

Long-Term Monitoring

WHY, WHAT, WHERE, WHEN & HOW?

Proceedings of a workshop and conference “*The Importance of the Long-term Monitoring of the Environment*” held by Sherkin Island Marine Station from 14th–19th September 2003 on Sherkin Island, Co Cork, Ireland

Edited by John Solbé

Price: €40.00 (softback)

Postage: Ireland €6.00

Europe - €7.50 Rest of World - €10.40

Available from Sherkin Island Marine Station, Sherkin Island, Co. Cork, Ireland.

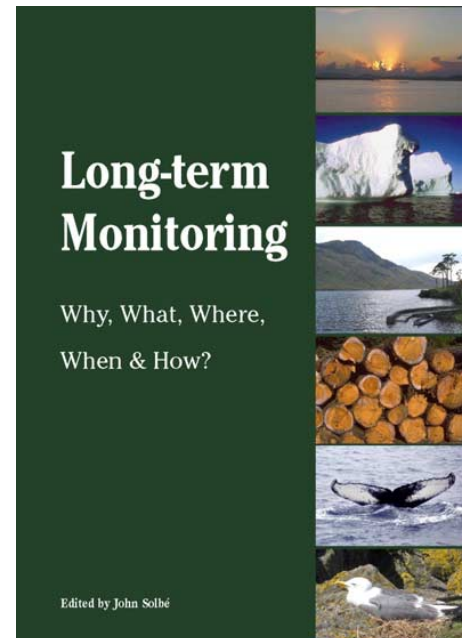
Tel: +353+28+20187 Fax: +353+28+20407

Email: sherkinmarine@eircom.net Website: www.sherkinmarine.ie

ISBN: 1 870492 82 X

226pp 175mm x 246mm

Published by Sherkin Island Marine Station, Sherkin Island, Co. Cork, Ireland. 2005



ONE major factor fuelling public concern over environmental deterioration is the uncertainty surrounding the main issues: global warming, ozone depletion, pollution, destruction of natural habitats. Ideally, we would tackle these issues of changing environments by first understanding the natural environment sufficiently in order to identify the change. In truth we are facing the urgent need to understand changes to natural systems when we have little understanding of their former state. There are several main reasons for our being inadequately prepared:

- **Natural systems are complex** – understanding them is therefore difficult, demanding enormous scientific efforts on a larger scale than has previously proved possible.
- **Natural systems are characterised by a high degree of variation** – on time-scales of hours to thousands of years; understanding this requires observations spanning at least the time frame of interest to humans (up to several hundreds of years).
- **We lack the necessary long-term observations** – to adequately understand the background for assessing the perceived threat from environmental change.

For these reasons, we are forced into making estimates of environmental change in the absence of adequate background information. In practice this involves using available, mostly short-term, observations to answer questions requiring longer-term series of data, with a heavy reliance on modelling to help make up for the shortfall. This inevitably produces large amounts of uncertainty in any predictions generated by the models, and it is this that adds to the uncertainty felt also by the public.

All this raises the question of what can we do to reduce the levels of uncertainty regarding environmental issues? The obvious need for more longer-term observations cannot be met instantaneously. However, if more such records would have helped us to understand present-day environmental changes and improved our ability to predict future changes, as seems to be the case, we should at least consider the possibilities for maintaining the few long-term series of observations we have in place and starting new series where needed. This was the subject of an international workshop leading to the publication of this book.

*Dr Barrie Dale
(Excerpt of Introduction)*

CONTENTS

PREFACE

EXECUTIVE SUMMARY

1. INTRODUCTION

2. OUTPUT OF THE WORKSHOP

Editor's Note on the Workshop Report

Participants in the Workshop

Workshop Report

2.1 What is Long-Term Monitoring?

- a) Definitions: surveillance and monitoring: long-term and short-term monitoring
- b) The reasons for and benefits of establishing a programme of long-term monitoring
- c) Opportunities for monitoring by amateur individuals and groups

2.2 Creating a Long-Term Monitoring Programme

- a) Aims and objectives
- b) The material to be observed
- c) Location and collections
 - i) Sampling sites
 - ii) Biological samples
 - iii) Reference sites and reference collections
- d) Sampling frequency and duration
- e) Sampling methods
- f) Trial periods; sampling limitations; damage from sampling

