CRC Reef Research Centre

FISHING & FISHERIES NEWSLETTER

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inside

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BACK TO THE BLUES

ELF blue reefs reopen after five year closure

The Effects of Line Fishing (ELF) Experiment has been progressing nicely over the last couple of years during the 'recovery phase'. On the 29th March 2003 this recovery phase is about to end on four 'blue' reefs, temporarily closed to fishing for the past five years, when they reopen to fishing. On the 29th March 1998 four 'blue' (General Use B) reefs, declared 'Fisheries Experimental Areas', were closed to bottom line and spear fishing for five years as part of the ELF Experiment. On the 29th March 2003, these reefs revert back to their 'blue' status and once again will be open to fishing.

By Bruce Mapstone and Annabel Jones

The ELF Project is one of a variety of research projects (albeit an important one) in the F&F Project. To those new to the ELF Experiment, this is a large scale experiment to determine how reef fish populations and other species respond to different levels of line and spear fishing on a small number of reefs in the GBR. By carefully monitoring fish and other organisms during controlled changes to fishing pressure (by opening and closing reefs to fishing), we are gaining information about how fish populations respond to fishing, giving us an insight to the effects of past and potential future fishing. The ELF Experiment also includes research on important biological features of a range of fish species, both target and non-target species. This information, along with other important fisheries data is feeding into a Management Strategy Evaluation task, being developed by ELF researchers, that will allow managers and stakeholders to effectively evaluate current and potential management strategies for the GBR Reef Line Fishery. This research is providing some essential information for some of the big questions asked by many of us, such as how effective are reef closures?

The reefs that will re-open on March 29th 2003 are Rocky Islets B (14-132b, near Lizard Island), Knife Reef (18-081, off Townsville), Liff Reef (20-296, off Mackay) and Unnamed Reef 21-124 (near Storm Cay). All other reefs in the ELF Experiment remain closed to fishing, including the other four 'blue' reefs in the Experiment that were closed on March 6th 2000. A full list of the ELF reefs and their status after March 29th can be found on page two.

ELF researchers have been surveying these reefs over the recovery phase to monitor how fish stocks on these reefs have reacted to being protected from fishing. This information provides us with some understanding of the effectiveness of Marine Protected Areas (MPA's) as conservation management tools and will inform managers about what might be expected from future closures implemented under the GBRMPA's Representative Areas Program.

ELF researchers have monitored fish stocks and other aspects of the ecosystem on all the reefs in the ELF Experiment since 1995, and will continue to do so until the end of the experiment in 2006. We are now in the process of analysing the huge amounts of data collected from the ELF Experiment, but already some important results are apparent.

The success of the recovery phase of the ELF Experiment rests heavily on adequately protecting these closed blue reefs from fishing pressure - that is, keeping inadvertent or deliberate illegal fishing to a minimum. While it would be naive to expect that no fishing occurred on these reefs during closure, we can take illegal fishing into account if we know roughly how much has occurred. Surveillance records from agencies such as Coastwatch and Queensland Boating and Fisheries Patrol have provided us with information on infringements on the experimental closed reefs. Since fish stocks have begun to rebuild on these reefs in the five years since they were closed (at least for

Continued on Page 3

The recovery phase of the ELF Experiment is providing important information on the effectiveness of marine protected areas.

PROJECT UPDATE

a word from the project leader

Gavin Begg

Welcome to the New Year!

2003 has started with a flourish for the F&F team who have hit the ground running with new staff, projects, proposals, reports and so on. The team has completed the processing of samples from our last catch survey, and are now entering the data. Results of the Spanish mackerel project will soon be completed, as will a progress report from the ELF Experiment.

We have also commenced an Environment Australia (EA) funded project reviewing the Elizabeth and Middleton Reefs Marine National Nature Reserve Management Plan, an Australian Fisheries Management Authority (AFMA) funded project collating Torres Strait Islanders commercial catch records, and the organisation of the Third International Symposium on Fish Otolith Research and Application, to be held in Townsville in July, 2004.

The F&F team have added two new staff, Dr Barry Goldman, who will be involved in the multi-species targeting project which was introduced in the last newsletter, and Dr Steve Sutton, who will be investigating social issues of recreational fisheries. We also have a number of new students who we will introduce in the coming newsletters.

