

Study into Inland and Sea Fisheries in Wales

FINAL REPORT

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in association with

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Executive summary

Overview

The aquatic resources and natural heritage of Wales are amongst the country's most valuable assets, providing a steady stream of high quality seafood and angling opportunities, offering both seasonal and full-time employment, and contributing to the rich cultural heritage of the rural communities of Wales. Whilst the quality of its sea trout fishing has been widely recognised for some time, and the ports of Milford Haven and Holyhead have been long recorded as the centres of commercial fishing in Wales, lower profile, higher value, activities in both recreational and commercial fishing are less well known.

It is estimated that commercial and recreational fisheries contribute annually over £100 M to the Welsh economy, and provide the equivalent of full-time employment for some 1600 people. Whilst much of this activity is associated with rural communities, the generally good health of the sector, and the continuing strong demand for the products and services of this sector, place it in marked contrast to the farming sector where the future is less secure. And yet there is more that the sector can offer in both output and employment. In particular, further development of the sector can be seen to address three key ambitions of the newly formed National Assembly for Wales, namely:

- ◆ maintenance and enhancement of the high quality and unique conformation of the natural environment in Wales;
- ◆ development of Welsh economic output, employment and quality of life in ways that enhance rather than diminish the unique qualities of the geography of Wales;
- ◆ pursuit of the above employing sustainable systems that achieve a practical balance between economic, social and natural resource interests, and ensure the long-term viability of both rural and urban communities.

In today's highly competitive market place, the many qualities that have confounded larger scale development within the sector in Wales, and have denied local entrepreneurs the advantages that economies of scale might have offered, are now highly sought after. For seafood there is growing demand for sustainably produced, low volume, high quality produce; for recreational fishing, the demand is for quality angling opportunities in often remote and exceptional environments. Whilst there is no denying that a fragmented sector and poor distribution infrastructures continue to constrain business, there is much that quality, good practice, high environmental standards, and modern technology and communications can overcome.

For many parts of the fisheries sector the future looks good. In this report we profile each element of the sector, and identify where opportunities exist, and where weaknesses undermine future development. Building on this overview of the industry, we map out a five year integrated development strategy for the sector. Given the *ad hoc* and largely reactive nature of recent development support, weak industry infrastructure, and the generally low level of re-investment in the sector, we believe that a focused development programme has the potential to realise significant added value within the industry. Accordingly, we have put together a focused £70 M five year development and investment programme which we believe can boost output by 20 per cent, and sector employment by 10 per cent.

Contribution of Welsh fisheries to the economy

Table 1 presents the overall contribution that the various fisheries sectors make to the Welsh economy in terms of turnover each year and in terms of employment. For commercial fisheries, most of the economic benefit is represented in terms of production. For recreational fisheries, however, in addition to direct spend on the sport, much of the benefit derives from the use by visiting anglers of overnight accommodation and catering facilities. In addition to the annual economic output that the sector generates, the capital value of Welsh fisheries, as represented by property rights (notably for recreational fisheries), can be far greater than the annual contribution presented here.

The collation and extrapolation of existing data presented in Table 1 comes from a variety of sources. No similar calculation has been presented before for Welsh fisheries, and it is thought that at least some of these figures underestimate the full scale of contribution to the economy. As such, it is recommended that further work be conducted to establish more accurate figures for the economic contribution of fisheries to the Welsh economy. This is particularly important given the socio-economic importance of fisheries to certain rural communities in Wales.

Table 1. Fisheries Contribution to the Welsh Economy

	Turnover (£ millions)	Employment (FTE)
Inshore fishing ¹	8.8	598
Offshore fishing ^{1,2}	11.8	162
Processing	2.0	40
Shellfish aquaculture	2.5	28
Finfish aquaculture	4.0	99
Game angling ³	8.2	171
Coarse angling	39.4	90
Sea angling	28.7	471
Total	105.4	1,659

¹ these figures are based on data from the Seafish Fishermen's Handbook and the CEMARE report Economic and Financial Performance of the UK English Channel Fleet.

² vessels registered in Wales but that list their main port of landing as outside the country (Spain or Holland) have not been included in these calculations. Two non-flagship beam trawlers have also been excluded from the calculation, as they are known to operate mainly in the North Sea.

³ extrapolation of spend by game anglers on River Teifi, Environment Agency Report

Industry profiles

Commercial fisheries

The commercial fishing sector comprises the sea-going fleet, which is made up of large offshore vessels, smaller inshore vessels, hand gatherers and commercial diadromous fishermen.

Inshore

Inshore fishing includes activities by the small boat fleet, as well as hand gathering of shellfish, and fishing for salmon and sea trout (sewin).

The majority of registered fishing vessels in Wales are less than 10m registered length. The largest section of the Welsh fleet is made up of vessels of between five and six meters, most of which have a crew of one. Members of the inshore fleet mainly fish close to the coast for a wide range of species including bass, crabs, scallops, lobster and whelks. Many of these species are of high commercial value and high quality due to the methods of capture used and short time between capture and landing.

Hand gathering occurs to a greater or lesser extent on mud flats all round the Welsh coast. The two main shore-based fisheries are the cockle fishery in the South and the mussel fishery in the North. The largest concentration of gatherers is located in Burry Inlet in South Wales where a well-established cockle fishery supports a number of local gatherers and a local processing industry. In addition to cockles, winkles, mussels, lugworms and seaweed (for lava bread) are gathered. The majority of hand gathering is not closely regulated although some fisheries operate under Regulating Orders such as the Burry Inlet cockle fishery.

Commercial diadromous fisheries (for salmon and sea trout, eels and elvers) are in decline. Salmon netting licences are in the process of being retired by Environment Agency Wales as part of an integrated plan to help conserve and re-build stocks of salmon. Commercial elver fishing remains fairly profitable due to high demand from the Far East, where elvers are on-grown for consumption.

There is considerable scope for improvement in the economic strength of this sub-sector, primarily through initiatives aimed at countering the highly fragmented nature of the sub-sector. On the one hand these involve improved stewardship of the coastal environment, and the shouldering of greater management responsibilities by fishermen, and on the other they involve initiatives to improve industry organisation and representation, and the achievement of improved industry logistics. The growth potential in the sub-sector is good, underpinned by more focused marketing and promotion, such as the accreditation of the Burry Inlet cockle fishery by the Marine Stewardship Council.

Offshore

The offshore fleet comprises over 10m vessels that fish both within and outside the 12 mile coastal waters around Wales. A large proportion of the offshore fleet is made up of flagships – vessels registered in Wales but owned and operated by interests outside the UK. The majority of the flagships are Spanish-owned, though there are also a small number of Dutch-owned vessels. Flagships must comply with economic-linkages, but they do not contribute a great deal to the local economy as only a small proportion of fish is sold over Milford Haven auction; the majority is loaded onto lorries and transported for sale in Spain or Holland. In addition to flagships, many Dutch and Spanish registered vessels operate in the seas around Wales and land to Milford Haven but these too transport their fish out of the region. The Welsh fleet includes twobeamers, but these are operated in the North Sea, and whilst the beneficial ownership is in Wales the operation of these vessels provides little direct contribution to the local economy.

This sub-sector is relatively large in terms of economic turnover, but contributes little to the Welsh economy as most fish from the flagships is consigned to ports in Spain and most landings by the local fleet are consigned to ports outside the region. The sub-sector shows an overall downwards trend in scale and economic health due to a contraction in the resource base (TAC¹ cuts), in fleet and in the volume of landings. The relatively limited control that the National Assembly for Wales has over the offshore fishing sub-sector,

¹ Total Allowable Catch

coupled with the limited economic benefit to Wales from such activity, makes this a particularly difficult sub-sector to influence for the better.

Positive change would require heavy investment in areas such as new harbour developments and quota purchase, both of which are high risk with relatively poor chances of achieving real impact. This is not to suggest that there should be no public investment in the sector, but that a tight rein should be placed on the public purse. Potential lays in maximising the use of existing landings, the deployment of more sustainable fishing techniques, the modernisation of the fleet and improvement in the handling of fish. There is also potential in encouraging entrepreneurs to capture more added value from product before it leaves Wales.

Overall, the sector shows limited development potential under current conditions, and is likely to represent poor value for money for public or private funding investment. It also shows poor synergy with investments in other aspects of the economy outside fisheries. Any improvements to shore-based facilities such as provision of ice, storage and improvement of handling aimed at increasing the potential of the inshore fleet will also benefit the offshore fleet.

Processing

Very little processing of finfish occurs in Wales. There are a few small filleting / re-packing operations situated in Milford Haven but they suffer from a lack of continuity of supply and often have to buy product from other auctions. They employ only a handful of people.

As a result, the main centres of seafood processing in Wales are associated with the main cockle and mussel gathering / farming areas. There are four cockle processors based around the Burry Inlet in South Wales who buy from local hand gatherers. The local beds do not produce enough cockles to satisfy the processors' needs so supplies are supplemented with cockles from elsewhere. The largest processor in South Wales employs 25 full-time staff.

The main mussel growers and processors are located in the Menai Straits in North Wales, near to the mussel beds. Potential exists for the value added processing of mussels in North Wales, but to date the majority of harvested mussels is washed and packed in 25kg bags for export to the Continent where they are processed further. Additional processing such as cooking, pickling, and manufacture of ready-meals occurs outside Wales and does not, therefore, contribute to the Welsh economy.

A small amount of crab is processed by fishermen at home and sold "farm gate" style sold to passers-by. It is unclear how much crab is sold in this way or if it is caught by commercial fishermen or by unlicensed fishermen who sell it to supplement their income.

The current Welsh processing sector is small. There appears to be little interest from the industry in expanding this sector with most fish and shellfish being transported from landing and production sites to export markets where much of it is subsequently processed prior to final sale. Nevertheless, there are many opportunities for fish processing in Wales, given the high quality sources of raw material available around the coast. Processing offers great potential for capturing additional economic benefit to that achieved by primary producers, further under-pinning the viability of the commercial fishery infrastructure of Wales. The greatest potential is in encouraging small-scale local processing for local or niche market sale. The formation of co-operative ventures that can take advantage of larger premises and lower transport and marketing costs than individuals is advised.

Marine aquaculture

Marine aquaculture is mainly confined to extensive culture of mussels in the Menai Strait in North Wales. This fishery can be valued at between £2 million and £3 million annually, dependent on ruling price and destination market. Taking extremely good or bad years into consideration, this range can be between £1 million and £4 million. It should be noted that there is no direct correlation between a good year in the Menai Strait fisheries and good years in other fisheries; spat-fall, availability of seed, and grow-out conditions are each subject to local temporal conditions. Other shellfish culture operations are limited although oyster farming has been attempted in the past.

The coastal morphology of Wales does not lend itself to the sea cage culture of finfish as in Scotland and Ireland. Accordingly, the focus of fin-fish mariculture has now moved ashore, and two pioneer farms, using re-circulation systems, are currently under construction for turbot and bass – systems new to the UK.

In terms of development opportunity, there is scope for the expansion of mussel growing operations, and the development of a scale of operation that better suits the economics of local processing and ruling market conditions. Existing farms could be expanded and new ones developed by the introduction of more Regulating Orders and the collection and re-laying of spat from areas that are not conducive to on-growing to more favourable areas e.g. collection of spat from South Wales.

There may also be opportunities for more intensive husbanding of other molluscan resources, but this will be dependent on a combination of the fishery management systems applied and the ability to create and maintain the required environmental conditions. This could, for example, involve exploitation of emerging opportunities associated with artificial structures, offshore and coastal, e.g. barrages, offshore wind farms, etc ..

It should be noted that molluscan farming is very sensitive to water quality, and product destined for human consumption cannot be produced in waters below Grade B. Molluscan farming offers many synergies with efforts to maintain and improve environmental status and water quality, and most farming techniques are compatible with most forms of environmental designation.

The economics of re-circulation systems in the production of fish, shellfish and aquatic plants is improving rapidly. The use of such systems has much to offer Wales, and more in-depth exploration of their viability is to be encouraged. Given that such systems can be as easily installed elsewhere as in Wales, i.e. location in Wales offers no inherent comparative advantage, the development of advantage in this field would need to be based on the ability to control and reduce the costs of production. This could be achieved if the particular mix of academic, research and innovation resources already available in Wales could be used to form a recognised "cluster" of expertise in this field.

Freshwater aquaculture

Freshwater aquaculture is mainly concerned with the culture of salmon and trout. Salmon farming focuses on the production of parr, smolt and fry for stocking on-growing sites outside Wales. Trout farming operations produce fish for stocking commercial sport fishing ponds and rainbow trout for consumption. Most such businesses are family run and small in scale.

Some operations combine sport fishing and table production by operating "put and take" farms where anglers can fish for rainbow trout that they can keep for home consumption. In this same vein, there is increasing interest in farm based coarse fishing, for example carp

production for both re-stocking and pond/lake based fishing. There is one extant proposal for carp farming, and there are also proposals for two eel farms to be set up in South Wales.

Trout farms in Wales produced 532 tonnes of rainbow trout for table consumption. At a price of £1.80 per kg, this is equivalent to £1 M. An additional 279 tonnes of rainbow and brown trout were produced for re-stocking / on-growing. Assuming the value of these fish is equal to the value of table fish, this is a further £0.5 M.

There remains some further scope for development of the salmonid industry, but diversification on to the cultivation of other species offers the greatest opportunities. Again, re-circulation systems may have something to offer in this regard. Support to the recreational fishing sector can be expanded, focusing on the production of a range of freshwater species for re-stocking purposes. The same techniques can be used in the production of fish for the aquarium and for domestic ponds. Where local entrepreneurs are not familiar with appropriate breeding technologies, assistance can be drawn from eastern Europe, where such practices are well established.

In addition, there is a recognisable market niche for “put and take” fisheries, meeting recreational / entertainment requirements of holiday-makers, where the whole family may take part. This has the advantage of attracting the participation of those who may not otherwise be familiar with fishing as a sport. In addition, more specialist managed production and fishing units can be designed to cater more for the niche enthusiast, and also support training and coaching efforts.

Development of finfish aquaculture has particularly good synergy with development ambitions in rural locations. It can encompass the re-use of existing buildings and water management infrastructures and this fits well with national ambitions towards sustainability, high environmental quality and the more stringent environmental designations associated with much of the region.

Recreational fisheries

Recreational angling can be subdivided into game, coarse and sea angling. Angling is a hugely popular participatory sport in Wales with a wide range of target.

Game angling

There are in the region of 240 salmon and trout rivers in Wales. Of those, 26 rivers account for over 99 per cent of rod caught sea trout – the most important species to game fishing in Wales. More sea trout are caught in West Wales than anywhere else in Britain.

Other species attracting game fishermen to Wales (particularly Central and Northern areas) are grayling and brown trout. Stillwater game fishing is also to be found throughout Wales where brown and rainbow trout are targeted from bank and boat fishing in the larger reservoirs.

As an indication of the popularity of the sport, it is estimated that just over 90,000 rod-days were spent game fishing in Wales in 1999.

It is widely accepted that Welsh salmon stocks will not support further fishing pressure as the evidence suggests the stocks are currently overfished. Game fishing in Wales can, however, develop its reputation for excellent sea trout fishing, as catches remain high enough to attract visiting anglers. Future development of the sub-sector rests with

continued upgrading in river system quality and management, and more focused marketing and promotion of the quality of local fisheries.

Unlike the mature game fishing market in Scotland, there are many opportunities to increase the income derived from existing game fishing centres as well as to develop new or relatively undiscovered game fisheries. The draft "Celtic Fishing" initiative proposed by Environment Agency Wales seeks to develop a joint marketing initiative for the two countries. This offers potential benefits for Wales through association with a more established game fishing and holiday destination for overseas visitors such as Ireland, but operators in the Welsh game fishing sector need to ensure that Welsh 'product' does not suffer by comparison with the Irish.

Coarse angling

Coarse fishing is amongst the most popular recreational activities in the UK, and incorporates a strengthening competitive sport element. Wales provides a wide range of venues and species for the coarse angler, with significant corollary contribution to the local, and particularly rural, economy. Environment Agency Wales maintains a database of over 250 still water coarse fisheries in Wales, from one acre ponds to larger lakes and reservoirs. River coarse fishing opportunities are more limited, but the river fisheries on the Wye, Dee, Usk and Taff are of high quality.

There are estimated to be at least 20,000 coarse anglers in Wales. In addition, 1998 visitor surveys indicate that 408,000 visitors participated in fishing during their stay, and 56,000 of these visited Wales specifically to fish. Many of such visitors engage in coarse fishing.

Whilst the range of coarse angling species, and the concentration of sites, available in Wales is not as large as in England, the quality of fishing and impressive surroundings draw regular support from anglers in the English midlands, particularly to the larger Welsh venues. Nevertheless, there is considered to be untapped development potential in this sub-sector, potential that needs to be released through a combination of improved site management and more focused marketing and promotion.

Development of the sector displays strong synergies with the movement towards greater rural sustainability, promotion of the Welsh environment, and promotion of Wales as a tourism venue for all the family. In addition, the sector is considered to offer substantial economic and development gain, for relatively little public spend and at low risk.

Sea angling

Sea angling, comprising boat and shore fishing, is a very popular recreational activity in the UK and Ireland, and Wales is able to offer fishing to compare with the best on offer in other areas. In particular, Wales is able to offer, amongst a wide range of species, excellent shore fishing for bass, cod and whiting, and boat fishing for black bream and tope.

Little statistical information has been hitherto available for the scale and economic worth of sea angling, and despite its obvious popularity, it is often over-looked when tourism and coastal development matters are debated. With the assistance of local sea angling specialists and fishing clubs we have been able to estimate that the sport in Wales involves the participation of approximately 12,000 locally resident anglers, and upwards of 28,000 visiting anglers. Estimates of angler spend suggest that this sport makes a gross contribution to the coastal economy of Wales of over £28 million.

Despite the considerable scale of the industry as is, there remains room for improvement in the quality of the fishing available and the economic benefits that the sport can generate. A

key area of improvement is in the promotion of fishing activities to both resident Welsh anglers and visiting anglers. Fishing opportunities need to be managed, packaged and promoted effectively and existing and specialist travel agencies can supply and promote specialist fishing packages. The availability of more fishermen friendly accommodation, and particularly its specific designation and promotion, could greatly enhance the popularity of overnight stays and the economic value of this recreational activity.

There also exists potential to provide higher quality information regarding the fishing opportunities available e.g. a low cost detailed guide to sea fishing opportunities in Wales and a database to existing sea fishing web-sites (notably fishing sites, accommodation, charter boat availability, facilities and opportunities for family entertainment).

Fishery Sector Management

Fisheries sector management, with the exception of offshore fisheries, rests with the National Assembly for Wales. For offshore fisheries, management responsibility rests with MAFF. The NAWs' executive agencies in advising on and implementing fisheries policy, bearing in mind that this covers both commercial and recreational fisheries, rests with Environment Agency Wales, the Countryside Commission for Wales, and the two Sea Fisheries Committees that cover most of Wales. Development support is also provided by the Welsh Development Agency, the Wales Tourist Board and the local councils.

In general, the professional capacities and resources of the fisheries management agencies are well developed and appropriate. In terms of development support, general capacities are good, but sector specific expertise and focus is poor (largely in line with the fragmented nature of the sector). In the former area, the one exception is the role and operational structure of the Sea Fisheries Committees. These committees form the focal point for all matters associated with inshore fisheries, but whilst they possess the professional capacities to fulfil their role, they lack secure and adequate funding. Perennial concerns about funding undermine the capacity of these institutions to operate at full capacity. Given the importance of inshore fishing in the current and future mix of economic activity in the coastal zone, this issue needs to be addressed with some urgency.

As a secondary, but no less important, issue, the fact that the North Wales and North West Sea Fisheries Committee covers territories in both Wales and England compromises the linkage between the NAW and its key source of advice on management and development of inshore fisheries. As they stand at the present, the Sea Fisheries Committees report to both local government and central government, and operate through local byelaw. Consideration should be given to strengthening the formal linkage between the NAW and the SFCs.

On this basis, the NAW should press for an early review of how England and Wales SFCs are funded, the territorial coverage of the SFCs, and the institutional linkages between the SFCs and regional government.

In a third issue, it is considered that the SFCs possess the requisite expertise in marine matters, and Environment Agency Wales in freshwater issues. Areas of potential conflict arise in the management of estuarine environments and in the management of diadromous fisheries. Further, there is overlap in the roles of these bodies and those of the CCW. Despite this, co-operation between these agencies is particularly strong, but would benefit from more formal structure. This could be achieved by a combination of framework planning, where agencies work out common operational plans in the areas where they overlap (an extension of the local environmental action plans and integrated coastal management plans already in circulation), and the development and sharing of a case

record, documenting decisions and arguments that have been addressed in one area which can also be applied in others. In addition, EAW should retain its seaward responsibilities in respect of diadromous fisheries, but consideration should be given to releasing responsibility for some estuarine environments to the SFCs (notably the Dee and areas of the Severn).

Development potential

Table 2 summarises the current contribution to the economy and development potential of the main sectors of the Welsh industry – fishing, processing, aquaculture and angling. The table brings together all the information gathered about each sector. The costs, risks, synergy, etc. of investing public funds in the sector have been evaluated on the basis of information gathered, recent trends and the consultants' knowledge of the future development of the fisheries industry.

Linkage between the high quality of the natural environment and the health of the fisheries sector is well established. Indeed there are particularly strong impacts associated with recreational and inshore fisheries, both of which depend on the high quality of coastal, river, and lake environments. Yet despite the high standing of much of the aquatic environment in Wales (in the order of ninety per cent of the coastline is subject to one form of environmental designation or another), there is still considered to be room for further improvement.

Of note, achievement of greater efficiencies in the husbanding and harvesting of coastal resources is likely to generate substantial increases in the value of landings. In addition, such improvements offer the potential for the evolution of small niche seafood processors, a development that is difficult with current supply chain structures. In the area of aquaculture, the exploration of innovative aquaculture and habitat management systems that focus on integrated low effluent systems have the potential to revolutionise environmental management at the land / water interface. For recreational fisheries, it is felt that much added value can be generated through the combination of improved marketing and promotion, and improvement in the quality of sector facilities and services.

In general, whilst Wales offers a unique geography and mix of aquatic resources and exploitation patterns, it does not display innate comparative advantage over similar environments and exploitation patterns found in the UK and western Europe. Efforts to enhance economic contribution, let alone achieve comparative advantage, will require clear vision, strong leadership and confidence in the appropriate allocation of financial and skilled resources. This strategy provides the beginnings of a framework for such advance, but much further debate, planning and action will be needed to convert these strategic thrusts into positive and sustainable development. It will be necessary for public agencies to seek funding from sources far outside simply the Financial Instrument for Fisheries Guidance (FIFG) and other structural funds, but to tap into other sources of development funding and to mobilise private and institutional investment funds.

Re-establishing the balance of interest between economic, social and natural resource is now more firmly on the agenda. It is this that forms the main thrust of the fishery development strategy. The strategy focuses on the common cause of economic operators and environmental interest groups, and the synergy that exists, and can be enhanced, across sectoral borders.

Table 2 - Development potential by sub-sector

	Fishing		Processing	Aquaculture		Coarse	Angling Game	Sea
	Inshore*	Offshore		Shellfish	Finfish			
a. Economic contribution	£8.8M	£11.8M	£2M	£2.5M	£4M	£39.4M	£8.2M	£28.7M
b. Employment	598	162	40	28	99	90	171	471
c. Recent trend	↑	↓↓	↔	↔	↔	↑↑	↔	↑
d. Cost	££	£££££	£££	£	££££	£	£	£
e. Risks	xxx	xxxxx	xxx	xx	xxxx	x	xxx	x
f. Returns	£££	£	££	££££	££££	££££	£££	£££££
g. Synergy	****	*	***	*****	****	*****	*****	****
h. Cost effective	££££	£	££	££££	££££	££££	£££	£££££
i. Ranking	*****	*	***	**	**	*****	****	*****

* Inshore figures include shore-based fisheries

Key

- Economic Contribution.** Estimated current economic contribution (from Sections 2 - 5).
- Employment.** Estimated employment (from Sections 2 - 5).
- Recent trend.** An indication of whether the sub-sector has expanded or contracted in the last five years.
- Cost.** An indication of the scale of public sector investment considered to be required to bring about a significant level of development in the sub-sector, where £££££ indicates greatest investment and £ the least.
- Risks.** An indication of the risk that such public investment might not achieve the desired development gain, where xxxxx indicates the greatest risk and x the lowest.
- Returns.** An indication of the scale of development gain that public sector investment could stimulate, where £££££ indicates the greatest gain and £ the least.
- Synergy.** The degree to which development in the sub-sector is likely to underpin other NAW development ambitions, where ***** indicates the greatest synergy and * the lowest.
- Cost effective.** The cost-effectiveness of public sector investment - a combination of the leverage that development expenditure might be expected to achieve, tempered by the risk attaching to the desired results not being achieved (combines d and e). £££££ indicates the most cost-effective areas for public fund investment and £ the least.
- Ranking.** The importance that should be given by public agencies in allocating scarce development resources between sub-sectors, where ***** indicates the most important areas for development and * the least.

These synergies are captured within the strategy by:

- ◆ raising awareness of the scale and profile of the existing economic, social and environmental contribution of fisheries to Wales and pin-pointing where exploitation of fishery sector opportunities also contributes to sustainability and the achievement of environmental improvements
- ◆ encouraging a focus away from exclusive environmental conservation influences towards sustainable exploitation
- ◆ encouraging a planned and strategic response to development opportunities through the re-orientation and stream-lining of institutional networks and the provision of dedicated sectoral development support
- ◆ re-focusing public sector investment on the facilitation of development, actively promoting exploitation of development opportunities rather than simply responding to requests for capital and infrastructural support
- ◆ creating comparative advantage in sustainable aquatic environmental management and exploitation by channelling Welsh R&D, entrepreneurial and venture capital resources towards the development and commercial exploitation of both low and hi-tech aquatic management systems.

The main beneficiaries of this strategy are the fishery related businesses in rural and coastal communities where alternate economic opportunities are limited and where the future viability of the community is closely allied to the high quality of the surrounding environment and the application of more sustainable practices.

Overall programme dimensions

Overall, a programme of development expenditure of £60 million is proposed comprising about sixty per cent public funding, and forty per cent private investment. It is proposed that this development thrust be underpinned by attracting research funding of approximately £10 million.

At the core of the strategy is the Objective 1 programme. Valued at £55 million over five years, this is expected to draw down a little over half of its funds from EU structural assistance, match funding from local and central government of 6 per cent, and a little under forty per cent from private investment.

£31 M of expenditure is programmed under Objective 1 sub-measure 5.9 – “support for fisheries and aquaculture”, and £22 M split between sub-measures 5.7, and 5.8 – “a sustainable countryside – enhancement and protection of the natural environment and countryside management (EAGGF)” and “support for recreational opportunities and management of the natural environment (ERDF)” respectively. A further £2 M is programmed under sub-measures 1.1 (assistance to SMEs) and 2.1 (information and communications technology infrastructure).

At the end of the five year programme the sector will be expected to be in better financial shape, operating more efficiently and profitably, employing practices that focus on value rather than volume, and operating sustainably within the capacities of the natural resource systems on which the businesses depend.

The thrust of this programme is to provide an environment in which fishery related businesses will prosper (54 per cent of programme funding). This is achieved through:

- ◆ **Facilitation** in the form of the focused umbrella projects Seafood Wales and Fishing / Angling Wales and incentives towards stronger representation within the industry (4 per cent).
- ◆ Achievement of **improvements in resource management systems** as they apply to both commercial and recreational fisheries (8 per cent).
- ◆ Redirection of fishing activities to embrace **more sustainable practices** (5 per cent).

Support is also provided in the form of infrastructure improvements through programmes of **habitat improvement** (18 per cent) and **upgrading of harbours** (18 per cent), with the emphasis on small harbours, jetties and launch sites. Further support is provided in the promotion of **higher levels of research and development expenditure** through the Aqua-Innovation project (3 per cent), drawing down up to £10 million in additional EU, public and private sector research funding from sources largely outside the Structural Fund programmes.

Direct support in promoting business growth and achieving improvements in the quality and value of associated products and services will be provided along three fronts. Support in **business development** will be provided to both new and existing ventures (19 per cent). Support in establishing **standards of practice and quality**, and in meeting such standards, will be provided (20 per cent). Stimulation of additional business, based on the high quality of products and services available in Wales, will be provided in focused **marketing and promotion** programmes (6 per cent).

The composition of the Wales fishery development programme is summarised in Table 3 below.

Table 3 Proposed programme expenditure by category

	Total	£'000		
		EU	Public	Private
Objective 1 programme				
Facilitation	2,950	2,218	223	510
Improved resource management systems	4,150	2,693	258	1,200
Adjustment of fishing effort	2,719	1,419	186	1,114
Physical infrastructure	19,880	12,440	1,494	5,946
Quality control	11,153	5,784	558	4,777
Business development	10,300	3,770	515	5,990
Marketing and promotion	3,400	1,815	170	1,415
Total	54,552	30,138	3,403	20,952
		55%	6%	38%
Non-Objective 1 programme¹	5,000	3,500	500	1,000
		70%	10%	20%
Research and Development²	10,000	7,000	1,000	2,000
		70%	10%	20%

¹ – includes other structural fund programmes and funding under specific European Community initiatives, such as INTERREG.

² – comprises drawings on the EUs Framework Five Programme, central government research programmes, the matched funding elements of such programmes, and contract research.

Facilitating change - spearhead initiatives: Seafood Wales, Angling/Fishing Wales and Aqua-Innovation

Providing the institutional mechanism for realisation of the development opportunities identified, it is proposed to establish facilitation services in two programming offices, and one co-ordination body. The facilitation services are to be provided through two umbrella initiatives under which projects to support the development opportunities outlined in the previous section can be pursued. These umbrella projects are:

- ◆ **Seafood Wales** – dealing with commercial fisheries and aquaculture and
- ◆ **Angling / Fishing Wales** – dealing with recreational fishing

It is proposed that the bodies fall, respectively, under the organisational control of The National Assembly for Wales in the case of the Seafood Wales project, and Environment Agency Wales in the case of the Angling / Fishing Wales project.

As the vehicle for placing Wales at the forefront of technology and practice in integrated aquatic resource management, it is proposed to form a strategy group under the heading **Aqua-Innovation**. The mandate of this group will be to act as a catalyst in bringing together financial and human capital in the development and application of innovative aquatic resource management and exploitation systems, and associated sustainable technologies and production systems.

Seafood Wales

Dealing with commercial fishing, aquaculture and processing industries, this programme will be organised by the National Assembly for Wales.

There are four main thrusts to the Seafood Wales project:

Business	Including harbour developments; start-up grants to encourage new entrants; vessel modernisation/training grants (which do not increase capacity e.g. improving catch quality, working conditions); safety grants; grants for diversification into other fisheries or activities; fishing heritage; local processing development
Promotion / marketing	Promotion of specific sustainable inshore fisheries; promotion of Welsh fisheries in general
Pilot studies / feasibility studies / R&D	Investigations into new fisheries; new aquaculture techniques and species; processing ventures (R&D for new products and services).
Conservation / management	Stock conservation & management schemes; education; formation of representative bodies.

Angling / Fishing Wales

Dealing with recreational fishing this programme will be organised by Environment Agency Wales. This project is a broadening of the existing Fishing Wales project being undertaken by the Environment Agency Wales and the Wales Tourist Board, building on the success of

this initiative. The name “Fishing Wales” is already established and it may cause confusion to change it at this stage but it is recommended that “angling” is specifically mentioned in the project heading in order to avoid any confusion with commercial fishing.

There are four development thrusts to the project:

Business	Development of new and existing fisheries (improved facilities, access, coaching); development of associated industries (angler-friendly accommodation); development of code of conduct (managers and users).
Tourism / marketing	Promotion of Welsh angling; “one stop shop” for visitors; development of web-based resources; accreditation scheme for fisheries and facilities; information provision; development of specialist fishing holidays; angling competitions.
In Wales promotion	Development of the sport; coaching qualifications
Conservation / management	Habitat improvement projects; restocking; management; water quality; research; education.

Aqua-Innovation

The Aqua-Innovation programme is explicitly set-up to support and add value to the development activities of the umbrella initiatives, Seafood Wales and Angling / Fishing Wales. It is charged to identify, support and promote the development and promulgation of front-line technology and integrated management systems in all aspects of aquatic environment management and exploitation. It will achieve this by encouraging public / private partnerships in applying for applied research funding from all available sources.

Key aspects of its operation will be:

- ◆ the establishment of research priorities in aquatic resource management and exploitation, as a service to both public and private sector funding agencies;
- ◆ the sponsoring / commissioning of specialist reports in support of such advice;
- ◆ the establishment of a case record database of best practice (web-mediated) as a means of further promoting excellence within Wales; and
- ◆ the organisation of an annual conference to promulgate Welsh achievements in this area, and exchange experience with sector practitioners from other geographic areas.

Key areas of research activity are likely to be in relation to environmental management systems, integrated coastal management systems, catchment area management systems, and water-based elements of rural diversification.

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1. Introduction

Wales is a country of great geographic diversity - a diversity that is reflected in the wide range of eco-systems to be found within its borders and the discrete distribution of its natural and human resources. Indeed, a defining element of this geography is the wealth of its aquatic resources; from its many lakes and reservoirs feeding its fast flowing rivers; to its long and largely unspoilt coastline and the rich waters of the Irish and Celtic Seas.

The aquatic resources and natural heritage of Wales are some of its most valuable assets and offer employment, homes and a way of life to many people. These areas of the Welsh countryside often correspond to regions of high unemployment and low income, but there is great potential to develop the aquatic resources and economies of these areas.

Nautilus Consultants in Association with EKOS Economic Consultants were commissioned by the National Assembly for Wales to undertake a study into the inland and sea fisheries of Wales and formulate a development strategy encompassing all sectors of the industry. The study and development strategy are designed to support the Objective 1 funding plans for Wales and contribute to the co-ordinated socio-economic development of the coastal and rural Welsh economies.

The fisheries in Wales can be subdivided into three sectors – commercial fisheries, recreational fisheries and aquaculture. The following report examines each of these sectors in turn, providing a description of the current status of the sector, identifying strengths, weaknesses, opportunities and threats and identifying development potential. The fisheries / environmental interactions are also examined for each of the sectors.

The associated fish processing industry is also examined, as are the structure and responsibilities of the various fisheries management bodies – MAFF, the National Assembly for Wales, the Sea Fisheries Committees (SFCs), the Environment Agency Wales and other bodies with an interest in the regulation of fisheries.

The final sections present a development and supporting funding strategy within the context of the whole Objective 1 strategy for Wales and taking into account the over-arching strategies on sustainability and rural development that have been recently published by the National Assembly for Wales.

2. Commercial fisheries

The commercial fisheries of Wales can be broadly divided into four sectors – offshore fisheries, inshore fisheries, shore-based fisheries undertaken by hand gatherers and diadromous fisheries which take place in coastal, estuarine and riverine waters.

This section gives a brief overview of the state of fish stocks followed by a short profile of each sector within the commercial fisheries of Wales including its contribution to the economy in terms of value and employment. The fisheries / environment interactions are explored then explored. The strengths, weaknesses, opportunities and threats inherent in the commercial fisheries sector are assessed and potential development options are identified.

2.1 State of fish stocks

2.1.1 Finfish

The International Council for the Exploration of the Seas (ICES) advise the EU on the health of fish stocks. ICES gives advice in terms of the spawning stock biomass (SSB) and fishing mortality of the different stocks. SSB is defined as the amount of fish in the population able to reproduce (expressed as weight). Fishing mortality is a measure of the proportion of a stock killed in a year by fishing. ICES propose precautionary levels for SSB and fishing mortality at which the probability of the stock collapsing is low. They also propose limits for SSB and fishing mortality. If these limits are reached or breached, the probability of the stock collapsing is high. ICES advise that these limits should not be breached.

The Welsh coast is surrounded by waters of the Irish Sea (ICES sub-area VIIa) and south of the Pembrokeshire coast by the Celtic Sea (sub area VIIg & f). Map 1 shows the ICES Areas around the UK. Table 2.1 shows the EU TACs set for Area VII species for 1999 and 2000 and the percentage change in the TACs. The status of the stock is also given, as defined in the EC Council list of critical stocks. Ten of the twenty species listed in table 2.1 are considered to be overfished or at risk of depletion. These stocks are at risk of collapse if fishing effort continues at current levels.

In addition to the quota species targeted around the Welsh coast, many non-quota species and shore-based fisheries are prosecuted. Non-quota species stocks are deemed to be healthy enough to withstand unregulated fishing but some measures to protect stocks are in place such as minimum landing sizes (MLS) and Sea Fisheries Committee (SFC) byelaws. In particular, the bass fishery has come under increasing pressure in recent years from commercial fishermen diversifying into other fisheries and increasing effort from recreational and unlicensed fishermen. Fishing is restricted on bass nursery grounds around the coast and MLS has recently been raised by the South Wales Sea Fisheries Committee (SWSFC) – a somewhat contentious issue with local fishermen.

Non-quota species stocks are not as closely regulated or studied as quota species stocks and the health of the stock is determined largely by short studies or anecdotal evidence. It is, therefore, inevitable that some disagreement about the state of the stocks exists. A potentially serious threat to all stocks is the exploitation by unlicensed fishermen who do not respect MLS, closed areas or seasons and continue to profit from their activities.

