

SCRFA

SOCIETY FOR THE CONSERVATION
OF REEF FISH AGGREGATIONS



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CONTENTS

Editorial

SCRFA Activities

News

Caribbean and Atlantic
Indo-Pacific

Publications

Acknowledgements

BREAKING NEWS

- IUCN 3rd World Conservation Congress Recommendation for greater protection of fish spawning aggregations
- Documentary launched, a new spawning aggregation film from the Indo-Pacific

EDITORIAL

Welcome to the sixth edition and a 'new-look' newsletter.

Over the past few months, there has been a spirit of change and movement forward in SCRFA. I am delighted and enthusiastic about being the new Chair of the Society and would like to express thanks, on behalf of the Board, to Dr Michael Domeier for his tremendous efforts as former SCRFA Chair.

Our Board is now eight strong, with the addition of Dr Enric Sala from Scripps Institution of Oceanography, USA: welcome to Enric. The Board is made up of experts from around the world, with representatives from Hong Kong, Palau, Guam, Australia, USA and Bermuda.

SCRFA is based on expertise and knowledge building, and there are some exciting new initiatives being progressed. We are now at a stage of rapid growth in the recognition, management and research of fish spawning aggregations globally. We are expanding the spawning aggregation site global database, and will be publishing a revised version of our popular Methods Manual soon. SCRFA is being incorporated as a not-for-profit organisation in the USA, and Board members recently presented our work at various conferences and meetings, including the 4th World Fisheries Congress (Canada), 10th International Coral Reef Symposium (Japan), 57th Gulf and Caribbean Fisheries Institute's annual meeting (USA), and 3rd IUCN World Conservation Congress (Thailand).

SCRFA promotes and facilitates the conservation and management of reef fish spawning aggregations. This edition of the newsletter has interesting articles on research findings, management news, innovative gear and new materials available, as well as a reminder on data discretion. I hope you find it informative.

Martin Russell
Chair

SCRFA ACTIVITIES

Recommendation adopted: the 3rd IUCN World Fisheries Congress in Bangkok (held every 4 years) adopted a Recommendation for the better protection of spawning aggregations (see SCRFA website for full text).

Documentary film: at last, a film on spawning aggregations from the Indo-Pacific! We have just produced a short (18 minute) educational film on fishing and

Next Newsletter:

If you have relevant articles, comments or publication news, please consider them for inclusion in our next newsletter - due out June 2005.

conserving spawning aggregations in Fiji (available on DVD or on our website) entitled: "Seeds of the Future: Fijian Spawning Aggregations".

Publications: a major focus of our work is education. We have just issued a new, attractive, and easy to read 21-page Handbook on managing and conserving reef fish spawning aggregations. Our much shorter introductory pamphlets are now available in four languages (English, Spanish, Chinese and Fijian) either directly from me, or from our website, and we have posters in Spanish and English. If you think that additional translations would be useful, please let me know (scrfa@hkucc.hku.hk). Several new *field* survey reports are now available on the website and all fisher field surveys for the current funding cycle have been completed. See below for a brief report from Indonesia.

Meetings: over 200 Caribbean experts attended the 57th annual meeting of the Gulf and Caribbean Institute (GCFI) meeting in St. Petersburg, Florida in early November at the Florida Fish and Wildlife Research Institute. The Nature Conservancy (TNC) and SCRFA co-sponsored a half-day spawning aggregation science session that included presentations by three SCRFA Board members: Pat Colin, Brian Luckhurst and Ken Lindeman. Pat also gave a plenary talk on connectivity and reef fish distributions. Pat and Brian gave presentations within a spawning aggregation workshop sponsored by TNC and showed our new documentary film on spawning aggregations in Fiji. The highlight of this workshop was the presence of many local fishers from the region. Ken gave an evening presentation on marine research opportunities in Cuba that included aggregation management initiatives. Brian and Ken also serve on the GCFI Board of Directors and will continue the productive relationship between SCRFA and GCFI. Next year's meeting will be in San Andres, Colombia.

A mini-symposium on the Conservation and Management of Reef Fish Spawning Aggregations was held during the 10th International Coral Reef Symposium in Okinawa, Japan (1 July, 2004). Eleven papers from 23 authors were delivered on conservation and management needs, the application of conservation and management strategies, spawning aggregation assessment methodologies, and the behavior and ecology of fishes in spawning aggregations. The range of talks was a good reflection of the current state of our understanding, or absence thereof, of aggregating reef fish species in the tropics. In particular, the need to validate the details of information acquired through interviews was discussed, to ensure its reliability for follow-up management action. An average of over 100 people attended each paper (see SCRFA website for more details) and a SCRFA members' meeting was held after the session.

