# Wrasse fishery independent report 2017

Completed by: Cornwall Inshore Fisheries and Conservation Authority (CIFCA)

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# 1 Project background

Wrasse have been found to be particularly effective as cleaner fish and have been used as part of many salmon production company's sea lice control strategies along with more traditional chemical treatments. Although having been practiced in Scotland and off the Norwegian coast for nearly 30 years, fishing for and retaining of live wrasse to supply the salmon production industry with cleaner fish is an extremely new and innovative fishery to the south west of England. Concerns for the long term effectiveness of current chemical treatments and the impact of those chemicals to the wider marine environment has seen measures introduced to restrict their use. Additionally, the industry has recognised the economic benefits of using cleaner fish rather than a dependence on chemical controls. The restrictions applied to the use of chemical treatments and increased used of cleaner fish has seen production companies sourcing wrasse from further afield than Scotland to maintain supply without exhausting local stocks (L Bennett, R Hawkins, 2017, pers. comm.). In Cornwall fishing for wrasse using creels began as very small scale experimental fishing during 2014. Those initial trials have led to the fishermen who carried out those early experiments now almost wholly relying on the fishery for their income.

This report describes the sampling effort carried out by Cornwall IFCA Scientific Officers during 2017 as part of their independent sampling effort onboard their own survey vessel, Tiger Lily.

## 1.1 Aims and Objectives

The aims of the study were to provide a baseline of data in two previously unfished areas to be used as a comparison for future monitoring and to provide data to inform management for a sustainable fishery.

### 1.1.1 Aims

- Develop an effective survey methodology for fishery independent sampling.
- To develop a consistent methodology which can be repeated year on year to monitor the fishery.

### 1.1.2 Objectives

- Improve and develop the fishery independent sampling method from 2016.
- Set and haul two strings of 10 wrasse traps within Falmouth Bay from Research Vessel (R/V) Tiger Lily.
- Analyse the catch data.

# 2 Methodology

## 2.1 Survey equipment set up

### 2.1.1 Size of traps

The local fishers use wrasse traps supplied by the salmon farms. The traps (Figure 1) are supplied by Carapax[1], measure 72cm length x 40cm width x 28cm height, weigh 3.7kg and are composed of small mesh netting with a self-closable parlour entrance. The traps were already rigged when they arrived with a back rope, and markers. None of the pots had escape gaps.

**Figure 1: Carapax wrasse trap used for survey (source: carapax.se).**

### 2.1.2 Weight of traps

The traps have been supplied with a metal frame around them (Figure 2). In the wrasse fishery, two of the operators have added weight to their traps suggesting that they fish better with more weight because they do not move around as much limiting damage. It is assumed that the metal cages around our traps is comparable to, or heavier than, those used in the fishery and so will be sufficient to effectively catch wrasse.

**Figure 2: Example of the metal cage around one of the wrasse traps, used for weighting the trap.**

[1] http://en.carapax.se/creelspotstraps/cleaning-wrasse-traps/wrasse-trap.html

### 2.1.3 Condition of the traps

In the fishery the traps are not cleaned and so have built up a layer of algae (Figure 3). The option of using some fake algae on our traps was discussed, suggesting that possibly the algae aids by providing a shelter for the wrasse. The CIFCA methodology initially used clean traps and the results shown in this report have used clean traps with no algal covering. It was noted that on one occasion, one operator cleaned their traps with bleach and the catch rates reportedly went down. If the traps ever do need to be cleaned (which is unlikely with their shorter soak times), a pressure washer with no chemicals will be used.

**Figure 3: An example of the algae growth covering the wrasse traps observed on fishing vessels as part of the fishery dependent survey.**

### 2.1.4 Escape gaps

The traps have been supplied with no escape gaps, apart from one trap. The traps have been left as supplied, with a note made of which trap had the escape gaps during each survey to compare with the other traps.

### 2.1.5 Distance between traps

Local fishermen have a 10 fathom backrope between traps. This has been replicated during this survey.

### 2.1.6 Weighted ends

The strings were put together with one parlor pot at one end as shown in Figure 4, and a 5kg anchor weight at the other.

**Figure 4: A parlour pot attached to one end of the string of wrasse traps, used as a weight end.**

### 2.1.7 Number of traps per string

The strings were set out to have five traps per string which enabled four strings of five traps to be used in the survey. In the wrasse fishery, strings are generally made of 10 traps. It was decided that shorter strings are easier to work on the boat. Discussions were carried out about using individual traps which was seen to be advantageous in having precise locations, but time consuming in terms of setting and hauling. Therefore four strings of five was settled on as a compromise. This also has the benefit of being able to work the strrings in pairs to cover a larger area.

## 2.2 Methodology for setting and hauling traps

The survey was carried out from Cornwall IFCA'S research vessel Tiger Lily (Figure 5), which is a South Boats 11m Island MkII catamaran with twin IVECO 450hp engines.


**Figure 5: Research Vessel (R/V) Tiger Lily – Cornwall IFCA's research survey vessel.**

### 2.2.1 Shooting

The traps were shot into the tide, with the back rope kept tight so that the traps were evenly spaced. Proposed start and end positions of strings were marked on the Olex (marine charting and navigation software). Once at the starting position for a string the first marker was deployed over the side and a mark made on the Olex of the deployment location which was labelled with the string number. The skipper slowly navigated the boat to the desired end point of the string whilst the deck crew deployed the traps; as the back rope became tight the first trap was deployed, then the processed repeated with each trap until the entire string was in the water. A clear line of sight and communication was maintained between skipper and deck crew throughout the shooting operation.

The traps were baited using a big handful of cooked crab shell (approximately two handfuls per trap). In total, eight 5kg bags of cooked crab meat were supplied from *Sea Food and Eat It* which was sufficient for 20 traps worth.

