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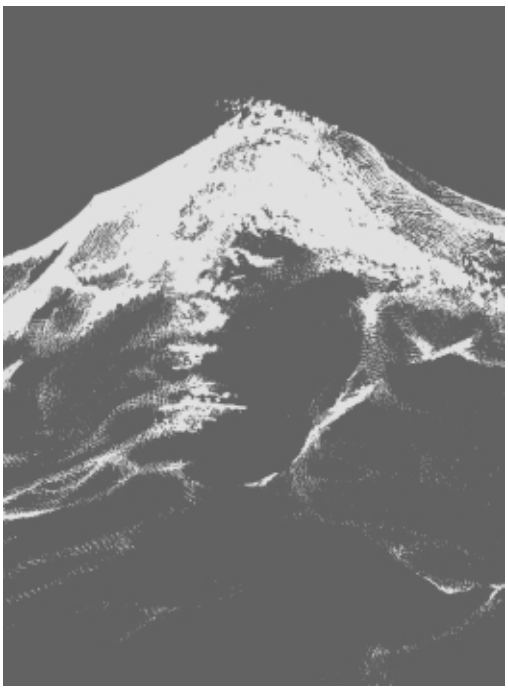

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# The 6th International Conference and Workshop on Lobster Biology and Management: an Introduction

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Every three years or so, the International Conference and Workshop on Lobster Biology and Management (ICWL) brings together lobster scientists, fishery managers, and industry representatives from around the world for a week of scientific presentations, workshops, and discussions on lobster biology and management. The first ICWL was held in Perth, Australia, in January 1977. Its purpose was to bring together a small group of lobster researchers from the USA and Australia to discuss common issues and themes. That initial workshop spawned a continuing series of meetings that have become the international lobster conference for scientists—the equivalent of an international congress meeting. The second conference was in St. Andrews, Canada, in 1985; the third in Havana, Cuba, in 1990; the fourth in Sanriku, Japan, in 1993; and the fifth in Queenstown, New Zealand, in 1997. The number of participants and the international representation at the conference has grown from 34 scientists and managers from 6 countries at the first meeting to over 200 participants from 25 countries at the September 2000 meeting in Key West, Florida (USA). All told, 126 oral presentations and 43 poster presentations took place during the five-day meeting.

## Why lobsters?

Lobsters are found throughout the world's temperate and tropical oceans and are among the most highly esteemed, valuable seafood products in the world. Three families of lobsters (Nephropidae, the clawed lobsters; Palinuridae, the spiny lobsters; Scyllaridae, the slipper lobsters) comprise the bulk of the world's lobster fisheries. In 1995, worldwide landings of lobsters were approximately 148,000 metric tons (mt) valued at over US$2.7 billion (FAO/GLOBEFISH Research Program 1995). Ours was the first of the ICWL series to be held in the United States, surprising given the importance of this resource to our country. Landings of lobster in the United States represent 25% of the world catch, a close second to Canada's 27% share. The value of the US catch is estimated to be over US$600 million annually. Lobsters are of particular economic and social consequence to Florida and the Florida Keys, where the 6th ICWL was held. The Florida spiny lobster population supports the most valuable commercial fishery in the state (~$30 million/year at dockside) and an economically important recreational diving fishery, which now accounts for ~22% of the total catch (Bertelsen and Hunt 1992, Harper 1995).

Their economic importance clearly drives much of the research on lobsters, but scientific interest in lobsters goes beyond their importance as table fare. As Bill Herrnkind so eloquently stated at the end of the first ICWL in 1977: 'Lobsters are, in fact, a very significant biological entity: widely distributed, speciose, large in size, long-lived, enormous in number, ecologically consequential . . . . Understanding how lobsters achieve their biological success is an important scientific contribution and cannot be inferred from sedentary invertebrates, pelagic forms, or terrestrial vertebrates.' I would add that lobsters also serve as exceptional 'model' organisms for the study of fishery issues in general. Their ecological attributes are similar enough to those of finfishes to be broadly applicable, yet their abundance, lower mobility, and robustness make them more tractable research subjects for many fishery science questions.

## The 6$^{th}$ International Conference and Workshop on Lobster Biology and Management

It follows then that the nature of the session topics is typically wide ranging at the ICWL conferences. Yet the emphasis of each meeting differs and tends to reflect current issues and, to some extent, the primary interests of the host group. The Australian workshop was largely descriptive, with emphasis on physiology, behavior, and ecology. In Canada, the workshop had a distinct focus on recruitment issues, so population dynamics and stock-recruitment research dominated the discussions. The Cuban meeting in 1990 focused on the use of biological reference points for management. In Japan, the long-term interest of the hosts in aquaculture and larval biology came to the fore, and at the New Zealand meeting an emphasis on stock assessment was clear. In keeping with tradition, our meeting in Key West was all-inclusive, encompassing sessions on aquaculture and enhancement, behavior and ecology, ecology for management, oceanic processes, physiology, and stock


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assessment, but we also convened three special symposia whose focus was on contemporary issues of interest.

