The Crustacean Fisheries of Inner Galway Bay

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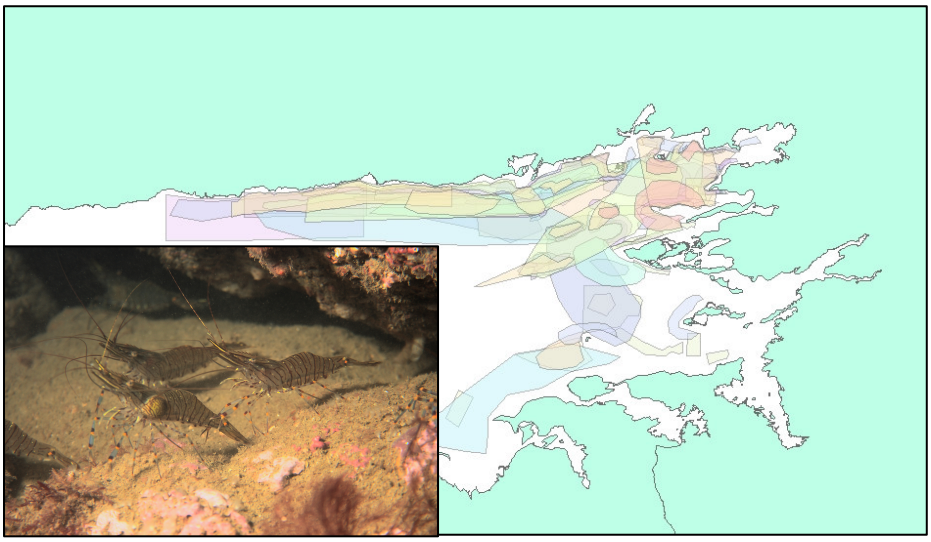


(Shrimp, Palaemon serratus, in its natural habitat off the north shore of Tawin Island, Galway Bay; the shrimp in the foreground is parasitized by a Bopyrid isopod (picture by Jonathan White) and shrimp fishing 'territories' in Galway Bay in the background)

(A report to the Galway Bay Inshore Fishermen's Association, GBIFA)

May 2010

Contents

Background

Commercial sea fisheries have operated in Galway Bay for over 200 years. Over the past 30 years the profile of fishing activity in the Bay has switched from pelagic, demersal, oyster and salmon fisheries to pot fisheries for crustaceans and a limited fishery for clams and scallops. This switch coincided with a decline in whitefish and oyster stocks in the Bay, closure of the salmon fishery in 2006 and the development of a commercial shrimp fishery in the early 1970s.

Today there are approximately 26 boats fishing in the Bay. They rely almost exclusively on shrimp, lobster and velvet crab stocks. Smaller volumes of spider crab and brown crab are landed and one or two vessels may fish scallops and clams using dredges.

Today the inner Galway Bay crustacean fisheries face a number of pressures, constraints and threats

- A large proportion of the fishing ground has been designated as a Special Area of Conservation (SAC) and a Special Protection area for Birds under the EU Habitats and Birds Directives respectively
- The proposed development of the docks area of Galway City may lead to some loss of shrimp fishing grounds
- Market prices for shrimp and lobster have declined in recent years
- Poor management of the fishery exposes fishermen to
    - Increased competition internally between vessels for fishing grounds
    - Risk of influx of new operators into the fishery
    - The risk of recruitment failure in the shrimp stock. Although there is no evidence of recent recruitment failure uncontrolled fishing effort on this stock is a high risk strategy.

The Galway Bay Inshore Fishermen's Association

The Galway Bay Inshore Fishermen's Association (GBIFA) was founded in early 2010, by the fishermen, with the immediate objective of obtaining the collective view of its members on the pressures and threats that the fisheries were experiencing and to identify how these pressures might best be resolved. Following meetings between the Association and the Marine Institute and BIM terms of reference, describing a workplan for 2010, were drawn up;

1. Issues relevant to the members in 2010 are
    - the docks development
    - designation of the area as an SAC and SPA
    - management of fisheries for the benefits of members
    - improving the market prices for fish landed by the members

2. The Association, with the assistance of BIM and MI, will develop a profile of the fishing activities of its members so that an economic and social value can be put on the fishery that can be used as a basis for developing positions in relation to the issues in 1 above (this is the subject of this report)

3. The Association will work progressively towards development of a fishery plan that will be of benefit to the members and which will assist the Association in complying with Article 6 of the Habitats Directive. The plan will also consider how the balance of fishing costs, catch rate and market price can be optimised for the benefit of the members

4. The Association will seek funding, where available, to strengthen its capacity particularly in the area of marketing

This report quantifies the economic and social value of the fishery, maps the location of each of the fisheries in detail and describes the collective views of all fishermen operating in the Bay on the main issues currently facing the fishery and how these issues can be resolved. The report provides information to the members of GBIFA necessary for the resolution of issues they identify and is also important preparatory work for any fishery management plan(s) that may be developed for the fishery by the Association in the future.

The Inner Galway Bay Area

The Inner Bay, inside the Black Head to Spiddal line is 216km^2 in extent (Figure 1). The area of ground suitable for crustacean pot fisheries is, however, much less than this as these fisheries are confined to shallow water areas (generally less than 20m in depth) along the northern, southern and in particular the eastern shores of the Bay. The seabed in these shallow areas consists of mud, sand, cobble and reefs.

Residual currents in the Bay are westward in direction along the north shore driven by the surface flow of water from the River Corrib and eastwards on the south west area of the Bay. A number of smaller rivers drain into the Bay on its eastern shores. The eastern and southeastern shores have in the past supported major oyster fisheries.

The sub-tidal portion of the inner Galway Bay SAC occupies an area of 81km^2 or 37% of the inner Bay area and the SPA occupies an area of 75 km^2 or 35% of the inner Bay. The SAC and SPA overlap and essentially occupy the same area of the Bay.

