



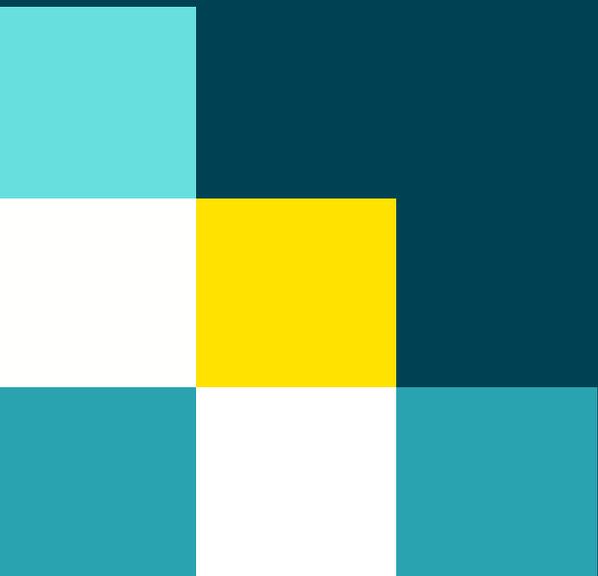
Wales Centre for Public Policy
Canolfan Polisi Cyhoeddus Cymru

Policy options for Welsh fishing opportunities

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New Economics Foundation

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Contents

Summary	1
Introduction	2
The Welsh fishing industry	3
The catching sector	3
Quota holdings	6
Economic performance	8
The Welsh policy-making context	10
Inshore fisheries management	10
Management of fishing opportunities	11
Issues within and between key institutions and organisations	11
The Well-being of Future Generations Act	13
Marine fisheries and the WFGA	14
The Environment Act (Wales) 2016	16
Welsh fisheries' powers post-Brexit	17
Setting fishing opportunities post-Brexit	17
Vessel licensing post-Brexit	17
The division of fishing opportunities between the UK and Wales post-Brexit	18
Allocating Welsh quota post-Brexit	19
Other fisheries powers post-Brexit	19
Developing fisheries objectives	20
Developing fisheries objectives in the Welsh context	20
Alignment of the fisheries objectives with the well-being goals	22

Policy options for managing Welsh fishing opportunities	26
A radical, blank canvas	29
Choosing the type of fishing opportunity	29
The allocation of fishing opportunities	33
Exchanging fishing opportunities	41
Externalities	44
Landings	46
Ownership	49
Revenue use	54
Other associated policies	59
Assessing policy options	64
Policy conditionality on a 'Brexit dividend'	68
Policy conditionality on revisiting the UK Concordat on Fisheries Management	68
Government capacity to implement fishery policies	69
Infrastructural capacity to implement fishery policies	69
Combining policies into new approaches to fisheries management	70
The way forward	75
How to deal with FQA holdings	75
Process for secondary legislation	79
Trialling new systems	79
Acting unilaterally	80
Ensuring a just transition for those negatively impacted	80
The need for consultation	81
Fisheries for the well-being of future generations	81

References	83
Annex 1	94
Map of ICES statistical areas	94
Annex 2	95
Cost and income by fleet segment	95

Summary

- This report explores the potential fishing opportunities open to Wales, building on existing research and evidence from Wales and elsewhere.
- The current size and performance of the Welsh fishing industry, as well as the policy context of the Well-being of Future Generations Act and Environment Act, all provide important context for thinking through what a successful industry fishing can look like in Wales post-Brexit.
- Attempts have been made to strengthen fisheries management, particularly at a regional level, but a fully functioning and trusted management system has yet to be put in place.
- Marine fisheries does not fall under the mandate of any public body, which can mean it is neglected when considering wellbeing objectives and implementation of the Well-being of Future Generations Act.
- A reporting mechanism to better evaluate the sector's contributions, fish stocks and type of work undertaken would be beneficial.
- While the power to allocate fishing opportunities has always rested with EU Member States (a power devolved to the Senedd and Welsh Government), this power was never used to institute any major reforms in Wales.
- This could change post-Brexit, due to a combination of the significant attention that is now focused on fisheries, the possibility for 'additional' quota to become available post-Brexit, and the ability to join up the allocation of fishing opportunities with new powers over other aspects of fisheries policy, to create a new vision for Welsh fisheries.
- Some potential options are set out in the report, focusing on the type, allocation, exchange, use and landing of fishing opportunities.
- All options have trade-offs and depend on governmental and infrastructural capacity, as well as consultation with the sector and communities. However, they provide an opportunity to consider landings, allocation, revenue and ownership in a more beneficial way.
- Despite, or perhaps because of, its small size, Wales can lead in demonstrating what fisheries managed for the well-being of future generations can look like.

Introduction

In Wales or elsewhere, marine fisheries have no comparable industry. Making a fishing business work has all the uncertainties of a farming business combined with a harsh environment about which we still know very little. Fishers have no control over their main resource and are the only significant commercial hunters. The industry operates in a global market and has become totemic during debates on the United Kingdom's exit from the European Union (EU). Marine fisheries are owned by the public but directly used by very few. Yet despite operating at the fringes of society, fishers operate in a highly regulated environment.

These fundamental characteristics make marine fisheries a unique industry and highlight the importance of defining objectives from which fisheries management can be based. Eide (2009) argues that “how utilise the natural value of a fish resource...needs to be based on expressed political objectives, preferably with clear priorities”.

Even within the shared waters of Europe, no two countries have the same fisheries management system. This includes countries within the EU where fishing opportunities (i.e., access rights granted to companies, individual fishers, and members of the public that allow them to fish commercially) are allocated has always been up to individual Member States (Carpenter and Kleinjans, 2017).

In Wales, this power is administered directly by Welsh Government. The implication is that in the context of Welsh Government's Well-being of Future Generations Act (WFGA), which defines the objectives for the government's functions, fisheries could be better managed for the people, communities and environment of Wales.

The UK's exit from the EU, and the development of a new UK Fisheries Bill (currently in the legislative process), devolves many powers over fisheries to the four UK fisheries administrations (including Welsh Government). This provides a new context in which to evaluate how the management of Welsh fisheries aligns with the WFGA. Just as important as the change in formal powers, exit from the EU and the debate surrounding it has brought a focus to fisheries policy and a new energy for change.

In February 2018, the Wales Centre for Public Policy published *Implications of Brexit for fishing opportunities in Wales* (Carpenter et al., 2018). This report explores the potential implications for fisheries policy in Wales from the UK's planned exit from the EU and the EU's Common Fisheries Policy (CFP). It includes an economic impact analysis based on modelling by the New Economics Foundation and an outline of policy options at each level of setting, sharing, and allocating fishing opportunities.

In October 2018, the Climate Change, Environment, and Rural Affairs Committee (CCERAC) of the National Assembly for Wales published *The impact of Brexit on fisheries in Wales* (CCERAC, 2018). Based on oral and written evidence as well as a stakeholder workshop, the report summarises likely impacts and offered eight recommendations for policy change.

In May 2019, Welsh Government launched a public consultation on how the marine environment should be managed after Brexit and following existing Welsh legislation. The summary of responses was published as the *Brexit and our Seas* report in August 2019 (Welsh Government, 2019a).

The present report builds on this existing evidence base by analysing the particular area of fishing opportunities in more depth and only referring to research on Brexit impacts and stakeholders already collected and reported rather than repeating these activities.

The Welsh fishing industry

The Welsh seafood sector comprises the catching sector, which generates £12 million gross value added (GVA); the fish processing sector, which generates £2.3 million GVA; and aquaculture, which generates £8.6 million GVA (Seafish, 2016, 2017 and 2018). This equates to 0.020%, 0.004%, and 0.014% of Welsh GVA, respectively, and a total of 0.030% for the seafood sector, (excluding transport and distribution, wholesale, and retail). This economic share is higher in areas of large seafood production, such as Milford Haven, Holyhead, Bangor, and Swansea. There are also significant recreational fisheries in Wales that generate an estimated £126.6 million in expenditure (Monkman et al., 2015) or £37 million GVA using a GVA-to-expenditure ratio found for England and Wales (Armstrong et al., 2013). Comparing the economic value of sectors is fraught with challenges, especially for policy-making purposes (Tinch et al., 2015).

The catching sector

In 2018, there were 440 fishing vessels registered in Wales of which 410 were <10m in length and 30 were >10m (Table 1). This share of <10m vessels (93%) and part-time employment (59%) within the national fleet is higher than any other UK nation.^{1,2}

¹ Seafish record a full-time equivalent (FTE) employment of 136 for the Welsh catching sector (Seafish, 2018), much lower than the Marine Management Organisation (MMO) figure reported here.

² A survey by Pantin et al. (2015) in Wales had 75% full-time fishers and 25% part-time, although there may be selection bias in the respondents.

Table 1: Number of vessels and fishers in each fisheries administration (2018)

Nation	Number of vessels				Number of fishers employed					
	Under 10m	%	Over 10m	%	Total	Regular	%	Part-time	%	Total
Wales	410	93%	30	7%	440	493	41%	700	59%	1,193
England	2,409	82%	514	18%	2,923	4,377	87%	680	13%	5,057
Scotland	1,527	73%	556	27%	2,083	4,032	83%	825	17%	4,857
Northern Ireland	194	58%	138	42%	332	686	80%	168	20%	854
United Kingdom	4,760	79%	1,276	21%	6,036	9,588	80%	2,373	20%	11,961

Source: Authors' calculations based on MMO 2019a.

Characterising the Welsh catching sector depends significantly on the definition used for 'Welsh fisheries' due to the significant mixing of Welsh fisheries with other nations, both within the UK and further abroad.

Nearly half of the landings from Welsh-registered vessels, predominantly squid, take place in the Falkland Islands (42% by weight and 45% by value). Welsh-registered vessels also land a significant amount in Ireland and Spain, predominantly monkfish, megrim, and squid (8% by weight and 12% by value). Less than half (45% by weight and 38% by value) of the landings from Welsh-registered vessels takes place in Welsh ports (Table 2).

Table 2: Landings by Welsh vessels (2018)

Port nationality	Weight of landings		Value of landings	
Welsh ports	4,388	45%	9,535,135	38%
rUK ports	517	5%	1,281,079	5%
rEU ports (Irish & Spanish)	806	8%	3,007,051	12%
Falkland Islands	4,145	42%	11,152,126	45%
All	9,856	100%	24,975,390	100%

Source: Authors' calculations based on MMO 2019a.. Note: rUK refers to the rest of the UK outside Wales and rEU refers to the rest of the EU outside the UK.

A second, similar complication emerges if Welsh fisheries are defined by landings that are made into Welsh ports. Less than half (45% by weight and 43% by value) of the total landings recorded in Welsh ports are made by Welsh-registered vessels with significant amounts from vessels from the other UK nations (30% by weight and 27% by value, a mix of species), and Belgian vessels (25% by weight and 30% by value, predominantly sole) (Table 3).

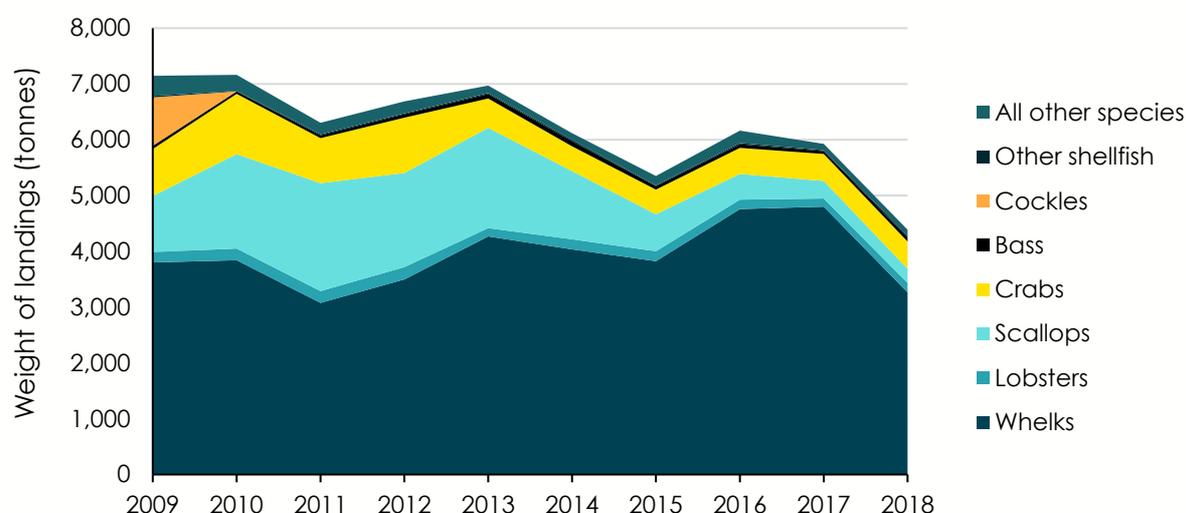
Table 3: Landings into Welsh ports (2018)

Vessel nationality	Weight of landings		Value of landings	
Welsh vessels	4,388	45%	9,535,135	43%
rUK vessels	2,882	30%	5,938,534	27%
rEU vessels (Belgian)	2,401	25%	6,659,105	30%
All	9,671	100%	22,132,774	100%

Source: Authors' calculations based on MMO 2019a.. Note: rUK refers to the rest of the UK outside Wales and rEU refers to the rest of the EU outside the UK.

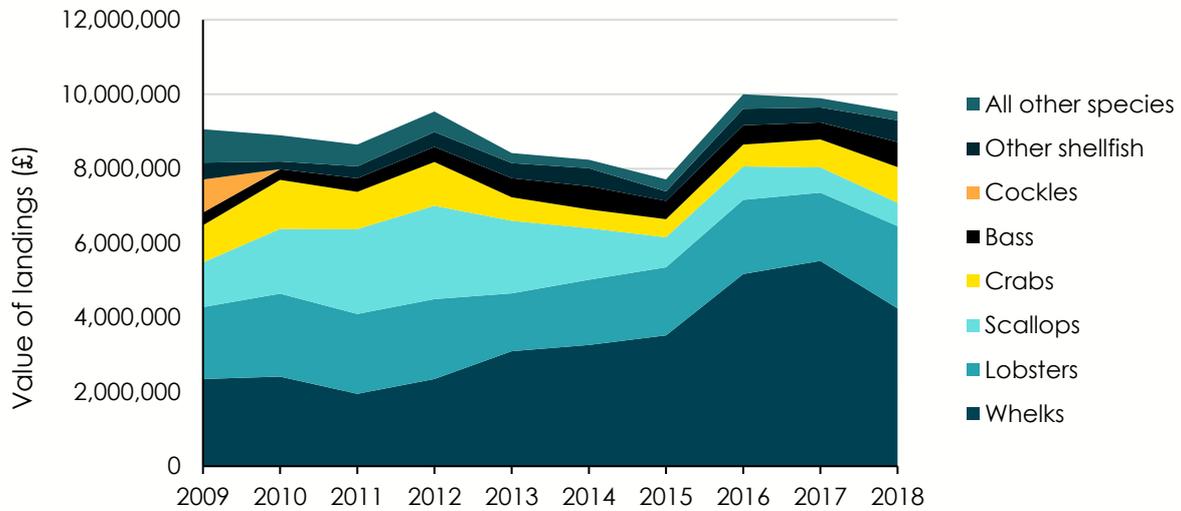
Taking a narrow view of Welsh fisheries defined as Welsh-registered vessels landing into Welsh ports, the industry is almost entirely, and increasingly, oriented around shellfish. In recent years, the whelk fishery has reached approximately half the value of landings from Welsh vessels into Welsh ports while the scallop fishery has declined (Figure 1). Whelks are predominately exported to South Korea while most Welsh lobsters, crabs, and other shellfish are exported to the EU (Welsh Government, 2019a).

Figure 1a: Weight of landings by Welsh vessels into Welsh ports



Source: Authors' calculations based on MMO 2019a..

Figure 1b: Value of landings by Welsh vessels into Welsh ports



Source: Authors' calculations based on MMO 2019a. Note: Figures in 2018 values.

The distinct Welsh fisheries can be summarised by size as follows:

- Falkland Islands squid;
- Belgian sole landings;
- Spanish-owned vessels landing Welsh monkfish and megrim into Ireland and Spain;
- rUK fleet landing mixed species to Wales;
- Welsh vessels landing whelks for the South Korean market;
- Welsh vessels landing other shellfish for the EU market;
- Welsh vessels landing mixed species to Wales.

Welsh Government's Marine and Fisheries Strategic Action Plan identifies three key fisheries in Wales as cockle, crustacean, and bass (Welsh Government, 2013). None of these is a quota species. With Brexit changing the landscape of the power of Welsh fisheries and potentially the quota available, this strategy may need to be revisited.

Quota holdings

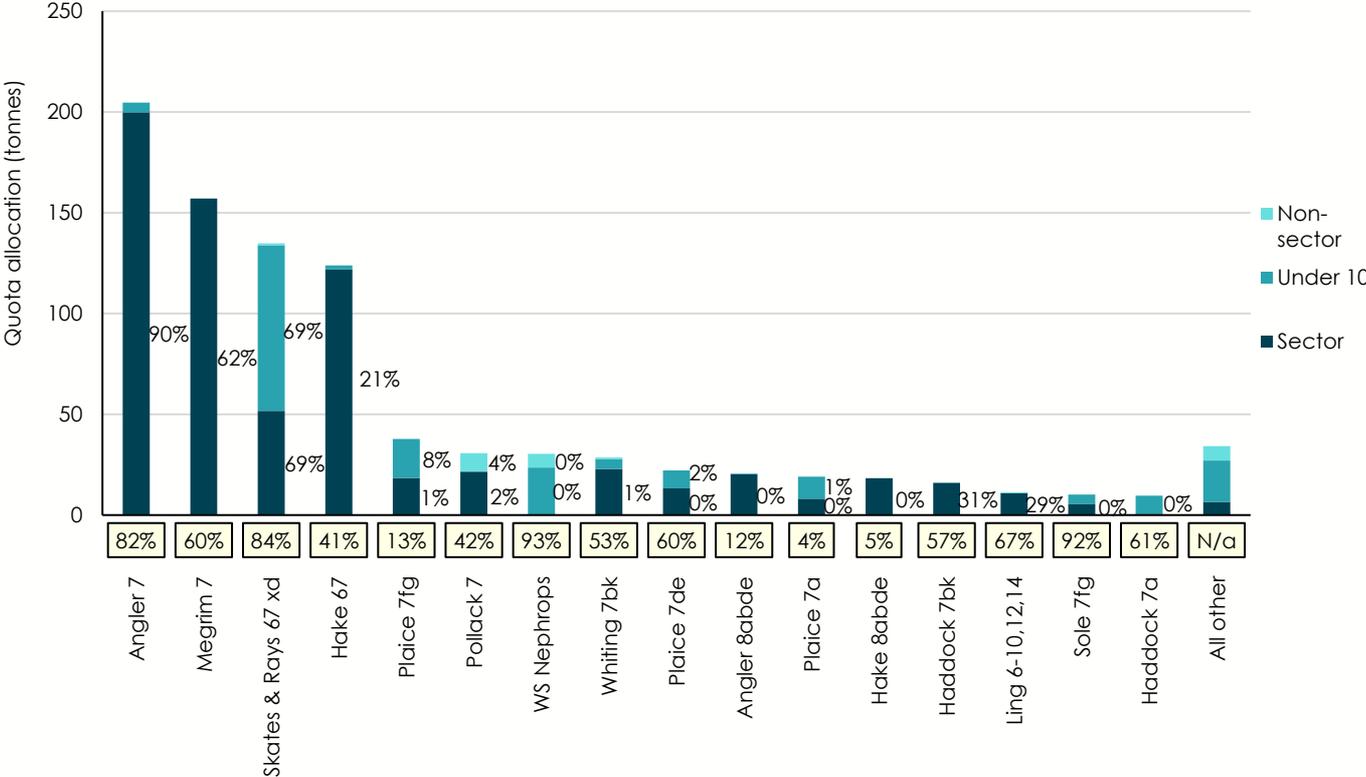
Wales receives approximately 0.1% of the UK quota allocation (author's calculations based on MMO, 2020a). Of this quota, the most important species are angler/monkfish, megrim, skates and rays, and hake. As previously noted, much of this quota is landed into Irish and Spanish ports.

The majority of the Welsh quota holdings (76%) are allocated to the sector, i.e., the Wales and West Coast Fish Producers Organisation (WWCFPO), one of the UK's 27 producer organisations and the only one covering Welsh vessels (author's calculations based on

MMO, 2020a). Producer organisations are officially recognised bodies that manage the fishing opportunities of their members, align supply with demand, and create added value for landed catch. The six vessels that are members of the WWCFPO are owned by Spanish interests [author’s calculations based on MMO (2020b) and Companies House].

For the <10m vessels that have their quota directly managed by Welsh Government (21% of Welsh quota holdings), skates and rays, Nephrops, and plaice are the largest quota allocations. For the non-sector, i.e., – vessels that are >10m in length but are not members of a producer organisation (3% of Welsh quota holdings), pollack and Nephrops are the largest quota allocations [author’s calculations based on MMO (2020a)].

Figure 2: Quota allocation and uptake in Wales by sector (2019)



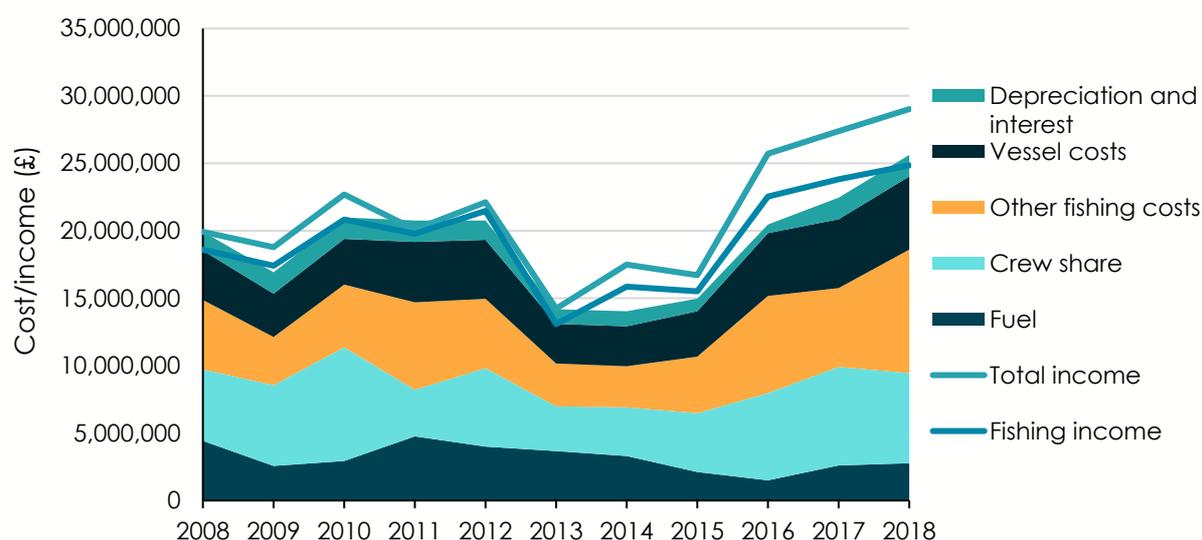
Source: Authors’ calculations based on MMO 2019b. Note: Yellow boxes indicate total UK quota uptake. The uptake for the Welsh sector, <10m, and non-sector is only displayed for allocations over five tonnes. Numbers indicate ICES (International Council for the Exploration of the Sea) areas that define the extent of a particular fish stock (see Annex 1 for map).

