



Department of  
Primary Industries and  
Regional Development

Dear meshed pot fisher.

With the start of the new season, please find included in this letter your current research exemption for using the mesh and modified pots and an update and report on the meshed program.

The information from the meshed pot is key to the research information that we provide to you on your fishery and underpins model projections and TACC setting. Participation has dropped and we are hoping that this update and any feedback that you can provide will help us to provide a much needed lift in participation

If you require any callipers or additional datasheets please do not hesitate to contact me.

Yours sincerely

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This year marks the 10<sup>th</sup> year of the meshed pot program, and so it is only fitting that we provide you with an update on the program so far and also our vision for this valuable program into the future. The meshed pot program (initiated in 2007), allows a fisher to fish a modified pot designed to capture undersize lobster. This was one of many programs designed to investigate the causes and implications of the low puerulus settlement. Since the project began, 84 different vessels have provided meshed pot data and without the help of the skipper and crew of these vessels, the information presented below would not be possible.

Of particular note, a number of vessels have provided over 200 days of meshed pot data (Figure 1), so to those fishers in particular a very big thank you.

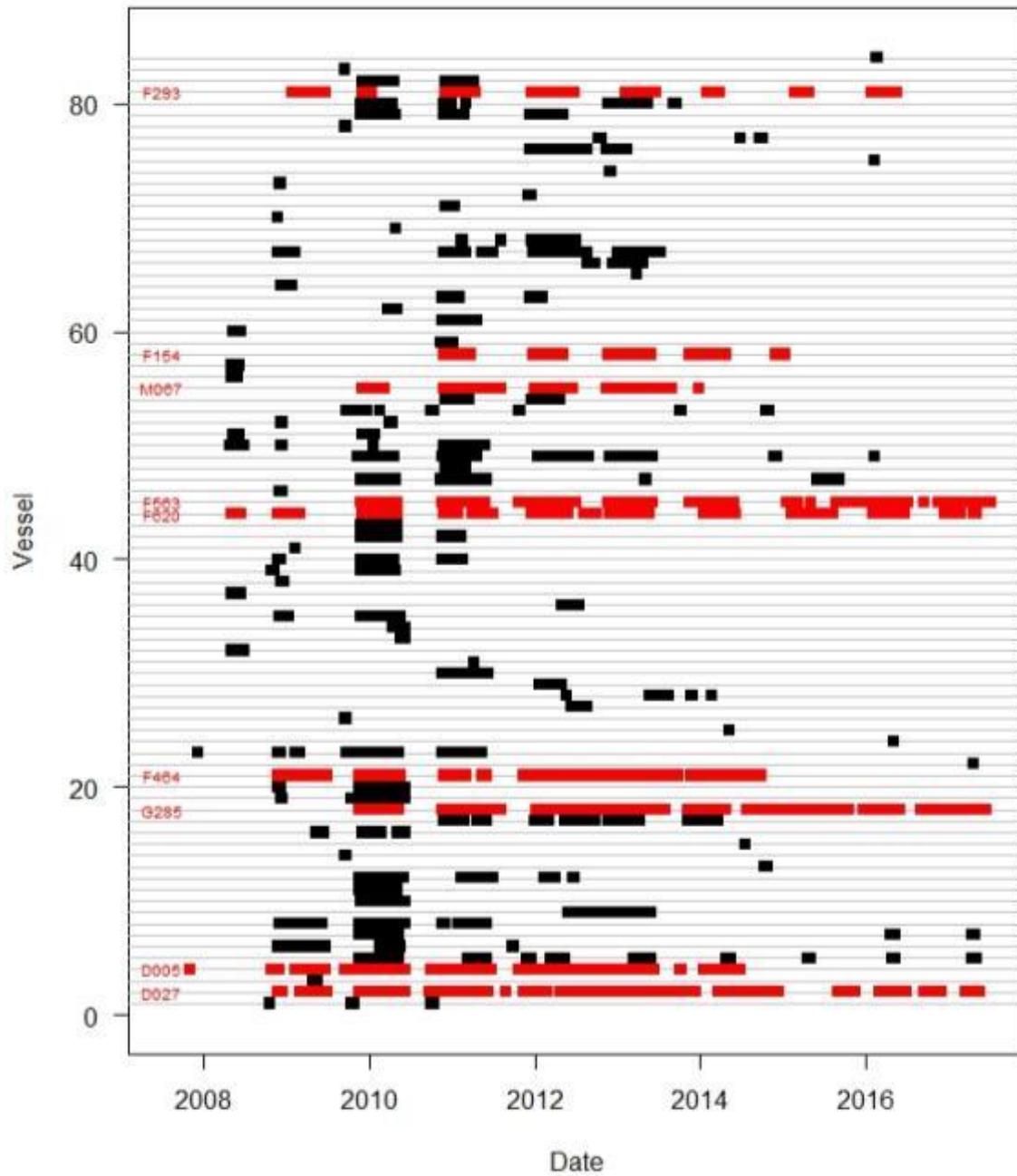


Figure 1 Time series of those fishers who have provided meshed pot data

Whilst a few fishers continue to participate in the program, there has been a progressive decline in the number of fishers providing meshed pot data, and consequently the number of lobsters measured has declined (Figure 2).

