, then high quality diver training would be an integral part of such a centre. Interestingly, the term Centre of Excellence is currently used by BSAC to refer to a diving school which fulfils a specific set of criteria. A BSAC school is a diver training facility which provides diving instruction on a regular basis, has at least one dedicated classroom and provides diving instruction courses. BSAC grants recognition to dive schools at three different levels – standard schools, premier schools and Centres of Excellence. Premier school status depends on achieving a certain volume of sales in terms of Ocean Diver certification, Skill

Development courses and supporting BSAC products. BSAC will grant Centre of Excellence status to schools that meet most of a long list of criteria including providing permanent residential accommodation on site for visiting divers and non-diving visitors, providing boats, classroom and seated education facilities for up to 50 people and offering compressed air services as well as diving equipment to a certain standard for at least 50 people. They must also carry out a variety of certification courses and must have supported BSAC for a continuous period of not less than 5 years. There are currently six such schools in the UK.

- 5.8. PADI uses different guidelines for grading its dive centres. All PADI dive centres consist of a retail dive store and offer PADI certification courses as well as equipment rental and repair, compressed air, recreational scuba diving or snorkelling and travel opportunities. They also provide classroom facilities and confined water sites for instruction. PADI 5 Star Dive centre status is awarded to progressive, professional retail dive stores, with awards given for education, community involvement and environmental awareness. A PADI 5 Star Instructor Development Centre (which develops dive professionals) must meet 5 Star Dive Centre standards but also offer instructor level training. Finally, a PADI 5 Star Career Development Centre (CDC) is all of the above with instructor-level training beyond instructor development courses. Fort Bovisand had obtained PADI Instructor Development Centre status, but this accreditation has been taken away with the closure of the centre. Clearly, it would be desirable for a new COE, or any diver training schools associated with the COE to have high level accreditation by either PADI or BSAC.
- 5.9. Another core feature of a COE according to many interviewees would be the availability of a full 'package' of services to support diving including equipment, accommodation and food/drink. Many individual divers and diving organisations that we spoke to emphasised the importance of this type of service. Indeed, over 50% of the respondents to the BSAC e-mail survey indicated that the existence of a facility providing such services would make them more likely to visit the area. Interestingly, almost 20% of the survey respondents noted that Mount Batten already provided such facilities, although it is presently a relatively small centre. The CEO of the Mount Batten Centre confirmed that in his view many divers like to have the whole package of services available close to site. There is also a fairly general consensus that divers predominantly desire 'cheap and cheerful' accommodation. The Mount Batten Centre currently charges £20 for B&B accommodation, which seems to be about the right level for most divers. It is also important that a centre has facilities to cater for clubs, universities and schools as such groups are an important source of demand for diving and training courses.
- 5.10. Whilst some interviewees thought that a COE could contain retail facilities selling diving equipment, some expressed scepticism as many divers tend to bring their own equipment and only have limited requirements whilst on

a dive. This view was confirmed in discussions with individual divers and club representatives at the London Dive Show. This is clearly an issue that would have to be considered carefully in the plans for any new centre.