Map 1. ICES areas around the UK

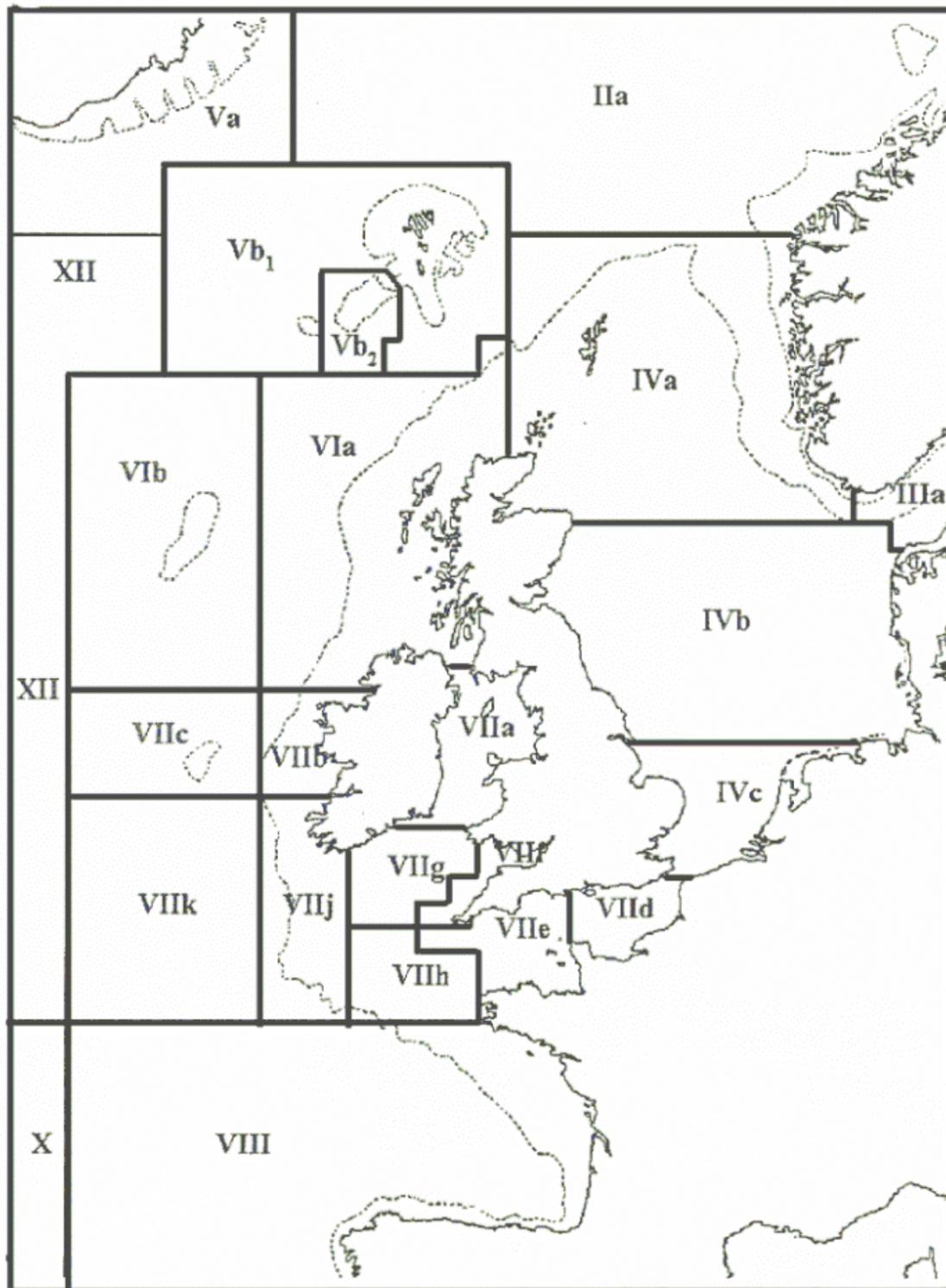


Table 2.1 State of Area VII stocks

ICES Area	Species	1999 TAC	2000 TAC	% change	Status *
VIIa	sole	900	1,080	20%	OF
VIIId	sole	4,700	4,100	-13%	OF
VIIe	sole	700	660	-6%	DR
VIIIfg	sole	960	1,160	21%	DR
VIIhjk	sole	720	720	-	DR
VIIa	plaice	2,400	2,400	-	FE
VIIId	plaice	7,400	6,500	-12%	FE
VIIIfg	plaice	900	800	-11%	DR
VIIhjk	plaice	2,400	1,350	-44%	DR
VIIa	cod	5,500	2,100	-62%	DR
VIIb-k	cod	19,000	16,000	-16%	OF
VIIa	whiting	4,400	2,640	-40%	-
VIIb-k	whiting	25,000	22,500	-10%	-
VII	saithe	8,800	6,500	-26%	-
VII	angler	26,670	23,000	-14%	OF
VII	megrin	22,400	17,920	-20%	FE
VII	haddock	22,000	13,200	-40%	FE/OF
VII	hake	30,910	23,600	-24%	OF
VII	pollack	17,000	17,000	-	-
VII	nephrops	23,000	21,000	-9%	FE

* from www.marsource.maris.int

Key

DR	Depletion Risk	Spawning Stock Biomass (SSB) is below Minimum Biological Acceptable Level (MBAL) or is likely to be below MBAL in the short-term future if fishing mortality remains at current levels.
OF	Overfished	Moderate to substantial gains in long-term yield can be expected if fishing effort is decreased. If the stock is heavily overfished there is a medium-term risk of the SSB falling below MBAL and the status of the stock falling to DR.
FE	Fully Exploited	No substantial long-term gains or losses to the stock are likely if fishing effort remains the same or is moderately increased or decreased.
SSB	Spawning Stock Biomass	The amount of fish in the population able to reproduce (expressed as weight)
MBAL	Minimum Biological Acceptable Level	The critical lower level of stock size for any species above which stocks should be maintained
	Fishing Mortality	The proportion of fish in a stock that is killed by fishing

2.1.2 Shellfish

Shellfish stocks are also protected by MLS and a lobster V-notching scheme is operation in both North Wales and South Wales. Lobster and crab are important stocks for many inshore fishermen. Both the North West and North Wales Sea Fisheries Committee (NW&NWSFC) and the South Wales Sea Fisheries Committee (SWSFC) have investigated the possibility of setting up a lobster hatchery to re-stock local waters with juvenile lobster. The NW&NWSFC is likely to proceed with its plan for a hatchery while the SWSFC is looking at sourcing lobster stock from the lobster hatchery being developed in Cornwall.

The continued health of lobster and crab stocks is essential to the continued economic viability of the inshore fleet. V-notching schemes and MLS are important for the protection of stocks but many

fishermen are concerned about the pressure exerted on stocks by recreational and unlicensed fishermen that do not always respect these schemes. Crustaceans caught by recreational and unlicensed fishermen often find their way into local restaurants, pubs, etc. via the “grey economy”. If local businesses buy such catches, especially if they are made up of undersized individuals, the effectiveness of stock conservation programmes is undermined. This poses a potentially serious risk to the local industry.

Cockles are protected by restricting the number of gatherers in certain areas (Burry Inlet and Caernarfon) but in other areas gathering cockles, mussels and other shore dwelling organisms is unrestricted and the only methods available to restrict exploitation are MLS and the option to close the fishery. Such unrestricted fisheries are prosecuted by regular gatherers and by opportunistic gatherers that travel from outside the immediate area to target stocks in years of plenty. The increase in pressure on stocks by increased local effort and an influx of gatherers from outside the area can rapidly deplete shellfish stocks. This can lead to a “boom and bust” cycle in landings from one year to the next, seen in historic landings data from the Three Rivers cockle fishery.

2.1.3 Diadromous fish

Diadromous fish are those that spend part of their life cycle in fresh water and part in the ocean. Commercially fished diadromous fish include salmon, sea trout and eels. Stocks of Atlantic salmon (*Salmo salar*) in Wales and indeed throughout Europe are in a poor state. It is unclear what is affecting salmon stocks but the number of multi-sea winter fish (fish that stay at sea for more than one year) have been affected particularly badly, pointing to at-sea pressures being a major factor. Degradation of fresh water habitats in which salmon spawn and the young salmon grow before migrating to sea is also a potential problem. Both ICES and the North Atlantic Salmon Conservation Organisation (NASCO) provide advice concerning the state of Atlantic salmon stocks. Measures exist to protect salmon in rivers and at sea throughout the North Atlantic region, such as the prohibition on taking spring running salmon, bag limits and the various Salmon Action Plans devised by the Environment Agency for each river. If these efforts and habitat restoration schemes are effective, stocks should increase but this is likely to take at least five to ten years.

Conversely, sea trout stocks in Wales are relatively healthy. Sea trout and brown trout are effectively the same species *Salmo trutta* but those that migrate out to sea become “sea trout” (also known as “sewin”), while those that remain in fresh water are “brown trout”. Salmon and trout populations are often found in the same watercourses and factors that affect salmon populations such as habitat degradation and pollution also affect trout. Brown trout can be forced to migrate if riverine conditions become unfavourable. Anglers cite a shortage of food in rivers as causing brown trout to migrate and become sea trout. Sea trout do not migrate out to sea as far as salmon and return to rivers after a much shorter period in the marine environment.

Relatively little is known about the biology and life history of the European eel, *Anguilla anguilla*, but it is possible that all European eels belong to the same breeding population. Commercial fisheries exist for all life stages of European eels. Few catch records exist but those that do point to a decline in the stock of all life stages and in recruitment. It is thought that an increase in fishing effort has maintained catches despite this stock decline. ICES have advised the EU that stocks of European eels are outside safe biological limits and that the fishery is unsustainable in its current form.

In response to declining numbers of all life-stages of eel, the Environment Agency has drafted a *National Eel Management Strategy*, along the lines of similar strategies produced for the management of coarse fish and salmon. It recognises that all European countries with an interest in eel fisheries need to work together if stocks are to be protected and enhanced whilst maintaining a viable eel and elver fishery. The Strategy is currently in the consultation phase and few practical stock conservation measures have been implemented yet.

2.1.4 Quota

Under the common fisheries policy, many commercial fisheries are managed by the setting of Total Allowable Catches (TACs). In the UK, Fish Producer Organisations (POs) are responsible for allocating the majority of the UK's share of TACs to individual vessels. Stocks that are not managed by TACs are known as "non-quota species" and are deemed to be of a sufficiently healthy status to allow unrestricted fishing.

Fishermen can opt to be members of Fish Producer Organisations. A PO is an EU inspired organisation that not only has the task of managing quotas on behalf of its members but also the task of meeting with defined EU marketing regulations such as grading fish on landing and the co-ordination of supplies. Those vessels within a PO are known as "the sector". Those who are not members of a PO fish against monthly restrictions set and administered by the Government fisheries departments. They are known as "the non-sector". Each vessel in the non-sector is entitled to catch a certain amount of quota species each month dependent on the vessel's track record.

The UK under 10m fleet fishes against a central pool of quota, which is set aside specifically for the fleet and is administered nationally by the Government fisheries departments. As landings by the under 10m sector are not required to be recorded in log books, fishing continues until the central quota is assumed to be exhausted.

The Welsh fleet fish primarily in ICES Area VII. There are three main POs that exploit fisheries in Area VIIa (Irish Sea) and three main POs that exploit fisheries in Area VIIb-k (South West and English Channel fisheries).

Main Area VIIb-k POs	Main Area VIIa POs
◆ Wales & West Coast Fish Producers' Organisation	◆ Northern Irish Fish Producers' Organisation
◆ Cornish Fish Producers Organisation	◆ Anglo North Irish Fish Producers' Organisation
◆ South West Fish Producers' Organisation	◆ Fleetwood Fish Producers' Organisation

The Wales & West Coast FPO (W&WCFPO) is the only Welsh based PO. It is geared towards the needs of Anglo-Spanish flagships. Welsh vessels that opt to join a PO join one of the POs based elsewhere in the UK e.g. South Wales vessels tend to join the Cornish FPO (CFPO).

The majority of Welsh registered fishing vessels are under 10m or belong to the non-sector. These vessels fish against centrally allocated monthly quotas and cannot buy, sell or lease quota to balance their fishing effort with their catch. Table 2.2 illustrates the distribution of the UK's Area VII quota between the six main POs, the non-sector and the under 10m fleet.

The under 10m and non-sector fleets have relatively little quota compared with that of the POs. The under 10m fleet has a large proportion of sole, plaice and cod quota for Area VII but this has to be shared among all under 10m vessels in the area. Many under 10m and other vessels change fishing methods depending on the availability of fish, quota and market conditions. They target both non-quota and quota species to enable them to continue fishing if quota is scarce. Larger vessels may also target non-quota species if quota is in short supply. There is, however, a general lack of quota among Welsh boats especially for high value species such as sole.

Table 2.2 Relative share of 1999 UK TACs for seas around Wales

ICES Area	Species	Percentage of UK quota allocation							
		SWPO	CFPO	W&WCFPO	NIFPO	ANIFPO	Fleetwood	Non sector	< 10m
VIIa	sole	40	9	-	9	8	12	4	5
VIIId	sole	43	5	-	-	-	-	5	36
VIIe	sole	70	18	-	-	-	-	1	7
VIIIfg	sole	44	43	-	-	-	-	1	4
VIIhjk	sole	41	53	-	-	-	-	-	-
VIIa	plaice	9	4	-	23	19	27	6	4
VIIde	plaice	44	11	-	-	-	-	7	25
VIIIfg	plaice	21	58	3	1	-	-	3	8
VIIhjk	plaice	22	52	22	-	-	-	1	-
VIIa	cod	1	2	-	42	37	11	2	1
VIIb-k	cod	11	32	7	-	-	-	6	35
VIIa	whiting	-	1	-	48	35	5	2	1
VIIb-k	whiting	30	26	12	2	1	-	10	11
VII	saithe	1	16	15	14	7	1	3	1
VII	angler	13	35	30	3	2	1	11	3
VII	megrin	8	48	35	-	1	-	7	1
VII	haddock	3	23	6	23	25	5	4	2
VII	hake	2	12	37	8	4	1	16	-
VII	pollack	8	43	14	5	3	1	7	10
VII	nephrops	-	1	5	56	30	1	3	2

Source: MAFF

2.2 Offshore fisheries

The main concentrations of sea fishing vessels are found in Milford Haven in the South and Holyhead in the North, although fishing vessels can be found in small ports all round the Welsh coast. For the purpose of this report offshore vessels will be considered to be those vessels over 10m registered length and offshore waters will be considered to be those outside 12 nautical miles. These definitions are somewhat arbitrary but they are commonly used and conform well to vessel and landings data produced by MAFF.

There are currently 70 over 10m vessels registered in Wales (15 per cent of the total Welsh registered fleet). Of these, approximately 50 are Anglo-Spanish flagships, one is a Dutch flagship and two are beam trawlers that although registered in Wales, operate in the North Sea.

Table 2.3 shows the distribution of all 452 vessels registered and administered by the MAFF Fisheries Office in Milford Haven in ports around Wales, highlighting the ports in which offshore vessels are registered. Thirty-five of the vessels registered in Wales do not normally use any of the ports in Wales but operate from overseas ports in Spain and Holland. These are flagship vessels – UK registered vessels that are owned and operated by interests outside the UK. Other flagships do operate out of Welsh ports and most are based in Milford Haven. Data is only available for registered fishing vessels. Map 2 shows the location of the ports.

Anecdotal evidence from local fishermen indicates that there is tension between some port and harbour operators and fishermen. Harbour operators are unwilling to allow commercial fishermen to land to some ports, preferring to provide facilities for yacht and other pleasure craft owners. Such action compounds the problem of finding suitable landing sites for the Welsh fleet and makes fishermen feel unwelcome in their local area.

Table 2.3 Fleet distribution in Wales

Port from which vessel normally operates	Number of registered fishing boats	
	All vessels	>10m vessels
Welsh ports		
Aberaeron	2	-
Aberdaran	10	-
Aberdovey	5	-
Aberystwyth	12	-
Anglesey	12	1
Bangor	4	3
Barmouth	7	3
Beumaris	4	-
Caernarvon	7	-
Cardiff	3	-
Cardigan	18	-
Caemes Bay	6	1
Chester	1	-
Conwy	11	1
Fishguard	18	-
Holyhead	26	5
Llanelli	30	-
Menai Bridge	2	-
Milford Haven	99	12
Mostyn	4	-
New Quay	6	1
Newport	3	-
Penrhyn	3	-
Port Talbot	5	-
Porthmadog	4	-
Pwllheli	38	2
Rhyl - Connahs Quay	12	-
Solva	6	-
St. Davids	8	1
Swansea	35	4
Tenby	1	-
Three Rivers Area	13	-
Trefor	2	1
Non-Welsh ports		
La Coruna	20	20
Ondarroa	5	5
Vigo	1	1
Unspecified Spanish port	8	8
Unspecified Dutch port	1	1
Total	452	70

Source: MAFF

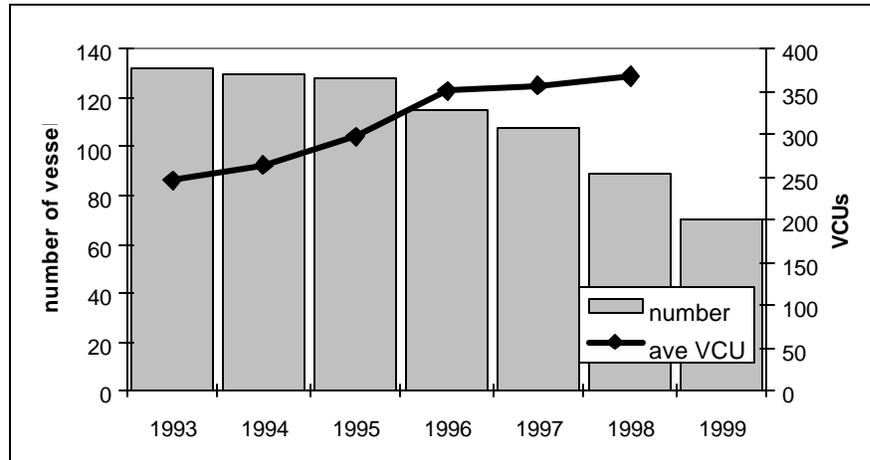
Map 2. Location of ports around the Welsh coast



The Welsh fleet, like the UK fleet as a whole, has been contracting but the average power and catching capacity of the fleet has, however, increased. Figure 2.1 below shows the evolution of the fleet since 1992. Vessel Capacity Units (VCUs) are used as a measure of a fishing vessels power and are calculated using the following formula:

$$\text{VCUs} = \text{overall length (m)} \times \text{breadth (m)} + (0.45 \times \text{engine power (kW)})$$

Figure 2.1 Evolution of the Welsh >10m fleet



Source: MAFF Fisheries Statistics 1998

Between 1993 and 1999, the Welsh fleet contracted by 62 vessels, a decrease of 47 per cent. Eighteen of these vessels left the fleet as part of the last round of decommissioning between 1992 and 1996. These eighteen vessels account for 29 per cent of the total contraction. The reason for the other 44 vessels leaving the fleet is unclear. Based on interviews with members of the industry, it is known that several vessels have not ceased to fish, but have moved outside Wales for example to Scotland where fishing opportunities and facilities are perceived to be better. A proportion of the loss will also be due to Anglo-Spanish vessels leaving the industry.

Table 2.4 Age of Welsh over 10m fleet (as at 31st December 1998)

Age (years)	5 - 12	13 - 17	18 - 22	23 - 27	28 - 32	33 - 37	38+
No. vessels	20	9	4	18	9	14	15
% fleet	22	10	4	20	10	16	17

Source: MAFF Fisheries Statistics 1998

The table above illustrates the increasing age of the over 10m fleet in Wales. The Anglo-Spanish flagships contribute to the large number of old vessels in Wales. There are no over 10m vessels under five years old currently registered in Wales. The average age of Welsh fishermen is also high. Vessel owners and operators are finding it difficult to recruit young crew and many skippers are approaching retirement age.

In addition to the Welsh registered fleet, offshore vessels from ports outside Wales fish in the waters around Wales and land to Welsh ports. Belgian vessels make approximately 300 landings per year into Milford Haven and French trawlers make approximately 100 landings per year. Irish vessels occasionally land to Milford Haven and a Faroese vessel that fishes for orange roughy off the Azores also regularly lands to the port. Vessels from North Devon and Cornwall regularly fish in the waters around Wales and scallopers from Scotland are also seasonal visitors.

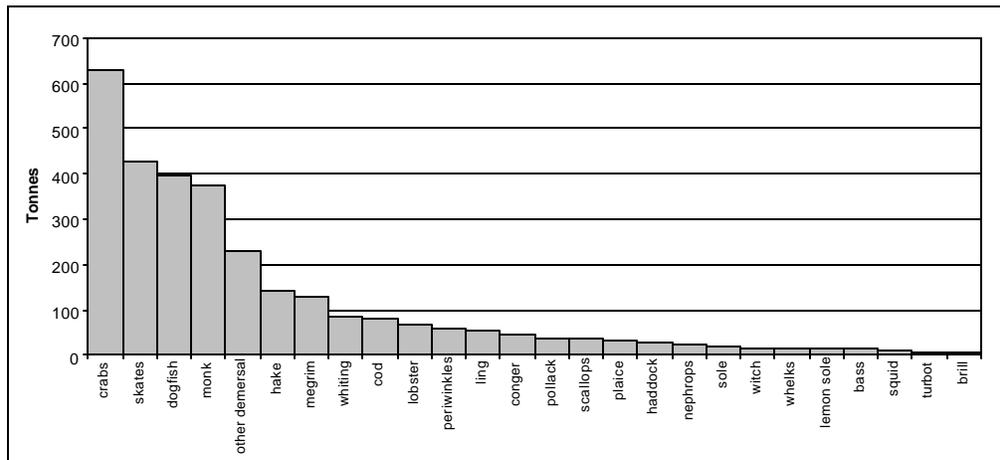
Fishermen's organisations

The only Wales based offshore fishermen's organisation is the Wales & West Coast Fish Producers Organisation (W&WCFPO). At the 1st January 1999, the PO had 51 vessels in its membership. The PO was set up for and is geared towards the needs of Anglo-Spanish flagships. The PO does not exclude other vessels from joining but the needs of the flagships and, therefore, the priorities of the PO are not the same as those of Welsh owned vessels. Welsh vessels that opt to join a PO join one of the POs based elsewhere in the UK e.g. South Wales vessels tend to join the Cornish FPO (CFPO).

2.2.1 Landings

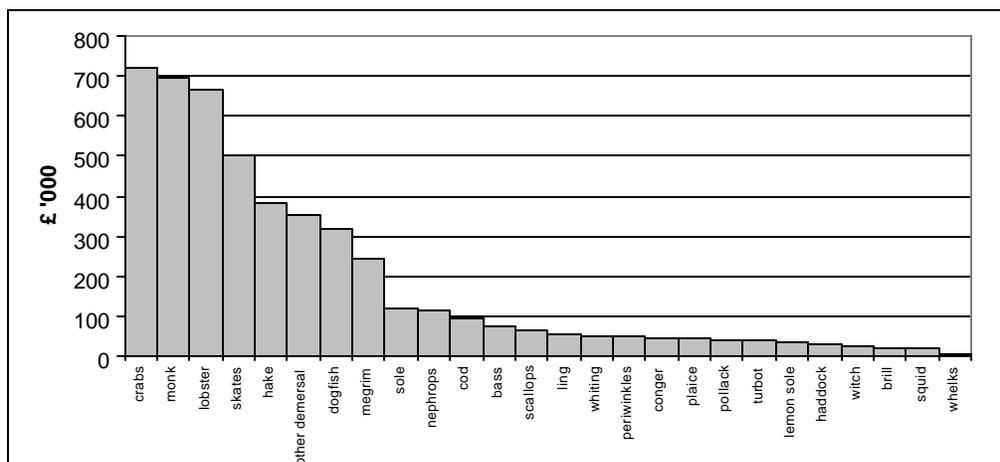
Landings of all fish to the Milford Haven MAFF district in 1998 were in excess of 3,000 tonnes worth over £4.8 million. This figure includes landings by flagships, foreign vessels, the non-sector, PO member vessels and under 10m vessels. It does not, however, include landings made by Welsh vessels to ports outside the Milford Haven landing district, recreational fishermen or amounts gathered by shore-based fishermen. Figures 2.2 and 2.3 illustrate the range of species landed in the district and their relative importance in terms of weight landed and value at first sale in 1998.

Figure 2.2 Landings by weight (tonnes)- 1998



Source: MAFF Fisheries Statistics 1998

Figure 2.3 Landings by value (£'000) - 1998



Source: MAFF Landings Statistics 1998

Eight of the top ten species landed by weight are also among the top ten species landed by value. The top ten species landed by weight and value account for 86 per cent of all landings and include an

equal number of quota and non-quota species. In total, non-quota species account for over 60 per cent of landings by weight and by value. This illustrates the importance of non-quota species to the Welsh fleet but is also a consequence of the general lack of quota suffered by Welsh registered vessels – both indigenous and flagship vessels.

Demersal finfish account for the majority of fishing vessel landings (72 per cent of landings by weight in 1998) with shellfish accounting for the remainder (28 per cent of landings by weight in 1998). Pelagic fish account for less than 1 per cent of all landings in Wales although local fishermen maintain that a handline fishery for mackerel, similar to that in Cornwall, would be possible.

Two of the most important species landed in terms of value are crab and lobster (£723,000 and £668,000 respectively). These are both non-quota species targeted by many small inshore vessels. Shellfish are particularly important, accounting for 34 per cent of landings by value. Nephrops is the only shellfish species that is managed by quota, but it accounts for only two per cent of all Welsh landings by value. Non-quota shellfish, therefore, make up 32 per cent of landings by value. These species are targeted mainly by inshore vessels using static gear.

The most valuable quota species landed are monkfish (£695,000), hake (£381,000) and megrim (£242,000). These species are targeted specifically by Anglo-Spanish flagships for sale to Spanish markets.

Unrecorded and illegal fishing

Estimates for the amount of fish caught and sold through the “grey economy” in Wales vary depending on the fishery. Accounts of unregistered inshore trawlers fishing the same grounds as registered fishermen and landing similar catches are known, as are accounts of unregistered fishermen using fixed nets to catch cod, bass, lobster, crab and other species. Interviews with fishermen put the number of unlicensed fishing vessels as high as 75 per cent of the number of licenced fishing vessels. Anecdotal evidence also indicates that individual fishermen fishing with numerous (10 – 15) fishing rods target bass, especially during the summer months. Local fishermen indicate that part-time and opportunistic fishing effort on Welsh inshore stocks increases dramatically during the summer.

First hand sale of catch

There is only one fish auction in Wales, based in Milford Haven. The auction was the first electronic auction to be opened in the UK and is operated by Milford Fish Auction Ltd. a division of Pan European Fish Auctions (PEFA). There are two main buyers in Milford Haven although up to twelve buyers may attend the auction in person. In addition, there are usually three or four remote buyers from a group of around 30 regular remote buyers bidding on the auction via Pefa.com. These remote buyers are based in other UK auctions such as Billingsgate or in other Member States such as France and Belgium. Local buyers buy the majority of fish sold on the auction (approximately 70 per cent). The remainder is bought remotely.

Vessels either land their catch directly to the auction or ship it overland for sale. Approximately 16 boats based mainly in South and West Wales (Swansea, Burry Port, Port Talbot, Saundersfoot, Milford Haven) regularly land to the auction. Vessels from North Wales do not tend to use the auction instead preferring to sell their catch via Grimsby and Fleetwood. Some South Wales vessels also choose to sell their catch via markets in Devon where they perceive the price paid to be better. There is also evidence of illegally landed fish being sold directly to processors.

Most flagships and vessels from other Member States do not land and sell their fish across the Milford Haven auction. Spanish and Belgian ships land their catch directly onto lorries to be transported to markets in Spain and Belgium respectively. The local economy and buyers do not have the opportunity to benefit from these landings. Prices for some species landed, such as dogfish, are greater in the UK than in Europe but vessels continue to tranship all landings abroad due

to pressure from their regular buyers. Belgian vessels only sell a proportion of their catch via the auction when they do not have enough to fill a lorry for transshipment. Flagships must, however, land a proportion of their catch in the country of registration to satisfy economic links legislation. This has meant that landings to the Milford Haven auction have increased slightly since the introduction of this legislation.

The market suffers from poor continuity of supply. This is due to irregular landings by flagships and other Member State vessels and the limited number of Welsh vessels that land to the market. Supply tends to decline further in winter months when the generally smaller-sized Welsh vessels cannot fish due to bad weather.

Shellfish do not tend to be sold across auctions but are instead sold direct to buyers or processors. The crustacean fishery supports several vivier operators based on the Pembrokeshire coast. The majority of the crabs and lobster are transported live in vivier lorries to Spain, Portugal and Italy. Hand-gathered cockles and mussels are sold direct to local processors.

The sale of "grey economy" fish occurs through a number of channels. Processors and registered buyers – both local and from outside the region - have been known to buy product from unlicensed fishermen. Recent MAFF legislation requiring all transport documents to indicate from whom the fish was bought and where it is being transported should reduce this practice. "Grey economy" sea fish is also sold to local residents, restaurants, public houses, etc. causing an estimated loss of sales of £2,000 - £3,000 per week for the main local merchants who cannot undercut the prices of the "grey economy". Fish is also transported outside the area and sold into other parts of the UK.

Household fish and shellfish sales in the UK were worth almost £1 billion in 1999. This has increased from approximately £900 million since 1992. Frozen product accounts for over 50 per cent of sales but the proportion of fresh fish sold (mainly through supermarkets) has doubled since 1992 and now accounts for almost 30 per cent of all sales².

2.2.2 Contribution to the economy

The total value of all landings made into the Welsh landing district has been examined. Table 2.5 estimates the value of offshore sea fishing to the economy of Wales using costs and earnings data taken from the *Seafish Fishermen's Handbook 1997/98*. It has been assumed that the majority of over 10m vessels registered in Wales fish predominantly in Area VII so characteristics of Area VII vessels, as given in the *Fishermen's Handbook* have been used.

Vessels that are registered in Wales but list their main port of landing as being outside the country (either in Spain or Holland) have not been included in the calculation as these are flagships that contribute very little to the local economy. As has been noted, flagships must land a certain proportion of their catch to the country of registration in order to satisfy economic links. It is also known that Spanish flagships contribute to the Welsh economy through the purchase of food, fuel, ice and other supplies locally. Those flagships that list their main port of operation as within Wales are included as a proportion of their expenditure is directed into the Welsh economy.

² UK Fish Industry Statistics 1999, Seafish

Two non-flagship beam trawlers have also been excluded from the calculation as it is known that two vessels registered in Wales fish predominantly in the North Sea. Vessels not included in the calculation are:

- ◆ 17 trawlers > 24m
- ◆ 3 long liners > 25m
- ◆ 13 gill netters > 24m
- ◆ 1 potter
- ◆ 1 beam trawler > 300kW
- ◆ 2 beam trawlers < 300 kW

A total of 37 vessels have been excluded from the calculation.

“Value added” is a measure of the income contribution of the fishing industry to the area and is calculated by adding the profits of the industry (vessel profits) to the wages paid by the industry (crew share).

The vessel profits lost to the industry through illegal / unrecorded catches have been estimated for each sector. It is believed that fishing by unlicensed fishermen takes place mainly from under 10m vessels but accounts have been given of larger vessels fishing without a licence. Illegal fishing by vessels over 10m is likely to be in the form of under-reporting or mis-reporting catches due to lack of quota. The level of this activity is estimated to be 10 per cent of legal catches.

Illegal / unrecorded catches are noted as being “lost” to the industry, but it is likely that the income from illegal activity is more likely to be retained in the local economy than legally caught fish. Fish caught by unlicensed fishermen is most likely to be sold to local restaurants, pubs, residents, etc. while legally caught fish is likely to be sold through legitimate channels and transported outside the region.

Table 2.5 Estimated earnings from offshore vessels

	Area VI / VII Trawler		SW / English Channel Beam trawler < 300 kW	Long liner		Area VI / VII Gill netter <24m	Scallop	Potter
	< 24m	>24m		< 25m	>25m			
No. vessels(a)	6	1	8	3	1	1	3	10
Vessel earnings (£) (b)	158,687	576,921	453,614	269,972	517,201	157,848	389,926	403,516
Vessel profit (£) (c)	37,772	17,831	72,884	40,774	15,324	26,497	156,615	95,054
Crew share (£) (d)	48,446	210,542	143,050	69,771	212,321	53,769	185,519	141,666
All vessels profit (£) (e = a x c)	226,632	17,831	583,072	122,322	15,324	26,497	469,845	950,540
All crew share (£) (f = a x d)	290,676	210,542	1,144,400	209,313	212,321	53,769	556,557	1,416,660
Value added (£) (g = e + f)	517,308	228,373	1,727,472	331,635	227,645	80,266	1,026,402	2,367,200
Total vessel turnover (£)	11,847,858							
Total crew share (£)	4,094,238							
Total vessel profit (£)	2,412,063							
Total value added (£)	6,506,301							
Loss to the fishery due to illegal / unrecorded landings								
Proportion of illegal landings (%) (k)	10	10	10	10	10	10	10	10
Vessel profit (£) (m = e x k)	22,663	1,783	58,307	12,232	1,532	2,650	46,984	95,054
Total vessel profit lost (£)	241,205							

2.2.3 Employment

The same vessels used in the calculation of the economic contribution of sea fisheries have been used in the following calculation of the number of people employed by sea fisheries. The average number of crew employed on each type of vessel has been taken from the *Seafish Fishermen's Handbook 1997/98*.

The number of people directly employed by the over 10m registered fishing fleet is estimated to be 162. The number of people gaining employment from fishing from unregistered over 10m vessels is likely to be minimal, although the practice is known to occur, according to local fishermen.

Table 2.6 Estimated employment in offshore sea fisheries

	Area VI / VII Trawler		SW / English Channel Beam Trawler <300kW	Area VI / VII Gill netter <24m
	<24m	>24m		
No. vessels ¹ (a)	6	1	8	1
Ave. no. crew (b)	3	7	5	4
Total crew (a x b)	18	7	40	4
	Longliner		Scalloper	Potter
	<25m	>25m		
No. vessels ¹ (a)	3	1	3	10
Ave. no. crew (b)	5	13	5	5
Total crew (a x b)	15	13	15	50
Total number of vessels	33			
Total number of crew	162			

¹ MAFF

2.2.4 Development potential

This sector is relatively large in terms of economic turnover, but it contributes little to the Welsh economy as most fish from the flagship fleet is consigned to ports in Spain and most landings by the local fleet are consigned to ports outside the region. The sector shows an overall downwards trend in scale and economic health due to a contraction in the resource base (TAC cuts), in the fleet and in the volume of landings.

The relatively limited control that the National Assembly for Wales has over the offshore fishing sector, coupled with the limited economic benefit to Wales from such activity, makes this a particularly difficult sector to influence for the better. Positive change would require heavy investment in areas such as new harbour developments and quota purchase, both of which are high risk with relatively poor chances of achieving real impact. This is not to suggest that there should be no public investment in the sector, but that a tight rein should be placed on the public purse. Potential lays in maximising the use of existing landings, the deployment of more sustainable fishing techniques, the modernisation of the fleet and in improved handling of fish. There is also potential in encouraging entrepreneurs to capture more added value from product before it leaves Wales.

Overall, the sector shows limited development potential under current conditions, and is likely to represent poor value for money for public or private funding investment. It also shows poor synergy with investments in other aspects of the economy outside fisheries. Any improvements to shore-based facilities such as provision of ice, storage and improvement of handling aimed at increasing the potential of the inshore fleet will also benefit the offshore fleet.

2.3 Inshore fisheries

The majority of registered fishing vessels in Wales are less than 10m registered length (382 vessels; 85 per cent of the fleet). The largest section of the Welsh fleet is made up of vessels between five and six metres long (approx. 16 – 20 feet). The majority of these vessels have a crew of one. In addition to registered vessels there are a large number of small vessels around the Welsh coast used commercially as charter boats, recreational fishing vessels and pleasure boats, such as yachts. It is very difficult to quantify the number of such vessels but it is likely that the number of small fishing vessels used either recreationally or to fish illegally is equal to the number of small (under 10m) registered fishing vessels.

The under 10m fleet is relatively old, comprising mainly vessels between 10 and 15 years old. These vessels are restricted by size and engine power as to how far offshore they can fish and are severely constrained by weather conditions in the winter months. Most under 10m vessels and many smaller over 10m vessels are unable to fish for a large part of the year due to a combination of poor weather conditions and inadequate harbour facilities that make leaving and entering port difficult and dangerous. Most Welsh vessels do not fish between October and March due to inclement weather while larger flagships and vessels from other ports and Member States fish year-round.

Inshore vessels fish for a wide range of species using a variety of methods. Most vessels use a combination of methods and target different species depending on the season and condition of the stocks. This makes the inshore fleet very flexible and adaptable.

The inshore fleet uses mainly static gear such as gill nets and pots to target demersal finfish and crustaceans such as lobster and crab but small otter trawls are also used to target demersal species. Cod, plaice, rays, turbot, sole, dab, flounder, whiting and dogfish are all caught by the inshore fleet.

Bass are an important species for the inshore fleet and targeted with fixed nets, rod & line and trawls between early spring and late autumn. This fishery has increased in importance since the late 1980's and is targeted by commercial and recreational fishermen alike. It is estimated that 75 per cent of the catch are netted, 15 per cent caught with rod & line and 10 per cent with trawls. The bass stock found in Welsh waters is the same stock as that found off the coast of Devon and Cornwall. Increased catches of bass off the South West coast of England by Scottish and French trawlers has led to a decrease in the number of bass available to and caught by Welsh fishermen.

Potting for crustaceans is important around the Welsh coast - along the Gower Peninsula, around Pembrokeshire, in Cardigan Bay, along the LLeyn Peninsula and around Anglesey. Lobster, spider crab, brown crab and velvet crab are all targeted as are crawfish and prawns.

Several boats dredge for scallops in Cardigan Bay during the winter. There is a closed season for scallops between 1st July and 31st October (set by SWSFC) and dredging is prohibited around Skomer Marine Nature Reserve. There is evidence that divers continue to harvest and land scallops during the closed season and from within the closed area around Skomer. This may be due to ignorance of the closed season by recreational divers but local fishermen attest that the commercial sale of scallops harvested by divers does occur. Scallops around the North Wales coast are mainly prosecuted by visiting scallopers from Scotland and the Isle of Man. The closure of the West of Scotland scallop grounds during the last year has led to increased pressure being exerted on the stocks off the Welsh coast by displaced boats.

A profitable whelk fishery has also grown up around the Welsh coast in recent years and is prosecuted by vessels from West and North Wales – Tenby, Fishguard, Cardigan Bay the LLeyn Peninsula and Anglesey. Whelks are fished for using baited pots. The main boom was during 1995 / 96 after which yields suffered a downturn due to overfishing. Stocks and landings have, however, recently recovered. The majority of whelks are sold to markets in the Far East.

Small fisheries for oysters also exist in bays and estuaries around the coast. Some inshore fishermen prosecute these in winter when rough weather means they cannot put to sea.

Fishermen's organisations

There are several small fishermen's organisations around the coast set up to represent local, mainly inshore fishermen's interests. They do not exclude offshore vessels but their membership tends to be made up of inshore vessels that are not represented by POs.

- ◆ Joint Fishing Communities of South & West Wales
- ◆ Welsh Coastal Inshore Fishermen's Association
- ◆ Cardigan Bay Fishermen's Association
- ◆ Holyhead Fishermen's Association
- ◆ Saundersfoot Fishermen's Association
- ◆ Freshwater East Boatman & Fishermen's Association
- ◆ Lleyn Fishermen's Co-operative
- ◆ Conwy Musselmen and Boatmen's Association

These organisations are often fairly short-lived, finding it difficult to maintain membership and find volunteers willing to give up valuable fishing time to devote to meetings and administration. Without the structured well-developed fishermen's organisations that exist elsewhere in the UK, the many commercial inshore fishermen find it difficult to get their views heard. The organisations often re-form in times of crisis when fishermen feel a need to work together as a more cohesive group. Fishermen's groups from North and South Wales do not tend to have much contact with each other. This is most probably because the two areas have different SFC's and therefore different organisations and problems to deal with.

2.3.1 Contribution to the economy

Table 2.7 estimates the economic contribution of the inshore sea fishing fleet to the economy of Wales. Figures have been taken from the CEMARE report *Economic and Financial Performance of the UK English Channel Fleet*. It has been assumed that Welsh inshore vessel earnings are similar to those of English Channel vessels as they operate under similar conditions, fishing for similar species.