### 2.2.2 Hauling

The traps were hauled by hanging away from them. The traps were hauled slowly so as to limit damage to the fish (Figure 6). As each trap was brought aboard the contents of each trap were emptied into a fish box (Figure 7) and a photograph was taken using a Olympus TG-5 camera. The number of escape gaps on each trap was noted. Any bycatch which could potentially impact the wrasse was noted down (including eels and velvet swimming crabs). The species and sex of the individual wrasse was recorded and a note was made if they were spawning. To check if the wrasse were spawning they were 'stripped' by running two fingers with a small amount of pressure along the underside of the wrasse and noting if eggs (female) or milt (male) came out. Once measured, the wrasse were transferred to a bongo full of seawater with fresh flowing seawater to recover before being returned to the sea at

the end of the string (Figure 7). The remaining contents of the fish box were emptied over the side of the vessel. The trap was then safely stacked on deck. This process was repeated for each trap.

**Figure 6: A parlour pot and wrasse trap being hauled onto survey vessel ready for sorting.**

**Figure 7: Wrasse being transferred from a trap to fish box & thereafter into a bongo with fresh flowing seawater.**

The daily logs for the all survey days are shown in Annex 1.

## 2.3 Temporal variables

There are a number of temporal variables which could have an impact on the results of this survey. To limit the impact of the tide, wind speed, wind direction and water visibility the following mitigation measures were followed;

### 2.3.1 Tidal range

The survey will generally take place outside of neap tides as other survey commitments take priority then and not over big spring tides as this is not an ideal tide stae to work. A tidal height of between 4.5m to 5m was chosen to allow a consistent tidal influcence.

### 2.3.2 Wind speed

The survey will only take place in wind speeds of less than 30mph for the entire time that the traps are fishing.

### 2.3.3 Wind Direction

All survey locations will be on the south coast with a southerly or easterly aspect. No survey will take place in an easterly wind with a NE-S wind above 10mph. The is for vessel safety when working so close in to shore and to reduce the influence of wind on the survey.

### 2.3.4 Water visibilty

Secchi disks will be taken on every survey on hauling and setting days to determine water visability, as it is considered that this may have an influence on the catch rates.

### 2.3.5 Location of strings

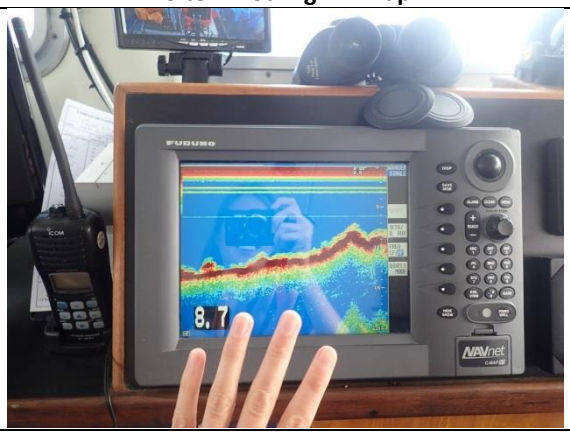
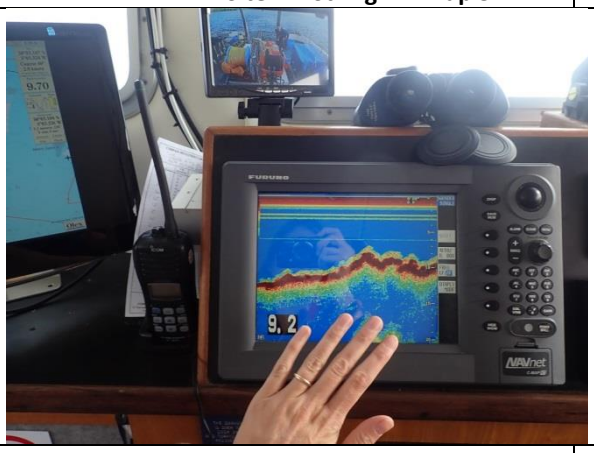
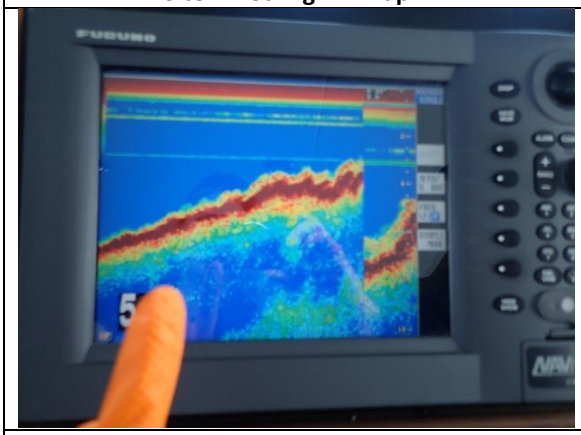
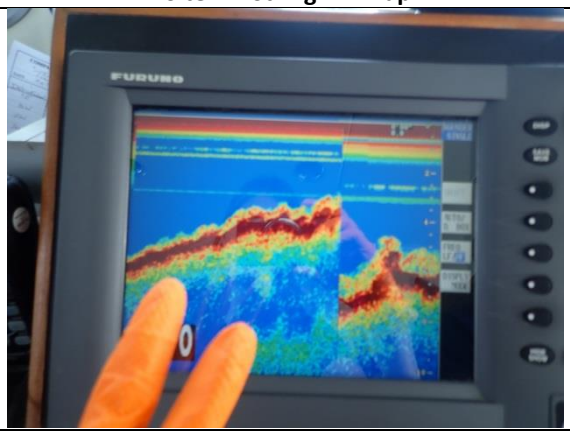
Two locations have been chosen as the focus of the study so far; the Manacles Marine Conservation Zone (MCZ) and the area around Coverack. These have been chosen as areas that are previously and currently unfished. These can be used to provide a baseline against which future studies can be compared.