Shellfish species (except for *Nephrops*) are not managed by quota limits; instead, vessel licensing and effort limits are in place. This management has been the purview of individual EU Member States. In the UK, management is mostly devolved to the fisheries administrations, including Welsh Government.

Economic performance

Information on economic performance is provided by Seafish through the Fleet Economic Survey. The Welsh-registered fishing fleet has highly variable income and costs, although both are on a four-year upward trajectory. In recent years, profits have been relatively high as income has increased dramatically with smaller increases in costs, notably fuel costs. In 2018, fuel contributed 12% to fishing costs; crew payments were 28%. The gross profit margin is 17% and the net profit margin (using 2017 financial costs) is an estimated 12%.

Figure 3: Cost structure and income for the Welsh-registered fishing fleet



Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

As many features of economic performance vary across the fleet, information is broken down by fleet segment (Table 4). This composition of fleet segments has changed very little since data records began in 2008.

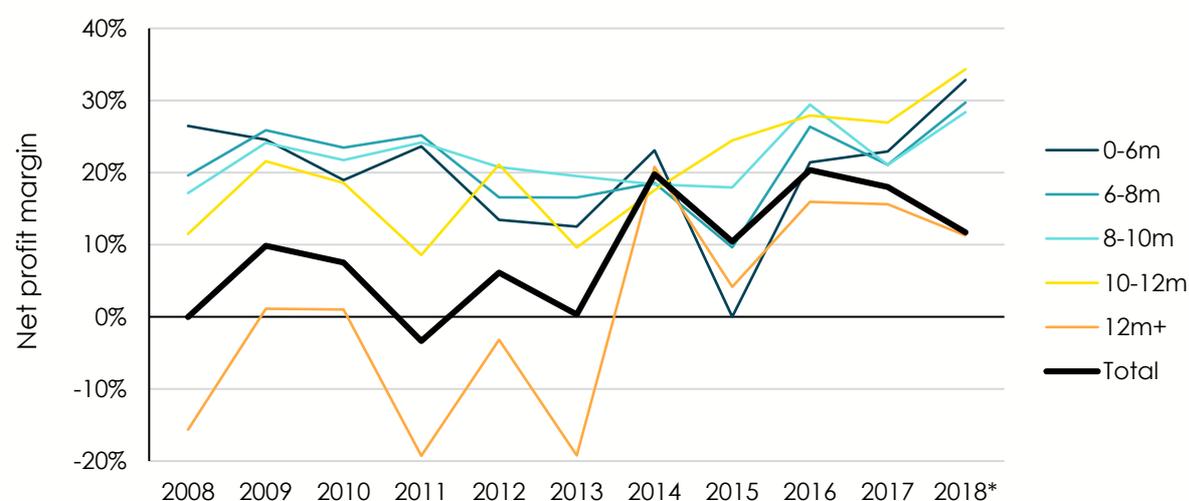
Table 4: Key economic statistics by Welsh fleet segment (2018)

Fleet segment (length)	Vessels (Number)	Employment (FTE)	Landed weight (tonnes)	Landed value (£)
0-6m	130	8	133	800,000
6-8m	77	8	170	1,000,000
8-10m	69	26	1,794	3,500,000
10-12m	19	30	1,484	2,800,000
12m+	9	64	6,362	16,600,000
Total	304	136	9,943	24,700,000

Source: Authors' calculations based on MMO 2019a. Note: Seafish fleet data on landed weight and value align with the MMO data from the previous section (Table 2), but the vessel and employment numbers differ (Table 1).

The cost structure and income for each fleet segment are reported in Annex 2. In general, however, the cost structure is similar for all fleet segments. Most fleet segments are following the same upward trajectory in profitability (Figure 4), with the >12m fleet segment the most independent and the most variable compared to the overall trend.

Figure 4: Net profit margin by Welsh fleet segment



Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

The Welsh policy-making context

Both fisheries and the environment are devolved powers, providing the Senedd and then Welsh Government with strategic direction over, and day-to-day management of, Welsh fisheries. Many aspects of how these powers are devolved have changed over the last decade.

Inshore fisheries management

As part of the 2009 Marine and Coastal Access Act, the 12 Sea Fisheries Committees across the whole UK were dissolved. In their place, Welsh Government established three Inshore Fisheries Groups (IFGs) as well as the Welsh Marine and Fisheries Advisory Group (WMFAG) to continue to provide a stakeholder body for inshore fisheries management.

In 2013, the Fisheries Unit was merged with Welsh Government's Marine Branch to form the Marine and Fisheries Division which reports directly to the Minister. The Minister announced that this change was part of his "clear determination to give a greater priority to marine matters" (Minister for Natural Resources and Food, 2013). This change in structure was followed by the Marine and Fisheries Strategic Action Plan later that year.

The Strategic Action Plan (2013: 11) committed the Welsh Government to "establish regional groups in 2014 to provide effective industry input on licensing and quota management". This action was to be completed by the end of the first quarter of 2014 with responsibility assigned to the Marine and Fisheries Division (Welsh Government, 2013). These regional quota management groups were not established due to low levels of participation.

Currently, the only advisory group, WMFAG, cover all of Wales, is not focused on quota management, does not meet around the annual quota calendar, and was formed in 2010 before the Strategic Action Plan was written. In general, the commitment to establish "regional groups" providing "effective industry input" has been moving in the opposite direction since the Strategic Action Plan was published.

In 2016, the three IFGs in Wales were dissolved (Terry et al., 2017). This was at odds with commitments in the Strategic Action Plan to "develop the three Inshore Fisheries Groups (IFGs) across Wales set up to improve management of local fisheries as a partnership between Welsh Government and fishermen" as "these Groups are a vital part of ensuring that the Welsh Government understands the needs of fishermen and to try to take their views into account as far as possible in the development of management decisions, policies and legislation" (Welsh Government, 2013).

Management of fishing opportunities

In 2012, a UK Concordat on Fisheries Management was signed between the four fisheries administrations of the UK (the Department for Environment, Food and Rural Affairs (Defra, 2012a); Marine Scotland; Welsh Government; and the Department of Agriculture and Rural Development) on how UK fishing opportunities and licensing should be jointly managed. While the Concordat granted the four UK fisheries administrations a greater degree of control over the management of their commercial fishing fleets, including how fishing opportunities are allocated within the administration (while keeping to a UK-wide framework), it established that allocations are distributed to fisheries administrations based on the fixed quota allocations (FQAs) of its licensed vessels. As <10m vessels were not required to keep landings records before the establishment of FQAs, it is widely understood that these vessels were under-allocated FQAs (Carpenter and Kleinjans, 2017; Carpenter et al., 2018) and as a result, the Welsh fleet received a tiny share of UK fishing opportunities under the fisheries Concordat, approximately 0.1% (MMO, 2020). This Concordat was updated in 2016 but was never signed off and in this respect remained fundamentally the same (Oliver, 2018).

This division of fishing opportunities between UK fisheries administrations remains a point of contention. In CCERAC's 2018 Brexit consultation report, *The impact of Brexit on fisheries in Wales*, the Assembly noted:

Many stakeholders strongly believed that the UK Fisheries Concordat has also been a disaster for Welsh fisheries. The share of quota set out in the concordat was based on a lack of records of historical catch and had, over time, led to Wales having a small, dilapidated fleet with a lack of re-investment (CCERAC, 2018: 11).

Issues within and between key institutions and organisations

Many reports on Welsh fisheries have been harsh in their criticism of how management has evolved, and the role played by key institutions and organisations. The Climate Change, Environment and Rural Affairs Committee (2018: 11-13) noted the following critiques:

- “Welsh Government needs to urgently develop a plan for fisheries” (p. 11).
- “Stakeholders who worked in the sector stressed the need for an urgent improvement in the way the Welsh Government engages with fisheries stakeholders (p. 11).
- “Minutes and papers of the official Welsh Government advisory group (Wales Marine Fisheries Advisory Group) were not accessible” (p. 11).

- “Consultation and discussion is concentrated in a small number of representative groups, which do not reflect the diverse opinions of the fisheries sector” (p. 13).
- “there’s a perception amongst stakeholders a lack of capacity in the Welsh Government, in both numbers of staff and their expertise, to deal with the development and administration of a new, ambitious fisheries policy after Brexit” (p. 13).

From the Committee’s report, it appears that the Committee struggled to engage with fisheries stakeholders themselves, with only two individuals providing oral evidence eight organisations providing written evidence, and a 17-member stakeholder workshop which took place in Fishguard. The report notes that the Committee agreed to hold a similar event in North Wales “as soon as possible” but there is no record of this taking place since the October 2018 publication.

Similar criticisms have been levied against key institutions and organisations in academic reports. Terry et al. (2017) were particularly scathing about how Welsh Government has managed inshore fisheries:

The Welsh Government has, therefore, simultaneously failed to conserve the marine environment effectively and has alienated a large number of commercial fishermen by not using the significant resources it now has available compared to its predecessors, to monitor adequately fishing activity... (Terry et al., 2017)

This finding aligns with a recent survey of fisheries stakeholders across the UK – albeit with a small sample in Wales – which found that the Welsh Government is one of the least trusted groups in UK fisheries management (Ford and Beukers-Stewart, 2019). While the report was based on interviews with some key stakeholders, the authors argue that their research “was hampered by the Welsh Government’s lack of transparency and cooperation” (Terry et al., 2017).

However, there are broader issues with the development of Welsh inshore fisheries. The authors note:

Whilst the [Welsh Government] should be held accountable for failing to use the powers granted to them, since 2011, the National Assembly for Wales (the legislature) has failed to use its legislative powers to impose a duty on the Welsh Government to engage more proactively to conserve the Welsh marine environment from the main pressure upon it, namely commercial fishing (Terry et al., 2017).

The Wales Marine Fisheries Advisory Group, set up to give stakeholders a voice, has been criticised by fishers as ineffectual (Terry et al., 2017; Worrall, 2018). The Welsh Fishermen's Association (WFA), which has five Welsh associations and much of the Welsh fleet in its membership, has been criticised as unrepresentative (Terry et al., 2017). Unlike fishing associations in other parts of the UK which were funded by a paying membership, the WFA is directly funded by government. CCERAC directly criticised the WFA for declining to participate in their report, although they did participate in others. A recurring theme is that stakeholder input is only received in the certain forums and by particular individuals (CCERAC, 2018).

These criticisms highlight the importance of new forms of diverse stakeholder involvement in future fisheries management as well as during consultations on how this management should take shape. While scope and appetite for radical change exist, processes must be gradual if there are low levels of trust on which to build.

The Well-being of Future Generations Act

Since 2015, the WFGA has required that all public bodies in Wales “think about the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change” (Future Generations Commissioner for Wales, 2020). A key component of the Act is the seven well-being goals that ensure all parts of Welsh Government are pulling in the same direction (National Assembly for Wales, 2015).

1. **A prosperous Wales:** An innovative, productive, and low-carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
2. **A resilient Wales:** A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic, and ecological resilience and the capacity to adapt to change (e.g. climate change).
3. **A healthier Wales:** A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
4. **A more equal Wales:** A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio-economic background and circumstances).
5. **A Wales of cohesive communities:** Attractive, viable, safe and well-connected communities.

6. **A Wales of vibrant culture and thriving Welsh language:** A society that promotes and protects culture, heritage, and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.
7. **A globally responsible Wales:** A nation which, when doing anything to improve the economic, social, environmental, and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

The WFGA not only specifies to what end the government should be acting but also how actions should be made. This is accomplished through the five ways of working:

1. **Long-term:** The importance of balancing short-term needs with the need to safeguard the ability to also meet long-term needs.
2. **Prevention:** How acting to prevent problems occurring or getting worse may help public bodies meet their objectives.
3. **Integration:** Considering how the public body's well-being objectives may impact each of the well-being goals, their other objectives, or the objectives of other public bodies.
4. **Collaboration:** Acting in collaboration with any other person (or different parts of the body itself) that could help the body to meet its well-being objectives.
5. **Involvement:** The importance of involving people with an interest in achieving the well-being goals, and ensuring that those people reflect the diversity of the area which the body serves.

The effectiveness of the WFGA lies in its accountability mechanisms for public bodies, as well as its soft power in encouraging holistic and collaborative decision making between public sector organisations (Nesom and Mackillop, 2020). Direct intervention has occurred, such as the Commissioner intervening in plans to build a proposed £1.4 billion M4 relief road scheme, questioning how it would meet the needs of future generations and submitting commissioned research on transport alternatives (Future Generations Commissioner for Wales, 2018). Ultimately the project was withdrawn.

At present, no case has gone before the courts to assess whether a public body has followed the WFGA while making a decision. The hope is that through the requirements to publish well-being statements and annual reports, change happens further upstream without a need for direct intervention.

Marine fisheries and the WFGA

As marine fisheries does not fall under the mandate of any public body of Welsh Government, implementation of the seven well-being goals and the five ways of working is difficult to assess. No well-being statement has been produced that covers marine fisheries and therefore no fisheries-specific objectives have been defined or reported on.

The public body Natural Resources Wales (NRW) does not cover marine fisheries, although it does cover the marine environment, noting that as a territory, Wales is 41% marine, including the 150,000 km² 12 nautical mile coastal zone (NRW, 2018).

NRW notes in their *Corporate Plan to 2022*: “We also have significant freshwater and marine fisheries where ensuring the sustainability of fish stocks is a significant issue: for example, there has been a marked reduction in the abundance of salmon in our rivers over recent years” (NRW, no date) This is not followed up on except for freshwater species (indicated by the example provided). NRW (2016) reports on the marine environment in *The State of Natural Resources Report* (SoNaRR), noting that “evidence suggests marine habitats are in variable condition but they are able to support healthy populations of many species of seabirds and marine mammals.” However once again there is little connection to fisheries themselves (e.g. the state of fish stocks), or the well-being goals.

Welsh Government produces an annual assessment against the well-being goals, the latest being *Well-being of Wales 2018-19* (Welsh Government, 2019b). Fisheries do not feature specifically and the marine environment is included in the context of marine-protected areas and special areas of conservation (reported on by NRW). The only fish species mentioned in any annual assessment (sea trout, shad, lamprey, bullheads, Atlantic Salmon) are from freshwater (Welsh Government, 2018a).

As required by the WFGA, Welsh Government also produces an indicator assessment report, the latest being *How to measure a nation's progress? National indicators for Wales* in 2016 (Welsh Government, 2017). The next update to this report will be in 2021. Most of the indicators are on the population, so fishers are included with the overall assessment. There are, however, two environmental indicators that could be more directly linked to fisheries.

Areas of healthy ecosystems in Wales measures gains and losses of broad habitat group by area, but the document notes that this is “to be measured initially through the extent of terrestrial semi-natural habitat” (Welsh Government, 2017), so the marine environment is not covered. **Status of biological diversity in Wales** measures species diversity by directly referencing the Joint Nature Conservation Committee (JNCC) indicator C4b on the status of priority species. However, the priority species have no marine species in their four taxonomic groups.³

The result is that due to structural division in public bodies (among possibly other issues), marine fisheries falls through the cracks of WFGA monitoring. There is no reporting or

³ These groups are bees, wasps, and ants; bryophytes and lichens; moths; other insects. The JNCC covers marine fisheries through indicator B2 on sustainable fisheries measuring the percentage of marine fish (quota) stocks of UK interest harvested sustainably and the percentage of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity, as well as indicator D1a on biodiversity and ecosystem services measuring fish size classes in the North Sea.

feedback mechanism that evaluates the contributions of the catching sector, considers the type of work in the industry, or documents the status of fish stocks.

The Environment Act (Wales) 2016

Alongside the WFGA, the Environment Act (Wales) serves as a pillar of Welsh policy for the management of natural resource industries. The Act defines the sustainable management of natural resources as:

...using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide. In doing so, meeting the needs of present generations of people without compromising the ability of future generations to meet their needs, and contributing to the achievement of the well-being goals in the Well-being of Future Generations Act (Nation Assembly for Wales, 2016).

This concept is further defined by the nine principles of sustainable management of natural resources:

1. **Adaptive management:** manage adaptively by planning, monitoring, reviewing and where appropriate, changing action.
2. **Scale:** consider the appropriate spatial scale for action.
3. **Collaboration and engagement:** consider the appropriate spatial scale for action.
4. **Public participation:** make appropriate arrangements for public participation in decision-making.
5. **Evidence:** take account of all relevant evidence, and gather evidence in respect of uncertainties.
6. **Long-term:** take account of the short, medium, and long-term consequences of actions.
7. **Multiple benefits:** take account of the short, medium, and long-term consequences of actions.
8. **Preventative action:** take action to prevent significant damage to ecosystems.
9. **Building resilience:** take account of the resilience of ecosystems, in particular the following aspects: (i) diversity between and within ecosystems; (ii) the connections between and within ecosystems; (iii) the scale of ecosystems; (iv) the condition of ecosystems (including their structure and functioning); (v) the adaptability of ecosystems.

Welsh fisheries' powers post-Brexit

On 29 January 2020, the UK government introduced the UK Fisheries Bill, similar in content to the Bill that was introduced in the previous parliament. One key feature of the Bill is the ability to control foreign vessels entering UK waters (no automatic rights of access). Sustainability provisions in the Bill are underpinned by a Joint Fisheries Statement and, where needed, fisheries management plans to achieve sustainable stocks. There are also new fisheries objectives in the Bill (added from the previous version) stipulating that fisheries should contribute a “national benefit” and mitigate their contribution to, and adapt to, climate change. This section focuses on the areas of the Fisheries Bill most relevant to the setting and allocation of fishing opportunities.

Setting fishing opportunities post-Brexit

Power to determine the level of fishing opportunities is still held by the UK Government. For international negotiations on shared fish stocks, this implies that Defra will still be negotiating for all fisheries administrations.

The level of fishing by the UK will be based on maximum sustainable yield (MSY) (to the extent that this can be controlled with shared fish stocks) as defined in the precautionary objective. To ensure that fishing limits are sustainable, the Fisheries Bill requires that the UK Government and the Devolved Administrations, including Welsh Government, publish a Joint Fisheries Statement to coordinate fisheries management and, where required, fisheries management plans to achieve sustainable stocks.

Achieving MSY is not a legal duty but an objective. Fisheries management plans can depart from proposals in the Joint Fisheries Statement due to “relevant change of circumstances” (UK Parliament, 2020). These circumstances provide significant leeway as the definition in the Bill includes “things done (or not done) by the government of a territory outside the United Kingdom” and “available evidence relating to the social, economic or environmental elements of sustainable development” (UK Parliament, 2020).

Vessel licensing post-Brexit

One of the headline announcements in the UK Fisheries Bill was the policy to grant foreign vessels access to UK waters through a new licence class issued by each fisheries administration for its waters. This effectively ended EU vessels' automatic access right to fish

in UK waters. Consequently, foreign vessels will be required to be licensed to fish in Welsh waters and will have to follow rules negotiated as part of the UK's fisheries negotiations.

This policy does not, however, change licensing with respect to UK vessels and continues with current access rights for UK vessels to any part of UK waters, as they do now regardless of whether they are registered in England, Scotland, Wales, or Northern Ireland. As it is up to each fisheries administration to license vessels, this allows for any fisheries administration (Welsh Government or otherwise) to issue licences to vessels that are or have been previously registered as foreign vessels. These vessels can then access all UK waters regardless of whether the other fisheries administrations would have denied them a licence.

The division of fishing opportunities between the UK and Wales post-Brexit

As with the previous version of the UK Fisheries Bill, the sharing of fishing opportunities between the UK Government and the four fisheries administrations remains unchanged. There is no indication that these shares will or will not change in subsequent legislation. At present, the shares of fishing opportunities continue to be based on the FQAs of registered vessels and the 2012 Concordat between Westminster and the Devolved Administrations.

After the previous Fisheries Bill was released, this aspect was criticised by CCERAC. As Wales receives only a 0.1% share of UK fishing opportunities, any post-Brexit 'dividend' of fishing opportunities would be small while the impacts from trade could be significant. Mike Hedges, chairman of the committee, explained:

In order to take up these opportunities, it is crucial to address Wales' current quota allocation, which we believe is fundamentally unfair. We are deeply disappointed that the UK government has decided that this issue will not be addressed as the UK leaves the EU. Unless this matter is revisited, the benefits for Welsh fisheries arising from Brexit will be marginal (BBC, 2018).

Welsh Government did not feel that the Fisheries Bill was the right place to address such issues:

The Fisheries Bill is not the mechanism to take forward detailed negotiations between UK administrations, or between the UK and the European Union, on issues such as quota share. We continue to press the case around quota shares with the other UK administrations as part of separate discussions (BBC, 2018).

On the same point, the UK Government seemed to dismiss that idea that quota shares would change through the UK Fisheries Bill or even other legislation. “Our priority is to negotiate a fairer share that will benefit the whole of the UK, and new legislation about quota shares is not necessary” (BBC, 2018).

Allocating Welsh quota post-Brexit

The CFP does not prescribe how EU Member States allocate fishing opportunities to their fleet of vessels. Instead, Article 17 of the CFP only specifies that the allocation of fishing opportunities be transparent and objective; the use of particular allocation criteria is only suggestive. The Article states [emphasis added]:

Member States *shall* use transparent and objective criteria including those of an environmental, social and economic nature. The criteria to be used *may* include, inter alia, the impact of fishing on the environment, the history of compliance, the contribution to the local economy and historic catch levels. Within the fishing opportunities allocated to them, Member States *shall endeavour* to provide incentives to fishing vessels deploying selective fishing gear or using fishing techniques with reduced environmental impact, such as reduced energy consumption or habitat damage (CFP, 2014).

In the opinion of both the European Commission (Vella, 2017) and UK courts [Greenpeace Ltd v The Secretary of State for the Environment (2016)], the UK currently meets the requirement under Article 17. While the UK Government has taken steps towards transparency by publishing a record of quota holders through the FQA register, it is also clear that the quota allocation system did not change after the reformed CFP and Article 17 entered into law in 2014, implying that ultimately Article 17 was ineffectual in changing the nature of fisheries.

The UK Fisheries Bill brings over Article 17 of the CFP in its entirety, only changing the obligation from Member States to fisheries administrations. There continues to be great discretion in how Welsh Government allocates fishing opportunities. The following sections explore how Welsh Government could structure its allocation based on a set of unique fisheries objectives aligned with the well-being goals.

Other fisheries powers post-Brexit

Other powers granted in the Bill include the power for Welsh Government to amend technical fisheries regulations, equivalent to those provided to the UK Government. By devolving this

power, different fisheries administrations can move away (or retain) CFP regulations to different degrees or at different speeds.

New funding powers enable Welsh Government to provide financial support for the same breadth of coverage as the current European Maritime and Fisheries Fund. This includes activities such as training and port improvements.

Developing fisheries objectives

This section develops a set of fisheries objectives aligned with Welsh Government's well-being goals. These objectives form an essential link between the overarching approach of Welsh Government and specific fisheries policy. To date, and for reasons explained in earlier, fisheries objectives have not been developed for Wales. For this report, the fisheries objectives are sourced from the UK Fisheries Bill (in its second reading at the time of writing), supplemented by additional objectives sourced from the WFGA and associated documents as well as the *Brexit and our Seas* consultation (Welsh Government, 2019a). These objectives are applied in the context of developing and assessing policies on the allocation of fishing opportunities, but the same objectives should apply across all aspects of fisheries management.