The vessel profits lost to the industry through illegal / unrecorded catches have also been estimated. It is believed that the majority of fishing by unlicensed fishermen takes place from under 10m vessels. As such, the greatest contribution towards illegal / unrecorded catch is likely to come from this sector and is estimated to be 50 per cent of the legal catch made by similar sized vessels. As for the offshore fleet, illegal / unrecorded catches are noted as being "lost" to the industry.

Table 2.7 Estimated earnings from inshore vessels

	<7m	7 – 10m
No. vessels (a)	237	145
Vessel earnings (£) (b)	11,505	27,515
Vessel profit (£) (c)	6,248	11,7366
Crew share (d)	1,215	5,052
All vessels profit (£) (e = a x c)	1,480,776	1,701,720
All crew share (£) (f = a x d)	287,955	732,540
Value added (£) (g = e + f)	1,768,731	2,434,260
Total vessel turnover (£)	6,716,360	
Total crew share	1,020,495	
Total vessel profit (£)	3,182,496	
Total value added (£)	4,202,991	
Proportion of illegal landings (%) (k)	50	50
Illegal vessel profit (£) (m = e x k)	740,388	850,860
Total vessel profit lost (£)	1,591,248	

2.3.2 Employment

It has been assumed that the number of crew on vessels under 7m is one and that 7 – 10m vessels have two crew. The number of people directly employed by the under 10m registered fishing fleet is estimated to be 572. This is over three times greater than the number of people employed by the offshore fleet. This figure of 572 does not include unregistered fishermen but, based on information gathered from the fishing industry, an estimate of 263 unregistered fishermen in Wales (50 per cent of the number of registered under 10m fishermen) can be made.

Table 2.8 Estimated employment in inshore sea fisheries

	<7m	7 – 10m
No. vessels ¹ (a)	237	145
Ave. no. crew (b)	1	2
Total crew (a x b)	237	290
Total number of vessels		382
Total number of crew		572

¹ MAFF

2.3.3 Development potential

The inshore sector is economically significant, involving employment of many people distributed around the coast focussing on the harvesting of inshore finfish, lobster and crab and various other shellfish. Its dispersed nature, low profile and poor structure are such that its scale and contribution to the coastal and rural economy has, in general, been over-looked. These characteristics have also favoured a relatively high level of illegal activity. This has arguably benefited elements of the local economy – as un-taxed income for fishermen and allowing catering and distributive industries to reap

higher margins from raw material that they have purchased at below market prices, but at a cost to the formal sector.

In the UK as a whole in the past five years, there has been a tendency towards smaller vessels. While the offshore Welsh fleet has contracted during this period, the under 10m fleet has not undergone the same contraction. The number of under 10m vessels does, however, comprise a large number of part-time and unlicensed vessels. Expansion of the inshore fleet brings with it the need for tighter management to control potential illegal harvesting activities, which carries with it the potential for unwelcome ecological and environmental impacts.

Significant economic, social and environmental gains are possible with investment in improving facilities, management, industry co-ordination and fishing practices. Steps towards such greater co-ordination have been taken in, for example, the establishment of the Lleyn Peninsula Fishermen's Association. Further support to such development will be needed if such organisations are to stand a chance of challenging established practice and generating visible benefits for their members. The relatively low costs of providing facilitation services to bring about such changes could generate large economic, social and environmental gains such as improved efficiencies in marketing and distribution, and higher prices paid for high quality raw material over a relatively short period of time.

Investment in the inshore sector has strong synergies with other aspects of the economic, social and environmental structures of the coast in terms of supporting the socio-economics of coastal communities, contributing positively to the management and upkeep of the coastal environment, stimulating additional employment in processing and distribution, and adding to the attraction of the Welsh coastline as a tourist destination.

The increase in demand for fresh, high quality seafood can be capitalised on by the inshore fleet, which lands a wide range of species, caught only hours earlier. The sector represents good investment potential for public funds, showing considerable development potential and good value for money. It should be considered a high priority in any public sector support programme. Activities should focus on achieving the greater involvement of fishermen in the management of their activities, the control of illegal activity and the improvement of onshore and landing facilities for the inshore fleet and wider coastal community. Many of the characteristics and opportunities of the inshore can also be seen in shore-based fisheries and, as such, they too should be considered a value for money priority for public sector spending.

2.4 Shore based fisheries

The two main shore-based fisheries in Wales are the cockle fishery in the South and mussel fishery in the North. There is, however, some overlap as cockles are also harvested from around the North Wales coast and mussels from around the South coast.

The South Wales cockle fishery is centred on the Burry Inlet on the Gower Peninsula and the Three Rivers area in Carmarthen Bay. Cockles in both areas are hand gathered – the use of mechanical dredges of any kind is prohibited by the SWSFC. The Burry Inlet fishery is a limited entry fishery regulated by the SWSFC, who restrict the number of licences available while the Three Rivers fishery is not limited entry; it is either open or closed to fishing.

There are 50 licensed cockle fishermen in the Burry Inlet that gather approximately 3,500 tonnes cockles each year. The SWSFC considers this to be equivalent to about 30 per cent of the fishable stock. The fishery is open all year but gathering is concentrated in the summer months. Fishermen pay £600 per year for their licence and there is a waiting list for those wishing to receive a commercial cockle gathering licence. The Three Rivers fishery can attract 2,000 hand gatherers in a single day. It is estimated that a single gatherer can collect up to £1,000 worth of cockles in a weekend.

The consequence of these different management regimes is that the Burry Inlet is the centre of the commercial fishery while the Three Rivers fishery tends to be prosecuted by opportunistic fishermen when it is open. The Burry Inlet supports a more sustainable fishery, while the Three Rivers fishery follows a “boom and bust” pattern.

The North Wales mussel gathering industry is concentrated around the Menai Straits – around Caernarfon and the Isle of Anglesey, but mussels and cockles are gathered from bays and estuaries along much of the North Wales coast – around Aberdovey Barmouth and Portmadog. Cockles can also be found in these areas and cockle dredging is licenced in Conwy Bay on the Lafan Sands by the NW&NWSFC. There is a well-established mussel farming industry in and around Bangor that collects mussel spat for re-laying and on-growing.

Other species that are harvested by hand are periwinkles, which are sold to Far Eastern markets, lugworms that are dug for bait for personal use or commercial sale to anglers and seaweed that is collected mainly from around the Gower Peninsula and Pembrokeshire to produce lava bread. Bait digging often occurs in areas where cockle beds are located and the SWSFC has had to limit bait digging in the Burry Inlet to limit disturbance to the commercially harvested cockle beds in the area.

Fishermen's organisations

There are very few organisations that represent the interests of shore-based fishermen. Two organisations exist centred on the South Wales cockle fishery. The demand for a cockle harvesting licence is so great that those waiting for a licence have formed their own association.

- ◆ Penclawdd Shellfish Association
- ◆ Burry Inlet Waiting List Association

The associations, like the inshore fishermen's associations, are more active in times of crisis. They find it difficult to gain recognition as a representative body for local fishermen in part because of the complex administration required to form an association and in part because of the influence of part-time opportunistic gatherers that exploit the Three Rivers fishery and do not contribute to the association.

2.4.1 Landings

In addition to sea fisheries landings recorded by MAFF, approximately 3,500 tonnes of cockles are harvested from the Burry Inlet each year and between 700 and 5,000 tonnes of cockles harvested from the Three Rivers area, depending on the state of the stocks. A smaller quantity of cockles is gathered from North Wales. Mussels are primarily cultured in North Wales but a small amount of hand gathering does occur. There are two regulated mussel hand gathering fisheries in North Wales – the Conwy mussel fishery and the Menai Strait (East) mussel and oyster fishery which takes place on small natural beds within the larger area covered by the Menai mussel fishery Several Order.

Very little landing data exists for the shore-based fisheries in Wales. The SFCs are the main bodies responsible for the control of shore-based fisheries but are constrained by a lack of resources from collecting detailed harvest data.

In addition to the main regulated cockle and mussel fisheries, smaller fisheries occur all round the coast. It is likely that the amount of unrecorded shellfish harvested from the shore around Wales is more than equal to the recorded landings.

Table 2.9 Shore-based landings 1998 (tonnes)

Species	SWSFC	NW&NWSFC
Cockles	4,437	598
Mussels	60*	217
Winkles	61	118
Total	4,560	933

* mussel spat was also harvested by dredge in these years (not included in volume of landings)

Source: SWSFC, NW&NWSFC

2.4.2 Contribution to the economy

Shore based fisheries in Wales require very little capital outlay by the fishermen that prosecute them because they can only be exploited by traditional hand gathering methods, the use of mechanical gatherers is prohibited. The main cost to fishermen is the annual price of a licence for those fisheries that are managed by limiting access.

Table 2.10 estimates the value of shore-based fisheries in Wales based on data for 1998 from the SFCs. The value and number of cockle licences correspond to the Burry Inlet cockle fishery in South Wales while the two values and quantities of licences for mussels correspond to the Conwy (16 licences at £150 each) and Menai Strait (East) (5 licences at £50 each) fisheries in North Wales.

The amount from illegal / unrecorded gathering is thought to be equal to recorded / legal harvest. These amounts are considered to contribute to the local economy in the same way that illegal / unrecorded catches of sea fish do. There is likely to be a loss to the local economy because it is known that some processors buy landings from unlicensed fisheries, which disadvantages local processors and registered gatherers who cannot afford to buy or sell their product at similar prices. The influx of opportunistic gatherers to unregistered fisheries can also lead to a glut of supply causing prices to fall. This has a detrimental effect on the earning ability of full-time hand gatherers.

Table 2.10 Estimated earnings from shore-base fisheries

	Cockles	Mussels	Winkles
Landings (tonnes) (a)	5,035	277	179
Price (£ / tonne) (b)	390 ¹	207 ²	770 ³
Value of landings (£) (c = a x b)	1,963,650	57,339	137,830
Turnover (£)	2,158,819		
Cost of licence (£) (d)	600	150	50
No. licences (e)	50	16	5
Total cost (£) (f = d x e)	30,000	2,650	-
Profit (£) (g = c - f)	1,933,650	54,689	137,830
Total value (£)	2,126,169		
Loss to the fishery due to illegal / unrecorded landings			
Landings (tonnes) †	5,035	277	179
Price (£ / tonne)	390 ¹	207 ²	770 ³
Value of landings	1,963,650	57,339	137,830
Total (£)	2,158,819		

† assumed to be equal to legal landings

1 based on an average price of £20 per cwt (£390 per tonne) (Rory Parsons, pers. comm.)

2 based on MAFF Fisheries Statistics 1997

3 based on MAFF Fisheries Statistics 1998

2.4.3 Employment

The number of people that gain employment by exploited unregulated fisheries is very difficult to quantify. It has been assumed that the number of licences granted by the SFCs corresponds to the number of full-time handgatherers.

The Three Rivers fishery in South Wales can attract 2,000 hand gatherers in a single day. The majority of these are opportunistic fishermen who are attracted to the fishery in years when stocks are plentiful. Other shore-based shellfish fisheries around the coast are exploited on a seasonal basis with effort increasing during the summer months and attracting more gatherers in times of plenty or good market price. It can be assumed that since un-recorded / illegal landings are likely to equal legal landings, that the number of unregistered gatherers is at least equal to the number of registered gatherers.

Table 2.11 Employment in regulated shore-base fisheries 1999

	Fishery	Number of jobs
SWSFC	Burry Inlet cockle fishery	50
NWSFC	Mussel gathering (Conwy & Menai Strait East)	21
Total		71

Source: NW&NWSFC, SWSFC

2.5 SWOT analysis

This section examines the **Strengths, Weaknesses, Opportunities and Threats (SWOT)** for commercial fisheries. Changes in the fishing industry have an effect on the industries associated with fishing and the effect of changes on the associated industries is also considered. Many of the results of the SWOT analysis for offshore fishing can also be applied to inshore and shore-based fisheries. For this reason, the SWOT for offshore, inshore and shore-based fisheries are combined below.

Strengths

There is a wide range of both quota and non-quota species around the Welsh coast. Many of these species are of high market value such as lobsters, crabs, bass and whelks. Most of the fishing vessels harvesting these species only spend one or two days at sea and use static gear such as nets, lines and pots which do not damage the catch as much as dragged gear does. The fish and shellfish caught by Welsh fishermen are, therefore, of a high quality and very fresh when landed.

Some of the fisheries such as Burry Inlet cockle fishery are well-established and well-managed - the number of registered gatherers is restricted and individual harvest quotas are set to ensure that the risk of overexploitation is minimised. This is a factor that could be used to the advantage of Welsh fishermen in the promotion of their catch and also in ensuring that stocks remain viable in the future. The "green" nature of many of the methods used (high selectivity and low impact on the surrounding environment) is also a strength of the Welsh industry. Static gear and hand gathering cause less disturbance than dragged or towed fishing gear and mechanical or tractor shore-based gathering methods and are more acceptable and sustainable methods of fishing in the view of many conservationists, environmentalists and consumers.

Although many areas of Wales are rural, they are also in close proximity to the consumer concentrations of London, Birmingham, Liverpool, Manchester and with good transport routes to the continent.

Weaknesses

There are a number of weaknesses in the current fishing industry in Wales. The influence of the "grey economy" is very strong. Illegal or unrecorded landings sold through the "grey economy" depress market prices and can lead to a glut of product. Registered or licenced fishermen, gatherers and merchants find it difficult to compete with "grey" prices. Relations between local and visiting gatherers or licenced and unlicenced fishermen can become very strained and can cause problems for local residents, which in turn may have a deleterious effect on tourism. Illegal / unrecorded fishing and gathering also puts stocks at risk of overexploitation.

There is a general lack of financial and political support for the SFCs, which makes adequate control of unlicenced / illegal fishing almost impossible. This subject is explored in more depth in Section 6. This and other factors have led to a general lack of industry confidence in the SFCs.

There is a shortage of facilities available for fishermen (and other vessels) in ports and harbours. There are few landing sites suitable for fishing vessels, provision of ice is limited and there is only one regular fish market in Wales. This lack of services means that vessels travel outside the region to buy supplies and sell their catch or have to pay to transport items by road. This increases the running costs of local vessels. There is also a lack of support for the industry from harbour and port operators who are excluding fishermen in favour of pleasure and tourist craft.

The lack of consistent industry representation makes it difficult for fishermen to put their views across on these and other matters on a local, national and international level. Small local fishermen's groups find it difficult to remain in existence and rely on one or two fishermen to represent the views of many. The lack of industry representation also makes it difficult for licensed and registered

fishermen and gatherers to distance themselves from the practices of unlicensed and opportunistic fishermen.

Opportunities

There are a number of opportunities available to the industry. New fisheries have been or are being explored for commercial exploitation (e.g. razorfish in Cardigan Bay, *Venerupis* clams off the Pembrokeshire coast); these can be developed and stock management and conservation schemes can also be introduced or expanded. V-notching, MLS, closed seasons and areas and Regulating Orders are all potential options. The introduction of Regulating Orders for existing, unregulated fisheries has the potential to provide more stability to hand gathered fisheries – both fishermen and processors / buyers, while the expansion of Regulating Orders to cover other hand-gathered species such as winkles or to incorporate sea fished species such as whelks, crustaceans and mussels can reduce the risk of overexploitation. The introduction of the European Shellfish Waters Directive which is designed to protect shellfish production waters from pollution also has the potential to provide more stability to hand gathered and inshore fisheries

Improvement of handling, grading and storage facilities can increase the value at first hand sale, while the development and expansion of local processing can add value to the product. Some fishermen already process their catch to some extent – crab fishermen produce dressed crab for “farm gate” sales and some prawn fishermen sort and cook their catch for sale in local fishmongers. This “cottage industry” processing should be encouraged and formalised. Economies of scale can be realised if groups of fishermen / processors act together e.g. formation of co-operatives.

The use of marketing initiatives to encourage the sale of Welsh fish can be used to increase the profile of the Welsh industry both within Wales and over a wider geographical area. The promotion of well managed fisheries, accreditation under the Marine Stewardship Council (MSC) or similar, and the use of Wales as a branding tool are all potential options.

The formation of at least one representative body for Welsh fishermen able to represent the industry at local, Welsh, UK and European levels provides a point of contact for both the industry and organisations outside the industry. The Welsh fishing industry then has the opportunity to act more cohesively and lobby for or against specific actions or activities.

The use of grants also provides various opportunities for the industry – the development of harbour facilities for all users (fishermen, yachts, pleasure craft, etc.), safety grants, training, vessels modernisation or diversification grants can provide the industry with the ability to regenerate, branch out into other fisheries or leave the industry.

Threats

It is likely that Total allowable Catches (TACs) will continue to be cut as European fisheries managers seek to halt and reverse the depletion of fish stocks. Stock conservation measures take time to have an observable effect and it is unlikely that TACs will rise in the short to medium term (five to ten years). This will affect all European fishermen, not just those in Wales. Falling TACs and other pressures such as rising operational costs will probably lead to a contraction of the Welsh registered fleet, in both over and under 10m sectors. The contraction of the over 10m fleet could lead to a loss of quota from the area as retiring vessel owners sell their licence and quota units to other operators, possibly outside the region. Contraction of the under 10m fleet may be tempered by some vessel owners downsizing from the over 10m fleet. More stringent transfer rules are, however, being put in place to discourage the building of ‘rule beaters’ in the under 10m fleet.

A risk related to the contraction of the registered fleet is an expansion of the unregistered fleet. It is likely that as skippers retire from commercial fishing, some will continue to fish on a part-time basis, with their landings finding their way onto the market through the “grey economy”. In addition, individuals may purchase vessels sold by retiring commercial fishermen for the sole purpose of

fishing illegally. Any increase in the size of the unregistered under 10m fleet could have a serious effect on the health of inshore stocks as unregistered fishermen are least likely to respect conservation measures such as MLS, V-notching, closed areas, etc. Increased pressure on inshore stocks could also be the result of larger vessels actively targeting high value non-quota stocks in times of quota shortage. Pressure on non-quota stocks may also come from outside the region e.g. increased effort on the bass stock in waters around Devon and Cornwall. Pressure from environmental groups is also a potential threat to the industry. Fisheries / environment interactions are examined in more detail in Section 2.6.

<p>Strengths</p> <ul style="list-style-type: none"> ◆ Wide range of species in the waters around Wales ◆ High quality of landings ◆ Well-managed and well-established fisheries ◆ Use of highly selective fishing and gathering methods ◆ Proximity to large consumption centres (UK and continental cities) 	<p>Weaknesses</p> <ul style="list-style-type: none"> ◆ Lack of structured and consistent industry representation. ◆ Illegal / unrecorded fishing or opportunistic gathering. ◆ Influence of the “grey economy” (related to the point above). ◆ Lack of support for fishing from port and harbour operators. ◆ Lack of financial and political support for SFCs. ◆ Fishermen’s lack of confidence in the ability of SFCs. ◆ Lack of quota. ◆ Lack of facilities for fishing vessels. ◆ Restricted competition among buyers. ◆ Poor transport infrastructure in rural areas
<p>Opportunities</p> <ul style="list-style-type: none"> ◆ Development of new fisheries. ◆ Formation of consistent industry representative body. ◆ Stock conservation / management schemes. ◆ The introduction of the European Shellfish Waters Directive. ◆ Improvement of handling, grading and storage. ◆ Marketing initiatives. ◆ Development and expansion of local processing. ◆ Harbour development. ◆ Assistance for new entrants / young fishermen. ◆ Vessel modernisation. ◆ Improved training. ◆ Improved safety. ◆ Diversification. 	<p>Threats</p> <ul style="list-style-type: none"> ◆ Reduction of TACs. ◆ Contraction of the Welsh owned over 10m fleet. ◆ Contraction of the registered under 10m fleet. ◆ Expansion of the unregistered fleet. ◆ Loss of quota to the area. ◆ Increasing age of the fleet. ◆ Lack of crew. ◆ Increased pressure on inshore and non-quota stocks. ◆ Pressure from environmental groups.

Associated industries

Industries directly associated with the fishing industry such as chandlers, processors and buyers will be greatly affected by changes in the commercial fishing industry. The fish auction in Milford Haven is currently operating at a low level of product throughput and any reduction in landings to Milford Haven caused by a reduction in Welsh fleet size or a reduction in the quantity of flagship landings could cause the closure of the auction. This would be a very serious threat to the remaining fleet as they would have to land outside of Wales or continue to land in Wales but transport their catch to other ports (e.g. Plymouth) for sale. This would result in higher operating costs and make many small vessels unprofitable, leading to a further reduction in the fleet as owners decide to leave the industry.

Processors and buyers that rely on local landings would also be affected by a reduction in landings but as many already source product from outside Wales, the effect of reduced landings may not be too adverse. If, however, the amount of product they can source from Wales falls too low, businesses may choose to close or move elsewhere, where product is available locally.

Chandlers, vessel repair companies and marine engineers may be able to compensate for any loss of business caused by a contraction of the Welsh fleet by shifting their operations towards pleasure craft, yachts and recreational fishing vessels. Similarly, transport companies that primarily service the fishing industry may be able to redirect their services towards other industries.

Any reduction in the fisheries support infrastructure could lead to further reduction in the Welsh fleet as local vessels find it harder to service their vessels, sell and transport their catch and buy supplies locally, forcing them to sell their vessels, move elsewhere or shift from the registered fleet into the unregistered fleet and contribute to the "grey economy".

The "boom and bust" cycle that arises from unregulated hand gathering can result in either a glut of supply pushing market prices down or a lack of supply forcing prices up. This poses a threat to shellfish buyers and processors by reducing the stability of the market on a year to year basis. Buyers and processors of shore-based fisheries product would benefit from any measures designed to increase the stability of the fisheries and therefore supply and market price. The continued influence of opportunistic gatherers and the grey economy pose threats to buyers and processors.

Conversely, any improvement in support infrastructure, local fisheries management, etc. would have a positive effect on the fishing industry and, therefore, the associated industries.

2.6 Diadromous fisheries

Commercial fishing for such species, specifically salmon, sea trout and eels, is declining but is still practised by a few fishermen around the coast and rivers in Wales.

Salmon

The commercial salmon net fisheries in England and Wales are controlled by a Net Limitation Order (NLO) that limits the number of commercial net licences that can be allocated. The salmon fishing season has also been shortened by the introduction of National byelaws in 1999 to protect spring running salmon, which state that no salmon may be killed before 1st June. This byelaw will remain in force for ten years. The number of days available to fishermen is further reduced by factors such as weather and tide conditions and in most Welsh salmon fisheries, the number of net days utilised was less than 50 per cent of the available net days³.

³ Annual Assessment of Salmon Stocks and Fisheries in England and Wales 1999, CEFAS & the Environment Agency.

In 1999, 65 licences for salmon net fisheries on 13 rivers (Usk, Tywi, Taf, Cleddau, Nevern, Teifi, Dyfi, Mawddach, Glaslyn, Dwyfawr, Ogwen, Conwy and Dee) were issued in Wales.

Sea trout

Salmon net licences allow fishermen to catch sea trout. In areas where netting for sea trout occurs in salmon rivers, netsmen are given a derogation to the prohibition of fishing before 1st June (designed to protect spring running salmon) on the basis that any salmon caught must be returned. In 1999, derogations for sea trout fishing, allowing netsmen to fish before 1st June, were applied to 25 licences.

Eels & elvers

All life history stages of the eel are fished commercially. Glass eel and elver fisheries in Wales take place in the River Severn, and South Wales rivers that drain into the Bristol Channel. The largest elver fishery takes place in the River Wye. Yellow and silver eels are also commercially fished in estuaries and coastal waters. Glass eels and elvers are fished with a handheld dip net while yellow and silver eels are taken by a variety of fixed nets and traps. Elver and eel licences are issued by the Environment Agency annually. Each licence is valid for one calendar year and expires on the 31st December. It is not the fishermen that are licenced but the instrument used to fish with. In Wales either fyke nets or baited traps are used to catch eels. An elver licence costs £11, fyke net licences cost £5 each and baited trap licences cost £11 per 20 traps.

Table 2.12 Number and cost of elver, eel and instrument licences issued 1995 - 1999

	1995	1996	1997	1998	1999
No. licences					
Elver licences	375*	300*	590*	706	539
Eel licences					
Fyke nets	212	209	298	356	238
Baited traps	20	100	120	240	60
Cost of licences					
Elver licences @ £11 each	£4,125	£3,300	£6,490	£7,766	£5,929
Eel licences					
Fyke nets @ £5 each	£1,060	£1,045	£1,490	£1,780	£1,190
Baited traps @ £11 per 20	£11	£55	£66	£132	£33
Total	£5,196	£4,400	£8,046	£9,678	£7,152

* approximate values

Source: Environment Agency

2.6.1 Landings

Fishermen that target salmon, elver and eel fisheries are required to complete catch returns for the Environment Agency.

Table 2.13 Commercial catch of diadromous fish (kg) 1995 - 1999

	1995	1996	1997	1998	1999
Salmon ‡	12,126	11,695	10,486	9,177	9,345†
Sea trout	2,428	1,608	1,322	1,182	1,200*
Elvers	425*	475*	1,000*	1,000*	700*
Eels	-	400*	450*	1,929	642
Total	14,979	14,178	13,258	13,288	11,887

‡ based on 3.99kg per salmon (from Salmon Stocks and Fisheries in England & Wales 1999)

* approximate values – based on Environment Agency information

† provisional

Source: Environment Agency

Unrecorded and illegal fishing

The level of under-recording of salmon catches by licenced netmen is estimated to be between zero and fifteen per cent of reported catches. The Environment Agency / CEFAS publication, Salmon Stocks and Fisheries in England and Wales 1999, uses a national average of eight per cent under-reporting. This would put the number of unreported salmon caught by licenced netmen in 1999 at 187 (746 kg).

The number of salmon caught by unlicenced net fishermen is put at between five and 18 per cent of reported catches. A national average of 12 per cent is used in Salmon Stocks and Fisheries in England and Wales 1999. This would put the number of illegally netted salmon at 281 (1,121 kg) in 1999.

Anecdotal evidence suggests that for certain species (bass, lobster, crab, cockles and mussels, sea trout, elvers and eels) as much as half of what is landed is caught illegally.

First hand sale of catch

The sale of legally caught eels and elvers occurs through well-established routes via registered buyers. The main market for elvers is the Far East for aquaculture purposes. A smaller aquaculture market exists in Europe and a small quantity is sold to Spain for direct consumption. Yellow and silver eels caught in the UK are sold mainly to Belgium and the Netherlands for stewing. The home market for eel (principally jellied) is small. A large quantity of eels is transshipped from Northern Ireland to the smoking markets in Germany and the Netherlands. This is more profitable than the stewing market. China and New Zealand also import some eels from the UK.

2.6.2 Contribution to the economy

Table 2.14 Estimated earnings from diadromous fisheries

	Salmon	Sea trout	Elvers	Eels
Legal fishing				
Landings (kg) (a)	9,345	1,200	700	642
Price (£ / kg)* (b)	3.60	2.80	40	5
Value of landings (£) (c = a x b)	33,642	3,360	28,000	3,210
Total turnover (£)	68,212			
Cost of fishing (£) (d)	13,457 ¹	1,344 ¹	5,929 ²	1,223 ²
Profit (e = c – d)	20,185	2,016	22,071	1,987
Total value (£)	46,259			
Loss to the fishery due to illegal / unrecorded landings				
Landings (kg) (g)	1,867	1,200	700	642
Price (£ / kg)* (h)	3.60	2.80	40	5
Value of landings (£) (k = g x h)	6,721	3,360	28,000	3,210
Total loss (£)	41,291			

* Environment Agency estimates (Rob Evans, National Stock Assessment Officer, pers. comm.)

¹ costs = 40 per cent gross income (based on Redford *et al*, 1991)

² from Table 6

Illegal / unrecorded fishing for eels and elvers is estimated by the Environment Agency⁴ to be equal to recorded legal landings. The illegal / unrecorded landings of salmon and sea trout are taken from the Environment Agency / CEFAS report *Annual Assessment of Salmon Stocks and Fisheries in England and Wales 1999*.

Illegal and unrecorded catches of eels and elver are likely to be made by fishermen already exploiting the fishery and sold through the channels normally used to sell legally caught fish. As these catches are mainly exported with little value added in Wales, the illegal catches will also not contribute to the Welsh economy.

Illegal / unrecorded landings of salmon and sea trout are made by commercial and recreational fishermen. These catches will contribute to the local economy in the same way that illegal / unrecorded catches of sea fish do – i.e. in sales to local restaurants, businesses and residents.

2.6.3 Employment

The table below presents data for the number of fishermen employed in commercial diadromous fisheries. Data is based on the number of licences sold for each fishery. No value is given for employment in the sea trout fishery as there is no additional licence required for the fishery - licenced salmon netmen are permitted to fish for sea trout. Given the relatively small sums of money and short seasons involved in commercial diadromous fisheries, most licence holders must have

⁴ National Stock Assessment Officer, pers. comm.

alternative sources of income, only fishing commercially for a short period each year. There are, therefore, no full-time commercial diadromous fishermen. Based on the turnover of diadromous fisheries (£68,000) and a minimum wage of £7,000, commercial diadromous fisheries employ approximately ten Full Time Equivalents. The number of people finding full-time employment by illegally exploiting diadromous fisheries is estimated to be zero.

Table 2.15 Number of diadromous fishing licences (1999)

	Salmon	Elver	Eel	Total
No. licences	65	539	19	623

Source: Annual Assessment of Salmon Stocks and Fisheries in England and Wales 1999, Environment Agency / CEFAS

2.6.4 SWOT analysis

This section examines the **Strengths, Weaknesses, Opportunities and Threats (SWOT)** of commercial diadromous fisheries.

<p><i>Strengths</i></p> <ul style="list-style-type: none"> ◆ Habitat and stock improvement initiatives are being implemented. 	<p><i>Weaknesses</i></p> <ul style="list-style-type: none"> ◆ State of stocks. ◆ Elver fishery remains profitable.
<p><i>Opportunities</i></p> <ul style="list-style-type: none"> ◆ Development of an eel management strategy. ◆ Recreational potential (see Section 2.2). ◆ Support for remaining commercial fishermen. ◆ Fishing heritage. 	<p><i>Threats</i></p> <ul style="list-style-type: none"> ◆ Illegal fishing. ◆ The influence of the "grey economy". ◆ An increase in demand for wild caught fish. ◆ Demand for elvers from the Far East.

Commercial diadromous fisheries would appear to be drawing to a close on the basis that they are no longer biologically or commercially viable under ruling conditions. The strengths of the current fisheries lay in the fact that actions to preserve the stocks and their habitat are being carried out by the implementation of Environment Agency Salmon Action Plans and various other conservation and restoration activities.

The development of a UK-wide (and possibly Europe-wide) eel management strategy to preserve and rebuild stocks is in its initial stages. This could lead to a sustainable elver / eel fishery. If, however, the strategy is not implemented over a wide enough geographic area or is too long in development, fish stocks will suffer further. Any management plan and beneficial effects it may have on stocks will be in the medium to long-term future (10+ years).

The brightest future for the fishing of salmon, sea trout and eels lies within the recreational sector where it has great potential (see Section 3 on recreational fisheries). Salmon and eel fishermen are, however, an important part of the fishing heritage of Wales and ways of preserving this should be investigated. The possibility of developing educational / tourism fishing heritage centres exists and support for the remaining netmen should be provided through retraining or diversification into other areas.

Commercial salmon and eel fisheries cannot and should not be developed as a harvestable resource given the state of stocks, but continued action needs to be taken to discourage illegal harvesting. A

recent trend in the restaurant trade is to replace wild-caught salmon with sea trout on the menu instead. This trend will inevitably lead to additional fishing pressure (including illegal harvesting) as demand increases. While sea trout stocks appear to be in a healthier state than salmon, encouraging the commercial fishing of sea trout could lead to over-exploitation as well as bycatches of the already over-exploited salmon stocks.

The knowledge to breed and rear eels in a cultured environment does not exist, as a result the on-growing of elvers requires a supply of wild caught elvers, thus maintaining the economic viability of the elver fishery. Strong demand for elvers from the Far East on-growing industries is likely to lead to increased fishing effort by both registered and illegal fishermen.

Associated industries

Industries that rely on diadromous commercial fisheries will not be viable in the future. It is, however, unlikely that any businesses rely solely on commercial diadromous fisheries because of their small size.

2.7 Fisheries / environment interactions

Approximately 70 per cent of the Welsh coast is covered by some form of protective designation⁵. A large proportion has been designated as Heritage Coast including most of the Llyn Peninsula, Gower Peninsula and Pembrokeshire coasts and parts of Anglesey, Cardigan Bay and the Glamorgan coasts. There are over 150 coastal SSSIs in Wales and Skomer Island, off the Pembrokeshire coast, was the first statutory Marine Nature Reserve in the UK.

Given the importance placed on the protection and preservation of the natural environment in Wales, it is inevitable that environmental and fisheries interests will hold different opinions regarding the type of activity that should be carried out in coastal waters.

The main potential areas of conflict and interaction between sea and shore fisheries and environmental concerns are:

- ◆ Overexploitation of commercial target species
- ◆ Bycatch of non-target species
- ◆ Physical damage to the seabed and shore
- ◆ Re-suspension of Sea Empress oil
- ◆ Competing for food with wildlife
- ◆ Effects on marine community structures

Overexploitation

The overexploitation of commercial target species is a cause for concern for both fishermen and environmental organisations but for potentially very different reasons. Overexploitation of stocks jeopardises the future of commercial fishing and overfishing, especially by unregistered or opportunistic fishermen / gatherers, is an issue on which fishing and environmental groups often agree and can work together on.

In addition to general environmental concerns about overfishing, there are concerns for particular species that are seen as being more at risk from over exploitation. An example of this is the concern regarding the commercial exploitation of elasmobranchs (sharks and rays) that are generally slow growing and late maturing species that produce few offspring. These characteristics make

⁵ A Policy Framework for the Coastal and Marine Zone of Wales, CCW, 1994.

elasmobranchs particularly susceptible to overfishing. Species of concern are the spiny dogfish (also known as spurdog, huss and rock salmon - *Squalus acanthias*), thornback ray (*Raja clavata*), spotted ray (*Raja montagui*) and small eye ray (*Raja microocellata*).

There are many measures in place to reduce or eliminate overexploitation and conserve stocks. SFC byelaws, MAFF and European fisheries legislation all attempt to address the problem with the use of TACs, MLS, gear restrictions, etc. Of particular cause for concern in Wales is the widespread unlicensed or opportunistic fishing that SFCs and MAFF seem under-equipped to deal with. If this continues at or above current levels, the risk of overexploitation is high, especially of high value species such as bass, crab, lobster and scallop. This poses a significant threat to the balance of coastal ecosystems and to the coastal economy.

New legislation means that transport documentation is required for the movement of all fish products stating where it was caught, who purchased it and where it is being transported to. It is hoped that this will reduce the amount of illegal or undeclared fish sold through commercial channels. Additional measures should be taken to reduce the amount of fish bought by local residents and businesses that has not been purchased from a registered buyer. Fishermen, environmental groups and fisheries enforcement bodies should work together on this issue.

Bycatch

Bycatch of non-target species, especially of high profile species such as marine mammals and sea birds, is a cause of great environmental concern. Fishermen are also concerned about this issue as the capture of such large organisms can cause damage to fishing gear. Static nets that are left to soak for long periods of time are more likely to catch marine mammals than those that are regularly checked. Fishermen that leave nets to soak for too long are considered to be operating unprofessionally and this again brings to light the problem of unregistered and opportunistic fishermen.

These problems can be overcome by fishermen and environmental groups working together and an example of this is the work carried out in Cardigan Bay where fishermen have been providing information regarding the siting and identification of cetaceans (whales and dolphins) in the area.

The catch and subsequent discard of other non-target species (fish for which there is no market, juvenile fish, starfish and other marine life) is also something that both fishermen and environmental interests would like to reduce. Fishermen are continually modifying their gear and practices to attempt to reduce bycatch and discards and work with fisheries scientists and gear technologists to achieve these ends.

Damage to the seabed

The physical damage that certain fishing methods cause to the seabed and shore is a potential area of conflict. Some fishing methods cause more damage than others – beam and scallop trawls are designed to dig into the seabed as are trawl doors, while fixed nets, longlines and crustacean and whelk pots cause less damage to the surrounding environment. Conflict between fishermen using different fishing methods often arises, generally due to towed gear damaging static gear.

Environmental concerns are centred on the fact that fishing gear can damage the seabed causing mortality of benthic (bottom dwelling) species. Disturbance can change the species composition of benthic communities with fast-growing opportunistic organisms flourishing compared to slower-growing ones. Disturbance of the seabed can also contribute to or speed up erosion.

There are SFC byelaws in place to limit the amount of physical disturbance to the seabed by fishing – mechanical dredging is forbidden and there is a closed season for scallops so that the seabed and stocks are given time to recover from fishing pressure. There is also a vessel length limit and, in the

SWSFC, a four metre maximum size for beam trawl beams. These efforts are designed to restrict the fishing capacity within SWSFC waters but they also restrict seabed disturbance to some extent.

There are, however, arguments for the periodic disturbance of the seabed. Cockle beds are more productive if the “crumble” (a mix of broken shells and debris) is cleared away and other target species prefer a disturbed seabed – crabs, lobsters and other scavengers benefit from an abundance of detritus.

Sea Empress oil

Related to the concern over general disturbance of the seabed is the worry that oil from the Sea Empress spill could be disturbed and become re-suspended in the water column. This is a fear from both a fishing and environmental point of view as any re-suspension of oil could result in the closure of fisheries as well as potentially damaging other wildlife. This fear does, however, seem to be greater than the reality of the situation and very little Sea Empress oil has been found since the initial clean-up operation. The Environment Agency has been monitoring the degradation and fate of the oil since the spill.

Competition for food

The issue of fishermen competing for food with wildlife is a contentious one and there is less common ground between fishing and environmental interests. That fishermen target the same species as birds, seals, cetaceans and other wildlife is not in dispute but it is often seen by fishermen that the wildlife is eating their catch, while environmental concerns see it as fishermen who are taking the wildlife's food. The greatest point of contention is often the seal population, which has increased in recent years not only around Wales, but also around other parts of the UK and the views of environmental groups and fishermen are often diametrically opposed. Similar conflicting points of view can be seen in Scotland and the South West of England where seal populations have also increased dramatically in recent years.

Many research projects have focussed on the diet of marine wildlife and the competition between fishermen and wildlife for fish. As is often the case, different projects come to different conclusions and this issue will continue to fuel debate and conflict. Wildlife tourism is growing in popularity and whale watching and wildlife tours are contributing more to the economy than in years past and provide an alternate source of income for some fishermen during the summer months.

Community structure

Fishing affects the structure of marine ecosystem composition by the physical effects of fishing on the seabed (as mentioned above) and by the action of removing a proportion of the population of some species. What this does to the structure of marine communities is largely unknown. There will be knock-on effects such as the removal of a food source for other species but more subtle effects such as the removal of sources of predation or competition are less clear and less well understood.