- 5.11. If a COE was to function as a central focus of a cluster of related activities, it would be essential for the centre to link closely with other diving related organisations. One key link would be to the education sector. There appears to be some interest in the development of a COE within the University of Plymouth. The University's Marine Science and Technology centre has recently produced a paper which argues that having the University at the core of a new centre would provide an important element of expertise on which a good reputation could be built. Moreover, it would create the potential for the University to link diving activities and training more closely to their degree courses. It is also suggested there is potential for the University to manage the professional dive requirements of a variety of public sector organisations which might attract a large number of divers from outside the region. Another link to education could be through Plymouth College of Art and Design which has expressed an interest in using Scylla for courses in underwater photography. The centre could also link with those organisations in the education sector and elsewhere concerned with research into diving and environmental issues.
- 5.12. Another aspect of a COE that was mentioned by some of those consulted was a wider social or community focus. One view was that a centre could (subject to funding) run courses for disadvantaged youth and others in the local community. Another idea was that there could also be a link into schools in the area, perhaps through a website or visits to the wreck or aquarium. A further aspect of the centre could be the further development of disabled diving facilities. Deep Blue Diving at the Mount Batten Centre is keen to expand facilities for disabled divers and already has some facilities, including electric lifts on some boats. Scylla would be the only UK sea-based wreck adapted for disabled divers and as such could help to underpin Plymouth as a centre for disabled diving. The presence of the DDRC's hyperbaric centre in Plymouth also ensures a rapid response time to an accident. According to Mount Batten Centre, the DDRC could also provide medical advice to disabled divers. The activities of the DDRC would hence add an extra dimension to a COE.
- 5.13. A new COE could also link in with the wider tourism sector adding to the package of attractions that are used to promote tourism. One possibility is the linking of cameras to the Scylla at various locations. For example, the aquarium already has a web-based learning project and might be interested in implementing a camera on HMS Scylla with a link into the aquarium. A representative of Caradon County Council also suggested that there could be a camera-link into the SE Cornwall Discovery Centre or diving on the wreck could be viewed from a site above Whitsand Bay.

- 5.14. Over the long term a successful centre could generate economic benefits from new business attracted into the region by the centre and related marine based activities. Indeed, diving developments could link in with the strategies of organisations such as SWRDA, Plymouth City Council and Business Link, all of whom are developing strategies to encourage the marine sector. Clearly, it would seem sensible to link the development of a COE with wider initiatives being developed by these organisations.
- 5.15. It is important to recognise that not all interviewees were uniformly enthusiastic about a new centre. One local diving company expressed the view that there was still unused capacity in the sector. For example, some boats were currently running below capacity. In this interviewee's view, the sinking of the Scylla should initially involve greater use of existing facilities rather than the creation of new facilities. This raises the question of the relationship between any new COE and existing diving companies in the area. It is essential that any new development works in consultation with these businesses or there is a danger that they may see a new COE as a competitor to their businesses. Indeed, in the absence of a considerable increase in demand generated by Scylla, a new centre may merely take away existing business and redirect it to the new site. In addition, whilst diving appears to be an activity attracting growing interest, there is concern about the extent of growth over the long term as divers may increasingly choose to go abroad rather than diving in UK waters. This has been mentioned as a potential threat in a recent paper produced by the Professional Boatman's Association and may be exacerbated by the large number of artificial reefs being developed in exotic locations.
- 5.16. Another potential cause for concern is the economic viability of a new centre given the long history of financial problems at Fort Bovisand. This centre, which was finally closed in January 2003, has supplied many of the facilities envisaged as being at the core of a new COE such as accommodation, training and equipment services. In order to examine this issue, SWEC interviewed a senior individual involved in the recent activities of the centre. It was the opinion of this interviewee that the problems at Bovisand were primarily attributable to management failures and a lack of investment in the infrastructure of the site. He argued that the core sport diving business of Bovisand was able to make money but that there were more difficulties with other commercial activities on the site. In this light, the financial viability of businesses located at any new COE would need careful appraisal before any decision on the nature of a COE is taken.

The location and funding of a Centre of Excellence

- 5.17. Detailed consideration of the location and funding of a COE is beyond the scope of the current report. However, a number of points concerning these issues were raised by interviewees and are important to report as these factors will inevitably affect the nature of any new centre. First, it is important to note there were different opinions as to the location of a new

centre. Some interviewees argued that the Mount Batten Centre would be the best option as much of the infrastructure (dive site, dive school, accommodation etc.) is already in place. However, some expansion would be necessary, as the accommodation is already inadequate for the level of peak demand. Others disagreed with this and thought that a revitalised Fort Bovisand would be the best site. For example, many delegates at the London Dive Show, who had visited Fort Bovisand when it was first established as a dive centre, were very positive about the potential for the site. However, there was a general concern that establishing a centre at Fort Bovisand would require a large investment as substantial refurbishment is necessary, the harbour may need to be cleared of rocks, adequate parking spaces have to be created and development may also be limited by its heritage status.

