SCFF
SCOTTISH CREEL FISHERMEN'S FEDERATION

# An Assessment of Anderson Solutions paper: **Analysis of nephrops industry in Scotland**

## 1. Background

In May 2017, the Scottish Creel Fisherman's Federation (SCFF) produced a paper entitled **"Correcting the Misallocation of Nephrops Stocks in Scottish Inshore Waters: Untapping a Vast Economic (And Environmental) Potential".**

This paper argued that there is a serious misallocation of Scotland's Nephrops stocks between creeling and trawling. The paper also argued that devoting a greater proportion of inshore and near shore areas to creeling would best serve the interests of Scotland as whole.

This was not well received by the representatives of the prawn trawl fleet and the Scottish Fishermen's Federation (SFF) promised to employ top fisheries economists with the aim of discrediting the SCFF paper. Some representatives of the mobile sector clearly believe (or hope) that the SCFF paper is flawed (see quotes below). Thus far, no commentator has explained the alleged deficiencies.

Along with Scottish Fishermen's Organisation (SFO), the SFF commissioned and financed a study by Anderson Solutions (herewith referred to as the AS paper). This was published in October 2017. The expectation was that Anderson Solutions (AS) would explain the alleged problems with the SCFF paper and attempt to rebut its general conclusions.

After publication of the AS paper, the SFF website offered the following press briefing:

> ***"PRAWN TRAWLERS IN SCOTLAND are just as competitive as the creel fleet, undermining the case for a major transfer of quota.***
>
> ***That is the conclusion of a study carried out for the Scottish Fishermen's Federation (SFF) and Scottish Fishermen's Organisation (SFO) following a series of unfounded claims made by the Scottish Creel Fishermen's Federation.***
>
> ***Researchers at the economic development consultancy Anderson Solutions conducted a comprehensive analysis of Scotland's £80m nephrops sector, which is the biggest in the world, examining quota, weight and value of landings, employment and supply chains.***
>
> ***They concluded that "the competitiveness of the different fleet segments in Scotland is relatively well-balanced."***
>
> ***Bertie Armstrong, chief executive of the SFF, said: "The creel sector's argument amounted to a call for a perfectly sustainable and profitable sector to be shut down, which is ridiculous.***
>
> ***"Part of the rationale seemed to be that this would create more than 700 new jobs. This study is clear that there are 1588 full-time equivalent posts in the trawl sector to 489 in the creel sector, so the net effect would be the loss of 900 jobs."***

***John Anderson, chief executive of the SFO, said: "We commissioned this work to investigate what we perceived to be a deeply flawed but headline grabbing proposition that half of the Scottish nephrops quota currently held by mobile gears should be re-allocated to static gears to improve the overall socio-economic performance of the nephrops sector in Scotland.***

***"This extremely comprehensive assessment confirms that there is no real economic rationale for re-allocation between gear types; rather it quite clearly demonstrates that not only are the mobile and static gear fleets remarkably similar in terms of overall competitiveness, they also have distinct but equally important roles to play in contributing to the economic resilience of our coastal communities and in maintaining Scotland's position as the world's leading producer of high quality langoustine."***

Before considering the merits of the AS paper, it is appropriate to highlight the key conclusions of the SCFF paper.

## 2. Key Conclusions of the SCFF Paper.

1. Creeling and trawling for Nephrops are not simply alternative methods of harvesting Nephrops in inshore waters. Economically, they are quite separate economic activities which deliver fundamentally different economic outcomes. What they have in common is that, in Scotland's inshore and near shore waters, they compete for access to the same stock of Nephrops.

2. Currently, in Scotland we have an economically absurd outcome whereby each tonne of Nephrops caught by trawls in those near shore areas fishable by creels is contributing to an unnecessary degradation of the Scottish marine environment and a significant reduction in Scottish output, income, employment and profits, particularly in remote and rural areas.

3. This outcome is a manifestation of '**market failure'**. Specifically, the absence of property rights to the seabed means there is absolutely no requirement for fishers to outbid other potential fishers of a particular area of seabed. In these circumstances, the value of the forgone output of creel caught live Nephrops (selling for £9,500) is irrelevant to someone with a license and quota who wishes to use a trawl and land a tonne of nephrop tails (selling for £1,750 per live weight tonne). Also, compared with creeling, trawling of the seabed has a significantly greater adverse impact on the marine environment. These environmental impacts do not currently influence the decision-making of operators. Effectively, with respect to the allocation of Nephrops stocks, the market mechanism ignores opportunity costs (foregone live creel caught Nephrops and foregone marine environment service flows). When this happens it is quite impossible for the market to deliver best value to society.

