

NIFCA Aln Estuary Survey

2016

Written By: Natalie Wallace

Background

Marine protected areas are used to protect vulnerable habitats and species (JNCC, 2015). Section 154 of the Marine and Coastal Access Act outlines the responsibilities of Inshore Fisheries and Conservation Authorities pertaining to the protection of Marine Conservation Zones (MCZs). The Northumberland Inshore Fisheries and Conservation Authority (NIFCA) have conducted A series of TrAC Transitional and Coastal Monitoring (TrAC) fish surveys within the Aln Estuary MCZ.

The surveys particularly focused on juvenile fish species to determine if the estuary acts as a nursery habitat for fish. A habitat is classed as a nursery if fish occur at high densities and suffer lower rates of predation or higher rates of growth (Gillanders et al. 2003). It is thought that small fish, including juveniles are most abundant in shallow areas because these habitats enhance survivorship and growth (Manderson et al. 2004). Shallow habitats function as refuges for prey species because large predators are often less abundant in shallow water. This may not be universal as some predators are not limited to deep water by body size or behaviour (Manderson et al. 2004; Linehan et al. 2001).

Study Site

The Aln Estuary is a 0.44 km² estuary at the town of Alnmouth, Northumberland. The Aln Estuary area has a range of habitats including mud, sand, saltmarsh and estuarine rocky habitats (Net Gain 2012) and was designated as a Marine Conservation Zone in 2013.