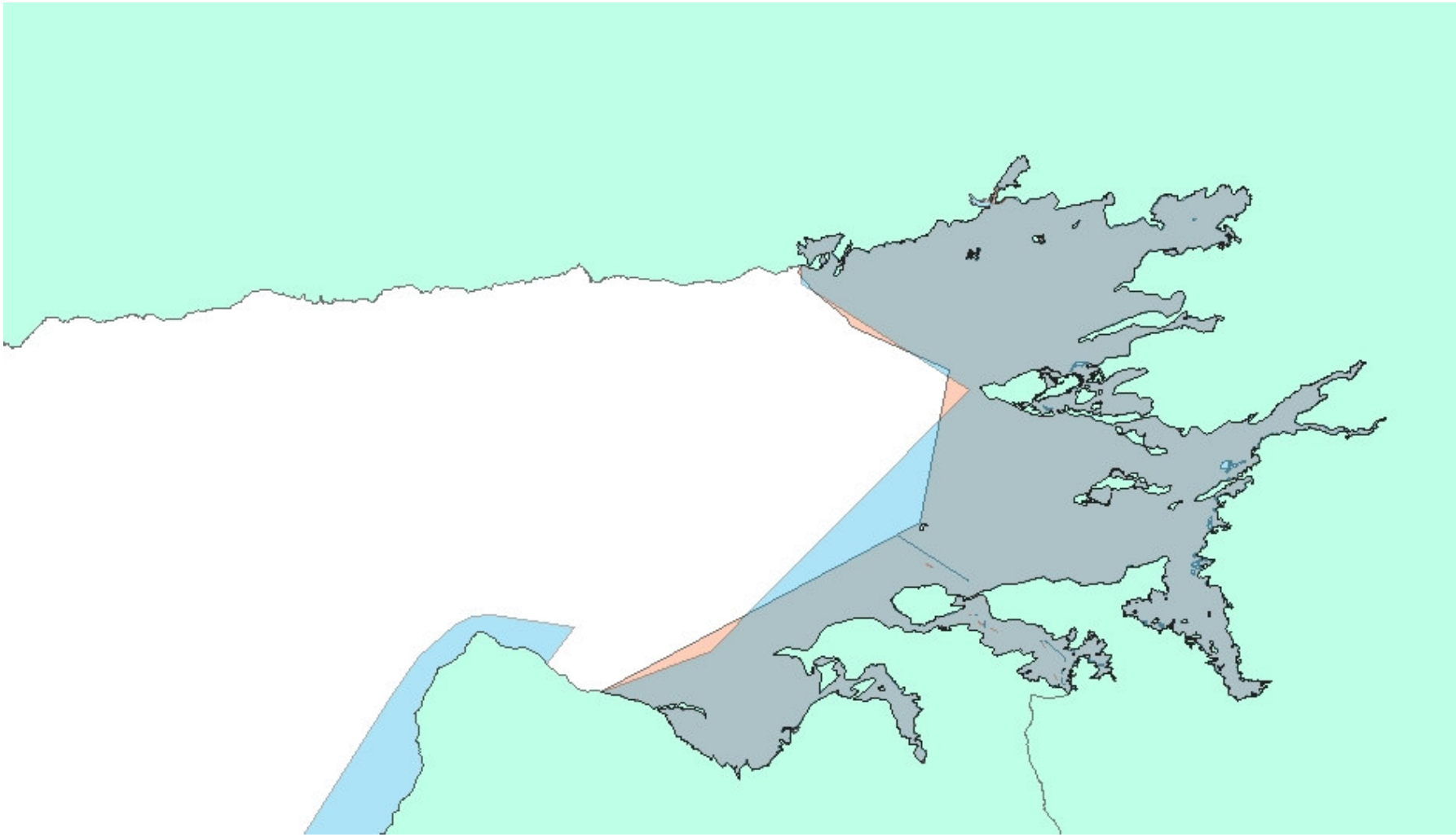


Figure 1. Inner Galway Bay (defined here as the area east of a line connecting Black Head in the south to Spiddal in the north) showing the Special Area of Conservation (blue) and Special Protection Area for birds (brown) and areas where the SAC and SPA overlap (grey).

Legislation governing the lobster, shrimp and velvet crab fishery in Galway Bay

Existing legislation impinging on the crustacean fisheries in the Bay include regulations on minimum landing sizes, a prohibition on landing lobsters with v-notched or damaged tails and a closed season for shrimp (May-August).

All commercial vessels must be licenced in the polyvalent or potting segment of the national fleet.

In addition the EU Habitats and Birds Directives require the fishery does not impact on the long term integrity of the habitats and species, including birds, of the inner part of the Bay which is designated under these directives. SI 346/2009 enables the planning of fisheries within or close to such designated sites with the objective of ensuring these fisheries are compliant with the Directives (Table 1)

Table 1. Legislation impinging on crustacean fisheries in Galway Bay

Legislation	Purpose	Effect
Closed season for shrimp (235/2006)	To prohibit fishing for shrimp during the closed season to allow juvenile shrimp to grow	No fishing during May, June or July
Minimum landing size of lobster (850/98/EC)	Prohibit the landing of small lobsters and to prevent growth overfishing	Lobsters less than 87mm carapace length cannot be landed
V-notched lobsters (234/2006)	Prohibit the landing of lobsters with v-notched or damaged tails	Lobsters with v-notch marks or other damage to the tail fan must not be landed
The Habitats Directive (92/43/EEC) European Union (Natural Habitats) regulations S.I. 94/1997 European Union (Natural Habitats) amendment regulations S.I. 233/1998 European Union (Natural Habitats) amendment regulations S.I. 378/2005	To protect the conservation status of particular habitats and flora and fauna in Special Areas of Conservation (SAC) designated under the Directive	The impact of fisheries on the habitats or species in the SAC must be assessed through appropriate assessment. Fishing activity must not have long term impacts on the habitats or species within the SAC
The Birds Directive (79/409/EEC) S.I. 94/1997	To protect the conservation status of bird species, their critical habitats and their populations in Special Protection Areas (SPAs)	The impact of fisheries on bird populations in the SPA must be assessed through appropriate assessment. Fishing activity must not have long term impacts on bird habitats or species within the SPA
European Union (Habitats and Birds), Sea-Fisheries) Regulations 2009 , S.I. 346/2009	To enable planning and management of fisheries with respect to their impact on the environment where such fisheries occur within SACs or SPAs (collectively Natura sites) designated by the Habitats and Birds Directives.	Fisheries activities where they occur wholly or partially within SACs or SPAs and for the purpose of assessing their impact on the conservation status of those areas may be subject to fishery plans. Vessels operating under such plans may come under additional regulation as outlined in a Natura Declaration and may be required to hold a Natura Permit to operate in such a fishery.

Methods

To obtain information on the fishery a questionnaire was developed (Annex I) and its contents agreed with the fishermen prior to undertaking any data collection. The questionnaires were completed by face to face interviews with fishermen. These interviews, completed during April and May 2010, were therefore partially structured by the questionnaire but in addition it was possible to construct a collective narrative from the conversations with fishermen which provided information on issues relevant to the future management of the fishery. Twenty six interviews were completed which involved all vessel owners fishing crustaceans in the Bay.

Profile of the fishery

Vessels and capital investment

Twenty six potting vessels are or have recently operated in the Bay (Table 2). These are small vessels all below 11 GTs and mostly below 7 GTs. Fourteen are open vessels and 12 are decked or half decked. The total fleet capacity is 97GTs and 865kws. The ratio of kws to GTs is 8.5Kws per GT of vessel (Figure 2). Sixteen of the vessels have GPS and 20 have sounders. The total number of operators (skippers and crew) is 45 and an average of 1.8 operators per vessel.

Capital invested in fishing boats may be in the region of €1million using an average vessel purchase price of €10,000 per GT (based on national statistics from the BIM sentinel vessel data). Capital invested in 6350 shrimp pots and 2400 lobster pots, which is a minimum estimate of the number of pots in the Bay, is at least €290,000. The number of pots in the bay is, however, higher than this.

Capital invested in GTs and KWs, based on 2009 prices and omitting vessels with pot only licences, which are not transferable, did not require investment and have no asset value, is €412,000.

Total investment in capital is, therefore, in the region of €1.7million

Table 2. Profile of vessels in inner Galway Bay

	Quantity
Open vessels	14
Half deck	4
Decked	8
Total GTs	96.8
Total Kws	865.7
Have GPS	16
Do not have GPS	10
Have sounder	20
Do not have sounder	6
Total crew	45.5

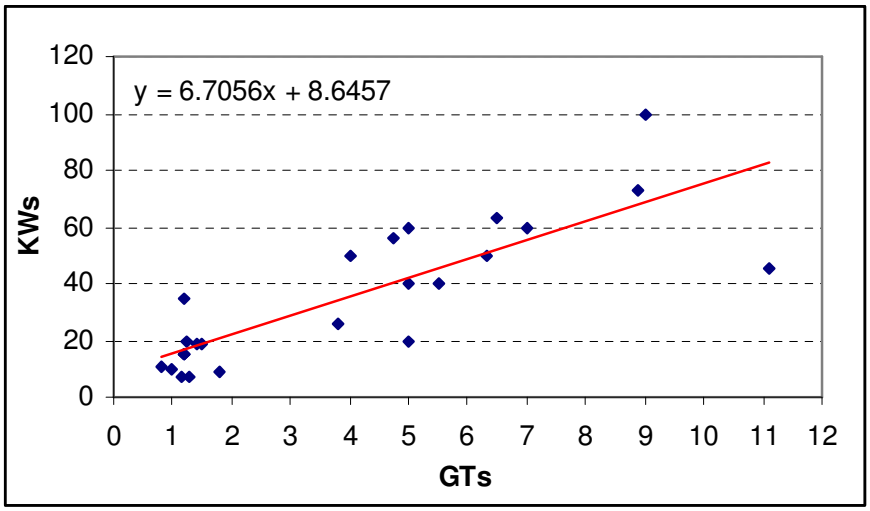


Figure 2. Relationship between GTs and KWs in the inner Galway Bay fleet.