Developing fisheries objectives in the Welsh context

Fisheries objectives should be developed through a stakeholder process such as that outlined in Pascoe et al. (2013). In the Welsh context, the requirements of the WFGA imply that a wide set of stakeholders to represent civil society should be included in such a process to represent all current and potential beneficiaries (including future generations) of fisheries and the marine ecosystem.

A stakeholder-sourced approach to reaching objectives was not suitable given the scope of this research report, but some objectives can be sourced from the UK Fisheries Bill, supplemented by additional objectives sourced from the WFGA and associated documents as well as the *Brexit and our Seas* consultation (Welsh Government, 2019a). In total, 12 Welsh fisheries objectives were compiled. Table 5 lists why each objective matters for fisheries policy, why each objective matters in the Welsh context, and whence the objective is sourced.

Table 5: Description of the 12 well-being objectives for fisheries

Objectives	Components	Why it matters for fisheries	Why it matters for Wales	Source
Sustainability objective	Environmental sustainability; economic, social, and employment benefits; food supplies; capacity managed for economic viability.	A prerequisite for managing an industry is that it is able to achieve profitable, and somewhat stable, returns. Employment is particularly important for fisheries due to its setting in remote and often vulnerable communities. This employment should be secure and well-compensated, but at present fishing is the most dangerous occupation and there is a great deal of financial insecurity.	Welsh coastal communities are remote and lower-income. The part-time nature of Welsh fisheries employment is challenging and coincides with part-time employment in tourism.	UK Fisheries Bill
Precautionary objective	Precautionary approach; fish populations above levels that can produce the maximum sustainable yield.	The sustainability of fish stocks, one of the key focuses of fisheries management, is predominantly an equity issue as one generation erodes the ability for the next generation to have the same opportunities to fish.	The marine ecosystems around Wales (Irish Sea and Celtic Sea) have among the most overexploited fish stocks in the Northeast Atlantic (ICES, 2020).	UK Fisheries Bill
Ecosystem objective	Ecosystem-based approach; incidental catch minimised and eliminated.	Where resources are used in commercial production, not only must resource use be sustainable, but care needs to be taken to protect the wider ecosystem. The sustainability of fish stocks cannot be ensured through managing direct pressure but also through the health of the wider marine ecosystem that supports fish stocks.	Welsh fisheries management attempts an ecosystem-based approach that considers all marine impacts.	UK Fisheries Bill
Scientific evidence objective	Collect scientific data; share information between authorities; make decisions based on best available scientific advice.	Management relies on information about the industry, the ecosystem in which it operates, and the interaction between the two. This information should be incorporated into management and where information is not available it should be collected. There is a severe lack of information on many species: where they develop, how long they live, what pressures they are sensitive to, what population numbers exist, and what is a sustainable level of harvest.	Welsh fisheries mainly target non-quota species where the knowledge gap is even larger than the quota species that characterise fisheries in the rest of the UK.	UK Fisheries Bill
Bycatch objective	Catches below minimum conservation reference size are minimised and eliminated; catches recorded and accounted for; bycatch landed where appropriate.	The biodiversity of non-target species and habitats also has a value beyond its contribution to fisheries.	Biodiversity is a significant concern in Wales. In the National Survey for Wales, 43% of respondents indicated they were fairly or very concerned about past or future changes to the variety of species in Wales (Welsh Government, 2018a).	UK Fisheries Bill
Equal access objective	UK fishing vessels can access any area within UK limits.	Fishing vessels are highly mobile and many will cross the borders of UK nations as part of their normal fishing practices.	Welsh waters are important for Scottish, Northern Irish, and English fishing fleets. At present, Welsh fishing vessels mostly fish within Welsh waters.	UK Fisheries Bill
National benefit objective	Fishing activities of UK fishing boats bring social or economic benefits to the UK (or any part).	Private use of a public resource is tolerated so long as it does not take away from someone else's use (e.g. a public park). Where this rivalrous behaviour occurs, there must be a clear flow of benefits to wider users. Marine fisheries are a public resource but are directly used by very few. While fisheries produce a	Compared with the other UK nations, Welsh fisheries are particularly small compared to the size of the population and economy of Wales. The benefits	UK Fisheries Bill

		livelihood and a profit from the resource, the benefits to the rest of the nation (particularly given the costs of management and degree of international trade in fish products) is indirect.	must extend beyond this small group.	
Climate change objective	Minimise climate impacts; adapt fishing and aquaculture to climate change.	The sustainability of fish stocks, one of the key focuses of fisheries management, is predominantly an equity issue as one generation erodes the ability for the next generation to have the same opportunities to fish. Intragenerational equity is also an issue, for example the claims of different fishers to the same resource.	The marine ecosystems around Wales (Irish Sea and Celtic Sea) have among the most overexploited fish stocks in the Northeast Atlantic (ICES, 2020).	UK Fisheries Bill
Supportive interaction objective	Objectives for different sectors are co-viable; integration in fisheries management between marine sectors; integration between countries.	Sectors are not independent. They will be supported or undermined by activities in other sectors. Secondary industries add value to Welsh fisheries which produce a primary product. Additionally, fish stocks, particularly finfish, are highly mobile and one jurisdiction's exploitation affects all others.	Welsh fisheries are highly integrated with neighbours with a large share of landings from Welsh vessels taking place in non-Welsh ports and a large share of landings in Welsh ports from non-Welsh vessels.	The WFGA emphasises international impacts and linkages with other sectors and parts of government.
Good governance objective	Simple, respectful, dynamic, responsive, and affordable management structures.	Process matters as well as outcomes. Fisheries management is plagued by low levels of respect for nearly every institution and stakeholder group (Ford & Beukers-Stewart, 2019). Each area can be very different. This often means a local co-management, although that is not the only possible approach.	Levels of trust are particularly low in Welsh fisheries. Welsh Government is one of the least trusted groups in UK fisheries (Ford & Beukers-Stewart, 2019).	The WFGA emphasises processes as well as outcomes.
Community resilience objective	Resilience to mitigate uncertainty and potential losses; protect and enhance cultural heritage.	Well-being is asymmetrical: the losses are felt more than the gains (De Neve et al., 2015). Fisheries are a wild, hunted resource. Various pressures have generated tremendous change in the species landed over time (Balata and Vardakoulis, 2016). It is difficult to anticipate future fisheries.	Welsh landings are an even more extreme version of this same effect. Whelks, a previously marginal fishery, are now half the landed value from Welsh vessels into Welsh ports. There are few options after whelks in terms of ecosystem trophic levels.	The WFGA emphasises communities (in addition to individuals and businesses).
Efficient production objective	Maximise the value of outputs and minimise the cost of inputs (including management costs and the cost to animal life).	As a key resource input, fishing opportunities should be used by those receiving allocations and not wasted through discarding. Catches should be high quality and valued as healthy food or for other uses. This should not be achieved at a needless cost to animals and their welfare. Altogether, this defines an efficient use of societal resources.	The vast majority of the catch is exported, primarily to EU Member States (Welsh Government, 2019). If food production is a valuable output from fisheries, it is not one that contributes significantly to the Welsh diet.	Added as objectives should be achieved to the highest degree and at the lowest cost possible.

Alignment of the fisheries objectives with the well-being goals

The 12 Welsh fisheries objectives are assessed in Table 6 for their contribution to the well-being goals. Given the importance of the marine ecosystem to fisheries, these fisheries objectives must be compatible with those developed for NRW (2018) in its well-being

statement. While the objectives do not directly align, there is a significant degree of overlap. Here the fisheries objectives are indicated for each of the NRW well-being objectives:

1. Champion the Welsh environment and the sustainable management of Wales' natural resources (*Efficient and valuable production*)
2. Ensure land and water in Wales is managed sustainably and in an integrated way (*Ecosystem thinking and protection; Integration with other sectors and governments*)
3. Improve the resilience and quality of our ecosystems (*Resilient communities; Ecosystem thinking and protection*)
4. Reduce the risk to people and communities from environmental hazards like flooding and pollution (*Resilient communities*)
5. Help people live healthier and more fulfilled lives (*Secure and decent work*)
6. Promote successful and responsible business, using natural resources without damaging them (*A viable industry; Intergenerational and intragenerational equity; Public benefits from private use*)
7. Develop NRW into an excellent organisation, delivering first class customer service (*Simple, respectful, dynamic, responsive, affordable management structures; Knowledge-based governance*)

Table 6: Contribution of the 12 well-being objectives to the seven wellbeing goals

		A prosperous Wales	A resilient Wales	A healthier Wales	A more equal Wales	A Wales of cohesive communities	A Wales of vibrant culture and thriving Welsh language	A globally responsible Wales
		An innovative, productive, low carbon society which recognises the limits of the environment and uses resources efficiently; and which develops a skilled and well-educated population with employment opportunities.	A nation which maintains and enhances a biodiversity with healthy ecosystems that support the capacity to adapt to change.	A society in which people's physical and mental well-being is maximised.	A society that enables people to fulfil their potential no matter their background or circumstances.	Attractive, viable, safe and well-connected communities.	A society that promotes and protects culture, heritage and the Welsh language.	A nation which, when improving the well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.
Sustainability objective	Environmental sustainability, economic, social and employment benefits, food supplies, capacity managed for economic viability.	2	0	1	1	1	0	0
Precautionary objective	Precautionary approach, populations harvest above BMSY.	0	1	0	1	0	0	0
Ecosystem objective	Ecosystem-based approach, incidental catch minimised and eliminated.	0	2	0	0	0	0	0
Scientific evidence objective	Collect scientific data, shared between authorities, make decisions based on best available scientific advice.	1	0	0	0	0	0	0
Bycatch objective	Catches below MCRS are minimised and eliminated, catches recorded and accounted for, bycatch landed where appropriate.	0	2	0	0	0	0	0
Equal access objective	UK fishing vessels can access any area within UK fishery limits.	0	0	0	0	1	0	1
National benefit objective	Fishing activities of UK fishing boats bring social or economic benefits to the UK (or any part).	1	0	0	0	0	1	0
Climate change objective	Climate impacts are minimised, fishing and aquaculture adapt to climate change.	0	1	0	1	0	0	0
Supportive interaction objective	Objectives for different sectors are co-viable, integration in fisheries management between	1	0	0	0	1	0	2

	marine sectors, and integration between countries.						
Good governance objective	Simple, respectful, dynamic, responsive, affordable management structures.	0	0	1	0	0	0
Community resilience objective	Resilience to mitigate uncertainty and potential losses.	0	2	0	0	2	2
Efficient production objective	Maximises the value of outputs and minimises the costs of inputs, including the cost of management and cost to animal life.	2	0	2	0	0	1

Note: Descriptions shortened. Interactions are scored on a scale with 0 for minimal contribution, 1 for indirect or partial contribution, and 2 for direct and significant contribution.

Policy options for managing Welsh fishing opportunities

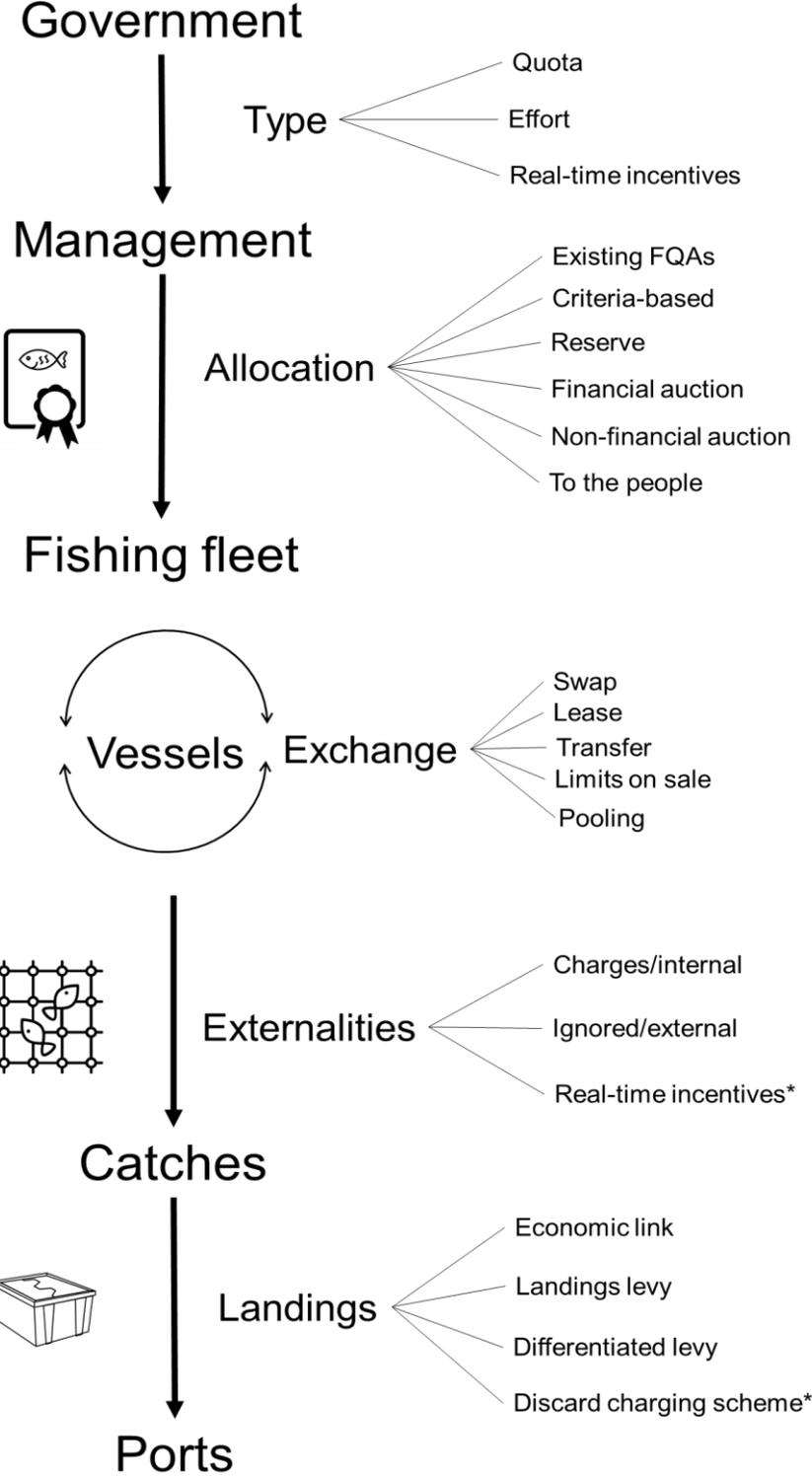
While the power to allocate fishing opportunities has always rested with EU Member States (a power devolved to the Senedd and Welsh Government), this power was never used to institute any major reforms in Wales. This could change post-Brexit, not due to any new powers but due to a combination of the significant attention that is now focused on fisheries, the possibility for 'additional' quota to become available post-Brexit, and the ability to join up the allocation of fishing opportunities with new powers over other aspects of fisheries policy to create a new vision for Welsh fisheries.

While this report does not cover how the total number of fishing opportunities is determined (only the allocation of these opportunities), some of the key aspects of the fisheries objectives described in the previous section relate more to the total size of fishing opportunities rather than their allocation. For example, the total size of fishing opportunities will determine the sustainability of catches (Intergenerational and intragenerational equality) as well as the boom and bust nature of overfishing (Secure, decent jobs, Resilient communities). Different policy options to set the total fishing opportunities are discussed in the previous Wales Centre for Public Policy report on fisheries management in the post-Brexit context: *Implications of Brexit for fishing opportunities in Wales* (Carpenter et al., 2018).

Similarly, this report does not cover the allocation of quota between fisheries administrations, also covered by Carpenter et al. (2018). As Wales receives approximately a 0.1% share of the UK total allowable catch, the policy options that follow are, to some degree, contingent on major changes in Welsh quota holdings so that quota allocations are worthwhile.

As Figure 5 illustrates, the allocation of fishing opportunities involves multiple levels: type of fishing opportunities, allocation method, use of pooling and/or use of a market within the fishing fleet, policies to deal with externalities in the use of fishing opportunities, and requirements on the landing of fish caught with these fishing opportunities. Each level has different policy options. Segmenting the analysis of fishing opportunities in this way makes it clear which policy options are alternatives (within a level) and which policy options can be paired together (between levels).

Figure 5: Determining the management system for Welsh fishing opportunities



* policies are repeated

A radical, blank canvas

In considering policy options, this report takes a blank canvas approach whereby all options are considered without reference to the existing system. As a result, some of the policy options considered have never been used and a few options are described for perhaps the very first time in a fisheries context.

This approach is a radical departure from the majority of policy analyses but is a function of four factors: the small role that fisheries management has historically played in Welsh Government, the ambitious aims of the WFGA for Wales to pursue a world-leading example, the overhaul to management that Brexit could allow for, and the widely-held sentiment that fisheries management is not delivering on various wellbeing criteria in its current form.

Even at the UK level, there is an appetite for more radical reform than is currently being proposed. The House of Commons Environment, Food and Rural Affairs Committee explained in its report on the UK Fisheries Bill that:

While we welcome the Government’s commitment to establishing a new method of allocation, the proposals laid down in Clause 22 do not meet our expectations and lack detail. We are concerned that such proposals will marginalise owners of smaller vessels and will not represent a significant break from current practice, which is based on the situation many years ago when the UK joined the EU (House of Commons, 2018).

Choosing the type of fishing opportunity

Currently, many species caught in Wales, shellfish in particular (except for *Nephrops*), are not managed through EU total allowable catches (TACs). This means that most of the Welsh catch is managed through limits on effort (e.g. pot limits, scallop dredges) rather than specified quantities as under a quota limit. Welsh Government could bring these fisheries under a catch quota or pursue effort limitations for the species managed under EU TACs. A third approach would be to implement a new system entirely, such as real-time incentives (RTIs) that blend features of catch quota and effort limitations. Any change in the type of fishing opportunity issued would require coordination with the other UK fisheries administrations, more so than the other aspects of fishing opportunities explored in this report.

Moving from effort to quota

Welsh Government, regardless of Brexit, could implement local TACs (i.e., catch quotas) for shellfish species. Catch quotas have the advantage of providing a cumulative limit on the

amount of catch and thus the mortality of fish stock. This approach more directly targets the harm that is trying to be avoided, rather than limiting licences, days at sea, or other input controls under effort management. In consideration of the transition from effort management to catch quota, Carpenter and Kleinjans (2017) define several conditions that indicate the suitability of a stock to catch quota management:

- Species that can be targeted with limited bycatch (i.e., not mixed fisheries);
- Large or medium-scale fisheries;
- A high level of overfishing (i.e., an urgent policy change);
- Reliable landings data to ensure the limit is respected;
- Reliable scientific data for setting catch limits;
- Few ports and vessels involved for easier management and enforcement;
- A good length composition of stock (to protect against the incentive to discard small fish);
- Reliable catch records.

The major non-quota fisheries in Wales of whelks, scallops, and sea bass all have mixed results when assessed against these suitability criteria. Whether the entire UK (or beyond) would also need to be under a catch quota system for it to be effective in Wales is an additional aspect for consideration.

Among finfish species, sea bass is a notable exception that is not under quota management. This is partly due to a conflict between France and the UK over how a reference period to divide quota shares would be set. However, the poor state of the sea bass stock in recent years required a catch quota in the form of monthly catch limits. These catch limits are set with an expectation of the total annual catch; however, there is no formal annual limit. This approach (which could be termed a 'rationed individual quota') can provide a model for less formal catch limits or even part of a longer-term transition for non-quota species.

Moving from quota to effort

Some groups, in particular Fishing for Leave (2016), have proposed a move away from managing species with catch quotas to effort management through restrictions on days-at-sea instead. Days-at-sea has been presented as a solution to the issue of discarding and choke species (where fishers catching a mix of species will exhaust their quota for one species and need to stop fishing, even if quotas for other species are still held) by enabling vessels to land everything they catch within their permitted days. Fishing for Leave (2016) has emphasised that their system would involve flexible catch compositions, making it unlike the current use of days-at-sea used for some scallop fisheries, (e.g. South-West Scotland and Western Waters) and the recovery plans for both cod and sole.

Days-at-sea and other forms of effort limitation are controversial. An effort-based regime will always be a second-best solution because it is limiting a factor that is related to excess extraction but not specifically linked to fish mortality itself.

While a limit on days-at-sea would mean that a whole mix of species could continue to be caught, this does not solve the choke species problem in the way that avoiding catches of this species would; it just means that fishing continues despite overfishing the vulnerable species. Given that the UK Fisheries Bill is continuing with the objective to end overfishing for all commercial species, a limit on days-at-sea would be critically low and worsen economic performance. This is simply a choke by another name.

Using days-at-sea for fishing opportunities also carries a great risk of getting the wrong balance between the number of days-at-sea that protects fish stocks while allowing for financial viability. This is an extremely difficult calculation due to technological creep, where the catching efficiency of fishing vessels, and thus the pressure on fish stocks, continues to improve. Effort limits will always lag behind changing technology and behaviour. Fishers seeking to maximise their catches per day would have the perverse incentive to fish harder, closer to crowded inshore waters, and more dangerously.

There is also the issue of how to convert current fishing rights into effort limits, especially for small-scale vessels (<10m) that do not possess rights but fish out of a pool. The Fishing for Leave proposal addresses part of this issue by proposing to remove the small-scale vessels (<10m) from effort restrictions entirely. This would be a hugely problematic, as taken all together, small-scale vessels can have a large impact on fish stocks and restrictions must remain for all fishing vessels if we are to ensure long-term sustainability.