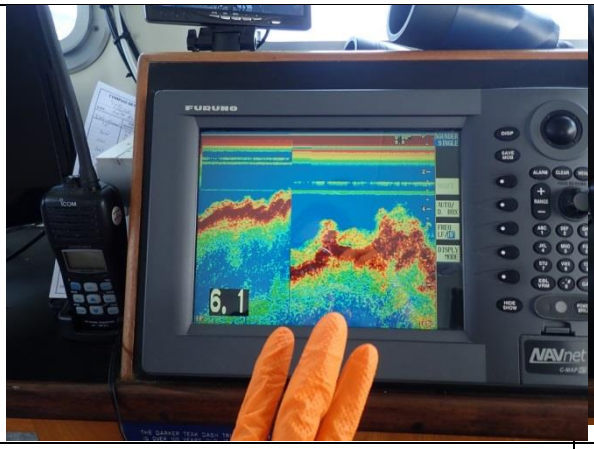
### 2.3.6 Data recording

As strings were set on the seabed during both surveys an Olex mark for their position was created, enabling them to be recovered easily. An image of the plotter was also taken at this time to determine the habitat and topography of the seabed where each trap was set, allowing comparisons to be made (Table 1). When recording catch sample, the species, length, sex, spawning or not spawning, damage to the fish and swim bladder damage was documented; the same recording methodology as the fishery dependent study. All catch details were then transferred into an excel spreadsheet for analysis. An Olex chart plotter was used to record waypoints/ marks at the start and end of each string. These were transferred out of Olex as a .gz file, extracted using 7-Zip (7-Zip V9.20) and converted to a .txt file using Olex to GPSU File Converter (Olex to GPSU File Converter V1.05). The resulting file could then be converted to

.txt file using MS Notepad. When opened in Excel, the file had all irrelevant header data removed and replacement field headers applied. Once completed and reviewed, the Excel file was then transferred to the GI software where data points were created to give a visualisation of the location of each string.

**Table 1: Sounder images to determine habitat type from wrasse sampling surveys on 24th August 2017 (site 1) and 7th September 2017 (site 2).**

| **Site 1 – String 1 – Trap 1** | **Site 1 – String 1 – Trap 2** |
|---|---|
| No image available | No image available |
| **Site 1 – String 1 – Trap 3** | **Site 1 – String 1 – Trap 4** |
|  |  |
| **Site 1 – String 1 – Trap 5** | |
|  | |
| **Site 1 – String 2 – Trap 1** | **Site 1 – String 2 – Trap 2** |
|  |  |
| **Site 1 – String 2 – Trap 3** | **Site 1 – String 2 – Trap 4** |