4. Regrettably, Marine Scotland, which should be correcting the anomaly of excessive trawling effort, has adopted a *laissez-faire* approach. This is precisely the wrong response.

5. In addressing the issue of which sector should have preferential access to Scotland's inshore Nephrops stocks, the SCFF paper considers the question; ***"which sector will make best economic use of each and every live weight tonne of Nephrops?"***

6. With respect to the economic outcomes, the paper demonstrates **that per live weight tonne** creeling generates:
   - More revenue (550% more than tails, over 200% for whole and 300% overall);
   - More profits (340% more profits than an under 250kW trawler and over 180% more than an over 250kW trawler)
   - 280% more fishing jobs;
   - Seven times as many vessels and fishing businesses; and,
   - More of a high quality ambassadorial product to enhance Scotland's reputation as a supplier of high quality food and drink.

7. In fact, there is not a single per live weight tonne economic performance indicator where trawling outperforms creeling. In addition, **per live weight tonne**, creeling will deliver:
   - More geodiversity;
   - More biodiversity; and,
   - More biomass, possibly including more commercially important demersal species.

## 3. Consideration of the AS paper

Each Section of the AS paper is considered in turn:

**Section 1: Introduction.**
This provides an overview of the paper's aims and method. The questions it addresses are stated as:

- *How competitive is the Scottish nephrops fishing fleet;*
- *What is the economic value of the Scottish nephrops fishing fleet to Scotland; and*
- *What does the future look like for the Scottish nephrops fishing fleet?*

There is no explicit consideration of societal costs and benefits or the fishery's impact on the marine environment. It is therefore quite clear the AS paper is not going to tackle the market failure / misallocation issue, or engage directly with the argument and evidence presented in the SCFF Report.

It should also be mentioned that the key conclusions of the SCFF study are robustly supported by the Grid Report[1] and the New Economic Foundation (NEF) study[2]. Given its remit, the AS paper therefore avoids directly addressing the central message of these three studies, all of which advocate a different approach to the exploitation of Scotland's Nephrops stocks.

SCFF and other stakeholder groups believe that an informed debate on how best to manage Scotland's inshore Nephrops fishery is long overdue. The failure of the AS paper to engage with resource allocation issues is regrettable. It was hoped the AS paper would further contribute to the debate.

**Section 2: The Nephrops Fleet in Scotland**.
This Section provides a detailed description of the fleet, governance, gear types, the fleet and its segments. The difference between landed and liveweight is very important when considering how best to allocate stocks or comparing performance of fleet segments. This distinction could have been better emphasized.

**Section 3 Business performance and competitiveness of Scotland's nephrops fleet segments**

[1] A study commissioned and published by Marine Scotland: The Grid Report (Riddington and Radford 2014, "Management of The Scottish Inshore Fisheries; Assessing the Options for Change") http://www.gov.scot/Publications/2015/01/4022/0. This quantified the economic benefits from the enhanced environmental service flow that could be realised through a re-balancing of Scottish inshore fishing effort in favour of creeling. Interestingly, even with quite modest improvements in the marine habitat, the magnitude of the potential environmental benefits to stakeholders outside commercial shellfish fishery greatly exceeded the benefits that that could be realised by stakeholders within the fishery.

[2] *The Scottish Nephrops fishery: Applying social, economic and environmental criteria (CFP Article 17)"* Chris Williams and Griffin Carpenter, New Economics Foundation Working Paper (2016). http://b.3cdn.net/nefoundation/21d024b2ce367cac07_ybm6bd667.pdf. This study presented 17 criteria for analysing the allocation of opportunities to inshore fishing grounds, in Scotland. Their chosen criteria were aligned with the Scottish government's Strategic Objectives, making Scotland: wealthier and fairer, smarter, healthier, safer and stronger, and greener. NEF developed a multi-criteria decision-making framework to evaluate trade-offs and to determine the relative performance of creelers and trawlers. Their analysis leads them to conclude that the creel fishery should be granted greater spatial access to inshore waters to deliver better value from the resource