It is in fishermen's best interest to protect the stocks of fish that they target as well as the marine environment in general. While the motives for addressing some of the issues above might differ for fishermen and environmental groups, there is much common ground and all can benefit by co-operating and pooling resources. The whale and dolphin identification project in Cardigan Bay is a good example of how fishing and environmental groups can work together. This project also involves the scientific community.

Moves are currently being made to involve fishermen more in the management of fisheries and to improve the working relationship with fisheries scientists. Similar efforts should be made to improve the relationship between environmental groups and fishermen. This can be achieved by joint participation in the management of fisheries and in environmental and development projects so that

all points of view can be taken into account and, hopefully, consensus reached on the way forward. To achieve this end, fishermen need an organisation or individuals that are able to represent their interests at these and other meetings and both sides need to be willing to co-operate and compromise.

2.8 Development opportunities

Below, possible development opportunities that are pertinent to the commercial fisheries in Wales are listed. These opportunities are expanded on in Section 7, where a development strategy for Welsh fisheries is explored. Many of these opportunities benefit the inshore fleet, the offshore fleet and shore-based fisheries. For example, the promotion of Welsh fish will benefit all fish producers in Wales while harbour developments can benefit the commercial sector, recreational sea anglers and other recreational harbour users such as yacht owners.

- ◆ Harbour developments
- ◆ Start-up grants
- ◆ Vessel modernisation / training grants
- ◆ Safety grants
- ◆ Diversification grants
- ◆ Fishing heritage
- ◆ Promotion of well-managed fisheries
- ◆ Promotion of Welsh fish
- ◆ Development of new fisheries
- ◆ Stock conservation / management schemes
- ◆ Education of the public
- ◆ Formation of industry representative bodies

3. Recreational fisheries

Recreational fisheries can be split into the three sub-sectors of game angling, coarse angling and sea angling. Each sub-sector has their contribution to the economy in terms of value, a SWOT analysis and development potential addressed individually. Employment, environmental interactions and development opportunities are assessed in the context of the recreational fishing sector as a whole.

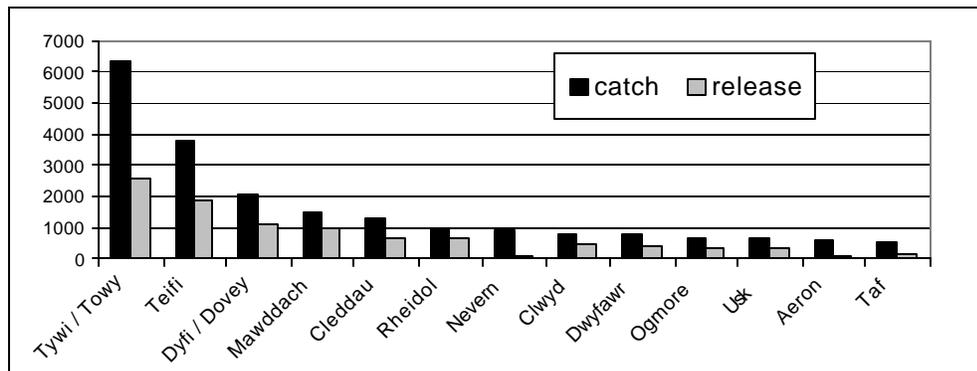
3.1 Game Angling

3.1.1 Background

There are in the region of 240 salmon and trout rivers in Wales⁶. Of those, 26 rivers account for over 99 per cent of rod caught sea trout (sewin) - the most important species to game fishing in Wales. More sea trout are caught in West Wales than anywhere else in Britain with 40 per cent of all rod caught sea trout in England and Wales recorded from Welsh rivers. In total 24,629 sea trout were rod caught in Wales in 1999; 49 per cent were returned alive to the river.

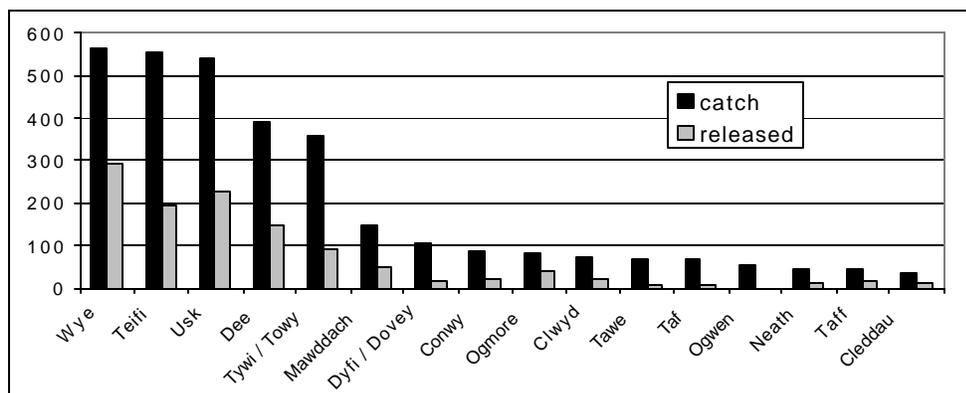
The largest stocks of sewin are to be found in the Towy, Teifi and Cleddau rivers in South West Wales and the Dovey and Mawddach further North. Figure 3.1 presents the catch returns for the main sea trout rivers in Wales in 1999 as well as the numbers subsequently released in each river.

Figure 3.1. Rod caught sea trout in 1999 for main sea trout rivers in Wales



Source: Environment Agency (based on catch returns)

Figure 3.2. Rod caught salmon in 1999 for main salmon rivers in Wales



Source: Environment Agency (based on catch returns)

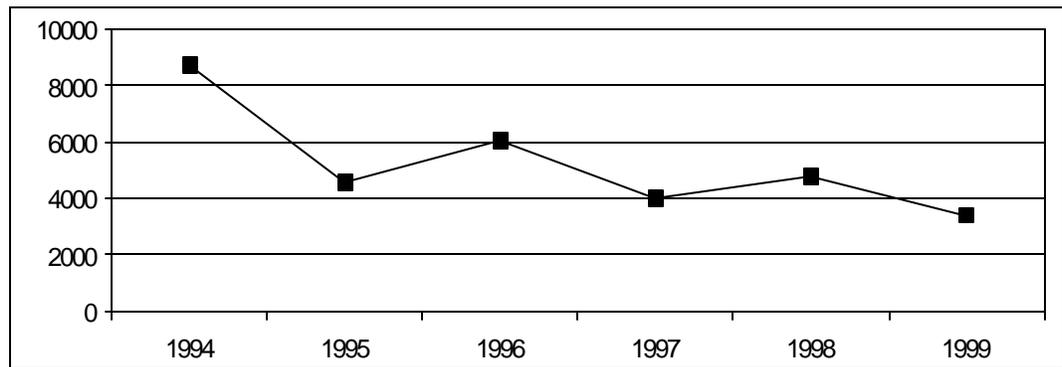
⁶ From 'Fishing Wales', Pat O'Reilly

Figure 3.2 shows a breakdown of rod caught salmon in Welsh rivers in 1999. The total figure for rod caught salmon in Wales in 1999 (adjusted for under-reporting x 1.1) is 3,403, with 1,209 being released (35.5 per cent). The figures show a 39 per cent reduction in catch compared to the 5 year mean of 5,602 rod caught salmon; this is a consequence of the very poor state of salmon stocks and the introduction of a byelaw in 1999 to protect spring running salmon. Although not specifically designed to reduce effort, the introduction of the byelaw has had a significant impact on effort levels in both netting and rod fisheries throughout the England and Wales. Figure 3.3 shows the downward trend of salmon and grilse rod catches in recent years which mirrors the Returning Stock Estimates (RSE) of most Welsh rivers. Despite fewer licences being issued, the salmon rod catch per licence day has also show a downward trend.

As in the rest of the UK, salmon stocks are generally in decline with many stocks currently outside safe biological limits. This is reflected in the reduced catches by salmonnetters (see table 2.7, Section 2.1.5) and in the rod caught fisheries.

Sea trout rod catches have also declined in recent decades, but this has not been as pronounced as the reduction in salmon caught and catches for the last two years have been very good.

Figure 3.3 Corrected total catch figures for rod caught salmon in Wales 1994 and 1999



Source: Annual Assessment of Salmon Stocks and Fisheries in England and Wales, 1999 Environment Agency.

Hyder operates many of the reservoirs and lakes in Wales as wild brown or rainbow trout fisheries. The water company owns 91 reservoirs, some of which are leased to angling clubs while others are managed by Hamdden, a subsidiary company of Hyder.

Other species attracting game fishermen to Wales (particularly Central and Northern areas) are grayling and brown trout. Certain rivers in Wales such as the Dee have an excellent reputation for grayling fishing as do the Teifi and Usk for wild brown trout fishing. Catches of these species are not, however, recorded to the extent that salmon and sea trout catches are. Stillwater game fishing is also to be found throughout Wales where brown and rainbow trout are targeted both from the banks and from the boat in larger reservoirs.

3.1.2 Contribution to the economy

The Wales Tourist Board estimates that 56,000 people visit Wales specifically to fish and that six per cent (408,000) of all visitors to Wales go fishing. Visiting anglers are estimated to spend £63.7 million⁷. This is a significant contribution to the economy of Wales particularly in areas such as West Wales and the Valleys – an Objective 1 area.

⁷ A comparative assessment of the potential contribution of alternative sectors to a sustainable agricultural industry and rural economy in Wales, Scottish Agricultural College Agro Industrial Research Services

An estimation of the contribution to the economy by game fishing is difficult to establish given the differing amounts of research on the target species for game anglers (salmon, sea trout, brown trout, rainbow trout, grayling). Fly fishermen will also switch to targeting different species during a trip depending on location, time of year and conditions. Focus has for the most part been on salmon and sea trout, but in many areas the other species attract more effort from both local and visiting anglers and thus contribute more to the local economy.

A recent economic evaluation of the Upper Teifi brown trout fishery showed that brown trout fishing in the region accounted for 2,300 angler days (44 per cent of river anglers were from outside Wales) compared to 500 days per year spent fishing for salmon and sea trout⁸. The total contribution of the brown trout fishery to the local economy is calculated in the report to be around £130,000 per year for the Upper Teifi. If this is extrapolated to include the other widely-known brown trout fishery on the Usk as well as lesser known fisheries, such as the Wye, Dee, Seiont and Taff, the figure would be well over half a million pounds per annum.

Table 3.1 shows 1998/99 sales of rod licences in Wales. In recent years, sales of salmon licences have declined, mirroring declining catches. Sales of trout and coarse licences have also declined. Licence sales in Wales have not fallen by as much as national licence sales. This provided a total income of £779,548, which contributes to the Environment Agency's work in maintaining and improving freshwater fisheries. While some of this expenditure is spent solely to benefit anglers, much of it goes towards general habitat improvements, benefiting both the wider population and general tourism in Wales.

Table 3.1 Number and value of rod licences sold in Wales in 1999

	Licence type				Total
	Full	Concess.	8 day	1 day	
Coarse / trout					
Number	23,462	11,360	1,401	14,215	50,438
Value (£)	375,392	90,880	8,406	28,430	503,108
Salmon / sea trout					
Number	3,340	2,321	773	1,494	8,212
Value (£)	18,370	63,828	11,595	7,470	276,440

Source: Environment Agency Wales

It is estimated that just over **90,000 days** were spent game fishing in Wales in 1999. The mean number of rod days per year between 1994 and 1998 is calculated by the Environment Agency Wales to be **95,618**; this figure will be used in the following calculations. A recent study on river Teifi anglers⁹ suggests a best estimate on average spend per angler as well as the proportion of angling trips made by anglers from different locations (Tables 3.2 to 3.4).

In order to calculate the economic value of game fishing it is assumed that the average expenditure of Teifi anglers does not differ significantly to expenditure by anglers on other Welsh rivers. With 5,661 long term salmon and sea trout licences purchased in 1999, direct fishing expenditure by game fishermen in Wales can be estimated at **£3.425 million** (5,661 x £605). The following tables calculate indirect fishing and non-fishing expenditure associated with game anglers.

Table 3.2 Estimated directly related annual expenditure of Teifi Angler.

⁸ An economic Evaluation of the Upper Teifi Brown Trout Fishery, Environment Agency Wales, Nov. 1999

⁹ Economic Evaluation of Inland Fishing in England and Wales, Environment Agency, 1999

Item	Expenditure	
	£ / year	%
Rod Licence	42	7
Fees/permits	285	47
Rods/reels/nets	125	21
Tackle	60	10
Competition	12.5	2
General	80	13
Total	604.5	100

Source: Environment Agency Wales

Table 3.3 Indirect expenditure

Anglers from:	Angler days (a)	Estimated expenditure per day (£)				% expend. in Wales (c)	Total expend (£'000). $\frac{a*b}{c}$
		Food	Travel	Accom.	Total (b)		
Within 25 miles	31,554	2	2	-	4	100	126
County	4,781	10	6	-	16	100	76
Wales	9,562	20	10	15	45	100	430
England	47,809	20	15	15	45	90	1,936
Elsewhere	1,912	20	10	20	50	95	91
Total	95,618				160		2,660

Source: Adapted from Environment Agency

Table 3.4 Additional indirect non-fishing expenditure by anglers and family members

Anglers from:	No. fishing days	Ratio of non-fishing days	No. non-fishing days	Extra expenditure per day (£)	Total Additional Expenditure (£'000)
Within 25 miles	31,554	0	0	0	0
county	4,781	0	0	0	0
Wales	9,562	0.2	1,912	35	66.9
England	47,809	1	47,809	40	1,912.4
Elsewhere	1,912	1	1,912	50	95.6
Total	95,618		51,633		2,075

Source: Environment Agency

The value of game fishing to Wales, combining direct and indirect fishing-related expenditure with additional non-fishing expenditure by anglers and their family is calculated as:

Direct fishing expenditure	£3.425 million
Indirect fishing expenditure	£2.660 million
Additional non-fishing expenditure	£2.075 million
Total	£8.16 million

Cardiff Business School and Welsh institute of Rural Studies, 1996 suggest a multiplier of 1.1 (knock-on spending effects in the local economy) which would increase the total value of game fishing to just under **£9 million**. This calculation of game fishing related spend per year is thought to be a conservative estimate, particularly when considering the profile of game fishing in relation to coarse and sea fishing. Given the simple calculations of average spend and rod licence ownership used, however, it is unclear where additional spend would be generated from and thus contribute more to the Welsh economy.

It must be remembered that contribution to the economy relates to what is spent in the economy annually and bears little relation to the estimated market value or capitalised economic rent for the resource. The market value includes the potential income from ownership of rights to the fishery as well as the 'status value' of ownership of the fishery. For game fishing more so than for other recreational fishing, a high economic rent is placed on the resource.

In attracting diadromous species, game fishing rivers are by definition high quality aquatic environments. They are also unspoilt natural environments that are often in private ownership and have therefore historically had values placed on them. The economic value of an individual fish has been calculated as £8,000 per salmon (Radford et al, 1991). Such estimates should be re-assessed given the changes in stocks and probable changes in average spend by those participating in game fishing since 1988, the year data for the original study was collected.

A survey relating to salmon fishing in the Wye catchment area calculated that average salmon catches over a 10 year period up to 1997 showed a 72 per cent decrease. The decrease in salmon caught has had an effect on the numbers of anglers travelling to fish the river (a drop of 62 per cent). Most Wye salmon fishery owners stated that an increase in rod catches would result in them employing more labour directly and spending more on their fisheries. Similar situations exist in most Welsh salmon and trout rivers and it is inevitable that the decline in salmon stocks has caused a decline in the economic value of game fishing in recent years.

3.1.3 SWOT Analysis

Strengths

Some of the strengths in the Welsh game fishing sector (ie. permit availability and under-exploitation of some game fisheries) compared to other game fishing areas are a result of game fishing in Wales being something of an unknown quantity. Game fishing opportunities in both Scotland and Ireland are well-documented and the subject of extensive, well-established marketing campaigns. As a result, however, this has led to high prices and a shortage of permits in Scotland, which Ireland is currently benefiting from.

Weaknesses

Wild stocks of Atlantic salmon are in a poor state both in the UK and Ireland. As a consequence both countries have brought in measures to limit the effort of netsmen and anglers as well as undertaking habitat improvements specifically aimed at improved salmon recruitment. These have, however, been relatively recent developments and catches continue to decline, which in turn has resulted in

declining numbers of visiting anglers. Illegal fishing remains a problem and undoubtedly also impacts adversely on efforts to conserve stocks.

Lack of marketing has meant that Wales is often not considered when people overseas are choosing an angling holiday. Although a varied choice should be a strength, the large number of rivers and varied angling opportunities in Wales can at once be enticing and bewildering. To complicate matters more for the visiting angler there are several, often competing sources of information on where to fish in Wales with little objective advice available.

When a venue is selected by visiting anglers, accommodation often has to be investigated and booked separately, often with great difficulty as there appears to be a shortage of accommodation that caters to the particular needs of fishermen (storage of wet clothes and equipment, unconventional hours).

Opportunities

It is widely accepted that Welsh salmon stocks will not support further fishing pressure as the evidence suggests the stocks are currently overfished. Game fishing in Wales can, however, develop its reputation for excellent sea trout fishing, as catches remain high enough to attract visiting anglers. Fishing for grayling could also be promoted as it provides game fishing opportunities during the closed seasons for salmon and trout. This is, however, limited to only a few rivers and the health of stocks is relatively unknown. Any developments should, therefore, be pursued with caution. Any extension of fishing opportunities inevitably has positive effects on surrounding businesses that benefit from angler spend for more of the year.

These promotional efforts do, however, require strict control with the level of fishing pressure controlled as tightly as possible. Research should be conducted to assess the sustainable level of fishing pressure on wild stocks of these species, in particular the lesser-known grayling. Long term monitoring, as conducted by the Environment Agency on salmon and trout numbers, is essential in achieving sustainable recreational fisheries.

Permits for most areas remain available to visitors and locals alike and there appears to be the potential to develop certain fisheries for recreational users (except salmon where effort should not be allowed to increase for the present time). Opportunities still exist partly because of the lack of marketing until recently, with visiting anglers being unaware of fishing opportunities.

Unlike the mature game fishing market in Scotland, there are many opportunities to increase the income derived from existing game fishing centres as well as to develop new or relatively undiscovered game fisheries. The main competitor to Wales as a game fishing centre is thought to be Ireland as many of the strengths mentioned above also hold true for Ireland. Ireland has recently begun to realise the potential of its angling resources and will be a couple of years ahead of Wales in implementing development plans for the sector. Ireland should, however, be seen as a competitor to Wales rather than a threat.

The draft "Celtic Fishing" initiative proposed by the Environment Agency Wales is intended to develop a joint marketing initiative for the two countries and will probably seek monies from InterReg. There are potential benefits for Wales through association with a more established game fishing and holiday destination for overseas visitors such as Ireland. Operators in the Welsh game fishing sector should, however, ensure that Welsh 'product' does not suffer by comparison with the Irish.

Threats

One of the main threats to future developments for game fishing in Wales is the continued decline of wild fish stocks. Some of the reasons for that decline are outside the control of the Environment Agency Wales and the Welsh Sea Fisheries Committees, namely:

- ◆ The capture of potential returns in sea areas outside Welsh control
- ◆ Marine pollution
- ◆ Climate change

As the behaviour and physiology of fish are very temperature dependent, it is thought that the geographical distribution of fish could alter with anticipated changes to water temperatures, currents and salinity brought about by climate change. Marine pollution incidents, be they diffuse or specific such as the Sea Empress, will also have a negative effect on target stocks.

Welsh authorities can ensure that discharges of pollutants into their water bodies are kept within acceptable levels, but cannot ensure that the quality of the seawater where diadromous fish spend certain life stages will not adversely affect them. The authorities can reduce the risk of specific pollution incidents and ensure an effective contingency plan is in place when incidents do occur, but target species, as with the ecosystem they inhabit, will always be susceptible to catastrophic events.

Development and intensive agriculture within river catchments have caused damage to riparian habitats over the last few decades. The chronic pollution caused by run-off from agricultural land, excessive water removal and degradation of banks by livestock have all contributed to rivers being less able to support healthy populations of diadromous fish.

Developments within river catchments contribute to this chronic pollution and also increase the risk of catastrophic events causing fish kills downstream of the event. Whether toxic enough to affect freshwater fish species or not, discharges can alter the delicate balance in water chemistry that is necessary for salmon and sea trout to thrive.

While conflicts between various recreational river users, such as pleasure boaters and canoeists are rare, future developments aimed at improving angling opportunities must take other users into consideration. The various river owners should be in agreement regarding developments or initiatives to avoid conflict between owners and owners and users. The ownership of a river's reaches by a number of different parties could complicate matters for users and prevent the exploitation of all potential angling opportunities.

Attracting visiting anglers on short-stay and specialist holidays is all the more important as the decline in long-stay family holidays in Wales is expected to continue. The reduction in long stay family holidays in Wales will lead to a reduction in the number of opportunistic anglers contributing directly to fishing-related income and a drop in occupancy levels in holiday accommodation. Specialist holiday markets must be developed to ensure visitor numbers are increased or at least maintained.

3.1.4 Development potential

Game angling for trout and salmon is a popular participation sport and recreational activity in Wales, with the fishery for sea trout being a major attraction. This activity makes an important contribution to the Welsh tourism industry, supporting the tourism infrastructure in rural locations and under-pinning the reputation of Wales as a location of high environmental quality and beauty.

The Environment Agency programme of habitat improvement in the higher reaches of the main rivers is hoped to have a major impact on the survival of trout and salmon. This is considered to be a long-term investment in improving water quality, associated habitats and agricultural and land

management practices, with benefits to a wide range of economic and quality of life matters to local residents, tourists and anglers.

Promotion and enhancement of game angling is considered to be possible at relatively little cost to the public purse, with the main drawback being the declining strength of the annual salmon runs. Returns on any public investment in river and salmonid management and support and promotion of game fishing are considered to be strongly positive, and display strong synergies with environmental, tourism, and rural development ambitions.

The sector is a strong candidate for continued investment in improved management and promotion. The focus of efforts should be on marketing and provision of accessible and comprehensive information on game fishing opportunities in Wales. Development of the back-office components of web-site development and of angler-friendly accommodation should also be supported. Overall, the sector offers sound public sector investment and development potential opportunities, and a cost-effective deployment of funds.

3.2 Coarse Angling

3.2.1 Background

The Environment Agency Wales maintains a database of over 250 still water coarse fisheries from one acre ponds to larger lakes and reservoirs. River coarse fishing opportunities are more limited. There are, however, significant coarse river fisheries on the Wye, Dee, Usk and Taff.

It is estimated that there are 20,000 coarse anglers in Wales¹⁰. The 1994 National Angling Survey found that 56 per cent of coarse anglers in England and Wales were members of a club. This suggests that most Welsh anglers are members of the 300 or so clubs in Wales. Anecdotal evidence from coarse anglers suggests that the proportion of anglers that are members of a club is much lower than this (approximately 50 per cent). The 1994 National Angling Survey also shows the mean number of coarse fishing trips in the last two years per angler was 26 in Wales, which was far lower than for other regions (average of 87 trips in last two years). The small sample size, however, prevents conclusions being drawn from this.

3.2.2 Contribution to the Economy

Table 3.5 Number and value of rod licences sold (1999)

	Licence type				Total
	Full	Concs.	8 day	1 day	
Coarse / Trout					
Number	23,462	11,360	1,401	14,215	50,438
Value (£)	375,392	90,880	8,406	28,430	503,108

Source: Environment Agency

Welsh angling bodies estimate that 10 per cent of coarse fishing is conducted without a rod licence. This is, however, higher than the Environment Agency estimates of 7 per cent.

The average annual expenditure in 1994 was calculated to be £1,070. Given the estimated number of coarse anglers in Wales (20,000), the total spend by coarse anglers in Wales is estimated to be £21.4 million.

¹⁰ Association of Welsh Anglers, pers. comm.

In 1998 there were 6.8 million visitors to Wales spending £910 million. Of those, 408,000 fished while in Wales and over 56,000 visited Wales specifically to fish, spending around £18 million¹¹.

Combining both the domestic and visitor spend on coarse fishing in Wales gives a total of £39.4 million, of which a large proportion is expenditure within rural economies. Introducing the income multiplier of 1.1, as mentioned in section 3.2, gives a figure of **£43.3 million**.

Evidence from various angling organisations and the Environment Agency Wales suggests that the contribution that inland angling makes to the economy of Wales is greater than the estimates calculated by the consultants. Many angling organisations have estimated the contribution to the local economy of various fisheries and river systems in Wales. No standardised method of calculating this contribution has been used. The consultants have based their estimates on the most up to date information available.

3.2.3 SWOT Analysis

Strengths

Wales benefits from having a large number of natural coarse fishing resources as well as increasing numbers of man-made ponds. The 250 coarse fisheries listed on the Environment Agency's database vary enormously in terms of quality of the fishing and facilities, but stocks are generally maintained at the necessary levels to attract anglers.

Recent surveys have found that between two and three per cent of the Welsh public participate in fishing to some extent¹². As this percentage includes sea and game fishing, the amount roughly tallies with rod licence sales for coarse fishing of around 50,000 in 1999. Fishing is one of the most popular sporting activities for men in Wales behind cycling, golf, snooker and general keep-fit.

Despite the relatively high participation levels, coarse fishing venues in Wales are generally not overcrowded, with only a few of the more popular venues reaching capacity at weekends. Wales has the added bonus of many venues, whether man-made or natural lakes and ponds being surrounded by countryside. This makes a family outing a possibility, as there is more to see and do than simply fishing. More facilities could, however, be provided to cater for non-fishing as well as for fishing visitors to venues.

Weaknesses

While the two Welsh coarse angling bodies are very active in representing anglers' interests and promoting the sport where possible, they lack the resources to be proactive in the development of the sport. As coarse angling falls between the interests of the Environment Agency, the Sports Council, the Tourist Board, local authorities and private interests, structured development is difficult.

The Welsh Coarse Fish Strategy produced by the Environment Agency Wales has broad objectives tackling the economics and development of coarse fisheries as well as their ecological management. It is unclear how far this plan has or will be implemented, but such wide-ranging plans should be in partnership with the numerous other parties with expertise in certain aspects rather than in isolation. The 'Fishing Wales' initiative recognises this need for collaboration (see section on development opportunities below).

The focus is often on game fishing as this has a greater impact on wild stocks in natural habitats and also commercial interests. Perhaps as a result, game fishermen have more representation on committees and in the regional decision-making process than coarse fishermen, despite coarse fishing being a more popular pursuit. This imbalance is noted by those involved and action has been

¹¹ Welsh Federation of Coarse Anglers, Executive secretary pers. comm.

¹² The Sports Council for Wales, sport participation survey 95/96, 97/98, 98/99

taken by some organisations to correct it. This process is on-going and it will take time to properly redress the balance.

For visiting anglers, making a choice between the many coarse fishing sites can be difficult. There is a shortage of specialist advice and information available to visiting anglers. This is an important issue when it is also noted that some coarse fisheries have poor facilities. There is also the view among many anglers that certain commercial fisheries are only interested in gate receipts rather than customer satisfaction. Visiting anglers are therefore having to take pot luck, with some inevitably having experiences below their expectations; this is not a good basis on which to develop the sector.

As with game fishing there is a certain proportion of illegal activity associated with coarse fishing, mainly licence avoidance and poaching of specimen fish. Such activities deprive the sport of revenue and hinder its development.

Opportunities

With the co-hosting of the Rugby World Cup in 1999, Wales proved its ability to successfully host major sporting events. The Angling Centre of Excellence in the Millennium Coastal Park, Llanelli will allow Wales to host major angling events.

The interest in fishing from non-anglers or occasional anglers is perceived to be high with 6 per cent of visitors to Wales in 1998 participating in some form of angling, only a third of those suggesting it was mainly a fishing holiday. To cater for and develop this "opportunistic" market, angling should be made as accessible as possible and promoted as a potential activity for anyone, be they visitors or resident in Wales.

Threats

Farmers and landowners are increasingly recognising the potential to make money from coarse angling. With over-capacity in some agricultural sectors and recent farm-gate price drops, several Welsh farmers have chosen to build coarse fishing ponds as an extra source of income. While it appears there are opportunities for expansion of the sector, these developments have come about to make money rather than provide good fishing and first-class facilities. There is a danger that poor quality developments could damage the reputation of other man-made fishing venues and the wider reputation of coarse fishing in Wales.

Despite the large and increasing number of fishing venues, there is a recognised shortage of suitable match fishing venues. There are also few suitable sites where purpose-built match fishing venues can be situated.

Expanding coarse fishing opportunities in Wales should however be through improvements to existing facilities as well as the creation of new venues. Fishing is competing with water sports in other areas and the expansion of fishing should not be at the expense of all other recreational users. Such competition for space and facilities needs to be managed properly to avoid potential conflict. It should also be recognised that fishing does have an impact on the wildlife, albeit a minimal one if anglers adhere to good practice guidelines. Countryside managers should therefore also maintain a balance between supporting the needs of recreational users and the needs of the environment they have come to enjoy.

3.2.4 Development potential

Coarse fishing is amongst the most popular recreational activities in the UK, and incorporates a strengthening competitive sport element. Wales provides a wide range of venues and species for the coarse angler, with significant corollary contribution to the local, and particularly rural, economy, though it is considered that the quality of facilities and access charges are not competitive with England and Ireland.

Development of the sector displays strong synergies with the movement towards greater rural sustainability, promotion of the Welsh environment, and of Wales as a tourism venue for all the family.

This sector is considered to offer substantial economic and development gain for relatively little public spend at low risk.

3.3 Sea Angling

3.3.1 Background

Sea angling, comprising boat and shore fishing, is a very popular recreational activity in the UK and Ireland, and Wales is able to offer fishing to compare with the best on offer in other areas. In particular, Wales is able to offer, amongst a wide range of species, excellent shore fishing for bass, cod and whiting, and boat fishing for black bream and tope.

Little statistical information is available for the scale and economic worth of sea angling, and despite its obvious popularity, it is often over-looked when tourism and coastal development matters are debated. For the purposes of analysis, however, we have divided sea angling into shore angling, charter boat angling, and angling from an angler's own boat. In addition, we have divided the year into three activity periods – winter, spring and summer. The spring season represents the low season, with many target inshore species moving offshore for breeding. During this season the best fishing occurs on the higher spring tides that occur twice a month, and the peak number of anglers will be fishing around this time, drawing mainly from locally resident anglers. For the rest of the year, weather and ease of access to fishing areas will largely determine the number and distribution of anglers. Thus, angling during late spring and winter is concentrated in those areas served by good motorway and trunk road access – Swansea, Cardiff and Newport in South Wales, and Anglesey and the northern coast of Wales in the north. This pattern changes in the summer months when visiting anglers prefer the more rural and scenic aspect of the west coast.

There are 294 registered angling charter vessels operating in Wales¹³, ranging in size from the smaller vessels capable (and licensed) to take small parties, to large vessels with a capacity for up to twenty anglers. Typical charter costs are £30 per person per day. Black bream and tope fishing are a key element of this sort of fishing such that, for example, if tope were to disappear from Cardigan Bay, charter boat days would fall by a third, rendering most boats non-viable.

Charter skippers operate for as long a season as possible, and the best are booked up weeks, if not months, in advance. Charter boats do not, however, operate during the period November to mid March inside Cardigan Bay and rarely along the Pembrokeshire coast. Charter boat operators throughout Wales are of a high standard, but they are concerned about the lack of easy parking in many ports and harbours close enough to the boats for simple access. Another concern is the high cost of parking, especially in the mid and north Wales areas. Gwynedd has particularly high long stay car park prices.

Anglers who fish from their own boats, transporting their boats to launch sites around the coast, are a growing and important component of this sport. For these anglers, road access, and convenience and cost of use of launch site, are key considerations in when and how often they visit Wales. The main concerns of these anglers relate to poor launch facilities, high daily launch fees and expensive parking. Again Gwynedd is quoted as especially expensive for day launches and grossly inadequate launch sites, many only allowing high water launch times. More all states-of-tide launch ramps are required throughout Wales for safety reasons (if the weather worsens while the boats are at sea) and convenience. Many launch sites along the south coast of England are free, or carry a small £2

¹³ Welsh Federation of Sea Anglers, pers. comm.

charge, which includes a free tractor launch and retrieve facility. Some North Wales daily launch fees are currently £10.

In terms of overall spend, anglers buy bait, and inevitably some tackle, from local shops. They need fresh bait, and this is obviously best bought from the local shops. They usually use the nearby cafe's and restaurants, shops and grocery stores for provisions. Fuel for cars and boat engines also comes into the equation. Many boat anglers choose to take bed and breakfast the night before a charter boat or beach trip, at the same time spending money in pubs and other public facilities. In general, few B&Bs tailor services and facilities to the needs of anglers; this is in marked contrast to facilities available in Ireland.

3.3.2 Contribution to the Economy

With the assistance of local sea angling specialists¹⁴ we have been able to estimate the scale of economic contribution made by this sport. Sea angling involves the participation of approximately 12,000 locally resident anglers, and upwards of 28,000 visiting anglers. The calculations presented in Table 3.6 suggest that this sport makes a gross contribution to the coastal economy of Wales of over **£28 million**.

¹⁴ Mike Thrussel, sea angling journalist, and Hefen Jones, Chairman of the Welsh Federation of Sea Anglers and a board member of the NW & NW Sea Fisheries Committee

Table 3.6 Estimates of sea angling activity (rod days)

	Local				Visitor			
	Spring	Summer	Winter	Total	Spring	Summer	Winter	Total
N Wales	3,188	5,950	5,143	14,280	3,783	5,525	5,738	15,045
Anglesey	3,400	7,650	6,375	17,425	4,250	11,050	8,500	23,800
Lleyn Peninsula	2,040	6,375	4,590	13,005	1,700	6,375	3,060	11,135
Cardigan Bay	7,310	8,500	6,205	22,015	1,955	6,630	3,060	11,645
Pembrokeshire	9,393	10,200	8,075	27,668	2,763	8,500	3,570	14,833
South Wales coast	12,175	15,300	22,100	50,575	5,525	8,925	5,950	20,400
Severn Estuary	10,200	10,200	6,800	27,200	2,550	3,825	3,825	10,200
Total	48,705	64,175	59,288	172,168	22,525	50,830	33,703	107,058
Ave. days per angler.				50				20
Est. no. anglers				3,443				5,353
Ave. spend per day (£)				15				45
Total spend (£ million)				2.6				4.8
Charter boat angling								
	Local				Visitor			
	Spring	Summer	Winter	Total	Spring	Summer	Winter	Total
N Wales	5,950	13,600	9,350	28,900	3,570	6,290	3,876	13,736
Anglesey	3,485	8,075	5,525	17,085	1,700	4,845	2,907	9,452
Lleyn Peninsula	2,465	6,120	2,210	10,795	2,295	5,780	1,445	9,520
Cardigan Bay	1,386	4,794	2,091	8,271	10,795	54,485	11,900	77,180
Pembrokeshire	1,726	5,270	2,465	9,461	10,710	60,299	11,050	82,059
South Wales coast	1,360	2,550	2,550	6,460	5,100	8,670	8,670	22,440
Severn Estuary	850	850	850	2,550	4,250	1,275	2,975	8,500
Total	17,221	41,259	25,041	83,521	38,420	141,644	42,823	222,887
Ave. days per angler.				10				10
Est. no. anglers				8,352				22,289
Ave. spend per day (£)				£45				£70
Total spend (£ million)				3.8				15.6
Private boat angling								
	Local				Visitor			
	Spring	Summer	Winter	Total	Spring	Summer	Winter	Total
N Wales	340	850	850	2,040	680	1,700	1,700	4,080
Anglesey	340	680	680	1,700	340	1,870	1,190	3,400
Lleyn Peninsula	170	680	340	1,190	170	1,020	544	1,734
Cardigan Bay	340	1,360	510	2,210	340	2,720	510	3,570
Pembrokeshire	340	1,700	510	2,550	340	2,720	340	3,400
South Wales coast	2,550	3,400	3,400	9,350	850	3,400	3,400	7,650
Total	4,080	8,670	6,290	19,040	2,720	13,430	7,684	23,834
Ave. days per angler.				50				20
Est. no. anglers				381				1,192
Ave. spend per day (£)				£25				£60
Total spend (£ million)				£0.5				£1.4

3.3.3 SWOT Analysis

Strengths

Many of the strengths, weaknesses, opportunities and threats of sea fishing are similar to those for the other recreational fishing sectors. There is a wide range of species available to sport fishermen – excellent bass, black bream and tope fishing - providing good competitive fishing for both shore and boat anglers.

Much of the coastline and inshore sea areas are protected by various natural heritage designations, few of which limit angling activity or opportunities. Access to the coast is facilitated by the good road access along both the north and south coasts of Wales. The relatively low population density and high natural beauty and environmental quality of coastal areas contribute to the air of peacefulness, allowing anglers to “get away from it all”.

There is active consultation and co-operation between organisations representing sea anglers and fisheries and environmental managers.

Weaknesses

The economic importance of this sector is not widely recognised resulting in limited official support to the sector and its requirements. There is no evidence of travel agency interest in this sector and B&B and hotel infrastructure is not generally tailored to the requirements of sea anglers. There is limited information available on the fishing opportunities available and signage for beach and boat fishing is poor at best. Launching and landing facilities for anglers are generally poor, as is the road infrastructure in some areas, especially West Wales.

Sector representation is undertaken on a voluntary basis and is fragmented, though this is improving but there remains no single point of contact for all matters to do with sea angling in Wales.

There is heavy commercial fishing pressure on various species of interest to recreational sea anglers and inshore netting, particularly illegal netting for bass, undermines the resource base.

Opportunities

There is great potential to improve the promotion of fishing activities to both resident Welsh anglers and visiting anglers. Fishing opportunities need to be managed, packaged and promoted effectively and existing and specialist travel agencies can supply and promote specialist fishing packages. The availability of more fishermen friendly accommodation, and particularly its specific designation and promotion, could greatly enhance the popularity of overnight stays and the economic value of this recreational activity.

There also exists potential to provide higher quality information regarding the fishing opportunities available e.g. a low cost detailed guide to sea fishing opportunities in Wales and a database to existing sea fishing web-sites (notably fishing sites, accommodation, charter boat availability, facilities and opportunities for family entertainment).

Threats

Potential deterioration in the state of the stocks and the quality of the natural environment poses a threat to the continued popularity and expansion of sea angling. Overfishing, illegal fishing and habitat degradation are all real threats.

Uncompetitive pricing of long-stay parking at harbours and beaches and of launching and landing facilities acts as a disincentive to participation in sea angling, as does the continued poor quality of overnight accommodation and the shortage of sea angling information.

3.3.4 Development potential

Sea angling is a major participation sport and recreational activity in Wales contributing strongly to the coastal economy. It also has some significance for the Welsh tourism economy. Participation in the sector is on the increase, despite the fact that public support is very limited.