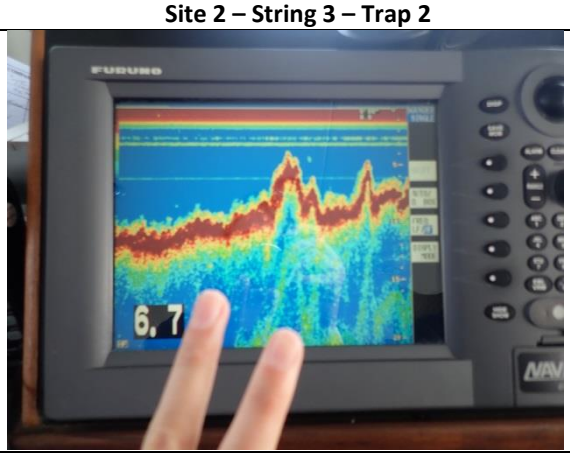

Site 1 – String 2 – Trap 5



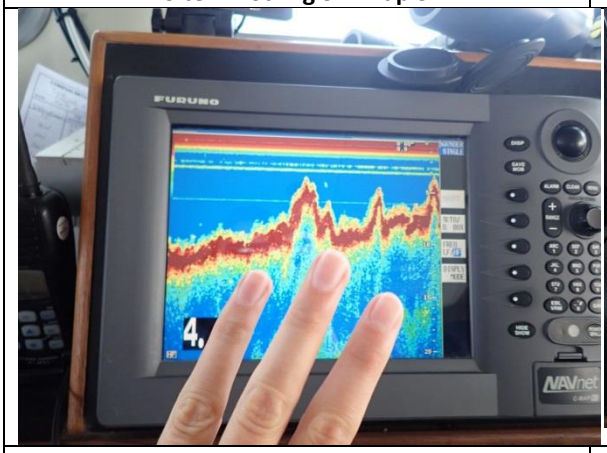
Site 2 – String 3 – Trap 1

Site 2 – String 3 – Trap 2

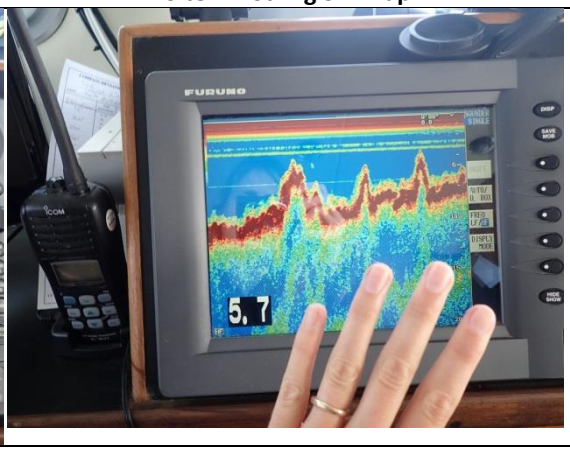

Site 2 – String 3 – Trap 3

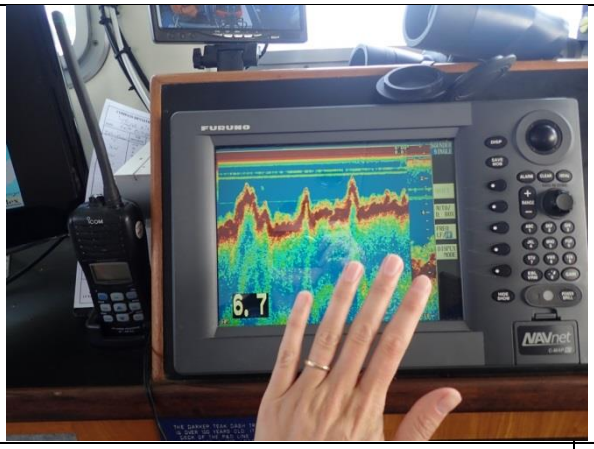



Site 2 – String 3 – Trap 4



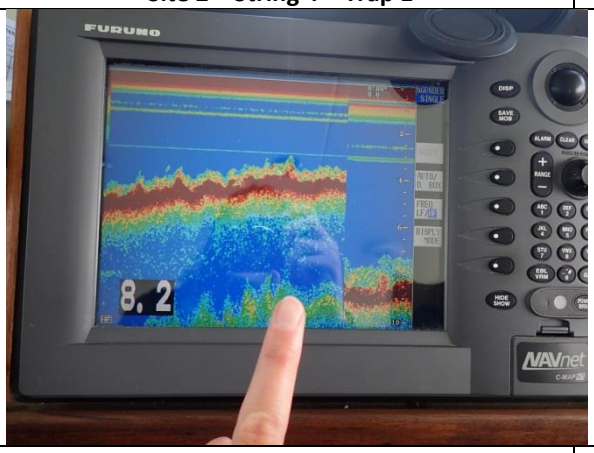

Site 2 – String 3 – Trap 5





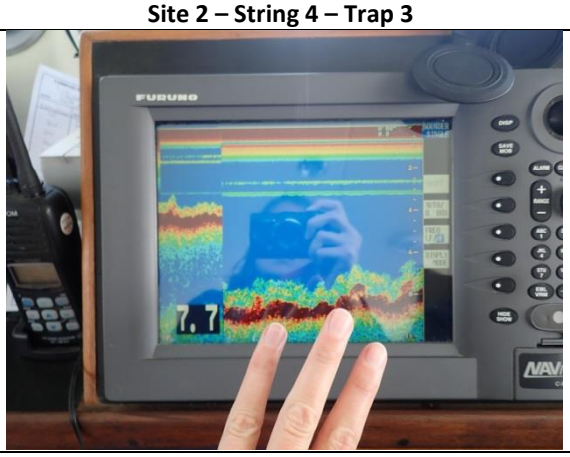

**Site 2 – String 4 – Trap 1**


**Site 2 – String 4 – Trap 2**

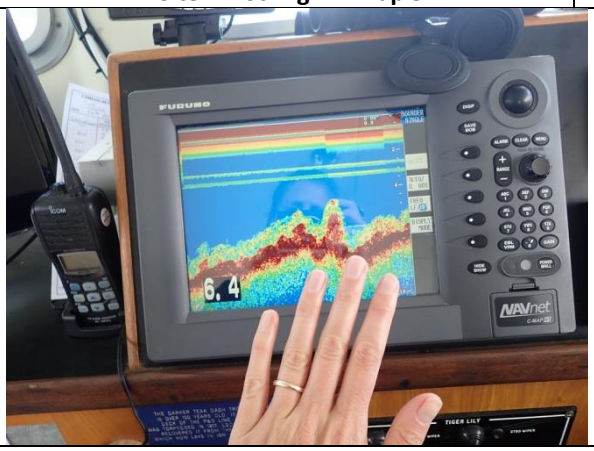



**Site 2 – String 4 – Trap 3**


**Site 2 – String 4 – Trap 4**




**Site 2 – String 4 – Trap 5**



# 3 Results

A total of 364 wrasse were retained and measured from four different species of wrasse; cuckoo, goldsinny, corkwing and rock cook, with 265 recorded on the 24th August 2017 and 99 recorded on the 7th September 2017 (Table 2 and Table 3).

**Table 2: Percentage catch composition of the survey on 24th August 2017.**

| Species | Number | % of catch |
|---|---|---|
| Ballan | 0 | 0 |
| Cuckoo | 29 | 11 |
| Goldsinny | 228 | 86 |
| Corkwing | 1 | 0 |
| Rock Cook | 7 | 3 |
| Total | **265** | |

**Table 3: Percentage catch composition of the survey on 7th September 2017**

| Species | Number | % of catch |
|---|---|---|
| Ballan | 0 | 0 |
| Cuckoo (f) | 9 | 9 |
| Goldsinny | 77 | 78 |
| Corkwing | 5 | 5 |
| Rock Cook | 8 | 8 |
| Total | **99** | |

**The catch composition of the species is shown in**

Figure 8 and Figure 9. For both survey days, goldsinnys were the most dominant species caught in the traps making up 86% of the catch on the 24th August 2017 and 78% of the catch on the 7th September 2017. Cuckoo wrasse were the second most abundant species, taking up 11% and 9% of the catch respectively followed by rock cooks, which took up 3% and 8% respectively. No ballan wrasse were recorded during this survey.

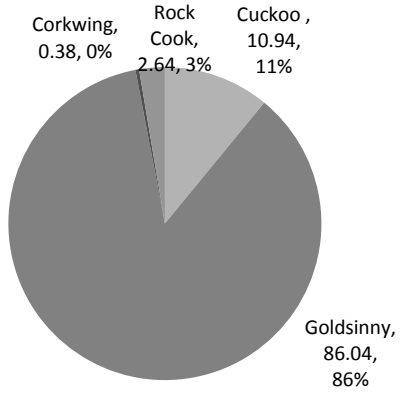



**Figure 8: Catch composition of the wrasse species recorded on 24th August 2017**

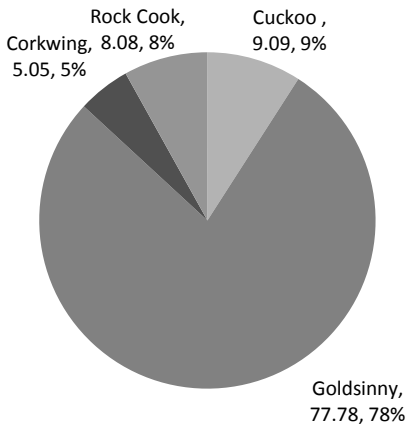



**Figure 9: Catch composition of the wrasse species recorded on 7th September 2017**

The percentage length frequency plots for both survey days are shown in Figure 10 for 24th August 2017 and Figure 11 for 7th September 2017.