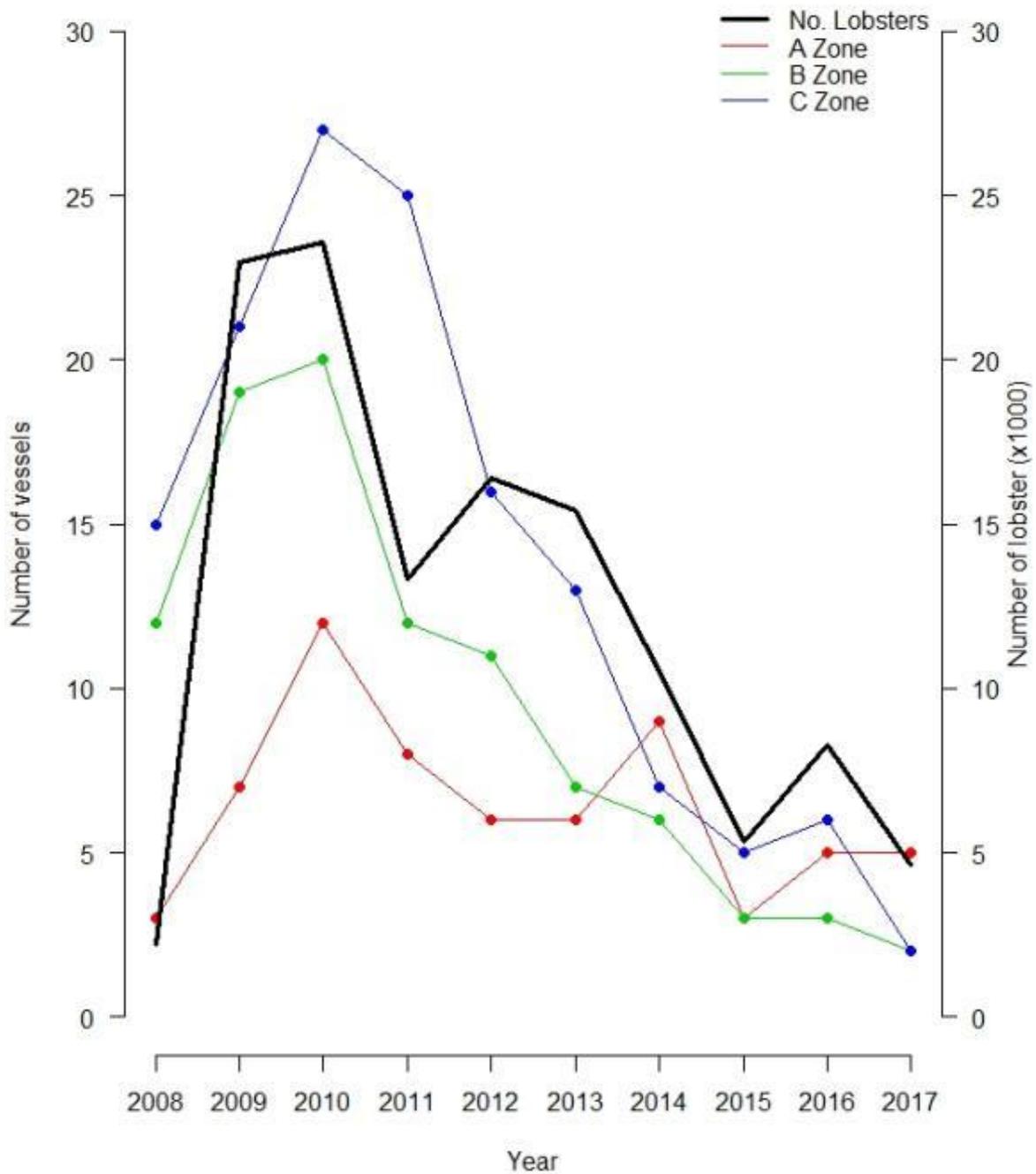


Figure 2 Number of fishers who have provided meshed pot data by year and zone, and the annual number of lobsters (x1000) which were recorded.

There are a number of factors which may have contributed to this including an improvement in puerulus settlement reducing some of the concerns about settlement levels, the incentives (e.g. fishing an additional pot) was not enough to warrant the effort of measuring the

lobsters or a reduction in the amount of data that is provided back to fishers from the Department. The data from the mesh pot program remains very important for our assessments and we are very keen to increase participation. As such if people have ideas on what incentives may encourage more people to participate please let us know. Currently those people participating in the program can fish an experimental pot which has a number of the pot design restrictions removed, and is aimed at allowing fishers to try different pot designs to increase pot efficiency. This will be discussed more later in this letter, but we hope that this letter provides you with an idea of how important this project is and encourages a few people back to the program. Your input would be greatly appreciated, so please let us know your ideas.

### **Program Details**

Fishers taking part in the program modify by using either mesh or battens, one of their commercial pots so it is capable of catching juvenile rock lobsters (Figure 3). This includes the closure/removal of escape gaps and reducing the gaps in the floor and walls of the pots using either prawn-trawl mesh or increased number of battens / steel bars. The exact method is left to the individual so that