Finally, I would just like to remind you of the re-opening of four blue experimental reefs to fishing, and that we will soon be visiting you to discuss some of the projects we are involved in, and to ask for your involvement in a questionnaire for the multi-species targeting project.

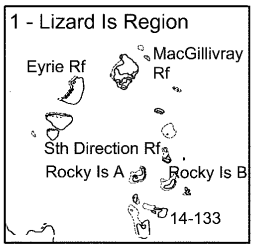
The F&F team is certainly broadening its experience and interests, which no doubt will lead to a very interesting and productive year.

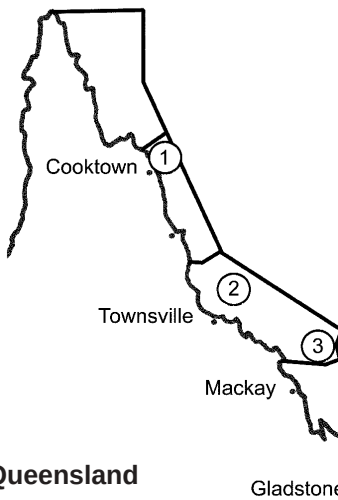
ELF EXPERIMENT UPDATE

reefs & timetable

WE ARE HERE

		2003	2004	2005
		29/3/03		6/3/05
Lizard Island Region	Rocky Islets B (14-132b)	CLOSED	OPEN	
	Unnamed Reef 14-133		CLOSED	OPEN
	Eyrie Reef (14-118)		CLOSED	
	Rocky Islets A (14-132a)		CLOSED	
	MacGillivray Reef (14-114)		CLOSED	
	South Direction Reef (14-147)		CLOSED	
Townsville Region	Knife Reef (18-081)	CLOSED	OPEN	
	Fork Reef (18-083)		CLOSED	OPEN
	Faraday Reef (18-041)		CLOSED	
	Yankee Reef (18-074)		CLOSED	
	Glow Reef (18-071)		CLOSED	
	Dip Reef (18-039)		CLOSED	
Mackay Region	Liff Reef (20-296)	CLOSED	OPEN	
	Boulton Reef (20-146)		CLOSED	OPEN
	Bax Reef (20-138)		CLOSED	
	Unnamed Reef 20-136		CLOSED	
	Unnamed Reef 20-142		CLOSED	
	Unnamed Reef 20-137		CLOSED	
Storm Cay Region	Unnamed Reef 21-124	CLOSED	OPEN	
	Unnamed Reef 21-139		CLOSED	OPEN
	Unnamed Reef 21-133		CLOSED	
	Unnamed Reef 21-130		CLOSED	
	Unnamed Reef 21-132		CLOSED	
	Unnamed Reef 21-131		CLOSED	





ELF Experimental reefs and their zoning status. Dates for zoning changes are given at the top of the table. 'Open' indicates the relevant reef is open to bottom line and spear fishing. 'Closed' indicates the relevant reef is closed to fishing. All changes to zoning regulations take place on and including the date indicated. Please remember that the dates and conditions in this table are only for the ELF Experiment and all other relevant regulations remain in place.

The ELF reefs and their approximate lo above are those included in the ELF E reefs are given in the adjacent table. T and marine park sections are also given

PROJECT NEWS
new faces

Introducing Steve Sutton.....

New research projects mean new faces and new expertise, and the past six months has seen lots of both. This edition we would like to introduce some new team members that are tackling some of our newer research projects.

Barry Goldman has worked with the F&F team as a consultant for the past couple of years developing and refining databases on which to securely store our valuable data. He has now joined the research team in a more active role and will be working with other researchers to add a dimension of vessel movement to our multi-species modelling project.

Steve Sutton has also joined the team bringing with him a wealth of experience in the areas of fisheries biology and social sciences. He hails from Canada, and has worked more recently in the USA. His main area of interest in the F&F team focuses on the social aspects of recreational fishing in Queensland. We will keep you updated with their work as it progresses.

