



Agenda Item B3 supplementary

By: Lead Scientific and Conservation Officer

To: Kent and Essex Inshore Fisheries and Conservation Authority – 22<sup>nd</sup> January 2016

Subject: **Results of the KEIFCA whelk riddle size trials conducted in Leigh on Sea & Ramsgate in January 2016**

Classification Unrestricted

Summary: To report on the results of the 22m, 24mm and 25mm whelk riddle size trials conducted with industry in the KEIFCA district in January 2016.

**Reviewing the riddle size**

On the 7<sup>th</sup> January 2016 the KEIFCA technical panel discussed changing the riddle gap size as this is an important management tool in managing the whelk fishery. The panel was presented with results from recent and historic research (KEIFCA, Defra, Cefas, Sussex IFCA, Bangor University & Queen Mary University London) which demonstrated that whelks reach sexual maturity in the KEIFCA district above 45mm (Table 1). A consequence of this new research is that the current EU Minimum Landing Size (MLS) of 45mm does not allow whelks to reproduce before they are fished, as it is smaller than the mean size of maturity for the important whelk fishing grounds. The panel discussed the effectiveness of the riddle to sort different sizes of whelks and that increasing the riddle size could have a significant impact on fishermen’s catches. Weighing up this information, the panel recommended that the riddle gap size should be increased from the current 22mm to 25mm.

Table 1: Size of maturity in different areas of the KEIFCA district

	Area 1		Area 2		Area 3		Area 4	
Sampling month	October		March		July		March	
Sex	Male	Female	Male	Female	Male	Female	Male	Female
Shell height at maturity	42.08mm	47.80mm	58.05mm	62.78mm	55.81mm	60.51mm	59.52mm	64.22mm

**Working with the local industry**

Following this recommendation, a number of local fishermen were concerned about the impacts of an increase in riddle gaps and asked that KEIFCA undertake further trials to assess the impact of this recommendation. KEIFCA officers spent over 10

officer days working with the industry to conduct riddle size experiments in two ports in the district, Leigh on Sea in Essex and Ramsgate in Kent. In total over 340 kg of whelks were riddled across the 2 ports and the trials helped evaluate the length and weight of whelks retained (sold) and rejected (returned to sea) for different size riddles; 22mm, 24mm and 25mm.