Goldsinny and corkwing wrasse had a unimodal distribution recorded on both survey days. The frequency distribution for the other species was less uniform with no obvious peak in the length frequency data.

## 3.1 24th August 2017

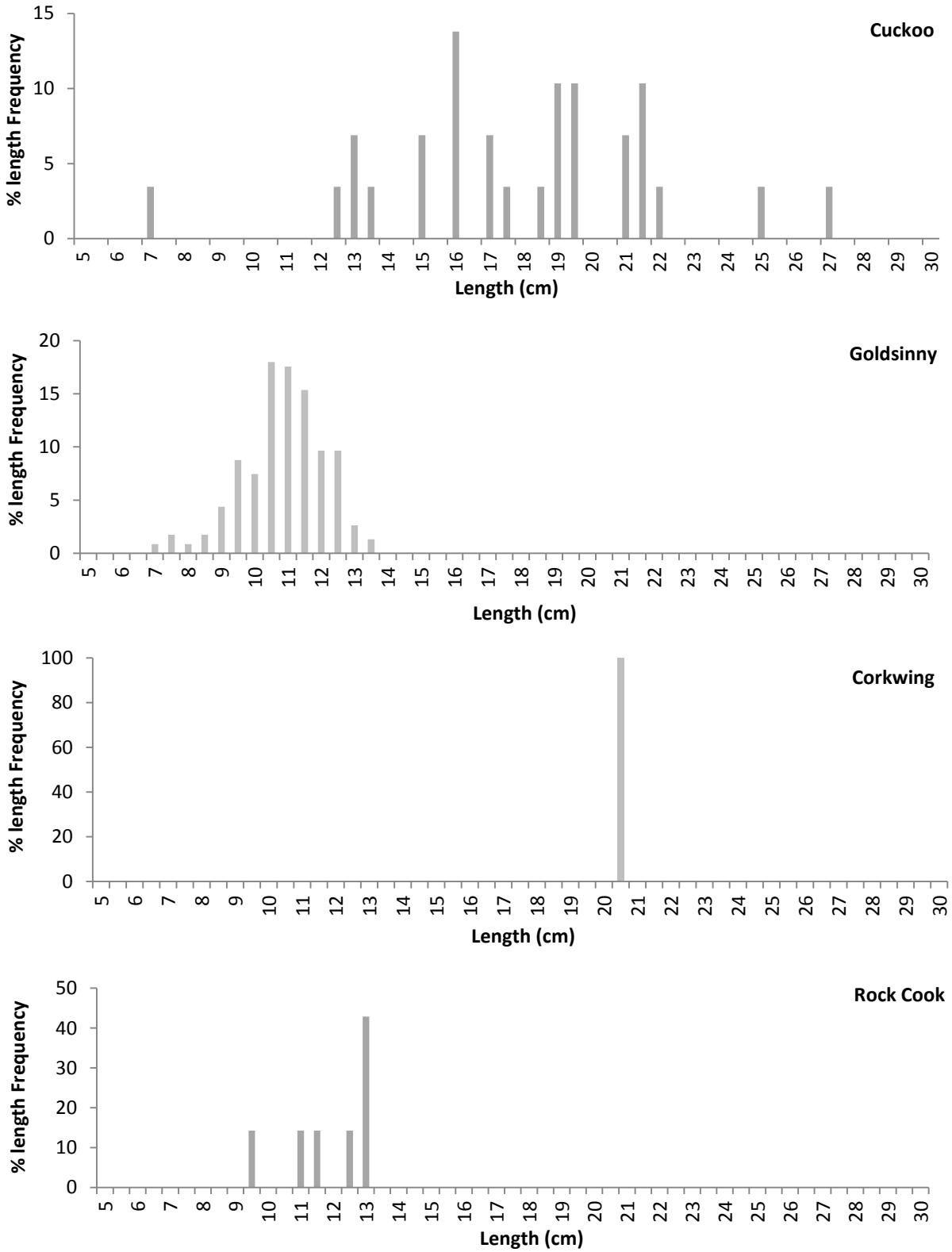



**Figure 10: The percentage (%) length frequency of species of wrasse (ballan, corkwing, cuckoo, goldsinny and rock cook) from all strings from a survey on 24th August 2017.**