Section 3 describes the 8 fleet segments (2 Creel and 6 Mobile). It presents each segment's landing by weight for ALL species caught. This unhelpfully obscures Nephrops issues. Why not just use Nephrops landing by weight and by value? It then presents prices for each segment. Again these are landed prices, not liveweight. For trawled Nephrops tails the landed price is three times its liveweight price, so this is a very significant distinction. Also, the average prices are for all fish – not just Nephrops. These prices are therefore largely irrelevant for comparing trawl and creel. This is unusual, because in this instance the authors seem to be aware of these inadequacies. At the end of the price analysis they state that:

> *"A price analysis in Chapter 4 provides results which are focused only on nephrops landings and the price for liveweight landings, rather than landed weight."*

OK, but why undertake a price analysis having these known shortcomings which are corrected later in the document.

Section 3, then considers income, costs and profit margins but includes fishing income and non-fishing income. Why include non-fishing income such as guard duty? Income and costs for each segment are expressed as a value per kilowatt days at sea (kWdas). There is no comparison of income, costs, and profits **per tonne** of liveweight landings. This is the obvious comparison and not just when addressing the issue of how best to allocate stocks.

Section 3 proceeds to address competiveness. It starts with a mention of the SCFF report:

> *"A recent report by the Scottish Creel Fishermen's Federation (SCFF) proposed that the economic benefits of catching nephrops by creel is significantly greater than the economic benefits of catching nephrops by trawl. However, our experience of the owners of fishing vessels is that they are hugely pragmatic individuals who are well-used to the vagaries of the fishing industry, and, importantly, are in the industry for the long-haul. If the economic advantages of creel fishing are as substantial as promoted in the SCFF report then it raises the question: why does such a sizable trawl fleet exist in the UK and in other countries? The remainder of Chapter 3 explores if the competitiveness of the different fleet segments can provide an answer as to why Scotland does have such a diverse nephrops fleet."*

Of course, the answer to their rhetorical question is given in the SCFF Report. Namely, market failure results in excessive trawling in near shore areas, and correction of this failure would require less trawling and more creeling in these areas.

Fundamentally, the AS study does not acknowledge that the interests of a trawler operator do not coincide with Scotland's best interests. For example, an average trawler over 250kW catching 160 tonnes per annum might be quite profitable. Indeed compared with an average creeler catching 10 tonnes per annum the trawler generates more profits, catches much more and employs more people. However, from the perspective of Scotland as a whole, this comparison is superficial and, in our view, misleading.

The correct comparison is either per tonne as above **or** between the over 250kW trawler and the 16 creelers each landing 10 tonnes per annum that could profitably exploit the 160 tonnes landed by a single trawler. Collectively, the 16 creelers would provide more jobs, more profits, more vessels, more fishing businesses and less damage to the marine environment. This is the core message of not just the SCFF paper, but also the Grid Report and NEF's working paper.

Section 3 continues and then asserts:

> *"The best measure to assess the efficiency of a fishing fleet, or vessel, is to analyse landings per unit of effort, i.e. how much effort does it take to land a kilogram or tonne of catch.*

Technical efficiency measures are quite meaningless as a performance indicator when examining two different methods (e.g. creeling versus trawling) producing two different economic outputs (e.g. live versus dead, whole or tailed). The most technically efficient way to land live Nephrops is to use a creel. A trawl is

best used to land dead whole Nephrops or Nephrops tails. The entire AS discussion and data on "efficiency" misses this point and is therefore irrelevant.

Section 3 further asserts (often assertion is preferred to logical argument).

> *"The best measure to assess the economy of a fishing fleet, or vessel, is to analyse how well it turns its operating costs into income".*

The term "the economy of a fishing fleet" describes the other performance indicator of Section 3 (the other, as described above, is efficiency). As explained by Section 3, "the fleet economy" is simply a measure of profit. At least "fleet economy" has some measure of the costs of landing prawns, the revenue generated and the profits. It transpires that creels are more profitable per £1 of accounting cost incurred – so what?