- 5.18. An alternative (or complementary) option to the development of an existing diving related facility is the development of a new, possibly brownfield site. One vision was of a 'park & dive' facility, which would go some way to alleviating the capacity constraints due to the lack of public slipways in the area. This could involve developing a site with the capacity to park vans/ trailers with slipways and boats provided to ferry divers to the wrecks perhaps with shops located on site. An assessment of the viability of such an approach is difficult, but the proposal highlights the variety of options potentially available.
- 5.19. The source of funding for a COE remains to be clarified. According to the ARC proposal, Sport England would play a major role in financing and managing the project. However, under current guidelines, it appears that Sport England would not be able to be the primary source of funds as it is required by its mandate to concentrate on projects for disadvantaged people and on increasing participation in major sports. However, there may be some limited funds made available once the rules governing the organisation are amended from April, with some value being attached to projects which demonstrate an 'innovative' approach in sport. This funding is unlikely to be sufficient to cover the costs involved in establishing a major dive centre and other sources of funds would need to be accessed. Although various figures for the level of funding required are mentioned in the documentation (up to £5m), it is impossible to be certain as to the level of funding required until a detailed proposal is presented.

Summary

- Opinion was generally supportive of the development of a COE. However, there was some concern as to how such a development would impact on existing businesses.
- Opinion on the nature of a new COE was varied. Some argued that a COE should simply co-ordinate existing activities, others that it should involve the development of a designated site. The most ambitious

vision was that the centre could be the focus for a wide range of diving related activities in the region.

- Many existing organisations in the city, including the University, expressed interest in being involved in any new development.
 - There were divided opinions on the location of a new centre, although Fort Bovisand was the most frequently mentioned option.
 - Some concern was expressed about the financial viability of a new centre, given the difficulties experienced by Fort Bovisand.
 - The funding of a new site is an unresolved issue.
 - It is impossible to assess the costs of a COE until issues such as the nature of a centre, its location and sources of funding are resolved.
- 5.20. In conclusion, it is clear that at present the development of a COE remains at the stage of being an "interesting idea", rather than a detailed proposal. The successful development of a COE is critically dependent upon the success of Scylla in generating new diving business in the area. The chequered history of Fort Bovisand casts some doubt as to whether an extensive new development would be viable in the absence of such increased business. A sensible option might be to set in process a framework for bringing together those organisations that are interested in the development of a centre to elaborate more detailed proposals, whilst monitoring the actual impact of the sinking of the Scylla. This would also allow time for a more detailed investigation of alternative sites and sources of funding.

6. The SWERC Impact Assessment

- 6.1. This section presents SWEC's assessment of the economic impact of the Scylla project. First, a quantitative analysis of the Scylla as a stand-alone project is presented based upon SWEC's input-output model. This is followed by a discussion of the potential additional benefits of the development of a COE. Finally, the proposal considers some of the wider social benefits of the project.