## 3.2 7th September 2017

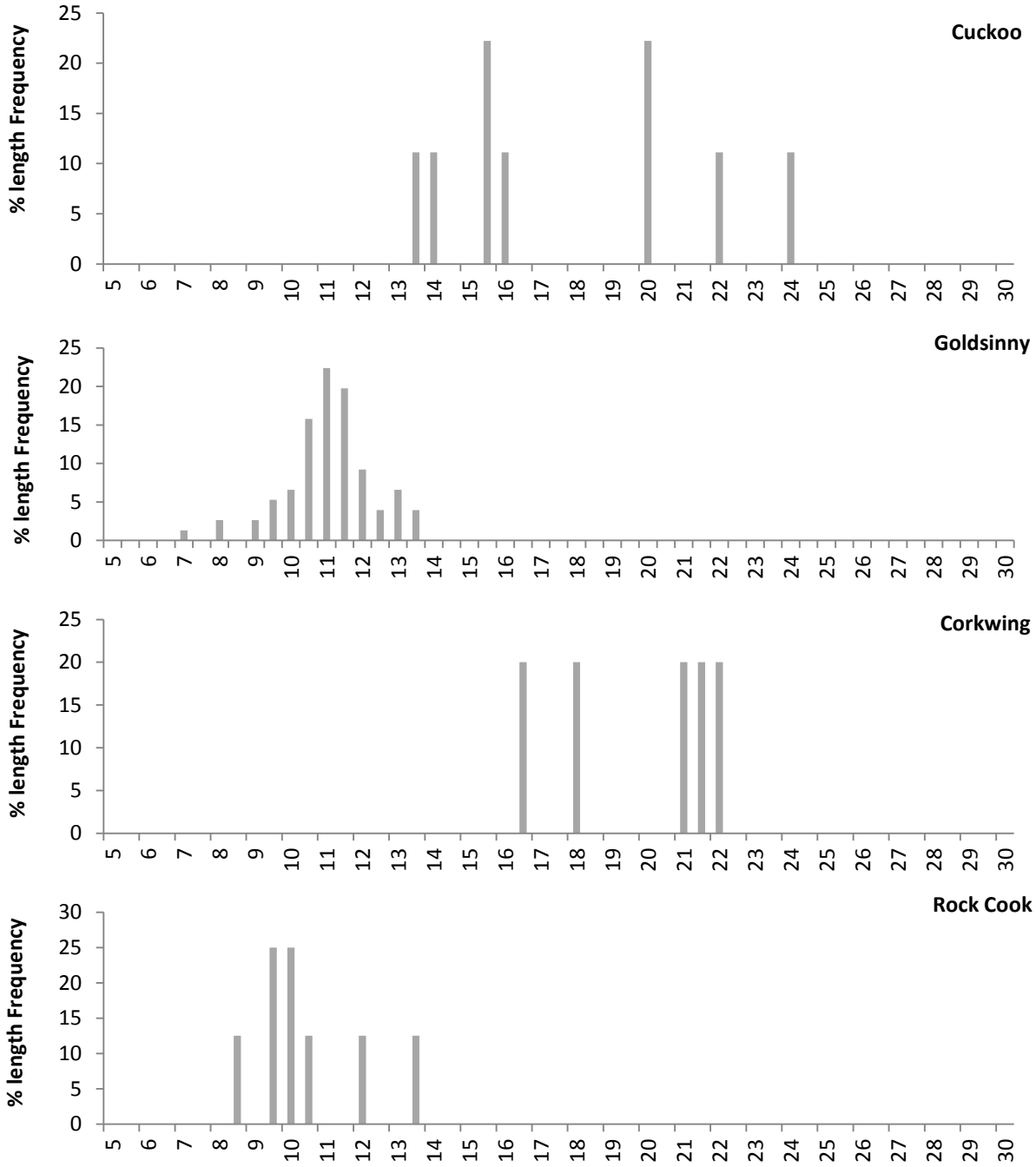



**Figure 11: The percentage (%) length frequency of species of wrasse (ballan, corkwing, cuckoo, goldsinny and rock cook) from all strings from a survey on 7th September 2017.**

The percentage frequency distribution per string for each survey day is shown in Figure 12 and Figure 13. This shows that goldsinny wrasse were the most abundant species for all four strings on both survey days.

## 3.3 24th August 2017

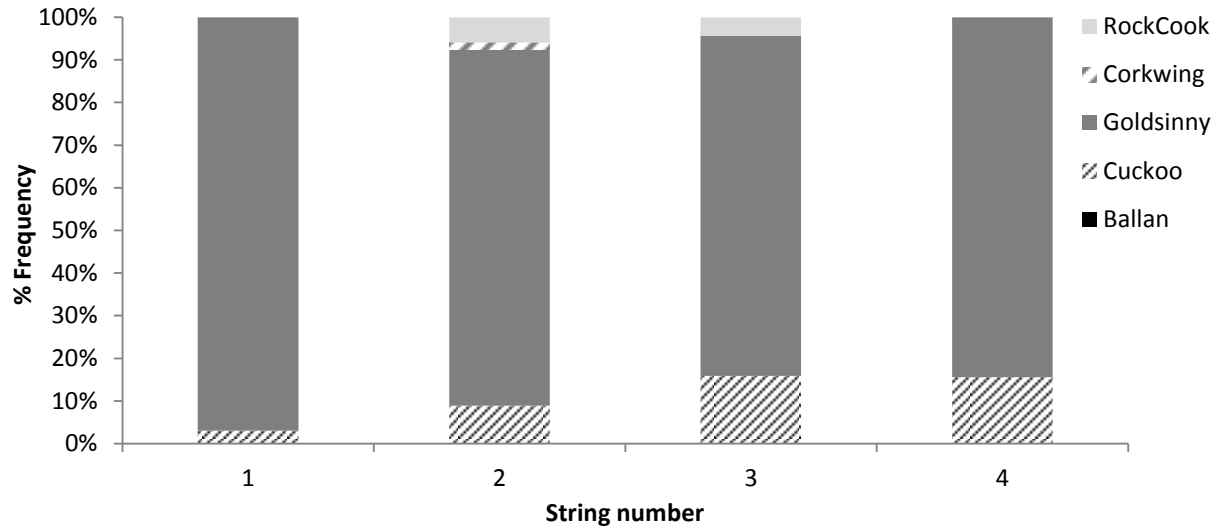



**Figure 12: The percentage (%) frequency of species of wrasse (ballan, corkwing, cuckoo, goldsinny and rock cook) per string from a survey on 24th August 2017**