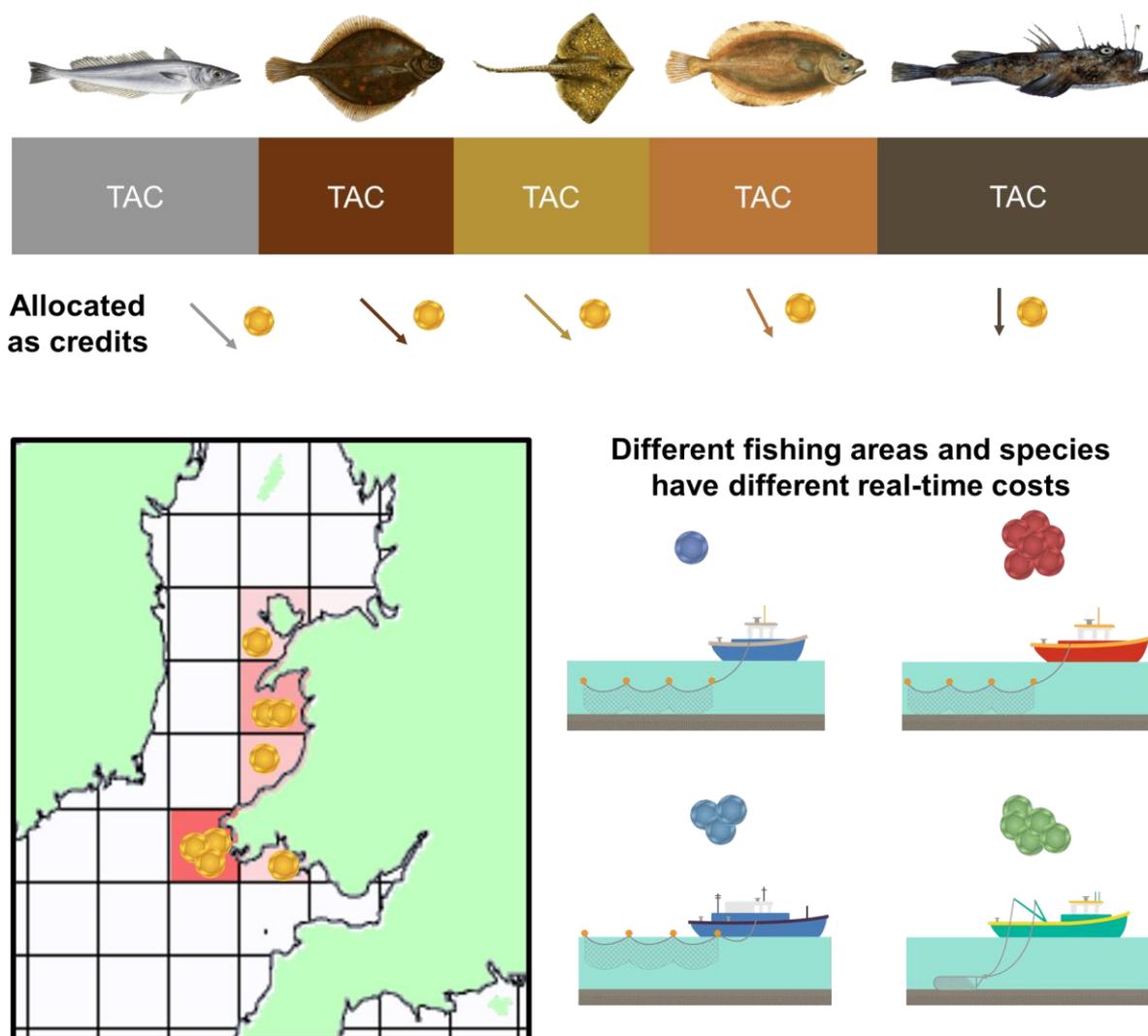
For these reasons and many others, the trend in fisheries management around the globe is moving in the reverse direction: from effort management to quota management (Marchal et al., 2016). While Fishing For Leave points to the Faroe Islands as a model to replicate in the UK (Jacobsen, 2016), their fish stocks are overexploited, financial performance is poor, and the Faroese Government is attempting to overhaul their system (Danielsen and Agnarsson, 2018).

Limiting effort requires scientific assessment to understand what opportunities in terms of days could be realistically expected. Directed analysis could explore how industry fishing practices may change and if there are lessons to be learnt from days-at-sea management of scallop fishing (Welsh Government, 2016a). The UK Fisheries Bill and White Paper point to effort trials as a way to advance this (Defra, 2018a; UK Parliament, 2020).

Real-time incentives

In the RTI system, fishers use credits to pay for rapidly changing tariffs set based on species, location, and time of year. Managers decide the tariffs based on scientific assessments of marine stocks. Prices indirectly incentivise fishers to fish where is cheaper or in less sensitive areas and therefore where tariffs are lower. Some research has indicated that the use of RTIs outperforms the traditional management systems of quota and effort allowances (Kraak et al., 2015).

Figure 6: Real-time incentives



To date, RTIs have not been used in fisheries management, although a research case study is currently taking place in the Celtic Sea (Pedreschi et al., 2017) so there is an opportunity for Wales to lead. The main challenge is the technological resource requirement for both fishers and fisheries managers.

The allocation of fishing opportunities

Like the relative stability principle used to allocate fishing opportunities between EU Member States, the allocation of fishing opportunities in the UK uses a reference period for historical catches and fixes quota shares at this level. The use of these FQAs also means that the share between UK fisheries administrations remains fixed (for each TAC).

While both the UK Government and Welsh Government could change this system of allocations, it has remained one of the most stable, and controversial, aspects of the fisheries management. There have been suggestions to change FQAs to make the allocations more up to date or fairer or to look at different allocation systems entirely.

Continue with fixed quota allocations

Fishing opportunities in Wales, like most jurisdictions, are allocated based on established fishing patterns, i.e., grandfathering (Lynham, 2013). The track record approach to allocation has disadvantaged a large majority of vessels and led to the concentration of quota. It has also meant (as no safeguards were put in place) that this gifting is neither time-limited, nor does it compensate the public for the use of the common resource in the form of rent (Carpenter and Kleinjans, 2017). With an FQA market valued at over £1.1 billion (Appleby et al., 2016), the UK Government only recently (2015) published a register of FQA ownership.

The lack of quota allocation for most vessels has meant an increase in fishing pressure on non-quota species like sea bass and shellfish. This has limited the fishing opportunities available to the Welsh fleet and resulted in its current specialisation. It has also limited the development of shore-side infrastructure and processing and the potential for 46 value-added activities that can contribute to economic and social development. Addressing the lack of access to quota for the Welsh fleet could facilitate diversification of fishing activities; reduce reliance on non-quota stocks; and generate environmental, economic, and social benefits in coastal communities and beyond.

The National Federation of Fishermen's Organisations (NFFO) and the Scottish Fishermen's Federation (SFF), the biggest fishing organisations in England and Scotland, have published briefings advocating the continuation of FQAs (NFFO, 2019; SFF, 2019), with no advocated position from groups representing Welsh fishers. Unfortunately, there is a lack of clarity in the NFFO and SFF briefings as to when support for FQAs is referring to FQAs as currently practised in the England and Scotland or when support is for the whole approach of annual quota allocations distributed to individuals in fixed proportions. This distinction is crucial because it is possible to support annual quota allocations distributed to individuals in fixed proportions while opposing the current system of FQAs as practised. There is also confusion over where security emanates from the UK system. The NFFO describes quota as secure

but says also that the government can reallocate at any time through ‘top slicing’. This confusion is understandable given the legal ambiguity in the system previously described. Lastly, there is confusion over what scope of potential reform is being proposed. The briefing centres on an amendment to the Fisheries Bill put forward by several MPs and former fishing ministers that requires the use of social and environmental criteria in quota allocation. The NFFO and the SFF see this as the end of catch history and FQAs, but the amendment does not forbid catch history, it just does not require it.

Criteria-based allocation of fishing opportunities

It is unlikely that diverse fisheries objectives will naturally emerge without explicit and targeted policies. Criteria-based allocations (sometimes termed a ‘beauty contest’) directly align the allocation of fishing opportunities with fisheries objectives (Williams et al., 2018). The concept of criteria-based allocation also has some parallels with the concept of public money for public goods in agriculture. The idea is to use a public resource (i.e., access to fish stocks, subsidies) to pursue a public purpose. Qualification for criteria-based allocations could be opt-in where data is voluntarily disclosed or integrated through existing (and likely expanded) data collection processes.

Like public money for public goods in agriculture, there is an emerging consensus around the use of criteria-based allocations in UK fisheries (with the NFFO and SFF as notable exceptions). The Defra summary of responses on allocating future quota notes that “the most popular choices were to allocate using socio-economic, economic and environmental criteria and to allocate additional quota to the under 10m/inshore fleet” (Defra, 2019).

Criteria-based quota allocations would serve as an incentive-based policy instrument. As fisheries are operated by heterogeneous and dynamic agents (fishers) that differ greatly in performance, incentive-based instruments encourage positive change in fishers and work as policy levers by ‘moving’ agents from one side of the spectrum (bad/unsustainable behaviour) to the other (good/sustainable behaviour). Incentives, as opposed to regulatory instruments, provide decision-making flexibility allowing fishers to modify their performance within their means. Therefore, incentive-based instruments are most effective when dealing with heterogeneous and dynamic agents that need the flexibility to adapt to changing policy systems.

Incentive-based instruments work because they affect fishers’ profit function either by increasing their profits (rewards) or reducing them (penalties). Fishers who are not rewarded because their fishing methods are not sustainable are at a disadvantage but can change their fishing methods to gain the same rewards as their peers.

Fishing opportunities for criteria-based allocations could come from a reserve or it could be argued that all fishing opportunities are criteria-based, just that the criteria used are often

limited and non-disruptive, in particular the use of historical landings as the main or only criterion in allocation. This is how many EU Member States, including the UK, have explained their application of Article 17 of the CFP.

One exception to this practice is Ireland, where to protect coastal communities and artisanal fleets from the potential concentration of quota allowance by large fishing operators, the Irish Government set aside quota allocations for <18m artisanal gillnet and hook-and-line mackerel fishing, herring ringnets, and surface longlining for albacore tuna (Carpenter and Kleinjans, 2017). The Irish Government makes explicit reference to Article 17 of the CFP in designating its quota allocations.

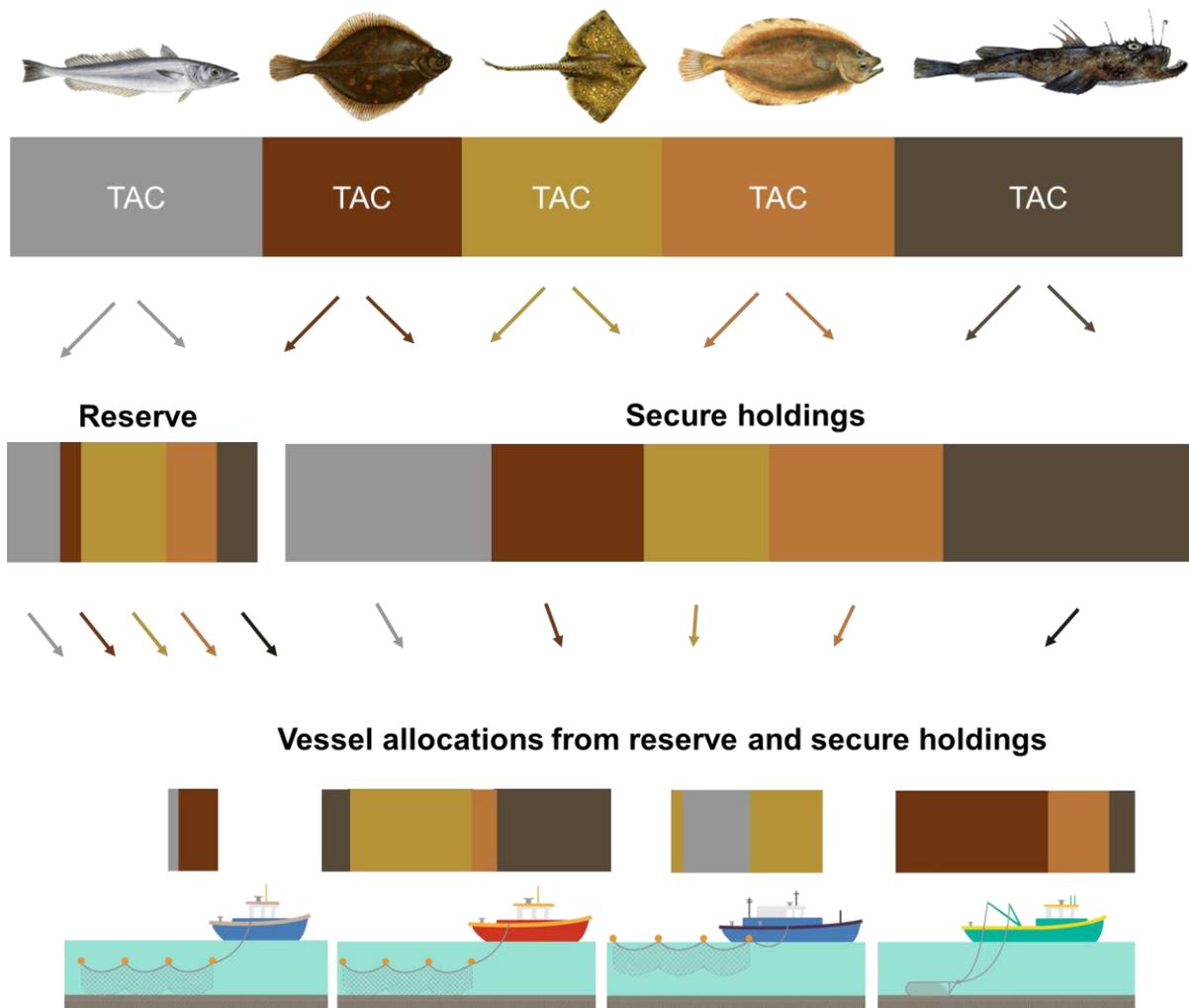
In the UK, the Scottish Conservation Credits Scheme (CCS) is an example of criteria-based allocation of fishing effort. Under the scheme, limited time was allocated to vessels using non-selective gear (in particular trawls for whitefish and Nephrops) and additional time was awarded to vessels using more environmentally friendly fishing methods. The CCS has generally received positive reviews, although much more success was observed in reducing cod discards than haddock and whiting (WWF, 2009). The scheme was set up in 2008 and ended in 2016 with the termination of the EU's cod recovery plan.

Fishing opportunity reserve

Continuing with the use of FQAs or switching to criteria-based allocations are not mutually exclusive systems. Criteria-based allocations could include historical catches as one of the criteria that is applied (in this sense FQAs can be seen as a criteria-based allocation with historical catch as the single criterion).

Alternatively, a quota reserve can be used to formally separate quota so that some fishing opportunities are allocated using a different method from the main share. Establishing a reserve of fishing opportunities allows a government to directly target outcomes by using the allocation of fishing opportunities as an incentive-based tool. Denmark's Fishfund is a quota reserve set aside for new entrants to the fishery, as well as specific objectives, such as increasing the amount of quota available to the small-scale passive-gear coastal fleet (Carpenter and Kleinjans, 2017).

Figure 7: Use of a quota reserve



A reserve would likely retain a greater share from some quotas than others. In the Danish example, a more significant share of cod is reserved than sprat as small-scale passive-gear fleet and new entrants are more like to fish cod than sprat.

A reserve can also be populated with fishing opportunities through different means. This could include top-slicing a share of existing allocations with or without compensation (e.g. Denmark), 'taxing' a share of quota allocations when there is an ownership change (e.g. France (Carpenter and Kleinjans, 2017), or setting aside newly acquired quota including changing in allocations post-Brexit (as Defra's Fisheries White Paper suggests as an option) or higher quota tonnage when fish stocks recover (Carpenter and Kleinjans, 2017).

Further, there could be two quota reserves: one for new entrants and one for an incentive-based allocation based on social and environmental criteria. By way of example, this division could be 80% fixed, 5% new entrants, 15% criteria based.

Financial auction

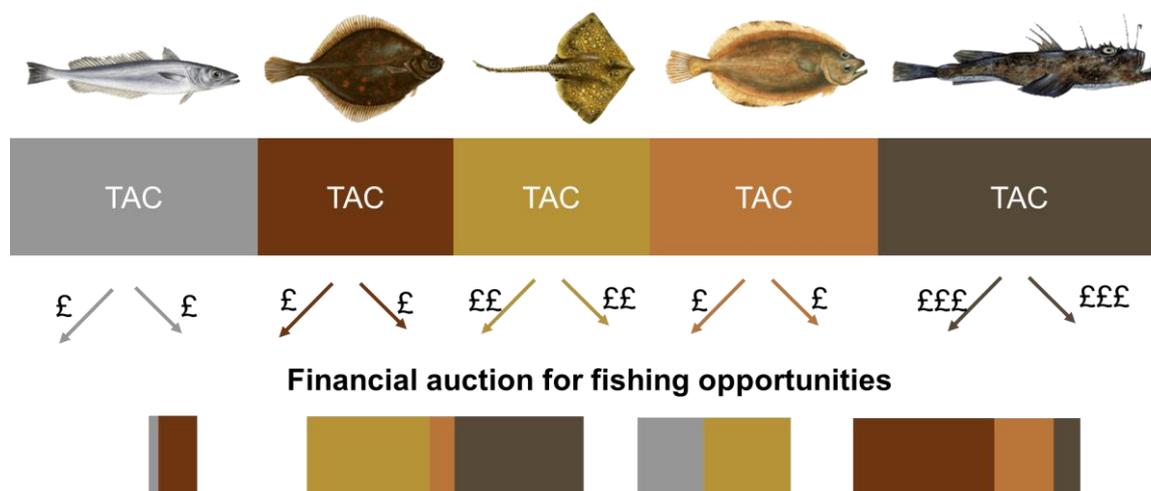
Financial auctions allocate fishing opportunities to the highest bidder. While auctions have been used to allocate some resource, for example the 3G auction in 2000 raised £37 billion, equating to 2.5% of UK GDP (Binmore and Klemperer, 2002), this method is relatively uncommon in fisheries. Only 3% of quota systems use auctions exclusively to allocate shares, but up to 30% have used auctions to allocate some fraction of the catch shares (Lynham, 2013).

In Europe, there are historical examples of the use of auctions to distribute fishing rights. For example, oyster-bed leases in the Dutch province of Zeeland were allocated through auction from 1870 until shortly after the outbreak of the First World War (van Ginkel, 1988). Until 2005, 90% of rights in Estonia were allocated according to historical track record, with 10% of fishing rights distributed at auction each year (Vetemaa et al., 2002). Chile and New Zealand have also used auctions for part of their quota allocation systems (Lynham, 2013).

In 2018, the Faroe Islands passed a new fisheries reform to prevent the privatisation of the seas and retain public control of fishing resources. The Faroese nationalised their fishing quotas and distribute them to the fishers in public auctions. Quota holders are obliged to use them. Additionally, fishing licences cannot be traded directly between private hands but need to be auctioned in public. Another important element of the reform is the allocation of fishing quotas to trawlers based on the number of fish they can catch and not the number of days at sea, as previously established (Hanssen, 2018).

Based on these examples of where auctions have been used in other fisheries, an auction for fishing opportunities in Wales could be used for a portion of the available fishing opportunities, once allocations have been made based on other criteria and priorities. This would enable other priorities to be addressed first through preferential allocation to certain sectors (e.g. <10m vessels) or vessels based on criteria to be determined (e.g. historical track record, beauty contest criteria), with any remaining fishing opportunities, or a portion of any new fishing opportunities (e.g. if additional quota can be brought in to Welsh fisheries) being allocated through auction.

Figure 8: Financial auction for fishing opportunities



Depending on objectives, the auction could be open to any participants (which would help maximise the potential revenue from the auction), or participation could be restricted based on criteria set by Welsh Government (e.g. established track record in the fishing industry, local economic link to Wales, commitment to land catches into Welsh ports), although this would likely reduce the overall revenue potential of the auctions. Important design features to consider, which affect who can participate in the auction and the degree of concentration among shareholders, include (Lyndham, 2013):

- Type of auction used (e.g. English, sealed-bid);
- Size of the shares sold at the auction;
- Consolidation limits; and
- Whether bids are paid upfront or when fish are landed.

The quota of fishing opportunities to be auctioned may be set by Welsh Government in some cases (i.e., those stocks for which Welsh Government has management responsibility), or may be the portion of the UK quota that is allocated to Wales as a fisheries administration. The auction could be run by Welsh Government, or by a separate independent body established for this purpose.

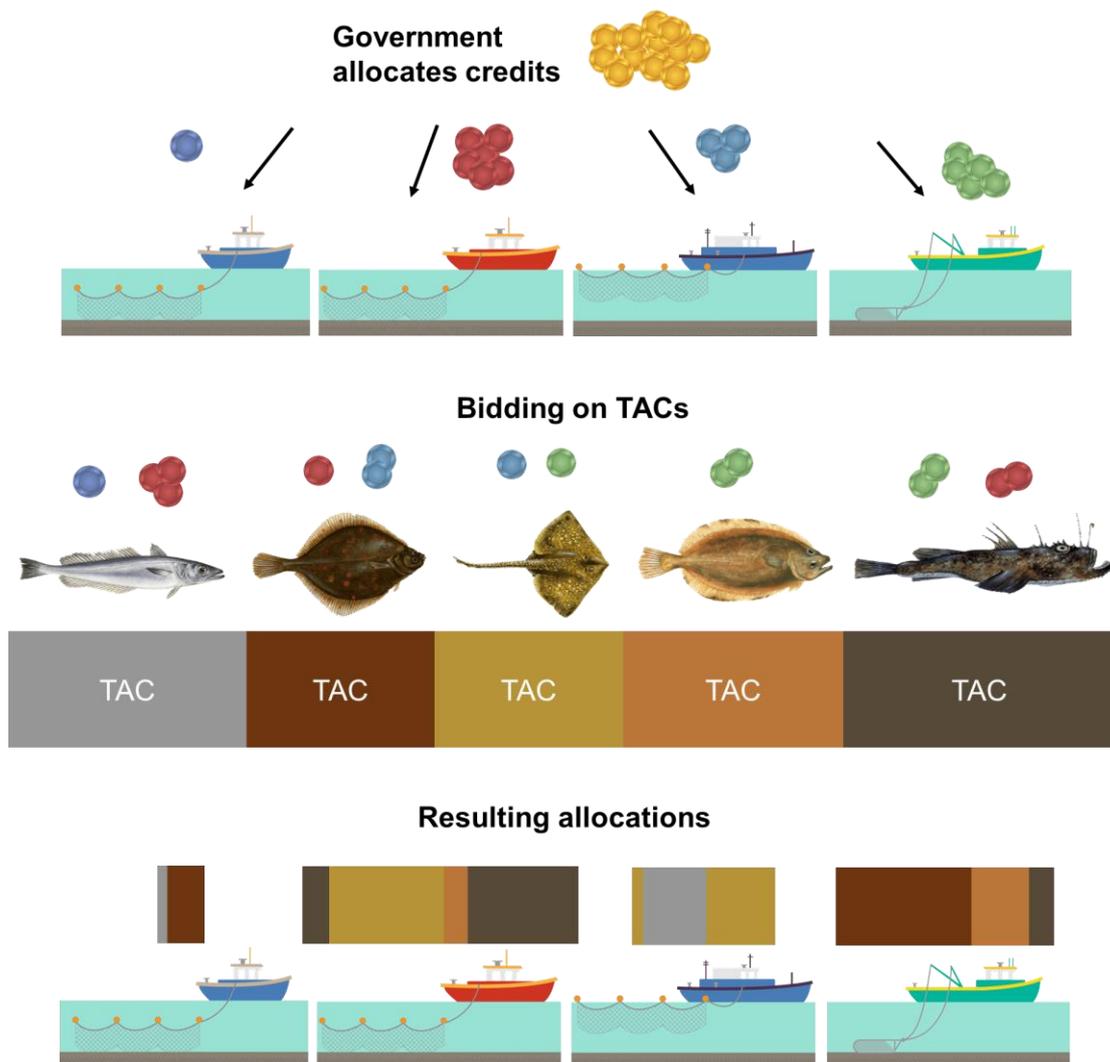
Financial auctions have only recently been suggested for fisheries in the UK, most prominently in the UK Government’s Fisheries White Paper (Defra, 2018a). This was met with resistance from fisheries stakeholders. The White Paper consultation notes:

The possibility of auctioning quota in England was met with mixed reactions across sectors, with most being against it as they were concerned that it would unfairly disadvantage smaller or less prosperous fishers; however, some saw it as an avenue for MMO cost recovery...Concerns were expressed by the catching sector that auctioning of quota would lead to consolidation and be prohibitive for new entrants or small scale fishers to access the industry (Defra, 2018b).

Non-financial auction

While it is often assumed that auctions for fishing opportunities are financial, this need not be the case. Criteria-based allocations where fishing opportunities are gifted through a tendering process based on the strength of the application have some similarities to non-financial auctions.