The Economic Impact of the Sinking of the Scylla

- 6.2. The impact of a development such as the sinking of the Scylla upon a local economy can be examined through a variety of modelling techniques. This report utilises an input-output methodology based upon a model of the South West economy developed by SWEC at the University of Plymouth. This model provides a detailed description of the transactions that take place between the various sectors within the local economy based upon a combination of national, regional and survey-based information. If the initial direct impact of an organisation or sector is known, the model can be utilised to calculate the indirect multiplier impacts throughout the local economy.
- 6.3. The accuracy of the estimates of an input-output model relies heavily upon the quality of the information obtained on the size of the initial direct impact. For the Scylla project, the critical assumptions concern the number of additional diving days within the South West generated by the project and the expenditure of divers on diving and non-diving elements per day.
- 6.4. As far as the number of additional diving days is concerned, the experience of artificial reef projects throughout the world is variable. Thus, it would be unwise to rely upon a single assumption concerning the number of extra days and the analysis that follows presents a number of alternative scenarios. A pessimistic scenario envisages the project only generating an extra 2,500 diving days per year. If an average diver spends 2 days diving on the Scylla this would equate to an extra 1,250 divers. Apart from the COLUMBIA, the experience of other projects suggests that artificial reefs attract at least 3,000 additional divers. Thus, this scenario can reasonably be assumed to be at the lower end of expectations – effectively representing a "failure" of the project to capture the imagination of divers. An optimistic scenario would envisage the Scylla generating an extra 10,000 diver days per year. Again, if the average diver spends two days diving, this would equate to 5,000 divers. This is in line with the diver numbers quoted for the James Eagan Layne in the ARC proposal. As this appears to be the most dived wreck in the UK, our optimistic scenario effectively implies that the Scylla achieves a level of performance equal to the current best in the UK. Two intermediate scenarios involving 5,000 and 7,500 extra diving days are also presented.

- 6.5. The second key assumption needed for the analysis of the economic impact of the reef is the expenditure of divers per day. As was noted in the discussion of the ARC assumptions, £35 a day would seem a reasonable estimate of diving expenditure. Non-diving expenditure is more problematic. The ARC calculations assume £80 a day. However, as already noted, this may be on the high side. The BSAC survey indicates a figure of £28 a day but this reflects high proportion of “local” divers. A compromise between these two extremes would seem to be the most plausible scenario. Consequently the following analysis assumes a typical non-diving expenditure of £50. In both cases it was assumed that most of this non-diving expenditure takes place in the retail and accommodation sectors.
- 6.6. Table 1 presents the estimates of the impact of the sinking on the South West economy in terms of Full Time Equivalent (FTE) employment and GDP. The table also separates out the direct impact on the diving sector from the indirect impact on the rest of the economy due to non-diving purchases and multiplier effects.

Table 1: The impact of Scylla on the South West Economy

	Extra Diver Days			
	2500	5000	7500	10000
Employment (FTE)				
Direct	3.9	7.7	11.6	15.5
Indirect	3.5	7.1	10.6	14.2
Total	7.4	14.8	22.2	29.6
GDP(£)				
Direct	66,060	132,120	198,180	264,240
Indirect	101,275	202,551	303,826	405,102
Total	167,336	334,671	502,007	669,342

- 6.7. Table 1 shows that in the optimistic scenario in which Scylla generates 10,000 extra diving days for the region, the project creates approximately 30 FTE jobs. These jobs are distributed evenly between the diving and non-diving sectors. The project increases South West GDP by approximately £670,000 p.a. at current prices. In the pessimistic scenario, the project would only generate 7 jobs and a £167,000 contribution to GDP. In the intermediate scenarios, job creation varies from 15–22 and the contribution to GDP varies from £335,000 to £500,000. It should be noted that the estimates are directly related to the number of additional diver days with every 1,000 additional days generating a £66,900 contribution to GDP and approximately 3 FTE's. Thus, the projections can be used to assess the impact of alternative assumptions concerning the number of additional diving days.