Presentations in the conference's opening session on 'Emerging Areas in Lobster Biology and Management', sponsored by the Darden Environmental Trust, were selected to preview the range of topics to be covered during the week-long meeting. These presentations also highlighted novel research or new approaches to existing problems. Enhancement of lobster stocks through habitat addition or stocking of juveniles is an important and ongoing effort world-wide, and the success of such efforts varies widely with species. The presentation by J. Stanley Cobb and colleagues (Kathleen Castro, Richard Wahle, and John Catena) showed how much more useful information can be gained when enhancement programs are based on thoughtful experimental design. The Western Australian fishery for *Panulirus cygnus* has long been regarded as one of the best-managed marine fisheries in the world. Three presentations by Nick Caputi, Norm Hall, Kevin Donohue, and their colleagues (Chris Chubb and Alan Pearce) provided an introspective evaluation of their success in (a) predicting stocks based on postlarval supply and environmental influences, (b) increasing egg production by means of management controls, and (c) improving the social, economic, and biological aspects of their fishery with individual transferable quotas as opposed to input controls. Larry Boles gave a fascinating presentation on his work with Ken Lohmann on magnetic orientation by Caribbean spiny lobster. He offered compelling evidence that lobsters possess both a magnetic directional compass and a geographic position sense. The latter capability is the first documented for an invertebrate and, combined with their directional sense, grants them an orientation ability that equals or exceeds that of the best known vertebrates (passenger pigeons, sea turtles, etc.). The use of modern molecular methods to resolve spiny lobster phylogeny was the subject of Margaret Ptacek's presentation, coauthored by Shane Sarver, Michael Childress, and William Herrnkind. Using nucleotide sequence data from portions of the mitochondrial large subunit (16S) ribosomal RNA gene and cytochrome c oxidase subunit I gene, Ptacek and colleagues derived a molecular phyologeny that closely matches one based on morphological characteristics and proposed over 30 years ago (George and Main 1967). Rom Lipcius's presentation offered a prelude to the special session on marine reserves (see below). The modelling work by Lipcius and colleagues (William Stockhausen and David Eggleston) describing recruitment of spiny lobster in Exuma Sound (Bahamas) is an excellent example of how the troublesome questions concerning site location of marine reserves for the conservation of species with meroplanktonic larvae can be aided through the use of spatially explicit models coupling oceanographic features with biological processes. The presentation by Mark Butler and colleagues (Alison MacDiarmid and Jamie Heisig) wrapped up the opening session with a look at a largely unexplored consequence of intense fishing—the reduction of fertilization success due to sperm depletion in male lobsters. Comparing results from experiments on lobsters from fished areas and marine reserves in Florida and New Zealand, Butler and colleagues showed that reductions in male size in a population may portend lower realized fecundity for females and thus lower egg production. In addition to the contributed-paper sessions, three other special symposia followed and were equally rewarding. Many of these presentations appear as papers in this volume.

The special symposium 'Ecology for Management', sponsored by Florida Sea Grant and chaired by William Herrnkind and John Booth, reflected the long-term interest and success of the United States NOAA Sea Grant Program in supporting basic research that yields knowledge applicable to fisheries management. Much of the research covered in the 16 presentations focused on efforts to link postlarval supply or early benthic juvenile abundance with estimates of commercial fishery catch several years hence. The abundance and catchability of lobsters as related to behaviour, habitat structure, and environmental change (e.g., temperature, salinity) was the subject of several other empirical and modeling studies discussed in other sessions.

The current global interest in marine reserves has not been lost on lobster scientists and managers, who presented eight papers in a special symposium sponsored by The Nature Conservancy and chaired by Rom Lipcius. Most of these presentations described empirical investigations of changes in lobster population abundance, size structure, and reproductive output within and outside of marine reserves in Florida, New Zealand, and Sweden. The remaining presentations in this symposium described modeling efforts undertaken to optimize the design and placement of marine reserves for lobsters in the Bahamas.

'Sustainable Fisheries Management for the 21st Century' was the subject of the conference's final special symposium. Dick Monroe of the Darden Environmental Trust, which sponsored this symposium, provided the opening presentation, wherein he described the active and important role that responsible corporations can play in sustaining lobster stocks. That presentation was followed by three case studies describing current and future management strategies for American clawed lobster, European clawed lobster, and Tasmanian rock (spiny) lobster fisheries. Along with changing management practices, the deployment of artificial structures to concentrate lobsters, for ease of capture and for possible enhancement of limited habitat and future stocks, is a burgeoning practice among fishermen. An experimental test of these ideas off the Yucatán coast of Mexico was the subject of the presentation by Patricia Briones-Fourzan and Enrique Lozano-Álvarez. The session concluded with remarks from John Sorlien and colleagues,

who proposed that co-management of fisheries and cooperative research by fishery scientists, managers, and fishermen is an alternative model to those strategies now in place. The 6th ICWL concluded later that evening with a sumptuous social gathering, show of thanks, and traditional presentation of the next meeting venue by the organizers of the subsequent conference. The 7th ICWL will be held in Hobart, Tasmania (Australia), in 2003.

We are grateful for the generous financial assistance given by our sponsors, without whom the 6th ICWL and this volume would not have been possible. The Darden Environmental Trust, Florida Sea Grant, The Nature Conservancy, the Florida Keys National Marine Sanctuary, the National Marine Fisheries Service, Old Dominion University, the Florida Fish and Wildlife Conservation Commission, Florida State University, and the Virginia Institute of Marine Science all contributed substantially to this conference. I would also like to thank personally the Organizing Committee for assisting me in producing the largest ICWL conference yet; members of that committee were John Hunt and Carollyn Cox (Florida Fish and Wildlife Conservation Commission), William Herrnkind (Florida State University), Rom Lipcius (Virginia Institute of Marine Science), Scott Quackenbush (University of North Carolina at Wilmington), and David Eggleston (North Carolina State University). The editing of this volume could not have been accomplished in so timely and thorough a fashion, were it not for Dr Anne B. Thistle, to whom we also owe a great deal of thanks.

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Photo of conference participants