Skippers and crew

The current operators are highly experienced fishermen. They have an average experience of 27 years in fishing. A number of them were responsible for the initial development of the shrimp fishery in the 1970s and still continue in the fishery today.

All recent entrants to the crustacean fishery, of which there are few, come from families who have strong tradition in the fishery or from other fisheries in the outer Bay (Figure 3). Twenty of the 26 fishermen interviewed have been fishing in Galway Bay for over 20 years although they may previously have fished other species such as salmon, oyster and whitefish. Nevertheless, since 1990 there has been a significant increase in the number of vessels targeting shrimp, as shown below, as opportunities in other fisheries declined and as fishermen in the lobster fishery expanded into shrimp.

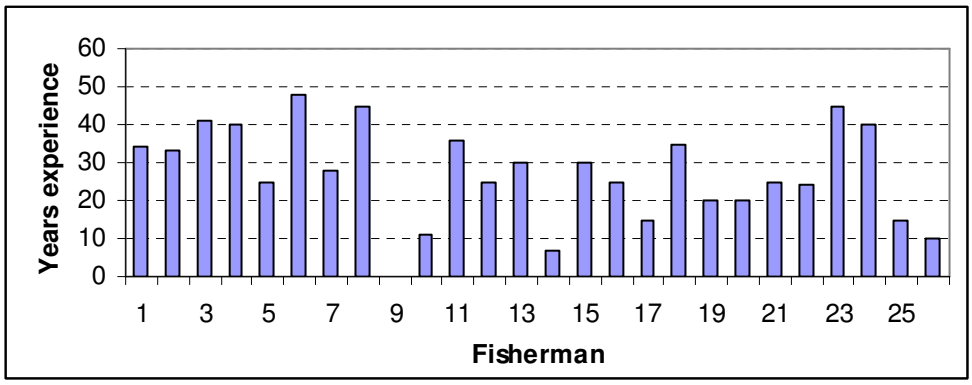


Figure 3. Profile of fishing experience of fishermen in Galway Bay

Landings, value and earnings

Annual landings (tonnes) of shrimp, lobster and velvets in the period 2005-2010 averaged 46, 18 and 42 tonnes respectively (Table 3). These landings had a cumulative value of €0.98million. The annual value of the landings from the inner Galway Bay fishery is, therefore, about €1million when spider, brown crab and prawns are included. These values are based on financial data or volume of landings data obtained during interview and subsequently converted to value, using unit values of €12, €14 and €2.5 per kg for lobster, shrimp and velvet crab respectively.

Official landings statistics for shrimp in county Galway, including Galway Bay, Connemara and smaller shrimp fisheries in Cleggan and Ballinakill in 2008 was 45 tonnes. The data from the questionnaires suggest that the official data underestimate the landings by at least 50%.

Table 3. Annual volume and value of landings of shrimp, lobster and velvet crab from inner Galway Bay.

	Volume (tonnes)	Value
Shrimp	45.8	€540,000
Lobster	18.3	€331,000
Velvets	42.4	€106,000
Total	**106.5**	**€977,000**

Effort and earnings

The annual value of the landings for a vessel is generally positively correlated with the number of days fished by the vessel. Annual value of the landings of vessels fishing around 50 days per year is approximately €20,000. However, earnings by vessels fishing between 100-150 days per annum vary between €15,000 and €80,000. The value of the landings of vessels fishing over 250 days is between €80,000 and €100,000 (Figure 4). The relationship between days at sea and annual value of the landings suggests average gross earnings per vessel per day of €307.

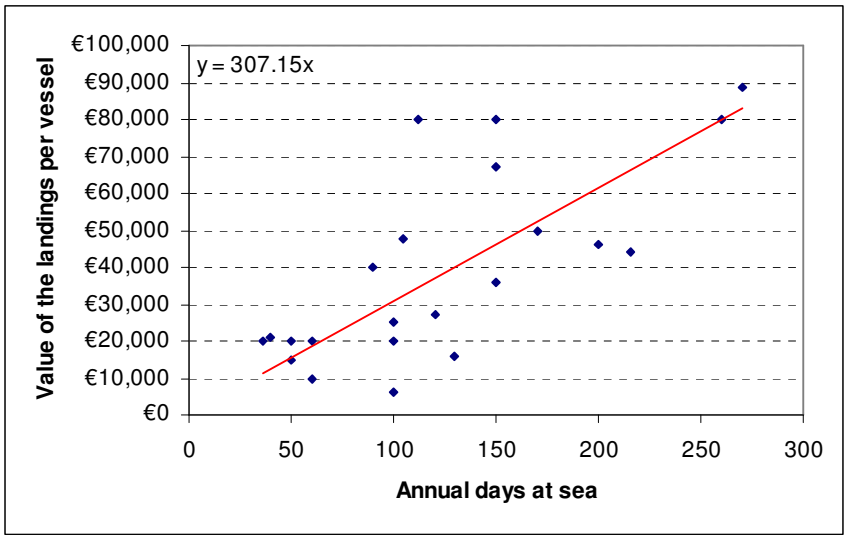


Figure 4. Relationship between the annual value of the landings of a vessel and the annual number of days fished by the vessel.

The number of crew per vessel varies from 1-3. The earnings per fisherman (assuming equal share between crew and skipper/owner) per day, obtained by dividing the annual earnings by the product of the days at sea and the number of crew, ranges from €100-500 but is generally between €100-250 and averages €203 per man per day (Figure 5). Fishermen operating on vessels with high annual effort (and which generally have 2-3 crew) do not earn more per day than fishermen fishing solo and who may fish for less than 100 days. However, annual income per fisherman is related to the number of days the vessel operates (Figure 6).

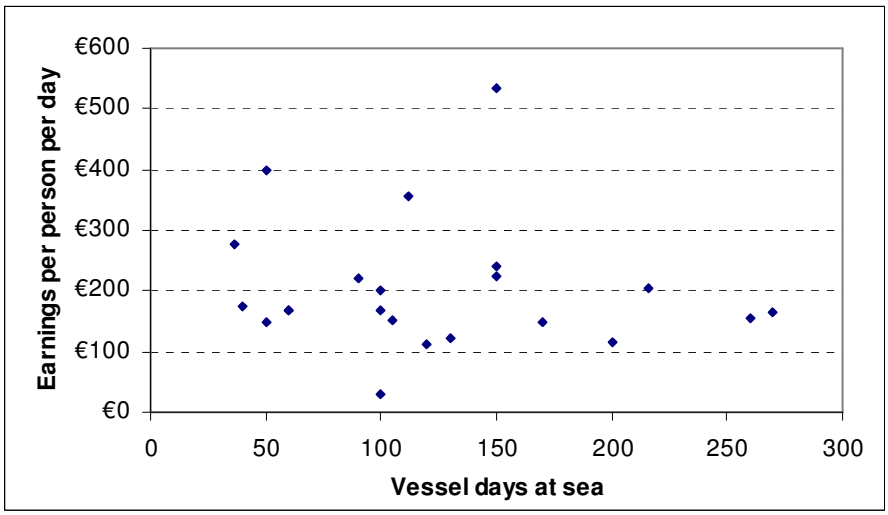


Figure 5. Relationship between the earnings per fisherman per day and the annual number of days fished by the vessel.