- 6.8. The scenarios illustrate the range of possible benefits that might accrue from the project. The range of possibilities can be best understood by contrasting the benefits with the cost of the project. If the overall project was, say, to cost £800,000, then in the optimistic scenario this would be “paid back” in terms of local economic benefits in less than two years. In the pessimistic scenario, the payback period would be around five years. Different project costs and assumptions concerning non-diving spend would obviously change the payback period. For example, if the non-diving spend was assumed to be only £28 per day, then the corresponding GDP estimates would be reduced by approximately 20% and the payback period would be correspondingly extended in every scenario.
- 6.9. The impact estimates presented in Table 1 are for the South West economy as a whole. However, given that the main centre of diving and accommodation is likely to be in Plymouth, one would expect most of the benefits to be within the Plymouth area. There would also be some benefit to other areas that might have divers visiting the wreck, particularly South East Cornwall. There might also be some relocation of existing benefits within the region as divers visit Scylla as a substitute for other wrecks in the area. It is, however, impossible to ascertain the precise distribution of benefits or substitutions at this local level.
- 6.10. It is difficult to judge which of the four scenarios that have been presented is the most likely. The BSAC survey indicates a high level of interest in Scylla, with many respondents indicating that they would dive several times a year. The diving organisations and boat owners that we interviewed during the study were also generally optimistic. These factors would give some credence to the intermediate and optimistic scenarios. There are, however, two factors that are likely to be important in influencing the success of the project. The first is the success of the marketing and media campaign that surrounds the sinking. Most successful reefs have attracted considerable media interest and promotion by local organisations. It is critical that an effective plan is in place if the purchase of the Scylla goes ahead. This is particularly important as the repeated financial problems at Fort Bovisand have had a negative impact on Plymouth’s image as a dive centre. PADI suggested that it would be very supportive of a project involving Scylla and would be able to derive some publicity through its popular website. Some of the representatives of dive magazines spoken to at the London Dive Show also suggested that they would be interested in writing about any new project.
- 6.11. The second important factor is whether the expansion of diver numbers is hindered by supply constraints such as slipways or accommodation. An assessment of these factors is beyond the scope of the present study. Nevertheless, it is clear that the slipway capacity in Plymouth is limited and it may be difficult to deal with a substantial surge in diving numbers. With the closure of Fort Bovisand, there is also a supply constraint in terms of

dedicated diving accommodation. These factors could potentially adversely affect the success of the project.

The Economic Impact of a Centre of Excellence

6.12. It is impossible to provide any detailed quantitative estimates of the potential economic impact of a COE on the local economy until the proposals are developed in detail and the precise nature of the centre and its location are specified. However, there are a number of potential economic benefits that could accrue from such a project in addition to those estimated for the sinking of the Scylla as a stand-alone project. These include:

- The one-off benefit of any construction work associated with the project. This would be directly related to the value of any construction spending and the proportion of the work undertaken within the region.
- The benefit of any additional divers attracted to all wrecks in the area as a consequence of the existence of the centre. In principle, these benefits can be assessed by using the impact figures per additional 1,000 diving days presented in the Scylla analysis.
- Expenditure on training courses as a consequence of the expansion of training opportunities.
- Divers attracted to purchase equipment in the area due to a cluster of diving-related retail outlets.
- The additional non-diving tourists generated by facilities associated with the project e.g. cameras viewing the Scylla.

6.13. As an illustration of the potential economic benefits that could arise from a COE, SWEC has estimated the impact of the expansion of diver training facilities. This assessment is based on data provided by one of the existing training providers on the cost of training and current numbers undertaking these opportunities. It has also been assumed that the divers attending these courses spend £50 a day on non-diving expenses in line with the assumption of the previous analysis. If, plausibly, one assumes that existing training numbers (of approximately 200) increase proportionately to the increase in overall diver numbers generated by Scylla, then it is possible to estimate the potential additional impact of training.

6.14. The estimates are presented in Table 2. It can be seen that the additional benefits vary from £38,500 and 1.5 FTE jobs in the pessimistic scenario to £154,000 and 5.5 FTE jobs in the optimistic scenario. Whilst these are relatively small, they are simply based on the expansion of one existing operator and could potentially be much larger if a new centre was established. The estimates should, of course, be viewed as purely illustrative of the type of benefits that could emerge.