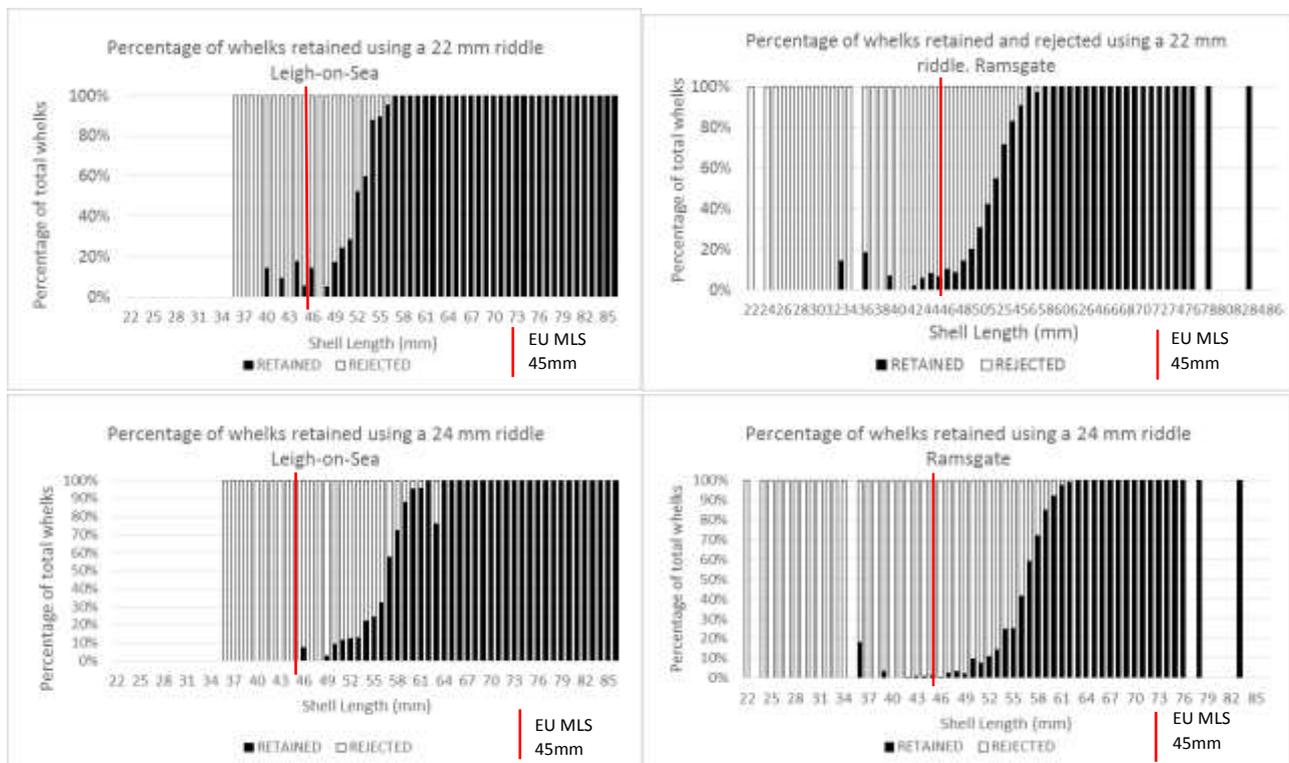
## Key conclusions of the riddle trial

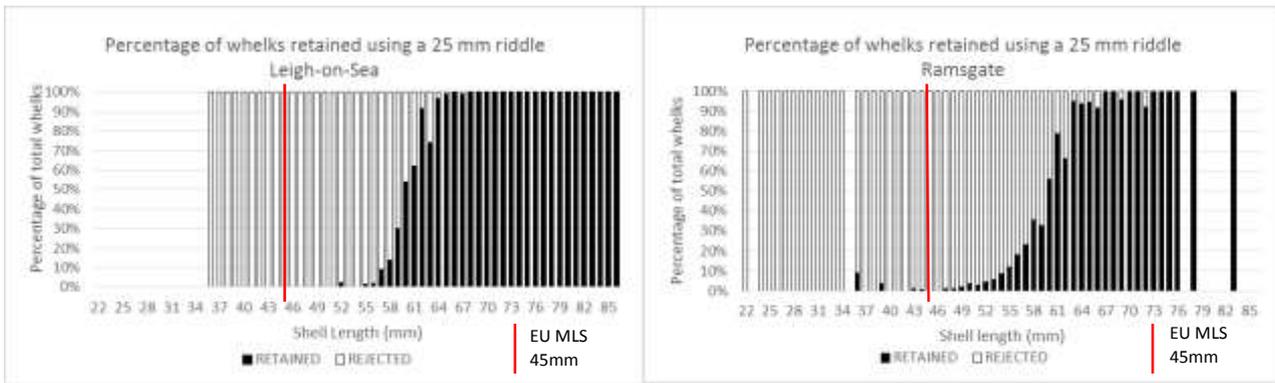
### 1) Trials showed fishermen using the current 22mm riddle are landing undersized (<45mm) whelks

The current EU minimum landing size (MLS) of 45mm is the minimum whelk shell length that can be landed. As shown (Figure 1), riddles sort whelks based on shell width, not length. Given this, in the recent trials, the current 22mm sized riddle retained some whelks that were below the EU MLS in both Leigh on Sea and Ramsgate (Figure 1). Both the 24mm and 25mm riddles also retained some undersized whelks in Ramsgate but not in Leigh on Sea.

Despite the inefficiency of riddling to sort whelk shell lengths, a size of riddle should be chosen that doesn't retain any, or minimises the risk of retaining any, undersized whelks. Any whelks which are riddled and then found to be undersized upon landing by an inspection from any regulator (IFCA, MMO, Royal Navy, and Border Force) would still be an offence under EU legislation and subject to compliance action.

**Figure 1:** Percentage number of whelks retained and rejected by each riddle size from whelks landed into Leigh on Sea and Ramsgate. The red line indicates the EU MLS.