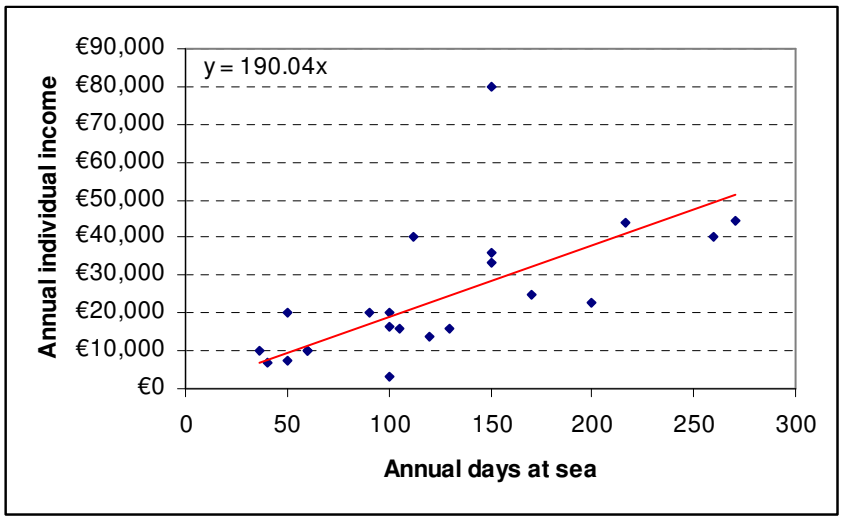


Figure 6. Annual income per fishermen in relation to annual days fished

Fishing activity

Annual activity

The lobster and velvet crab fisheries are open year round. The shrimp fishery is closed during May, June and July.

The fleet is active throughout the year and particularly during the period August to January in the shrimp fishery. The number of days fished per year and the number of months during which a vessel is active has declined consistently since 1990. In recent years (2005-2010), on average, a vessel may operate for 8.5 months and fish for 118 days per year and fish for 8.6 hours per day. In the periods 1990-1995 the number of days fished per year averaged 191 and 11.1 months (Table 4).

Although the shrimp fishing season legally extends from August 1st to May 1st only 2 vessels reported fishing shrimp later than the end of February. Fishing for shrimp ceases towards the end of February for different reasons however; in some areas the abundance of large shrimp is low and the catches are dominated by very small shrimp. In other areas berried females pre-dominate and some fishermen stop fishing when this occurs.

Eight of the vessels fish for 1 species (shrimp) only. Ten vessels target 3 (lobster, shrimp, velvets) species. Some vessels also catch spider crab, brown crab and prawns.

Eighteen of 26 boat owners were previously active in the salmon, whitefish or gillnet fisheries but are now reliant solely on crustaceans.

Table 4. Activity profile of Galway Bay vessels in the period 1990-2010

Time period	Daily hours	Days per year	Months fished per year	Number of crustacean species targeted
1990-1995	9.18	191	11.10	2.55
1995-2000	9.13	158	10.33	2.31
2000-2005	8.75	127	9.21	2.20
2005-2010	8.58	118	8.57	2.33

Fishing effort

Shrimp

The average number of pot hauls per vessel per day in the shrimp fishery in the period 2005-2010 ranged from 120-500 pots per boat per day. The average number of pots hauled per vessel per day has been relatively stable since 1990 increasing from 250 in 1990-1995 to 289 in the period 2005-2010 (Table 5, Figure 7).

The potential total number of pot hauls per day in the shrimp fishery (i.e. if all vessels fished on the same day) has increased significantly during the period 1990-2010 from 2540 pots per day for the fleet in the period 1990-1995 to 6350 in the period 2005-2010.

Average gear set time or soak time has remained stable at between 3.3 and 3.8 days.

The number of pots owned by skippers ranges from 150-1000. A total figure for the number of pots owned by the fleet has not been estimated but it is greater than 6350 (which is the number of pot hauls that can be hauled by the fleet in a day). This figure was estimated directly from the questionnaire data.

Almost all shrimp fishermen use herring to bait shrimp pots.

Lobster
The average number of pot hauls per vessel per day in the lobster fishery in the period 2005-2010 ranged from 60-300 pots per boat per day. The average number of pots hauled per day remained relatively stable at 160-174 pots during the period 1990-2010 (Table 5, Figure 7).

The potential total number of pot hauls in the lobster/velvet crab fishery increased from 1595 during the period 1990-1995 to 2785 during the period 2000-2005 and then declined to 2400 pots during the period 2005-2010 mainly due to a small decline in the number of vessels participating in the fishery in recent years. There has been a significant increase in lobster gear soak time from 3.1 days in 1990-1995 to 4.6 days in 1995-2000.

Most lobster fishermen use fish offal to bait pots. Three of the 26 operators catch their own bait.

Table 5. Average number of pot hauls per vessel per day and total pot hauls of all vessels per day in the shrimp and lobster/velvet fishery between 1990-2010.

Shrimp	1990-1995	1995-2000	2000-2005	2005-2010
Average pots per day	254	260	271	289
Total pots per day	2540	4155	5150	6350
Number of boats	10	16	19	22
Average soak time (days)	3.8	3.3	3.4	3.8
Lobster/Velvets				
Average pots per day	160	170	174	171
Total pots per day	1595	2205	2785	2400
Number of boats	10	13	16	14
Average soak time (days)	3.1	3.2	3.7	4.6

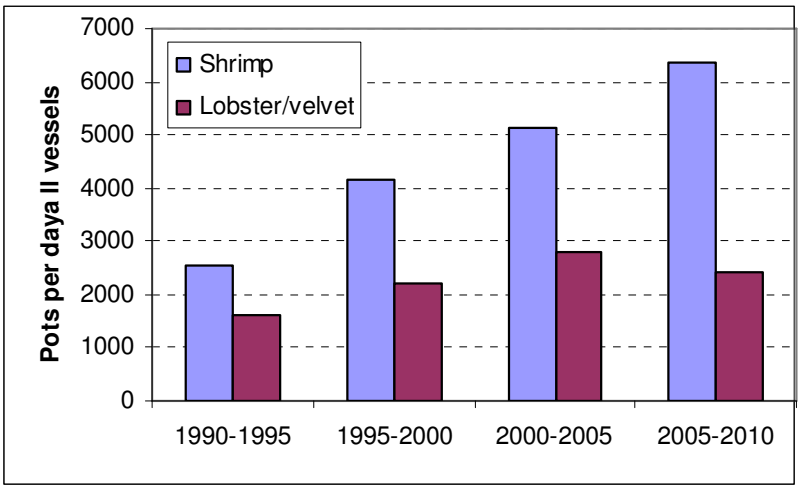


Figure 7. Total number of pots hauls per day in the shrimp and lobster fleet in Galway Bay in the period 1990-2010.

Individual vessel fishing grounds

During interview each fisherman was asked to identify the areas in the Bay where they fish for shrimp, lobster and velvet crab. This was done either by drawing the areas as shape files in a geographic information system (GIS) using the guidance of the fisherman or drawing in the areas on hard copy maps and later transferring these areas to the GIS.