## 3.4 7th September 2017

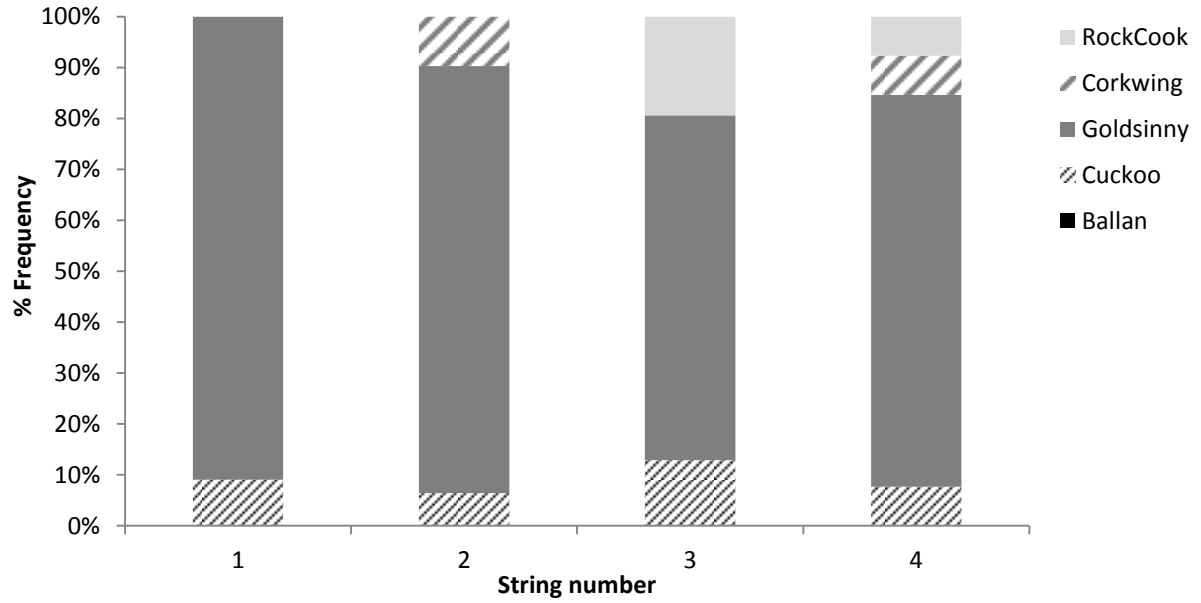



**Figure 13: The percentage (%) frequency of species of wrasse (ballan, corkwing, cuckoo, goldsinny and rock cook) per string from a survey on 7th September 2017**

Each trap was emptied into a fish box once recovered to deck. Images showing the emptied traps for the 24th August 2017 are shown in Table 4 and for the 7th September 2017 are shown in Table 5.

Table 4: The contents from each wrasse trap. Images from wrasse sampling survey on 24th August 2017.

| Site 1 – String 1 – Trap 1 | Site 1 – String 1 – Trap 2 |
|---|---|
|  |  |
| **Site 1 – String 1 – Trap 3** | **Site 1 – String 1 – Trap 4** |
|  |  |
| **Site 1 – String 1 – Trap 5** | |
|  | |
| **Site 1 – String 2 – Trap 1** | **Site 1 – String 2 – Trap 2** |

**Site 1 – String 2 – Trap 3**

**Site 1 – String 2 – Trap 4**

**Site 1 – String 2 – Trap 5**

**Site 2 – String 3 – Trap 1**

**Site 2 – String 3 – Trap 2**

**Site 2 – String 3 – Trap 3**



**Site 2 – String 3 – Trap 4**

**Site 2 – String 3 – Trap 5**

**No image available**

**Site 2 – String 4 – Trap 1**

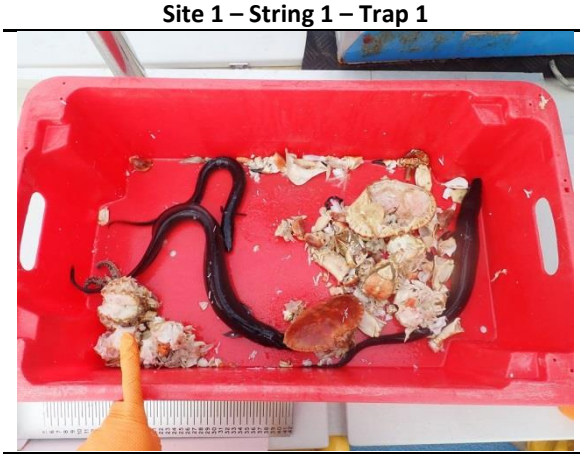
**Site 2 – String 4 – Trap 2**

**Site 2 – String 4 – Trap 3**

**Site 2 – String 4 – Trap 4**

**Site 2 – String 4 – Trap 5**

Table 5: The contents from each wrasse trap. Images from wrasse sampling survey on 7th September 2017.

| Site 1 – String 1 – Trap 1 | Site 1 – String 1 – Trap 2 |
|---|---|
|  |  |
| **Site 1 – String 1 – Trap 3** | **Site 1 – String 1 – Trap 4** |
|  | No image available |
| **Site 1 – String 1 – Trap 5** | |
|  | |
| **Site 1 – String 2 – Trap 1** | **Site 1 – String 2 – Trap 2** |
|  |  |

**Site 1 – String 2 – Trap 3**

**Site 1 – String 2 – Trap 4**

**Site 1 – String 2 – Trap 5**

**Site 2 – String 3 – Trap 1**

**Site 2 – String 3 – Trap 2**

**Site 2 – String 3 – Trap 3**

No image available

**Site 2 – String 3 – Trap 4**

**Site 2 – String 3 – Trap 5**

**Site 2 – String 4 – Trap 1**

**Site 2 – String 4 – Trap 2**

**Site 2 – String 4 – Trap 3**

**Site 2 – String 4 – Trap 4**

**Site 2 – String 4 – Trap 5**

# 4 Discussion

A high number of goldsinny wrasse were recorded during this survey. Goldsinny wrasse are known to be able to withstand high tidal flows and wave action suggesting the survey may have been carried out in an area with too much tidal flow. Previous studies have observed goldsinny wrasse as being resilient in maintaining position during periods of fast water movement (Sayer *et al.*, 1993). During informal talks with wrasse fishermen they have stated that in their experience ballan wrasse have been more abundant in areas of low tidal flow; resulting in them obtaining higher catch rates of ballan wrasse in these areas. During a study in 1995 into wrasse activity patterns, Costello *et al.*, found that ballan wrasse activity was not evident on a rising tide.