Sea angling when undertaken using best practice (responsible use of facilities, respect for the high environmental quality of venues and return of most fish live to the sea) shows strong synergy with the sustainable development of the coastal economy. It underpins the high environmental designations of much of the Welsh coastline and encourages the conservation of fish stocks and the marine ecosystem.

It is thought that this sector offers considerable potential for growth and expansion and that relatively little public investment in low risk support activities would stimulate considerable gains. Investment should focus on the promotion of sea angling in Wales as amongst the best in Europe and the upgrading of support facilities for the sector (signage, car parking, facilities at launch sites, support to charter vessel operators, encouragement and recognition of accommodation providers meeting the specific requirements of anglers).

Many of the strengths, weaknesses, opportunities and threats are shared by all three recreational fishing sectors while others are sector specific. The table below summarises the SWOT analysis for game, coarse and sea angling noting shared characteristics and sector specific characteristics.

<p>Strengths</p> <p>The wide range of fishing opportunities and 'unspoilt' environment means recreational fishing is popular, but venues are not overcrowded and there is still room for growth in all sectors.</p> <p>Coarse fishing</p> <ul style="list-style-type: none"> ◆ Large number of venues ◆ Stocks of coarse fish healthy ◆ High participation levels by Welsh residents and visitors ◆ Attractive surrounding countryside <p>Game fishing</p> <ul style="list-style-type: none"> ◆ Relatively low price of participation (compared to Scotland, but not Ireland), ◆ Availability of licences, ◆ 'Unspoilt' nature of the countryside and ◆ Varied game fishing opportunities (locations and species) <p>Sea angling</p> <ul style="list-style-type: none"> ◆ Wide range of species – excellent bass, black bream and tope fishing ◆ Much of coastline and inshore sea area protected by various natural heritage designations, few of which limit angling activity or opportunities ◆ Active consultation and co-operation between organisations representing sea anglers and fisheries and environmental managers ◆ Good road access along the north and south coasts of Wales ◆ Good competition venues – for both shore and boat angling 	<p>Weaknesses</p> <p>A lack of strategic development and support/marketing infrastructure leading to potential customers being unaware of fishing opportunities and poor associated facilities, accommodation and access.</p> <p>Coarse fishing</p> <ul style="list-style-type: none"> ◆ Lack of coarse fishing representation on committees compared to game fishing ◆ Not as varied species mix as English coarse fishing facilities ◆ Lack of good match fishing facilities ◆ Questionable value for money at some venues ◆ Illegal activity (licence avoidance and poaching of specimens from ponds) <p>Game fishing</p> <ul style="list-style-type: none"> ◆ Depleted wild fish stocks (salmon in particular) ◆ Water quality and pollution risks <p>Sea fishing</p> <ul style="list-style-type: none"> ◆ Generally poor recognition of the economic importance of this sector resulting in limited official support to the sector and its requirements ◆ Sector representation on a voluntary basis and fragmented, though this is improving ◆ Heavy commercial fishing pressure on various species – particularly illegal netting for bass – under-mining resource base for recreational anglers ◆ More difficult road access to the west coast of Wales – limits attraction to day and short-stay visitors ◆ Poor to non-existent signage for beach and boat angling
<p>Opportunities</p> <p>New and existing venues, accommodation, facilities and marketing initiatives can be substantially improved and there is European money available to assist this.</p> <p>Coarse fishing</p> <ul style="list-style-type: none"> ◆ Angling Centre of Excellence being built ◆ Hosting international events ◆ Increase recruitment of non-anglers through simplified participation and coaching <p>Game fishing</p> <ul style="list-style-type: none"> ◆ Targeted marketing based on sea trout, brown trout and grayling ◆ Business opportunities associated with visiting anglers <p>Sea fishing</p> <ul style="list-style-type: none"> ◆ The provision of a low cost but detailed guide to sea fishing opportunities in Wales ◆ Substantially enhanced back-office database infrastructure to existing sea fishing web-sites (notably fishing sites, accommodation, charter boat availability, facilities and opportunities for family entertainment) 	<p>Threats</p> <p>The strength of the pound and decline in long-stay holidays means fewer people are visiting Wales for long periods. This means the promotion of specialist holidays such as fishing is necessary, but it should be balanced with environmental concerns (disturbance to wildlife and health of diadromous stocks) and needs of other users.</p> <p>Coarse fishing</p> <ul style="list-style-type: none"> ◆ Opportunistic commercial fishery operators may damage reputation of others ◆ Few suitable match fishing venues ◆ Pollution and disease causing fish-kills <p>Game fishing</p> <ul style="list-style-type: none"> ◆ Pressure on water courses from development ◆ Purchase of fishing rights by outside interests <p>Sea fishing</p> <ul style="list-style-type: none"> ◆ The over-pricing of long-stay parking at harbours and beaches ◆ The limited number, quality and over-pricing of launch facilities

3.4 Other aquatic resource related recreation

In addition to tourism directly related to fishing, healthy fisheries are an integral part of healthy ecosystems, which contribute significantly to the attraction of Wales for the majority of tourists. Habitat improvement creates positive impacts for fishing, wildlife tourism and more general tourism involving outdoor activities.

Marine-related tourism activities that are dependent on fisheries include charter boats providing short cruises of between one and four hours along areas of coastline, generally associated with large bird or seal populations. Bird watching (boat or land based) and seal watching are popular tourist activities in Wales as it boasts large grey seal populations along the Pembrokeshire coast as well as internationally important sea bird sites (Skomer) and wild fowl sites (lagoons and saltmarshes throughout Wales).

Although Cardigan Bay claims one of only two resident UK populations of bottle-nosed dolphins (the other being in the Moray Firth), there are no tourism enterprises specifically marketing themselves as "dolphin-watching". Cruises in the area are referred to as "heritage cruises" as the success rate for spotting the dolphins is not thought to be high enough to justify marketing as purely "dolphin watching". In a 1992 survey of dedicated cruises, sightings of bottle-nosed dolphins were estimated to be 80 - 100 per 1,000 km travelled in Cardigan Bay; compared to 200-300 sightings per 1,000 km travelled in the Moray Firth¹⁵.

Several tourism-related companies in the Cardigan Bay area do, however, refer to the dolphins within their promotional literature and New Quay, noted for dolphin sightings from the shore, has seen an upturn in visitor numbers even in the winter months. The prospect of seeing dolphins is enough to warrant more visits to the area, but most of these visitors stay on-shore. Paying for a boat-trip to see dolphins increases expectations and it is therefore debatable whether a cruise company based on dolphin-watching would frustrate customers, potentially damaging the reputation of other local operators.

Several other popular tourism attractions in Wales have a fisheries-related theme, including various sealife centres, aquaria and fishing heritage boats and museums. A heritage workshop does exist in Milford Haven and various other local museums along the coast refer to the fishing tradition of Wales.

3.4.1 Contribution to the Economy

Tourism now accounts for five per cent of Wales' GDP (over £1.35 billion per annum). Day visits are thought to account for a further £550 million. Many of these visitors come to the coast and experience fisheries-related activities or attractions to some degree. In West Wales and the Valleys tourism accounts for eight per cent of employment and this rises to nearer 20 per cent in some rural localities.

3.5 Employment

3.5.1 Highly dependent employment

In 1957 Wye fishery owners employed 29 people to look after the water (ghillies), in 1977 there were 23 and in 1997 this figure was down to three. These results indicate that nowadays there is only one direct job per 161 rod caught salmon (based on 482 rod caught salmon in the Wye in 1997). If this employment trend is extended to all Welsh salmon rivers, the total now directly employed in the salmon fisheries is 21 (3,403 salmon caught/161).

¹⁵ Status review of cetaceans in British and Irish waters, Evans, PGH. Oxford Sea Watch Foundation (Report to the UK Dept. of the Environment, London) 1992

Direct private sector employment appears to be very low for salmon fisheries. This is not surprising given the transfer of responsibilities to state agencies and the large number of landowners with some riparian responsibility. Fishery owners generally apportion most of their time to agriculture and land management rather than fisheries.

There are approximately 250 inland fisheries in Wales. About fifty of these are of sufficient size to support two staff (FTE) each. Of the 250 remaining, approximately 100 support about ½ (FTE) each, contributing a further 50 FTE. Direct employment in the management and operation of the inland fisheries of 150 may be allocated about 20 per cent to coarse and 80 per cent to game. The equivalent category for sea angling is represented by the charter vessel skippers and their crew. At 1½ staff per charter vessel, the 294 registered vessels represent direct employment of 441 (FTE).

3.5.2 Associated industries

Some of the industries associated with recreational fisheries are more directly associated with the fortunes of the industry than others. Bait and tackle shops and specialist fishing clothing retailers are closely tied to the recreational angling industry and any increase in the popularity of angling will have positive knock-on effects on these industries. There are approximately 90 tackle shops in Wales, each supporting about two staff (FTE). On balance, an equal proportion of this employment may be attributed to each of game, coarse and sea angling.

Indirect employment that is reliant on angling to some extent, particularly by visiting anglers, includes B&B's, hotels, pubs etc. Revenue from anglers contributes to local economies, extending the tourist season beyond the peak months of July and August. With angling it has been shown that an increase in the likelihood of success results in higher visitor numbers. One study also found that anglers who were successful stay an average of 23 per cent longer¹⁶.

B&Bs, hotels, restaurants and shops in the vicinity of recreational fisheries benefit from a healthy angling industry but most are not geared specifically towards catering for this sector and are not so reliant on the fortunes of the recreational angling industry for their income. It is possible that many of these businesses do not recognise that a proportion of their income is dependent on the recreational angling industry. An upsurge in interest in angling would have a beneficial effect on these businesses but it is unclear if any would attempt to capitalise on this by attempting to become more angler-friendly.

Other local businesses and tourist attractions are also likely to benefit from an increase in recreational fishing if anglers from further afield are attracted to Wales as they are more likely to bring their families than local anglers. Families may not wish to fish but may be interested in local tourist sites, shops, restaurants while the angler in the family enjoys the local fishery.

3.7 Angling / environment interactions

The main issues are:

- ◆ Impact on wild stocks of target species
- ◆ Impact on non-target species
- ◆ Habitat modification to facilitate angling
- ◆ Introduction of non-indigenous fish species for angling reasons
- ◆ Bait-digging/collection for commercial gain
- ◆ Use of live bait and ground baiting

¹⁶ Main Quarry hypothesis and salmon angling. Bell, F.W., 1989. Florida State University

- ◆ Littering and poor knowledge of environmental issues amongst anglers
- ◆ Competition for food / disturbance of wildlife

The Salmon and Freshwater Fisheries Review presents a comprehensive list of recommendations intended to address the many issues identified. The issues highlighted above of specific relevance to Welsh recreational fisheries have been discussed at length by the Review Group and a number of recommendations put forward. The consultants suggest that the Review's findings be used as a guide on how to address the practical management issues relating to recreational fisheries and environment interactions. The issues are tackled from a Welsh perspective below.

Target Species

A major concern with regard to recreational fisheries is their impact on wild stocks of target species. This is most pertinent for game fishing where diadromous species are captured in significant numbers compared to commercial fisheries. The recorded Welsh rod catch in 1999 was 3,094 salmon compared to a net catch of 2,341. Although unrecorded net catches may in reality push net catch figures above the number of rod caught salmon, game fishing evidently has a large impact on stocks as well as commercial fisheries.

The Environment Agency is aware of the need to limit recreational effort as well as commercial effort, taking action in 1999 by banning the killing of salmon caught before June 16th, restricting fishing methods (artificial flies and lures) and supporting local rules imposing bag limits on Welsh rivers for salmon.

The continued decline in salmon (and to a lesser extent sea trout) stocks does suggest yet more needs to be done to reach sustainable levels of fishing pressure and encourage the recovery of stocks including encouraging anglers to return both salmon and sea trout.

Research is necessary to establish sustainable levels of exploitation for specific fisheries with effort managed accordingly. Excess fishing effort should be redirected through marketing to under-exploited Welsh fisheries. All fisheries thought to be able to sustain further effort should be investigated to confirm this. Catches of sea trout have declined in recent years and, as sea trout is an increasingly important game fish in Wales, and Wales is attempting to develop a world class reputation, a precautionary approach should be adopted and conservation limits set.

There are on-going restocking programmes for many Welsh rivers carried out by the Environment Agency, but these are intended to slow the decline in stocks not increase stock level. This practice is costly and does not prevent the decline of "natural" stocks. Habitat improvement is a longer-term strategy that attempts to improve the chances of fish returning to breed and provide suitable habitat for successful breeding and recruitment.

Certain stocks of marine target species for both sea angling and commercial fishing are also in decline. Bass is highly valued by both commercial and recreational fishermen. The division between recreational and commercial fishing is often blurred where bass is concerned, with some apparently recreational fishermen fishing from a boat using several rods and then selling the catch locally. The practice is widespread enough for the additional supplies to cause the price received by commercial fishermen to be reduced. This has knock-on effects for the environment with stocks being subjected to a great deal of fishing pressure from recreational fishing.

Although sea angling uses a rod and is therefore "cleaner" than some commercial fishing techniques such as trawling, there are concerns that the targeting and non-return of particular species is having a significant impact on the abundance of those species and also altering the ecosystem as a result. High fishing pressure on thornback ray is causing concern in some quarters.

Non-target species

Over-stocking of natural still-water fisheries for angling can have adverse effects on both overall water quality and habitat. The combination of high stocking densities and ground baiting can result in anoxic bottom conditions, causing the loss of species intolerant of low oxygen conditions.

Allis and twaite shad are two species of fish that are on the endangered list both through fishing pressure (captured occasionally by sea anglers as well as commercial fishermen) and habitat destruction. Being diadromous fish they are affected by obstacles affecting passage along the reaches of rivers, as well as by general pollution.

Another group of fish in need of protection is lampreys. This group has also suffered due to increases in pollution, habitat degradation and river engineering adversely affecting the complex and specific habitat requirements throughout its lifecycle. Sea lampreys are only found in the Towy and Teifi rivers in Wales.

The Salmon Action Plans (SAPs) developed by the Environment Agency for all major salmon rivers in Wales should take impacts on non-target species into account. In particular, the alteration of flow patterns should be thoroughly investigated prior to action as this can have serious impacts on a number of species including those on the endangered list such as lampreys.

Habitat modification

Habitat modification can take on a number of forms - habitat improvements to encourage the recovery of wild target species stocks, the building of roads, paths and pitches to increase the access to reaches, and "gardening" riparian vegetation.

While well-planned and applied habitat improvements can benefit the wider environment as well as fisheries, poorly planned works can have the opposite effect. Alterations to the flow of rivers, such as constrictions to increase flow rates for salmonids, can be to the detriment of other habitats and potentially increase flood risks.

The River Cennen project has shown that habitat improvements can be a cost-effective way of improving salmon and trout stocks compared to restocking, with the added benefit of improving the general riparian environment. Similar projects are to be encouraged if appropriate safeguards are in place to ensure that salmon and trout habitats are not developed at the expense of other habitats and wildlife.

Every effort should be made to ensure that the natural diversity of Welsh rivers is maintained. As diadromous fish are useful indicators of the health of an ecosystem, it is likely that most habitat improvements such as buffer strips, fencing, riverbank protection and gravel cleaning will benefit the whole river ecosystem. The Salmon and Freshwater Fisheries Review Group does, however, recommend that research be undertaken to investigate the distribution and needs of rare and non-target fish species.

Introduction of non-indigenous fish species

A weakness of coarse angling in Wales is a less varied species mix than some English venues. There is a temptation to introduce species that are favoured by anglers into watercourses to rectify this. Such introductions can have devastating effects on the natural ecosystem with alterations to complex predator / prey relationships. The movement and stocking of fish is under the jurisdiction of the Environment Agency. It is not apparent under what set of conditions the introduction of non-indigenous species into a watercourse could be justified. Such action should not be permitted, other than in enclosed man-made water bodies, and only then after full consultation with the Environment Agency. It is prohibited to introduce fish to waters without the consent of the Environment Agency.

Bait-digging/collection for commercial gain

There are concerns, particularly among bird conservation groups such as the RSPB, that bait-digging, along with shore-based commercial gathering of shellfish, can remove excessive amounts of a bird food resource as well as the human presence causing excessive disturbance to bird populations¹⁷.

It is estimated that an experienced bait-digger can turn over a 200m² area of sediment on each tide and diggers can remove a significant proportion of lug worms (*Arenicola marina*) and rag worms (*Nereis virens*) in certain localities as well as cause general disturbance to the inter-tidal habitat.

Welsh Sea Fisheries Committee byelaws already prohibit the use of mechanical bait diggers. This prohibition should certainly be maintained. Hand-gathering activity should be monitored to ensure it does not reach excessive levels. Research should also be conducted to assess sustainable exploitation levels and establish whether limits or seasonal closures should be imposed to avoid over-exploitation and disturbance to bird populations respectively.

Use of live bait and ground baiting

Live baiting can result in the transfer of fish from one water body to another which can have similar consequences to introducing non-local species for angling purposes for the ecosystem of receiving waters.

The use of livebait should be strictly controlled to avoid any adverse effects through introductions. At the very least, only livebait from the same watercourse should be permitted. If such controls are not observed by anglers or cannot be enforced, the Environment Agency should consider banning the use of livebait.

Littering and awareness of environmental issues

In the recent past angling achieved notoriety for the negative environmental impacts of lead shot, particularly on swans. The issue has now been dealt with, but there remains a more general concern that anglers should be more aware of their impacts upon the surrounding environment as well as on the fish.

Although a lack of environmental awareness is an issue to be addressed with the public in general, anglers spend more time in the outdoors interacting with the natural environment and, therefore, have more opportunity than most to impact upon that environment. In general anglers take care not to leave tackle and litter behind, but there are inevitably people who are not as environmentally conscious. Popular fishing areas are prone to spoiling with litter and discarded fishing line and tackle which are both aesthetically displeasing and dangerous to wildlife.

Fishermen are a large target group that can be informed through the specialist angling publications and upon receipt of a rod licence and byelaws. Additionally, signage providing useful information to anglers can also inform on environmental matters. The Environment Agency cannot realistically strictly enforce byelaws preventing littering. Instead, a shift in attitude towards one of stewardship should be encouraged through good, accessible environmental interpretation.

¹⁷ 'Foreshore Fishing for Shellfish and Bait' Duncan Huggett, RSPB, 1992

Competition for food / disturbance of wildlife

Competition between anglers and wildlife for the same fish, especially competition with piscivorous (fish-eating) birds is a potential area of conflict. A recent in-depth study has been carried out into this interaction but it continues to be a potential area of disagreement between anglers and environmental groups. Some anglers are also concerned that the removal of closed seasons for coarse fish may lead to disturbances during water birds' breeding seasons. This could lead to additional conflict between angling and environmental groups.

3.8 Development opportunities

A list of possible development opportunities that are of relevance to angling in Wales is given below. These opportunities are expanded on in Section 7, where a development strategy for Welsh fisheries is explored.

- ◆ Development of new and existing fisheries
- ◆ Development of associated industries
- ◆ Code of conduct for the management of recreational fisheries
- ◆ Promotion of Welsh angling
- ◆ Provision of advice / information
- ◆ Improved links with tourism / visitors
- ◆ Development and expansion of Fishing in Wales website
- ◆ Accreditation scheme for fisheries
- ◆ Accreditation scheme for "angler friendly" accommodation
- ◆ Development of fishing package holidays
- ◆ Competitions
- ◆ Development of angling as a sport
- ◆ Coaching qualifications
- ◆ Habitat improvement projects
- ◆ Combining habitat improvement with eco-tourism breaks / holidays
- ◆ Restocking schemes
- ◆ Management schemes
- ◆ Water quality improvement programmes
- ◆ Research

4. Aquaculture

Aquaculture operations can be subdivided into those that take place in marine waters and those that take place in freshwater. In this section, each sector is considered separately and its contribution to the Welsh economy assessed.

4.1 Marine aquaculture

The geography of the coastline and inshore areas of Wales is broadly typified by rocky outcrops to the north west and south west (Anglesey / Llyn Peninsula and Pembrokeshire), separated by a sweeping low-lying sandy bay (Cardigan Bay). The north coast is dominated by the shallow water flats associated with the Mersey / Dee estuarine complex. The south coast is similarly affected by the impacts of the Severn Estuary and Bristol Channel where a mix of sandy / muddy foreshore is interspersed by rocky headlands. It is this southern coastline that has the largest urban communities and suffered the effects of heavy industrial activity and mining associated with the valley regions of south Wales. These impacts lessened as the industries contracted.

The Irish Sea is relatively shallow in comparison to other western European marine waters, offering scope for seabed mounted structures. In particular, the seabed of Liverpool and Morecambe Bays offer shallow, smooth sand / mud substrate. The northern part of Cardigan Bay contains remains from glacial boulder material providing a substrate and habitat particularly favourable to crustaceans – crabs, lobsters and crawfish.

Offshore oil and gas has been identified in Liverpool Bay and this is being actively exploited through established seabed mounted platforms. There is continued interest in the potential location of wind-farms at sea on shallow offshore banks. A total exclusion amenity barrage has been erected across Cardiff Bay and a partial exclusion marine barrage has been erected across Swansea Bay. Consideration is currently being given to a proposed tidal power barrage on the north coast of Wales.

The coastal morphology of Wales offers little protection from the worst of the winter storms, with notably the North Wales coastline and that of Cardigan Bay particularly exposed to the predominant north westerly weather patterns. Naturally protected areas only exist around Holyhead and Anglesey, the inlet complexes associated with Pembrokeshire, and the various bays of South Wales. Major commercial harbours are located at Holyhead, Fishguard, Milford Haven, Swansea and Cardiff. Most smaller harbours are associated with the mouths of rivers with protection provided in the form of sea walls.

The combination of physical influences indicated above has left little scope for mariculture development in Wales. The exposed coastline has greatly limited opportunities for any form of moored or suspended culture systems (cage culture, rope culture, seaweed culture). Further, the physical impact of winter storms on shallow seabed and beaches limits the scope for more intensive management and husbandry of bivalve resources. Against this background, marine aquaculture development to date has been limited to bivalve cultivation in the Menai Straits. This has been based on the development of traditional bivalve husbandry practices in this area, assisted in part by local expertise associated with and / or developed by the Menai Marine Laboratory operated by University of Wales, Bangor and the MAFF Laboratory at Conwy (which has closed in the recent restructuring of MAFF research infrastructure).

Up until now there has been no marine fin fish culture activity, but a private initiative, supported by public funding, has recently been approved to establish a 500 tonne per year on-shore turbot farm using re-circulation technology.

Shellfish

Under European legislation, all shellfish production waters must be tested and classified. There are three grades of classification – Grade A, Grade B and Grade C. Shellfish gathered from or farmed in Grade A waters are suitable for direct sale and consumption. Shellfish from Grade B waters must be either re-layed in Grade A waters or cleaned by depuration (placing the shellfish in purified water). Re-laying and depuration allows the shellfish to filter clean water through their system, flushing out any bacteria that may be harmful to human health if consumed. Shellfish from Grade C waters are not suitable for human consumption. UK retail multiples have elected to be more cautious than stipulated by European legislation and will only sell UK product that has been grown or collected from Grade A waters and depurated. They will not stock any shellfish produced in UK Grade B waters even after depuration. They do, however, stock product from outside the UK that has grown in Grade B waters and depurated. This practice by UK multiples effectively excludes much of the UK shellfish production from being sold directly in the UK. Continental buyers will accept product from Grade B waters that has been depurated.

The waters of the Menai Strait are classified as Grade B and environmental conditions in the area covered by mussel Several Orders are considered near ideal for mussel cultivation. The local environment is not considered suitable for further expansion of this fishery and future production gains will only be achieved through improvements in husbandry practices (optimisation of growing density, seed laying, harvesting strategies, and control of predation).

Mussel farming in the Menai Strait is focused at its eastern end where four companies use traditional bottom laid husbandry practices under the protection of Several Orders regulated by the NW&NWSFC. Traditionally husbanded as a semi-extensive production system by some local fishing families, efforts to increase the intensity and extent of husbanded stock were begun in the early 1980's. Almost twenty years later this fishery has been established as the pre-eminent managed fishery in the UK (other key fisheries are located in the Wash, Dornoch Firth and Poole). The area is considered to support a sustainable fishery averaging 6,000 tonnes of mature mussels per year, within a range of 2,000 to 9,000 tonnes. During the harvesting period the mussels are washed and packed in 25kg bags. Some mussels are sold to the UK market, for which they are depurated, graded, de-bisssed and packed in 25kg or 2kg bags.

Key to the year on year success of this fishery is the extent of local spat-fall (the settlement of planktonic mussel larvae on the seabed), which is linked to annual and seasonal fluctuations in local environmental conditions, and the availability of seed mussel (adult spat producing mussels). The area itself generates good annual spat-fall, but to make full use of the available growing environment, and to balance years when local spat-fall is sub-optimal, additional seeding is required. Seed mussel is harvested from areas where spat-fall is high and surplus to local requirements, or where local conditions are not conducive to commercial grow-out.

In some cases seed is harvested from areas where general conditions are conducive to grow-out, but where the more exposed seed beds are typically washed away or silted up as a result of winter storm activity. Seed mussel has been collected from Morecambe Bay and more recently from off Whiteford Point in South Wales, near the Burry Inlet cockle fishery. Seed is harvested by specialist dredger and carried by barge to Menai Strait for relaying.

Other mussel harvesting activities are undertaken in Conwy Bay (Conwy Mussels Ltd., using traditional hand gathering techniques, harvests in the order of 300 tonnes per year), and the Burry Inlet (minimal). DeepDock Ltd has applied for a Several Order for mussel cultivation in Swansea Bay, and has also undertaken test production at Penrose Point, Anglesey with mixed results.

Table 4.1 Production in North Wales mussel culture

	Company			
	Myti Mussels	DeepDock Ltd	Ogwyn Mussel Partnership	Gannet Fisheries
Production range (tonnes)	1,000 - 7,000	500 - 1,000	300 - 800	100 - 300

Source: Nautilus survey

There have been a number of oyster cultivation initiatives in recent decades, notably in the Menai Strait (on-going), the Inland Sea (between Anglesey and Holyhead – now defunct), and Milford Haven (closed following the Sea Empress oil spill). Focus has been almost exclusively on the non-native Pacific oyster, *Crassostrea gigas*, although there remains some interest in cultivation of the native flat oyster *Ostrea edulis*.

There has also been experimentation in the cultivation of a number of other bivalve species. The University of Wales, Bangor School of Ocean Science Laboratory at Menai Bridge, and the MAFF Fisheries Laboratory at Conwy have initiated most experimental work. None of the experimental species have been cultivated commercially. They include:

Common name	Latin name	Exotic / native
Hard-shell clam	<i>Mercenaria mercenaria</i>	exotic
Manila clam	<i>Tapes philippinarum</i>	exotic
Palourde	<i>Tapes decussatus</i>	exotic
King scallop	<i>Pecten maximus</i>	native
Queen scallop	<i>Chlamys opercularis</i>	native
New Zealand oyster	<i>Tiostrea lutaria</i>	exotic
American oyster	<i>Crassostrea virginica</i>	exotic
Japanese abalone		exotic
European abalone	<i>Haliotis</i>	native

Source: JNCC Coastal Directories (1999): Region 12 - Wales

Finfish

The exposed nature of much of the Welsh coastline limits the opportunities for finfish cage culture, as practised in such areas of the UK as the west of Scotland. Some cultivation efforts were tested commercially in Milford Haven in the late 1980's and early 1990's but proved unsuccessful. Future opportunities may exist in association with seabed mounted structures.

This year, planning permission has been given to a commercial grouping to construct an on-shore recirculation system for the cultivation of turbot on Anglesey. Construction of the facility is just commencing. Initial production is planned at 200 tonnes per year, increasing to 450 tonnes per year. The actual economic contribution of this farm is yet to be established, but it is estimated to have an annual output value of approximately £1 million and employ about six full-time and six part-time staff (eight full time equivalents). If successful, output and employment could increase in later years.

Another marine finfish venture producing bass is in operation on the Lleyn Peninsula. The facility is in phase 1 of a larger development plan to produce fry for on-growing and bass for table consumption. Production of 200 tonnes of table fish and 1.5 million fry is planned. The site currently employs five FTE. After expansion it would employ about 15 FTE.

Sale of product

The main mussel producing areas in western Europe are Holland, Spain and France, with sizeable additional production in Denmark, Germany and Ireland. The main characteristic of Continental demand for British and Irish mussels is as a complement to Dutch, French and Spanish production. Continental demand for British mussels is, therefore, greatest towards the end of the Continental season to make up short falls in Continental production. Poor Continental supply will create a greater demand for UK mussel and is likely to push prices up. In the UK there is a growing market in the catering sector for high quality mussels. Accordingly, early harvest (late summer / autumn) is preferentially directed towards the UK specialist market, where higher prices are paid. Later harvest is directed towards the Continent to balance declining local production in the run-up to Christmas and early in the New Year.

The two largest producing companies in North Wales have commercial links with Dutch processors. Typically the bulk of harvested product is shipped to processing plants in Holland where the largest intact shells are finely graded, de-bisshed (removal of fibres from shells) and packed for distribution to the catering trade and retailers in Holland, Belgium and France. The remainder is processed to cooked product for pickling, freezing or vacuum packing. Some of this processed and live mussel undoubtedly finds its way back into the UK market. A proportion (approx. 10 - 15 per cent) of Menai Strait production is sold directly onto the UK market.

4.1.1 Contribution to the economy

The Menai Strait mussel fishery can be valued at between £2 million and £3 million annually, dependent on ruling price and destination market. Taking extremely good or bad years into consideration, this range could be between £1 million and £4 million. Prices typically range between £300 and £450 per tonne. It is of note that there is no direct correlation between a good year in the Menai Strait fisheries and good years in other fisheries - spat-fall, availability of seed, and grow-out conditions are each subject to local temporal conditions. The contribution of other marine aquaculture to the Welsh economy is minimal.

Table 4.2 Marine aquaculture production value in Wales (1997)

	Annual turnover (£)
Mussels	2,500,000
Oysters	100,000
Total	2,600,000

Source: Nautilus survey

4.1.2 Employment

The mussel farming industry directly employs about 15 people on a full-time basis, and up to 27 on a part-time basis during the harvesting season from September to April. This equates to approximately **28 full-time equivalents (FTE)**. In addition, the industry supports employment in product distribution, servicing and repairs to mussel dredgers and support craft, etc. and other normal multipliers associated with business inputs and outputs.

Table 4.3 Employment in marine aquaculture in Wales

	Company							
	Myti Mussels		DeepDock Ltd		Ogwyn Mussel Partnership		Gannet Fisheries	
	ft	pt	ft	pt	ft	pt	ft	pt
Direct								
Management & admin.	3	-	-	4	4	-	1	-
Boats	2	1	3	1	-	-	-	-
Handling / bagging	2	6-8	-	3-6	-	4-5	-	2
Total	7	7-9	3	8-11	4	4-5	1	2

Total FT

15

Total PT

21 - 27

Source: Nautilus survey

4.2 Freshwater aquaculture

Salmon & trout farming

Atlantic salmon, rainbow trout and brown trout are all farmed in Wales. Many sites farm more than one species. Salmon farming in Wales focuses on the production of parr, smolts and fry for stocking on-growing sites elsewhere, rather than growing to retail market size, which is the focus of production in Scotland. Production of the juvenile stages of salmon takes place on land in freshwater. Welsh production of fry accounts for two per cent of the total production in England and Wales, while parr and smolt production account for 15 per cent of the total production¹⁸. Seven sites in Wales produce Atlantic salmon.

Table 4.4 Salmon production in Wales (1998)

	Production	% of total England & Wales production
Post smolt (tonnes)	1	50
Parr / smolts ('000)	505	15
Fry ('000)	103	2
Ova ('000)	12	19

Source: Trout News, July 1999

Trout farming encompasses rainbow trout and brown trout farming. Forty sites in Wales produce rainbow and / or brown trout. Thirteen of these sites produce both rainbow and brown trout. Trout farming can be subdivided into hatcheries and on-growing activities. The main activity of hatcheries is the production of young trout for re-stocking sports fishing lakes or on-growing.

On-growing facilities provide trout for re-stocking and / or human consumption (rainbow trout only) mainly for supply to the local hotel and restaurant trade (11 rainbow trout sites produce fish for both table and re-stocking). Some of these businesses combine growing table fish with operating a "put and take" fishery – enabling the public to fish for and catch farmed fish to keep for home consumption.

¹⁸ Trout News, July 1999, CEFAS

Table 4.5 Trout production in Wales in 1998 / 99

	Table		Re-stocking / on-growing		Fry		Ova	
	tonnes	%	tonnes	%	'000	%	'000	%
Rainbow trout	532	8	238	7	4,418	14	1,890	5
Brown trout	n/a	n/a	41	9	10	< 1	339	4
Total	532		279					

Source: Trout News, July 1999

These farms utilise established hatchery and production technologies and are economically stable. The key risks that such farms face relate to water quality, disease control and continuity of electrical power (not always a simple matter in some parts of rural Wales).

Welsh rainbow and brown trout farms produced 811 tonnes of fish in 1998. The majority of these farms are small, producing less than 10 tonnes of fish. Only four farms in Wales produce more than 50 tonnes of fish per year. These four farms produce 59 per cent of the trout in Wales.

Table 4.6 Welsh trout production by scale of farm output (1998)

Output category (tonnes)	No. farms	Total production (tonnes)	Average production per farm (tonnes)	% total Welsh production
0 – 10	24	57	2	7
11 – 50	12	274	23	34
51 – 100	2	158	79	19
101 – 200	1	105	105	13
201+	1	217	217	27
Total	40	811		

Source: Trout News, July 1999

Eel farming

The River Severn is one of the main eel rivers in Europe, receiving a major migration of young eels (elvers or glass eels) each year, as they make their way from the Sargasso Sea in the northern Atlantic into freshwater to mature into adults. This supports a traditional fishery in both elvers and mature eels (see Section 2).

Since the late 1960's eel farming has been a major economic activity in many parts of the Far East (Japan, Taiwan, Korea and China), and more recently in Italy. Given that there has been little progress achieved in the artificial breeding of such animals, the elver fisheries of Wales have provided an important input to such farms.

Whilst the 1970's and 1980's saw some experimental farming of eels in Britain, there was no such commercial activity in Wales. Nevertheless, it is understood that there are at least two commercial proposals in preparation to set up farms in South Wales. These are likely to be presented for consideration by planning authorities some time in early 2001.

Carp farming

The farming of carp is well established in Europe, focusing on the on-growing of wild fish and the stimulation of mature fish to spawn in enclosed areas, providing a steady input to farming for human consumption. The technology for the artificial propagation of carp has been available for some decades now, but there has been little commercial farming of carp for human consumption in the UK as there is no tradition of eating freshwater fish, as there is in Europe.

Where carp farming has been evident in the UK is in support of the aquarium trade. Given the premiums paid for fish of particular colours and markings, koi carp farming has focused less on simple production technology and more on the controlled breeding of these animals in an effort to produce highly sought after specimens.

Large wild carp (common, mirror and Crucian) are particularly difficult to catch using rod and line and carp angling has become a distinct sub-sector of coarse fishing practised by an enthusiastic, dedicated and highly competitive group of anglers. Smaller carp are much easier to catch and many recreational fisheries and match fishing venues operate active stocking programmes to increase the probability of anglers catching fish. It is not apparent that farming carp for stocking angling venues is yet undertaken in Wales, but the conditions are suited to both hatchery and grow-out operations so that both large and small carp could be cultured. It is understood that there is at least one commercial project in preparation for the development of a farmed carp fishery.

4.2.1 Contribution to the economy

Trout farms in Wales produced 532 tonnes of rainbow trout for table consumption. At a price of £1.80 per kg¹⁹, this is equivalent to £957,600. An additional 279 tonnes of rainbow and brown trout were produced for re-stocking / on-growing. Assuming the value of these fish is equal to the value of table fish, this is a further £502,200. No figures exist for the value of ova, and fry produced by trout hatcheries as most hatchery operations are combined with on-growing for re-stocking or table production. Based on these figures, total freshwater aquaculture production in 1997 was equal to **£1,459,800**.

4.2.2 Employment

In 1999 there were 46 registered fish farms in Wales operated by 43 businesses. This includes salmon, trout and coarse fish farms. These farms employed a total of 75 full-time employees and 49 part-time employees, making a total of approximately **99 FTE** (assuming two part-time employees is equal to one FTE)²⁰.

4.3 SWOT analysis

This section examines the **Strengths, Weaknesses, Opportunities and Threats (SWOT)** for the aquaculture industry in Wales. Many of the strengths, weaknesses, opportunities and threats of the marine aquaculture industry are shared by the freshwater aquaculture industry so the SWOT analysis combines both aspects of the sector. The effect of changes on associated industries is also considered.

¹⁹ Regional Socio-economic Study on Employment and the Level of Dependency on Fishing in England and Wales, 2000, DGXIV European Commission.
CEFAS, Nautilus survey

<p>Strengths</p> <ul style="list-style-type: none"> ◆ Well-established and well-developed sites. ◆ Use of well-established techniques. ◆ “Green” nature of the industry. 	<p>Weaknesses</p> <ul style="list-style-type: none"> ◆ Lack of suitable coastal sites. ◆ North Wales mussel culture operating at / near carrying capacity. ◆ Lack of structured industry representation. ◆ Small facilities unable to make use of economies of scale. ◆ Absence of local processing.
<p>Opportunities</p> <ul style="list-style-type: none"> ◆ Offshore / coastal structures could provide new sites for farms. ◆ Expansion of existing and development of new farms. ◆ Collection and re-laying of spat. ◆ Development and expansion of local processing. ◆ Cultivation of other species. ◆ Use of new techniques. ◆ Development of new culture techniques / species. ◆ Improvement of water quality. ◆ Diversification of farms. ◆ Use of organic farming practices and marketing of product as organic. 	<p>Threats</p> <ul style="list-style-type: none"> ◆ Pollution / reduced water quality. ◆ Disease. ◆ Lack of consumer confidence. ◆ Pressure from environmental groups.

Strengths

The strengths of the current aquaculture industry in Wales lie in its use of well-established culture techniques in well-established and well developed sites e.g. the mussel culture industry in North Wales. The costs and risks of the methods and sites are well known and the productivity and profitability are proven making the established industry a low-risk investment. The “green” nature of the Welsh marine aquaculture industry is also a strength. Compared with, for example, the intensive culture of salmon in Scotland, the Welsh aquaculture industry is more “environmentally friendly” as it does not require large inputs of organic material or chemicals. The freshwater aquaculture industry (mainly trout) is, however, perceived as less “green” because of its more intensive nature.

Weaknesses

There are a limited number of sheltered coastal sites around Wales, thus limiting the type and number of coastal mariculture operations. The established sites, such as the mussel culture in North Wales are operating at or near to the environment’s carrying capacity, so there is little scope for expansion. The mussel culture is also heavily reliant on the collection of sufficient wild spat and, as such, is at the mercy of variable environmental conditions.