From a societal perspective, if we included the opportunity cost of Nephrops used (they are currently free), or the costs of damage to the marine environment (both of which all operators ignore) then creel profit per £1 of true costs would be massively greater. This is the whole point of the SCFF's Misallocation report. The absence of property rights to the sea bed means there is absolutely no requirement for fishers to outbid other potential fishers of a particular area of sea bed. In these circumstances, the value of the forgone output of live Nephrops (i.e. the opportunity cost of £9,500) is completely irrelevant to someone with a licence and FQA who wishes to use a trawl and land a tonne of nephrop tails (worth £1,750 per live weight tonne). The market fails because it ignores the opportunity cost. Ironically, the AS paper makes the same error because it also ignores opportunity costs. As such the AS paper cannot provide any insight into Scotland's best interests

Section 3 then combines "economy" and "efficiency" to try and quantify "competitiveness". It would be helpful if "competitiveness" was defined so that we could understand how best to measure it. Section 3 states:

> "*It is not considered reasonable to use any single finding on economy and efficiency to demonstrate that one fleet segment is 'better' than the other. However, a multi-criteria approach was developed to merge the findings on efficiency and economy to provide a quantitative view of overall competitiveness, which can indicate the overall success and sustainability of the fleet segments*".

Since both the AS's definition of efficiency and economy criteria are – for reasons highlighted above – conceptually flawed, the AS multi-criteria analysis is worthless. In any event, as stated earlier, NEF has already undertaken an extensive multi-criteria analysis of the Scottish Nephrops fishery. Surprisingly, the AS paper did not even acknowledge the existence of the NEF analysis.

It is revealing to compare the AS and NEF analyses. The NEF analysis used 17 criteria, including environmental impact criteria. All the NEF criteria were all aligned with the Scottish Government's Strategic Objectives. NEF concluded that in order to deliver better value from the resource, the creel fishery should be granted greater spatial access to inshore waters. The NEF conclusions support the SCFF paper and the Grid Report[3] view that there is currently a misallocation within the fishery. In contrast, the AS analysis used two criteria and arrives at a completely insupportable conclusion:

> *"The findings suggest that the competitiveness of the different fleet segments in Scotland is remarkably well-balanced, with most fleet segments scoring between four and five. However, for some fleets their*

[3] Prior to publication, the Grid Report was subject to extensive peer review by economists and other analysts within Marine Scotland. Post publication, at the specific request of the Inshore Fisheries management and Conservation Group, Marine Scotland had the Grid Report peer reviewed by an anonymous external referee. Neither internal nor external peer review raised any concerns about the economic analysis, the results or their implications.

*competitiveness is achieved by strong economy, for some fleet segments their competitiveness is achieved by strong efficiency and for others it is a balance of the two which supports their competitiveness"*

The last part of Section 3 addresses other issues which are largely peripheral to the misallocation discussion.

Overall, Section 3 is analytically incoherent and delivers an unsubstantiated conclusion which is inconsistent with the existing literature which unanimously concludes that the economic potential of Scottish Nephrops is not being fully realized (i.e. SCFF paper, Grid Report and NEF)

**Section 4 Nephrops price and value chain**

This section is more rigourous and coherent than previous sections and indeed succeeding ones. It provides a detailed analysis of the price paid for Nephrops products landed into Scotland and an overview of the price and total value of these products as they move through the value chain. This makes redundant the strange price analysis of Section 3.

In Section 4 reference is made to post-processing prices for live, chilled, frozen and tailed Nephrops. The study does not state what these prices are. It is therefore difficult to follow the process of converting the value of primary product to final sale values. The analysis concludes:

*"The application of the above assumptions, estimates that £14.7 million is added to the value of Scottish nephrops production by primary processors. Of this it is estimated that trawled nephrops makes up approximately £13.7 million and creeled nephrops £1.0 million."*

There is no way of checking these estimates. On the basis of these estimates live Nephrops worth £12.9m are processed adding £1m producing total final sales of £13.9m. This represents a 7% processing margin for final live Nephrops sales. However, we are informed that £20.9m of combined chilled and live Nephrops primary products have £5.2m of processing value added (20% of final sales). The £12.9m of live Nephrops accounts for 62% of the combined chilled and live primary product. Chilled could have less processing than live. Even on a pro rata basis we would expect a £3.2m live processing add-on. Where does the £1m processing of all live Nephrops come from? It is incumbent on the study's authors to provide a much more detailed explanation. Otherwise this cannot be considered sufficiently robust evidence to inform the debate.