Figure 9: Non-financial auction for fishing opportunities



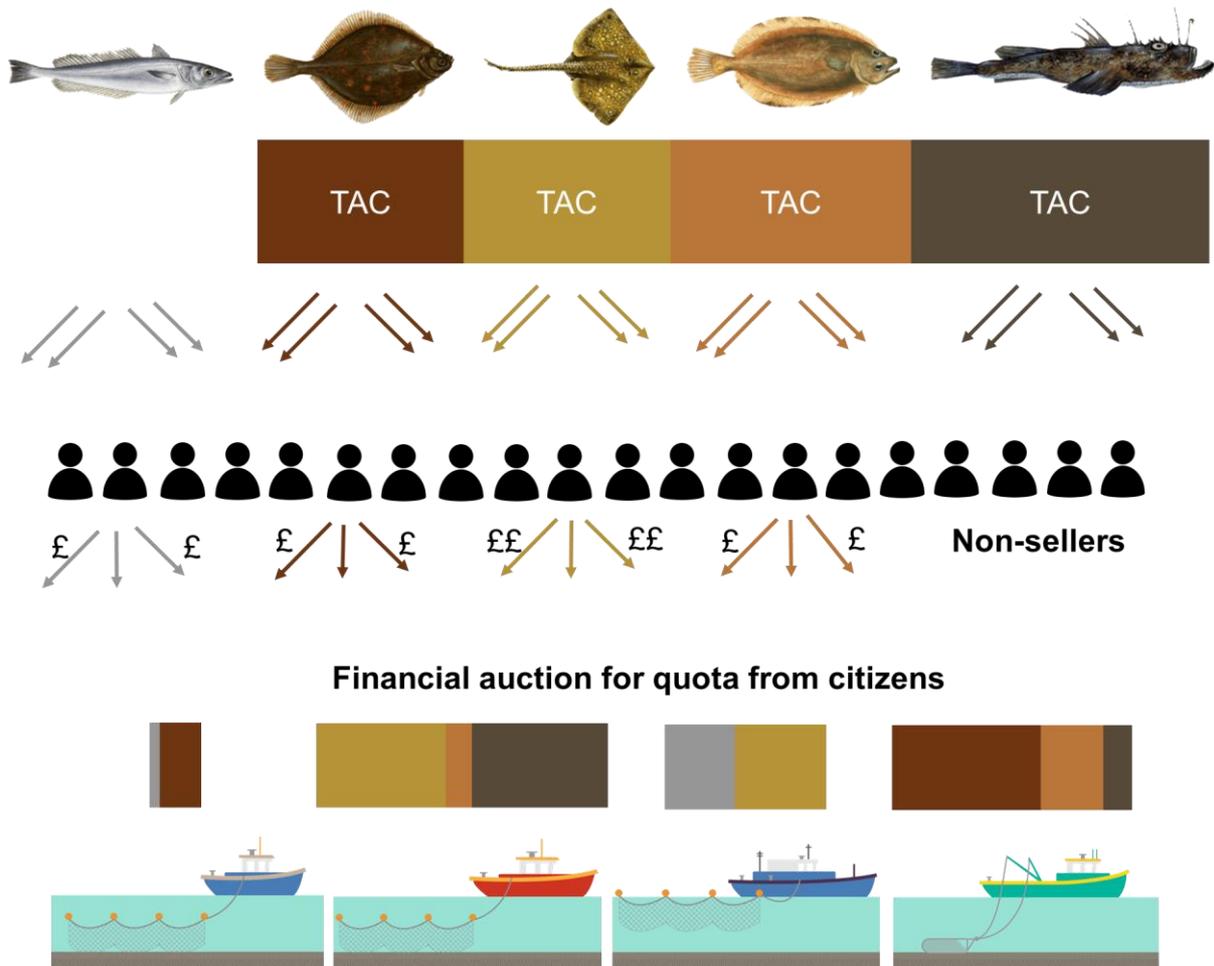
There is also the option to use non-financial auctions, for example allocating credits to fishers who can then use these credits (rather than their money) to bid at an auction. These credits can be allocated according to any number of principles or criteria. The objective is to put fishers in control of balancing the fishing opportunities they need most.

Food banks in the USA have developed a system where centralised donations are distributed to local food banks according to a non-financial auction market. Each food bank has credits that are used to bid on available food items (Prendergast, 2017). This system means each food bank can respond to their local needs and shortages without needing to rely on finances which can be unevenly and/or unfairly distributed. In fisheries management, this could work by assigning fishers credits (with the potential to allocate some credits based on social and environmental criteria) to bid on annual quotas that could support their fishing business. There is a risk, however, of unforeseen marketplace behaviours (e.g. one individual dominating the market for one species). The repercussions of such behaviour are much greater in fisheries than in food banks as access to a species (especially choke species) can determine whether a fisher can go to sea at all.

Allocation to the people

One particularly straightforward approach to emphasise that fish populations are a public asset is the direct allocation of fishing opportunities across the Welsh population. Few citizens would use the fishing opportunities directly, but an online auction system (set up by Welsh Government or privately) would allow licensed commercial fishers to acquire quota in a similar, but likely more disjointed, manner to an auction by the government. Some citizens may decide not to sell, either because the financial outcomes do not motivate effort, or in effort to conserve fish populations. This expression of preference is not a problem *per se* if the mechanisms are available. One potential advantage of this system is that it could easily accommodate recreational fishing (currently managed separately) within the same quota system.

Figure 10: Allocation of fishing opportunities to the people



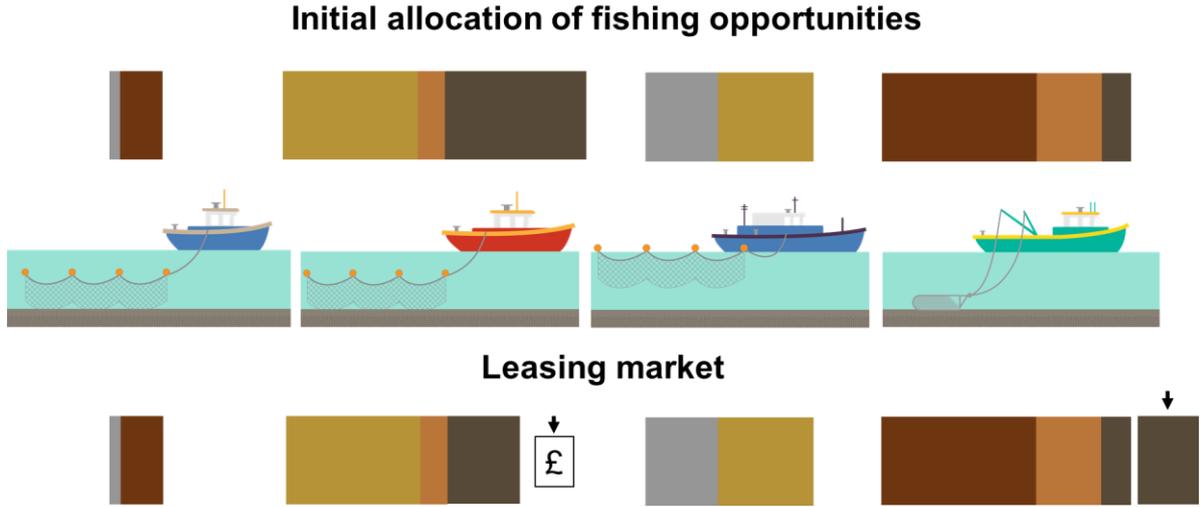
Currently, with 700 tonnes of Welsh quota, each citizen (or resident) of Wales would receive approximately 0.2kg of quota. As this has next to no value (certainly not a value worth the effort of seeking a buyer), an alternative scheme could issue a quota lottery with the same mechanisms in place for licensed commercial fishers to acquire the quota. Later in this section, an alternative system is outlined where a revenue share from commercial fishing is distributed to citizens through royalty payments rather than fishing opportunities themselves.

Exchanging fishing opportunities

Regardless of the allocation method used (from government to fishing licence), a market can be used for fishing opportunities (between licence holders). Currently, sector fishers can swap quota (exchange a quantity of quota for one TAC for a quantity of quota for another TAC, e.g. cod for haddock), lease quota (pay for a quantity of quota within that year, after which it returns to the owner), and sell quota (permanent financial transfer). For fishers in the

<10m pool and non-sector fishers, the fisheries administration acts as a broker for their fishing opportunities.

Figure 11: An example of a leased fishing opportunity



Online platform for swapping fishing opportunities

Other quota management tools besides transferability can utilise peer networks to increase flexibility. Risk pools are used to combine quota for a group of fishers together and therefore act as an insurance system. Existing POs can serve this function for their membership. An alternative system to add flexibility into the quota system would be to scale-up systems of quota swaps (e.g. cod for haddock), which do not involve financial transactions. New technologies and mobile phone apps could be used to foster a flexible system of peer-to-peer quota swaps that do not require producer organisations (Carpenter and Kleinjans, 2017).

Market for transferable fishing opportunities

Some commentators have pointed to the system of individual transferable quotas (ITQs) as a potential model for post-Brexit fishing opportunities (Pirie, 2016). Iceland and New Zealand are often used as models for ITQs, although even within the EU there are Member States (e.g. Netherlands, Sweden, Denmark) that have ITQs as part of their fisheries management system (Carpenter and Kleinjans, 2017).

ITQs are touted for their ability to add flexibility to a quota system (Birkenbach et al., 2017); however, this is only true if fishers have the capital to make large transfers of ownership. This is frequently not the case and is also an issue that has plagued the quota leasing market in the UK.

ITQs are also praised for their sustainability benefits (Costello et al., 2008; Isaksen and Richter, 2019) . However, ITQs, like all systems of managing fishing opportunities, are a combination of multiple management attributes and it is not clear that it is the transferability of fishing opportunities that results to sustainable outcomes as opposed to the duration or ownership of fishing opportunities (discussed in the ownership section) or the ‘individual’ allocation of fishing opportunities (discussed in the pooling section). Empirical literature that specifically analyses transferability finds no effect on sustainability (Essington et al., 2012; Melynychuk et al., 2012) or even a negative effect (Melynychuk et al., 2014).

In terms of economic effects, the advantages and disadvantages of transferable fishing opportunities are much clearer, with proponents often pointing to increased profitability as a result of consolidation and opponents pointing to job losses in coastal communities (Carpenter and Kleinjans, 2017).

It is important to note that transferable fishing opportunities, and, to a lesser extent, leasable fishing opportunities, can undermine the objectives achieved through the allocation of fishing opportunities as the market disrupts the original distribution. As a fisheries minister for Namibia noted in opposition to transferable fishing quotas:

To be comfortable with the outcome of full transferability of rights, a community or a government has to be broadly indifferent to who holds the rights. That may not seem like a major limit, but even the strongest systems of transferability all seem to have limits, for example on right-holding by foreign interests (Iyambo, 1999).

If some fishing opportunities are intentionally allocated to specific fishers because they have a low environmental impact or high social impact, then a market will undermine these objectives. Greater revenue would accrue to these targeted fishers, but the specific objectives will not be achieved.

One modification of an ITQ system to pursue other objectives would be to tax a portion of the FQA transfers either in quota (e.g. to populate a quota reserve, as in France), or as a financial value (e.g. to fund government, as in a Tobin tax on financial trading).

Limits on sale

In many systems of fishing opportunities, there are limits on sale. These can include:

- Ringfenced by region or fleet (e.g. transfers within a vessel class or geographic boundary);
- One-way transfers (e.g. transfers from industrial to coastal fisheries but not in the opposite direction);

- Concentration shares (e.g. a limit of 10% of the total fishing opportunities for a TAC held by one owner).

Pooling fishing opportunities

Most of the policy options for allocating and exchanging fishing opportunities imply that fishing opportunities are held individually, but they can also be held collectively. These systems involve fisheries exploiting a pool of fishing opportunities until it is exhausted. These Olympic fisheries give an incentive to race to fish where individuals fish as much and as fast as possible because the pool of quota is exhausted. This leads to short fishing seasons, spikes in supply, low prices, and dangerous fishing conditions.

There are also hybrid models between individual and collective holdings. In the UK, all fisheries administrations have quota pools for the <10m fleet. While there is a joint pool for <10m fishers across the full year, these fishing opportunities are still allocated in individual, monthly allocations. Each fisher is restricted by their individual allocation.

Managing fishing opportunities through pooling is sometimes associated with, and confused with, community quota (discussed later as a form of ownership).

Externalities

In economic terminology, an 'externality' refers to a cost or benefit that is incurred or received by a third party to an activity. In environmental policy, negative externalities are discussed in detail, for example, the negative externalities that are incurred by the public as a result of air pollution from diesel and petrol motor vehicles. Fisheries policy is rarely characterised in the terminology of externalities, although negative externalities (e.g. bycatch, seabed impact, fuel use) are recognised.

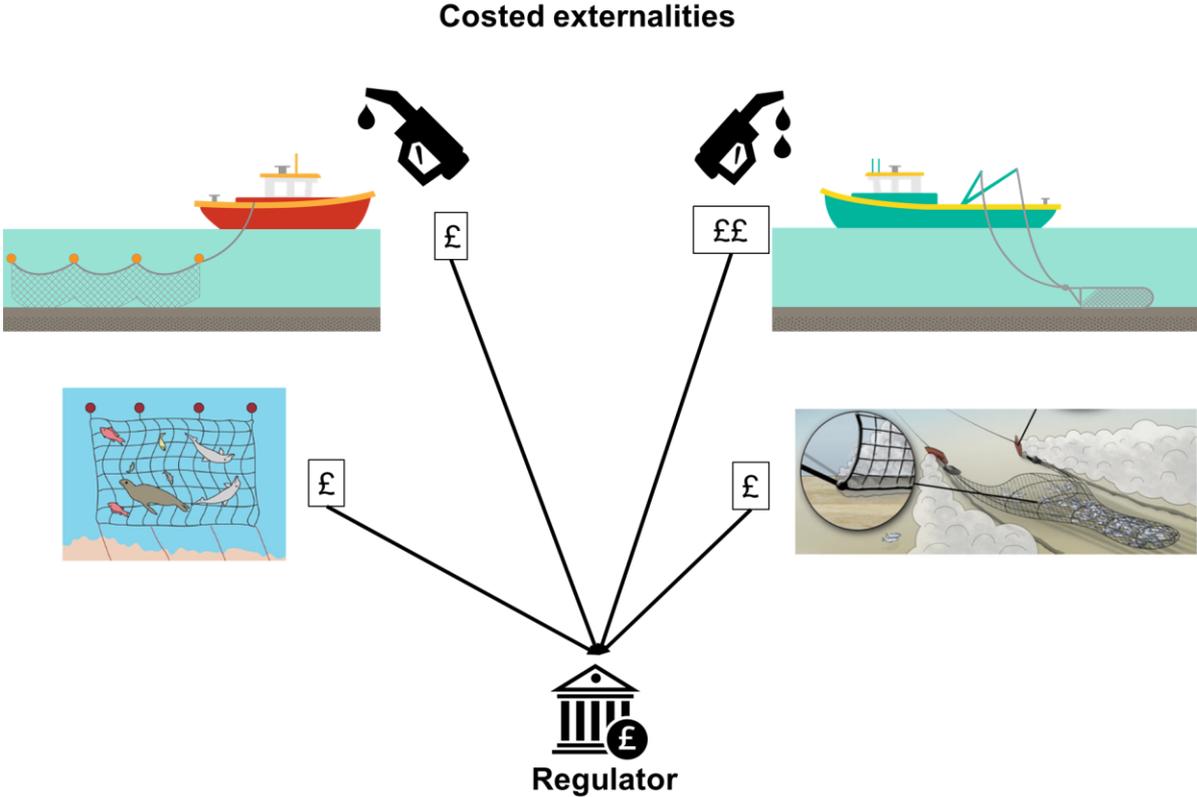
Taxing externalities

In general, negative externalities from fishing are dealt with through regulations to minimise their extent, but externalities could also be dealt with through criteria-based allocation of fishing opportunities (i.e., allocating fishing opportunities to fishers with high positive externalities and/or low environmental externalities) or by levying taxes for the creation of negative externalities, such as the modelling by Ryan et al. (2014).

Taxing externalities (a Pigouvian tax) attempts to lower the production of externalities in the same way that a price increase lowers the demand for a product or activity. This taxation is not about raising revenue, although this point is often misunderstood. It is irrelevant what happens with any revenue raised, illustrated, for example, by plastic bag levies where all revenue raised is distributed to charity. Certainly, revenue can be used to further the same

purpose (sometimes referred to as the double dividend of environmental taxes) but the primary purpose of taxing externalities is to shift the amount of a certain activity to its socially optimal level, – the level once any externalities have been accounted for.

Figure 12: Charging externalities



This approach to managing externalities is sometimes referred to as a market-based system (e.g. for carbon taxes) but there is no market created for the externalities. It is simply a system based on financial incentives. This allows for a more dynamic outcome (i.e., whether fishers pay the charge or adjust their behaviour) compared to direct regulation.

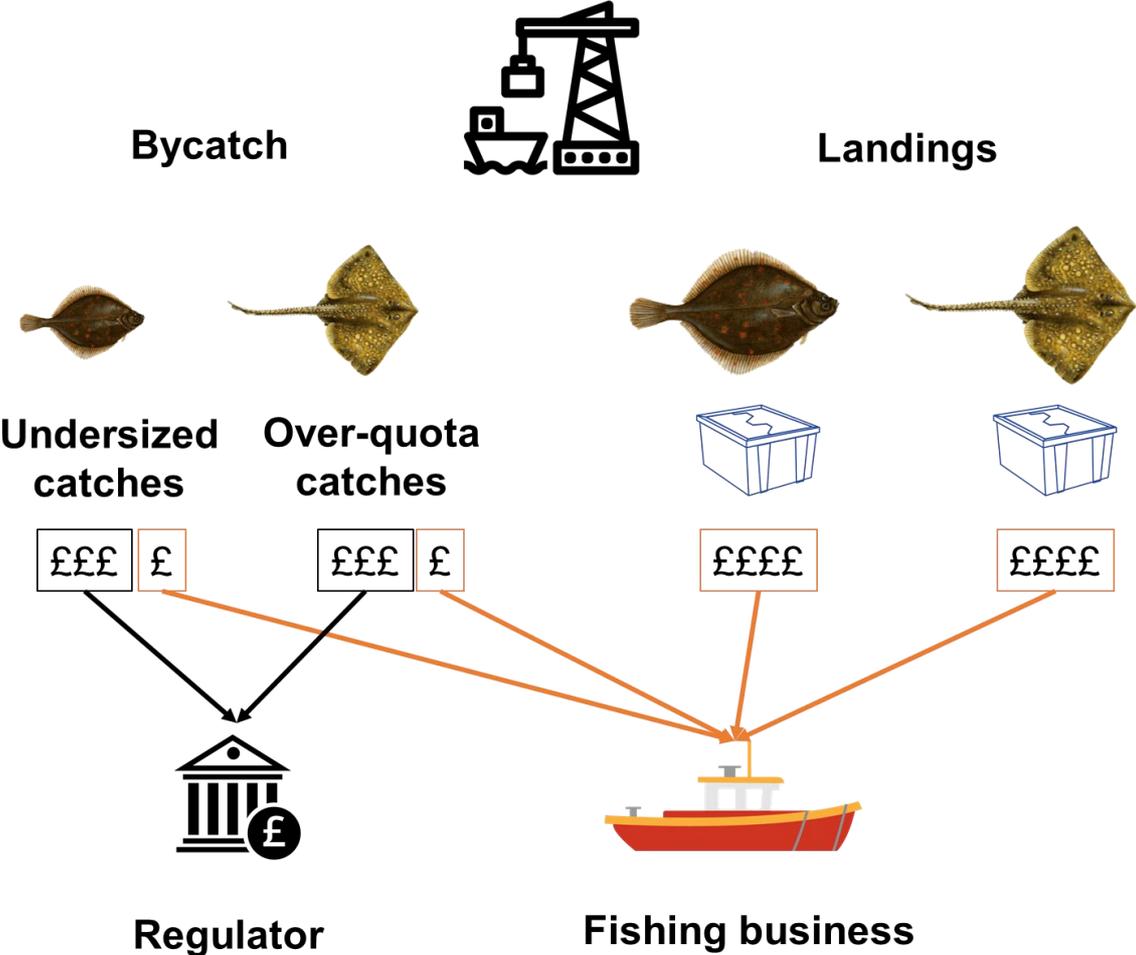
Discard charging scheme

The UK Fisheries Bill grants the UK Government’s Secretary of State the power to establish a scheme to charge fishers for unauthorised catches of fish. This allows fish caught to still be used for human consumption while balancing the incentive for selectivity with the incentive for illegal discarding. Such a scheme is essentially charging for externalities, as some portion of the revenue is ‘taxed’ by the regulator.

It is not specified that this power has also devolved to the fisheries administrations, potentially implying that the UK would need to implement such a policy across all UK vessels

or not at all. If such a scheme is possible for Wales to legislate independently, it provides an option to incentivise selective fishing while preventing a choke risk, ending the ability to fish in a mixed fishery once the most limited quota is exhausted.

Figure 13: Discard charging scheme



Norway implements a discard charging scheme whereby the economic value of fish caught above quota is forfeited to the state but in the whitefish sector, 20% of the value is kept by the fisher to encourage landing rather than discarding at sea. The scheme is part of the Norwegian approach to discarding that has been successful in achieving many of its objectives (Diamond and Beukers-Stewart, 2009). While the EU discard ban (landings obligation) is fully implemented, reports are that it is widely flouted (EFCA, 2020).

Landings

Policy governing fishing opportunities can also apply after fish has been caught and the fishing opportunity has been transformed from a privilege in law to physical catch. The existing economic link policy, which refers to the licensing of UK fishing vessels is one such policy, but there are many more policy options concerning what happens to the landings of fish that are caught using fishing opportunities.

Economic link

To ensure that fishing opportunities provide a real benefit to UK coastal communities and wider society, the economic link policy specifies a UK licence condition whereby one of the following options must be satisfied:

1. Make 50% of quota landings into the UK;
2. Have 50% of crew normally resident into the UK;
3. Incur 50% of operating expenditure in the UK.

Vessels not establishing an economic link licence condition also have the option of agreeing with their licensing administration to make quota gifts instead of meeting the other criteria for establishing a real economic link.

A review of the economic link policy concluded that the effect was minimal (Defra, 2009); however, it remains one of the few policies that engage with the issue of foreign ownership. While the *Merchant Shipping Act 1988* required fishing vessels to be 75% owned by UK nationals, the *Factortame* case established in 1991 that these provisions could not be upheld in relation to EU nationals (and that European law took priority over UK law), so the economic link was put in place. There have been calls to return to the ownership condition of the *Merchant Shipping Act 1988* post-Brexit; however, the Secretary of State was clear in a statement to the House of Lords EU Energy and Environment Sub-Committee that the UK government was not pursuing this option:

In future, any foreign company that wanted to buy vessels in the UK they might well be able to, but it would be subject to that new condition [stronger economic link]. It would also require there to be a willing seller and I think if we are creating the opportunities for our own fleet and actually allocating additional quota in a different way, as we've set out in our white paper, you're less likely to see that kind of purchase of vessels (Eustice, 2020).

The economic link is currently applied at a UK-wide level but there is an opportunity for each fisheries administration to establish their own economic link (whether an economic link the UK or the specific devolved nations). In 2017, Marine Scotland launched a consultation on amending the economic link licence condition in Scotland to do away with the crew and

expenditure options but requiring that 55% of catches of quota species per calendar year be landed into Scotland (Marine Scotland, 2017). Much of the feedback, especially from the catching sector, was wholly negative and the policy was not taken forward. At its core, an economic link policy disadvantages the catching sector profitability in favour of turnover for domestic fish processing and associated services. If landings are not taking place locally, there is some reason (generally economic) why these landings are currently happening elsewhere.