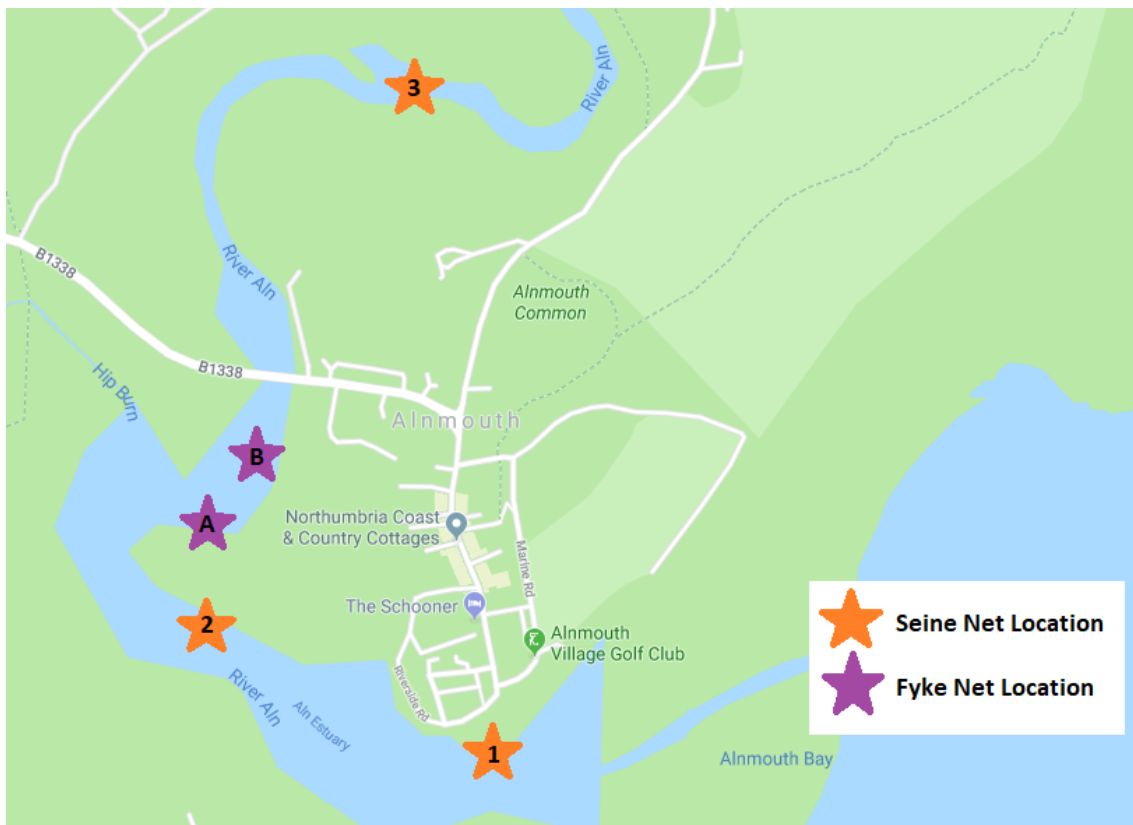


Figure 1. Aln estuary with survey locations of fyke nets and seine nets marked.

Methods

Two-day surveys collecting data relating to the fish species present in the Aln Estuary were conducted in May 2016 and September 2016 to coincide with the spring and autumn downstream migration of juvenile fish species (Ibbotson et al. 2013)

Day One

Fyke nets set at two locations (A and B in Figure 1) in the estuary using a small boat at mid-tide (locations were selected based on depth to prevent exposure at low tide) and were left to soak for 24 hours. Seine net surveys were then conducted at sites 1 and 2 (Figure 1) and each location was surveyed twice. An estuary seine net 43m in length and 4m in depth (210/12 with 6.5mm and 14mm mesh size), with floats on the head rope and no lead weights on the footrope was deployed from the boat. The first tow line was fastened ashore and the net was set out in a wide arc returning to the beach (FAO, 2013). The seine net was then pulled ashore by a number of individuals (Environment Agency, 2011) with the ground rope reaching the beach first, herding the fish towards the shore and into the net (FAO, 2013).

Day Two

The fyke nets were recovered at mid tide using the boat and seine netting using the same methodology as the previous day was carried out at site 3 (Figure 1).

For all surveys the species caught were removed from the nets and placed into buckets of water (collected at each site). Fish species were identified using the Environment Agency 2009 manual “Key to the marine and freshwater fishes of Britain and Ireland” and measured to the nearest millimetre using a fish measuring board.

Results

Table 1. Total catch, mean length and size at maturity for the commercially important species caught during the 2017 Aln Estuary surveys. Pink cells indicate where mean length was smaller than size at maturity for that species.

Species	Total no. caught	Mean Length (mm)	Size at maturity (mm)	References
Sprat (<i>Sprattus sprattus</i>)	60	66.8	130	Environment Agency (2009);
Atlantic Herring (<i>Clupea harengus</i>)	5	50.0	175	Ellis <i>et al.</i> (2012); ICES (2009)
Lesser Sandeel (<i>Ammodytes tobianus</i>)	208	115.6	130	Ellis <i>et al.</i> (2012); ICES (2009)
Greater Sandeel (<i>Hyperoplus lanceolatus</i>)	19	144.6	130	Ellis <i>et al.</i> (2012); ICES (2009)
Trout (<i>Salmo trutta</i>)	50	168.8	160-400	Jonsson <i>et al.</i> (2001)
Saithe	5	161.6	554.0	Jennings <i>et al.</i> (1998)
European Eel	2	312.5	Unknown	MSEP (2014)
Flounder (<i>Pleuronectes flesus</i>)	85	39.6	300	MSEP (2014)

Table 2. Total catch and mean length for the non-commercially important species caught during the 2017 Aln Estuary surveys.

Species	Total no. caught	Mean Length (mm)
Goby Spp.	109	48.4
5 Bearded Rockling (<i>Ciliata mustela</i>)	3	170.0
Pipefish (unidentified)	1	83.0
Scorpion Fish (unidentified)	4	74.3
15-Spined Stickleback (<i>Spinachia spinachia</i>)	3	126.0
3-Spined Stickleback (<i>Gasterosteus aculeatus</i>)	3	52.0

556 fish composed of 14 species of fish were caught during the 2016 Aln Estuary surveys. Of the fish species caught, seven species (Flounder, Lesser Sandeel, Goby, Scorpion fish sp., European Eel, 5-Bearded Rockling and Trout) were caught in both May and September 2017. Three of these species (Lesser Sandeel, Flounder and Goby) were also in the four most abundant species for both months, Sprat were also in the top four most abundant species in May and Trout in September (Figure 2).