The result of the mapping of fishing locations shows the overall distribution of fishing activity on each species and also the overlap of individual vessel fishing areas.

The total area of the shrimp fishery is 108km^2 and is concentrated on the north and east shores of the Bay with less intensive activity on the south shore (Figure 8). The individual fishing grounds of the vessels overlap in all areas to the extent that the individual areas cannot be said to be 'territories' as such. There are few, if any, agreed borders or demarcation lines between vessels on the north and east coasts of the Bay. However, there is limited cross over between vessels on the north, south and east shores although vessels operating out of Galway fish both to the south and to the west and there is generally more 'crowding' in the north east corner of the Bay.

Some vessels are precise about where pots are placed and have discrete areas which may be used at different times of year or depending on weather conditions. For others the areas described are larger and less focused on particular sub-sea features or depth contours. Fishing occurs both on soft and weed covered hard ground. Typically larger and older shrimp are found on harder ground.

Not all the areas are used all the time. Gear is moved to relatively deeper water later in the season, as shrimp move into offshore to overwintering grounds or in bad weather.

The total area of the lobster fishery is 99 km^2 and is concentrated on northern, eastern and southern shores. A lot of targeted lobster fishing is concentrated around sub-sea

reefs and ledges and on rough ground. There is, however, a lot of overlap with the shrimp fishery.

The intensive overlap in fishing areas between vessels and the high levels of fishing effort (pots) suggests that there is a high level of competition for good fishing ground. However, most fishermen consider that the grounds they fish (and have access to) is good ground for the particular species that they may be targeting i.e. they have not been excluded from good ground (Table 6). Fishermen fishing on poor ground for a particular species do so because that is the nature of the ground they have always fished or it's close to their home pier. For instance the poorest ground for shrimp is on the south shore of the Bay but these fishermen do not fish on the east or north shores. Lobster fishermen fishing poor or limited ground on the north shore do not fish on the south shore.

Table 6. Number of fishermen who consider that the grounds they target for each species is good, average or poor

	Shrimp	Lobster	Velvets
Good	9	8	8
Average	3	3	1
Poor	3	1	2

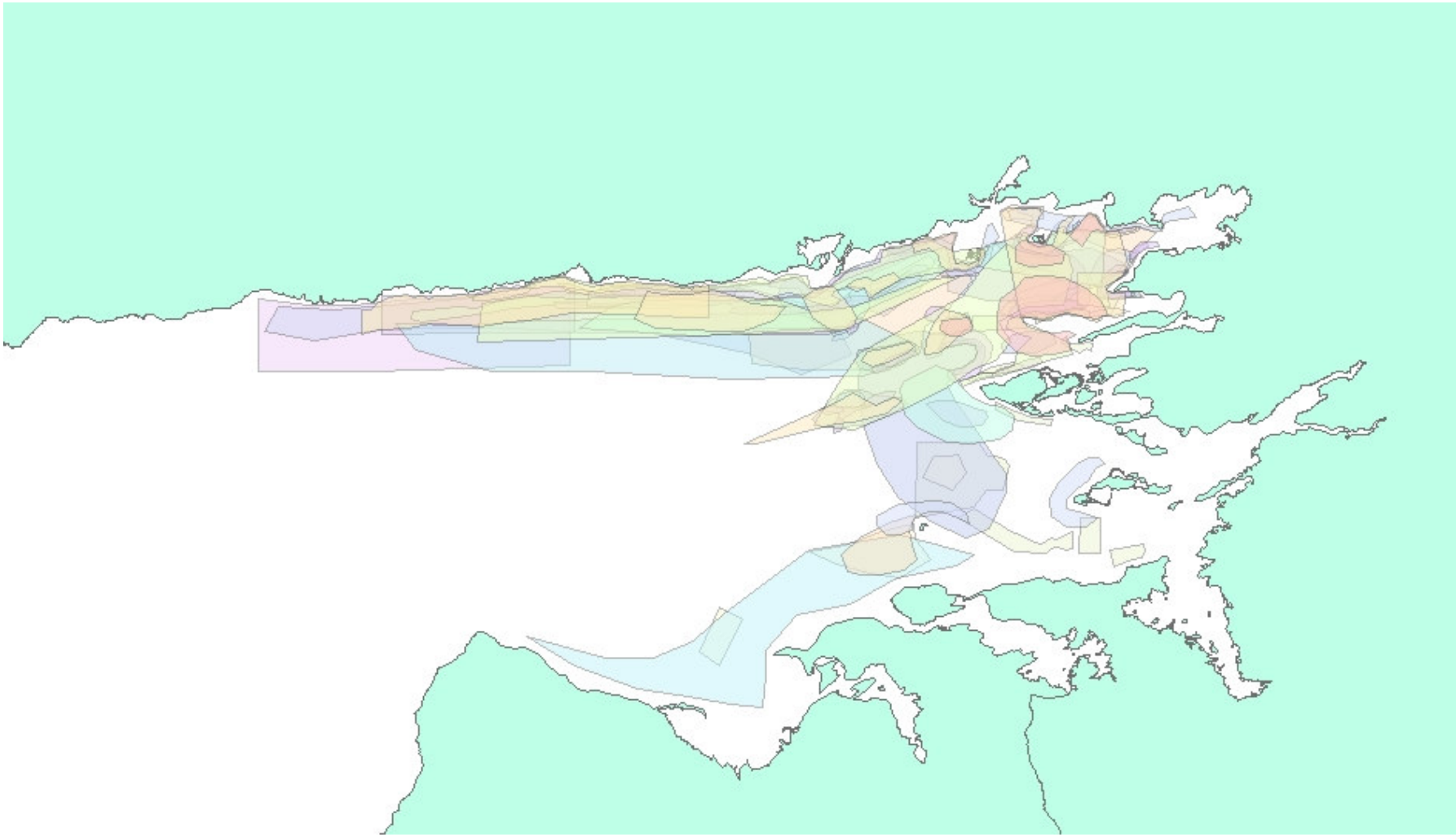


Figure 8. Individual vessel shrimp fishing areas shown as partially transparent superimposed layers.

