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1.0 Introduction

2017 was the 6th consecutive year of the Langstone Harbour Small Fish survey. Once again, the survey was a partnership between the Langstone Harbour Board, RSPB Southern IFCA and the University of Portsmouth. During 2017 staff from Natural England joined the survey team at some sites.

The survey aims to collect data on the small fish community in Langstone Harbour to see whether changes or trends in that community can be observed over time. Environmental data including water temperature and salinity are also collected and it is hoped that this combined data set will assist in conservation management decisions in the future.

As in previous years, the 3 sites illustrated in the map above were surveyed. Each site was visited in both June and September and methodology described in the following section followed. All fish caught during the survey were identified, measured and returned to the sea close to where they were caught.
2.0 Methodology

Full details of the methodology followed during the 2017 Small Fish Survey can be found within the Standard Operating Procedure which should be read in conjunction with this report. The SOP is available on the “Fish Survey” page of the Langstone Harbour Board website.

Methodology changed little from that in 2016.

The 43m seine net was deployed at each of the 3 sites on each date, and the 2m beam trawl was successfully towed for 10 minutes at both Sword Sands and Eastney point. All fish caught were identified, measured and counted before being returned to the sea. Meta data including water temperature and salinity were also, as in previous years, recorded.

Bad weather during September forced the cancellation of the survey at Eastney Point, and for the first time reschedule was not possible. Some deployment and retrieval difficulties were experienced with the seine net during the June survey series—an issue is further examined in the “Discussion” section of this report.
19 species of fish were caught over the 3 survey sites during June. One of the species—Snake Pipefish *Entelurus aequoreus* had not previously been recorded during the Langstone Harbour Small Fish Survey. The most abundant fish caught during June 2017 was the grey Mullet (*Liza* sp.) with 174 individuals recorded. Lower species diversity was seen at each site during June in comparison to previous survey years. It is likely that operational problems encountered when hauling in the seine net during June were a large factor contributing to this. Problems encountered with the seine net are discussed later in this report.
Bass numbers in June 2017 were consistent with catches in previous years (with the exception of 2015 when especially high numbers were recorded). Herring were, however, caught in the lowest numbers in the history of the survey with just 13 individuals recorded. For the first time, no Sand Smelt were recorded in June and for the second consecutive year no Sandeel were captured during June. Sand Gobies were however recorded in their highest numbers since the survey began. The survey team experienced some problems with rolling of the base of the seine net during June which is likely to have had a negative impact on the size of the catches. As such it is possible that more agile species (such as Sandeel) could have evaded capture more easily.

Mean lengths during June were comparable to those seen in previous years, although Bass were on average smaller than in previous years, most likely as a result of a greater proportion of year 1 individuals being captured.
Due to a spell of very windy weather during September the survey was, for the first time, cancelled at Eastney Point with no opportunity for re-schedule. As such, catch figures are for 2 (rather than the usual 3) sites. However, technical difficulties with the seine net that occurred during June were resolved in September with all hauls being completed quickly and efficiently and no net rolling experienced.

A total of 15 fish species were recorded during September 2018, with all species having been previously recorded during the survey.

The most abundant species was the Sand Goby with 721 individuals captured.

Species diversity during 2017 at both Sword Sands and Bedhampton Wharf was similar to that seen in previous survey years.
Low numbers of Sand Smelt and Herring during the September survey may be explained by the cancellation of the survey at Eastney Point, where high numbers of both of these species have historically been caught. Sand Gobies too are also often caught in good numbers at Eastney. A single Sandeel was caught at Sword Sands, although the presence of numerous charter fishing vessels towing bait nets for Sandeel throughout the summer months indicates that despite the lack of Sandeels caught during the survey that this species is still present in good numbers at the site. Year 0 Bass were caught in high numbers—almost double the number of fish were caught in 2017 compared with 2016 despite Eastney not being sampled.