**2) Whelks are difficult to riddle**

Unfortunately, riddles are not optimal devices for size separating whelk catches based on shell length into landed and discarded components due to the conical shape of the whelk and variation in their length to width ratio in different areas. Whelks will pass through the gap in a riddle with the smallest dimensions, i.e. their width rather than the longest dimension, i.e. their length. As whelks are usually landed in large quantities, using a riddle allows a rapid sorting mechanism which is far less labour intensive than manually measuring every whelk caught however it does select based on shell width rather than height.

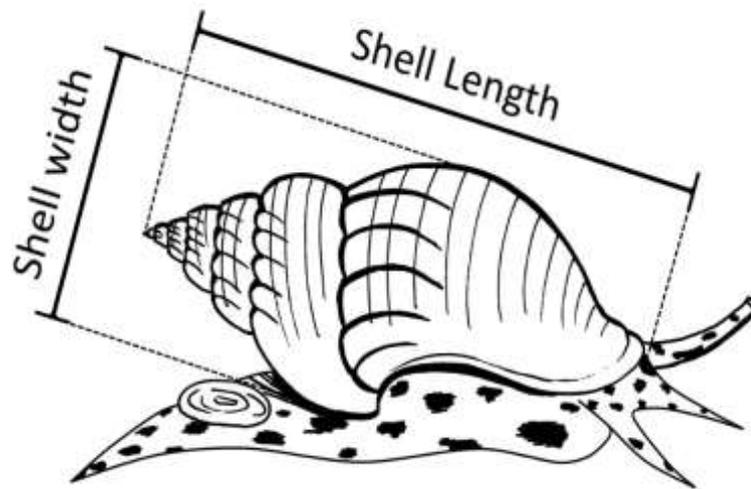
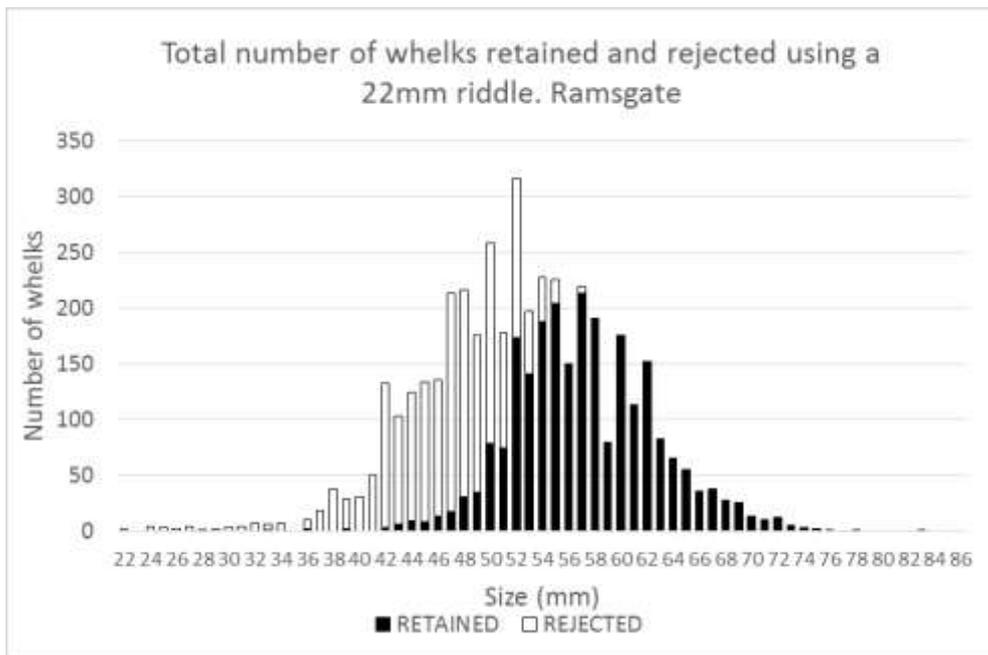