Overall, Section 4 provides some new information and supply chain analysis.

**Section 5: Economic value of the nephrops industry in Scotland**

Compared with the strange Section 3, Section 5 is better if only because it uses recognised economic concepts derived from Economic Impact Assessment, although, there are no performance indicators relating to Cost Benefit Analysis. The Section looks at the GVA and employment contribution of the catching and processing sector. However, the analysis and results are very confusing.

For example Section 5 states

*"Prior to calculating direct GVA and direct, indirect and induced employment it is first necessary to estimate the overall financial performance of the sectors. Table 5-1 presents the turnover of the fleet and processing sector, split by creel and trawl……..The total estimated turnover for these segments is £133 million, and of this (as presented in chapter 4):*

- *the fleet generates total sales of £62.9m, of which nephrops was £55.8m; and*
- *the processing of nephrops generates total sales of £70.5m."*

This suggests that the overall financial performance, as reflected in total turnover, is £133 million. Turnover should never be a performance indicator. Adding the turnover of each stage in the supply chain double counts the turnover of the previous stage. In this case landings are counted twice. If there were three

stages, landings would be counted three times. Why produce such a misleading and completely irrelevant figure and present it as a performance indicator?

Total GVA for each segment is presented. This is then converted into GVA per FTE. The conclusion is drawn that:

> *"Overall in this analysis, the creel segments do not stand out as particularly different from the trawl segments in the generation of GVA per FTE post".*

In fact, the AS data shows that GVA per FTE is higher in creeling and, from a societal perspective, would be far greater if creelers and trawlers had to pay for the Nephrops they can access for free, or pay for the environmental damage they cause. This is what would happen if there was no market failure.

The Section then adds together the fleet and supply chain employment. The analysis starts by applying the Type II fisheries employment multiplier (1.35) to inflate the 1,267 fishing jobs. Thus the total jobs should be are 1,710 (1267 fishing and 433 processing). Confusingly, we are informed that:

> *"Applying the type II employment multiplier for fisheries (1.35) to calculate total direct, indirect and induced employment in the fleet and its supply chain indicates that the fleet and its supply chain supports a total of 1,744 FTE posts, of which:*
>
> - *417 were employed in and in support of the creel fleet or its supply chain; and*
> - *1,297 were employed in and in support of the trawl fleet or its supply chain."*

There are three problems here. First, the total should be 1,710 FTE posts not 1,744. Second, 417 and 1,297 sum to 1,714; whereas the correct total should be 1,710, whilst the stated total is 1,744. There is therefore some uncertainty about the true number of processing jobs. The third, more serious, problem relates to the relative employment contribution of creels and trawls. Assuming the estimates 417 and 1,297 represent the relative employment contributions, the implication is that creeling accounts for 24% of all Nephrop dependent jobs. This is the same percentage contribution that creeling makes to all fishing jobs (308 of 1,267 jobs). In effect, the assumption is that all Nephrops (chilled, live, frozen, tails) have the same processing. This is inconsistent with Section 4 which concluded that live Nephrops processing was 7% of final sales and over 20% for all trawl caught Nephrops.

Having provided the total jobs estimate of (1,744; 1,710; or 1714) and the implied total jobs in processing of 477, 443 or 447, Section 5 then, for some unspecified reason, undertakes an estimate of processing jobs by using a turnover analysis. It concludes:

> *"The estimates suggest that the employment created in the direct processing of nephrops in 2015 was 302 FTE posts, and of theseposts:*
>
> - *60 were employed in the processing of creel caught product; and*
> - *242 were employed in the processing of trawl caught product."*

A processing multiplier of 1.2 is applied to the 302 thereby generating a total of direct, indirect and induced processing jobs of 362 (compared with, say, 443 using the fishing employment multiplier).

As an exercise in triangulation, it is reassuring to have two methods of estimating processing jobs, even if they are somewhat divergent. We have one estimate of 443 processing jobs which means 1,710 total jobs when 1267 fishing jobs are added, and one of 363 suggesting 1,630 total jobs.