..... and Barry Goldman

ESTUARY FISHING
end for logbook program

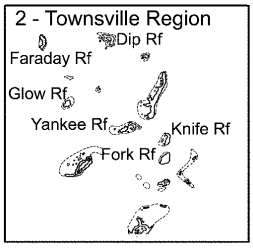
For those of you who have been participating in the Catch Logbook Program for the Estuary Fishing Project, you may be pleased to know that it is finally coming to an end. This project is looking at differences in recreational line catch quality in estuaries that are open and closed to commercial gillnet fishing. There are many claims that recreational fishing is better in estuaries that are closed to commercial fishing, however there are no data to support or refute these claims.

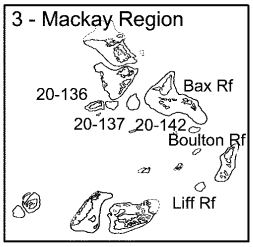
It is vital that impartial data are provided to managers to help them make more informed decisions regarding resource allocation between competing users. The Catch Logbook Program will help to provide this information.

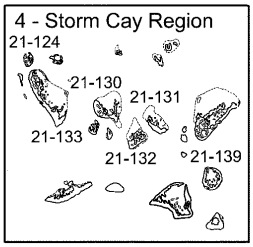
Renae Partridge has been sending out logbooks to recreational estuary fishers for 2 years now, and the overall response from the recreational fishing community has been fantastic! Every bit of information helps, and your contribution has been greatly appreciated. So, please return your logbooks (completed or not), to Renae so she can get all the data entered and get some results out to you.

The rest of the project is also going well. Structured fishing surveys were completed last year in six local estuaries (three open and three closed to commercial gillnet fishing). Renae also completed about 400 questionnaires with recreational fishers at local boat ramps earlier in 2002. Thank you to all those who participated! These questionnaires are being extended to the fishing clubs, charter operators, and commercial fishers this year, so if you're in these categories, get your pen ready to have your say about this resource competition issue!

2003 is a year of results for the estuary fishing project, so we'll keep you informed as we find out some answers. If you have any questions about the project, please call Renae on (07) 4781 5196, or email her at renae.partridge@jcu.edu.au.







cation. Those reefs labelled in the map
xperiment. The zoning status of these
he boundaries of the GBR Marine Park

From Page 1 - ELF Experiment Update

the southern areas of the GBR) it appears that the amount of illegal fishing has been insufficient to negate the effects of the closures.

The ELF research so far looks like providing much stronger evidence than has been available previously for the effectiveness of MPA's on the GBR. Our observations of rapid declines in fish numbers on reefs opened to fishing strongly indicated that without protection from fishing, these reefs would have had populations similar to the open reefs around them. The indications of rebuilding of fish stocks following closure of reefs illustrate that closures do lead to increases in the stocks of at least some species within the closed areas. Larger fish populations on closed reefs will have greater spawning capacity than stocks on surrounding open reefs. This adds support to the argument that MPA's are effective conservation management tools. One of the things we can't tell from the ELF Experiment, however, is how much these larger populations of fish in closed areas contribute to replenishment of stocks elsewhere, although the life cycles of the species (with eggs and larvae dispersed with the tides and currents) imply that there is likely to be at least some export of larvae from closed to open areas.

The ELF Experiment has gathered an unprecedented amount of data over the past seven years, and these data are now being synthesised into some important information. Formal analysis of the data is ongoing, but we expect to release some exciting results from this work in upcoming F&F Newsletters. The team is also planning to take our work out on the road to regional Queensland coastal towns later in 2003. Keep an eye out for advice about these events in your area for your chance to discuss the research with us in person.

If you have any questions about the ELF Experiment, please contact Annabel Jones on 07 47816365, email annabel.jones@jcu.edu.au or Bruce Mapstone on 07 47815113, email bruce.mapstone@jcu.edu.au.

QDPI COASTAL MONITORING

barramundi and mud crab

By Stuart Hyland & Rod Garrett - QDPI

In the last edition of the F&F Newsletter we introduced you to the Coastal Monitoring work being carried out by scientists from the Northern Fisheries Centre in Cairns as part of the F&F Project. This task monitors important species such as barramundi, mud crab, sharks and mangrove jack, as well as looking at some aspects of trawl bycatch. In this article Stuart Hyland and Rod Garrett report on some of the results from this work on two species important to both the recreational and commercial sectors, barramundi and mud crabs.