it is best suited to where and how they fish. In addition to recording data from this meshed pot we also ask for data from their nearest unmodified pot to provide a direct comparison of catches. Data can be recorded as often as suits each fisher, but we prefer at least weekly measurements if possible. Any legal lobsters captured in the meshed pot can be retained by the fisher as part of their daily catch.

To date data from these pots has provided size, sex, depth, and locational information for over 120,000 individual lobsters (Figure 4).



Figure 3 Image of two types of meshed pots with plastic coated wire mesh (left) and extra battens (right)

### Summary of the Data

The meshed pot designs used by fishers was very successful in retaining smaller lobsters, with a far greater number of small lobsters being retained in these pots (Figure 4). Very few lobsters  $< 70$  mm carapace length (CL) were retained in normal commercial pots, due to the escape gaps in these pots. Modified pots on the other hand caught lobsters as small as 16 mm CL. Meshed pots didn't appear to impact on the catches of legal-sized lobsters, with both open and meshed pots having a very similar size distribution above legal size (Figure 4).

The value of this data set is further enhanced by its impressive spatial (area) coverage. Data has been collected from Mandurah to north of Steep Point (Figure 5), a coverage that would simply not have been possible had it not been for industry's involvement. A broad spatial coverage such as this is very useful in allowing us to see trends in biomass in areas where we rarely go, and to see whether these trends are consistent across the various latitudes and depth ranges.