Landings levy

Fisheries management is extremely expensive, especially relative to the size of the industry in economic or employment terms (Carpenter and Kleinjans, 2017; Carpenter and Millar, 2018). Fisheries management also generates resource rent through limiting entry to the fishery, rent that the government does not directly recover. A quota auction is one approach to the generation of government revenue from fisheries. Another option is to institute a landings tax, which has the advantage of extending beyond quota fisheries and covering all species.

The most likely design is to levy Welsh vessels regardless of where their landings take place. While this would avoid the situation of incentivising landing in Ilfracombe or Fleetwood instead of Wales, it could potentially put Welsh fleets at a competitive disadvantage, although the financial performance of the fleet is improving and is healthy across the Welsh fishing fleet. It could also result in the reregistration of Welsh vessels to other UK administrations, although under the 2012 UK Concordat on Fisheries Management, this is only allowed for “genuine changes in fishing patterns” (Defra, 2012a).

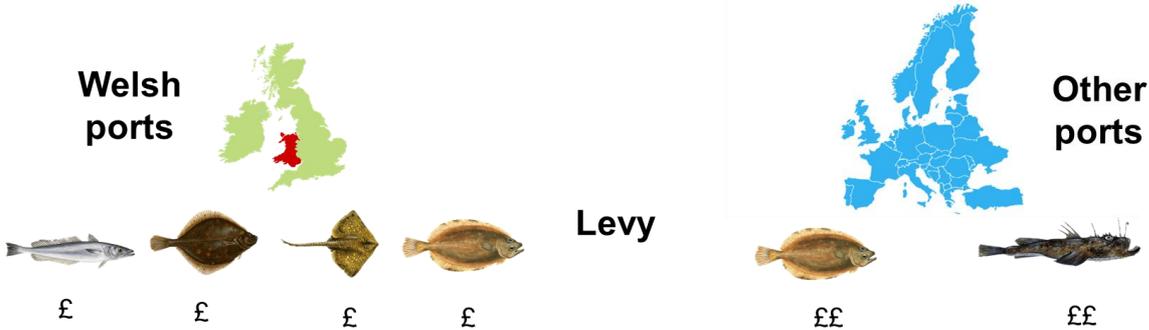
To ensure ease of implementation, the levy could build on the existing Seafish levy (for the catching sector). Several fisheries in the USA have a landings tax, whereas Iceland has a tax on landings and a further tax on fishing profits (Carpenter and Kleinjans, 2017).

As a tool for raising revenue from fisheries, there are three main reasons why a landings tax could be preferable to an auction. First, the variability in the resource generates an uncertain revenue stream. This problem is compounded if the revenues from the auction are hypothecated for specific purposes within the government. Second, the success of the most profitable fishers at auctions, or those with the greater access to capital, does not guarantee the most desirable quota allocation through auctions. And third, there are many non-quota fisheries (mostly under effort limits and technical regulations) that incur management costs, create negative externalities, and generate resource rent, just as quota fisheries do. This is described in more detail in Carpenter and Millar (2018) in the Scottish context.

Differentiated landings levy

As a potential modification, a landings levy could provide an incentive using a differentiated rate for domestic and foreign landings. One first step would be to set this differentiated rate to deduct current port duties in the UK. The treatment of landings from foreign vessels into UK ports under this levy is an important consideration as it should balance the incentive to land in the UK with the perception of disadvantaging domestic vessels.

Figure 14: Differentiated landings levy



This policy option contrasts with the economic link which establishes minimum criteria that UK vessels must adhere to be a licensed UK vessel. A differentiated landings levy is less prescriptive while also providing a marginal incentive for each trip rather than a required 50% of landings into Welsh ports which provides no incentive if a vessel is well above this threshold. Such a levy is detailed in Carpenter and Millar (2018).

Ownership

There is a great deal of ambiguity relating to the ownership of fishing opportunities in the UK. Fishing opportunities are considered by both the UK Government and Welsh Government as a public resource; however, due to the continued allocation of fishing opportunities in the same shares to the same FQA holders, in 2012 the High Court ruled that FQAs could be considered a possession, as a “legitimate expectation” around quota shares had formed, despite this expectation being “built very much of sand” as “no-one can own the fish of the sea” (Royal Courts of Justice, 2013).

This gradual transformation of resource ownership to FQA holders has been referred to as the “accidental privatisation” (Carpenter, 2018) of fishing opportunities and is cited as the largest squatting claim in UK history, valued at £1.1 billion (Appleby et al., 2016). Besides the 2012 High Court ruling, which ultimately ruled in the government’s favour as the reallocated quotas were consistently unused, the strength of this private claim has scarcely been tested and ambiguity remains. This is not a unique position internationally. In all developed countries, fishing quotas are set by a public body but used for private profits in the fishing

industry. At some point in between, fishing quota is 'transformed' from public to private ownership when the quota is allocated.

There is, however, international variation between countries in the duration of fishing quota. In New Zealand, quota shares are held indefinitely; in Denmark, quota shares are set at 16 years; and in Ireland, duration only lasts one year (Carpenter and Kleinjans, 2017). By far the most common practice is for the duration of quota shares to be unspecified, with the government claiming that quota is ultimately owned by the government (even in ITQ systems like Iceland) but in practice, the industry feels secure that the same or similar quota shares will continue year-on-year. Often, it is this issue of duration that researchers are referring to with terms like 'rights-based management' or secure 'catch shares' (although these terms are sometimes used for systems where, legally, the duration is ambiguous).

Much of the debate over ownership is specific to fishing quotas, although in theory some of the arguments could apply to non-quota fishing opportunities. However, because non-quota fishing opportunities are more adaptable on an annual basis, because they do not specify a quantity of fish and are therefore less tangible, because they are non-transferable and therefore no investments were made in the opportunities themselves, and because they are often universal (thus avoiding the debate over the security of 'shares'), it is generally assumed that there are no effort limits and other non-quota fishing opportunities do not represent a possession.

Nationalise existing fishing quota

There is an opportunity, especially given the ambiguity around the ownership of fishing quota in the UK, to nationalise fishing quota. The UK Government has resisted such calls (just as they have resisted calls to repatriate foreign-owned quota), instead focusing solely on any "new fishing opportunities" that result from Brexit (Defra, 2018a).

There would be challenges if Welsh Government took a different approach from the UK Government, especially as existing quotas would still be allocated to Welsh Government based on FQAs (as per the UK Concordat on Fisheries Management). However, Welsh Government could nationalise the quotas received (and then redistribute if it wished).

Specifying legal duration

In a similar vein, there is an opportunity to specify the legal duration of fishing opportunities. One approach would be to do this in conjunction with the nationalisation of existing fishing quota, for example by specifying a notice period of X years and then specifying a legal duration (thereafter) of Y years.

A legal duration to fishing opportunities attempts to offer the benefits of security to fishers while also formally securing national ownership of a public asset. This ownership structure is essentially a long-term lease from the state (whether paid or unpaid).

Privatisation of the setting of fishing opportunities

At one end of the ownership policy is to not only privatise fishing quotas (the New Zealand model) but to fully privatise the setting of fishing quotas as well. In economic theory, if fishing quotas are secure in the long term, then the problem of overfishing (the stock externality) is both perpetrated and absorbed by the same people and businesses. If the fishing quotas were set high, or removed entirely, then the value of the fishery would plummet and with it the value of the business. This approach is more like terrestrial resources like farming where it is assumed that secure property rights incentivise stewardship of the resource. Among developed countries, there are no examples of privatised quota setting, but it is the natural extension of the arguments around the benefits of secure quota and rights-based management.

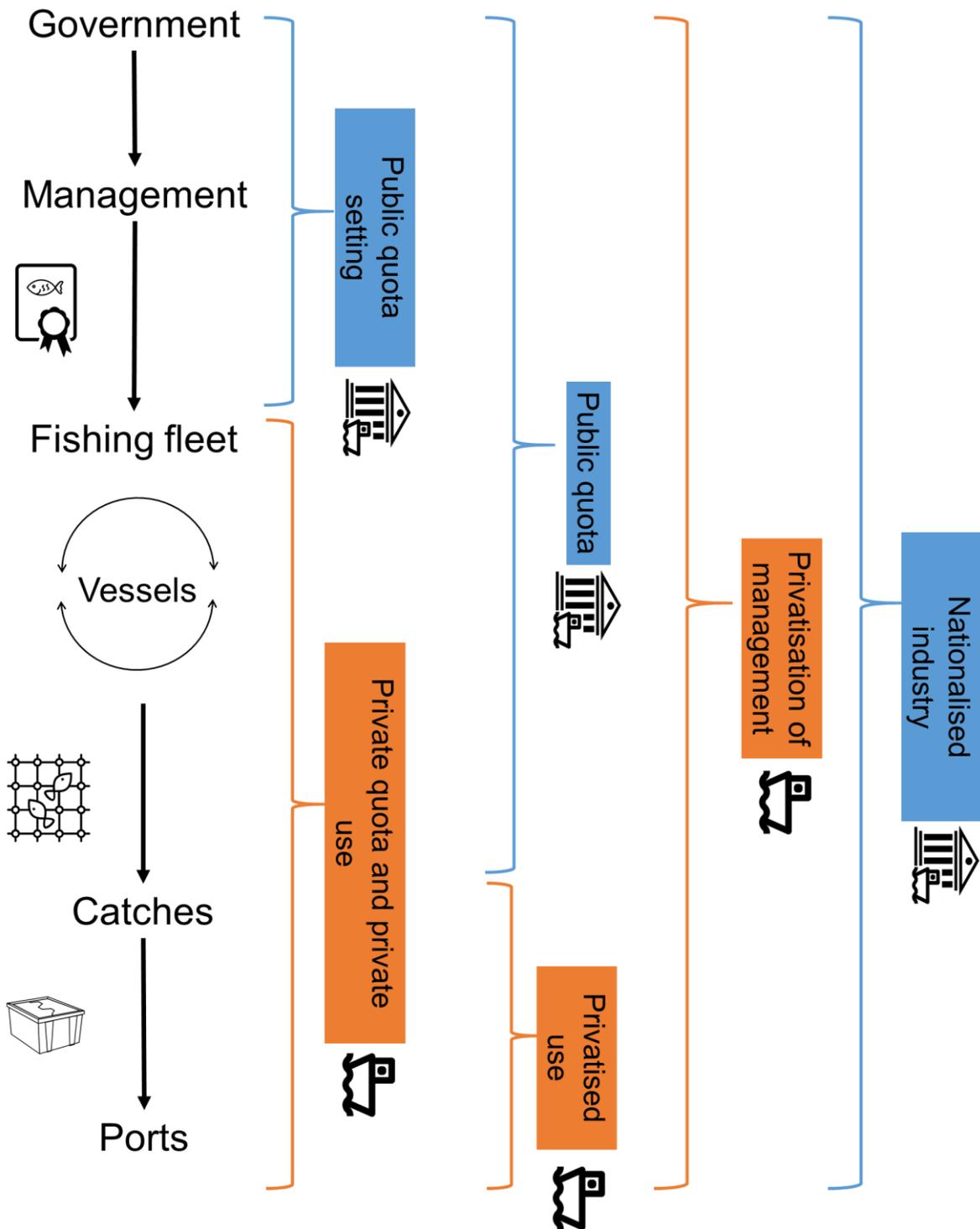
Nationalisation fo the fishing industry

At the other end of the spectrum of approaches to ownership lies a nationalised industry. Rather than just fishing opportunities being nationalised, this involves the capture of fish as a state employer rather than for private profit. Given the diverse objectives and plethora of management measures over the use of fishing opportunities, a nationalised industry is in some ways a simplification of this management approach.

From an economic perspective, given the high costs of fisheries management, the resource rent that is captured, and the negative externalities of fishing, there is an asymmetry between who pays for the costs of fisheries management and who reaps the benefits. A nationalised industry (like fully privatised management) is one means of aligning these costs and benefits.

It is not uncommon for industries that extract natural resources to operate under nationalised ownership (e.g. water, energy). However, most of these resource industries are natural monopolies where high infrastructure costs prevent competition whereas the fishing industry has many small businesses. Among developed countries, there are no examples of nationalised fishing industries.

Figure 15: Models of quota ownership



Community ownership

Similar to how the management of fishing opportunities has been devolved from the UK Government to Welsh Government, management could be further devolved to local government or community groups. Whereas producer organisations manage fishing opportunities on behalf of their membership (i.e., individuals who are free to leave with their own fishing opportunities at any time), community ownership involves self-governance where there are no national allocation rules and ownership is at the community level so an individual cannot leave the scheme. Community ownership implies a community of fishers, rather than a coastal community. For this reason, difficulties incorporating new entrants still remain.

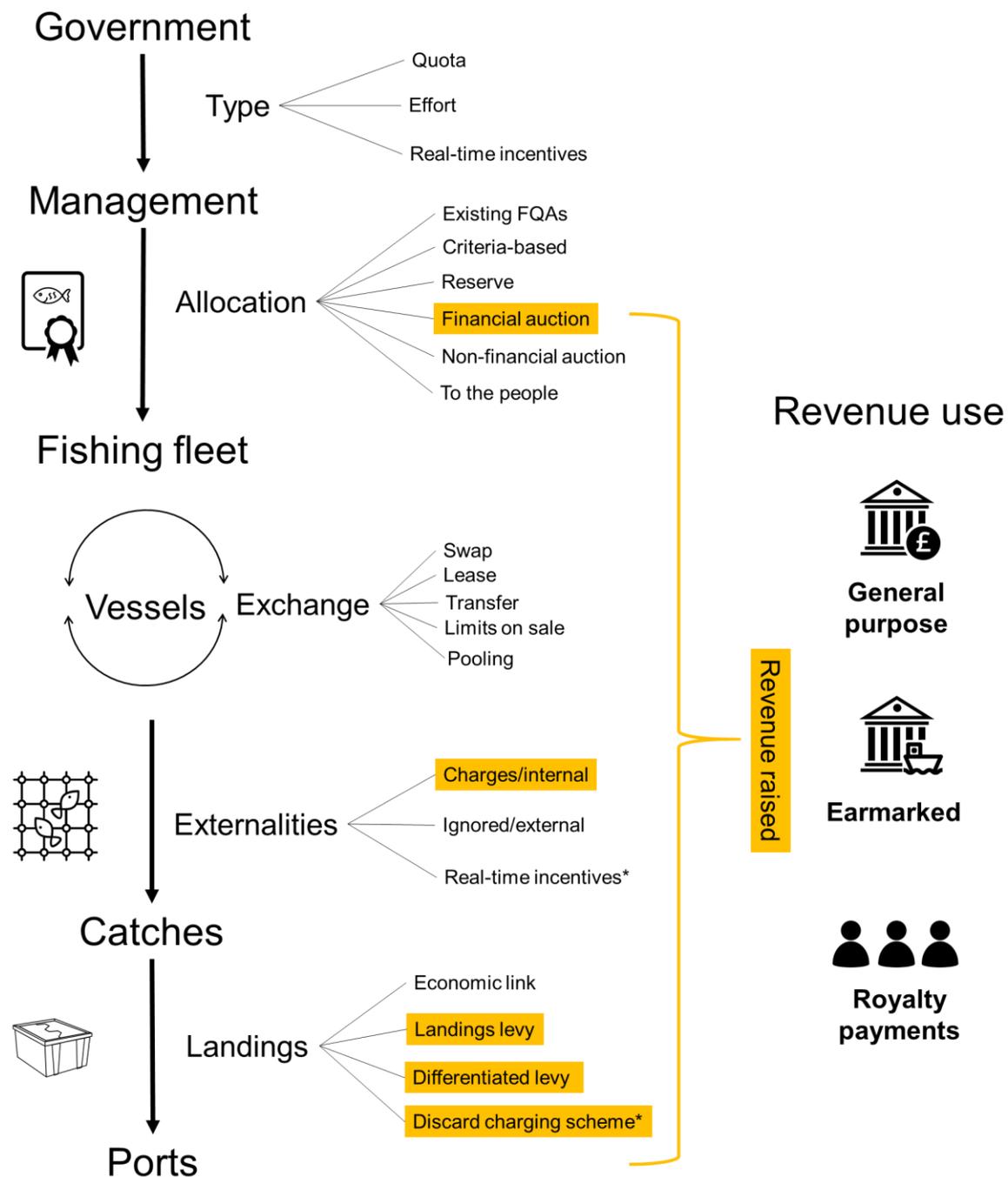
A second form of community ownership is the purchase (or gifting) of quota shares by communities (such as local authorities). These communities can then determine rules of allocation through standard democratic functions; however, national quota rules still apply. Examples include the Shetland Government (Anderson, 2008) and community quota programmes in Alaska (NOAA, 2020).

Research on systems of community ownership has shown that fishers in these systems have higher incomes than those fishing from total quota pool (Salazer and Dresdner, 2020) and lower levels of inequality than those fishing against individual quotas (Villanueva et al, 2019).

Revenue use

Several of the policy options previously detailed raise revenue through their application (financial auctions, charging externalities on use, and a landings levy). If any of these policy options are implemented a complementary policy over the use of revenues raised will be required. Three alternative approaches for the use of revenue are considered here: earmarking revenues for fisheries management, using revenues for general purposes, and issuing royalty payments to citizens.

Figure 16: Policy options for revenue use



Earmarking revenues for fisheries management

As part of a strategy to gain support for new taxes it has become popular to propose the earmarking of tax revenues for specific purposes (i.e., the hypothecation of revenues).

Surveys have revealed that hypothecation can significantly raise support for environmental taxation (Bachus et al., 2019). This is an appealing option for policy makers. In the UK, the hypothecation of water abstraction revenues for water-resource-related purposes is credited with building support for that charge.

While the suggestion of charging fishers in addition to their normal costs of doing business has only recently come about in fisheries management, there is some support, although fishing representative bodies are clear that they should have a say over how the revenues are used ('user pay, user say'). Such an approach to decision making has its advantages and disadvantages. It is unclear how it would work in practice.

Regardless of industry 'say', hypothecation of revenues is either extremely complicated to put into practice, or, extremely misleading. Hypothecation requires that revenue and expenditure balance in a certain period, but this generates extreme uncertainty in spending plans. This was observed in the cost-recovery scheme for the Scottish Solway cockle fishery (Marine Scotland Science, 2015). It could even backfire as the greater the intended incentive effect of the tax, the less revenue is raised for another worthwhile objective. It is generally poor policy design to put policy objectives at odds through perverse incentives.

'Softer' forms of hypothecation where a new tax contributes towards covering a larger expense is primarily about policy presentation, as the other sources of revenue could rise or fall in response. For example, new revenues earmarked for fisheries management could simply displace existing revenues originally destined for this expenditure to somewhere else. In this scenario, the marginal effect of the hypothecated revenue from fisheries would be an increase in spending in a different, unadvertised area. As the costs for fisheries management already exist, as opposed to a new programme, either additional expenditure must be equated and agreed by successive governments or displacement is inevitable.

Using revenues for general purposes

An alternative to hypothecation (whether hard or soft) is to simply direct the revenues to the general government coffer. This approach is both easier to implement and a more honest account of how government finances operate. Given the size of the Welsh fishing industry, it is likely that the revenues would be used directly, but an alternative approach, modelled on the Norwegian Oil Fund (which funds about 15% of government services) would distribute funds to government from interest accrued on investments, rather than directly from the resource itself (Fernand, 2019).

The main drawback of using revenues for general purposes is that it is unpopular and perceived as a money grab. This need not be the case with negative externalities, as the funds raised are irrelevant to the main purpose of changing incentives through the pricing system. For auctions and landings levies however, a money grab (i.e. raising revenue) is

specifically the point of fisheries charges as currently fisheries management costs are paid for through general taxation whereas the profits accrue privately.

It may also be the case that popular support for hypothecated revenues is short-sighted. As the *Financial Times* argues in an editorial against the rise in proposals for hypothecated taxes, both the revenue-raising element and the expenditure element must be finely balanced and agreed by successive governments, an unlikely proposition (*Financial Times*, 2018). This is exactly what happened in the 1970s when national insurance contributions could no longer keep pace with contributors' state pensions and other employment-related benefits and the link between the two broke (Giles, 2018). When, almost inevitably, a promise of hypothecation breaks down, there may be even more resentment and distrust than if general taxation were used.

An approach in between hypothecation and general purposes would be to simply set a revenue target for fisheries charges as a percentage of management costs (e.g. 50%). As the remaining amount would be covered by public costs, there is no fear if the amounts do not exactly balance and there is also no need to formally earmark funds if the only objective is a revenue target.

With Brexit and the Covid-19 crisis impacting public finances and fisheries management in Wales, there is an opportunity to design the optimal funding mechanism from a blank canvas rather than selling one specific policy feature. As a recent study of the Iceland fishing fees (totalling 6% of earnings) concludes: "The experience from Iceland shows that fishing fees can generate substantial revenue for the government without substantial negative impacts on the industry" (Gunnlaugsson et al., 2018).

Royalty payments

A third alternative, focusing on the resource rent aspect of revenues that are raised is to issue royalty payments directly to citizens. While there are no international examples of such a scheme in fisheries, this approach is used for other resources like Alaska's Permanent Fund Dividend where, every year since 1982, each citizen receives an annual cheque (around £800-£1600 depending on oil prices). Like the Norwegian Oil Fund previously discussed, these are payments from interest earned from the state's investment of oil royalties rather than revenue directly raised (Sundlee, 2019).

There are differences between Alaskan oil and Welsh fisheries, chief among them the size of the industry in proportion to the population. With £24 million in annual revenue in Welsh fisheries, a 1% share would issue each resident just 7.5 pence annually. Furthermore, with such high costs of fisheries management there is a degree of circularity in taxing citizens to pay for fisheries management, only to distribute some of the revenue back to citizens again.

Depending on policy objectives in other areas, royalty payments could be combined across multiple resources.

Other associated policies

The policies detailed in this section relate to the allocation of fishing opportunities in a direct manner. There are related policies, however, that would support their success in implementation, even if their link to fishing opportunities is indirect.

Under 10m, low-impact, or other management distinctions

It has long been recognised that different segments of the fishing fleet have different management needs and may be even be managed separately in pursuit of different objectives (e.g. maximising economic value, building local economic resilience, protecting cultural value). The UK, like many countries, recognises a small-scale fishing fleet (Davies et al., 2018), delineated in the UK as fishing vessels that are 10 metres and under in length. As described earlier, there is a pool of quota available for these fishers and a minimum level of quota is available through ‘underpinning’.

While this delineation of a small-scale fleet at 10m is widely criticised in the fishing industry as arbitrary and outdated, no clear alternative has emerged. A recent survey on the <10m distinction revealed that while most stakeholders believe that some distinction is important and that the <10m delineation is not fit for purpose, once a plurality of options is considered, most stakeholders still nominate length-based as their preferred option (Davies et al., 2018). A reform of the distinction should recognise these points.

A focus on the impact of fishing vessels (whether negative environmentally or positive socially, like the criteria-based allocation of fishing opportunities) rather than vessel length provides an alternative distinction. The UK Government’s Fisheries White Paper supports the idea of a low-impact distinction. This is not defined, but a Defra (2019) research project is currently exploring the issue.

Producer organisations

For the sector, quota is currently managed by producer organisations (PO) that act on behalf of their membership. This structure has several advantages by providing a co-management system where fishers have more control over how their quota is used and ultimately accountability rests with the PO, easing the management burden for government. The PO model is widely supported by fishers in the sector, but some fishers outside the system see it as an “old boys’ club” who profit from leasing quota whether or not they are active fishers. Keeping the PO structure but increasing transparency and supporting membership of <10m vessels (most likely through the establishment and support of a producer organisation(s) for their interests) would be beneficial for future management.