For Bass, Herring, Sand Goby and Sand Smelt the mean length measurement was consistent with previous years. The single Sandeel caught was somewhat smaller that fish caught in previous years, although with such a small sample size it is difficult to infer any conclusion from this.
As usual the undergraduate students from the UoP were trained prior to the survey season commencing upon how to use the equipment to measure the meta data parameters collected during the Small Fish Survey. The refractometer was calibrated prior to both the June and September surveys. Salinity measurements were seen at an expected 35-36ppt. The low reading at Bedhampton of 30ppt could be attributable to operator error. Spring water temperatures were the highest recorded during the survey in 2017. All of the June surveys were undertaken in hot sunny weather. Autumn temperatures were similar to those recorded in previous seasons. Secchi disk measurements are beginning to reveal a pattern between sites. On average the water at Eastney Point is least opaque, with the disk visible at an average of 2.49m in spring and 2.84m in autumn. Bedhampton and Sword Sands both average 1.73m in spring, whereas in Autumn Bedhampton is least clear at 1.5m compared to 2.24m at Sword Sands.

Continuing to implement mechanisms to improve meta data collection during the survey is essential, to allow comparison of these factors which may have a strong influence over the distribution and abundance of fish species.
4.0 Key Findings

- 1884 individual fish representing 20 different species were caught during the 2017 Small Fish Survey. Total fish numbers and species diversity were both less than during 2016. However during September 2017 Eastney Point was not surveyed due to adverse weather and this site usually has high catches.

- Just a single Sandeel was captured during the 2017 survey, which although an improvement on 2016 when no Sandeels were caught, is still a very low number compared to previous survey years. Sandeels are an important food source for Langstone Harbour’s breeding seabirds. Regular sightings of charter fishing vessels towing for Sandeels throughout the summer indicate that while the survey did not encounter Sandeels that they were in fact present.

- High numbers of Sand Gobies were caught during the June survey. This species is also recognised as an important prey species for seabirds.

- A species new to the survey—the Snake Pipefish *Entelurus aequoreus* was caught at Sword Sands during the June survey.

Sea Lemon—*Archidoris pseudoargus*
### 5.0 Species caught in Langstone Harbour during 2017

<table>
<thead>
<tr>
<th>Fish species</th>
<th>Scientific name</th>
<th>Locations caught</th>
<th>Total number caught</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bass</td>
<td><em>Dicentrarchus labrax</em></td>
<td>BW, SS</td>
<td>697</td>
</tr>
<tr>
<td>Black Goby</td>
<td><em>Gobius niger</em></td>
<td>EP, SS</td>
<td>15</td>
</tr>
<tr>
<td>Common Goby</td>
<td><em>Pomatoschistus microps</em></td>
<td>EP, SS</td>
<td>35</td>
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<tr>
<td>Corkwing Wrasse</td>
<td><em>Symphodus melops</em></td>
<td>EP</td>
<td>1</td>
</tr>
<tr>
<td>Dover Sole</td>
<td><em>Solea solea</em></td>
<td>SS</td>
<td>6</td>
</tr>
<tr>
<td>Flounder</td>
<td><em>Platichthys flesus</em></td>
<td>SS</td>
<td>2</td>
</tr>
<tr>
<td>Garfish</td>
<td><em>Belone belone</em></td>
<td>SS</td>
<td>1</td>
</tr>
<tr>
<td>Goby sp.</td>
<td>N/A</td>
<td>EP, SS</td>
<td>6</td>
</tr>
<tr>
<td>Greater Pipefish</td>
<td><em>Sygnathus acus</em></td>
<td>EP</td>
<td>1</td>
</tr>
<tr>
<td>Grey Mullet</td>
<td><em>Liza / Chelon sp.</em></td>
<td>BW, EP, SS</td>
<td>189</td>
</tr>
<tr>
<td>Herring</td>
<td><em>Clupea harengus</em></td>
<td>BW, EP, SS</td>
<td>66</td>
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<td>Long Spined Sea Scorpion</td>
<td><em>Taurulus bubalis</em></td>
<td>EP</td>
<td>2</td>
</tr>
<tr>
<td>Painted Goby</td>
<td><em>Pomatoschistus pictus</em></td>
<td>EP</td>
<td>2</td>
</tr>
<tr>
<td>Sand Goby</td>
<td><em>Pomatoschistus minutus</em></td>
<td>BW, EP, SS</td>
<td>830</td>
</tr>
<tr>
<td>Sand Smelt</td>
<td><em>Atherina presbyta</em></td>
<td>BW</td>
<td>10</td>
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<td>Sandeel</td>
<td><em>Ammodytes tobianus</em></td>
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</tr>
<tr>
<td>Short Spined Sea Scorpion</td>
<td><em>Myxocephalus scorpius</em></td>
<td>EP</td>
<td>1</td>
</tr>
<tr>
<td>Snake Pipefish</td>
<td><em>Entelurus aequoreus</em></td>
<td>SS</td>
<td>1</td>
</tr>
<tr>
<td>Sprat</td>
<td><em>Sprattus sprattus</em></td>
<td>BW</td>
<td>16</td>
</tr>
<tr>
<td>Transparent Goby</td>
<td><em>Aphia minuta</em></td>
<td>SS</td>
<td>2</td>
</tr>
</tbody>
</table>
6.0 GPS Imagery