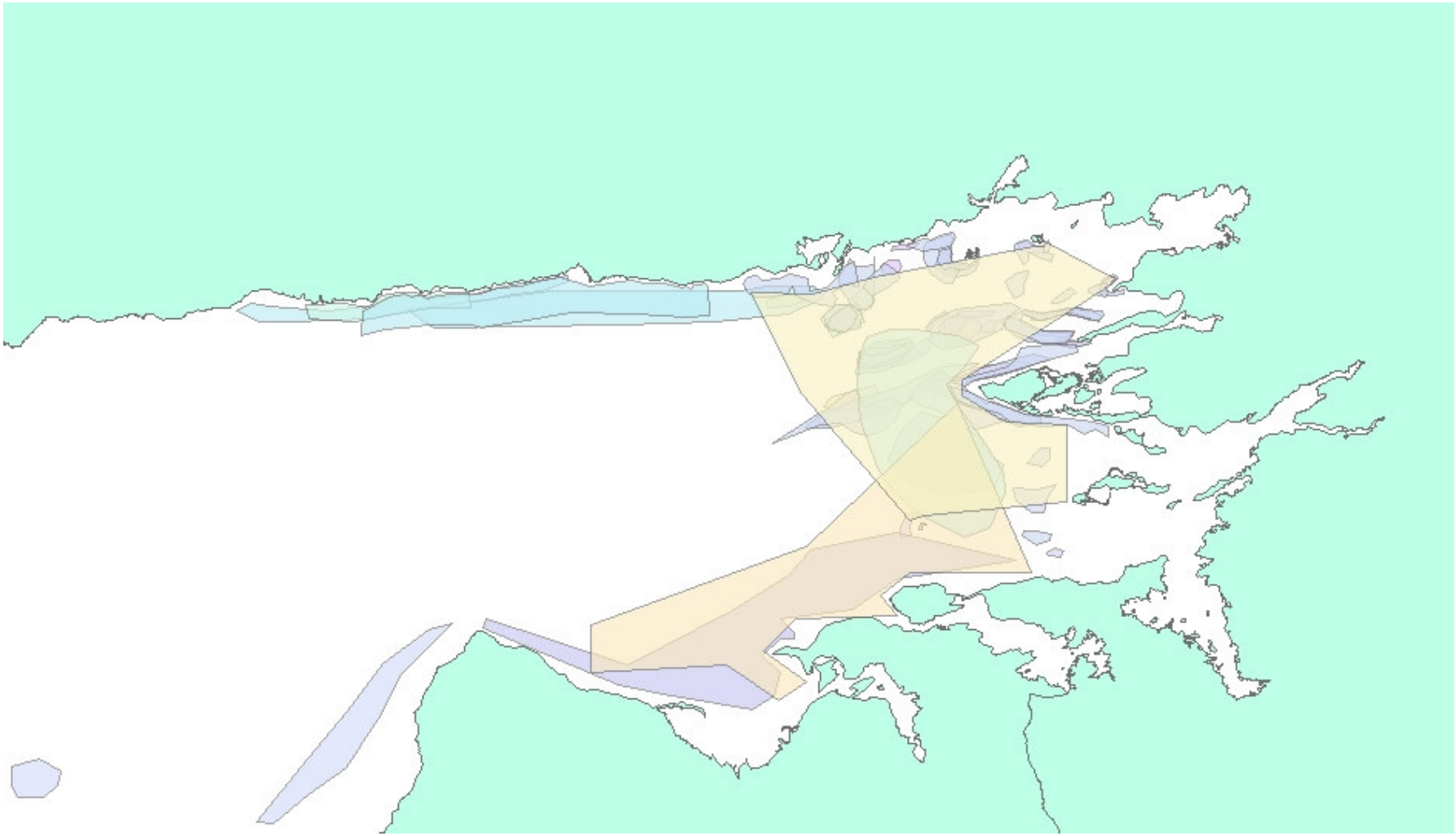


Figure 9 Individual vessel lobster/velvet crab fishing areas shown as partially transparent superimposed layers

Views on the economic performance and management of the shrimp, lobster and velvet crab fisheries

Potential for improvement

Market price, costs and catch per unit of effort determine the net profit per effort. Twenty of 23 fishermen, when asked to rank the potential for improvement in market price, cost reduction or catch rate, indicated the biggest room for improvement was in the market price. No fishermen put cost reduction as the first priority in order to improve net profit. Fifty percent put improvement in catch rate as first or second priority (Table 7).

Table 7. Views expressed by fishermen on the need and potential for improvement in market, fishing costs and catch rate.

Potential for improvement	Market	Costs	Catch rate
First	**20**	0	3
Second	2	**12**	8
Third	1	10	**11**
Total responses	23	22	22

Twelve of 23 fishermen said that fishing was not profitable every day they fished i.e the costs were greater than the value of the fish caught on certain days. These fishermen were all referring to the lobster fishery. Shrimp fishing was regarded as profitable every day. Lobster fishing may not be profitable early in the year in particular.

Issues and solutions identified in the shrimp fishery

The stock

Fifty percent of fishermen interviewed suggested that the shrimp stock was stable. Twenty nine percent suggested it was declining (by about 30% for instance) while 21% said it was increasing (Table 8). These apparently conflicting views probably reflect the experiences of fishermen in different parts of the bay where ground type and shrimp abundance may vary. Some fishermen said there were good and bad years but that the introduction of grading (and live discarding) had stabilised catches and that the last poor year was 2002-2003.

Table 8. Number and percentage of fishermen who regarded the shrimp, lobster and velvet fisheries as stable, increasing or declining.

	Shrimp	Lobster	Velvet
Stable	**12**	**11**	**2**
Decline	**7**	**4**	**11**
Increase	**5**	**3**	**2**
Responses	*24*	*18*	*15*
Stable (%)	**0.50**	**0.61**	0.13
Decline (%)	0.29	0.22	**0.73**
Increase (%)	0.21	0.17	0.13

There was a very positive attitude to grading even though fishermen did not think that they were rewarded for providing graded catch to the buyers. Comments on grading included that it stabilised catches, reduced variation in catch between years, it protected the fishery, it was time consuming, it allowed time for shrimp to grow. Discard rates through the grader, which is mainly on a 9mm bar spacing, were reported as 50-60%.

Some fishermen also suggested that shrimp quality had declined; that there were fewer good quality shrimp available as the season progressed and the quality at the start of the season had fallen. Others said there was no change in shrimp quality and if you fished hard ground there were always good quality shrimp available. Others said there was a lot of small shrimp in Dec and Jan and the run of shrimp at this time was lower in recent years. Others find a lot of berried shrimp late in the season.

One fishermen gave a set of sales invoices for the period 1997-2002 (6 seasons) which showed the percentage of each grade in the landings and the price per grade (Figure 10). These data did not show any change in the percentage of each grade in the monthly catch during that time suggesting that the grade structure of shrimp in the catch was stable both during the season and between seasons in the period 1997-2002. No later data are available for comparison.

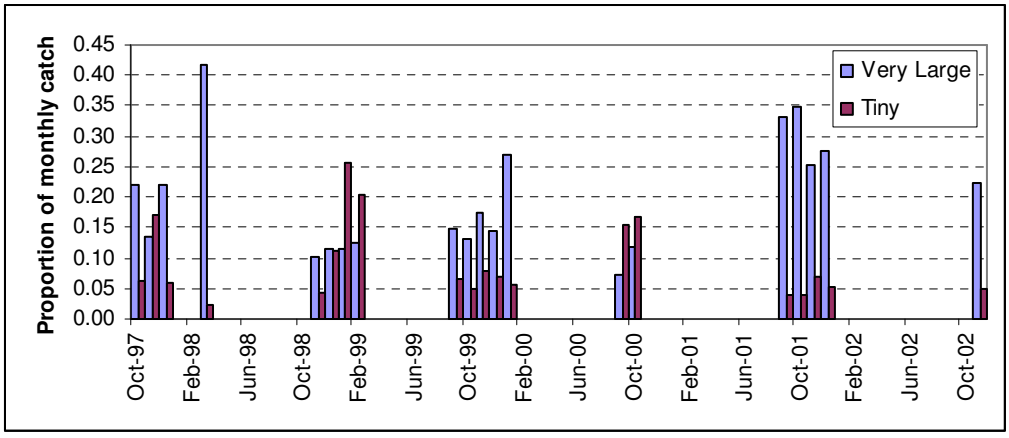


Figure 10. Percentage of 'very large' and 'tiny' commercial grades of shrimp in the monthly landings of 1 fisherman during 6 seasons from 1997-2002.

Fishing effort

Although over 70% of fishermen though that the shrimp stock was stable at least 18 of 26 fishermen indicated that there were too many pots in the Bay (Table 9). This was in response to the question "What are the 3 problems in the fishery at the moment?" or as a proposed solution to low catches rates or high costs. There were some suggestions as to how to limit pot numbers; 500-600 per boat, 500 per boat, 400 per boat, 800 per boat, 500-600 per boat, 800 per boat, 600-700 per boat. Some fishermen with high numbers of pots suggested that a limit per crew member rather than per boat would be more equitable as these vessels had higher pay costs.

