Tacumshin Lake

Sampling Fish for the Water Framework Directive - Transitional Waters 2009

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the CEO Mr. Pat Doherty, the Assistant CEO Mr. William Walsh and the staff of the Eastern Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and cooperation from all their colleagues in the Central Fisheries Board and especially Dr. Jimmy King for his guidance with the transitional waters surveys.

We would like to thank the landowners and angling clubs that granted us access to their land and respective fisheries.

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The authors would also like to acknowledge the funding provided for the project from the Department of Communications Energy and Natural Resources for 2009.

1. INTRODUCTION

A fish stock survey was conducted on Tacumshin Lake, as part of the fish monitoring programme for the Water Framework Directive (WFD), between the 22nd and the 23rd of September 2009 by staff from the Central Fisheries Board (CFB) and the Eastern Regional Fisheries Board (ERFB).

Tacumshin Lake is a shallow coastal lagoon covering an area of 3.11km² and is located on Ireland's south-eastern coast, approximately 1km south-east of the village of Tomhaggard, Co. Wexford (Fig. 1.1, Plate 1.1). This lagoon was once a shallow sea bay but gradually got cut off from the sea by a long narrow spit that formed due to longshore drift (NPWS, 2010). At times in the past the lagoon was completely land-locked by the spit and at the end of the 19th century, when this situation prevailed for some time, the lake was drained by means of a large bore pipe set through the gravel/sand bar. In the mid-1970s the spit again closed off the lagoon from the sea. To relieve subsequent flooding of surrounding farmland, the old drainage pipe was reactivated and a second pipe installed at a lower level. The capacity of these two pipes is insufficient to prevent the lagoon filling up in winter when inflow from streams is greater than the outflow through the pipes. To speed the drainage from the lagoon two main drains leading to the landward end of the pipes were excavated (NPWS, 2010).

The water body lies within the Tacumshin Lake SAC and and is a good example of a sedimentary lagoon, a habitat listed in Annex I of the EU Habitats Directive. Other Annex I listed habitats present at the site include drift lines, perennial vegetation of stony banks, embryonic shifting dunes and marram dunes (NPWS, 2010). The site is also a SPA under the EU Birds Directive for a number of bird species (NPWS, 2010).