2.3 The Data

- a) Sample design: statistical treatment
- b) Accuracy and precision; quality control
- c) Relationships between sampling frequency and intended applications
- d) Who can collect data?
- e) Quality control
- f) Accessibility and other issues
- g) Using data sets not originating in monitoring programmes

2.4 Using the Results

- a) Interpretation – general
- b) Monitoring compliance standards
- c) Prediction
 - i) Prediction within the sampled area
 - ii) Prediction outside the sampled area
- d) Examples (and benefits) of long-term monitoring
- e) Communication

2.5 Recommendations from the Workshop

- a) New programmes
- b) Existing or historic programmes
- c) Special Recommendations

3. PAPERS FROM CONFERENCE

Editor's Introduction to the Conference Papers

3.1 Opening Address

Pat the Cope Gallagher TD, Minister of State at the Department of the Environment, Heritage and Local Government, Dublin, Ireland

3.2 Is Short-Term Monitoring Sufficient?

Prof G.E. (Tony) Fogg, Prof Emeritus in Marine Biology, School of Ocean Sciences, University of Wales, Bangor, UK

3.3 An Overview of the Social Value of Long-Term Monitoring

Prof John F. Solbé, Environmental Consultant, St Asaph, Wales, UK

3.4 Long-Term Monitoring – A Media Viewpoint

Alex Kirby, Environmental Journalist, UK

3.5 The Role of Geology in Long-Term Monitoring

Dr Peadar McArdle, Director, Geological Survey of Ireland, Dublin, Ireland

3.6 Thirty Years Monitoring Waters, Weeds and Fishes

W.S.T. Champ; M.F. O'Grady; P. Gargan; P. Fitzmaurice and P. Green, Central Fisheries Board, Dublin, Ireland

3.7 Long-Term Monitoring of Birds in Ireland

Oscar J. Merne, National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin, Ireland

3.8 Otters and Fish Farming – A Good News Story

Jane Twelves, Salar, Isle of South Uist, Outer Hebrides, Scotland, UK

3.9 Thirteen Years of Monitoring Sea Lice in Farmed Salmonids

Dr David Jackson, Lorraine Copley, Frank Kane, Oisín Naughton, Suzanne Kennedy and Pauline O'Donohoe, Marine Institute, Galway, Ireland

3.10 The Sedimentary Record Shows the Need for Long-Term Monitoring of Phytoplankton

Dr Barrie Dale, Department of GeoSciences, University of Oslo, Norway

3.11 Rocky-Shore Monitoring at Sherkin Island Marine Station since 1975

Dr Gillian Bishop, Environmental Consultant, Aberdeen, Scotland, UK

3.12 Long-Term Fisheries Monitoring with Emphasis on the Striped Bass (*Morone saxatilis*) from the Hudson River

Byron Young, Kim A. McKown and Julia M. Brischler, New York State Department of Environmental Conservation, USA

3.13 Long-Term Monitoring of Marine Phytoplankton at Sherkin Island Marine Station

Dr Geraldine Reid, Curator of Diatoms, Natural History Museum, London, UK

3.14 Long-term Observations: Crustaceans and Molluscs in Atlantic Canada

Dr René Lavoie, Fisheries & Oceans Canada, Nova Scotia, Canada

3.15 Shellfish Toxicity in the NW Atlantic: Unexpected and Widespread Occurrences of *Alexandrium fundyense* Balech in Coastal New England, September 1972. Where was the monitoring?

Christopher Martin, NOAA/National Marine Fisheries Service, Milford, CT, USA

3.16 Cetaceans: Can we Manage to Conserve them? The Role of Long-Term Monitoring

Greg Donovan, International Whaling Commission, Cambridge, England, UK

3.17 Environmental Monitoring in Ireland: Aspects of the Role of the Environmental Protection Agency

Larry Stapleton, Environmental Protection Agency, Wexford, Ireland.

3.18 The Importance of Long-Term Monitoring of the Environment

Michael Ludwig, National Marine Fisheries Service, Milford, CT, USA

REFERENCES

INDEX