The concern about pot numbers is related to access to ground, competition for ground and fishing costs. The competition for ground makes the fishery more difficult than it should be and increases the costs. It was felt by some that the gear was not being used to catch shrimp as such but in the "anticipation of catching shrimp" such that gear was left on the ground waiting for shrimp to arrive.

Seven fishermen said that the number of boats should be limited as a condition of limiting pots.

A number of fishermen thought that the season started too early. In effect few shrimp are being landed in August although gear is set. Most of the shrimp vessels fish from September to February although the open season extends from August 1st to May 1st.

Fishing costs

No quantitative data on fishing costs were requested in the questionnaire. However, bait is regarded as the highest cost for most vessels although some vessels, in the lobster and crab fisheries in particular, have high fuel bills.

Although not included in the questionnaire, information on the quantity of bait used to haul a given number of pots was obtained in conversation. This suggests that bait costs in the shrimp fishery per pot soak are about €0.2 (i.e. 20 cents to bait a pot). If daily potential effort by all boats in the shrimp fishery is 6350 pot hauls then daily bait costs for the entire shrimp fleet may be in the region of €1270 per day and may be €61,000 per season assuming a 6 month season and two hauls of all pots every week. This is about 12% of the value of the shrimp landings.

Market price

Market price was a concern to a lot of fishermen. In particular the lack of price reward for graded shrimp was disappointing to them as the amount of discarding and time required to grade the catch was significant and costly. Higher prices for graded shrimp was given by buyers after grading was first introduced in 2007 (as is evidenced from BIM logbook data at the time). Now that everybody is grading the buyers seem to be giving a flat price to everybody.

Data from 1 fishermen on prices per grade for 6 seasons between 1997-2002 showed that the market, at that time at least, demanded shrimp of different grades and that the price paid by the market was significantly higher for larger shrimps. At that time the buyers bought all shrimp and graded the catch themselves.

During 1997-2002 there were 4 grades and price increased by about €2-3 per grade but were flat during the season. Prices increased annually from 1997-2001 but fell back in the 2002-2003 season (Figure 11)

There were a number of proposed solutions to the low market prices

- collective selling to a fixed price or to the highest bidder
- bring in more buyers to increase competition for the landings
- land high quality shrimp strategically to the market

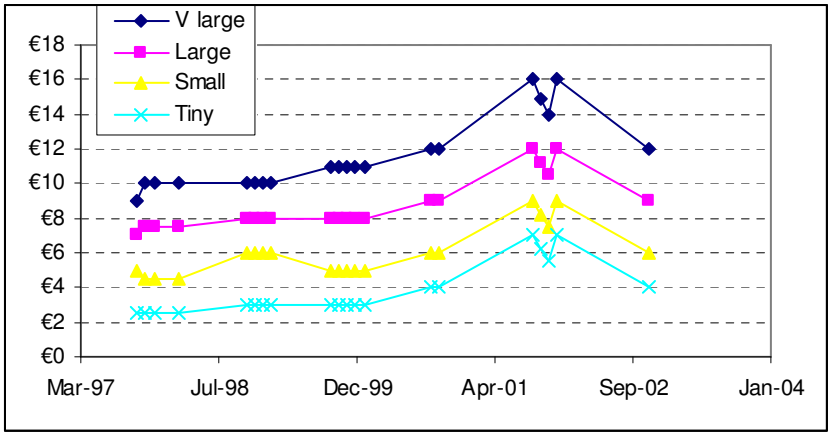


Figure 11. Price of shrimp per grade per month during the 1997-2002 period.

Table 9. Individual fishermen's comments on issues and solutions in the shrimp fishery

Issues	Solutions
Fishery officers	Remove the need for a logbook
Fishing season too long	Delay opening until September
Fishing season too long	Fish from September to January
Fishing season too long	
Fishing season too long	Extend the closed season
High competition for ground	Limit access and gear
High costs	Collective buying, limit gear
High costs	Increase soak time
High costs	Less gear and higher catch rate
Lack of facilities for fishermen	Organise
Low catch rate	Shorter fishing season, limit gear, grade
Low catch rate	Limit gear
Low catch rate	Extend the closed season
Low price for graded shrimp	Price should reflect the grade, agree a max count per grade
Low price for graded shrimp	Price should reflect the grade
Low prices	Sell collectively to a fixed price
Low prices	Grade the catch
Low prices	Sell collectively to a fixed price
Poor market	Collective selling
Poor market	Collective selling
Poor market	Collective selling
Quality of shrimp has declined	Reduce fishing effort, target higher quality shrimp only
Too many pots	
Too many pots	Limit entry and then control pot numbers
Too many pots	
Too many pots	
Too many pots	
Too many pots	Limit entry (full timers only) and pots
Too many pots	Limit entry and then control pot numbers
Too many pots	Limit pots
Too many pots	Limit pots
Too many pots	No extra effort
Too much effort	Limit access and gear
Too much effort	Limit access and gear, closed areas and seasons
Too much gear	

Issues and solutions identified in the lobster fishery

The stock

61% of fishermen thought that the lobster stock was stable and 17% said it was increasing. One fishermen commented on the remarkable consistency in the annual average size of lobsters over the past 10 years (at 1.3lbs) and there were still some large lobsters of 4-5lbs in the catch. On the north shore there are a lot of small lobsters on the ground but this does not necessarily translate into higher catches in the following year or years. One fishermen on the north shore suggested that the catch rate has declined by 40% in the past 10 years. On the south shore there may have been a small decline recently.

V-notching was regarded as a very positive measure. A number of fishermen notch and release lobsters voluntarily. Others notch berried females and do not land berried females at all. Some felt that v-notching should be a mandatory part of the licence.

Some fishermen supported additional technical measures, such as raising the minimum size to 90mm, so that catch rates could be improved.

Fishing effort

Many fishermen also felt that there were too many pots in the lobster fishery and that catch rates were low. Some fishermen fish single pots rather than strings. On the north shore in particular some fishermen said that gear competition was an issue i.e. strings of pots set in deeper water affected catches in shallow water.

Fishing costs

The cost of bait was regarded as high and collective buying of bait proposed as a solution.

Market price

The decline in market price of lobsters was of concern to all fishermen who fished lobsters. The proposed solutions to this were to increase competition among the buyers but also to fish more strategically for the market (suggesting that there would be limited fishing when the market was poor), and to engage in market research and product development (Table 10).

In the lobster fishery, more so than the shrimp fishery, the link between price, fishing costs and fishing effort was more apparent in the questionnaire returns. In the lobster fishery it was thought that fishing costs could be reduced by fishing less and fishing when market conditions were strong. This idea was supported by the responses indicating that the fishery is not profitable all the time. Some suggested that a closed season be introduced.