Yvonne Sadovy

NEWS

CARIBBEAN AND ATLANTIC

Data discretion urged

Mark Spalding has just completed a new "Guide to the Coral Reefs of the Caribbean" (University of California Press). While preparing this guide, he

Need for Research

Conservation and management of spawning aggregations cannot be achieved without properly focused research and monitoring to evaluate the effectiveness of measures implemented.

repeatedly came across mention of remote reefs that he later found to be overexploited and not the hidden gems he had hoped for. There were a few exceptions but overall his conclusion was that remoteness often doesn't help because location information is so easy to communicate. In one example Mark gives, the Florida Middlegrounds still has many deeper reefs (rising to 20-30 m) with large numbers of big predatory fishes. But a main source of information about this area were the web-sites of commercial operators advertising to take fishers out to dive and spear these virtually unknown and unmapped locations – in just a few dives the really big "breeders" could be gone. Mark urges 'Let's keep these areas quiet...'85!'

Gulf of Mexico, USA

Some great results coming out of long-term scientific research on the gag and other groupers were provided by Chris Koenig and coworkers. For more information contact koenig@bio.fsu.edu as well as two of the citations provided with this newsletter.

Spawning site fidelity: in part of the Madison Swanson Marine Reserve there is evidence of extreme site fidelity among large gag, *Mycteroperca microlepis*, red grouper, *Epinephelus morio*, and red snapper, *Lutjanus campechanus*, around the spawning sites on which they were caught. For economic reasons (tags cost > \$300 each) only larger fish were tagged (30 breeding male and female gag and red groupers, and red snapper). These tagged fish are being monitored with 8 Vemco VR2 in situ receivers attached to semi-permanent moorings with subsurface floats where aggregations of gag, scamp, and red snapper occur, and in red grouper habitat depths of 80 - 100 m. Findings so far are that red grouper are sedentary. Gag and red snapper, on the other hand, remain within a 200 m radius of the receiver during the spawning season, but then venture out for short periods (hours), probably for feeding, maintaining periodic contact with the sites throughout the non-spawning season.

Sex ratio: the sex ratio in the reserve has shown an 8-10 fold increase in males, up from about 2% males in recent unprotected times. The late 1970s male percentage was about 20% so the increase brings the males back to historic levels inside the reserve compared to outside of the protected area. Good news for the ladies!

Age structure and habitat: fin rays are being used to determine age, as validated for the gag, and is accurate up to at least 17 years of age, the oldest gag for which rays and otoliths were collected; this is an excellent advance since it does not require fish to be killed. Otoliths are also being used to try to trace back the habitat of juveniles using chemical signatures.

Sound production: sounds associated with spawning have been noted for the three dominant groupers being studied by Chris Koenig and his team: gag, scamp, *Mycteroperca phenax*, and red grouper, although the significance of the sounds is not known. The hope is that if there is a specific sound associated with the spawning act, it might be possible to estimate spawning frequencies on fished (relatively few males) relative to unfished (normal proportion of males) aggregation sites, or to locate additional aggregation sites.



Management: in 2003, the Gulf of Mexico Fishery Management Council of the USA revised a fishery management plan in two reserves (Madison-Swanson and Steamboat Lumps) off the northwest Florida coast. These large reserves were created in 1999 to protect overfished stocks of gag grouper, *Mycteroperca microlepis*, and originally involved a total fishing ban: the ban originally included not just demersal fishing but also trolling for coastal pelagics. Subsequently, work by the National Marine Fisheries Service, and concerns expressed by the recreational fishing sector, suggested that trolling for coastal pelagic fishes, such as king mackerel and wahoo, should not affect the gag grouper which are not caught by this method. The revised plan continues the protection of gag grouper and, in addition, includes a prohibition on possession of any reef fish within the reserve areas. However, trolling is now permitted. This is a management example which seeks to address its objective of protecting gag while also taking into account other, apparently non-conflicting, activities in the same area and demonstrates the importance of tailoring management action to local needs and circumstances (Seawatch, Issue #97, October 2003).

Cayman Islands

Brice Semmens (Consultant for Reef Environmental Education Foundation's Pacific Coast Office) and Cayman Islands' Department of the Environment will investigate the effectiveness of no-take areas on spawning grounds by using acoustic tags to describe the reproductive migrations and spatial ecology of Nassau grouper, *Epinephelus striatus*, in Little Cayman. This island possesses what is believed to be the last healthy spawning aggregation of Nassau grouper in the Cayman Islands. The aggregation of between 2500 and 3000 fish has been monitored for the last three years as part of a longer-term project looking at the outcome of the 8-year closure to fishing, starting in 2003, of all Cayman Island Nassau grouper spawning aggregations. Fish are tagged both on and off the spawning sites and tracked by an array of 15 remote receivers deployed around the island. Manual (towed receiver) tracking will also be conducted around Cayman Brac (and perhaps around Grand Cayman) to investigate claims of abyssal crossings between the islands.