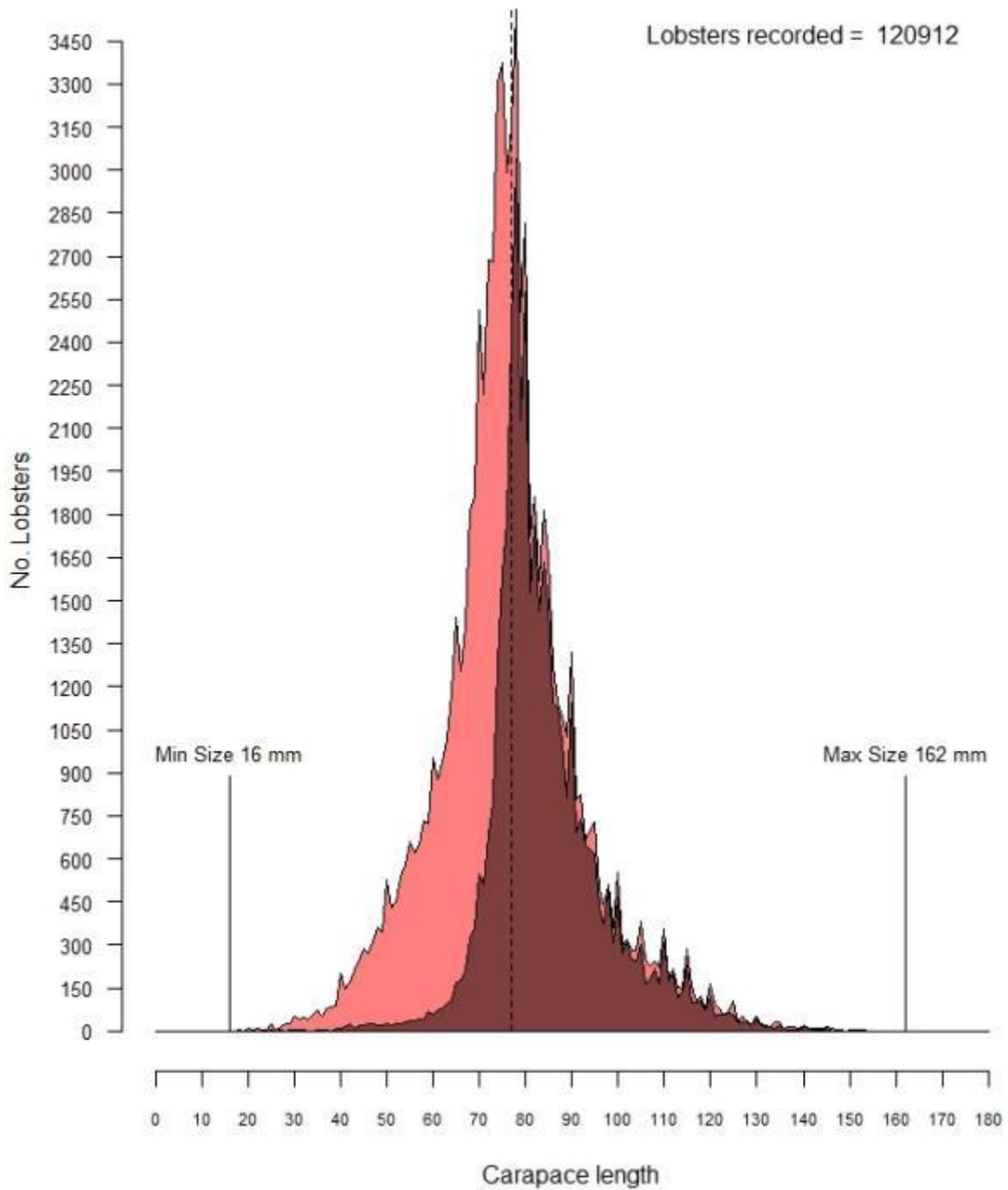


Figure 4 Length frequency of lobsters from meshed (pink) and normal (grey overlaid over the pink) commercial pots and the minimum and maximum size of lobsters captured. Vertical dotted line represents the legal minimum size (77 mm CL)