Many facilities are small, family-run farms that cannot take advantage of economies of scale and very little of the product grown in Wales is processed in the region. The majority is exported for processing elsewhere so value added opportunities are not being fully exploited.

Opportunities

Artificial structures offshore or in coastal waters e.g. barrages, offshore wind farms, etc. could offer substrates and shelter for the development of new farms. Existing farms could be expanded and new ones developed by the introduction of more Several Orders and the collection and re-laying of

spat from areas that are not conducive to on-growing to more favourable areas e.g. collection of spat from South Wales areas. Collection and re-laying of mussels around Conwy could also be encouraged.

There is potential to develop and expand local processing operations, adding value to product in Wales by producing ready-meals, curing, smoking or pickling product. The collective use of capital intensive operations would allow small operators to benefit from economies of scale e.g. a depuration unit that can be used by a number of small local farmers / gatherers, combining transport costs, etc.

The cultivation of other species using techniques similar to those currently being used holds potential as does the development of culture techniques for previously uncultured species and the use facilities using novel techniques e.g. re-circulation, on-shore extensive cultivation techniques, poly-culture operations. Farm sites can also diversify into recreational facilities ("put and take" fisheries) or tourist / educational sites.

The increase in demand for organically farmed produce can be capitalised on by increasing the use of organic farming practices in the farming of trout and other products for table consumption. Organically farmed produce should be marketed as such to take advantage of the price premiums available for such produce. It should, however, be noted that there is much debate about whether or not marine cultured shellfish can be marketed as being organic as the food source is not strictly controlled as it is for other organic products. Similar debate and difficulties have been encountered by honey producers attempting to make in-roads into the organic market.

Threats

The aquaculture industry in Wales, like that in other areas is at risk from pollution and reduced water quality due to man-made (e.g. oil spills) or natural events (e.g. toxic algal blooms) and the introduction of disease. These events, or even the rumour of such problems can lead to a loss of consumer confidence. Pressure from environmental groups also poses a threat (see Section 4.4).

Associated Industries

Many of the industries associated with commercial fishing are also associated with aquaculture – processing, transportation and to some extent engineers and vessel repair. Processing industries would benefit greatly from aquaculture producers attempting to add value to their product locally rather than transport it out of the region for processing elsewhere, while transportation companies would benefit from any increase in output. The construction of new sites would lead to a short-term benefit for building and engineering companies if this work was given to local companies and not to contractors outside the region. This would, however, rely on local firms having the required expertise to win such contracts. It is unclear if this knowledge is resident in Wales.

4.4 Aquaculture / environment interactions

Aquaculture in Wales is carried out in both the marine and freshwater environments. The proportion of the coast under some form of conservation designation has been touched upon in the section concerning commercial fisheries but inland there are also a number of different types of designated conservation site, including the National Parks of Snowdonia, Brecon and Pembrokeshire. The main issues involved in aquaculture / environment interactions are:

- ◆ Organic loading of the waters and sediment
- ◆ Introduction of disease / increased prevalence of disease
- ◆ Escapes of farmed species – indigenous and non-indigenous
- ◆ Discharge of chemicals into watercourses and coastal environments

- ◆ Aesthetics of aquaculture sites
- ◆ Siting of farms

Organic loading

The issue of organic loading is not as contentious in Wales as it is in other areas such as Scotland where intensive salmon farming has led to widespread environmental and fisheries concerns over a number of issues. The marine aquaculture in Wales operates on a much less intensive scale than the culture of salmon in Scotland. No additional organics are added to the mussel culture sites; they rely wholly on natural organics suspended in the water column.

The discharge of organics to inland watercourses and to coastal waters comes under the jurisdiction of the Environment Agency and any discharges must be covered by a consent to discharge which stipulates the amounts of chemicals and other matter that can be discharged. The Environment Agency carries out routine monitoring of all discharges and action is taken against any breach of consent to discharge. This may take the form of a warning or a prosecution and can lead to a fine.

Conflicts may arise in the future if more intensive methods of culture are undertaken in coastal waters or inland aquaculture sites. As all discharges to these waters must be notified to and are monitored by the Environment Agency, it should be involved in the decision-making process regarding the amounts of organics and chemicals discharged from these sites when consents are applied for. The Environment Agency should take into consideration environmental concerns regarding the discharge from a single site and cumulative effects if other similar sites are located nearby.

Disease

Disease in a cultured stock can lead to the stock being destroyed and the loss of potential and invested income. Environmental concerns are centred on the fear that high densities of cultured animals can act as reservoirs of disease that can then be spread to wild populations.

Numerous well-established procedures are in place to minimise the risk of importing or introducing disease to cultured stock. All aquaculture sites must be registered with CEFAS and are regularly monitored for the presence of disease. Certain diseases of fish and shellfish are "notifiable" diseases – if the disease is found or suspected, CEFAS must be notified in order that the UK can protect and maintain its disease-free status.

The potential for conflict concerning this issue is great. There is currently conflict in Scotland concerning the spread of disease and parasites from cultured salmon to wild stocks of salmon and trout, contributing to the degradation of wild fish stocks. Such conflicts could arise in Wales if intensive culture of stocks in sea cages were to occur. Given the coastal morphology of Wales, this is unlikely, but the possible introduction of on-shore re-circulation units may lead to fears about disease spreading from these sites to wild stocks via any discharge water. Regular monitoring by aquaculture operators and CEFAS should, however, minimise this risk.

Escapes

The escape of both indigenous and non-indigenous species from culture into the wild is an area of concern and again the example of cultured salmon in the UK and abroad highlights the potential risks. The fear is that cultured stocks that escape will breed with or out-compete and supplant wild stocks. It has been shown that escaped farmed salmon in Canada are breeding in the wild.

The risk of escape is minimised by the use of enclosed aquaculture units rather than sea cages. The potential use of sea cage culture around Wales is minimal and enclosed on-shore culture units are more likely.

The culture of non-indigenous species would be of concern because of the potential risk that they pose to the environment should they escape. The effect of the introduction of non-indigenous species has been mentioned in the section on recreational fisheries. The development of non-indigenous species culture in Wales should be carefully monitored to ensure that the risk of escape is minimised. This should be carried out by co-operative action on the part of the Environment Agency and CEFAS.

Chemical discharge

As with organic loading, the case in Wales is not as contentious as in Scotland where chemical treatments for sea lice and dosing with antibiotics as part of the operations of salmon farms is of great concern to environmental groups. Mussel beds in Wales are not treated with similar chemicals and inland aquaculture sites that chemically treat their stock must ensure that they remain within the conditions of their Environment Agency consent to discharge.

Aesthetics

This is a potential area of conflict that involves the general public more directly than other issues. Local residents may object to aquaculture sites on the grounds that they spoil the natural beauty of the countryside and coastline. Floating cages are not likely to be a particular problem in Wales as the coast does not lend itself well to this type of aquaculture but large on-shore tanks and the associated structures, gas tanks, etc. might lead to conflict between residents, environmental groups and aquaculturists. Full consultation with residents and willingness on the part of aquaculture operators to ensure that their sites blend in with the surroundings as much as possible can overcome such problems. Careful planning, landscaping and planting of camouflaging vegetation can all be used to achieve these ends.

Siting of farms

The initial siting of aquaculture operations incorporates all of the above issues. Environmental concerns should be addressed during the planning and application stages of the siting of farms. The farm operator should carry out an Environmental Impact Assessment (EIA) that adequately addresses the general concerns outlined above and any other concerns that are specific to the area. Local authorities, the Environment Agency and CEFAS should be consulted regarding the farm siting and operations. Consultation with local residents is also advisable and any fears can be allayed before the site is developed. Socio-economic costs and benefits should be taken into account as well as environmental costs and benefits.

The development of a clear policy on the siting of aquaculture operations would provide a guideline for all aquaculture operators. Questions such as whether or not developments should take place in SACs, National Parks or other designated sites should be addressed. If such issues are addressed at a national level and a clear development policy that takes into account environmental and socio-economic issues is drawn up, conflict at a later date can be lessened.

4.5 Development potential

4.5.1 Shellfish farming

This sector is a relatively small but locally significant element of the economy with the main activity focusing on mussel cultivation in the unique environmental conditions found at the eastern end of the Menai Strait. Interest in broadening the areas under mussel cultivation (increasing the intensification of mussel bottom growing practices and husbanding other shellfish resources) is on the increase.

In the future, market conditions and production economics might be such as to make the large scale processing of farmed shellfish commercially attractive, offering additional local employment potential.

Suitable sites are, however, limited and the Menai Strait area will remain the centre of shellfish culture.

Development of this sector displays strong synergies with the achievement of high coastal environmental and water quality standards (shellfish are particularly sensitive to pollution, and cannot be sold if harvested from waters posing a threat to human health) and makes productive use of inter-tidal mud flats. This use must, however, be tempered by the need to protect the many coastal environmental designations. If more intensive farming techniques are pursued, for example, in conjunction with offshore structures, tidal power schemes, or environmental improvement schemes, they would contribute to the economic viability of such schemes, as well as the environmental management of activities.

Further potential exists in regard to mussel and oyster farming and the more intensive husbanding of such resources as cockles and razor fish in both natural and artificial conditions. Limited public investment towards the realisation of such potential is considered to be appropriate.

The costs of stimulating further growth are relatively low with few risks associated with the deployment of established technologies and management techniques. If the combination of environmental conditions and sound management are achieved, returns on investment can be considerable.

4.5.2 Finfish aquaculture

Finfish aquaculture is currently only represented by trout farming, primarily for restocking rivers and open water fisheries, though two re-circulation saltwater ventures are about to get underway. Trout hatcheries provide an important contribution to the game fishing industry but overall, the contribution to the Welsh economy is small, though constructive at a local level given the often rural location of such ventures.

Further development of this sector is likely to come at high cost, since the potential for open water farming techniques is limited, given the prevailing geography and weather patterns although there may be some potential in association with offshore structures.

Interest is growing regarding the use of re-circulation systems - a technology that is currently expensive and commercially unproven in the UK on a commercial scale. In line with the relative novelty of such systems, any attempts at development in this area are likely to come with high risks. If this technology can be shown to be commercially viable the returns on public investment in this area could be considerable. Early indications will be available from the two pioneer ventures, though the industry is particularly secretive about the economics of what could prove to be a profitable new area of development. Accordingly, a priority must be for the promotion of independent examination of the economics of this type of operation and efforts should be made to secure information from those projects that are the recipients of public funding.

Development of finfish aquaculture has particularly good synergy with development ambitions in rural locations. It can encompass the re-use of existing buildings and water management infrastructures and this fits well with national ambitions towards sustainability, high environmental quality and the more stringent environmental designations associated with much of the region.

The high cost of any public sector intervention in this area acts as a disincentive but if the technology can be proven to be viable the development and economic potential offers cost effective investment.

4.6 Development opportunities

Below is a list of potential development projects / schemes of relevance to the aquaculture industry in Wales. These opportunities are expanded on in Section 7, where a development strategy for all Welsh fisheries is explored.

- ◆ Start-up grants
- ◆ Safety grants
- ◆ Diversification grants
- ◆ Promotion of well-managed fisheries
- ◆ Promotion of Welsh fish
- ◆ Development of new culture techniques
- ◆ Culture of different species using existing culture technology
- ◆ Formation of industry representative bodies

5. Processing

There are two main seafood processing centres in Wales associated with the main cockle and mussel gathering / farming areas. There are four cockle processors based around the Burry Inlet in South Wales who buy from local hand gatherers. The local beds do not produce enough cockles to satisfy the processors' demand so supplies are supplemented with cockles from elsewhere. Local cockle beds can supply between 20 and 60 per cent of the processors needs, depending on the yield, which varies from year to year. The largest processor in South Wales employs 25 full-time staff. There are three other local processors employing fewer staff.

The majority of the processed product goes for sale in other parts of the UK through supermarket chains. Cockles harvested from unregulated fisheries tend to contribute to the grey economy and are bought locally or by buyers from other areas of the UK who purposely travel to unregulated fisheries.

The main mussel growers and processors are located in the Menai Straits in North Wales, near to the mussel beds. Some cockle processors in South Wales also process mussels but these are imported from the continent. Very little value added processing of mussels takes place in North Wales. The majority of harvested mussels are washed and packed in 25kg bags for export to the Continent where they are processed further. Mussels for sale in the UK also undergo very little processing – they are depurated, graded, washed and de-bissed and packed in either 2kg or 25kg bags. This is undertaken by staff employed at the mussel farms. Additional processing such as cooking, pickling, manufacture or ready-meals occurs outside Wales and does not, therefore, contribute to the Welsh economy.

A small amount of crab is processed by fishermen at home and sold "farm gate" style to passers-by. It is unclear how much crab is sold in this way or if it is caught by commercial fishermen or by unlicensed fishermen who sell it to supplement their income.

Very little processing of finfish occurs in Wales. There are a few small filleting / re-packing operations situated in Milford Haven but they suffer from a lack of continuity of supply and often have to buy product from other auctions. They employ only a handful of people.

5.1 Development potential

The current Welsh processing sector is small. There appears to be little interest from the industry in expanding this sector with most fish and shellfish being transported from landing and production sites to export markets where much of it is subsequently processed prior to final sale. This reluctance is a feature that might undermine public sector investment in this area.

There are many opportunities for fish processing in Wales, given the high quality sources of raw material available around the coast. Processing offers the greatest potential for capturing additional economic benefit from primary producers and further under-pinning the viability of the commercial fishery infrastructure of Wales. The greatest potential is in encouraging small-scale local processing for local or niche market sale. Individual fishermen carry out some processing for "farm gate" sale to local fishmongers. This practice should be encouraged and formalised. The formation of co-operative ventures that can take advantage of larger premises and lower transport and marketing costs than individuals is advised.

The practicalities of larger scale processing ventures should undergo close scrutiny before any public finances are committed as existing processors already suffer from a lack of local supply at certain times of the year.

5.2 Development opportunities

Possible development projects / schemes of relevance to the processing industry in Wales are listed below. These opportunities are expanded on in Section 7, where a development strategy for all Welsh fisheries is explored.

- ◆ Start-up grants
- ◆ Safety grants
- ◆ Diversification grants
- ◆ Development and expansion of processing companies
- ◆ Promotion of product from well-managed fisheries
- ◆ Promotion of Welsh fish
- ◆ Formation of industry representative bodies

6. Fishery sector management and development

As with any section of the economy, overall management of the sector can be divided into three key functions – regulation, policy formation, and development. In general, each of the main industry bodies contributes to these three functions, whether they are a statutory authority or industry representative body. In the following section the structure and operation of such bodies is examined in this context, improvements are identified where needed, and ways of achieving these improvements are explored.

6.1 Institutional infrastructure

6.1.1 Regulatory bodies

Overall responsibility for the management of both marine and inland fisheries rests with the UK Parliament. This is empowered to lay down primary legislation. Since the UK's accession to the European Community, its primary legislation is required to interpret and apply EC regulations at the national level.

The principal executive agencies of Parliament in matters of fisheries are the Ministry of Agriculture, Fisheries and Food (MAFF), with responsibilities for the primary production industries of agriculture, forestry and fisheries, and the Department for Environment, Transport and the Regions (DETR), with particular inputs in relation to management of the environment.

Nesting within MAFF's fisheries jurisdiction, which extends from the heads of the river systems to the 200-mile seaward boundary of the UK's Exclusive Economic Zone (EEZ), various other bodies are empowered to apply and enforce UK fisheries legislation. For the area from the six-mile limit to the 200-mile limit, MAFF relies on its own fisheries inspectorate supported by the fisheries protection service of the Royal Navy.

As with the relationship between the UK Parliament and the EC, the National Assembly for Wales is empowered to lay down secondary legislation that covers inshore waters, interpreting UK fisheries legislation within the geo-political boundaries of Wales. Administration and enforcement of these coastal fisheries rests with Sea Fisheries Committees (SFCs), bodies that have been established by Act of Parliament but which are funded from local government resources and exercise their regulatory powers through the establishment of local byelaws.

Covering the coastal fisheries of Wales are two Sea Fisheries Committees – the South Wales SFC (based in Swansea and covering from the England–Wales border on the Severn Estuary to Cemaes Head, Pembrokeshire), and the North Wales and North West SFC (based in Lancaster and covering from Cemaes Head to the England-Wales border on the Dee and northwards to Haverigg Point, Cumbria). The SFCs operate a number of enforcement vehicles including two sophisticated patrol vessels, a number of inshore fast patrol boats and a small fleet of rough terrain vehicles.

Administration and enforcement of fisheries and environmental regulations covering freshwater and estuarine fisheries rests with Environment Agency Wales. Whilst this forms a part of the Environment Agency for England and Wales, Environment Agency Wales is responsible to and funded by the National Assembly for Wales. Apart from covering all freshwater lakes, river catchments and estuaries, its remit also covers diadromous species of fish such as salmon, sea trout and eels.

The Countryside Council for Wales (CCW) has responsibility for the natural heritage of Wales, covering both freshwater and marine regimes. This agency has a wide-ranging remit to monitor and protect the natural heritage. It does so primarily through the dissemination of the results of its monitoring activities, and through its role as a necessary consultee in development and physical

planning. It is the instigator and guardian of a wide range of protected environments using a range of instruments from voluntary management agreements to areas protected by statute. Where appropriate it can employ the force of law through a raft of inter-connecting environmental and heritage legislation that can be applied at local, regional, national and international levels, much of which interprets European Community Directives, or international agreements. It is also responsible for monitoring implementation of such directives as the Habitats Directive. Of particular relevance to fisheries, the CCW is the prime agency in regard to establishing and upholding such designations as Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), and Areas of Outstanding Natural Beauty (AONB).

Physical regulation and enforcement on land, extending down to the low water mark (and arguably further seaward, given the powers to control physical development on land), is the responsibility of the unitary authorities of Wales. These are controlled by local government legislation and are empowered to apply planning and other legislation at the local level. Such authority is established by primary legislation set at the UK level, but is also subject to modification at the level of the National Assembly for Wales. In this, the local authorities are the front-line organisations in controlling and co-ordinating development in the coastal zone and river catchments, and in interpreting the various elements of legislation that impact on such activities. Whilst the scope for interpretation of this role is considerable, the local authorities are at the core of resource management and regulation through the sheer scale of their statutory obligations. It is also the body most directly accountable to democratic processes.

Until recently the fisheries research arm of MAFF – the Centre for Environment, Fisheries and Aquaculture Research (CEFAS) – was represented in Wales in the form of the Conwy Fisheries Laboratory. This was closed in 1999 as part of a restructuring and consolidation exercise. Government monitoring and research of fisheries matters in Wales continues, but this is managed from the main CEFAS laboratory in Lowestoft and from its shellfish and water quality monitoring laboratory in Weymouth.

6.1.2 Policy formation

At the heart of commercial and recreational fisheries policy formation are the central government departments of MAFF, DETR and the Department for Trade and Industry (DTI). These departments are responsible to Parliament and develop policy that conforms to the intent of European Community legislation and advice, addresses and represents national interests, and interprets regional and local issues and concerns.

Following the recent moves to decentralisation, the National Assembly for Wales has taken on an increased role in policy formation. It acts as a regional focal point for views on all fisheries matters, notably on the management of the inshore and coastal regime, river catchments and rural Wales.

The fisheries industry in Wales is also able to make representations at a national UK level, either directly or through various apex organisations. This is most clearly the case in offshore fishing interests where the National Assembly has least influence, but can also be the case in respect of angling federations, the joint representatives for England and Wales Sea Fisheries Committees, aquaculturists, shellfish harvesters, etc ..

Industry representation in Wales is relatively poor and fragmented due to the small scale and highly distributed nature of fisheries interests. In any fisheries sector debate the views of the National Assembly for Wales are always sought, but the economic geography of fisheries in Wales, combined with a relatively poorly developed institutional infrastructure to the industry, conspire to make consultation within Wales difficult. Many special interest groups circumvent the National Assembly altogether, making their views known at the UK level only, so that any contribution to policy formation is made through apex organisations at the UK level, rather than directed to the National Assembly.

Further institutional input to fishery sector policy formation is provided by local government and the two Sea Fisheries Committees. Local government is represented at the all-Wales level through the Association of Welsh Local Authorities. This has considerable impact at the level of the National Assembly for Wales and has the professional capacity and knowledge to contribute effectively in matters of formal planning and development policy. It does not, however, have the professional capacity or focus to contribute productively on more specifically fisheries related issues.

In contrast, the Sea Fisheries Committees, whose Boards comprise equal memberships of local authority councillors and MAFF appointees (including scientists, industry representatives, environmental representatives and other knowledgeable individuals) do possess the sectoral focus and expertise. SFCs explicitly combine full-time executive staff with informed lay and industry membership and local councillor membership, which represent the broader public interest. The SFCs' role is, however, somewhat more complex. Their funding comes direct from local councils and their powers are primarily exercised through the development and application of local byelaws. They actively contribute to policy at that National Assembly level but, given that the NAW has limited legislative powers (notably focused in the formulation of secondary legislation with explicit Wales application), the SFCs focus their main input to policy at the UK level. These linkages are further complicated by the fact that the North Wales and North West SFC has responsibility for areas in both Wales and England.

The various bodies representing recreational fisheries and those directly involved with integrated coastal management provide additional capacity to contribute to policy. Of the former, local interests across Wales are represented through an active infrastructure of coarse, game and sea angling clubs. The attentions of these organisations are focused on the management of local fishing facilities, opportunities and competitions. Policy contributions tend to be through their Welsh and UK apex bodies, although matters of a more local interest appear to be channelled through Assembly Members. These bodies do not have full-time executives and rely on the voluntary inputs of knowledgeable members. The development of river catchment plans and aquatic environmental improvement schemes has provided additional focus for local interests, drawing together a mixture of special interest groups and full-time professionals. Such groupings often have high profiles, and offer productive input to aspects of policy formation.

There is no formal structure to those representing integrated coastal management interests, but in the UK as a whole it has become commonplace for local interest to become focused around local coastal forums. Such forums are typically project based and represented by a small full-time professional project staff. They are usually funded by a combination of local government, central government and European Community budgets. Most specialist interest groups that form the consultation base to such forums tend to make their views known through national representative structures, such as the RSPB and Friends of the Earth, many of which have full-time complements of professional staff. The special integrating roles of the forums themselves is such that their staff have both the professional capacity and mandate to actively contribute to policy formation through whatever channels are most appropriate. In England and Scotland this is achieved through English and Scottish Coastal Forums. In Wales the channels are of a more *ad hoc* nature.

The focal points in terms of the capacity of commercial fishing to contribute to policy formation are the Producer Organisations (POs) and the National Federation of Fishermen's Organisations (NFFO). The POs' primary interest group is vessel owners of over 10m vessels, while the NFFO represents commercial vessel owner interests in England, Wales and Northern Ireland. POs have a range of statutory obligations, established at European Community level, and exercised through the UK government. They are managed by a small complement of full-time staff, and are obligatory consultees on all matters of fisheries policy.

The Shellfish Association of Great Britain (SAGB) represents shellfish fishermen, harvesters and farmers, while finfish farming interests are represented primarily by species oriented groupings such as the British Trout Association (BTA). These organisations are also run by small complements of

full-time staff and tend to be consulted on all matters affecting their particular domains. Such organisations have limited dedicated policy analysis capacity, if any and rely heavily on the capacities of individuals within the industry and the transmission of views from member organisations to the apex organisation.

In addition to these larger organisations there are a number of more localised commercial fisheries interest groups in the form of fishermen's associations, but these tend to be loose associations which only come together in times of crisis. Whilst the views of a number of such organisations are sought in terms of local debate and decision-making forums, the crisis orientation of their activities is such that their interactions with the National Assembly for Wales are limited and they hold little sway in national representative structures or on national issues. Their interests are most commonly represented *in absentia*, through national apex organisations or Sea Fisheries Committees. The ability of these organisations to truly represent the views and opinions of the Welsh fishing industry is debatable.

In most respects it is the Environment Agency Wales and the Countryside Commission for Wales that arguably provide the strongest and most coherent and focused interest group representation at an all Wales level. Despite their formal agency status, they have clear obligations to represent the public interest and have the necessary professional infrastructures needed to provide effective and informed input to policy debates.

6.1.3 Development bodies

A range of bodies provide development support. Primary support is through local government, mainly via the economic and development planning departments of each unitary authority. Primary impetus for development is provided in the strategic planning activities of local government and their interpretation through local action plans and the physical planning process. Funding for such development is drawn from a range of largely central government sources – mainly from taxation but supplemented by specific development funds such as EC Structural Funding. Local government plays a key role in almost all aspects of the fisheries industry, from the management and maintenance of port, harbour and jetty facilities to the licensing of businesses; from economic and physical planning to direct support for local businesses. Despite this role, Pembrokeshire is the only council to employ a dedicated fishery industry specialist.

With a specific economic and commercial focus, the Welsh Development Agency (WDA) facilitates business start-ups and growth, supports local entrepreneurs and encourages non-Welsh companies to locate production and service facilities in Wales. This is achieved via a network of local offices, centralised services and a variety of specific programme initiatives, many in combination with other development bodies. Of some relevance to the fishery sector is the "Business Connect" programme, run in association with local councils, which provides a single access point for assistance in business start-ups, expansion and professional services. In addition, the Welsh Agri-Food Partnership is structured to be able to provide support to fishery interests, but in practice its agricultural orientation (beef, dairy, sheep and organics) means that fish is given scant attention.

Environment Agency Wales also has a strong development role in inland fisheries. It is responsible both for maintaining high environmental and water qualities through a combination of regulation and development and for maximising the value of fisheries. A key element in this process is the preparation of Local Environment Action Plans (LEAPs) which identify quality targets and development actions that can be financially supported by the agency.

The SFCs do not have an explicit development function but development is a necessary part of effective management of the natural resources under their control. Accordingly, SFCs seek to promote sustainable development and to attract resources from wherever they can be found to fund such activities.

Development of tourism in Wales is the specific responsibility of the Wales Tourist Board (WTB). It operates a range of programmes and initiatives, which have relevance to fishery issues. These are channelled through the three Welsh Regional Tourism Companies. Relevant examples are: its commitment to improving accommodation booking and information provision using communication and information technology; programmes to promote particular geographic areas (e.g. coastal resorts and heritage towns); continuing schemes to underpin the upgrading of tourism accommodation and visitor attractions; and sectoral projects (such as Fishing in Wales).

MAFF, CCW and DETR each has access to development funding in support of individual remits.

6.1.4 Institutional staffing

As an indication of the relative roles of each organisation in matters to do with fisheries regulation, policy formation and development, table 6.1 below provides an estimate of the number of people dedicated to such activities based on best estimates.

Table 6.1 Employment by regulatory and developmental bodies

Body	Fisheries staff (FTE)
MAFF	13
National Assembly for Wales	3
The Environment Agency Wales	65
The Sea Fisheries Committees	11
The Countryside Council for Wales	3
Local Government	2
The Welsh Development Agency	½
The Tourist Board for Wales	½
Total	98

Source: Nautilus estimates based background documentation and interviews

MAFF has full-time officers at Milford Haven and Holyhead with responsibility for the administration and management of fisheries and the collation of information on fish catches and landings. This employs about three officers on a full-time basis. Additional staff resources are used to monitor shellfish and finfish farming activities and water quality associated with such activities. At-sea enforcement infrastructure, involving a mix of MAFF officers and Naval officers, employs approximately 10 further staff (FTE) in relation to offshore waters associated with Wales.

The National Assembly for Wales has, within its Agricultural Division, a fishery-related staff of two, with a support staff of one FTE.

Environment Agency Wales has very few officers holding explicit fisheries briefs but between its water bailiffs, fisheries administration and management and its scientific staff, it is likely that 65 people (FTE) from a workforce of 1,000 are engaged in fishery-related work.

The Sea Fisheries Committees have headquarter staff, field officers and patrol vessel skippers and crew all dedicated to fisheries management and enforcement. In total these number approximately 11 FTE.

The CCW does not have staff with a specific fisheries designation, but staff from its marine and freshwater divisions are most closely connected with fisheries matters, and a wide range of other resources are applied to catchment area, coastal and protected area matters. In total it is estimated that employment on fisheries-related matters is equal to 3 FTE.

In respect of the local councils, Pembrokeshire County Council employs one full-time fisheries development officer (as part of a three-year PESCA funded project). For the remaining Councils, fisheries matters are dealt with by their regular staff, contributing approximately one dedicated (FTE) staff member to fisheries matters.

The WDA and the WTB do not have dedicated staff for fisheries matters. The WDA have a rural development officer and the WTB is appointing a marketing and development officer. Both will have fisheries development as small parts of their wider work remit.

6.2 SWOT analysis

This section examines the **Strengths, Weaknesses, Opportunities and Threats (SWOT)** for the management and development bodies responsible for the fisheries industry in Wales.

6.2.1 Management bodies

Strengths

With the exception of offshore fisheries, fisheries management falls under the executive control of the National Assembly for Wales and the management bodies responsible for fisheries each focus on a different sector – MAFF focuses on commercial offshore fishing, SFCs on inshore fisheries and Environment Agency Wales on freshwater fisheries. They do, however, consult regularly with each other on local, regional and provincial base. In general, the management bodies have the necessary legislative support to manage all fisheries under their jurisdiction, and the mechanisms to alter such legislation when necessary.

Environment Agency Wales has jurisdiction over salmon, trout and eel populations within the coastal marine environment and the freshwater environment, allowing coherent management of both the stocks and fisheries for these species. This function is, however, a source of weakness and potential conflict between Environment Agency Wales and SFCs (see Weaknesses). The catchment-based management of water resources by Environment Agency Wales takes into consideration the numerous factors that can affect water quality including pollution, flooding, development and recreation. This integrated approach is a considerable strength in the management, protection and improvement of water and habitat quality.

Environment Agency Wales, CCW and the SFCs provide a potent professional policy resource to the National Assembly for Wales. As matters stand, however, the SFCs are not consulted by the NAW as extensively as perhaps they should be. Given the importance of inshore fishing and management of the coastal environment and the associated social and economic linkages, an opportunity exists to strengthen the contribution of the SFCs to Welsh fisheries and coastal policy. This does, however, have major implications in terms of funding and territorial jurisdiction. These matters can only really be addressed at an England and Wales level.

Project-based initiatives, as in integrated coastal management and environmental improvement of rivers, provide effective mechanisms for achieving the concentration of professional resources needed to contribute effectively to policy formation. In addition, they also effectively promote the integration of interests that are considered to be essential to the sustainable management and development of the particularly high quality of natural resources found throughout Wales and on which so much of its economy depends.

<p>Strengths</p> <ul style="list-style-type: none"> ◆ Focused sector specific expertise. ◆ Fisheries management is under National Assembly for Wales's control (except offshore fisheries). ◆ Management bodies have the necessary legislative support and the mechanisms to alter legislation. ◆ Regular consultation between management bodies. ◆ Management of salmon, trout and eel populations in coastal and fresh waters is under the jurisdiction of a single body – Environment Agency Wales. ◆ Environment Agency Wales, CCW and the SFCs provide a potent professional policy resource to the National Assembly for Wales. ◆ Integrated coastal management projects and integrated river improvement schemes provide an effective full-time professional project based capacity to contribute to policy matters. ◆ Catchment-based management by Environment Agency Wales. 	<p>Weaknesses</p> <ul style="list-style-type: none"> ◆ Lack of policy and enforcement to protect against overexploitation. ◆ Funding of SFCs. ◆ The management of diadromous fish species cuts across the established management structures for coastal finfish. ◆ Not all coastal waters are under SFC jurisdiction. ◆ NW&NW SFC covers territory in England and Wales weakening its ability to focus on Welsh matters. ◆ Consultation is not systematic or well documented. ◆ Local councils form the competent bodies in matters to do with strategic development planning, and physical and economic planning, but have little competence in fisheries matters. ◆ The promotion of recreational fisheries in Wales does not appear to rank highly in the work of the Wales Tourist Board. ◆ Fisheries representation in Wales is patchy, reliant on voluntary inputs, and is poorly equipped to contribute to policy debates. ◆ Most special interest representation is on a UK rather than Wales basis, complicating the ability of NAW to adequately consult and report on matters of Welsh interest.
<p>Opportunities</p> <ul style="list-style-type: none"> ◆ Adequate and secure funding for SFCs. ◆ Framework planning between the various bodies with responsibilities for fisheries management. ◆ Greater consultation and involvement of fishermen in management and enforcement processes. ◆ Development of a more explicitly Welsh fisheries management and development strategy. ◆ The possibility of redrawing the borders of the SFCs to reflect Welsh interests (does have drawbacks – see Threats). 	<p>Threats</p> <ul style="list-style-type: none"> ◆ A failure to adequately address the economic and social dimensions of fisheries when addressing biodiversity and conservation planning, and the designation of areas as having special conservation requirements. ◆ Degradation of the coastal environment. ◆ Focussing too much effort on sections of the industry that are relatively small (e.g. offshore fisheries). ◆ Allowing legitimate Welsh interests to be diluted through the use of representation channels at UK or England & Wales levels by special interest groups. ◆ Splitting the NW&NWSFC to conform to Welsh interests would cut across an ecological basis to the zoning – the Liverpool Bay / Morecambe Bay complex.

Weaknesses

Over-exploitation of marine and coastal resources is a perennial problem for which the fisheries management bodies are poorly equipped – from both policy and enforcement perspectives – to address adequately. The SFCs in particular suffer from a variable level of funding both between local authorities and from one year to the next. This severely hampers the SFCs ability to manage and police the resources under their authority.

The fact that SFCs do not have jurisdiction over all coastal waters around Wales – specifically the Dee estuary and the waters to the East of Cardiff – means that management and enforcement resources and activities undertaken by the SFCs have to be duplicated by Environment Agency Wales. This and the Agency's jurisdiction over diadromous fish in fresh and marine water cuts across established management structures for coastal finfish.

Consultation between management bodies, although regular, does not appear to be systematic or documented in such a way as to inform others and leaves no coherent paper trail for other to follow regarding discussions and decisions that have taken place.

The physical and economic planning systems applied by local government do not often take into account the strategic and seaward requirements of the fishery sector, meaning that local developments can occur with little regard to their implications for the fishing sector. Local councils are at the core of strategic development planning, and physical and economic planning, but lack competence in fisheries matters. Given the sizeable contribution of fisheries to the economy and the evident potential for further development of this sector, this weakness needs to be addressed with some urgency. Three mechanisms are currently in place to address this:

- ◆ drawing together appropriately competent agency staff (EAW, CCW and SFCs) in *ad hoc* groups to address specific issues (the most commonly used device)
- ◆ establishment of project based initiatives addressing geographically bounded issues (e.g. the Cardigan Bay Coastal Plan, and various river habitat improvement projects)
- ◆ recruitment of sector specific professionals to council staff (e.g. the Fishery Development Officer for Pembrokeshire).

The first of these could benefit from greater structure, since the use of such *ad hoc* groupings is wasteful in terms of the application of scarce human resources. The argumentation and debate of particular issues are not readily available to others outside the group and little attempt is made to develop a case record, to disseminate findings, or to establish principles and application of best practice for wider use.

The second of these provides a valuable local resource and is a vehicle that could be further exploited possibly as a means of boosting the policy and development capacities of the SFCs. Nonetheless, such resources do not constitute an appropriate infrastructure for the provision of fishery expertise to councils and other development agencies.

The recruitment of qualified specialists by local councils provides an effective means of interpreting professional advice and cementing links between industry, council and specialist interest groups. Given wider recognition of the important role played by fisheries in the local economy, further recruitment along these lines may prove cost effective, particularly if combined with a strong development focus.

Despite the undoubted contribution of these individual approaches, matters of fragmentation and scale undermine each of them. The establishment of a single, permanent, dedicated fishery team, accessible to all, would overcome these disadvantages. Such a team could be attached to one of a

number of institutions, but would benefit from adequate financial resources and a high degree of autonomy.

Opportunities

The differing mandates of the various bodies, especially where agencies have a more specific economic or environmental mandate, provides a necessary dynamic to the management and planning processes, but is also the basis of friction. Some such frictions could be reduced through a process of framework planning, where the balancing of economic, social and natural heritage interests are coherently presented and management bodies then work within that agreed framework.

SFCs would in all likelihood be more productive and cost-effective if provided with adequate and secure funding. This would have a beneficial impact on both the environment and knock-on effects for the economy.

Over-fishing and illegal fishing could be better controlled through the greater involvement of fishermen in management and enforcement processes. It is evident that fishermen are still poorly organised in this respect, particularly at the smaller scale of activity, and that the management bodies are at best neutral to the greater involvement of fishermen in their activities. The small scale and high dispersion of activity in Wales means the institutional infrastructure of the fishery sector is poorly developed and over-shadowed by the interests of stronger groupings elsewhere in the UK. This is true for environmental, recreational, economic and commercial fisheries. A more explicit Welsh focus to representation is needed. This requires positive effort to re-orient consultation channels and to under-pin some areas of representation. Such efforts would need strong focus and adequate funding.

Threats

Threats to the industry lie mainly in the continuation of the current situation and a failure to address the various weaknesses such as inadequate funding of SFCs. A failure to suitably address the economic and social dimensions of fisheries when addressing biodiversity and conservation planning, and the designation of protected areas does, however, pose a threat to the industry. Too much emphasis on conservation without balancing the socio-economic needs of local fisheries, whether they be commercial or recreational, could have a constraining effect on the sustainable development of the industry.

A failure, from both policy and management perspectives, to curb over-exploitation of fisheries resources and degradation of the coastal environment, is likely to have serious direct and indirect impact on the economic and socio-economic well-being of coastal and riparian communities throughout Wales as well as on the environment itself.

There are questionable practical benefits deriving from application of the economic linkage criteria to the flagship fleet operating out of Milford Haven, given that it contributes little to the Welsh economy. Placing too much reliance on the development of this sector of the fleet is risky.

6.2.3 Development bodies

<p><i>Strengths</i></p> <ul style="list-style-type: none"> ◆ The development structure in place. ◆ Environment Agency Wales' mandate to improve the environmental quality of catchment areas. 	<p><i>Weaknesses</i></p> <ul style="list-style-type: none"> ◆ SFC funding. ◆ Lack of support for small developments. ◆ Fisheries are treated as a low priority.
<p><i>Opportunities</i></p> <ul style="list-style-type: none"> ◆ Strengthening the development role of SFCs. ◆ The formulation and application of a development strategy. ◆ A more pro-active approach by development bodies. 	<p><i>Threats</i></p> <ul style="list-style-type: none"> ◆ Failure to achieve co-ordination of development efforts. ◆ Failure to realistically address the commercial risks attaching to development proposals. ◆ Failure to pool scarce knowledge resources. ◆ Failure to provide adequate development infrastructure for small and geographically dispersed businesses and initiatives. ◆ Failure to measure contribution to sustainable development alongside more traditional measures of profitability and economic benefit.