Trawling took place at a steady speed of 1.5 knots for a period of 10 minutes. Trawl time was reduced during September at Sword Sands due to the net becoming very heavy as it contained lots of weed.

The following distances were covered by the trawl at each site:

**Eastney Point, June:** 291m

**Sword Sands, June:** 379m

**Sword Sands, September:** 232m
7.0 Discussion

The 2017 Small Fish Survey revealed the lowest numbers of individuals caught as well as the second lowest number of different species since the survey began. This poor catch level is best attributed to the fact that during 2017, for the first time, the September Eastney Point survey could not be undertaken due to adverse weather conditions. To compound this, the survey team experienced difficulties with hauling the seine net during June. Hauling technique was adjusted and improved however, so that during September seine hauling went without incident.

Just a single Sandeel was caught during 2017, following 0 being caught during 2016. Analysis of survey practices through the years has revealed that although tidal height during surveys has remained fairly consistent (except 2016), that in 2015 (when the first low Sandeel catches were encountered) survey protocol was altered so that the beam trawl was deployed before the seine net. This means that in the initial years where catches were high the tide was likely still receding when the seine net (where the vast majority of Sandeels were caught) was deployed. In subsequent years when the beam trawl was deployed and fish caught within it processed prior to seine net deployment it is likely that the tide had begun to rise during seine deployment. It is possible that tidal state affects the behaviour of these burrow dwelling fish. In addition, it is possible that towing the beam trawl across the seabed close to the seine site prior to seine deployment could cause the Sandeels to remain hidden within their burrows rather than swim into the water column where they are catchable via the seine.

As well as Sandeels, the June catches of both Herring and Sand Gobies are of particular interest to survey partners as these species represent an important food source for Langstone Harbours seabird colony, which typically has hungry chicks during June. Although both herring and Sandeel numbers were low, Sand Gobies numbers were high. The survey provides just a snapshot of the fish community, but capture of large numbers of fish hunted as food by seabirds is always positive.

Although a number of the survey team are experienced in the survey methodology having taken part for several years, and able to adapt to equipment problems such as the rolling of the base of the seine as previously described, there remains room for further standardisation particularly in meta data collection following a seemingly errant salinity reading during 2017. More rigorous training and possible oversight of the data collection by an experienced team member may assist in achieving this.

While the weather made it impossible to undertake the Eastney Point survey in September, this unfortunate circumstance creates great difficulty in comparing the 2017 survey with other years. The weather can not be controlled, but measures should be put in place to minimise the chances of a repeat of this incident.
Invertebrates
The following species of invertebrate were recorded during the 2017 Small Fish Survey:

Brown Shrimp—*Crangon crangon*  Sea Cucumber sp
Cockle—*Cerastoderma edule*  Sea Goosberry—*Pleurobrachia pileus*
Cuttlefish—*Sepia officinalis*  Sea Lemon—*Archidoris pseudoargus*
Little Cuttle—*Sepiola atlantica*  Shore Crab—*Carcinus maenas*
Moonsnail—*Euspira catena*  Spider Crab—*Maja squinado*
Periwinkle—*Littorina littorea*  Velvet Swimming Crab—*Necora puba*
Prawn—*Palaemon serrarus*  Whelk—*Buccinum undatum*

Future Improvements
- Surveys should be scheduled as early as possible in the month, in order to allow maximum time for reschedule should postponement be necessary.
- Undertaking seine netting before beam trawling should be trialled to determine whether this may be an important factor in the capture of highly mobile species such as Sandeels.
- Training in the use of meta data measuring equipment should continue, and an experienced member of the survey team should supervise its collection.
- Outside of the fish survey season it might be beneficial to measure salinity at Bedhampton Wharf at intervals, particularly after heavy rain or drought, to determine whether fluctuations in salinity as a result of the input of freshwater from the Hermitage Stream in this area are to be expected.
10.0 Bibliography


