

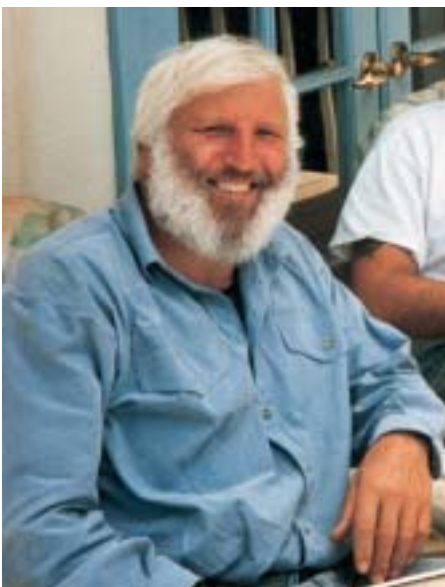
ERNIE

Electronic Recording of Nature, Investigation of Environment

The NZ RLIC has made significant progress to fully develop, including field testing of real time data entry and download, an electronic device and operating procedures for use in fisheries stock assessment research. The project is intent on providing new functionality and technical improvements to existing hardware and software technologies to improve the quality and quantity of fisheries research data and of fisheries management decision making. NZ RLIC Executive Officer and Research Programme Manager, *Daryl Sykes*, outlines the project.

Information

The management of NZ rock lobster fisheries is contingent upon a credible time series of biological information derived from monitoring of the fisheries, from catch, effort and landing data provided by commercial fishermen, and from statutory catch and processing reports made by commer-



Ernie Cave – an inspiration for new technology.
PHOTO: J. CAVE



Digital callipers, GPS position – fast, accurate recording with ERNIE. PHOTO: T. BURKHART

cial and customary fishermen. This information is essential to the annual rock lobster stock assessment process which informs fisheries management decisions.

Fisheries stock monitoring entails trained technicians in two-person teams on board fishing vessels manually recording information about rock lobster length, sex, maturity, injury index, as well as weather and sea conditions, water depth, method of capture etc. This is a time-consuming and laborious process and the need to record data accurately is made all the more difficult by the unstable working platform and the conditions encountered on the deck of a working fishing vessel.

The manual records are subsequently compiled for electronic data entry. There are two error checking procedures that comprise part of the elaborate standards and specifications for data entry and data base management set by the Ministry of Fisheries. The electronic data entry process is time-consuming, and therefore expensive.

Innovation

The NZ RLIC has researched extensively to find hardware and software components

that can be innovatively combined and modified to produce a specialised technology for fisheries research.

The concept developed by the NZ RLIC is a rugged, purpose built, waterproof, handheld computer, using software technology adapted from the forestry industry but incorporating a novel feature which enables direct downloads to the existing research data base.

The device has the capability to add slave components (e.g.: electronic callipers, electronic scales, bar code readers, GPS/GIS) which enhance reporting accuracy and efficiency and significantly reduce operator error.

Inspiration

Enter Southland rock lobster fisherman, now retired, Ernie Cave. Ernie was a good fisherman, a stalwart of the CRA 8 industry, an active representative for that industry over many years, an advocate, and an innovator. Work done by Ernie Cave and Fiordland fisherman, Mark Peychers, proved the effectiveness of modified escape gaps in rock lobster pots and resulted in a rewrite of escapement regulations.

Ernie was one of the few working fisher- ▶



Manual transactions – Bob Street and Khushla Draffin measure and record in CRA 5. PHOTO: G. BASHER

► men who properly understood the alchemy of stock assessment models. The importance of accurate, timely, and representative fisheries data was something that Ernie promoted to the CRA 8 industry as it commenced a Vessel Logbook programme in 1993.

Long before there were any affordable handheld personal computers such as IPAQs and Palm Pilots, Ernie Cave was outlining the potential for industry generated electronic data collection on board fishing vessels. However neither the technology nor the funding was available at the time so the notion of electronic data collection lingered for many years until 2000 when the NZ RLIC decided that it was an idea whose time had come.