Barramundi and mud crabs are important recreational and commercial species. QDPI coastal monitoring work is providing essential information on these important species.

- photo courtesy of Andrew Tobin CRC Reef.

The overall strategy of this task is to value-add to the Queensland Fisheries Service (QFS) statewide Long Term Monitoring Program (LTMP) by implementing supplementary surveys in selected estuaries and coastal sites within the GBR World Heritage Area (WHA). These surveys are conducted to give a seasonal dimension to the annual time series of data collected in the LTMP.

A number of factors are known to impact abundance and recruitment of barramundi and mud crabs including fishing pressure, habitat modifications (particularly of nursery areas), temperature, water flows, and rainfall. The additional pre-wet season surveys that are completed as part of this Task provides information on the seasonal patterns in the distribution of barramundi and mud crabs before any substantial rainfall or flow events for the season. This provides a useful comparison with post- wet season surveys completed by the QFS LTMP.

Barramundi populations are surveyed in Princess Charlotte Bay, Trinity Inlet and Burdekin delta using standardised research netting surveys across a variety of mesh sizes. Mud crab population investigations focus on four locations in the WHA - Princes Charlotte Bay, Trinity Inlet, Hinchinbrook Passage and Bowling Green Bay. Crab populations are surveyed using standardised pot sampling techniques. These locations were established as reference sites for the QFS LTMP in which annual surveys are completed during late summer and autumn for stock assessment purposes.

Results indicate distinct temporal and spatial patterns in the distribution of mud crabs and barramundi within estuaries. Barramundi are known to move between estuarine habitats and freshwater habitats as juveniles before returning to the estuary to spawn as maturity is reached. The results suggest that barramundi also move from one section of the estuary to another between seasons. In particular, results of the surveys indicate that barramundi in the 400-600 mm size range are more abundant in the upper estuarine reaches during spring but are more common in the mid estuarine reaches in autumn. This size class of barramundi provides the recruits to both the commercial and recreational fisheries. It is important to identify their distribution and how it changes between seasons to fully understand the pattern of recruitment to the fishery. Understanding these recruitment processes is important for assessing the impact of any habitat modifications. An understanding of the recruitment processes is also important for assessing the impact of introducing conservation management strategies such as the GBRMPA's Representative Areas Program.

Results of the mud crab investigations suggest male and female mud crabs are spatially segregated within estuaries, as are juvenile and adult crabs. Mature female mud crabs aggregate on foreshore habitats during spring when juvenile males dominate mud crab populations in creeks. Spatial segregation of small and large crabs is not surprising given the cannibalistic behaviour exhibited by mud crabs. There is however some apparent geographic variation to this pattern of spatial segregation with a different pattern evident in populations in Princess Charlotte Bay to those further south. The foreshore aggregation of mature females is of interest in relation to the suspected offshore spawning of mud crabs. It is also of interest in relation to the impact of the harvesting of mature male mud crabs on population structure and successful mating.

The male mud crabs in the size class of 120 to 150mm carapace width provide the recruits to the fishery as they moult during late summer to reach legal size (150mm carapace width) and this size also roughly corresponds to the size at which maturity is reached. An index of abundance for these sub-adult male mud crabs has considerable potential to provide a useful recruitment index for the following mud crab season and an indicator of stock condition. Such indicators have potential for assessing changes in management arrangements.

F&F host INTERNATIONAL SYMPOSIUM

The world-class research being conducted by the F&F team has been recognised by the international scientific community in the decision to appoint them host of an international symposium.

The Third International Symposium on Fish Otolith Research and Application will be held in Townsville from 11-16th July 2004 and will be organised by F&F team leader Gavin Begg and others of the team. This symposium is only conducted every five years and attracts the world's foremost scientists in this field.

Topics to be covered at the Symposium will include theoretical aspects of otolith research, as well as applications to such things as fisheries management, stock assessment, climate change and other ecological studies. This Symposium will be an ideal opportunity to showcase the F&F research to an international audience.