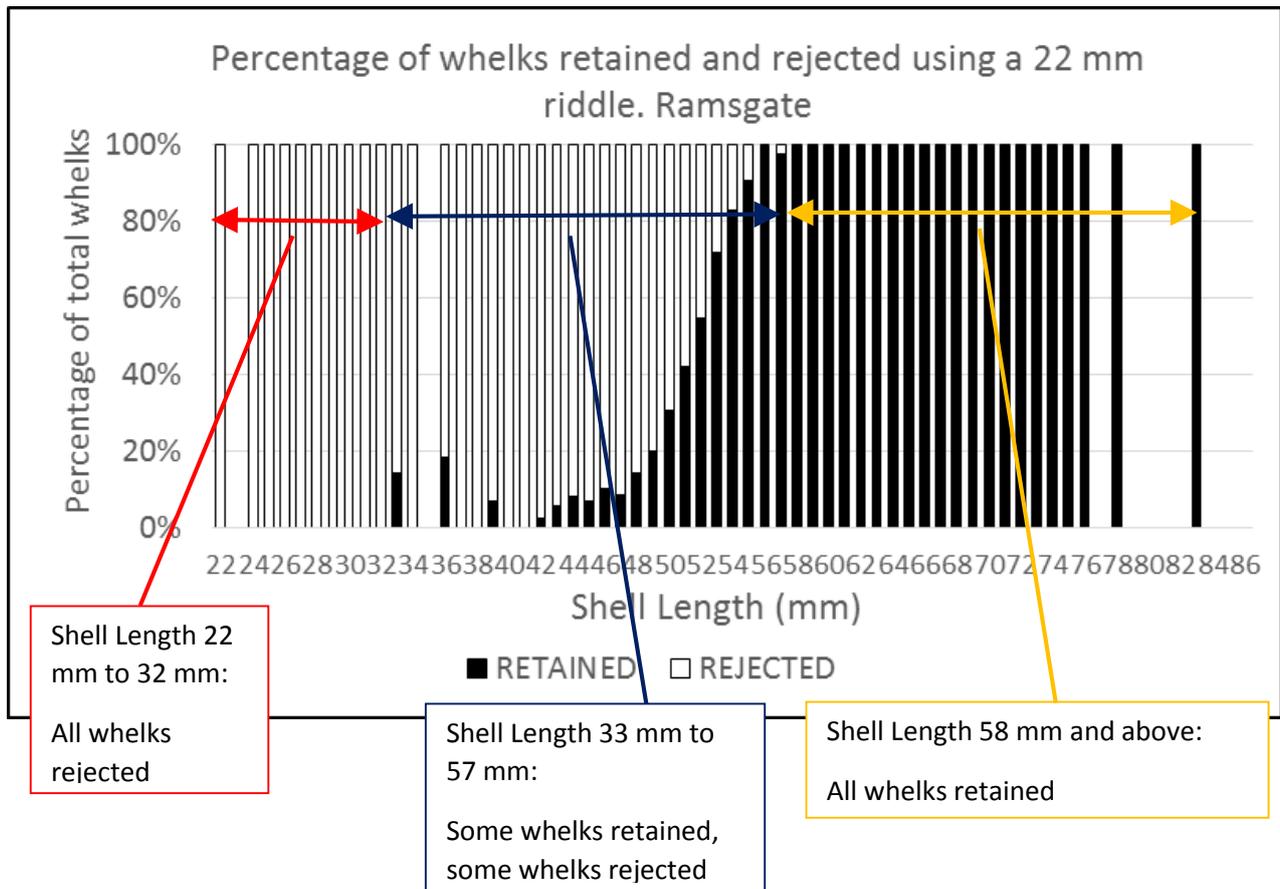
Figure 2 shows the number of different sized whelks retained in a 22mm riddle (currently would be landed) and the number and size of those whelks that passed through a 22mm riddle and would be returned to the sea. These 'size-frequency' graphs show the numbers of whelks of each shell length that were caught. It also shows that whelks with a smaller shell length pass through the riddle and are rejected compared to whelks with a larger shell length that are retained by the riddle indicating that overall the riddle does select for shell length. For several small to medium sized shell lengths, some whelks are retained in the riddle and some pass through the riddle and are rejected. Although these whelks that are retained and rejected have the same shell length, they have slightly different widths and this shows the inefficiency of the riddle at these size classes.