INDO-PACIFIC

Australia, Great Barrier Reef

In Australia, the Queensland Coral Reef Fin Fish Fishery on the Great Barrier Reef (GBR) has undergone management changes recently. A management plan for this fishery was introduced in 2003. As part of a suite of management measures, spawning season closures are being used to protect spawning fish during the peak-spawning season on the GBR. Three, nine-day periods were implemented as closed seasons for taking all coral reef fin fish in October, November and December each year around the new moon period. The closure periods start six days before the new moon and finish two days after. The closures are designated to protect spawning aggregations of most coral reef fish species, specifically common coral trout, *Plectropomus leopardus*. For more information on the spawning closures visit www.dpi.qld.gov.au/fish.guide, and for information on fish spawning aggregations on the GBR visit www.GBRMPA.gov.au

Tailoring Management:

There are many ways in which spawning aggregations can be managed; those selected should be tailored to local needs, constraints and species - see very different approaches from the USA, Cayman Islands and Australia.

Eastern Indonesia

Yvonne Sadovy and Liu Min of the University of Hong Kong completed SCRFA field surveys, based on fisher interviews, to identify currently, or historically, fished spawning aggregations during two visits to Indonesia. Areas visited were the Kei Islands, Raja Ampat, and three areas in southwestern Sulawesi (Sinjai, Pangkep, Selayar). A total of 39 spawning aggregations were identified from the areas visited (for report see www.SCRFA.org). Results suggested that 25 out of 30 identified spawning aggregations have declined substantially within living memory, often, it seemed, associated with increased fishing for the live reef fish export trade in groupers. In Waigeo, Raja Ampat, where some villages started catching for the export trade in live reef fish in 2002, 5 out of 9 aggregations showed declines. At 4 aggregations in Selayar, fishers have stopped fishing due to declines in catch volumes; some fishers now shifting to lobster fishing. In the Take Bonerate National Park, where cyanide and explosives have been prohibited since 1992, the fish stocks has evidently not improved over the last decade, and there is little enforcement and much poaching.

The results indicate little management of reef fishes with a greater focus by government on habitat and destructive fishing issues. There is also considerable interest by the government in developing grouper culture as an alternative to fishery management. Maintenance of healthy grouper stocks will be important for ensuring a good supply of broodstock if these initiatives are to progress and spawning aggregation management is encouraged. Many villagers expressed concern about declines in their local marine resources and, in some cases, had introduced their own regulations to protect them. Spawning aggregation management should be part of a long-term plan to help local communities manage their marine resources sustainably. Both government and NGOs could assist communities with information and support.

Palau

SCRFA Board member Pat Colin of the Coral Reef Research Foundation (CRRF) in Palau has developed a simple PVC plastic housing for a popular line of GPS receivers (Garmin eTrex) as part of his research on spawning aggregations in Palau (see Newsletter No. 3 on GPS use for aggregated fish counts). Pat found that a GPS receiver will work quite well inside a PCV plastic housing that protects it from the elements. This allows a GPS unit, which can log positions at some preprogrammed time interval, to be used to record positions over time for any sort of marine survey. If the unit is attached to a float it can be towed by a diver on the surface, or a snorkeler, to record the swimming track while in the water. Likewise it can be attached to a current drifter and the track of the drifter downloaded after recovery. Many other uses are possible, limited only by the imagination.

Please note that not all Garmin eTrex GPS units have the logging capability. The Garmin eTrex "Venture" is recommended, as it is one of the cheapest units with this capability. A download cable is included with the GPS unit. Also Garmin "World Map" software is needed to download the tracks from the unit (for details of prices and companies, contact Pat Colin).

More Information:

For further information
or materials, see
www.SCRFA.org,
or contact
SCRFA@hkucc.hku.hk

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The GPS housing is made from standard PVC pipe-fittings, and is water- and pressure-proof to at least 7 m depth. There is an o-ring seal around the lid, which is removed to insert the GPS. Plans for the housing are available from Pat Colin, if you want to make your own (a lathe is required to machine the o-ring groove). Completed housings, instructions and recommendations for use, are also being made available for \$25 US each, plus cost of postage. These can be ordered from Dr. Colin at crrf@palaunet.com or by mail at CRRF, P.O. Box 1765, Koror, Palau 96940. Do not send orders or money until you contact Pat Colin first.

Seychelles

The Seychelles Fishing Authority (SFA) is running a project to locate and manage reef fish spawning aggregations. The preliminary results are among the few descriptions of spawning aggregations from the area, and report on the tiger grouper, *Epinephelus fuscoguttatus*, and the camouflage grouper, *E. polyphkadion*, often aggregating together at the same locations, typically reef passes. This species 'association' has been reported from widely around the Indo-Pacific but in the western Indian Ocean, a third associated species is the marbled coral grouper, *Plectropomus punctatus*. Reef passes in the Indo-Pacific are emerging as an important habitat for several large grouper species at spawning time, and possibly for many other reef fishes. Yet they are often neglected when marine protected areas are designated. Mr. Jan Robinson of the SFA calls for greater protection of these important areas (Marine Conservation Society Seychelles, PO Box 1299, Mahe, Seychelles).

PUBLICATIONS

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Hanson, P. J., Koenig, C. C. and Zdanowicz, V. S. (2004). Elemental composition of otoliths used to trace estuarine habitats of juvenile gag *Mycterperca microlepis* along the west coast of Florida. *Marine Ecology Progress Series* 267: 253-265.

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