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A PRELIMINARY ANALYSIS OF PIKE ANGLER RECORDS FROM BASSENTHWAITE LAKE

FINAL REPORT

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CONTENTS **PAGE**

EXECUTIVE SUMMARY

1. In recent years, some but not all anglers fishing for pike (*Esox lucius*) in Bassenthwaite Lake, Cumbria, have complained that their catches have deteriorated in terms of numbers and individual sizes. Consequently, during 2007 the Lake District National Park Authority operated a log book scheme. This report presents an initial analysis of the resulting data, together with additional data resulting from scientific sampling at this lake and the nearby Derwent Water by the Centre for Ecology & Hydrology.

2. During 2007, pike angler log book returns were received from a total of 29 anglers over 115 fishing trips covering the weights of 263 pike, of which 20 individuals were also measured. Corresponding scientific data comprised the lengths of 52 pike from Bassenthwaite Lake and 50 pike from Derwent Water, of which weights were taken for 29 and 37 individuals, respectively.

3. Pike caught by anglers at Bassenthwaite Lake in 2007 ranged from 178 to 1016 mm in length (7 to 40 inches) and from 454 to 9072 g in weight (1 to 20 lbs).

4. Pike caught by scientific sampling at Bassenthwaite Lake from 1990 to 2007 ranged from 88 to 865 mm in length and from 4 to 5647 g in weight. Within the overall length-weight relationship, a considerable amount of variation was evident. Inspection of the data by discrete time periods revealed that this variation arose in large part because of differences between the time periods. Furthermore, the more recently-captured pike were relatively thinner for their weight.

5. Pike caught by scientific sampling at Derwent Water from 1990 to 2007 ranged from 166 to 855 mm in length and from 38 to 3600 g in weight. The overall length-weight relationship of these fish generally fell on or near to a single curve. Inspection of the data plotted by discrete time periods revealed no substantial shifts in the length-weight relationship over time.

6. The nature of the observed difference in the length-weight relationships of pike from these two nearby lakes was remarkable and unexpected. While a difference may have been expected in the slope of the two relationships, the relatively much greater variability observed at Bassenthwaite Lake was remarkable and indicative of an unstable population. Although the present analysis has been limited and requires a full statistical assessment, it does appear to support the complaints of some anglers that catches of pike in Bassenthwaite Lake have recently declined in terms of quality.

7. Four areas of future activities can be recommended. Firstly, an encouragement to members of the pike angling community to take more length measurements during the log book scheme of 2008. Secondly, an encouragement to such individuals to make available angling records that they may have covering any time periods prior to 2007. Thirdly, an examination of length-weight relationships for pike from Bassenthwaite Lake in a wider context using scientific data from further water bodies. Fourthly, an examination of pike opercular bones acquired during the scientific sampling to reconstruct individual growth histories, which would in turn enable a better assessment of the apparent problem or problems facing the pike population of Bassenthwaite Lake.

CHAPTER 1 INTRODUCTION

In recent years, some but not all anglers fishing for pike (*Esox lucius*) in Bassenthwaite Lake, Cumbria, have complained that their catches have deteriorated in terms of numbers and individual sizes. Although the lake is currently the subject of a number of research and management projects, none of these activities primarily address the pike population and only the vendace (*Coregonus albula*) monitoring programme of Winfield *et al.* (2007) produces directly relevant data, although even this is only of limited extent.

Given the above situation, in 2006 the Lake District National Park Authority (LDNPA) approached the Centre for Ecology & Hydrology (CEH) with a proposal for a log book scheme for the pike anglers of Bassenthwaite Lake. This proposal was informally discussed with the Environment Agency (EA) before being refined in late 2006. The scheme was subsequently operated by LDNPA for the whole of 2007.

This brief report presents an initial analysis of the resulting rod catch data, although due to limited resources a thorough statistical treatment of the data has not yet been undertaken. In addition, pike data resulting from the scientific sampling of Winfield *et al.* (2007) and two earlier projects are presented for comparative purposes, as are equivalent data from the nearby Derwent Water.

CHAPTER 2 METHODS

During 2007, LDNPA operated a voluntary pike angler log book scheme for Bassenthwaite Lake through which individual anglers could submit accounts of their fishing activities in terms of fishing dates, fishing hours, fishing methods and the numbers and weights of pike caught. These original data are held by Paul Burnell of LDNPA, with a copy being given to CEH for the present analysis which has been restricted to the individual length and weight ranges of these fish and the length-weight relationship of the overall sample. Returns were available from a total of 29 anglers over 115 fishing trips and reported the weights of 263 pike, of which 20 individuals were also measured.

In addition, corresponding individual length and weight data for pike recorded by scientific survey gill-net sampling from 1990 to 2007 within the projects reported in full by Winfield *et al.* (1994), Winfield *et al.* (1998) and the continuing project of Winfield *et al.* (2007) were made available by CEH. These samples comprised 52 pike from Bassenthwaite Lake and 50 pike from Derwent Water. Although all individuals were measured, weights were taken for only 29 and 37 pike from Bassenthwaite Lake and Derwent Water, respectively.