Perspiration

Enter Simon Anderson, now Senior Field Technician for the NZ RLIC. Formerly a commercial fisherman, MFish observer, marine research contractor to DOC and to other agencies, Simon is industrious, inquisitive, and persistent. Having been delivered the commission by the NZ RLIC, Simon firstly found the hardware technology – an Allegro Field PC manufactured by North American company Juniper Systems, specialists in field computing solutions for natural resources.

The Allegro PC is a fully waterproof and shockproof machine that can operate in extreme conditions. With long battery life, GPS and GIS capabilities, the ability to integrate additional components, and a keypad suitable for gloved hands, the compact Allegro was an ideal choice for the NZ RLIC project.

Simon then found a software developer who had a deceptively simple and reliable programme that had been rigorously tested on the Allegro PC.

Enter Ralph White, owner of R. White Woods Inc., a forestry consulting firm based in

Victoria, British Columbia. Ralph employs skilled individuals to work in a variety of forestry projects including tree improvement, growth and yield, and various research trials. Additionally they conduct ecological classification and GPS mapping. Since 1987 R. White Woods staff have used handheld computers and Ralph's EASYDC software programmes to collect 18 million observations.

Ralph confirmed that moving from logs to lobsters was not an impossible task, so a productive business relationship commenced, one that has resulted in the NZ RLIC being appointed an Australasian agent for Allegro and EASYDC fisheries research applications, and Simon Anderson becoming an agent for other R. White Woods products.

Guided and encouraged by the NZ RLIC office, Simon and Ralph transformed the MFish standards and specifications for field data collection and data entry into an electronic format. David Banks and David Fisher from the NIWA Stock Monitoring Unit provided useful technical advice. Simon Anderson took ERNIE to sea, field testing the hardware and software components whilst catch sampling and completing tag and release work in CRA 5.

Application

When used by a trained technician, the ERNIE system enables more data to be collected in the time available on board fishing vessels, and allows the direct download of electronic data into the research data base to provide a more cost effective and timely analysis for inclusion in stock assessments.

A consequent benefit is that existing field staff can be more efficiently deployed given that observations, measurements and recording can be undertaken by one person using this new device. Overall, a greater amount of biological information can be delivered to the stock assessment process using this new technology and the cost savings can be deployed into additional stock monitoring coverage.

A further benefit is a reduction in data entry and data loading errors. The manual procedures entail a succession of different individuals dealing with large amounts of paperwork and many thousands of separate data fields. The transcription from the original data sheets across to electronic file format and then delivery to the electronic data base presents the risk of operator error. The carefully designed electronic logging and download procedures have minimised the risk of errors,



Electronic transactions – Simon Anderson and ERNIE at work. PHOTO: T. BURKHART

which if undetected can confound the stock assessment analyses.

The NZ RLIC has embarked on this project in order to deliver more efficient and cost effective research provision to NZ rock lobster fisheries.

There is no similar technology in use in the world's rock lobster fisheries. Other countries which have important rock lobster fisheries will be interested in deriving the benefits from a fully functional device. The technology is transferable across fisheries in New Zealand and NIWA has already purchased an ERNIE system for use in scampi fishery research.

Sustainable utilisation of fish stocks in NZ and worldwide relies on accurate and timely data collection and data management yet the existing routines are predominantly built around the time-consuming and potentially error-prone manual recording and loading routines.

In any marine or freshwater fisheries situation where observers and/or field technicians are required to log extensive biological data for use in subsequent stock assessment or population analyses, the ERNIE device has an application.

From the deck of a lobster boat in Southland to everyday use in fisheries stock monitoring – Ernie inspired ERNIE – new technology at work in support of sustainable utilisation of NZ rock lobster fisheries. ■

NZ RLIC