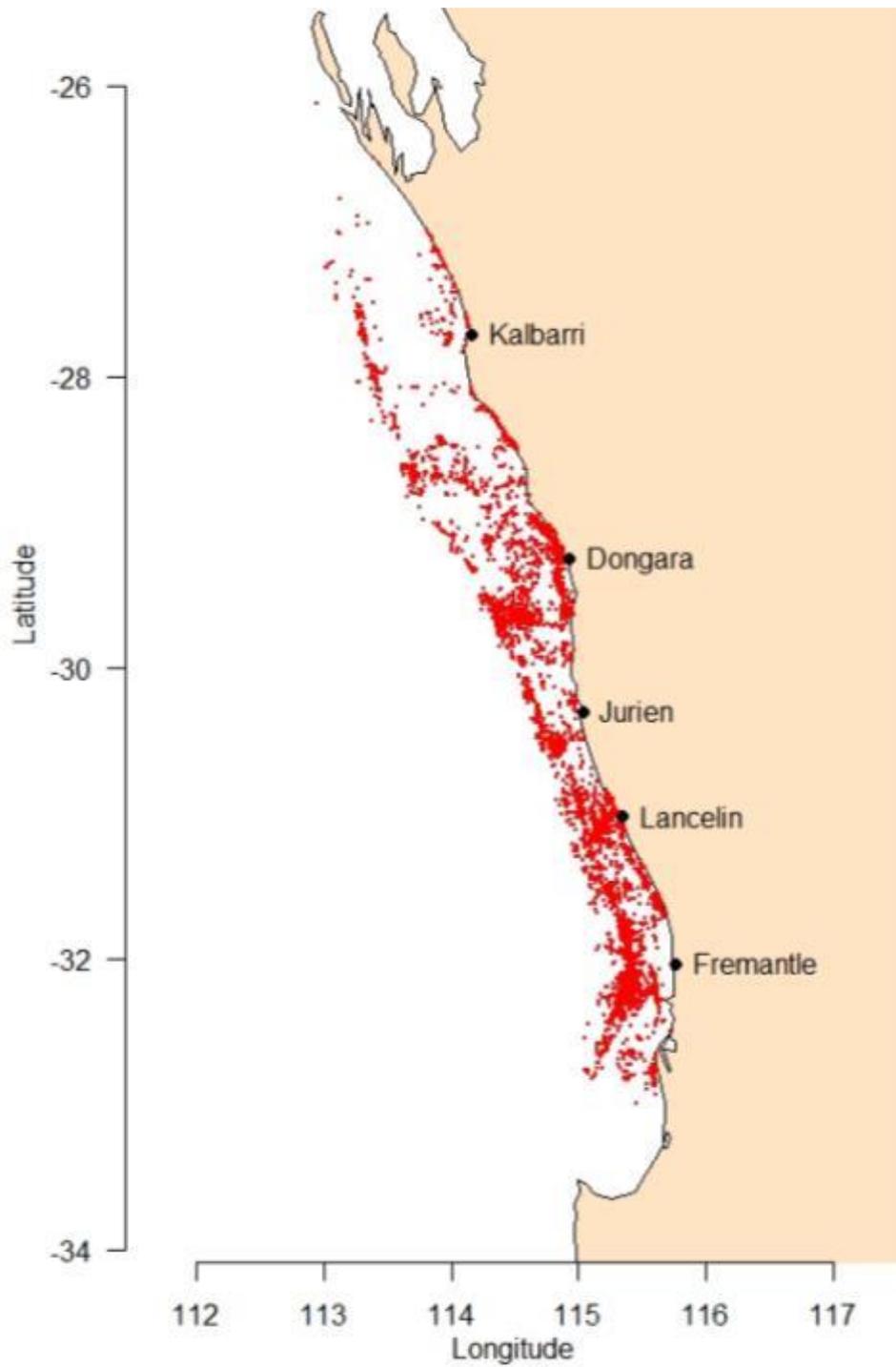


Figure 5 Location of data from meshed pots provided by commercial fishers

## Juvenile Settlement

The spatial extent of catch data from the meshed pots has enabled a thorough examination of the depth where juvenile lobsters are caught. It is this analysis which was the driving force behind the establishment of this program. When unexpected low puerulus settlement was recorded from 2007, there was a belief in industry that settlement was still occurring, not in the shallow waters where the puerulus collectors are located, but rather in deeper water. By looking at the relative size frequency of small lobsters from each depth category we can infer the relative settlement in these depths, as smaller lobsters (<60 mm CL) don't appear to migrate as whites from where they settle as puerulus.

When examining the size distribution of lobsters caught in 10 fathom depth categories, it is clear that there were more small lobsters in shallow waters (Figure 6). The proportion of smaller lobsters (<60 mm CL) was greatest in shallow water (20%) and declined through each successive depth category to 2% in water > 30 fathoms (Figure 6). So while small lobsters do occur throughout the various water depths, they are far more prevalent in the shallow (<20 fathoms) waters.