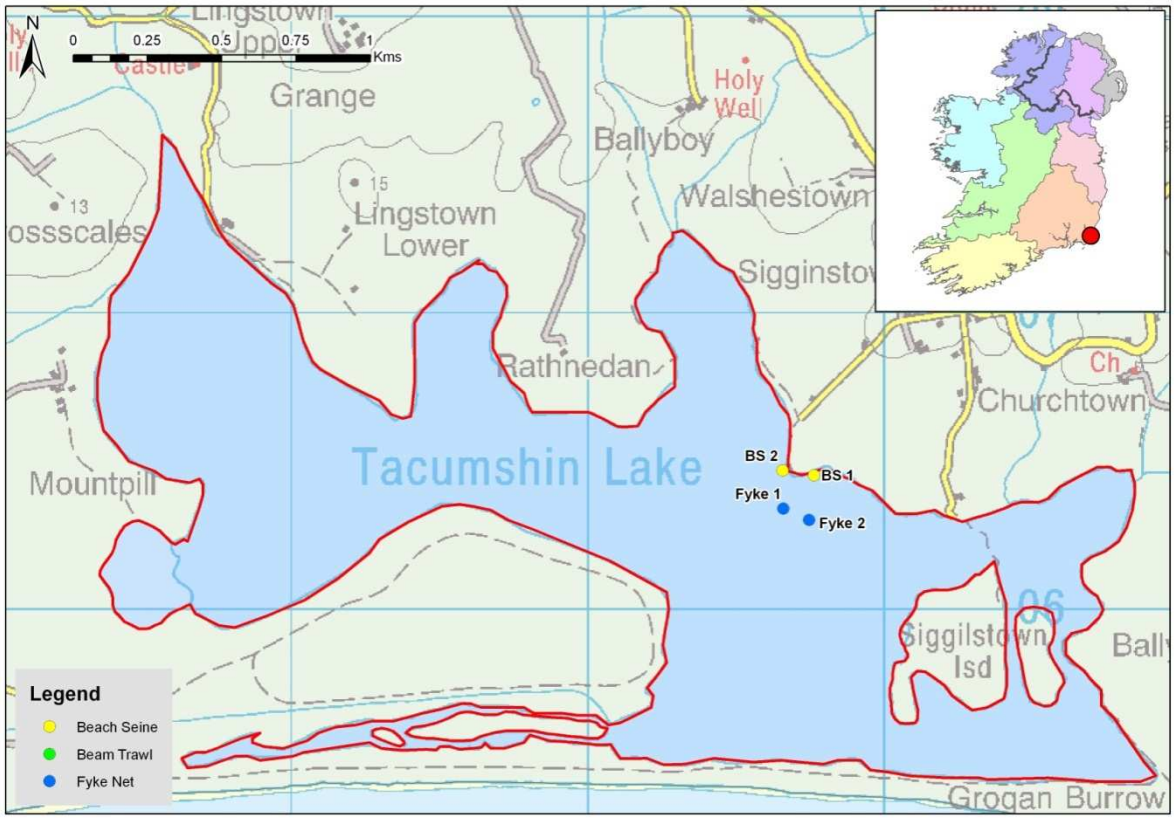

Fig. 1.1. Location map of Tacumshin Lake indicating sampling sites, September 2009

Plate 1.1. Tacumshin Lake, with spit in the background

2. METHODS

Current work in the UK and ROI indicates the need for a multi-method (beach seine, fyke net and beam trawl) approach to sampling fish in estuaries and these procedures are now the standard CFB methodology for fish stock surveys in transitional waters for the WFD monitoring program.

Beach seining is conducted using a 30m x 3m net (10mm mesh size) to capture fish in littoral areas. The bottom of the net has a weighted lead line to increase sediment disturbance and catch efficiency. Fyke nets (15m in length with a 0.8m diameter front hoop, joined by an 8m leader with a 10mm square mesh) are used to sample benthic fish in the littoral areas. Beam trawls are used for sampling benthic fish in the littoral and open waters, where bed type is suitable. The beam trawl measures 1.5m x 0.5m, with a 10mm mesh bag, decreasing to 5mm mesh in the cod end. The trawl is attached to a 20m tow rope and towed by a boat. Trawls are conducted along transects of 100 – 200m in length.

Sample sites are selected to represent the range of geographical and habitat ranges within the water body, based on such factors as exposure/orientation, shoreline slope, and substrate type. A handheld GPS is used to mark the precise location of each site.

All nets are processed on-site by identifying the species present and counting the total numbers caught in each. Length measurements are recorded for each species using a representative sub-sample of 30 fish, while scales are only collected for certain species, such as salmon and sea trout. Unidentified specimens were retained for subsequent identification in the laboratory.

A total of two beach seines and two fyke nets were deployed in Tacumshin Lake in September 2009. Beam trawling was not conducted in Tacumshin Lake in this survey.

3. RESULTS

A total of five fish species were recorded in Tacumshin Lake (Table 3.1). Three-spined stickleback was the most abundant species, followed by sand goby, eel, rudd and flounder (Table 3.1). Far greater numbers of three-spined stickleback were captured in Tacumshin Lake than in any other WFD transitional water body surveyed in 2009. Three-spined stickleback ranged in length from 2.0cm to 5.8cm in length, and their length frequency distribution is shown in Figure 3.1. The presence of rudd suggests a strong influence from freshwater on this lagoon.

Salinity readings taken at each beach seine site ranged from 3.80ppt to 3.89ppt.