**Figure 2:** Example of the number of different sized whelks retained and rejected from a 22mm riddle from a vessel that fishes out of Ramsgate. Data collected by KEIFCA officers in January 2016.



The numbers of whelks can also be expressed as percentages to show the relative amounts of whelks retained and returned to the sea in different shell length size categories (Figure 3). This example, using a 22mm riddle on a catch from Ramsgate, highlights the variance in whelk shell lengths and widths. Whelks shorter than 32mm all passed through the 22mm riddle and all whelks with a shell length longer than 58mm were all retained in the riddle. However, for whelks with a shell length between 33mm and 57mm, some had a width below 22mm and therefore passed through the riddle whereas some had a width greater than 22mm and were therefore retained by the riddle.

**Figure 3:** Example of the percentage of different sized whelks retained and rejected from a 22mm riddle from a vessel that fishes out of Ramsgate. Data collected by KEIFCA officers in January 2016.

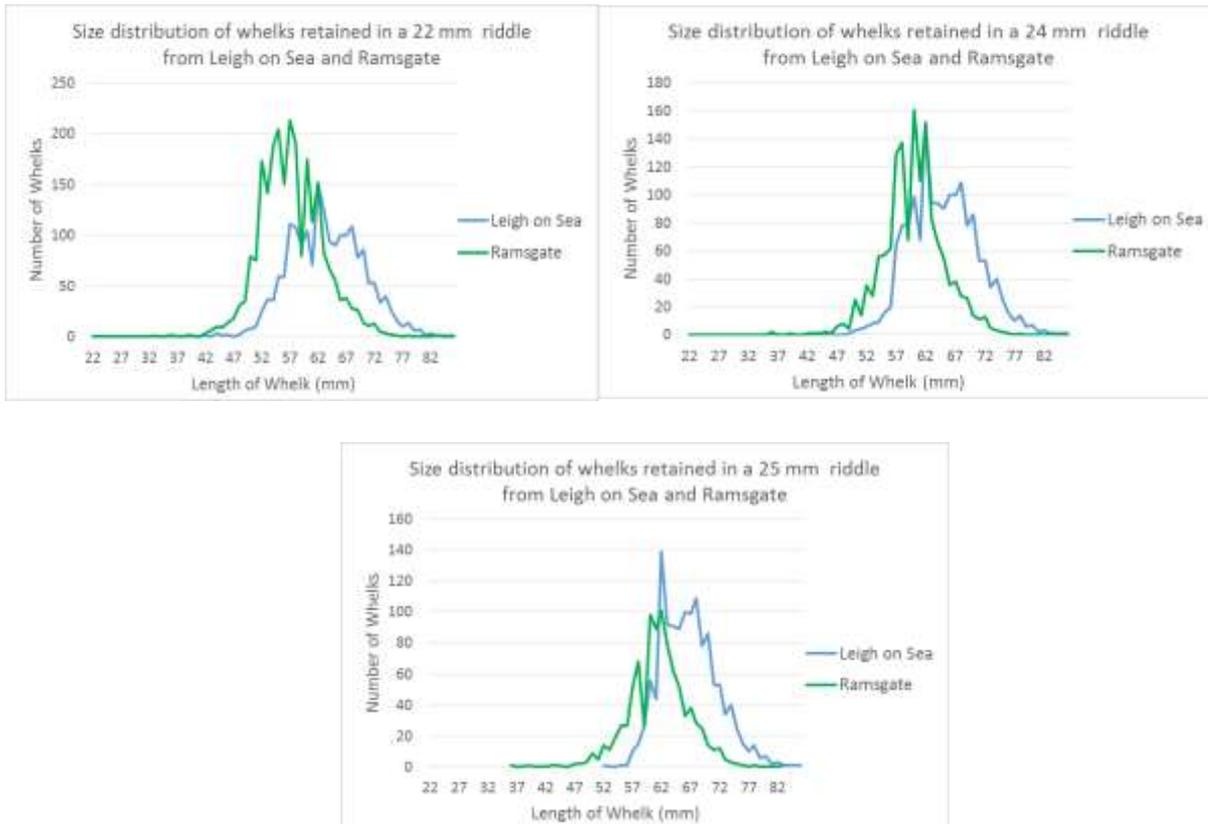


This variability in shell length to width shows that the efficiency of riddles for sorting whelks based on shell length is not optimal and that for a range of small to medium shell lengths, some will be retained and some will be rejected. This inefficiency with all the riddle width options (22mm, 24mm or 25mm) needs to be considered when using riddles as a management tool.