Strengths

The development machinery currently in place is more than adequate to support and develop a strong commercial and recreational fishing industry in Wales. It provides a potent engine for fishery sector development via local authorities and the Welsh Development Agency, supplemented by a raft of relevant funding from other public sources. In addition, the mandate of the Environment Agency to improve the environmental quality of catchment areas, and its interpretation of this mandate in habitat improvement programmes in the head waters of catchment areas, provides a strong development focus for recreational fishing in Wales

Weaknesses

Fisheries in Wales are, in general, treated as a low development priority by all the development bodies. Developments within the sectors are usually low capital and have the potential to create or secure only a few very local jobs. There is a lack of support for such small-scale ventures but their worth to the rural areas of Wales, where incomes and employment are both low, is great.

The SFCs have the potential to provide a strong developmental role for inshore and coastal fisheries. The scale and insecurity of future funding and the diversion of resources away from fisheries management, conservation, and enforcement to deal with the issues of under-funding detracts from realising the guiding development potential of these bodies.

Opportunities

The development and implementation of a clear fisheries development strategy that incorporates all sectors holds the greatest potential for the development of a sustainable fishing industry in Wales. The adoption of a pro-active approach by the development agencies towards the promotion of the availability of funds and the development of programmes with industry co-operation increases the chances of the industry taking up funding. Strengthening the development role of the SFCs is also

likely to lead to the development of inshore fisheries and to strengthen both the environmental quality and economic base of inshore fisheries and associated habitats.

Threats

The greatest threats again lay in the failure to address existing weaknesses and take advantage of available opportunities. The failure to achieve co-ordination of development efforts in relation to the fisheries sector and to realistically address the commercial risks attaching to development proposals are real threats and could lead to inefficient duplication of effort or over-commitment of funds to high-risk ventures that hold little sustainable development potential. It is also important that local knowledge be utilised fully and that scarce knowledge resources are pooled when addressing developments of a specialist fishery nature.

A failure to provide an adequate development infrastructure geared to supporting small and geographically dispersed businesses and initiatives risks overlooking projects that offer great local impact, with strong sustainability characteristics, but which would be given low ranking in developed parts of the economy or against larger scale developments. With this in mind, it is also necessary to take into account the need to measure a contribution to sustainable development alongside more traditional measures of profitability and economic benefit.

7. Development strategy

This section describes the proposed strategy for capitalising on many of the opportunities nominated in the previous chapters, and over-coming or minimising the impact of identified weaknesses and threats.

7.1 Development potential

This study brings together for the first time a consolidated summary of the economic contribution of the fishery sector in Wales. The contribution is substantially larger than had been previously estimated, but is still thought to be an underestimation of the full amount directly or indirectly attributable to Welsh fisheries. There are particularly strong impacts associated with recreational and inshore fisheries, both of which depend on the high quality of coastal, river and lake environments. There is, however, considerable room for further improvement in the economic contribution of fisheries in ways that can add to rather than subtract from these environments.

The achievement of greater efficiencies in the husbanding and harvesting of coastal resources is likely to facilitate the evolution of small niche seafood processors, which are not feasible with current supply chain structures. The exploration of innovative aquaculture and habitat management systems that focus on integrated low effluent systems have the potential to revolutionise environmental management at the land / water interface.

In general, whilst Wales offers a unique geography and mix of aquatic resources and exploitation patterns, it does not display innate comparative advantage over similar environments and exploitation patterns found elsewhere in the UK and western Europe. Efforts to enhance economic contribution, let alone achieve comparative advantage, will require clear vision, strong leadership and confidence in the appropriate allocation of financial and skilled resources. This strategy provides the beginnings of a framework for such advance, but much further debate, planning and action will be needed to convert these strategic thrusts into positive and sustainable development. It will be necessary for public agencies to seek funding from sources far outside simply the Financial Instrument for Fisheries Guidance (FIFG) and other structural funds, but to tap into other sources of development funding and to mobilise private and institutional investment funds.

Table 7.1 summarises the current contribution to the economy and development potential of the main sectors of the Welsh industry – fishing, processing, aquaculture and angling. The table brings together all the information gathered about each sector. The costs, risks, synergy, etc. of investing public funds in the sector have been evaluated on the basis of information gathered, recent trends and the consultants' knowledge of the future development of the fisheries industry.

Development opportunities and schemes have been identified in each sector. These are based on the needs of the sector and knowledge of schemes that have been successful elsewhere. The aims and beneficiaries within and outside the sector are summarised in Appendix 1. Each strategy is described further in the following section.

The consultants estimate that the fishery sector makes an annual contribution to the Welsh economy of over £100 million and employs 1,588 people on a full-time equivalent basis. The main benefits of this contribution are seen in rural and coastal communities where alternate economic opportunities are limited and where the future viability of the community is closely allied to the high quality of the surrounding environment and the application of more sustainable practices.

Table 7.1 Development potential by sub-sector

	Fishing		Processing	Aquaculture		Coarse	Angling Game	Sea
	Inshore*	Offshore		Shellfish	Finfish			
a. Economic contribution	£8.8M	£11.8M	£2M	£2.5M	£4M	£39.4M	£8.2M	£28.7M
b. Employment	598	162	40	28	99	90	171	471
c. Recent trend	↑	↓↓	↔	↔	↔	↑↑	↔	↑
d. Cost	££	£££££	£££	£	££££	£	£	£
e. Risks	xxx	xxxxx	xxx	xx	xxxx	x	xxx	x
f. Returns	£££	£	££	££££	££££	££££	£££	£££££
g. Synergy	****	*	***	*****	****	*****	*****	****
h. Cost effective	££££	£	££	££££	££££	££££	£££	£££££
i. Ranking	*****	*	***	**	**	*****	****	*****

* Inshore figures include shore-based fisheries

Key

- j. **Economic Contribution.** Estimated current economic contribution (from Sections 2 - 5).
- k. **Employment.** Estimated employment (from Sections 2 - 5).
- l. **Recent trend.** An indication of whether the sub-sector has expanded or contracted in the last five years.
- m. **Cost.** An indication of the scale of public sector investment considered to be required to bring about a significant level of development in the sub-sector, where £££££ indicates greatest investment and £ the least.
- n. **Risks.** An indication of the risk that such public investment might not achieve the desired development gain, where XXXXX indicates the greatest risk and X the lowest.
- o. **Returns.** An indication of the scale of development gain that public sector investment could stimulate, where £££££ indicates the greatest gain and £ the lowest.
- p. **Synergy.** The degree to which development in the sub-sector is likely to underpin other NAW development ambitions, where***** indicates the greatest synergy and* the lowest.
- q. **Cost effective.** The cost-effectiveness of public sector investment - a combination of the leverage that development expenditure might be expected to achieve, tempered by the risk attaching to the desired results not being achieved (combines d and e). £££££ indicates the most cost-effective areas for public fund investment and £ the least.
- r. **Ranking.** The importance that should be given by public agencies in allocating scarce development resources between sub-sectors, where***** indicates the most important areas for development and* the least.

The strategy outlined below focuses on enhancing the quality of products, and the quality of management practices and services. There is considered to be only limited potential for increased harvesting of aquatic resources but considerable opportunity for adding value to existing harvests and services, providing the opportunity for some additional employment within the sector.

7.2 Environmental Excellence and Sustainable Opportunities - the main thrusts of a fishery sector strategy

Meeting NAW ambitions

Three key elements characterise the management and development ambitions of the National Assembly for Wales:

1. Maintenance and enhancement of the high quality and unique conformation of the natural environment in Wales.

A major strength to Wales is the “unspoilt” quality of its coastal and inland waters. The fisheries development strategy should not merely acknowledge environmental issues, but strive towards environmental excellence. As fisheries are an integral part of a healthy environment, responsible management of both go hand in hand. This co-dependency means that steps towards sustainable fisheries development will have positive impacts upon the aquatic environment in general. In addition, there are benefits to fisheries from appropriate habitat improvements.

2. Development of Welsh economic output, employment and quality of life in ways that enhance the unique characteristics of Wales.

The contribution of marine and inland fisheries to the economy and social fabric of Wales is currently undervalued from both within and outside Wales. Quality products and services should follow from the excellent natural resources, facilities and opportunities potentially available in Wales. A reputation for excellence can then develop. Operations that provide quality products and services should be encouraged and supported by effective marketing, which is highly focused towards Wales’ unique qualities.

3. Pursue the above employing sustainable systems that achieve a practical balance between economic, social and natural resource interests, ensuring the long-term viability of rural communities.

Sustainability extends beyond the environment. The fisheries development strategy must create long-term employment opportunities both directly and indirectly associated with marine and inland fisheries. The strategy should encourage all those involved in the exploitation of natural resources to operate in a more sustainable manner and where possible be recognised and rewarded for doing so.

There remain considerable development opportunities in the fisheries sector that contribute to economic and social goals while working towards more sustainable management of the natural environment. Informed and appropriate management of the country’s aquatic environments and associated resources is, however, fundamental to the achievement of each of the above elements.

Strategic focus

These NAW ambitions are incorporated within the fishery strategy (outlined below), focusing on the generation of real gains in the application of the concept of sustainable resource management. These are achieved by:

- ◆ explicitly making more of the economic activities currently underway
- ◆ focusing on their synergy with improved systems of environmental management
- ◆ improvements in the quality of services provided, and application of best practice

This must not be seen as an empty gesture towards environmental concerns, but a simple recognition of the particularly high quality of the Welsh marine and freshwater environments, and the critical role these play in underpinning a strong Welsh economy. It is not for nothing that most of the Welsh coastline is protected by one form of environmental designation or another.

In further recognition of this linkage, and of the considerable headway that has already been made in integrating environmental, economic and social interests in the land/water interface, Wales can and should seek to lead the field in integrated aquatic resource management. This it can achieve through the creation of increased synergies between:

- ◆ existing institutional, research, development and entrepreneurial skills in aquatic resource management within Wales,
- ◆ existing recognised strengths in the application of both appropriate and high technologies, and the development and application of organic farming techniques, and
- ◆ a society that recognises and upholds the principles of stewardship of the environment.

Mechanisms for encouraging such synergies have also been incorporated in the sector development strategy.

Further, the strategy recognises the common purpose that environmental managers and entrepreneurs share in pursuing high environmental standards – recognising the links between a healthy marine environment, the ability to harvest high quality produce, and a productive and sustainable tourism industry. Common goals exist, and are now more explicitly recognised, between interest groups traditionally considered to be on opposing sides. Such synergies are recognised and supported in the strategy and are addressed through the following components:

- ◆ raising awareness of the scale and profile of the existing economic, social and environmental contribution of fisheries to Wales and pin-pointing where exploitation of fishery sector opportunities also contributes to sustainability and the achievement of environmental improvements.
- ◆ encouraging a focus away from exclusive environmental conservation towards sustainable exploitation.
- ◆ encouraging a planned and strategic response to development opportunities through the re-orientation and stream-lining of institutional networks and the provision of dedicated sectoral development support.
- ◆ re-focusing public sector investment through actively promoting exploitation of development opportunities rather than simply responding to requests for capital and infrastructural support.

7.3 Spearhead initiatives: Seafood Wales, Angling/Fishing Wales and Aqua-Innovation

7.3.1 Mechanisms

Providing the institutional mechanism for realisation of the development opportunities identified, it is proposed to establish facilitation services in two programming offices, and one co-ordination body.

The facilitation services are to be provided through two umbrella initiatives under which projects to support the development opportunities outlined in the previous section can be pursued.

These umbrella projects are:

- ◆ **Seafood Wales project** – dealing with commercial fisheries and aquaculture and
- ◆ **Angling / Fishing Wales project** – dealing with recreational fishing

It is proposed that the bodies fall, respectively, under the organisational control of The National Assembly for Wales, in the case of the Seafood Wales project, and the Environment Agency Wales in the case of the Angling / Fishing Wales project.

As the vehicle for placing Wales at the forefront of technology and practice in integrated aquatic resource management, it is proposed to form a strategy group under the heading **Aqua-Innovation**. The mandate of this group will be to act as a catalyst in bringing together financial and human capital in the development and application of innovative aquatic resource management and exploitation systems, and associated sustainable technologies and production systems. This will involve the provision of bridging mechanisms linking entrepreneurs, research institutions, academic centres, statutory bodies, local government, and private and public funding agencies.

It is proposed that the strategy group meet twice a year, and host an annual conference / seminar to explore innovation in aquatic resource management and exploitation, and promulgate best practice in natural resource management and sustainable technologies.

7.3.2 Operating structures

A schematic of the structures and mode of operation of the two initiatives is set out in Figure 7.1 below. Each initiative will be governed by a Steering Group comprising of five or six individuals. This number should allow different views to be represented without each group being too unwieldy. Appointees should ideally have good background knowledge of the fishing industry (commercial or recreational, depending on the Steering Group), be open to all points of view and able to think strategically about the sector as a whole. A representative of each project co-ordinating body should also sit on the Steering Group and act as chair. Steering Group members could be appointed from the following organisations:

Seafood Wales Steering Group

- ◆ MAFF
- ◆ CEFAS
- ◆ Fishermen's organisations
- ◆ Aquaculture industry
- ◆ Processing industry
- ◆ Marine science
- ◆ SFC Board
- ◆ Industry analyst
- ◆ CCW

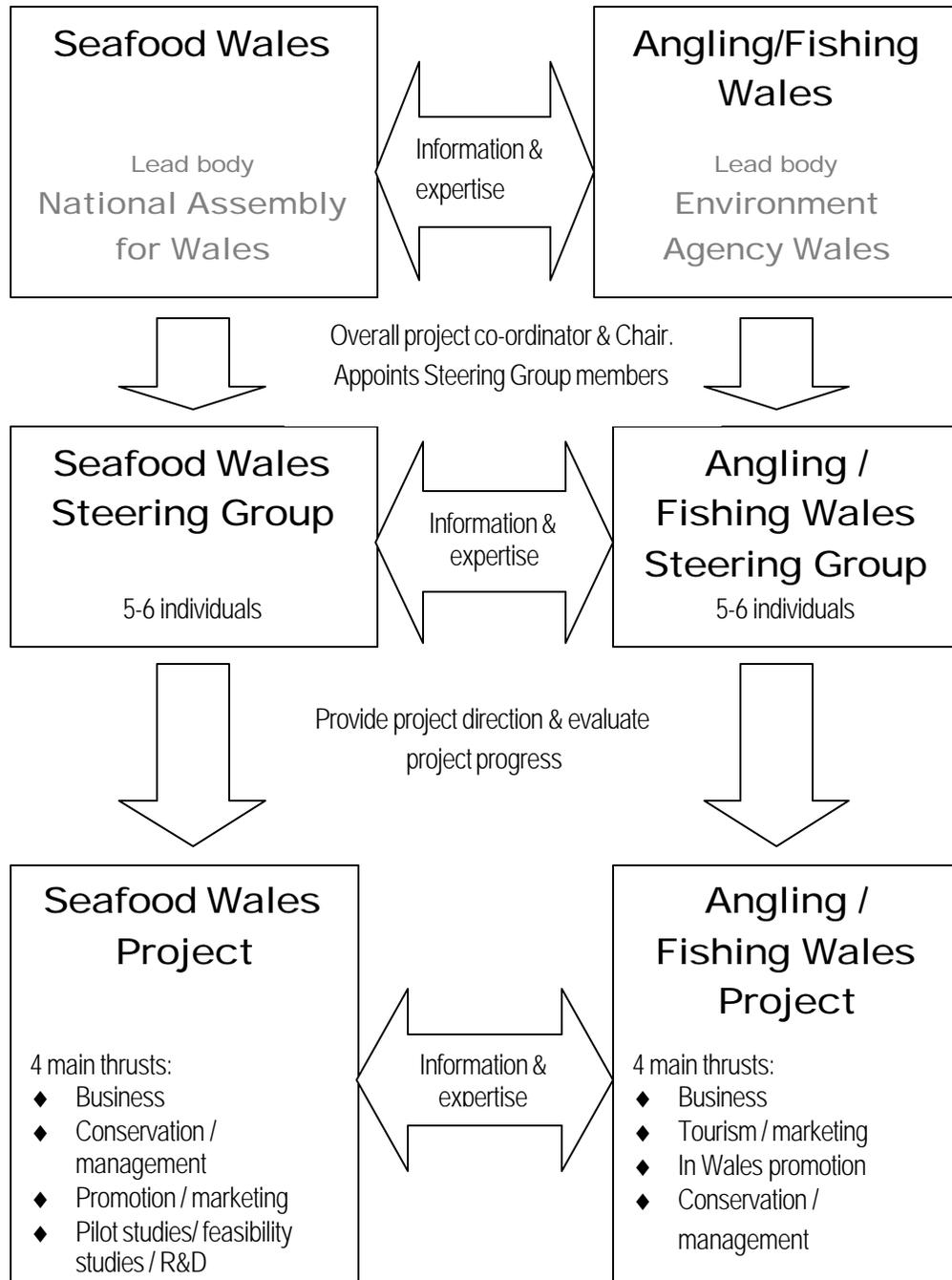
Angling / Fishing Wales Steering Group:

- ◆ Wales Tourist Board
- ◆ Angling organisations
- ◆ Commercial angling operators
- ◆ Charter angling operators
- ◆ Aquatic science
- ◆ Professional anglers
- ◆ CCW

It is important that both Steering Groups communicate and co-operate with each other as fully as possible as it is anticipated that certain development areas will have a degree of crossover between the two projects. Examples of such crossover projects include but are not limited to marine tourism, sea angling and culture of angling species.

In respect of Aqua-Innovation, the mix of Steering Group members might be slightly different, drawing on expertise from private business, finance and the research and academic communities as well as sectoral specialists. In this instance a larger grouping is appropriate with a membership of between 15 and 30.

Figure 7.1 - An outline for the structure of the projects.



7.3.3 Project Staff

The first task that each Steering Group should undertake is to appoint full-time project staff to carry out the development work involved and promote the availability of funds. These personnel should provide project support at every step. They take development ideas generated by the industry, develop funding plans and progress suitable projects through until their completion.

At present, local industry and recreational angling groups have little knowledge of available funding, how to develop project plans or write funding proposals. The current infrastructure available to help develop fisheries is very limited and resources to help develop ideas through each step of the process are scarce.

In addition, project officers will have the opportunity to be pro-active, developing projects of benefit to Welsh fisheries as a whole. This should be based on priorities identified by the steering groups and ideally be developed in partnership with relevant parties in the private or public sector.

Existing support from the Fisheries Development Officer at Pembrokeshire County Council and the Environment Agency, while a step in the right direction, is insufficient to fully develop ideas in all the areas identified. Seafood Wales and Angling / Fishing Wales project officers should complement these efforts by taking an active role in the writing and preparation of funding plans while regularly consulting the industry to ensure that the plans are developed in accordance with the industry's needs. Project officers should provide business management / development advice to enable individuals to draw up business management plans to help secure funding from commercial sources e.g. banks for projects or items that are not eligible for EU funding.

It is important that the availability of funds is widely publicised in an easily understandable and accessible manner to generate interest and development ideas for the project to focus on. This should help to overcome the poor response rate that previous funding programmes have suffered from which has been caused by a lack of awareness regarding the existence of funds or the eligibility criteria. Objective 1 funding incorporates a budget to enable the availability of funds to be publicised so that uptake of funds can be maximised. This budget should be used to promote the two umbrella projects and potential funding opportunities to all interested parties.

In terms of Aqua-Innovation, consideration should be given to placing responsibility for the set-up and co-ordination of this body with the Welsh Development Agency, given the specific expertise of the agency in technology, technology innovation and private / public partnerships. As a balance to this technical focus it may be appropriate to consider sharing this responsibility with one of the more overtly sectoral interest groups, such as the SFCs, CCW or EAW.

In the following sub-sections we examine in more detail the areas of work to be addressed by these umbrella initiatives.

7.4 Seafood Wales project

There are four main thrusts to the Seafood Wales project:

1. Business
2. Promotion / marketing
3. Pilot studies / feasibility studies / R&D
4. Conservation / management

7.4.1 Business

This heading encompasses a wide range of potential projects and development assistance ranging from assistance with business management planning and advice to funding for new and expanding businesses. Potential projects include:

Harbour developments

At present, good harbour and landing facilities for fishing and recreational vessels are limited to a few ports around the Welsh coast. Marinas are becoming congested and harbour managers are seeking to exclude commercial fishermen in preference to yachts and other pleasure craft. The fishing industry is, however, of commercial and historic importance to Welsh coastal communities and the presence of an active fishing fleet is also of positive benefit to tourism. Instead of seeking to exclude commercial fishermen, harbour managers should encourage the development of facilities that are suitable for all types of craft - commercial and recreational fishing vessels, yachts, marine wildlife tours, charter vessels, etc.

Developments should focus on providing landing and launching facilities at small harbours so that fishing vessels, yachts and other pleasure craft travelling around the coast have a wider choice of landing points. Both recreational and commercial boat users will add value to the local economy. Providing adequate landing facilities for fishermen will reduce transport costs for the fleet and ensure more of the first-hand sale of product can take place in Wales rather than at larger auctions outside the region.

Start-up grants

The average age of Welsh fishermen is increasing and skippers are finding it difficult to find crew, yet young fishermen find it difficult to enter the industry as a career with the price of vessels, licences and quota rising. This situation is leading to the Welsh industry becoming unable to renew itself.

Start-up grants should be made available for young fishermen to enter the industry through provision of training grants and encouraging partnerships with current skippers. The aim should be to remove the barriers preventing young people entering fishing and avoid vessels leaving the registered fleet only to continue fishing unregistered.

Start-up grants for aquaculture and processing ventures should also be made available, especially for ventures that are designed to add value to product within Wales.

Development and expansion of local processing

Some fishermen already process their catch to some extent, for example dressed crab and cooked prawns. This "cottage industry" processing should be encouraged and formalised so that value can be added at the point of landing and the product sold in local shops to residents or tourists. Sales should also be targeted to niche markets in other areas of Wales, the UK or elsewhere. Combining local processing with the promotion of well-managed fisheries and focussing on quality rather than quantity is key.

Development and expansion of the processing of Welsh cultured product should be encouraged as product from new and existing farms becomes available.

Vessel modernisation / training grants

Funds should be made available to fishermen to modernise their vessels so that more emphasis can be placed on traceability and quality rather than quantity. Funds for items such as on-board weighing, icing, handling, grading and storage facilities should be made available as well as training

to improve handling, sorting and storage of catch. Support for improved hygiene standards on-board will contribute to catch quality improvements and make some aspects of working conditions less off-putting to new entrants.

No funding will be available for improvements to vessels that will increase fishing effort e.g. larger engines. Funding such projects would be contrary to MAGP targets and would not qualify for EU funding.

Safety grants

Safety grants for equipment and training should be made available to ensure the safe working conditions of crew and ensure that Health & Safety standards are met.

Assistance with safety equipment and training should also be available for the aquaculture and processing industries to ensure that these operations can comply with all Health & Safety regulations and other environmental standards such as the European Waste Water Directive.

Diversification grants

Funds to enable vessels to diversify into other fisheries or convert to other activities (e.g. charter vessels, wildlife tours) should be available to create and secure coastal jobs. Diversification away from fisheries should also be assisted by funding re-training schemes and helping ex-fishermen to start new ventures in other industries. It is also important that support is provided for the remaining commercial diadromous fishermen through retraining or diversification into other areas.

Assistance for aquaculture operations to diversify into related activities such as other species, recreational fisheries, or educational / tourist attractions. The feasibility of diversification into the culture of other species and on-growing for consumption should be investigated as the need for restocking game fisheries diminishes.

Fishing heritage

While certain fishing activities are at odds with attempts to conserve stocks and, therefore, cannot be assisted by public monies, ways of preserving this heritage should be investigated. For example, the salmon and eel fishermen are an important component of the fishing heritage of Wales and should not be lost completely as these commercial fisheries come to an end.

7.4.2 Promotion / marketing

Promotion of well managed fisheries

Sustainability is an aspect of Welsh fisheries to be used as a promotional marketing tool. Once management schemes are in place or in fisheries that are already managed (e.g. Burry Inlet cockle fishery) fishermen that operate within the schemes can market their goods as being harvested from well-managed fisheries. Accreditation under the Marine Stewardship Council (MSC) or similar should be sought and promoted. Buyers, processors, hotels and restaurants can also promote the fact that they purchase only product from well-managed fisheries.

The promotion of the "green" aspects of Welsh aquaculture operations should be supported. The extensive operations of the Menai mussel fisheries are considered to be more "environmentally friendly" than more intensive farming practices. Any new aquaculture developments should be assessed for the potential damage they could do to this "green" reputation.

Promotion of Welsh fish

The high quality and range of Welsh fish should be actively promoted within and outside the region. The possibility of adopting a Welsh-branding programme similar to the branding programmes underway in Scotland should be investigated. The generic promotion of fish through national activities such as those employed by Seafish and by local initiatives such as fish festivals has been shown to have a recognisable effect on fish sales. Feedback from local fishmongers, restaurants and other fish retailers indicate that fish sales increased by between 30 and 50 per cent after the recent Pembrokeshire Fish Week²¹.

As with other UK regions, consideration should be given to the development of an industry marketing body. Many Welsh operators are too small to be able to participate in strategic marketing and a marketing body as part of Seafood Wales would provide economies of scale, allowing promotion of Welsh products to a wider audience than at present. The damage done to the reputation of high quality Welsh fish by the Sea Empress oil spill has not been adequately redressed and an industry-wide marketing body would be the most suitable vehicle to do so.

7.4.3 Pilot studies / feasibility studies / R&D

It is important that any new fisheries, aquaculture or processing ventures be fully investigated to explore the biological and socio-economic sustainability of the proposed ventures as well as their commercial viability. This can be accomplished by undertaking feasibility studies. If the ventures prove to be feasible on all accounts, they can be developed with assistance under the "business" arm of the project.

Funds should also be made available for research and development projects and to enable disparate research groups to work together. The commercial, as well as technical, risks involved in funding such ventures should, however, be fully explored as well as the ultimate potential benefit to the Welsh fishing industry.

Development of new fisheries

There is limited potential to develop new fisheries in the waters around Wales. Attempts have been made to develop the razorfish fishery in Cardigan Bay and a study into the potential of a *Venerupis* clam fishery off Pembrokeshire is currently underway. These ideas and others (e.g. mackerel handling and processing similar to the Cornwall fishery) should be fully investigated from commercial, biological and socio-economic standpoints. Pilot studies into harvesting, handling, marketing and processing of new products should be undertaken and supported through Seafood Wales.

It is important that local fishing industry knowledge is fully utilised in these projects and that buyers' and processors' knowledge of potential product and market development is also harnessed. Any new fishery should be operated on a sustainable basis and promoted thus to alleviate any environmental concerns.

Cultivation of species using current techniques

Culturing species using techniques similar to those currently in use should be explored. This is a much lower risk venture than the development of techniques for previously uncultured species. Species that could be investigated include clams, oysters and razorfish. The on-growing of periwinkles is currently being investigated in Scotland by Seafish with part-funding from Highlands and Islands Enterprise (HIE). Similar R&D is to be encouraged in Wales, and worldwide

²¹ Pembrokeshire County Council Fisheries Development Officer, pers. comm.

developments in the culture of new species in similar conditions to those in Wales must be followed closely with a view to developing pilot projects.

The freshwater cultivation of stock fish for commercial coarse / game fisheries should be investigated using the techniques currently applied to the cultivation of freshwater trout. Similar techniques could also be employed to culture ornamental fish.

Development of new culture techniques

The development of novel culture techniques such as re-circulation systems as well as extensive on-shore ponds culture and polyculture should be explored. Although higher-risk than the use of proven technology and techniques, as with many of the innovative aspects of Seafood Wales, the extensive resource of Welsh expertise in aquaculture and marine sciences can be utilised in this regard.

At present, the knowledge to breed and rear eels in a cultured environment does not exist and on-growing elvers into eels requires a supply of wild caught elvers. This situation maintains the current viability of the elver fishery and the possibility of culturing the whole life-cycle should be investigated. It is of course possible that elvers could be grown-on in Wales, providing the raw material for the export market. The competitive position of Wales in this matter should be examined.

7.4.4 Conservation / management

Conservation and fisheries management projects should receive funding. This arm of the Seafood Wales project will be of particular benefit to the SFCs, enabling them to expand some of their current conservation and management programmes. Local fishermen and aquaculturists should be encouraged to participate fully in any conservation or management schemes. Schemes that apply in part or wholly to the freshwater environment should be carried out with full co-operation and consultation with the Angling / Fishing Wales project.

Stock conservation / management schemes

V-notching, MLS, closed seasons and areas and Regulating Orders should be investigated and implemented where necessary. Management methods should be fully investigated and the biological and socio-economic implications of any scheme should be taken into account.

The introduction of stricter management is an important area of development for shore-based fisheries. The introduction of Regulating Orders to limit the number of gatherers and reduce the "boom and bust" cycle should be encouraged. This will provide stability to both hand gatherers and buyers & processors. For example, it is estimated that the Dee cockle fishery could sustainably support 60 licensed gatherers with an annual harvest of 2,500 tonnes worth £1.25 million²², while the Three Rivers cockle fishery could sustainably support at least 20 licensed gatherers harvesting 1,000 tonnes of cockles per year²³.

Regulating Orders should be expanded to cover other hand-gathered species such as winkles or to incorporate sea fished species such as whelks, crustaceans and mussels.

Education

It is difficult and expensive to prevent illegal and unlicensed fishing and sales of fish through enforcement alone but a move towards stewardship through local conservation/management should encourage more legitimate practice. It is also possible to reduce the "grey economy" to an extent by educating those individuals / businesses likely to purchase "grey" product. This can be achieved by providing restaurants, hotels, etc. with a guide to what conservation measures are being adopted and

²² Environment Agency estimate.

²³ Local processor's estimate.

why (e.g. what a V-notched lobster looks like, what MLS are and when closed seasons (if any) are in force). The conservation implications of these measures should be stressed and businesses should be persuaded not to purchase "grey" product. A similar scheme to educate local hotels and restaurants about V-notching of lobsters has been introduced successfully in Ireland.

It is also important that illegal fishing for diadromous species is reduced as it undermines attempts to protect and rebuild stocks and similar education schemes can be applied to the freshwater environment. Such programmes should be carried out in co-operation with the Angling / Fishing Wales project.

Formation of industry representative body(s)

The current commercial fishing and aquaculture industries have a very fractured representative structure. The formation of industry representative bodies would provide representation at local, Welsh, UK and international levels and be a point of contact for the industry and organisations outside the industry.

Representation for commercial fishermen and hand gatherers would allow them to distance themselves from unlicensed fishermen and the "grey economy", and provide support for individual fishermen whose livelihoods are threatened by increasing illegal activity. The organisation could combine the tasks of a PO and an Association to provide representation for the under 10m fleet, non-sector and sectoral vessels in Wales.

Representatives can work with the Seafood Wales project officers in identifying and progressing development options. It is essential that the views of the industry should be fully taken into account in creating any representative body.

7.5 Angling / Fishing Wales project

This project is a broadening of the existing Fishing Wales project being undertaken by the Environment Agency and Wales Tourist Board, building on the success of this initiative. The name "Fishing Wales" is already established and it may cause confusion to change it at this stage but it is recommended that "angling" is specifically mentioned in the project heading in order to avoid any confusion with commercial fishing.

There are a number of options that can be taken in order to develop the recreational fishing sector. The overall aim must be to provide quality angling both to the people of Wales and visitors to Wales on a sustainable basis that will bring revenue to local rural economies.

There are four development thrusts to the project:

1. Business
2. Tourism / marketing
3. In Wales promotion
4. Conservation / management

7.5.1 Business

As with the Seafood Wales project, this heading encompasses a wide range of potential projects and development assistance ranging from assistance with business management planning and advice to funding for new and expanding businesses.

Development of new and existing fisheries

Funds should be made available to improve the facilities available at existing sites – toilets, parking, access, coaching, etc. Assistance should also be given to the development of new commercial angling sites similar to the Centre of Excellence being developed in South Wales. Fisheries of all sizes should be considered, not just those able to host large international competitions. The development of sea angling should also be encouraged and assistance given to individuals wishing to become charter skippers or angling guides. This option could have links with the diversification grants proposed for the commercial fishing industry as many ex-fishermen may wish to convert their vessels to cater for charter groups. Care should be taken not to duplicate funding to any individuals / businesses.

Development of associated industries

In order to enhance the overall quality of stay for visiting anglers, funds should be made available for those associated industries that wish to cater more specifically for anglers. Funds should be provided to encourage B&Bs, hotels, etc. to incorporate drying rooms, bait and gear storage facilities, etc. into their operations while maintaining a high quality of customer service and complying with all Health and Safety standards.

Code of Conduct

A code of conduct for those managing Welsh recreational fisheries should be developed that addresses the responsibilities of both fisheries managers and fisheries users. Best practice should be encouraged in users with the improved handling and returning of fish, reduced impacts on the surrounding environment and conduct with other anglers and other users. A particular priority should be to encourage higher returns of wild game fish. Managers should be encouraged to improve customer service through better access and facilities as well as habitat improvement and stock management.

7.5.2 Tourism / marketing

Promotion of Welsh angling

The issue of marketing recreational fishing to potential visitors has begun to be tackled with the “Fishing Wales” initiative. Production of the “Fishing Wales” brochure and the fishing-in-wales web site have been found to be effective promotional tools. A follow-up survey revealed that 35 per cent of those receiving a brochure said the brochure had a lot or some contribution towards the decision to visit Wales²⁴. Although the survey sample size is small, it does show the brochure has had an impact.

The “One-Stop Shop”

Visitors to Wales that wish to go fishing are faced with a bewildering array of options. In addition to deciding which venue(s) to choose, they must get the necessary licences and permits (rod licence and for individual fisheries), be aware of local byelaws, address issues of transport and access to venues as well as organise suitable accommodation.

A one-stop shop providing independent advice and booking facilities for all anglers (and their families' needs) is needed to support the sound promotional foundation of the Fishing Wales brochure and web site. The service should incorporate a telephone booking and helpline with a database including up-to-date information on all angling services. This database can be linked with the fisheries

²⁴ ‘Fishing Wales’ Phase I report and Phase II draft strategy, Spring 2000

accreditation and classification schemes mentioned later in this section. The shop should have close links with the web site, allowing online enquiries to be answered swiftly.

Fishing in Wales web site

There were around 300,000 visits to the fishing-in-wales web site in 1999 with an average of 15 minutes spent on the site²⁵. The extensive site is well maintained and improvements have been made based on customer feedback. The information on visits to the web site is evidence of a useful, engaging web site that will have a positive impact on both the number of anglers choosing Wales and their experience during the visit. Angling clubs are also reporting direct benefits from the web site in terms of increased membership from outside Wales.

Planned developments for the site during 2000 outlined for Phase II include:

- ◆ Integrate the accommodation, travel and fishing information more closely, so that the site acts as an online "one-stop shop" for fishing tourism information.
- ◆ Link more closely with holiday package providers and facilitate world-class standards of information and customer care.
- ◆ Further strengthen the environmental education material on the site, and in particular make it more interactive.
- ◆ Support Objective 1 initiatives that link improving and protecting aquatic and riparian environmental quality to sustainable job creation, particularly via eco-tourism development and promotion.
- ◆ Broaden the base of the site to include other eco-tourism opportunities.

The goals outlined above are laudable and appropriate developments to an already successful web-based initiative. Consideration should also be given to providing additional language options to attract overseas anglers.

The on-line development efforts should be better integrated into the wider "Angling / Fishing Wales" marketing initiative. Though the web site can be developed in isolation in the ways described, there is the danger that inertia on the part of organisations involved with "Fishing Wales" will prevent associated developments occurring in reality, undermining the positive effects of the web site.

The project should seek to link the fishing-in-wales site to other sites dealing with angling in Wales, and make efforts to engage these sites more fully in the overall promotion of angling in Wales. It should also seek to incorporate more commercially oriented sites within the overall thrust of the Fishing Wales initiative.

The provision of world-class standards of information and customer care on the web site should be supported by initiatives to provide similar high standards to enquiries by telephone, post or in person (the one-stop shop). Improvements should in turn be supported by high standards of information and customer care to tourists once in Wales.

Accreditation scheme

An accreditation scheme for fisheries based on the range of target species available, ease of access for able bodied and disabled anglers, and the quality of associated facilities would be both a promotional tool for Welsh angling and provide a yardstick against which individual fisheries can be measured. The scheme can be developed using the Environment Agency's fisheries classification of watercourses as a starting point, potentially expanding the information into a full geographical information system (GIS) of Welsh fisheries.

²⁵ Fishing Wales Phase 1 Report & Phase II Development strategy, Pat O'Reilly

A similar accreditation scheme for local accommodation would enable anglers to choose accommodation that is most suited to their needs. It would also enable those hotels and B&B's that wish to focus more on provision of facilities for anglers to promote their "angler-friendliness".

Information

The provision of high-quality specialist information for angling of all types in Wales is essential if the quality and range of angling opportunities in Wales are to be promoted to the full. The range of media used should be as wide as possible, incorporating the use of brochures, website, CD-ROM, videos, etc. The development of multilingual information sources should also be encouraged.

Development of fishing package holidays

Specialist holidays that cater for anglers and their families can be developed. Provision of travel, accommodation, licences, gear, etc. can be incorporated into the package as well as additional attractions for non-angling members of the family such as tickets to local theme parks, museums, shows, etc. and information about other attractions such as wildlife tours, restaurants, shopping facilities. Packages could be tailored for different levels of proficiency with those for beginners incorporating lessons and coaching while those for more experienced anglers could include time with a professional angler to give more expert tips. The Wales Tourist Board should be fully involved in the development of such specialist activity.

Competitions

There are a number of regional and national angling competitions currently held in Wales and Welsh anglers have done well in international competitions. Competitions should be widely promoted to encourage visiting competitors as well as Welsh anglers and to raise the profile of angling in Wales. This activity could potentially be in partnership with Hyder plc as the company already plays host to a large number of angling competitions each year.

7.5.3 In Wales promotion

Development of the sport

The promotion of angling as a recreational pastime and sport in Wales should be encouraged. It is an activity that is easily accessible to a wide-range of individuals and encourages more interest in the natural environment. General promotional and marketing activities should target residents of Wales as well as attracting anglers from outside the region. The availability of licences should be widely advertised and local promotional events by local clubs and commercial fisheries should be encouraged. Any improvements in the facilities and accessibility of sites should also be publicised and promoted.

Coaching qualifications

Although several coaching schemes exist, they each apply different criteria and none are recognised by all angling bodies. The development of formal qualifications for angling coaches could raise the profile of angling as a sport rather than just a pastime. Formal qualifications would enable commercial fisheries to employ coaches that had all been trained to a recognised standard and would give beginners the confidence that they are learning from a recognised teacher. The introduction of formal qualifications could also enable individuals to become professional angling coaches.

The development of any qualifications should be undertaken with the co-operation of the angling community. Collaboration with the wider UK angling community should also be possible.