Table 2: The impact of the expansion of diver training

	Extra Diver Days			
	2500	5000	7500	10000
FTE Employment				
Direct	0.7	1.4	2.1	2.8
Indirect	0.7	1.4	2.1	2.7
Total	1.4	2.8	4.1	5.5
GDP				
Direct	20,791	41,582	62,372	83,163
Indirect	17,696	35,391	53,087	70,782
Total	38,486	76,973	115,459	153,946

6.15. Although the Weymouth Sailing Academy is not directly comparable to the proposal for a diving COE, the Academy provides a further illustration of the potential gains available from a focused centre. A recent study by Dorset County Council has calculated that the Academy has resulted in an increase in spending of over £2.5m and 65 full time jobs. An £8.5 million development plan has also been proposed to transform the centre into a ‘world class’ sailing facility. The new development is expected to increase the impact to £6m and 150 jobs.

Social Benefits and Costs

6.16. In addition to the economic benefits arising from the sinking of the Scylla and the establishment of a COE, there are other wider benefits that might arise. These include the following:

- The use value of the artificial reef: the current plan does not involve a direct charge for the use of the artificial reef. Thus, divers are obtaining a benefit at no cost and this is a welfare benefit of the project. Measuring such benefits is a complex exercise and, as far as SWEC is aware, the only major studies of such benefits are those that have been conducted in Florida. A study of South East Florida, for example, computes a use value of approximately £6 per person– day for the use of the reef. If Scylla had a similar use value then this could result in an additional benefit to the project of £15,000 – £60,000 p.a. depending upon diver numbers.
- Environmental Benefits: A positive aspect of the sinking of the Scylla will be the creation of an environment that will provide a breeding ground for fish and other marine life. In their proposal for the sinking of the Scylla, ARC also note the possibility of designating Scylla as part of a No Take Zone (NTZ) for fishing. Such a development could be seen as part of a wider policy to conserve fish stocks and develop more varied marine life. This would contribute marginally to the long–term sustainability of the fishing industry and may have long term social and

economic benefits. Such a policy may also enhance the experience of divers and attract researchers of marine life. ARC have been in contact with DEFRA concerning this issue, but it is clear that this process will take some time and, at present, remains a long term aspiration.

- Disabled Diving: Mount Batten has been designed with disabled people in mind and the boats of Deep Blue Diving have equipment, such as electric lifts, to facilitate disabled diving. If, as proposed, the Scylla allowed disabled diving, this would create a unique opportunity for disabled diving in the sea in the UK. Thus, the Scylla could significantly enhance the diving experience of disabled divers.
- Education and research: the possibility of linking a COE to the wider education sector has already been noted. There could be significant benefits generated by making use of the opportunities offered by Scylla. Examples might include underwater photography, marine research and greater access for the local population to diver training. The project could also be useful in promoting awareness of environmental issues e.g. if an NTZ were established.

Summary

6.17. The following key points emerge from the analysis of this section:

- The placement of Scylla is projected to add between £0.17m (pessimistic scenario) and £0.67m (optimistic scenario) to GDP p.a. and create between 7 and 30 FTE jobs within the South West economy.
- The experience of other artificial reef projects suggests that successful marketing is likely to be a key factor in determining the overall economic success of the project.
- Economic benefits from a COE might include the impact of construction work, additional divers attracted, additional tourist numbers, new business development and expenditure on training courses. A quantitative estimate of these costs and benefits is impossible until the nature of a centre, its location and sources of funding are established.
- Potential social benefits include the use value of the artificial reef, environmental benefits, enhanced opportunities for disabled diving, increased research possibilities and linking a COE to the wider community and education sector.

7. The Scylla Project and SWRDA's Targetary Framework

7.1. The aim of SWRDA is to 'improve the long-term economic performance of the South West of England' (Corporate Plan 2002/05). It therefore seeks to support key initiatives which will contribute to the region's economic success where economic success implies ensuring the highest quality environment, a high level of skills, economic inclusion, higher productivity and thriving local businesses. In order to monitor the achievement of these broad objectives SWRDA has a series of performance targets and milestones. This section briefly analyses the impact of the Scylla project within the context of SWRDA's regional outcome targets (Tier 2) and agreed annual core milestones (Tier 3).