284 and 272 fish were caught in May and September respectively. 10 species were caught in May and 11 species in September. As well as the species mentioned above, 3-spined Stickleback, Pipefish Sp. and Herring were caught in May and 15-Spined Stickleback, Sprat, Greater Sandeel and Saithe were caught in September. Mean Length was greater in September than May for all species present in both months in significant numbers (Table 3).

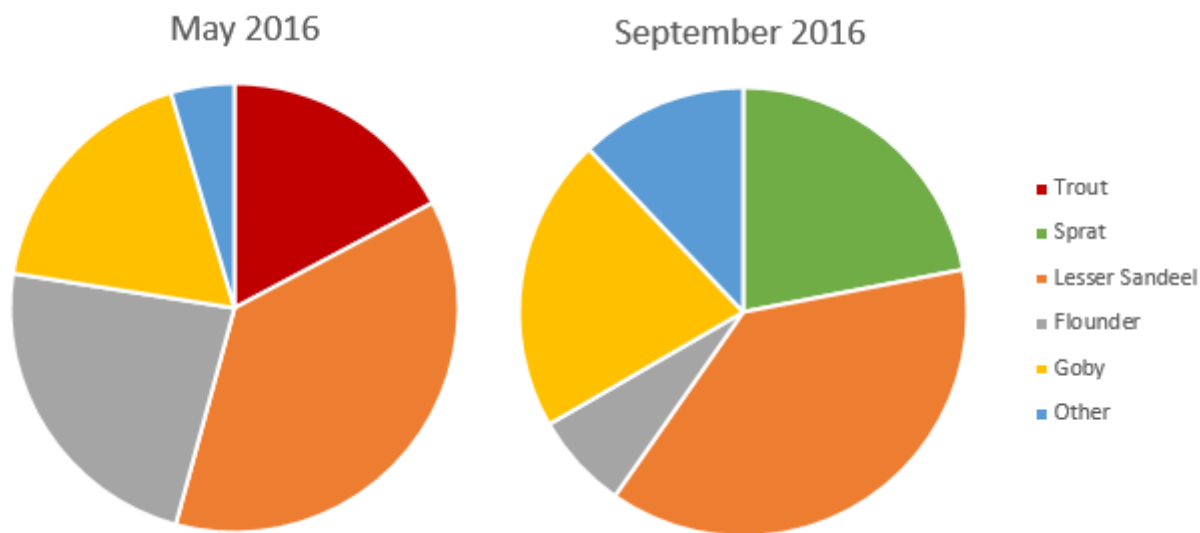


Figure 2. Four most abundant species as a proportion of total catch for May and September 2017.

Table 3. Mean Length in May and September 2016.

Species	Mean Length (mm)	
	May 2016	September 2016
Lesser Sandeel	106.3	125.0
Flounder	28.4	78.4
Goby	42.9	53.2

Discussion

Beach seine nets are highly unselective, catching a high diversity of fish species (Hillman, 2011), therefore it is assumed that the catch is representative of the species present at the time of each survey.

Mean length was below the corresponding Size at Maturity for the commercially important species listed in Figure 1 (with the exception of Lesser Sandeel, Trout and European Eel), suggesting a) a high proportion of the individuals caught were juveniles, b) Aln Estuary is an important site for juvenile fish. It is important to note that the size at maturity values obtained (Table 1) are approximations and may not be accurate for Aln Estuary. Size at maturity values are not available for the species in Table 2.

Acknowledgements

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