**3) Trials showed variation between fishing grounds**

These trials examined the sizes of whelks from catches into Ramsgate and into Leigh-on-sea and found variation in the amount and shell length of whelks that passed through the different sized riddle gaps. Figure 4 shows that a greater number of longer whelks were retained in Leigh on Sea, using all 3 riddle sizes, compared to Ramsgate. For all riddle sizes used, whelks in Ramsgate had a shorter shell length for the same width than whelks in Leigh on Sea. It is likely there are also seasonal differences throughout the year and this trial provides data from 1 day only. Further research is proposed to examine spatial and temporal variability in the districts whelk stocks.

**Figure 4:** Comparison of the size distribution of whelks retained in 22, 24 and 25mm riddles from vessels that fish out of Leigh on Sea and Ramsgate. Data collected by KEIFCA officers in January 2016.



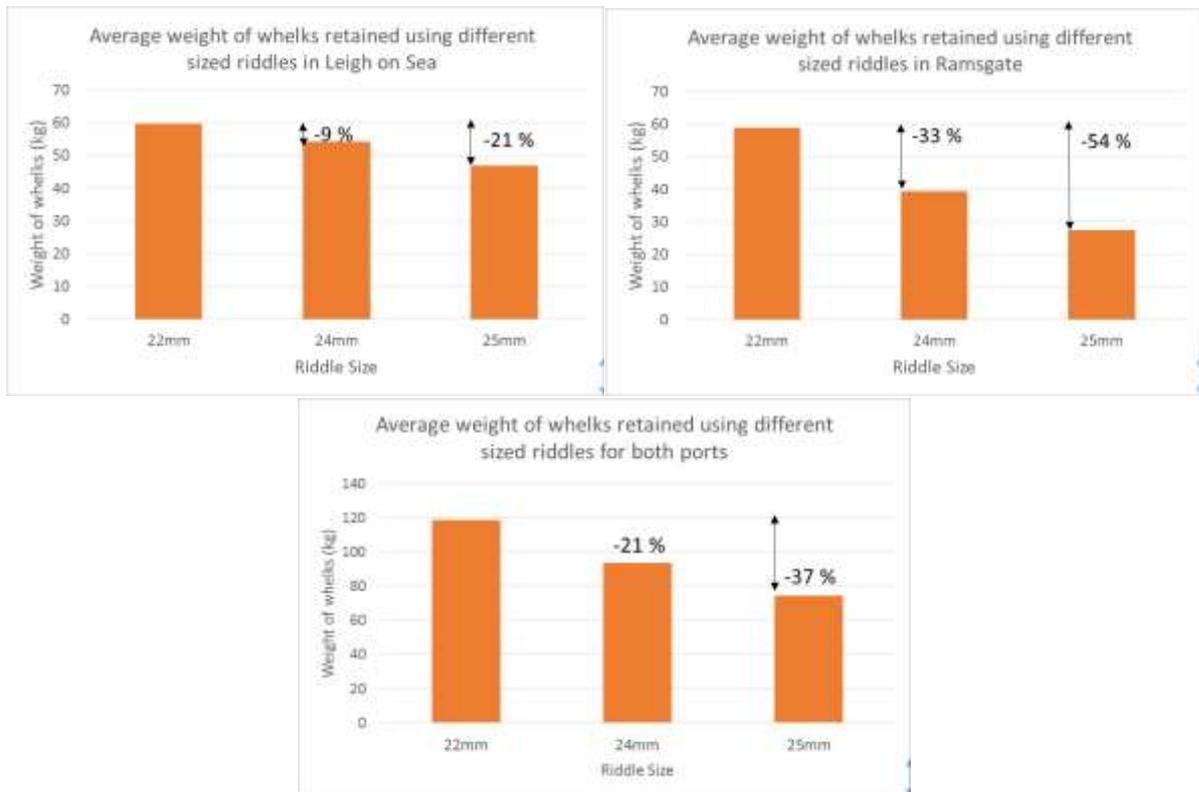
**4) A small increase in riddle size has a large impact in landings.**