3-year Regional Outcomes (Tier 2)

- 7.2. SWRDA has developed a series of 11 regional outcome targets based on the Government's national framework for RDA's. The project could potentially make a contribution to the **sustainable economic performance** target by increasing economic activity in marine related and tourism sectors. Similarly, it may contribute towards the **employment** target by creating job opportunities in the diving and tourism related sectors. A further possibility is that the project might encourage **enterprise** by stimulating local people to invest in new ventures to provide services to support diving related activities. It is unlikely that the project would make a significant contribution to the other regional outcome targets.
- 7.3. The contribution of Scylla, in itself, to the above regional outcome targets is likely to be modest given the expected economic benefits of the project. In the most optimistic scenario the project will create £670,000 of GDP and 30 FTE's which will not make a dramatic impact on local employment or income. However, the benefits could be enhanced over the long term by the development of a COE, although these benefits are impossible to quantify at this stage. Most of these benefits are likely to accrue in Plymouth, which is regarded as one of the key urban areas in SWRDA's corporate plan. The project would also assist in the development of the key marine related and tourism sectors. This may complement the wider priorities of the SWRDA and those of Plymouth City Council, which is currently investigating the merits of developing a marine science and technology cluster in the City.

Annual RDA Milestones (Tier 3)

- 7.4. A number of core annual milestones are outlined in SWRDA's corporate plan:
- **Employment opportunities - supporting the creation or safeguarding of jobs (net) as a direct result of SWRDA intervention.** The placement of Scylla is, in itself, likely to result in net job creation of between 7 and 30 new FTE's depending on the level of extra demand that is generated. The potential job creation arising from a wider COE

could be significantly greater but is impossible to estimate until precise proposals are outlined.

- **Employment opportunities through Foreign Direct Investment.** There is unlikely to be any contribution to this target in the short term, although in the long term, there may be some impact if Plymouth and the South West are seen as more attractive places to invest as a consequence of the presence of a COE.
- **Remediating and/or recycling brownfield land.** The placement of Scylla will not, in itself, contribute to this target. However, it is possible that brownfield land could be used for aspects of the COE project such as building extra parking facilities and creating new slipways.
- **Education and skills.** The placement of the Scylla will not, in itself, contribute to this target. However, a wider COE could make an important contribution e.g. through the development of new degree courses, links with local schools and increased opportunities for the local population to learn about the marine environment and acquire diving skills.
- **Business performance – supporting the creation/attraction of new business.** The placement of Scylla may attract new dive-related companies and businesses serving the diving sector such as the local B&B and restaurant trade. A COE could also, over the long term, attract new business development in sectors such as marine technology or medical research.

Summary

7.5. In summary, three clear conclusions emerge:

- The contribution of the sinking of the Scylla, in itself, is only likely to make a modest contribution to the achievement of SWRDA's targets.
- The development of a COE could **potentially** bring additional benefits and be of more strategic significance to the local economy. However, a more detailed proposal is required before these additional benefits can be quantified and assessed within the context of SWRDA's targets.
- The project would impact upon a key urban area (Plymouth) and be complementary to the wider priority of developing the marine related sector.

8. Overview of the Costs and Benefits of the Project

8.1. This section presents a brief overview of the benefits and costs of the Scylla project and draws conclusions from the analysis contained within the report.

Phases 1 and 2: the purchasing and sinking of the Scylla.