CHAPTER 3 RESULTS

Pike caught by anglers at Bassenthwaite Lake in 2007 ranged from 178 to 1016 mm in length (7 to 40 inches) and from 454 to 9072 g in weight (1 to 20 lbs). The length-weight relationship of these fish is given in Fig. 1.

Pike caught by scientific sampling at Bassenthwaite Lake from 1990 to 2007 ranged from 88 to 865 mm in length and from 4 to 5647 g in weight. The length-weight relationship of these fish is given in Fig. 2 for this period as a whole and for the four time periods of 1990-1994, 1995-1999, 2000-2004 and 2005-2007. For the overall relationship, a considerable amount of variation was evident, i.e. individual points did not fall consistently on or near to a single curve. Inspection of the data plotted by discrete time periods revealed that this overall variation arose in large part because of differences between the time periods. Furthermore, the more recently-captured pike were relatively thinner for their weight.

Pike caught by scientific sampling at Derwent Water from 1990 to 2007 ranged from 166 to 855 mm in length and from 38 to 3600 g in weight. The length-weight relationship of these fish is given in Fig. 3 for this period as a whole and for the four time periods of 1990-1994, 1995-1999, 2000-2004 and 2005-2007. For the overall relationship, with only very limited exceptions the individual points consistently fell on or near to a single curve. Inspection of the data plotted by discrete time periods revealed no substantial shifts in the length-weight relationship over time.

CHAPTER 4 DISCUSSION

Due to limited resources, the present analysis has been only preliminary in nature and has not been supported by a statistical assessment. Consequently, all conclusions drawn here must be viewed with some caution for the time being.

The log book scheme as operated during 2007 was clearly successful, producing returns from a total of 29 anglers over 115 fishing trips and the weights of 263 pike. It is unfortunate that only 20 of these pike, i.e. approximately 8%, were also measured. This disparity undoubtedly results from the normal angler practice of weighing rather than measuring pike, but it would be worthwhile actively to encourage the taking of measurements for future reports.

No analysis is presented here for the catch-per-unit-efforts of the pike anglers on Bassenthwaite Lake, although such calculations could readily be made with ease. This has not been done simply because of presently limited resources and also because at the moment there is nothing with which the resulting figures could be compared. This situation will change in the near future as further catch data become available from Bassenthwaite Lake and a similar scheme being started on Windermere by EA also starts to produce results. The situation will also change if apparently existing past angler records for Bassenthwaite Lake can be accessed and developed into a comparative analysis of trends over time.

In the present absence of access to earlier pike angler catch data, limited data on pike from scientific fish monitoring programmes on Bassenthwaite Lake and Derwent Water were

examined here in detail for the first time. The nature of the observed difference in the length-weight relationships of pike from these two nearby lakes was remarkable and unexpected. While a difference may have been expected in the slope of the two lines on which points fall, the much greater variability observed at Bassenthwaite Lake was remarkable and indicative of an unstable pike population. Moreover, closer inspection of the data revealed that more recently-captured pike were relatively thinner for their weight, an observation which concurs with the complaints made by some anglers. In contrast, the length-weight relationship observed at Derwent Water exhibited great stability over the same time period.

In conclusion, although the present analysis has been limited and requires a full statistical assessment it does appear to offer support to the complaints of some anglers that catches of pike in Bassenthwaite Lake have recently declined in terms of quality. Four areas of future activities can be readily recommended. Firstly, an encouragement to members of the pike angling community to take more length measurements during the log book scheme of 2008. Secondly, an encouragement to members of the pike angling community to make available angling records that they may have covering any time periods prior to 2007. Thirdly, the present length-weight relationships for pike from Bassenthwaite Lake could be put into a wider context by making comparisons with data from other water bodies held by CEH and EA at a national level. Fourthly, and with a lower priority, effort could be wisely invested in a detailed examination of pike opercular bones retained from weighed specimens of the scientific monitoring programme of Winfield *et al.* (2007). The latter would enable the reconstruction of individual growth histories for pike over the last almost two decades, which would in turn enable a better assessment of the apparent problem or problems facing the pike population of Bassenthwaite Lake.

ACKNOWLEDGEMENTS

We thank Paul Burnell of the Lake District National Park Authority for initiating and running the present log book scheme. We are also grateful to Keith Kendall of the Environment Agency for useful discussions and to Environment Agency for part-funding the monitoring programmes at Bassenthwaite Lake and Derwent Water which gave rise to the present scientific pike data. Finally, we would particularly like to thank the pike anglers of Bassenthwaite Lake for their invaluable time and efforts freely given through their participation in the log book scheme.

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Fig. 1. The length-weight relationship of 20 pike caught by anglers at Bassenthwaite Lake in 2007.