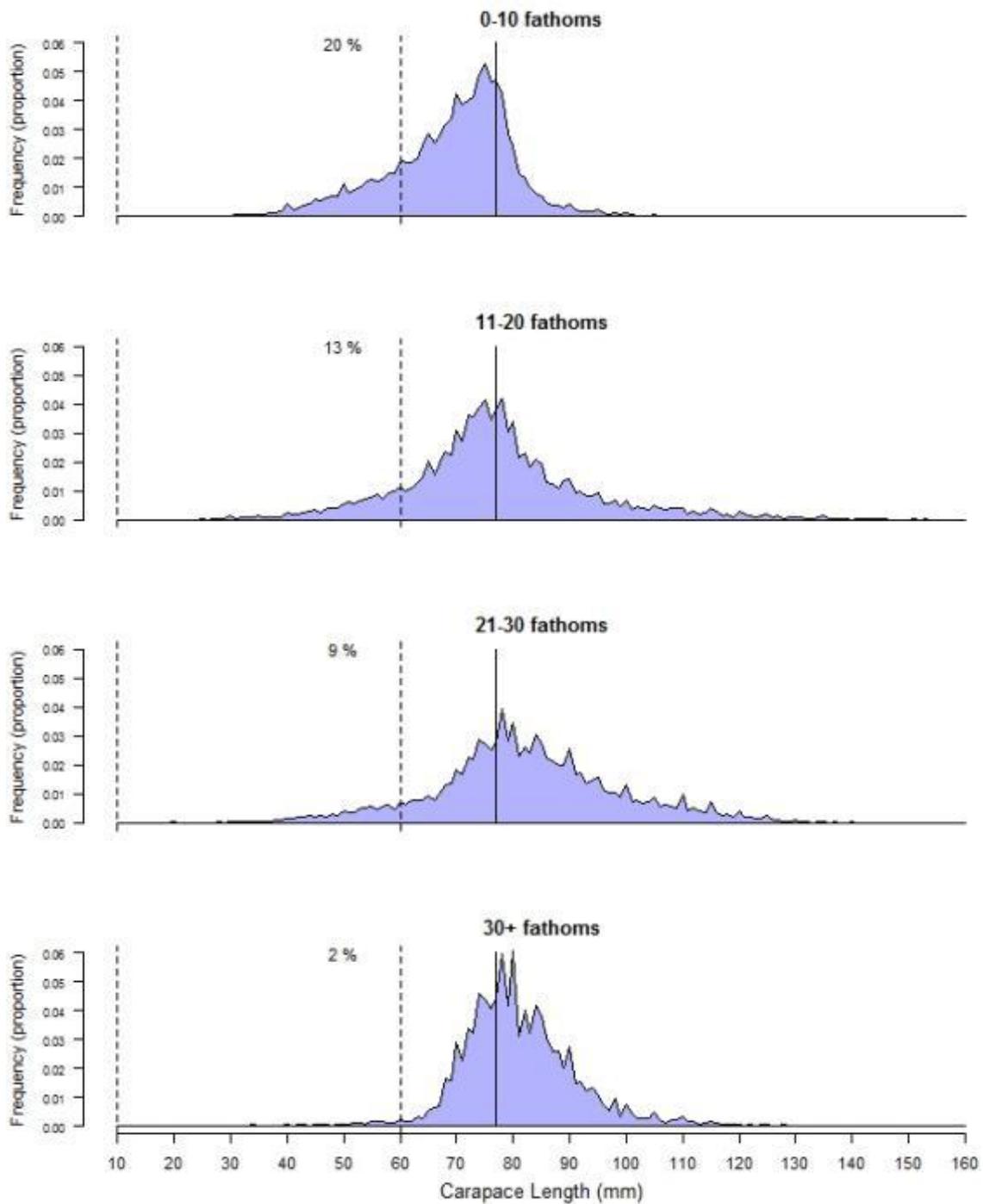


Figure 6 Length frequency (proportion) of lobsters captured in each of four depth categories by meshed pots throughout the duration of the meshed pot program. Solid line is legal minimum size (77mm CL) with the dotted lines representing the bounds of 10 and 60 mm CL with the proportion of catch from within these bounds presented.

## Puerulus and Juvenile Relationship

The reduction (numbers) and altered pattern (timing of settlement has become later) in puerulus settlement has had a major impact on the fishery. Limiting catch to maintain stock levels in the face of the reduced settlement was one of the major reasons behind effort reductions and then the move to quota and total allowable commercial catches (TACCs) being initially set at 5500 t. The shift to quota saw a major change in the dynamics of the fleet, both in terms of number of vessels, patterns of fishing, and targeting of sizes depending on beach price. Over the years since introduction of quota, it has been increasingly difficult to obtain catch data from shallow waters, and an examination of all of our data sources has shown that the meshed pot program provides us with the best data set against which to compare juvenile abundance with prior puerulus settlement. It is for this reason that we are now really encouraging fishers to participate in this program!

The information we have gathered over the last few years is starting to show some very interesting patterns. There has been a marked change in the catch rate of just undersize (70-75 mm CL) captured in shallow waters lobsters which was significantly related to the puerulus settlement in that zone four years earlier (Figure 7). Two potential relationships are shown between puerulus settlement and undersize catch rate four years later. In C Zone this relationship is very well explained by a curvilinear relationship (Figure 7, thick line). This is what we would expect as the number of puerulus settling increases, their survivorship will reduce as they compete with each other for habitat and prey. This is known biologically as density-dependent mortality. This relationship is not as clear in the other two northern zones (A&B) due to a couple of years which did not appear to fit the pattern. In both A and B Zone, the catch rates in 2015 were below what would be expected given the puerulus settlement in 2011, and in B Zone, the juvenile catch rate in 2017 is far greater than the 2013 settlement would have predicted (Figure 7). The relationship is likely to be more complex than simply the number of puerulus that settled four years prior, and this is an area we are continuing to investigate. However, you can see the value of the meshed pot data in allowing us to understand how different levels of settlement translate into future catches, especially given the very high biomass levels we currently have.