Due to the differences in the width/length relationships between Ramsgate and Leigh on Sea, the impacts of increasing the riddle size would be different between the 2 ports. Figure 5 shows the decrease in weight of whelks retained using different riddle sizes on whelk catches landed into Leigh on Sea and Ramsgate. In the trial, the weight of whelks retained using a 24mm was 9% lower than using a 22mm riddle in Leigh on Sea but 33% lower in Ramsgate. There was a 21% reduction in retained whelk weight using a 25mm riddle in Leigh on Sea versus a 22mm riddle but a 54% decrease in whelks retained using a 25mm riddle in Ramsgate compared to the weight of whelks retained using a 22mm riddle.

As the whelk permit byelaw applies to the district as a whole the results of both sites have been combined and analysis of the combined results reveals that to change from a 22mm riddle to a 24mm riddle would result in 21% more whelks being returned to the sea. To increase from a 22mm to a 25mm riddle would result in 37% more whelks being returned to the sea. By using a larger riddle and therefore returning a proportion of the smallest whelks to the sea will allow these whelks to continue to grow, to reproduce and to contribute to future stocks, thereby assisting sustainability.

An increase in the gap size of riddles would therefore have a direct impact on the earnings of the fishermen and this impact would vary depending on the area they fish in.

**Figure 5:** Comparison of the weight of whelks retained using different riddle sizes on whelks landed into Leigh on Sea and Ramsgate and the average weight from both vessels combined. Percentages shown are the percentage reduction in weight compared to weights obtained from the 22mm riddle.



### 5) Increasing the riddle size can have secondary impacts that need to be weighed-up

Increasing the riddle size may lead to a shift in the target whelk catch to catch more larger, mature whelks as shown by the line graphs below (Figure 6) where increasing the riddle size moves the graph to the right, i.e. to catch larger whelks. By increasing the riddle size and therefore the size of whelks landed, whelks with widths between 22 mm and either 24 mm or 25 mm would be returned to the sea to grow and reach sexual maturity. It is estimated that it takes approximately 15 months for a whelk to grow from the current MLS of 45mm to 60mm, the size of sexual maturity. Although initially there may be a decrease in the number and weight of whelks landed by increasing the riddle size, over time these whelks would grow into a size where they would be retained using a larger riddle after they had reproduced.

**Figure 6:** Comparison of the size distribution of whelks retained in 22mm, 24mm and 25mm riddles.



### **Fishermen's comments and feedback since the meeting**

- A number of fishermen strongly oppose the proposed increase in riddle size and feel it is not necessary.
- Increasing the riddle size would have a significant impact on their business and would reduce their incomes at a time when other fisheries (bass, CFP reforms etc.) are already impacting their income.
- Some fishermen have questioned the science behind the advice and don't feel it represents what they see.
- In general fishermen have expressed an interest in working with KEIFCA to gather more data to inform future decisions and gather evidence that reflects on their knowledge and experience.
- Most fishermen have felt that a long-term plan has got merit and would support its development
- There was a general feeling that if measures needed to be introduced a gradual introduction of would be preferable.
- Some fishermen also felt that developing a standardised riddle specification might be useful as would applying for grant funding to investigate the potential of different riddle designs.
- Some fishermen felt that developing a package of measures rather than focusing primarily on an increase in riddle size would be beneficial (increasing the minimum number and size of the escape holes) and that other measures such as a closed season in December/ January would be more beneficial.
- Other suggestions have emerged such as holding an interested parties register that would be included on any mailing list (the register would require an individual to contact and ask to be added, and would require the individual to reconfirm and update contact details every 2 years).
- Another suggestion was that local fishermen could form a whelk association to represent and discuss their views.