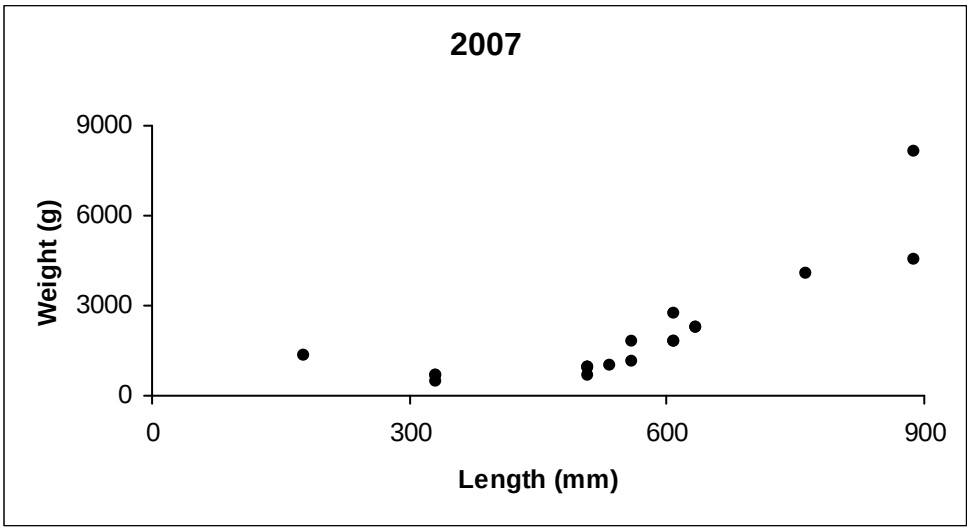
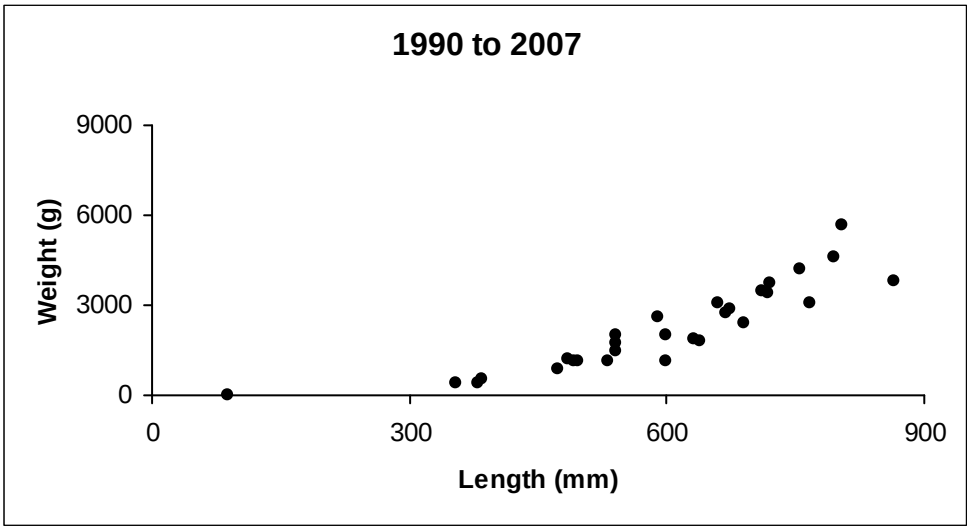


Fig. 2. The length-weight relationship of 29 pike caught by scientific sampling at Bassenthwaite Lake from 1990 to 2007 (upper figure) and for the four time periods of 1990-1994, 1995-1999, 2000-2004 and 2005-2007 (lower figure).



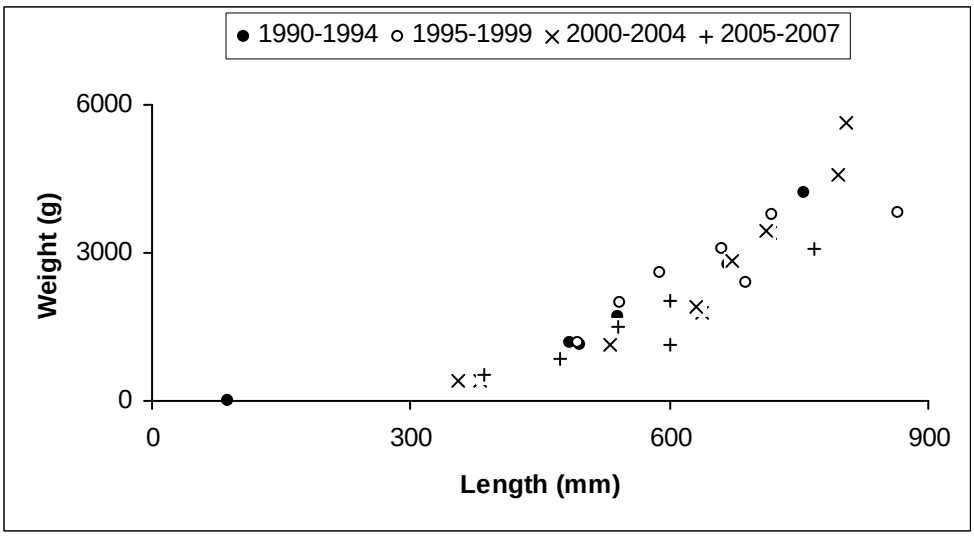


Fig. 3. The length-weight relationship of 37 pike caught by scientific sampling at Derwent Water from 1990 to 2007 (upper figure) and for the four time periods of 1990-1994, 1995-1999, 2000-2004 and 2005-2007 (lower figure).