In addition the number of nights lie may have influenced the catch rates. Wrasse fishermen usually have a minimum nights lie of two to three nights whereas our traps only had a one night lie; resulting in shorter immersion time.

The lack of algae on the traps which CIFCA used may have had an influence on the catch composition as the traps did not act as a refuge for the wrasse.

The number of replicates sampled during this survey is low and limited data analysis could be carried out due to insufficient replication of data collection and the size of the data set which could cause a high margin of error and outliers as the data set is unlikely to be representative sample of the population.

The CIFCA data is not comparable to the fishery dependent data as the methodology differs between the two data sets.

## 4.1 Limitations

In both fishery independent surveys the methodology was not able to be replicated. The surveys were influenced by methological issues; differences between vessels, nights lie, tidal state, where traps were set, trap differences i.e. the lack of escape gaps and absense of algae growth on the traps compared to those used by wrasse fishermen. Our results obtaining no ballan as of yet suggest that it is nesscary to contine adaptations to the survey methology. We suggest that there should be a greater emphasis on coordinating the timing, methods of sampling, areas of coverage and the number of surveys conducted.

Cost and weather conditions are a major constraint to increasing replication surveys at sea. Therefore utilising the fishery dependent data to develop a cost and time effective survey methodology is of great importance to future wrasse fishery independent surveys with an aim to develop a consistent methodology that can be repeated year on year to monitor the wrasse fishery.

Recommendations for future surveys are shown below.

## 4.2 Future surveys

### 4.2.1 Location of traps

Ideally, the traps would be set very close to the base of rocky outcrops and features which are seen on the plotter. However, the first time this was attempted fishing gear was obstructing the proposed location so the traps had to be set deeper than planned. The second time the traps were set they were in a shallower location but the tidal current was too strong which is thought to have had an influcence on the catch composition.

### 4.2.2 Nights lie

The fishermen leave their traps out for more than one night lie. CIFCA would like to leave their traps out on surveys for more than one night but don't feel it is viable without escape gaps being fitted to the traps.

### 4.2.3 Escape gaps

The fishermen have escape gaps fitted to the traps which let small juvenile wrasse escape from the traps. The traps which CIFCA use do not have escape gaps and it is thougth this could influence the catch composition by having many smaller fish inside the traps. Ideally for future surveys, escape gaps will be fitted to the traps that CIFCA are using.

### 4.2.4 Artificial kelp in traps

The wrasse traps observed during the fishery dependent sampling days have a dense algae covering which is thought to provide shelter for the wrasse. The trapswhich were used during the fishery independent surveys were clean because they are not being worked for the majority of the time. It is thought that a slightly split black plastic bin bag (to give the appearance of kelp) attached to the top of the trap on the inside would provide a similar level of cover for the wrass for future surveys.

### 4.2.5 Tidal state

The two sampling days were carried out on different states of the tide. It would be preferable to carry out the surveys when the tidal state is the same.

### 4.2.6 Spatial scale

It is advised to continue to survey our local wrasse population as species of wrasse that are separated geographically by to thousansds of kilometers have demostarted differences in their demorapghic parameters. This underlines the importance of surveying local populations to produce new forms of management instead of following models of management based on parameters from other regions (Villegas-Ríos *et al*., 2013).

# 5 References

Costello, M., Darwall, W. and Lysaght, S. 1995. Activity patterns of north European wrasse (Pisces, Labridae) species and precision of diver survey techniques. Biology and Ecology of Shallow Coastal Waters, p.348.

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# 6 Appendices

## Annex 1 – Daily Logs

- Shooting traps 23rd August 2017

| Time | Activity |
|---|---|
| **07:00** | Depart Mylor |
| **08:15** | Shoot string 1 |
| **08:16** | Finish shooting string 1 |
| **08:53** | Shoot string 2 |
| **08:54** | Finish shooting string 2 |
| **10:05** | Shoot string 3 |
| **10:07** | Finish shooting string 3 |
| **10:46** | Shoot string 4 |
| **10:47** | Finish shooting string 4 |
| **11:45** | Arrive back at Mylor |

- Hauling traps 24th August 2017

| Time | Activity |
|---|---|
| **10:41** | Depart Mylor |
| **10:45** | Re-fueling Tiger Lily |
| **11:00** | Finished re-fuelling. Transit to Coverack |
| **11:47** | Arrive on site. Preparing to haul first string |
| **12:00** | SOL String 4 |
| **12:36** | EOL String 4 |
| **12:47** | SOL String 3 |
| **13:25** | EOL String 3 |
| **13:42** | SOL String 1 |
| **14:10** | EOL String 1 |
| **14:18** | SOL String 2 |
| **14:46** | EOL String 2 |
| **14:47** | Finished survey work, heading to Mylor |
| **15:40** | Arrive Mylor |

- Shooting traps 6th September 2017

| Time | Activity |
|---|---|
| **07:30** | Depart Mylor |
| **08:57** | Shoot string 1 |
| **08:58** | Finish shooting string 1 |
| **09:14** | Shoot string 2 |
| **09:15** | Finish shooting string 2 |
| **09:29** | Shoot string 3 |
| **09:36** | Finish shooting string 3 |
| **10:16** | Shoot string 4 |
| **10:17** | Finish shooting string 4 |
| **11:30** | Arrive back at Mylor |

- Hauling traps 7th September 2017

| Time | Activity |
|---|---|
| **06:30** | Depart Mylor |
| **07:05** | Arrive on site. Preparing to haul first string |
| **07:08** | SOL String 1 |
| **07:23** | EOL String 1 |
| **07:26** | SOL String 2 |
| **07:44** | EOL String 2 |
| **08:02** | SOL String 3 |
| **08:16** | EOL String 3 |
| **08:23** | SOL String 4 |
| **08:38** | EOL String 4 |
| **08:52** | Finished survey work, heading to Mylor |
| **09:00** | Fisheries sightings on the way to Mylor |
| **11:00** | Arrive Mylor |