Table 10 Individual fishermen's comments on issues and solutions in the lobster fishery

Issues	Solutions
Competition for ground	Limit gear
Competition for ground	limit pots,
Decline in price	Fish strategially for the market
Fishing all year round	Fish strategically for the market
High costs	No solution proposed but cutting effort not feasible as income will drop
High costs	Fish strategically for the market, less effort more price
High costs	Limit effort, buy bait in bulk
High costs	collective buying
High costs	Bait: use discards
Low catch rate	More technical measures
Low catch rate	More v-notching no landing of berried lobsters
Low price	sell collectively to an agreed price
Poor access to market	Go for higher volume and lower price if necessary
Poor prices	Product development and market research
Poor prices	get more buyers in, increase market outlets
Poor prices	get in more buyers,
Too many pots	Pot limit (throughout the Bay), mark gear, remove unmarked gear, limit entry
Too many pots	Limit entry (full timers only) and pots
Too many pots	Limit entry and pots per boat, limit part-timers
Too many pots	Limit pots, limit boats but allow transfer to family members
Too much effort	Closed seasons all species, increase minimum size to 90mm
Too much gear reducing catch rate	Limit gear, increase v-notching
Undersized fish being landed	

Issues and solutions identified in the velvet crab fishery

The stock

Although some fishermen target velvet crab most fishermen regard it as a by-catch in the lobster fishery. 73% of fishermen suggested that the fishery had declined in the past 10 years. This decline was in both numbers and size (quality). However, some fishermen in the north and south shores suggested that the size structure of velvets was stable.

Fishing effort

There was some support for a closed season and for introduction of a minimum size. Grading is time consuming especially in areas where quality is poor. The use of escape hatches and a minimum landing size had some support.

Fishing costs

No comments obtained

Market price

No comments obtained

Table 11. Individual fishermen's comments on issues and solutions in the velvet crab fishery

Issues	Solutions
Decline	Minimum size, closed season
Grading is time consuming	Minimum size
Poor quality	Escape hatches
Small velvets killed in the shrimp fishery	

Issues for further discussion by GBIFA

Based on the responses to the questionnaire and issues that arose in conversation with fishermen a number of points of discussion, and potential action can be identified.

1. A significant majority of fishermen feel that there are too many pots in the Bay. Their concern is not primarily that the stocks are depleted but that there is too much competition for ground, too much cost associated with tending gear and generally that it makes fishing more difficult than it should be.

2. The significant effort spent grading the shrimp catch is perceived to be highly beneficial to the stock but the expected increases in price has not materialised

3. The low market prices were seen by many to be due to buyer monopoly and that collective selling to a fixed price or generating a bid from a wider group of buyers would bring benefits in price. Whether such benefits can be obtained is unknown, however, and would require additional market research.

4. Fishing costs, particularly bait costs, are significant and most of the members of GBIFA seem to support the idea of collective buying of bait and perhaps other materials.

5. Fishing for lobster is not profitable at all times of the year due to a combination of low catch rates and low prices. Unfortunately periods of low price corresponds to periods of high catch and the market seems to be highly sensitive to changes in volume. As the lobster stock is 'resident' in Galway Bay and the members of GBIFA have, in effect, sole access to it a more strategic use of this resource could be envisaged which would include strategic fishing of a given quantity of lobsters for the market at certain times of year only.

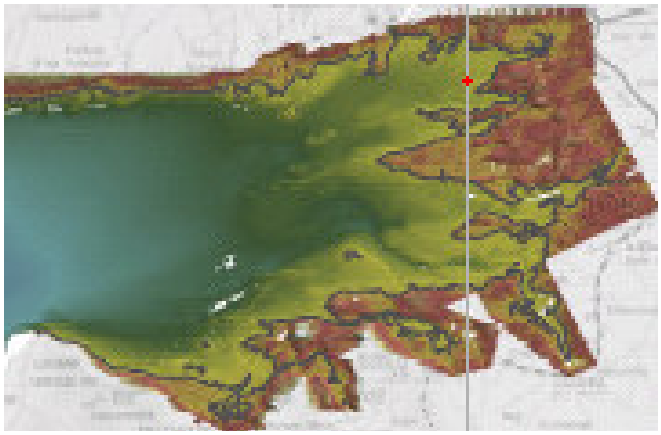
6. The majority of fishermen report that velvet crab stocks have declined. This fishery is totally unregulated with no minimum landing size or other controls. Measures to improve the quality of velvets that are landed and protection of reproductive potential are important for this stock.

7. Although most fishermen regard the shrimp stock as stable the amount of fishing effort has increased significantly in recent years. Although the response of the shrimp stock to this increase is unknown increasing effort may pose a risk to the stock. Measures that protected a proportion of the spawning stock annually would reduce the risk of recruitment variability or failure. This could include an earlier closure to the season for instance. A later start to the season would allow for a better yield early in the season as shrimp grow quickly in August and September when water temperatures are highest.

Annex I: Questionnaire

A profile of the Galway Bay Crustacean Fishery

The information requested in this questionnaire is for and on behalf of the members of the GB Inshore Fishermen's Association. The information will be used to profile and describe how the members of the GBIFA historically and currently fish for species of shrimp, lobster and crab in the bay and seeks to identify the main issues that the members of GBIFA currently see as important in securing the future sustainable development of the fishery. BIM or MI will not publish, otherwise use or distribute to third parties any of the information made available in this questionnaire without first consulting the Committee of the Association. Individuals or vessels will not be identified in any report that may be produced including reports to the Association itself.



Shaded Relief Map of inner Galway Bay (the area fished by members of the GBIFA) : source www.infomar.ie

Descriptions of the crustacean fishery in Galway Bay				
	1990-1995	1995-2000	2000-2005	2005-2010
Vessel type (open, half deck, decked etc)				
Vessel GTs and KWs				
GPS plotter installed ?				
Sounder installed ?				
Crew size				
Daily working hours				
Number of days fished per year				
Months fished				
What crustaceans did you target				
Other (non-crustacean) fisheries in which you and your vessel participated during this time				
SHRIMP pot hauls per day				
LOBSTER pot hauls per day				
VELVET pot hauls per day				
Gear soak times: SHRIMP				
Gear soak times: LOBSTER				
Gear soak times: VELVET				
Bait : shrimp, lobster, velvets				
Annual value of your landings of SHRIMP				
Annual value of your landings of LOBSTER				
Annual value of your landings of VELVETS				
Where do you fish for SHRIMP	NB: draw on the map (provided separately) the areas in which you currently fish for each species. You can also separately draw in areas			
Where do you fish for LOBSTER				

	that you used to fish if these are different to your current fishing area
Where do you fish for VELVET	
Describe the ground you fish for SHRIMP	Very good ground for shrimp Average ground for shrimp Poor ground for shrimp
Describe the ground you fish for LOBSTER	Very good ground for lobster Average ground for lobster Poor ground for lobster
Describe the ground you fish for VELVET	Very good ground for velvet Average ground for velvet Poor ground for velvet

Fisheries Management Issues in the GB Crustacean Fishery		
How many years have you been fishing in Galway Bay?		
How long has your family been fishing in Galway Bay?		
Is the performance of the SHRIMP fishery ? (envisage the trend over the past 10 years)	Stable	
	Increasing	
	Declining	
Is the performance of the LOBSTER fishery ? (envisage the trend over the past 10 years)	Stable	
	Increasing	
	Declining	
Is the performance of the VELVET fishery ? (envisage the trend over the past 10 years)	Stable	
	Increasing	
	Declining	
Describe, how in an ideal world, the crustacean fisheries in the bay would operate. You could consider issues like the market, working conditions, number of boats, catch rate, competition for ground, catch rates, costs etc.		
Describe what you consider are the 3 main problems about how the fishery operates and performs today. You could consider the same issues as above		

Economic status of the GB Crustacean Fishery	
Is fishing profitable every day you fish or are there some days in which the costs outweigh the earnings ?	
If you consider there are 3 elements which determine net profit can you indicate, in order of potential, which elements you think has potential for improvement ? 1. Catch rate , 2. Costs , 3. Market price	
If you consider that these elements can be improved how could this be brought about in each case ? Catch rate: _____ Costs: _____ Market price:	