8.2. The funding requirement for the first two phases of the project is likely to be at least £600,000 and possibly £800,000 or more. SWEC estimates that benefits will accrue in the form of an estimated increase in GDP of between £167,000 and £670,000 p.a. and between 7 and 30 FTE jobs will be created. In absolute terms, these benefits are modest. However, these benefits are likely to "pay back" the initial investment over a relatively short period of time (2–5 years). Moreover, additional benefits may arise from factors such as the use value of the wreck, the creation of a new marine environment and enhanced opportunities for disabled diving. The project will also make a modest contribution to the achievement of SWRDA's targets, the development of a key urban area and complement the development of the wider marine sector. The Scylla is also a unique project that will help to "put Plymouth on the map" if it attracts substantial media coverage. **Thus, there is a moderately strong case for SWRDA to fund the project.** However, it is important for the SWRDA to recognise that there are a number of issues that create uncertainty as to the benefits and costs of the project:

- Some important costs remain to be finalised. These issues need to be resolved before SWRDA can be confident of the financial commitment required for the project.
- Scylla cannot be sunk without obtaining an insurance policy that satisfies Crown Estates.
- This is the first project of its type in the UK and projections of additional diver numbers are inevitably uncertain.
- The success of the project is likely to depend upon a successful marketing and media campaign.
- A successful Scylla may require additional provision of moorings, slipways etc. This issue requires more detailed consideration.

Phase 3: the development of a COE.

8.3. Whilst opinion was generally supportive of the development of a COE, there were different views as to the nature of any new development. Thus, a COE might involve a loose co-ordination of existing diving related activities, a specific site acting as a one-stop shop for diving related services or a specific site which also acts as the focus for the wider cluster of diving related activities. Clearly, the costs and benefits of a COE will depend upon

both the nature and location of a new centre. Potential benefits include the impact of any construction work associated with the project, the additional divers attracted to wrecks in the area, tourists generated by facilities associated with the project, purchasing of diving equipment in the area and expenditure on additional training courses. There may also be significant social benefits arising from increased educational and research opportunities and the long-term development of a cluster of diving related businesses. However, there are a number of uncertainties associated with the project:

- The costs of the project are uncertain until a detailed proposal is presented.
 - The success of a new COE is likely to be dependent upon the additional diving numbers generated by Scylla.
 - The viability of new retail outlets and training courses is unclear given the considerable financial difficulties of Fort Bovisand, although a successful Scylla would enhance the likelihood of success.
 - The sources of funding for the project remain to be finalised.
- 8.4. Given the above considerations a sensible option might be to **establish a framework for bringing together those organisations that are interested in the development of a centre to elaborate more detailed proposals, whilst monitoring the actual impact of the sinking of the Scylla.** This would also allow time for a more detailed investigation of alternative sites and sources of funding. This approach would effectively regard the development of a COE as a medium or long-term option.

References

A large number of documents for this study were provided by ARC and SWRDA. Other important references include:

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- Hazen, and Sawyer (2001) A Socioeconomic Study of Reefs in Southeast Florida, National Oceanic and Atmospheric Administration, USA.
- Walden, L.L. (2000) Artificial Reefs: New Life For Old Vessels.

Web-sites

Much of the background information for this study was gathered from reports on numerous web-sites. The major sites consulted were:

www.bsac.com

www.divenet.com

www.dive-southaustralia.com.

www.diveshows.co.uk

www.divewreck.co.nz

www.dti.gov.uk

www.marineeconomics.noaa.gov/reefs

www.mount-batten-centre.co.uk

www.padi.com

www.sportengland.org

www.weymouth.gov.uk

List of organisations consulted

A large number of individuals and representatives of organisations were consulted during the research for this project. The organisations consulted included:

Artificial Reef Consortium (ARC)

British Sub-Aqua Club

Caradon District Council

Deep Blue Diving

Derriford Hospital Diving and Disease Research Centre

Devon Association of Tourist Attractions

English Tourism Council

Mount Batten Centre

National Marine Aquarium

PADI International

Professional Boatmen's Association

Plymouth City Council

Plymouth College of Art and Design

Sport England

SWRDA

South West Tourism

University of Plymouth – Marine Research and Technology Centre

Weymouth and Portland Sailing Academy