7.5.4 Conservation / management

Habitat improvement projects

Habitat improvement is being tackled in a number of ways including fencing off banks to prevent degradation by livestock, planting of trees and riparian vegetation to create buffer zones for rivers, aeration and water mixing, gravel cleaning, etc. Good examples of habitat improvement benefiting both target species and the wider environment include the River Cennen and Wye Habitat Improvement projects which incorporate many of the regenerative methods mentioned above. Work on the Cennen has resulted in increased numbers of sea trout and salmon redds along the reach, which are anticipated to increase numbers of trout parr by 2,700 and salmon parr by 330 each year.

Habitat improvement, carried out with appropriate consideration for the environment in general rather than just target species, appears to represent a sustainable option that is also good value for money compared to perennial restocking. The division of resources should swing towards habitat improvement and maintenance as the number of wild stock returns increases.

The possibility of incorporating habitat improvement projects into "eco-tourism" holidays could be explored as a possible way of "self-funding" for such projects.

Restocking

Restocking should be continued where appropriate until wild stocks are being managed sustainably, but investigations should be conducted into alternative uses for resources currently used for restocking. This action is closely linked with aquaculture initiatives as part of seafood Wales.

As with habitat improvements, re-stocking without due consideration for the riverine ecosystem can have adverse consequences for non-target species. With responsibilities for maintaining biodiversity in freshwater ecosystems as well as improving the potential for game fishing species, the Environment Agency should ensure its actions benefit conservation as well as economically profitable species.

Management

Management on a catchment basis is a logical, if often challenging, course of action as it encompasses the majority of potential pollution risks to a river as well as the main river owners and users. It is not enough, however, for the Environment Agency as statutory authority to adopt such a system in isolation. Stakeholders in catchment areas of major rivers should also form similar groupings, as has occurred with the formation of the Wye Foundation, given that the actions of one can have serious consequences for the river system as a whole. The formation and operation of such groupings should be given full support from the Angling / Fishing Wales project.

Water quality

The improved quality of inland waters is a perennial objective of the Environment Agency - the body responsible for such matters. The Environment Agency has developed a hierarchical planning framework encompassing Local Environment Agency Plans (LEAPs) within Environmental Issues Strategies. With regard to inland fisheries, the LEAPs take the form of catchment management plans relating to a more general fisheries action plan.

Chronic pollution caused by agricultural run-off, amongst other things, is more difficult to control than pollution incidents as it often enters the water through diffuse rather than point sources. It is, therefore, understandable that the focus has been on mitigating the impact of agricultural activities on adjacent water bodies through habitat improvement.

Research

There are several areas of research and monitoring thought to be necessary to support the Angling/Fishing Wales project, in addition to the need for feasibility studies for certain proposals.

Biological research includes the need to investigate the fate of diadromous species before entering waters under Welsh jurisdiction. Efforts to conserve stocks while resident in Welsh waters are likely to be undermined by fishing and pollution pressures at sea. Evidence of these impacts perhaps through tagging schemes may assist in bringing these pressures under control.

Socio-economic research looking in more detail into the value of angling to Wales would be useful as well as on-going monitoring of projects.

7.6 Aqua-Innovation

The Aqua-Innovation programme is explicitly set-up to support and add value to the development activities of the umbrella initiatives, Seafood Wales and Angling / Fishing Wales. It is charged to identify, support and promote the development and promulgation of front-line technology and integrated management systems in all aspects of aquatic environment management and exploitation.

Key areas of activity are likely to be in:

- ◆ Environmental management systems – low effluent production systems, pollution sinks, reed bed technology, re-circulation aquaculture technology, making visitor centres pay, integrating research with public education.
- ◆ Integrated coastal management systems – local fisheries management systems, integration of economic activities within environmentally sensitive areas, developing eco-tourism activities within industrial and urban areas, use of eco-labelling and branding in promoting good practice, management of stocks of migratory fish and their associated fisheries.
- ◆ Catchment area management systems – river system habitat modification, water related environmental management, innovation in stocking, re-stocking and open water fishery management, exploration of mechanism for reducing the impact of diffuse agricultural pollution on down-stream activities.
- ◆ Water-based elements of rural diversification – ornamental/sport fish production, support to recreational fishing.

The principal mechanisms for achieving its objectives will be:

- ◆ The establishment of research priorities in aquatic resource management and exploitation, as a service to both public and private sector funding agencies.
- ◆ The sponsoring / commissioning of specialist reports in support of the research priorities.
- ◆ The establishment of a case record database of best practice (web-mediated) as a means of further promoting excellence within Wales.
- ◆ Organising an annual conference to promulgate Welsh achievements in this area and exchange experience with sector practitioners from other geographic areas.

The Aqua-Innovation group should work very closely with the Seafood Wales and Angling / Fishing Wales initiatives.

8. Sources of funding

8.1 Overall programme dimensions

As indicated in earlier chapters, there is considered to be good potential for future growth in the fishery sector. Given the relatively low status afforded the sector in the recent past, coupled with its small scale, generally rural location and fragmented organisation, it is considered that focused development activity should be able to generate substantial improvements relatively quickly. It is expected that most such gains will be achieved through improvements in the quality of production rather than the quantity, leading to stronger and more sustainable businesses. Such development activity is likely to secure current levels of employment within the sector and to facilitate modest growth in employment, with most gains achieved through better management of coastal zone resources and more focused development of recreational fisheries.

Current sector turnover is calculated at just over £100 million, supporting local employment of some 1,660. By exploiting identified development opportunities it is considered that over a five-year period a twenty per cent increase in annual turnover, and a ten per cent increase in sector employment could feasibly be achieved. At the end of the five year programme the sector will be expected to be in better financial shape, operating more efficiently and profitably, employing practices that focus on value rather than volume, and operating sustainably within the capacities of the natural resource systems on which the businesses depend.

Overall, a programme of development expenditure of £60 million is proposed comprising about sixty per cent public funding, and forty per cent private investment. It is proposed that this development thrust be underpinned by attracting research funding of approximately £10 million.

At the core of the strategy is the Objective 1 programme. Valued at £55 million over five years, this is expected to draw down a little over half of its funds from EU structural assistance, match funding from local and central government of 6 per cent, and a little under forty per cent from private investment.

The thrust of this programme is to provide an environment in which fishery related businesses will prosper (54 per cent of programme funding). This is achieved through:

- ◆ **Facilitation** in the form of the focused umbrella projects Seafood Wales and Fishing / Angling Wales and incentives towards stronger representation within the industry (4 per cent).
- ◆ Achievement of **improvements in resource management systems** as they apply to both commercial and recreational fisheries (8 per cent).
- ◆ Redirection of fishing activities to embrace **more sustainable practices** (5 per cent).

Support is also provided in the form of infrastructure improvements through programmes of **habitat improvement** (18 per cent) and **upgrading of harbours** (18 per cent), with the emphasis on small harbours, jetties and launch sites. Further support is provided in the promotion of **higher levels of research and development expenditure** through the Aqua-Innovation project (3 per cent), drawing down up to £10 million in additional EU, public and private sector research funding from sources largely outside the Structural Fund programmes.

Direct support in promoting business growth and achieving improvements in the quality and value of associated products and services will be provided along three fronts. Support in **business development** will be provided to both new and existing ventures (19 per cent). Support in establishing **standards of practice and quality**, and in meeting such standards, will be provided (20 per cent). Stimulation of additional business, based on the high quality of products and services

available in Wales, will be provided in focused **marketing and promotion** programmes (6 per cent). The composition of the Wales fishery development programme is summarised in table 8.1 below.

Table 8.1 Proposed programme expenditure by category

	Total	£'000		
		EU	Public	Private
Objective 1 programme				
Facilitation	2,950	2,218	223	510
Improved resource management systems	4,150	2,693	258	1,200
Adjustment of fishing effort	2,719	1,419	186	1,114
Physical infrastructure	19,880	12,440	1,494	5,946
Quality control	11,153	5,784	558	4,777
Business development	10,300	3,770	515	5,990
Marketing and promotion	3,400	1,815	170	1,415
Total	54,552	30,138	3,403	20,952
		55%	6%	38%
Non-Objective 1 programme¹	5,000	3,500	500	1,000
		70%	10%	20%
Research and Development²	10,000	7,000	1,000	2,000
		70%	10%	20%

¹ – includes other structural fund programmes and funding under specific European Community initiatives, such as INTERREG.

² – comprises drawings on the EUs Framework Five Programme, central government research programmes, the matched funding elements of such programmes, and contract research.

8.2 Proposed allocations by Objective 1 priority and measure

There are seven priority measures within the Welsh SPD:

1. Developing and expanding the SME base
2. Developing innovation and the knowledge based economy
3. Community economic regeneration
4. Promoting employability and the development of a learning society
5. Rural development and the sustainable use of natural resources
6. Strategic infrastructure development
7. Technical assistance

Support for fisheries and aquaculture falls under priority five but elements of each priority measure apply to the fisheries sector in Wales. For example, the majority of fisheries related businesses are SMEs so the development of fisheries companies contributes to priority one. If the fisheries industries of Wales are to thrive and develop, they must be included in all aspects of social and economic regeneration, not just those pertaining specifically to fisheries, because the importance of the fisheries industry reaches much further than just the immediate coastal and riparian areas of Wales. It is, therefore, inappropriate to seek to allocate all fishery programme expenditure under measure 5.9 – support for fisheries and aquaculture. Table 8.2 indicates how allocations under the Objective 1 programme might be more appropriately apportioned.

Overall, the fishery sector component of the Objective 1 programme is valued at approximately £54.5 million. Of this, it is appropriate to allocate all but £2 million to priority 5 – rural development and the sustainable use of natural resources. £31 million will be allocated to the fishery specific measure 5.9,

whilst £21.5 million will be allocated to other measures under priority 5 (mainly 5.7 and 5.8, but also 5.2 and 5.6).

Key features of this form of allocation are:

- ◆ The facilitation, marketing and promotion, and quality control costs are met out of the fishery specific measure – where the fishery sector interest is particularly strong.
- ◆ Funding of “improved resource management systems” is distributed between measures 5.8 and 5.9 reflecting the marine / freshwater divide.
- ◆ The fairly substantial funding costs of harbour improvements are allocated to measure 5.9, whilst the similar funding level for habitat improvements is allocated to measure 5.7.

Of the £2 million allocated outside priority 5, it is proposed that £1.5 million be drawn from measure 2.1 – information and communications technology (ICT) infrastructure (ERDF) to support the computer based booking of angling holidays in Wales. This would contribute towards the costs of setting up an integrated web-based tourism database capable of supporting on-line searching and booking of angling facilities and associated accommodation available within Wales, and supporting one or more dedicated call-centres. Associated with this, it is proposed to draw a further £0.5 million contribution towards the costs of upgrading guest-house and bed and breakfast accommodation to better meet the special requirements of anglers from measure 1.1 – financial support for SMEs (ERDF).

Proposed Table 8.2 Breakdown of proposed programme expenditure by Priority**Priority 5 - rural development & the sustainable use of natural resources****Measure 5.9 – support for fisheries and aquaculture**

	£'000			
	Total	EU	Public	Private
Facilitation	2,950	2,218	223	510
Improved resource management systems	1,600	1,080	130	390
Adjustment of fishing effort	2,619	1,334	181	1,104
Physical infrastructure	9,880	4,940	494	4,446
Business development	4,700	1,610	235	2,830
Quality control	8,893	4,098	445	4,316
Marketing and promotion	350	238	18	95
Total	30,992	15,517 50%	1,725 6%	13,691 44%
Other measures under priority 5¹	Total	EU	Public	Private
Improved resource management systems	2,550	1,613	128	810
Adjustment of fishing effort	100	85	5	10
Physical infrastructure	10,000	7,500	1,000	1,500
Business development	5,100	2,060	255	2,785
Quality control	2,260	1,686	113	461
Marketing and promotion	1,550	828	78	645
Total	21,560	13,771 64%	1,578 7%	6,211 29%
Priorities 1 and 2	Total	EU	Public	Private
1.1 - Business development	500	100 20%	25 5%	375 75%
2.1 - Marketing and promotion	1,500	750 50%	75 5%	675 45%

¹ – notably:

² – measure 5.7 – a sustainable countryside – enhancement and protection of the natural environment and countryside management (EAGGF); and

³ - measure 5.8 – support for recreational opportunities and management of the natural environment (ERDF)

8.3 Allocations under measure 5.9 - support for fisheries and aquaculture

With regard to the specifically fisheries measure, measure 5.9 – support for fisheries and aquaculture, in line with the overall UK Objective 1 programme, funding is allocated by sub-measure according to four fishing priorities:

- ◆ Fishing priority 1 – adjustment of fishing effort: permanent withdrawal
- ◆ Fishing priority 2 – Renewal and modernisation of the fishing fleet
- ◆ Fishing priority 3 – Processing, marketing, ports and aquaculture
- ◆ Fishing priority 4 – other measures

As indicated in Table 8.2, allocation under this measure comprises 50 per cent from EU funds, 6 per cent from government funds, and 44 per cent from private sources. Broken down still further in Table 8.3 below, allocation by structural fund is £9.5 million to ERDF (62 per cent), £0.4 million to ESF (2 per cent) and £5.6 million to FIG (36 per cent).

Table 8.3 Objective 1 programming by fishery sub-measure

Sub-measure	£'000	Percentage allocation				
		ERDF	ESF	FIFG	Public	Private
Fleet reduction	1,419	42	5	27	5	20
Modernisation	4,343	21	4	10	5	60
Proc., mkt., ports & aqua	21,280	33	0	18	6	43
Other	3,950	25	3	23	5	43
Total	30,992	9,527	372	5,557	1,725	13,691
Percentage		61.6	2.4	36.0		

Sub-measure 1

In sub-measure 1 the focus is on adjustment of fishing effort to bring it into better alignment with available resources. No funding is provided in support of permanent withdrawal of effort, on the basis that given the particular conformation of the Welsh fleet, this is better achieved through market forces.

Instead, funding is put into encouraging the identification and dissemination of more sustainable fishing practices on the one hand, and facilitating the application of new forms of effort control on the other. In the latter category, funding is directed towards inshore fishing, and at encouraging greater fishermen involvement in fisheries management, and the exploration of novel control mechanisms that can be deployed by the SFCs.

Since it is expected that vessel owners and operators will benefit from such developments, it is considered that some element of co-funding from the industry is appropriate. In general this is most likely to take the form of contributions "in kind" – contribution of individual and vessel time.

Sub-measure 2

Under sub-measure 2, the focus is on safety and modernisation. Given that considerable potential exists for contributing to increased fishing effort under the guise of addressing safety issues and improving the layout and equipping of vessels, especial care should be taken in sanctioning expenditure under this sub-measure.

Nonetheless, increasingly stringent safety requirements for the under 10m fleet, and concerns about the declining fabric of the fleet, do support the need for reasonable levels of expenditure under this sub-measure. Accordingly, the main focus of this sub-measure is to provide incentive to vessel owners to undertake such modifications, but the onus will be on them to come up with the majority (60 per cent) of the funding required.

Sub-measure 3

Sub-measure 3 forms the main element of assistance to the fishery sector, focusing on:

- ◆ The identification and application of best practice in all avenues of fishery related business (and the generation of the benefits of such practice through effective marketing and promotion).
- ◆ The promotion of marine and freshwater aquaculture using both established and novel cultivation techniques.
- ◆ Provision of support to new and existing businesses.

- ◆ Upgrading small harbours, jetties and launch facilities.

These elements are given broad interpretation. For example, identifying and applying best practice includes the development of codes of practice, encouraging and supporting recruitment to commercial fishing, the development of new fisheries and improvement in water quality.

For the aquaculture sector, encouragement is given to the further application of known production techniques in bivalves, salmonids and, marine and freshwater finfish (for restocking, recreational fisheries, aquarium and ornamental use). In addition, support is given to the accelerated exploration of more novel cultivation techniques. Such techniques might include:

- ◆ Re-circulation systems for cultivation of marine and freshwater fin fish for consumption, and fish for recreational fisheries, ponds and aquaria.
- ◆ Low effluent systems of fish, shellfish and aquatic plant cultivation.
- ◆ Shellfish cultivation systems associated with natural and man-made coastal lagoons.
- ◆ Cultivation techniques associated with offshore structures.
- ◆ Hatchery and grow-on facilities in support of restocking (lobsters, scallops).

In offering support to novel aquaculture techniques, emphasis is placed on supporting the accelerated adaptation and adoption of technology. The main funding for such developments should be a combination of normal commercial channels (private investment, banks and venture capital companies) and applied research.

In the provision of support to existing businesses, funding is provided for the establishment of the Seafood Wales focused sector development team, as well as more direct support to development of existing fishery related businesses and to the establishment of new businesses. Particular attention is given to encouraging increased levels of fish processing within Wales, as well as promoting the quality of Welsh fish and fisheries and extolling the virtues of high environment qualities and sustainably managed fisheries.

The upgrading of small harbour, jetty and launch sites supports the small boat commercial fisheries sector as well as anglers and charter vessel operations. Assistance should be provided in facilitating physical improvement, cosmetic (and safety) improvements and signage.

Sub-measure 4

Sub-measure 4 focuses on the provision of facilitation services and support to initiatives directed towards strengthening the socio-economic fabric of fishery related communities. Within the first category, allocations are given to the management of the Angling / Fishing Wales initiative and the Aqua-Innovation project. Under the latter, funding is provided in support of initiatives to strengthen industry representation within Wales, to support projects that capture the fisheries traditions and heritage of Wales, to encourage diversification within the fisheries sector and to provide start-up grants for new entrants to the sector.

8.4 The spearhead projects – Seafood Wales and Angling / Fishing Wales

The successful implementation of the two main umbrella projects requires support from the EU, the public sector in Wales and the private sector. Although a significant proportion of the EU resources will be delivered through the deployment of FIG resources, additional support will be made available through ERDF and ESF and indirectly through EAGGF. It is the combination of resources from all four of the Funds which will allow the maximum impact to be achieved.

The need to deploy resources from more than one source also applies to the Welsh public sector. Although a significant proportion of funds will be from fishing specific sources, the strategy also identifies the development of tourism related activity as well as others, which will fall within the interest of environmental agencies. It is, therefore, likely that a variety of organisations will be involved in both financing and implementing the strategy.

Within FIG, there are four Axis or measures by which funds are distributed. These are:

- Axis 1: Adjustment of fishing effort: permanent withdrawal
- Axis 2: Renewal and modernisation of the fishing fleet
- Axis 3: Protection and development of aquatic resources, aquaculture, fishing port facilities, processing and marketing
- Axis 4: Other measures

In the following sections, the relevant EU and national funds are identified, and in the case of FIG, the relevant Axis is highlighted. In some cases it is possible for two Funds to support the same activity. Where this is likely the text identifies possible demarcation between the Funds. In view of the limited FIG funds available, the presumption is that ESF and ERDF will be used to fund activities wherever possible.

Seafood Wales project

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
<i>1. Business</i>		
Harbour developments	Both ERDF and FIG Axis 3 could support harbour developments. The preference should be for FIG where the investment is primarily to benefit the fishing industry, and ERDF where the benefits are primarily tourism related e.g. marina developments.	Local authorities, public sector, harbour owners.
Start-up grants	Start-up grants for young fishermen are eligible for funding under FIG Axis 4 (including purchase of second hand vessels). Start-up grants for aquaculture and processing ventures are eligible under FIG Axis 3.	National Assembly For Wales.

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
Vessel modernisation / training grants	Funds for modernisation are available under FIFG Axis 2. Training support would be eligible for support under ESF, although FIFG could be used depending on the nature of the "training".	National Assembly For Wales
Safety grants	Funds for modernisation are available under FIFG Axis 2.	National Assembly For Wales
Diversification Grants	Funds to enable vessels to diversify into other fisheries activities or convert to other activities will be available through FIFG Axis 4. Some activities could be eligible for support under ERDF. Assistance for aquaculture operations to diversify into related activities such as "put and take" recreational fisheries or educational / tourist attractions may be available under FIFG, but it is likely that some activities will not be eligible and will require ERDF support.	National Assembly For Wales, Welsh Development Agency.
Fishing Heritage	Further clarifications of the activities to be supported and economic benefits likely to be realised are needed to identify which, if any, of the Structural Funds will be able to provide support. Where the maintenance of a heritage tradition has an economic benefit, or can be linked to the cultural/tourism "product", support may be available through ERDF. It is unlikely however that ERDF support would be available to provide any on-going subsidy.	
Development and Expansion of local processing	Funds for local processing are available under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency.

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
2. Promotion / marketing		
Promotion of well-managed fisheries	Funds for the promotion of products through their association with well managed fisheries are available under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency.
Promotion of Welsh fish	Funds for the promotion of Welsh fish available under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency
3. Pilot studies / feasibility studies / R&D		
Development of new fisheries	Funds for pilot studies relating to harvesting, handling, marketing and processing of new products are eligible for support under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency.
Development of new culture techniques	Funds for pilot studies relating to the breeding and rearing of eels would be eligible for support under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency.
Cultivation of species using current techniques	Funds for pilot studies relating to using current techniques with new species would be eligible for support under FIFG Axis 4.	National Assembly for Wales, Welsh Development Agency.
4. Conservation / management		
Stock conservation / management schemes	Funds for stock conservation and management schemes would be eligible under FIFG Axis 3. Clarification is required from DG FISH as to the extent to which FIFG support is available for freshwater activities.	Environment Agency Wales, National Assembly for Wales.
Education	Funds would be available through FIFG Axis 4 if the awareness raising was linked to the protection and development of the industry and to other promotional activities.	Environment Agency Wales.
Formation of industry representative body(s)	Funds would be available through FIFG Axis 4.	National Assembly for Wales.

Angling / Fishing Wales project

It is likely that ERDF and ESF resources will be as important as FIGG resources in the delivery of the recreational fishing strand. In previous Programmes a key test of FIGG eligibility was the purpose of the fishing or investment i.e. where fish were being caught for sale in the commercial sense, FIGG support was available. Where fish were being caught for pleasure or sport they were not. Clarification is required to identify those parts of the fishing and angling activities that require non-FIGG support.

It should also be noted that ERDF support will be subject to a need for grant/market failure appraisal, and that some activities may be deemed not to need EU or public sector support.

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
1. Business		
Development of new and existing fisheries	Funds for the improvement of facilities sites – toilets, parking, access, coaching – may be eligible for support from ERDF.	Welsh Tourist Board, local authorities.
Development of associated industries	Funds for associated industries to incorporate drying rooms, bait and gear storage facilities, etc. into their operations may be eligible for support from ERDF.	Welsh Tourist Board, local authorities.
Code of conduct		
2. Tourism / marketing		
Promotion of Welsh angling	Funds for tourism marketing will be eligible for support from ERDF.	Welsh Tourist Board, local authorities.
“One-stop shop”	Funds for tourism marketing will be eligible for support from ERDF.	Welsh Tourist Board, local authorities.
Fishing in Wales website	Funds for tourism marketing will be eligible for support from ERDF.	Welsh Tourist Board, local authorities.
Accreditation scheme	Funds for an accreditation scheme, where it was linked to the development of tourism, would be eligible for support from ERDF.	Welsh Tourist Board, Environment Agency Wales, local authorities.
Information	Funds for information provision, where it was linked to the development of tourism, would be eligible for support from ERDF.	Welsh Tourist Board, Environment Agency Wales, local authorities.

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
Development of fishing package holidays	Funds for the development of package holidays, would be eligible for support from ERDF (but would have to provide evidence as to why they could not be developed by the private sector without public sector support; it is likely that development costs only would be eligible and / or the marketing of holidays).	Welsh Tourist Board, local authorities.
Competitions	Funds for the development of competitions would be eligible for support from ERDF provide they were directly linked to the attraction of visitors to Wales.	Welsh Tourist Board, Environment Agency Wales, local authorities.
3. In Wales promotion		
Development of the sport	Funds for the development of the support would only be available via ERDF where the benefits were linked to the development of the tourism industry.	Welsh Tourist Board, Environment Agency Wales, local authorities.
Coaching qualifications	Funds for coaching qualifications would be available through ESF	Training and Enterprise Councils.
4. Conservation / management		
Habitat improvement projects	Funds for the improvement of habitats would be available either through EAGGF or FIFG depending on the specific details.	Environment Agency Wales, local authorities.
Re-stocking	Clarification required from DG Fish	Environment Agency Wales, local authorities.
Management	Funds for the development of active management may be eligible for EU support. Clarification required from DG Fishing; if ineligible for FIFG an ERDF case around the economic benefits of the better management would be required.	Welsh Tourist Board, Environment Agency Wales, local authorities.

<i>Development Strand</i>	<i>EU Support</i>	<i>Public Sector Support</i>
Water quality	funds for the improvement of water quality may be available from FIGG or EAGGF. If the primary problem relates to agricultural activity, then EAGGF funds are likely to be available.	Assembly for Wales, Environment Agency Wales
Research	Support may be available from FIGG Axis 4, dependent on the focus of the project. Clarification required	Environment Agency Wales, local authorities.



Appendix 1 - Development opportunities for fisheries in Wales

Development opportunity	Aim	Beneficiaries within the sector	Beneficiaries outside sector
<i>Commercial</i>			
Harbour developments	Provide funds for harbour improvements - harbour walls, slips, facilities - toilets, storage facilities, etc.	Inshore fleet, offshore fleet	Charter vessel owners, recreational sea anglers, recreational harbour users (e.g. yacht owners), tourism
Start-up grants	To remove the barriers preventing young people entering fishing and avoid vessels leaving the registered fleet by providing grants for basic training and to encourage partnerships with skippers reaching retirement age.	Inshore fleet, offshore fleet	Fish buyers, processors, fishing communities, etc. by safeguarding the future of the Welsh fishing industry.
Vessel modernisation / training grants	Funds for new gear, and training to improve quality and traceability and update skills e.g. on-board weighing, iceing, handling and storage facilities and training to promote quality not quantity.	Inshore fleet, offshore fleet, hand gatherers	Fish buyers, processors. The wider community also benefits from increased quality and the reputation of the product improves.
Safety grants	Grants and loans to update vessel safety and crew safety training and to ensure required Health and Safety regulations are met.	Inshore fleet, offshore fleet	
Diversification grants	Assistance for fishermen to change fishing method in order to target different stocks or to explore new fisheries, to diversify into different sea-going activities e.g. charter fishing, wildlife tours, to retrain fishermen or start up businesses outside the fishing industry.	Inshore fleet, offshore fleet, hand gatherers	Recreational fishing, tourism. The wider community benefits if new ventures are successful or ex-fishermen find jobs outside of fishing.

Fishing heritage	To conserve the fishing heritage of Wales, especially of those sectors of the industry that are contracting such as eel and salmon netmen. Provide funds for the modernisation and promotion of fishing museums, demonstrations of traditional fishing methods, gear manufacture, etc.	No direct beneficiaries.	Tourism, fishing communities (preservation of heritage)
Promotion and development of well-managed fisheries	Raise the profile of sustainably managed Welsh fisheries and encourage the development of sustainable fisheries but the use of accreditation schemes such as the Marine Stewardship Council (MSC) and promotional activities.	Inshore fleet, some sectors of the offshore fleet, and gatherers.	Fish buyers, processors, restaurants, etc. can all publicise the use of sustainably managed seafood.
Promotion of Welsh fish	Raise awareness of Wales as a high quality fish producing area through the use of publicity campaigns, trade fairs, fishing galas, develop a Wales quality brand for the sector.	Inshore fleet, offshore fleet, hand gatherers.	Fish buyers, processors, restaurants, etc. - all those involved in the catching, handling and selling of seafood.
Development of new fisheries	Provision of funds to investigate the development of new fisheries – pilot studies, gear development, etc. Studies should incorporate socio-economic aspects, marketing, processing and handling issues.	Inshore fleet, offshore fleet, hand gatherers.	Fish buyers, processors, restaurants, tourism.
Stock conservation / management schemes	Introduction and expansion of Regulating Orders, use of V-notching schemes, closed areas, closed seasons, etc. to protect and enhance stocks. Fisheries can move towards more sustainable management practices and benefit from the opportunities available to such fisheries (see above).	Inshore fleet, hand gatherers.	Offshore fleet may also benefit. Fish buyers, processors, restaurants etc. benefit from more consistent supply.
Education of the public	Reduce the purchase of illegally caught seafood by educating buyers, restaurants, the general public, etc about conservation and management schemes, what minimum landing sizes are and the consequences of not adhering to the schemes.	Offshore fleet, inshore fleet, hand gatherers, diadromous fishermen.	Fish buyers, processors, restaurants, etc. benefit by a reduction in glut or lack of supply associated with opportunistic fishermen. Fishing communities benefit by reduction of illegal activity and the tension that can be caused between legal and illegal fishermen. Knock-on benefits for tourism.

Formation of industry representative bodies	Provide a point of contact for the whole industry that is geared towards the specific needs of Welsh fishermen. Point of contact for organisations outside the industry. Distance registered fishermen / gatherers from illegal / opportunistic operators. Provide continuity of representation and allow more industry participation in decision making process.	Offshore fleet, inshore fleet, hand gatherers, diadromous fishermen.	Fish buyers, processors, restaurants, etc, - all those involved in the catching, handling and selling of seafood by providing a recognised point of contact with fishermen. This also benefits local and national government and any organisations outside the industry such as CCW, WDA, etc. that may wish to consult with the industry.
<i>Recreational</i>			
Development of new and existing fisheries	To improve facilities at existing fisheries (e.g. toilets, access, parking) and develop new fisheries where demand exists.	Game, coarse, sea angling	Tourism, local businesses that provide goods and services to anglers (e.g. tackle and bait shops, cafes, garages).
Development of associated industries	To allow those businesses wishing to cater more specifically to anglers to improve their facilities e.g. to allow B&Bs, hotels to incorporate drying rooms, bait and gear storage facilities into their existing operations.	Game, coarse, sea angling	Tourism, local businesses that provide additional goods and services to anglers (e.g. tackle and bait shops, cafes, garages).
Code of conduct for the management of recreational fisheries	To encourage the use of best practice in managing fisheries and in the provision of services to anglers. The code can be adapted to suit coarse or game fisheries or to address issues associated with sea angling charters. Those fisheries meeting the code of conduct can use it as a promotional tool.	Game, coarse, sea angling, fisheries managers, charter vessel owners	Tourist industry, local businesses associated with the provision of goods and services to anglers.
Promotion of Welsh angling	To raise the profile of Wales as a quality destination for anglers through the use of advertising and promotional campaigns such as the "Fishing Wales" brochure and website.	Game, coarse, sea angling, fisheries managers, charter vessel owners	Tourist industry, local businesses associated with the provision of goods and services to anglers.
Provision of advice / information	To provide independent advice for visiting and local anglers regarding the types of angling and the facilities available so that anglers can choose destinations to suit their interests and needs e.g. advice as to which sites are most accessible for disabled anglers.	Game, coarse, sea angling, fisheries managers, charter vessel owners	Tourist industry, local businesses associated with the provision of goods and services to anglers.

Improved links with tourism / visitors	To provide advice regarding accommodation, local sites of interest for anglers and accompanying non-anglers to improve the overall quality and enjoyment of their stay.	Game, coarse and sea anglers	Visitors accompanying anglers have a more enjoyable stay, tourist sites, B&Bs, hotels, restaurants, etc.
Development and expansion of Fishing in Wales website	To increase the quantity and quality of information available on the website with regards to angling and associated facilities (accommodation, restaurants, etc.). Provision of multilingual information, encourage links to other Welsh angling and tourist information websites.	Game, coarse and sea anglers, fisheries managers, charter vessel owners	Tourist industry, local businesses associated with the provision of goods and services to anglers.
Accreditation / award scheme for fisheries	Provide a promotional tool and yardstick by which Welsh fisheries can be measured. Can include information about the range of species available, provision of facilities, ease of access, etc.	Game, coarse and sea anglers, fisheries managers, charter vessel owners	Tourist industry, local businesses associated with the provision of goods and services to anglers.
Accreditation / award scheme for "angler friendly" accommodation	Enable anglers to choose accommodation most suited to their needs, near to fisheries. Can also be used as a promotional tool for B&Bs and hotels that wish to target anglers as customers.	Game, coarse and sea anglers	B&Bs, hotels, tourism in general, local businesses associated with the provision of goods and services to anglers.
Development of angling package holidays	Provision of specialist holidays to cater specifically for anglers and their families (either fishing or non-fishing) to encourage visitors to Wales for short breaks or longer holidays.	Game, coarse and sea anglers, fisheries managers, charter vessel owners	Tourism industry in general including B&Bs, hotels, local tourist sites, also local businesses associated with the provision of goods and services to anglers.
Competitions	Raise the profile of angling in Wales and the achievements of Welsh anglers by promoting existing competitions in angling and non-angling press, on local and national radio and television. Development of new competitions of various sizes e.g. small local competitions through to world championship events.	Game, coarse and sea anglers, fisheries managers	Tourism industry in general including B&Bs, hotels, local tourist sites, also local businesses associated with the provision of goods and services to anglers and the followers of angling competitions.
Development of angling as a sport	Promotion of angling as a recreational pastime and sport that all ages and abilities can take part in through general marketing and advertising and special events e.g. beginner trial days.	Game, coarse and sea anglers, fisheries managers, charter vessel owners	Tourism industry in general including B&Bs, hotels, local tourist sites, also local businesses associated with the provision of goods and services to anglers and the followers of angling competitions.

Coaching qualifications	To develop formal qualifications recognised by national and international angling bodies to raise the profile of angling as a sport and to encourage commercial fisheries to employ coaches.	Game, coarse and sea anglers, fisheries managers, charter vessel owners	
Habitat improvement projects	To improve water and habitat quality of fisheries to improve stocks and thus fishing opportunities.	Game, coarse and sea anglers, fisheries managers.	The wider community benefits from an improved natural environment. There are also knock-on effects for the tourism industry as the natural environment is a major asset to the Welsh tourist industry.
Combine habitat improvement with "eco-tourism"	To improve water and habitat quality of fisheries to improve stocks and thus fishing opportunities while raising the profile of Wales as a tourist destination and promoting the natural heritage of Wales.	Game, coarse and sea anglers, fisheries managers.	The wider community benefits from improved natural environment and there are knock-on effects for the tourism industry.
Restocking schemes	To halt any decline and help re-build fish stocks.	Game, coarse and sea anglers	Angling tourism will benefit from improved stocks and benefits will also be gained by industries associated with angling.
<i>Aquaculture</i>			
Start-up grants	To assist in the development and expansion of the aquaculture industry by providing financial assistance to businesses / individuals wishing to locate in Wales for premises, equipment, training, etc ..	Mainly freshwater aquaculture but some opportunities exist for marine aquaculture.	Processors and buyers. The local community benefits from increased employment opportunities.
Safety / training grants	To assist the industry in meeting safety equipment and training standards and environmental standards. Such standards are especially important in the food production industry and the attainment of high standards can be used as a promotional tool.	Freshwater and marine aquaculture.	Processors and buyers benefit from improved quality of supply and can use the high standard or produce as a promotional tool.
Diversification grants	To assist existing aquaculture operations to diversify into culturing different species or to incorporate educational / tourism aspects into their operations. Can also assist recreational fisheries set up their own culturing activities to provide on-site re-stocking facilities.	Freshwater and marine aquaculture.	Recreational fisheries, tourism, processors and buyers benefit from a wider range of local produce. Expansion of sites may lead to increased local employment opportunities.

Promotion of "green" aquaculture / encourage the use of sustainable practices.	To promote the sustainable and environmentally friendly aspects of Welsh aquaculture.	Freshwater and marine aquaculture.	Buyers and processors can use the environmentally friendly aspect of their produce as a promotional tool, highlights Wales as an environmentally friendly producer.
Production and promotion of organically produced fish and shellfish	To encourage the use of organic practices and tap into the market for organically farmed produce.	Freshwater and possibly marine aquaculture	Buyers and processors can use the organic aspect of their produce as a promotional tool, highlights Wales as a "green" producer.
Promotion of Welsh fish	Raise awareness of Wales as a high quality fish producing area through the use of publicity campaigns, trade fairs, fishing galas, develop a Wales quality brand for the sector.	Freshwater and marine aquaculture	Fishermen, buyers, restaurants, etc. - all those involved in the catching, handling and selling of seafood.
Development of new culture techniques	To expand and diversify the culture techniques and species capable of being produced by Welsh aquaculture. Socio-economic, environmental, handling, marketing and processing must be considered.	Marine and freshwater aquaculture	Processors and buyers. The local community may benefit from increased employment opportunities.
Culture of different species using existing culture technology	To expand and diversify the species capable of being produced by Welsh aquaculture. Socio-economic, environmental, handling, marketing and processing must be considered	Marine and freshwater aquaculture	Processors and buyers. The local community may benefit from increased employment opportunities.
Formation of industry representative bodies	Provide a point of contact for the industry that is geared towards the specific needs of Welsh aquaculture. Point of contact for organisations outside the industry. Provide continuity of representation and allow more industry participation in decision making process.	Marine and freshwater aquaculture	Fish buyers, processors, restaurants, etc. - all those involved in the culture, handling and selling of seafood by providing a recognised point of contact the industry. This also benefits local and national government and any organisations outside the industry such as CCW, WDA, etc. that may wish to consult with the industry.
Processing			
Start-up grants	To encourage the practice of adding value within Wales by providing assistance to those wishing to enter the industry in Wales by providing grants for premises, equipment, training etc.	Processing industry	Fishermen, aquaculturists, fish buyers by providing extra demand for local product. The wider community benefits from increased employment opportunities.

Safety / training grants	To assist the industry in meeting safety equipment and training standards and environmental standards. Such standards are especially important in the food production industry and the attainment of high standards can be used as a promotional tool.	Processing industry	Promotion of high standards raises the profile of the industry and builds consumer confidence and a good reputation for Welsh produce, benefiting the whole fishing and food industries.
Diversification grants	To encourage a wider range of products produced in Wales by assisting individuals / businesses to explore new markets.	Processing industry	Diversification can lead to expansion, benefiting the community by increasing employment opportunities. The fishing and aquaculture industries may benefit from increased demand for species not previously used by processors.
Development and expansion of processing companies	To encourage the practice of adding value within Wales by providing assistance to those wishing to enter the in Wales or to expand existing processing companies by providing grants for premises, equipment, training etc.	Processing industry	Fishermen, aquaculturists, fish buyers by providing extra demand for local product. The wider community benefits from increased employment opportunities.
Promotion of product from well-managed fisheries	Encourage processors to source product from sustainably managed fisheries and "green" aquaculture sites through the use of advertising and marketing.	Processing industry	Highlights Wales as a "green" producer and raises the profile of Welsh fish and shellfish.
Promotion of Welsh fish	Raise awareness of Wales as a high quality fish producing area through the use of publicity campaigns, trade fairs, fishing galas, develop a Wales quality brand for the sector.	Processing industry	Fishermen, buyers, restaurants, etc. - all those involved in the catching, handling and selling of seafood.
Formation of industry representative bodies	Provide a point of contact for the industry that is geared towards the specific needs of Welsh processing. Point of contact for organisations outside the industry. Provide continuity of representation.	Processing industry	All those involved in the culture, handling and selling of seafood by providing a recognised point of contact the industry. This also benefits local and national government and any organisations outside the industry such as CCW, WDA, etc. that may wish to consult with the industry.