Table 3.1. Number of each species captured by each gear type in Tacumshin Lake, September 2009

Scientific name	Common Name	Beach seine (2)	Fyke net (2)	Beam trawl (0)	Total
Gasterosteus aculeatus	Three-spined stickleback	1538	-	-	1538
Pomatoschistus minutus	Sand goby	22	-	-	22
Anguilla anguilla	Eel	-	17	-	17
Scardinius erythrophthalmus	Rudd	-	10	-	10
Platichthys flesus	Flounder	-	3	-	3

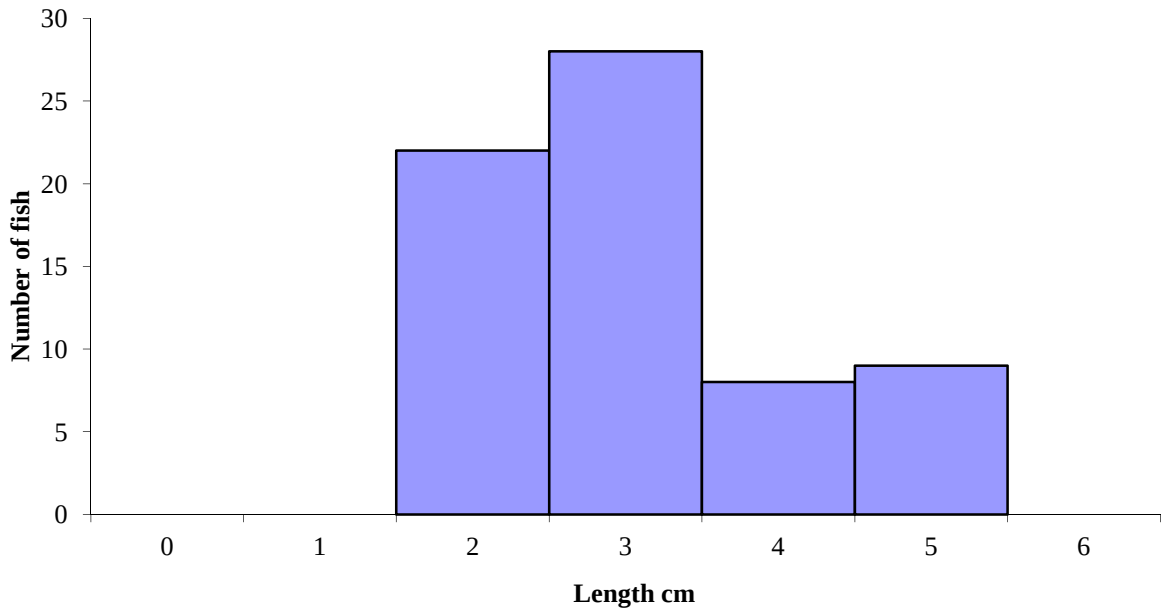

Fig. 3.1. Length frequency distribution of a sub-sample of three-spined stickleback captured in Tacumshin Lake, October 2009 (n = 67)

4. SUMMARY

A total of five fish species were recorded in Tacumshin Lake, which is relatively low when compared with other transitional water bodies surveyed in the ERFB during 2009. Most of the species recorded were either freshwater or diadromous fish (tolerant of both freshwater and saltwater), which indicates a strong influence of freshwater on the system. The presence of rudd within the system suggests that salinity may always be relatively low within the lagoon, with little seawater influence. Species richness and distribution among all transitional water bodies surveyed during 2009 can be seen in the 2009 WFD summary report (Kelly *et al*., 2010).

An essential step in the WFD monitoring process is the classification of the of the status of transitional waters, which in turn will assist in identifying the objectives that must be set in the individual River Basin Management Plans.

A new WFD fish classification tool, Transitional Fish Classification Index or TFCI, has been developed for the island of Ireland (Ecoregion 1) using Northern Ireland Environment Agency (NIEA) and CFB data. This is a multi-metric tool based on similar tools developed in South Africa and the UK (Harrison and Whitfield, 2004; Coates *et al.*, 2007). The TFCI is still undergoing further development in order to make it fully WFD compliant and to account for differences in estuary typologies; however, at this stage it has been used, along with expert opinion, to provide draft ecological status classifications for each transitional water body surveyed for the WFD.

Using this approach, Tacumshin Lake has been assigned a draft ecological status classification of "Moderate" based on the fish populations present.

The EPA have assigned Tacumshin Lake an overall interim draft classification of "Moderate" status, based on general physico-chemical elements, phytoplankton and macroalgal growths.

5. REFERENCES

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