There has been widespread criticism of the MMO quota pool by the inshore fleet, and a more adaptive system, run by a fishers cooperative or small-scale PO would enable to swapping of quota between vessels to account for seasonally and spatially diverse inshore fisheries. The current allocation of equal shares of each species per vessel each month, while easier to administer, does not reflect the reality of how inshore fisheries operate or the diversity and range of species available in different regions around the coast.

Community fishing opportunities

A community-based quota scheme is one approach that would localise decisions concerning fishing opportunities for the particular communities involved. In Ramsgate, a Pilot Community Quota Scheme was trialled with mixed success but clear lessons. As the Defra summary report of the Ramsgate scheme concluded, for community quota schemes to be successful, the areas, vessels, and amount of quota available need to be more ambitious (Defra, 2010). In the Ramsgate pilot, only one group took quota management for 18 months, but this did not provide enough time or scope to draw firm conclusions. The amount of quota was also small, limiting the impact. As Defra (2012b) concluded, “in all cases, the amount of quota allocated to each group (calculated using individuals track record) was less than the participants were expecting.” There were also difficulties in the pilot related to the use of track records, communication, and timing.

Despite these limitations, several benefits of the pilot were observed. Fishers could avoid fishing in bad weather for safer fishing. Managing their own quota also reduced the unpredictability of monthly catch limits, enabled better business planning, and increased flexibility to catch the fish from their allocation at a time of their choosing. Defra (2012b) concluded:

Despite these difficulties, perceptions of stakeholders show that the potential of local fishing groups to manage their own quota is a very good concept. The pilot scheme was an enabling initiative which brought together different fishermen to work together to seek solutions on how quota management, marketing and harbour infrastructure could be approached in a co-operative way.

The possibility of local fishing groups managing their own quota is a good concept. The pilot scheme should be expanded and include investment in bottom-up approaches to obtain buy-in for the pilot arrangements from the fishermen if it is to succeed in the future. Here the Defra (2012b) report pointed to a way forward:

Discussions at a group meeting in Ramsgate suggest that it would need 10-15 groups taking full quota responsibilities with the scheme running for 3-4 years to achieve a rigorous evaluation. This is because a large number of community groups taking part in the pilot scheme would increase the sample size with which the comparisons could be undertaken; while a longer time period is needed to distinguish patterns in the various indicators that are the result of own quota management by the skippers.

A better designed and more extensive trial, possibly using an inshore cooperative or an inshore PO rather than isolated ports with small numbers of vessels, is more likely to yield fruitful results and serve as a basis for future developments of community quotas. Experience from Alaska (Carothers, 2011) should also be reviewed; community quota schemes have been used there for longer with mixed results. Lessons learned should be applied to the development of community quota trials in Wales.

The management of community quota is distinct from the establishment of inshore fisheries groups, although the two are sometimes confused. Welsh Government has ended the use of IFGs and opted for a much more centralised form of fisheries management. This contrasts with fisheries management in England and Scotland where IFGs (Inshore Fisheries Conservation Authorities and Regional Inshore Fisheries Groups, respectively) are increasingly important bodies in national fisheries management.

Recreational quota

A formal incorporation of recreational fishing activity into a quota management system would end the separation between the two sectors and could lead to more harmonisation in management. Some of the main advantages of such a transition do not stem from quota management itself, but rather from the improvement in recreational catch data that would be required to reliably include recreational fishing in stock assessments and management decisions. This is not necessary, as recreational catch data is already used in the western Baltic cod stock assessment to adjust the commercial quota. There is no quota for recreational fishing (Eero et al., 2014), but a recreational share of quota allocations is a prerequisite.

A formal incorporation of recreational fishing activity into a quota management system would also make the sectors more directly comparable from a distributional perspective. While this has some advantages in clarity of decision making, it could also further the sentiment expressed by recreational fishers that the current commercial share of fish populations rewards those fishing (or overfishing) to the greatest degree (Total Sea Fishing, 2009). This very reason has led to reluctance from recreational fishers internationally to adopting a quota management system, for example among recreational fishers in Alaska (Chan et al., 2018). Even collecting data could meet resistance if the policy intention is deemed unfair. This

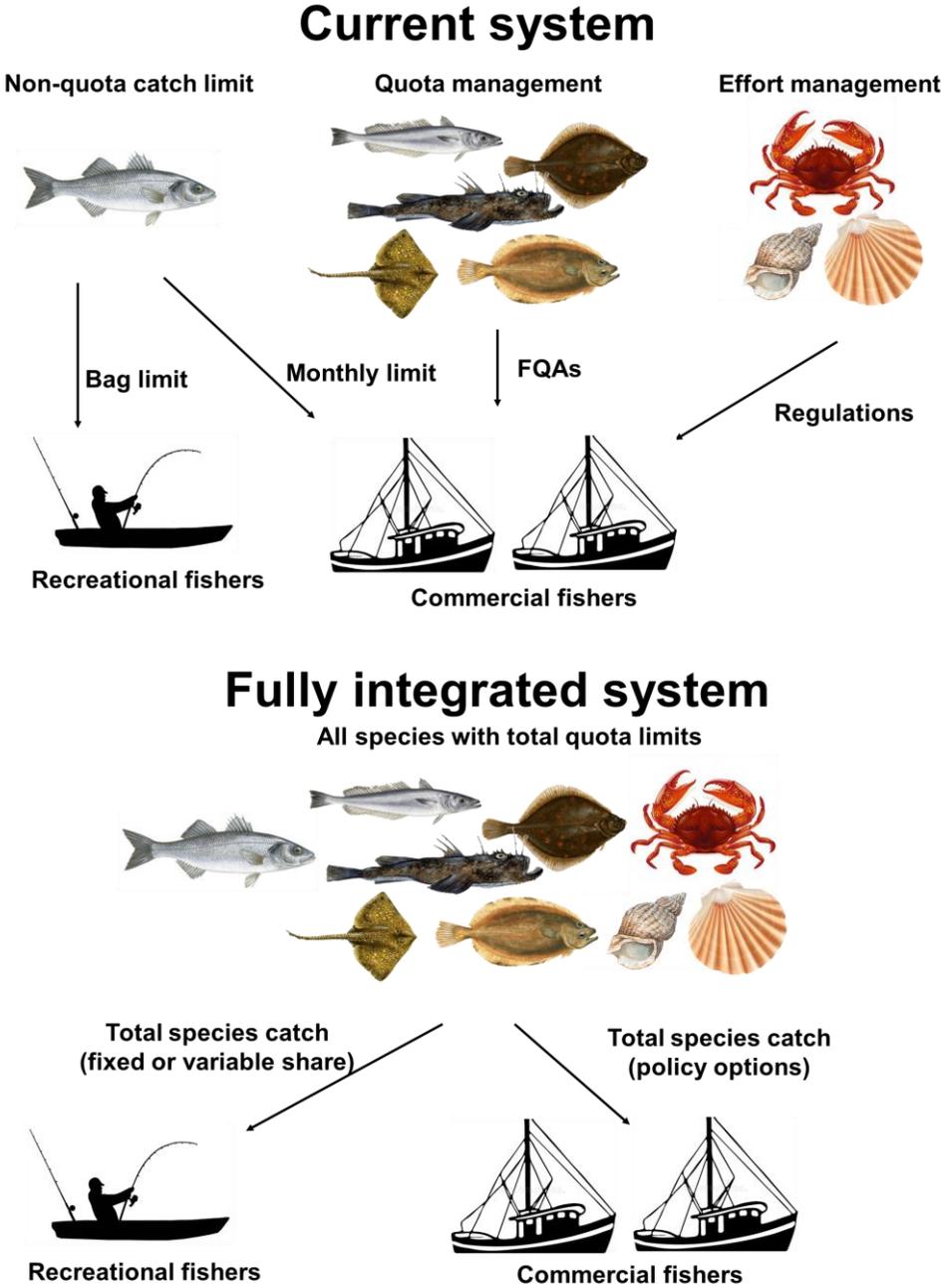
occurred in England when in 2016 the Angling Trust discouraged members from participating in sea bass research and data collection stating:

...the government has refused to take on board any of the recommendations or results which would accurately or fairly represent the recreational sea angling sector in the management of marine fishery resources (Angling Trust, 2016).

The characteristics of a quota system for recreational fishing activity is much more complicated than in commercial fisheries due to the lack of catch records, highly variable activity, and the large number of participants. Under one model, recreational fishers could receive initial allocations of quota. Some studies have indicated that the temporal flexibility that comes with an individual quota share could prevent the need for seasonal closures, if respected, and better outcomes for recreational fishers (Abbott et al., 2018). However, the initial distribution would need to happen through some version of a lottery system because historical levels of participation in the fishery are difficult to verify and highly variable.

An alternative approach is a hybrid model with the current management system, where there is a total quota level for the recreational fishery, and this is essentially managed as one pool that can be exhausted. To ensure wide participation, bag limits and other regulations would continue and the cumulative catches, in as high a resolution as possible, would be recorded. Under this system, the significant change from current management practices would be the recording of catches and the formal, total limit for recreational fisheries which would mean that the recreational fishery closes once the pool has been caught.

Figure 17: Current system of commercial and recreational fishing opportunities and an alternative, fully integrated system



Internationally, some areas are highly developed in using quotas for managing recreational fishing activity. For example, in the southeast USA there are many quotas for recreational fisheries. These can often have shares greater than the commercial sector, for example the gulf red snapper fishery where both limited licences and bag limits are employed, in

conjunction with a quota system which allocates 51% to the commercial sector and 49% to the recreational sector (NOAA, 2019).

A division between commercial and recreational quota would vary significantly by species (sea bass is highly targeted by recreational fishers, monkfish is not). Under some systems, this share would be fixed, while others, for example, quota markets, could set an initial allocation but the division would change over time as purchases are made.

Assessing policy options

It is difficult to assess the policy options against the fisheries objectives, as fisheries objectives refer to the performance of the whole fishery. Whether scientific evidence is used and/or an ecosystem-based approach is taken clearly matters for the functioning of fishing opportunities, but it is decided outside of the management of fishing opportunities. Considering this, the policy options are assessed (Table 7) against relevant concerns that apply to policy making in general.

The results indicate the following:

- Policy choice matters as few policies perform identically across all concerns.
- It is impossible to escape trade-offs as not all concerns can be optimised simultaneously. Short-term, radical concerns mostly mirror each other (but not completely, e.g. a financial auction or charging for externalities may take some time to set up but are not radical policy options, whereas privatising the quota-setting process or nationalising the industry is a radical approach but could be done in the short term if permitted).
- Much of the assessment depends on the detail of the policy option (the 'maybe' assessments). Clearer public control over the ownership of quota (e.g. nationalising quota, implementing a legal duration, nationalising the industry) allow for certain benefits to be targeted but does not guarantee them. Another example is found in the policies that generate a financial flow. These flows could be directed towards communities, but that depends on the policy design.
- Nearly all policy options that are not currently in place face some barrier to implementation (with a quota reserve and legal duration as two exceptions). This is realistic, but it also introduces a status quo bias within the policy assessment itself, especially for barriers such as the capacity of the catching sector and the capacity of Welsh Government.

- Many of these policy options would be new to Wales and whole levels (ownership, revenue use) have no existing policy at all and others (landings) only have UK policy.

Table 7: Assessing the policy options

	Policy option	Current system	Direct environmental benefits	Direct community benefits	Revenue raising	Radical	Short term	Barriers
Type	Quota	Yes (most finfish species)	If set appropriately	No	No	No	Yes	Stakeholder views
	Effort	Yes (most shellfish species)	If set appropriately	No	No	No	Yes	Stakeholder views
	RTIs	No	Yes	No	No	Yes	No	Untested policy; set-up cost
Allocation	Existing FQAs	Yes	No	No	No	No	Yes	No
	Criteria-based	No (only historical catch)	Yes	No	No	Maybe	No	Stakeholder views; assessment
	Reserve	No	Partial	No	No	Partial	Yes	No
	Financial auction	No	No	No	Yes	No	If existing body	Stakeholder resistance
	Non-financial auction	No	Partial	No	No	Yes	No	Untested policy; assessment; set-up cost
	To the people	No	No	If allocated to community	No	Yes	No	Stakeholder resistance, low quantity
	Swap	Yes	No	No	No	No	Yes	No
Exchange	Lease	Yes	No	No	No	No	Yes	No
	Transfer	Partial	No	No	Could tax	No	Yes	No
	Limits on sale	No	No	Yes	No	No	Yes	Stakeholder views
	Pooling	Yes (<10m fleet)	No	If pooled by community	No	No	Yes	No
	Charges/internal	No	Yes	No	Yes	Partial	No	Assessment; enforcement; resistance
Externalities	Ignored/external	Yes	No	No	No	No	Yes	No
	Economic link	Yes	No	Yes	No	No	Yes	No
	Landings levy	No (only industry promotion)	No	No	Yes	No	Yes	Stakeholder resistance
Landings	Differentiated levy	No	No	Yes	Yes	Partial	Yes	Stakeholder views
	Discard charging scheme	No	Partial	No	Yes	Partial	Yes	Data; enforcement
	Nationalise quota	No	Allows for	Allows for	No	Partial	If notice period	Legal issues
Ownership	Legal duration	No	Allows for	Allows for	No	No	No	No
	Privatise quota setting	No	No	No	No	Yes	Maybe (resistance)	Stakeholder resistance; untested
	Nationalise fishing industry	No	Allows for	Allows for	Yes	Yes	Maybe (resistance)	Other administrations; resistance
Revenue use	Earmarking	No	No	No	N/a	No	If existing body	Stakeholder views
	General purposes	No	No	No	N/a	No	Yes	Stakeholder resistance
	Royalty payments	No	No	If allocated to community	N/a	Yes	If existing body	Stakeholder resistance; low quantity; set-up cost
Other policies	Incorporate rec. fishing	No	No	No	No	Partial	Maybe (resistance)	Stakeholder views
	Fleet distinction	Yes (<10m)	Maybe	No	No	No	Yes	No

Producer organisations	Yes (small membership)	No	No	No	No	Yes	No
Community management	No	No	Yes	No	No	If existing body	Maybe (if new body)

Policy conditionality on a ‘Brexit dividend’

None of the policies considered here are dependent on a Brexit dividend, increased fishing opportunities that are secured post-Brexit as quota shares are revisited and relative stability no longer applies. The policy options could be implemented even with existing fishing opportunities.

However even if Welsh Government takes a different approach and reforms existing FQA holdings, some policy options are more dependent on a Brexit dividend as the existing Welsh FQAs are so small in size that some options may not be worth the cost of pursuing. These policies are indicated in the ‘barriers’ column in Table 7 as those that note a low quantity (allocation to the people, royalty payments) or a high set-up cost (RTIs, non-financial auction, royalty payments). These are policies that involve the creation of new institutions/assessment bodies or involve spreading the benefits of fishing opportunities to the wider Welsh public.

Policy conditionality on revisiting the UK Concordat on Fisheries Management

Revisiting the UK Concordat on Fisheries Management to grant Wales a greater share of UK fishing opportunities has the same implications as the ‘Brexit dividend’. Both conditionalities refer to an increase in fishing opportunities, the only difference being the negotiating arrangement and partner. As the current UK Concordat on Fisheries Management refers to EU legislation a new Concordat will likely be required post-Brexit, in which case there is an opportunity to revisit the policy around the distribution of FQAs at the same time as the references to EU institutions are updated. A new Concordat, very similar to the previous, was being developed in 2016 but progress stalled and it has not been signed off (Oliver, 2018).

CCERAC has emphasised the importance of revisiting the Fisheries Concordat, writing of the UK Fisheries Bill that “unless this matter is revisited, the benefits for Welsh fisheries arising from Brexit will be marginal” (Senedd Cymru/Welsh Parliament, 2019). Welsh Government responded to this claim by explaining their position that the Fisheries Bill is not the mechanism to revisit quota shares and that they “continue to press the case around quota shares with the other UK administrations as part of separate discussions” (BBC News, 2019). Defra went further, indicating that quota shares would not change as a result of the Fisheries Bill or any other process: “Our priority is to negotiate a fairer share that will benefit the whole of the UK, and new legislation about quota shares is not necessary” (BBC News, 2019).

In their report on the Legislative Consent Memorandum for the UK Fisheries Bill, CCERAC (2020) reiterated their request for review, this time specifying “an increased emphasis on environmental, social, and economic criteria when allocating quota to the constituent nations of the UK”.

Government capacity to implement fishery policies

Stakeholders frequently comment that Welsh Government lacks capacity in fisheries management, which CCERAC questioned Welsh Government on in its Brexit and fisheries impact report (CCERAC, 2018). Welsh Government responded (2018) by stating that they did not perceive a capacity issue: “We believe we have sufficient capacity in relation to fisheries policy and are seeking to increase capacity to deal with short term work to prepare for exit from the European Union.” In its report on the Legislative Consent Memorandum for the UK Fisheries Bill, CCERAC reiterated “concern regarding the capacity of this Division, including in relation to the Marine Conservation Branch” and requested “the latest estimates of changes in staffing numbers and profile in her Marine and Fisheries Division and associated legal support that will be necessary” to implement the UK Fisheries Bill (CCERAC, 2020).

Regardless of Welsh Government’s capacity to handle current commitments, it is clear that many of the policy options considered here represent new, sustained commitments (i.e. more than “short term work”) and would require capacity beyond what is currently in place.

Infrastructural capacity to implement fishery policies

In addition to government capacity constraints, there are also capacity constraints in terms of physical infrastructure. These constraints mostly arise in assessing whether the Welsh fishing fleet could take advantage of additional fishing opportunities, some of which is conditioned on the Brexit dividend and/or revisiting the Concordat, as previously described.

None of the policy options dealing with the *allocation* of fishing opportunities comes up against an infrastructural constraint; only the *quantity* and *species* involved. If a large amount of fishing opportunities are secured, especially those in Welsh waters like herring and Nephrops that the Welsh fleet does not currently target (Carpenter et al., 2018), then a larger fishing fleet including vessels for offshore Nephrops and pelagic trawling will need to be commissioned (possibly with the help of public policy and investment). Even if an increase is

secured for demersal species that Wales already receives a share of (monkfish, hake, megrim, pollack), the Welsh fleet will require larger vessels with greater capacity for longer trips and larger hauls. Any expansion of the fleet would require changes to vessel licensing while also respecting clause b of the sustainability objective in the UK Fisheries Bill that “the fishing capacity of fleets is such that fleets are economically viable but do not overexploit marine stocks” (UK Parliament, 2020).

There will also be a need for deep-water ports to facilitate landings from these vessels and, if fishing opportunities are to be fully seized, investment in fish processing in Wales, as this section is currently extremely small.

Combining policies into new approaches to fisheries management

Rather than considering each policy option separately, policy options can be combined. There is a risk that the high-performing policies do not pair together.

Given the large number of policy options, there are hundreds of potential combinations. Here the policies are combined in such a way so that there is a consistent ideological perspective behind each approach.

1. Light touch, heavy impact

Fishing opportunities	Policy option
Type	Existing
Allocation	Quota reserve
Exchange	Online swapping
Externalities	Ignored
Landings	Differentiated levy
Other	Producer organisation to manage the reserve

Perspective:

- Current fisheries system is mostly working

Advantages:

- Only minor structural changes required to the existing system
- Simple for fishers and managers to use
- Minimal risk

Disadvantages:

- Small change
- Keeps and cements the non-reserve FQA holdings

2. A new kind of fishing

Fishing opportunities	Policy option
Type	RTIs
Allocation	Financial auction/non-financial auction
Exchange	Transferable
Externalities	Included in RTIs
Landings	None/landings levy
Other	Might not need any fleet distinction

Perspective:

- Incentives are most impactful during use (e.g. during a fishing trip)

Advantages:

- Dynamic and responsive
- Flexible between raising revenue in credit sales or on landings
- Incorporates externalities

Disadvantages:

- Requires technological capability onboard vessels
- Resource intensive for fisheries managers
- Difficult to incorporate differentiated landings policy (already difficult calculation of what/where to catch)

3. A free but fair market

Fishing opportunities	Policy option
Type	Quota
Allocation	Financial auction
Exchange	Transferable
Externalities	Charges
Landings	(None)
Other	Recreational fishers included in the market

Perspective:

- Neoliberal approach by using markets to determine allocation
- Polluter-pays principle
- No new entrants, wider society can benefit from resource rent (Alaskan cheques, Norwegian fund, other)
- No landings levy is required as funds are raised through auction

Advantages:

- Quota markets are used in other countries
- Industry consolidation means fewer vessel and carbon emissions
- Smaller industry can be easier to manage

Disadvantages:

- Smaller industry would cause some ports to go under
- More unequal in the quota 'haves and have nots'
- Fully priced externalities are not used in any fisheries management system
- Could take a long time to arrive at controversial prices for externalities
- Could be difficult to levy (by gear, per day at sea?)

4 Local knows best

Fishing opportunities	Policy option
Type	Existing
Allocation	Existing FQAs
Exchange	Limits on sale
Externalities	Ignored
Landings	Economic link
Other	Community fishing opportunities

Perspective:

- Local, co-management best
- Could align with local authorities and local service boards from WFGA

Advantages:

- Helps deal with the issue of low trust and capacity in Welsh Government

Disadvantages:

- Might not be enough interest or involvement, fishing associations have struggled with membership (Nautilus Consultants, 2000)
- Potentially tried before as part of the Marine Fisheries Strategic Action Plan

5. Fisheries for the people

Fishing opportunities	Policy option
Type	Existing
Allocation	Criteria-based
Exchange	Existing
Externalities	Ignored
Landings	Differentiated levy

Perspective:

- Fishing opportunities are owned by the public and should benefit the public
- Commercial fishers are still the likely users, but benefits can flow from local landings and payments

Advantages:

- Criteria-based approach mirrors changes in agriculture
- Could be incorporated in a larger scheme of royalty payments

Disadvantages:

- Any royalties would be small
- High resource requirement for assessment, allocation, levies, and payment

The way forward

This report has taken a blank canvas approach to reimagining what a system of fishing opportunities could look like in Wales. In moving forward, several undeniable realities will need to be dealt with in reforming the system of fishing opportunities. This section comments on these practical issues while outlining a way forward.

How to deal with FQA holdings

In implementing a new system, one of the first issues to deal with is how existing FQA holdings should be dealt with. This assumes that some action needs to be taken, but even those most wedded to the current system suggest that existing FQAs should *not* apply to new quota, meaning a change in legislation is required, a change required in a potentially short period if new quota is available for January 2021 allocations.

Top slice new quota

The process by which existing FQA holdings are kept the same but new quota is handled differently is often referred to as top-slicing. At present, this seems to be the preferred approach of both the UK Government and Welsh Government. Of course, top-slicing new quota depends on new quota materialising, discussed in the previous section earlier as a conditionality.

In their response to the CCERAC Brexit impact report, Welsh Government wrote:

Whilst the total amount of fish to be caught sustainably will continue to be set for the European area as a whole, I believe we can negotiate, over time, a greater share of the fish for the UK and Wales. Any additional fish realised through these negotiations should be top sliced and used to rebalance any historic disparity in the fleet segments” (Welsh Government, 2018b).