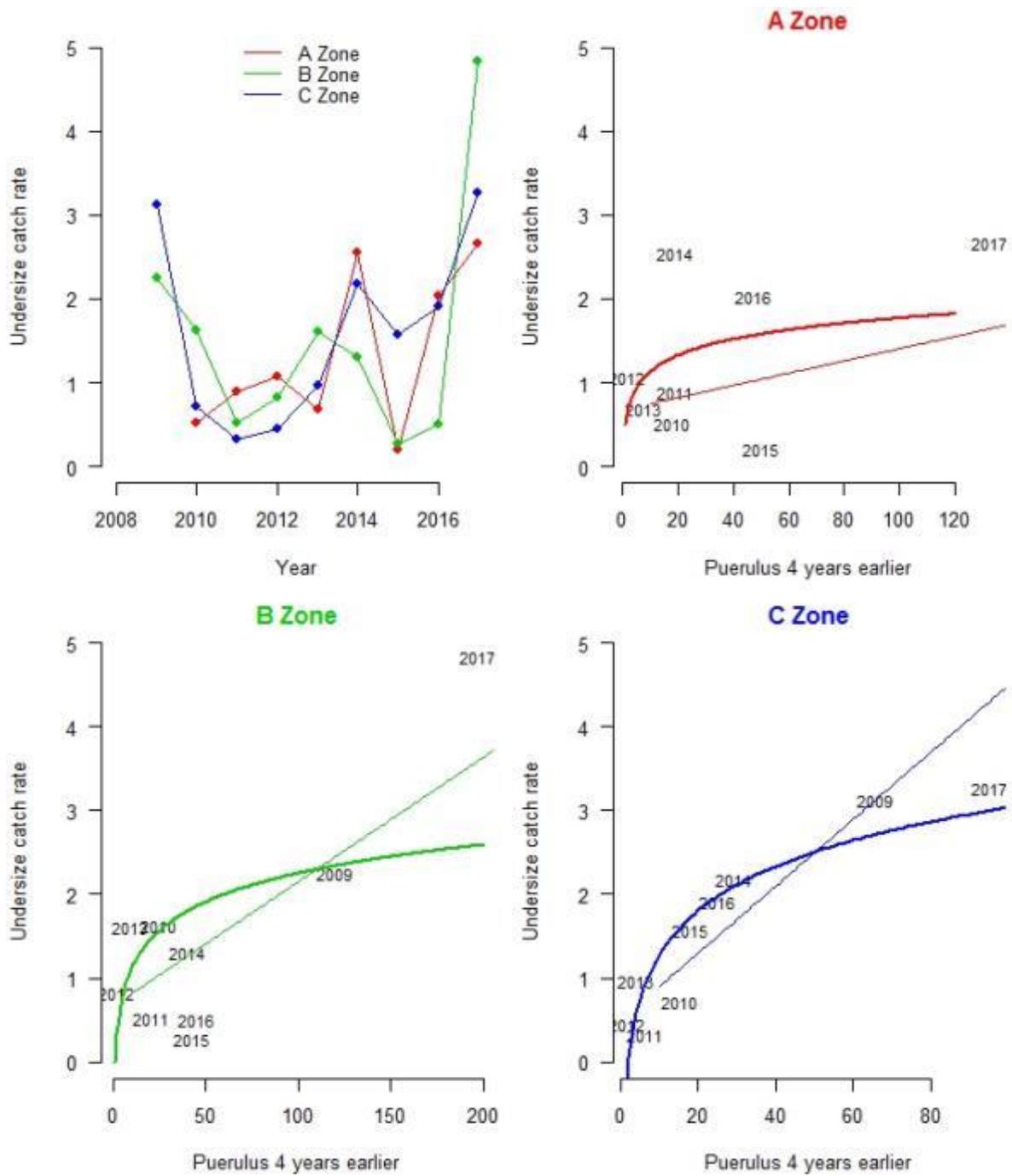


Figure 7 (topright) Annual undersize (70-75 mm CL) lobster catch rate by zone and the relationship (linear – thin line; curvilinear – thick line) between puerulus settlement four year prior and the undersize catch rate for each zone

## Next Step

Hopefully this letter has provided you with an understanding from the Rock Lobster Research Team of how valuable this meshed pot program is to your fishery. As mentioned previously, fishers who participate in the program are entitled to fish an additional, generally larger pot, designed to increase their catch rates. Data from these pots and how they perform will be the subject of the next letter. However, if there are other analyses you would like to see, or ways you think the program could be improved please contact me. This may include possible incentives to entice more people to participate in the program. If you wish to start fishing a meshed pot, then please contact us as we would love to have you on board.

Thank you once again to all who have provided this valuable data and we will be sending out another update soon.