However in the summary Section 5.4 we have the following bizarre statement:

> *"In total, it is estimated that 2,077 jobs are supported in Scotland by the nephrops industry with 1,267 of those jobs in fishing, 302 in processing and 508 jobs in supply chain companies. Splitting the total jobs by creel caught and trawl caught nephrops results in approximately 489 jobs supported by the creel sector and*

*1,588 jobs supported by the trawl sector. This estimate only includes the employment effects in the nephrops fleet, the processing sector and their supply chains. Therefore, the knock-on effect in the downstream economy is not considered."*

There are a number of problems with the above quote. First, the 302 should be 363 (302 times the 1.2 processing multiplier). Second, suddenly we have 508 supply chain jobs appearing. Where did all these jobs come from? There is no explanation anywhere of this 508. This whole section lacks credibility. It is quite possible that the number of jobs supported by the trawl sector have inexplicably been over-estimated by a considerable margin.

**Unfortunately these particular estimates (1,588 and 489) were, perhaps unwittingly, highlighted by Bertie Armstrong in the SFF press briefing (see above)**. It is clear that misinformation is being produced and disseminated.

**Section 6: Outlook for the nephrops industry**

This is a retelling of issues surrounding Nephrops exploitation with stakeholder quotes. In 8 pages it discusses; stocks, regulation, innovation, market conditions, business confidence and investment, workforce, competition for grounds, fuel prices. Given the number of topics addressed the discussion is largely superficial.

We then encounter section 6.9 which asks the question. What if there was no fleet diversity? It is worth stating that no-one is suggesting a "no-diversity" policy. The SCFF (and the Grid Report and NEF) argue that the status quo is not delivering best value. The SCFF report has argued that creels should be used where creels would deliver the greatest flow of societal benefits; likewise for trawls. No-one is suggesting that any of the trawl segments should cease to exist. The rationale for AS addressing this straw man is given:

*"The analyses contained in the earlier sections and chapters of the report confirm the diversity of the Scottish nephrops fleet but also offer no evidence to support the need for any change in fleet structure. Furthermore, with diversity also existing in the products that enter the value chain, the findings could be interpreted to support diversity. However, as discussed above, there are some who are engaged in a discussion that promotes creel fishing to be more economically advantageous than trawl fishing, a conclusion not supported in the findings of this study"*

Given the above, the AS study is clearly asserting that it finds no evidence to support any change. This is to be expected since it did not address the issue of how to deliver "best value" to Scotland as a whole. This study simply described (idiosyncratically) some of the economics of the Nephrops sector. It did not address the merits of the status quo relative to alternative possibilities.

At the very least, discussion of the reallocation issue needs to focus on performance indicators per liveweight tonne. It also needs to embrace economic concepts which embrace societal costs and benefits, as well as environmental impacts. Since the AS study did none of these things, it is not equipped to pass judgment on the status quo.

The judgment it has made is therefore unfounded and irrelevant. Given that background, it would be quite inappropriate for anyone now publicly to declare that the AS document presents a defence of the status quo.

## 4. Conclusion

The AS study's advocacy for the status quo simply cannot be supported by its approach or the evidence it presents. This is undoubtedly the most serious problem of the study.

Some stakeholders may prefer the AS conclusions to those contained in three prior reports, namely SCFF's Misallocation report, the Grid Economics' Assessing the Options for Change Report and NEF's Nephrops working paper. Without delving too deeply into the provenance of the AS conclusions, just like **Bertie**

**Armstrong,** these stakeholders might energetically disseminate these conclusions whilst downplaying the conclusions of other studies. Others, such as more disinterested stakeholder groups, might be surprised by the AS conclusions, but lack the resources or inclination to assess their veracity. This might undermine their confidence in the more robust analyses undertaken by SCFF, Grid and NEF.

Knowing that many users of this study would simply focus on the conclusions, it would be regrettable if this erroneous interpretation by AS of its own analysis was allowed to have unchallenged influence on policy. It is clear that the AS study has already been used – perhaps unwittingly - by SFF and others to mislead the public and distort public debate.

The reality is that, as designed and executed, the AS study is not qualified to pass judgment on the conclusion of the SCFF paper, or for that matter the conclusions of the Grid Report or NEF. Against that background, the Scottish Creel Fishermen's Federation maintains its position that reallocating spatial access to the Scottish inshore Nephrops fishery is in the long-term economic interest of the country.

**Scottish Creel Fishermen's Federation**
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