Likewise, the Secretary of State confirmed that in England (and presumably for the UK through the UK Concordat on Fisheries Management) they “will leave the existing FQA units as they are for existing fishing opportunities” (House of Commons, 2018). However, the Secretary of State continued that “as we depart from relative stability and have new fishing opportunities coming in, I do not think it makes any sense at all to compound the injustice of the FQA system” implying that existing holdings are unjust, but trumped by the desire for stability.

Norway has formalised top-slicing through the ‘trawler ladder’ where there is a dynamic share between coastal and industrial fishers that allocates a greater share to coastal fishers when the overall quota is low and a smaller share when the overall quota is high. This mechanism provides the coastal fleet with more resilient access to fishing opportunities. By distinguishing between coastal and industrial fisheries, this system could also be considered an example of criteria-based allocation.

A frequent criticism of quota reallocation is that it is ‘robbing Peter to pay Paul’, indicating that someone is made worse off in order to make someone else better off. This effect is not unique to fishing opportunities but is inherent in all forms of policy making. By dealing with new quota, this problem is seen to be avoided. Peter, in this case, is an EU fisher. The dynamic of top-slicing just described engages with this issue in another way by reallocating quota shares at high levels (from coastal to industrial). Peter, in this case a coastal fisher, is not made worse off. For a fishing business, it is the quantity of fish, not the share, that pays the bills.

Nationalise

In theory, the simplistic approach would be to nationalise fishing opportunities. As fishing opportunities are already a public resource, this option is purely an affirmation of what already exists rather than a change.

Both the UK Government and Welsh Government have been clear that fishing opportunities belong to the state. As the UK Concordat on Fisheries Management notes: “The Administrations reiterate that FQAs do not provide any right to a share of UK quota” (HM

Government, 2012). In 2018, the Fisheries Minister George Eustice (now Secretary of State) explained in a Westminster debate on the Fisheries Bill that while the UK Government will leave existing FQAs in place and only depart from FQAs for any quota gained: “It is absolutely open to a Government, at any point that they want to do so, to signal their intention to reallocate those FQA units” (House of Commons, 2018).

Even if this is disputed, since FQAs refer to the fishing opportunities granted through EU legislation, either the UK Government or Welsh Government could simply dissolve FQAs and issue new units through a different, even if functionally similar, system.

Provide notice period

A softer approach to nationalisation would be to provide a notice period. Regardless of the legal argument over the ownership of existing FQAs, a notice period recognises the practical reality that large investments have been made in the fishing industry related to FQA holdings. As such, a notice period could also avoid claims of compensation. As the Fisheries Minister explained in the same Westminster debate:

Justice Cranston suggested that there is a type of property right attached to the FQA units, and that they would therefore probably need to be given in the region of seven years’ notice of the intention to move away from those FQA units. Indeed, the Faroes, which have recently embarked on that process, gave their holders of FQA units, or their equivalent to FQA units, a 10-year notice period before they reallocated them (House of Commons, 2018).

Gradual drawdown

The same principle of sensitivity towards investments and security is the use of a gradual drawdown. One model that could be followed is Chile where allocations of quota are decreased by 10% each year which then goes back to the government (Lynham, 2013). This is part of a formal system of quota auctions with ten-year leases, but the same policy could be used for existing FQAs.

Top slice quota transactions and/or vessel retirement

Another system used to take quota allocations back to the state is to tax or top slice quota transactions (i.e., quota sales). This policy has been used in France since 2015 where, in every quota transaction, 80% goes to the new owner and 20% (split 30:70) goes to a national reserve and PO reserves (Carpenter and Kleinjans, 2017). In France, when a vessel is decommissioned, its associated quota is distributed 50:50 to the national and PO reserves (Carpenter and Kleinjans, 2017). Such a system better aligns when quota is allocated to vessels rather than to licences that can move between vessels.

Process for secondary legislation

There remains a lack of clarity on the legislative requirements in Wales concerning fisheries. A commitment was made in 2019 to a Fisheries Bill being presented to the Welsh Assembly in the current term, but that timetable could only be set out once the UK Fisheries Bill had ‘passed through [the UK] Parliament and the developing post-EU exit position becomes clearer’ (Welsh Government, 2019c: 10).

At the moment, the first post-Brexit fisheries opportunities will be allocated in 2021, and the intention is that a single issuing authority will make decisions on behalf of Welsh Government (Welsh Government, 2019c). This may be arranged through powers obtained using secondary legislation. A Welsh Fisheries Bill can then refine the intentions of the arrangements once the situation becomes clearer. This is not an ideal position to be in, and greater clarity over arrangements, the ability of the Welsh Assembly to scrutinise those arrangements, and the subsequent plans for the legislative basis for future objectives would be helpful (Senedd Climate Change, Environment and Rural Affairs Committee, 2020).

Trialling new systems

To move some of these policy options forward, for example, a days-at-sea system with flexible catch composition, it has been suggested that localised trials should be implemented to collect data and measure the impact (Ridley, 2017). While there is little opposition to more data and evidence, there are two important considerations in trials of alternative management systems. The first issue is how comprehensive the trial needs to be to properly inform management. Anything less than a full year would miss important seasonal effects in the fishery, for example. More difficult is the issue of spatial coverage. A trial that proved successful/unsuccessful in one area may not offer the evidence base to form a judgment for another. A trial may also attract participants that have fundamentally different characteristics from fishers as a whole. This is particularly concerning for controversial proposals, as changes to the management regime have proven to be (NFFO, 2017; Carpenter, 2017c). At the very least, the appropriate scope for a trial and the metrics for success would need to be agreed by stakeholder groups well in advance of any trial taking place.

There is also the issue of opportunity cost. An informative trial requires a significant amount of time and funding to administer, resources that could be spent on other policy options considered in this report. Given resource constraints, the priorities of fisheries stakeholders must be assessed. The only survey conducted of UK fishers on support for an alternative management was administered to members of Fishing for Leave, a Brexit campaign group (Carpenter, 2017a).

Most stakeholders do not support a move towards an effort-based regime in England. The summary of the White Paper consultation response confused the matter by reversing the burden of proof for policy support, which was not consistent with how views were summarised on other proposed policies (Defra, 2018b).

The responses to the White Paper consultation that were in favour of an effort-based trial had an important precondition: “If properly linked to effective monitoring systems” (Defra, 2018b). Any effort system necessarily relies on extensive real-time data to observe fishing mortality. The current quota management system would also benefit from such a development, so introducing this system as a first stage should be supported by a wide range of stakeholders regardless of the overall management system preferred.

An effort-based trial that is confined to one limited area and intersects with quota-based fisheries for the same species means that the results would not be comparable and any changes in stock would not be attributable to either system.

Acting unilaterally

Separate to the issue of trial(s), it would also be necessary to explore with the UK Government whether Welsh Government could implement its own management regime independent of the rest of the UK. For example, if Welsh Government decided to abandon the use of FQAs (either to move to a non-quota system and/or to pursue a reallocation of shares) it is likely, given statements from the UK Government, that FQAs would still be used to allocate to Welsh licences through the UK Concordat on Fisheries Management. Welsh Government could simply nationalise these holdings, transform them (if using a non-quota system), and then reallocate, but each divergence from the UK Government makes it more difficult to handle routine situations fairly, like vessels fishing in the waters of other fisheries administrations or vessels changing their home port to another fisheries administration.

Ensuring a just transition for those negatively impacted

In implementing changes to the management of fishing opportunities, Welsh Government must think of the well-being of current and future generations of beneficiaries from a policy change, but also those adversely harmed.

Welsh fishery stakeholders are enthusiastic about policies that deliver extra fishing opportunities for Wales while keeping the total amount of fishing opportunities at the same level. In this way, the fishing fleet can grow without increasing fishing pressure. The same applies to policies that encourage more landings of fishing opportunities into Wales.

However, by respecting sustainability and keeping fishing opportunities and landings at the same level there is a zero-sum element where any increase in Wales implies a decrease somewhere else. Importantly, the seventh well-being goal explains that a globally responsible Wales means:

A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being (National Assembly for Wales, 2015).

If policy change involves fewer fishing opportunities and/or landings elsewhere, then at the very least complementary policies are required to ensure a just transition for those fishers and communities. Just transition policies are usually within a nation's borders, but the requirements of the WFGA imply that these policies involve the consideration of fishing fleets and communities in Belgium and Spain.

The need for consultation

Policy change on fishing opportunities should only be made after thorough consultation with fisheries stakeholders. At present, there are significant trust issues in Welsh fisheries management, so a policy change must be pursued gradually and with buy-in. This need has to be balanced with the desire for radically different Welsh fisheries and a tight timeline with the first, potentially precedent-setting, post-Brexit fishing opportunities allocation in January 2021.

Fisheries for the well-being of future generations

Currently, Welsh fisheries are almost entirely composed of small-scale fishing vessels targeting shellfish for the export market. A large portion of landings into Wales come from Belgian vessels and a large portion of landings from (Spanish-owned) Welsh vessels take place into Ireland. In this sense, managing fishing opportunities has a very limited impact on Welsh fisheries and wider society. But this can change.

Brexit is set to not only change how the EU and the UK share waters, fishing opportunities, and markets, but it has also brought issues of domestic fisheries management into the spotlight. The ownership of fishing opportunities, the sharing of opportunities between the UK and Wales, and the financing of fisheries management are being seriously considered for the

first time in decades. With so many issues in flux, the management of Welsh fishing opportunities is starting with a blank page.

The larger Welsh policy context, however, is not a blank page. The Environment Act and the WFGA provide important context in which to develop new policy regarding fishing opportunities. This report applies this objective-based approach to the management of fishing opportunities in Wales for the first time. Many different options are available, each with its advantages and disadvantages. Engagement with stakeholders is required to determine which combination of policy options can deliver for Wales.

Welsh fisheries, particularly the fisheries dependent on quota fisheries, is a small industry. With planning, however, the industry can grow without putting additional pressure on the marine environment (as activity is displaced from elsewhere). Size should not be a barrier to ambition. While developing new systems comes with fixed costs, the smaller number of fishers in Wales means that stakeholder engagement consensus should be easier to reach. Indeed, some of the largest fisheries have continued with static management systems. In this context, Wales can lead in demonstrating what a fisheries management system for the well-being of future generations can look like.

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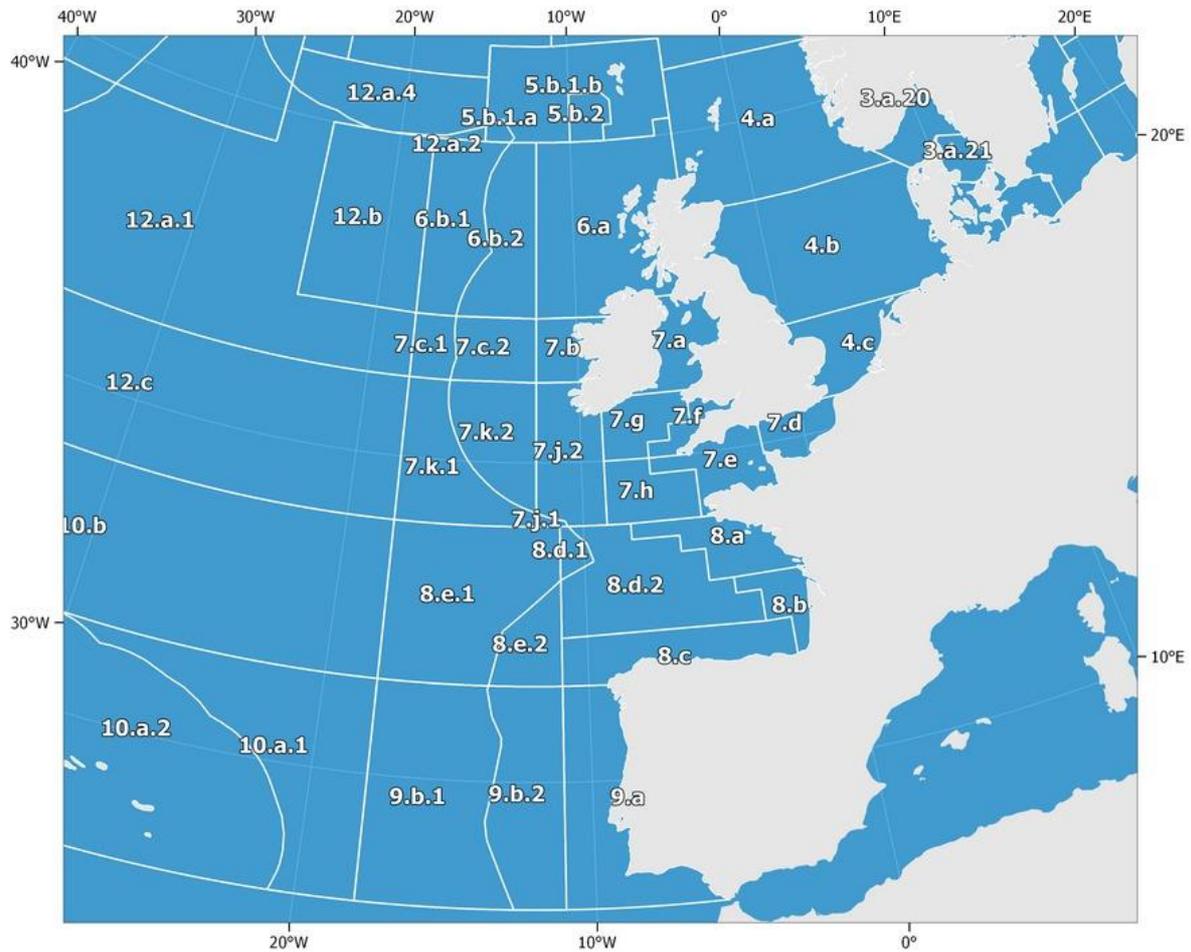
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Annex 1

Map of ICES statistical areas

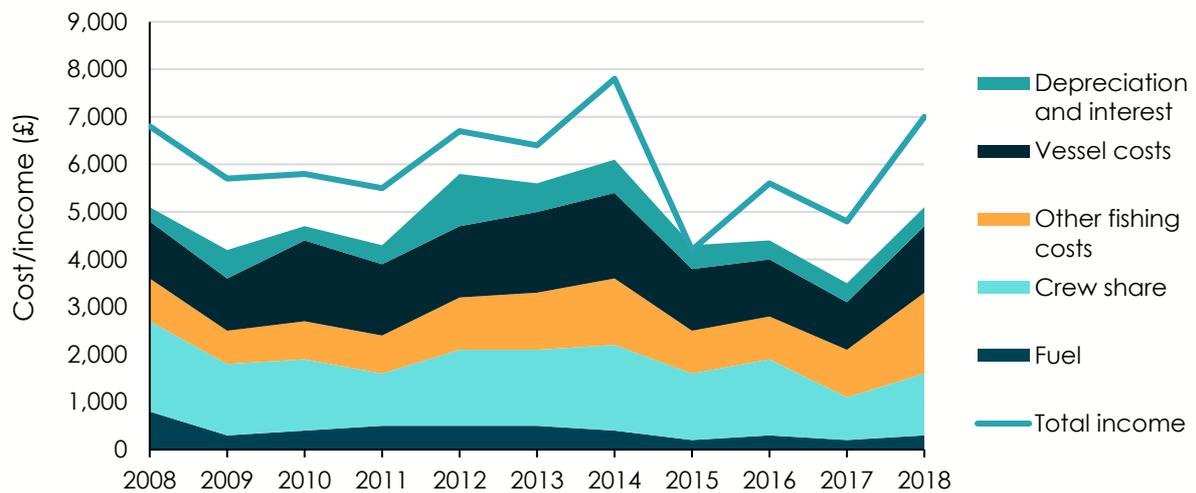


Source: FAO (2020).

Annex 2

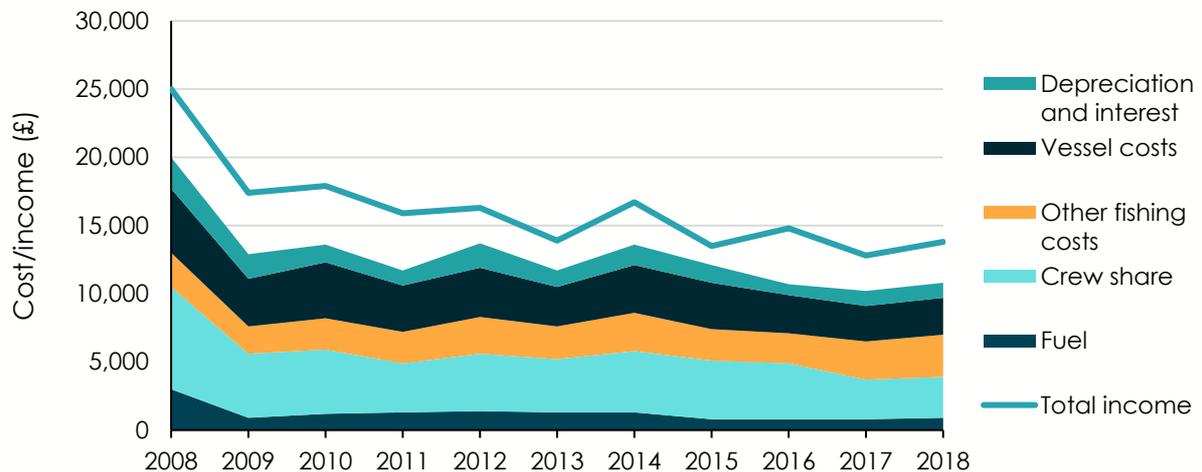
Cost and income by fleet segment

Figure A2a: Average cost structure and income for a 0-6m Welsh vessel



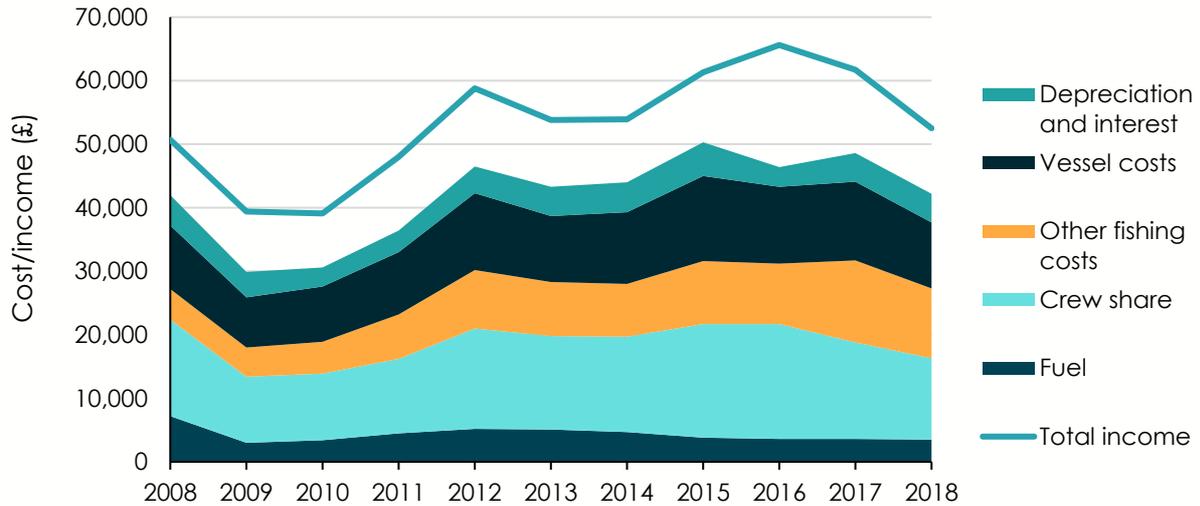
Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

Figure A2b: Average cost structure and income for a 6-8m Welsh vessel



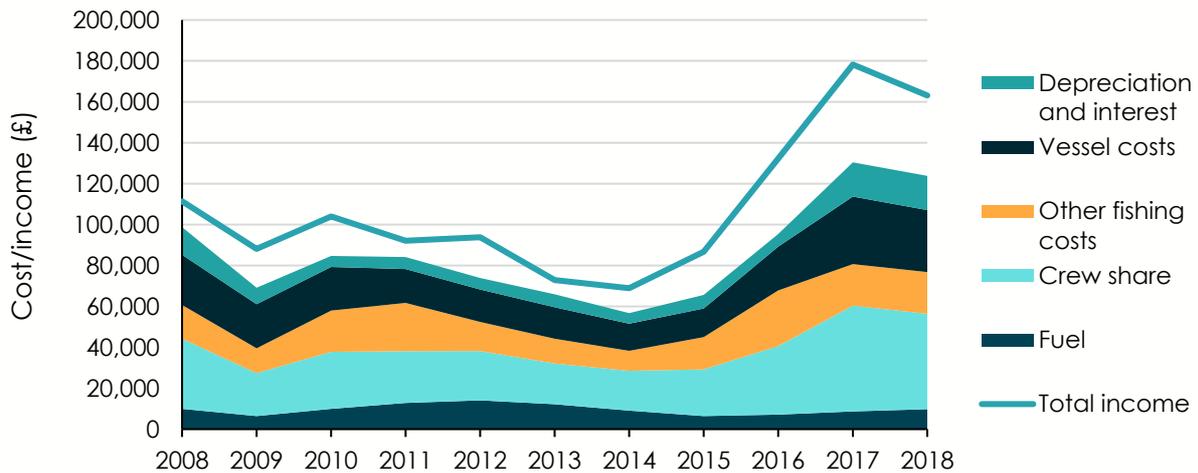
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Figure A2c: Average cost structure and income for an 8-10m Welsh vessel



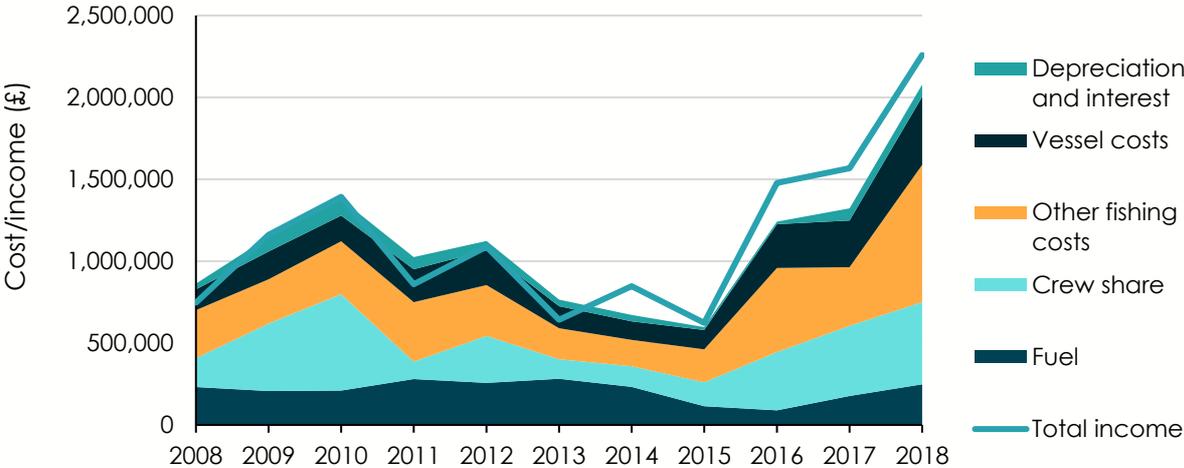
Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

Figure A2d: Average cost structure and income for a 10-12m Welsh vessel



Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

Figure A2e: Average cost structure and income for an over 12m Welsh vessel



Source: Authors' calculations based on Seafish (2020). Note: Figures in 2018 real values. Depreciation and interest in 2018 apply 2017 data.

Author Details

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