BREAKING NEWS

Protection for the Black grouper in Bermuda started May 1st, 2005

International standards for live reef fish trade released; includes recommendation for no aggregation-fishing

SCRFA

SOCIETY FOR THE CONSERVATION OF REEF FISH AGGREGATIONS

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EDITORIAL

Welcome to the seventh SCRFA newsletter. I hope you find it useful.

This edition is full of interesting updates on fish spawning aggregation research and management progress throughout the world. The newsletter provides a snapshot of what is happening globally, and facilitates a network of communication on fish spawning aggregation issues.

This year is a hectic one for SCRFA, with meetings, conference attendance, outreach, validation of spawning sites and administration of SCRFA. Yvonne Sadovy is working full time on various key projects, several in close association with IUCN on aggregating species (World Conservation Union), and the SCRFA Board is actively involved in spawning aggregation research and management in their respective parts of the globe. Gradually, the need to identify, characterize and manage fish spawning aggregation sites is becoming recognised by fishery, and marine protected area, managers around the world.

A very important task for SCRFA at the moment is the incorporation of the Society as a not-for-profit organisation in the USA. This will put SCRFA on a new footing as the global authority on fish spawning aggregations. Currently, SCRFA is operating under the umbrella of the Pfleger Institute of Environmental Research (PIER) in California. Thanks to the administrative support of PIER, and financial support from the David and Lucile Packard Foundation, SCRFA is now able to expand as an independent organization.

Martin Russell
Chair

SCRFA NEWS

It is very encouraging to see progress in the various initiatives reported in this newsletter to protect and manage reef fish spawning aggregations. We have come a long way since a few years ago when few outside of inner circles knew much, if anything, about them. Most recently, there is positive news from the Bahamas, Cayman Islands, Australia and Bermuda. In the Bahamas, the Nassau grouper is getting further protection. Hopefully this will help to reverse the declines we have seen in this species throughout much of its geographic range and ensure that its fishery can continue. Concern, however, continues for the Nassau which is still listed as ‘Endangered’ on the IUCN Red List. So there is much yet to be done.

In Bermuda, the black grouper is now protected. Interview work in relation to aggregations has recently been initiated in east Africa and Brazil.

The long-awaited 'International Standard for the Trade in Live Reef Food Fish' was recently released at the recent World Aquaculture Society meeting in Bali. The voluntary standards are intended to form the basis of better practice in live reef food-fish practice and trade, and in mariculture operations.They recommend no aggregation-fishing. For more details contact the Marine Aquarium Council (MAC) at info@aquariumcouncil.org.

SCRFA Progress: the first part of this year has been occupied with preparation of educational materials, articles, website update, and review of our database of spawning aggregations: a period of 'spring-cleaning' and planning. Other projects involve translation of the SCRFA pamphlet into Tok Pidgin and a poster in Fijian. A generic poster design on spawning aggregations is also available for translation as needed. Please contact scrfa@hkucc.hku.hk.

Later this year, field work begins, with additional fisher surveys being planned in the Philippines (with Philippines WWF), Indonesia, Fiji, and Costa Rica (in collaboration with PIER). Field work will be conducted to validate (ground-truth) information collected during interviews in some locations.

The Society is almost ready to stand on its own two 'financial' feet– we will be fully incorporated as a not-for-profit organisation in California by the end of the year.

During a recent workshop on threats to marine fishes, spawning aggregations were flagged as one criterion to consider when assessing potential or actual threat to aggregating species in unmanaged fisheries. The recommendation was included in a report to the Canadian government following a workshop of experts organized by the government and including COSEWIC (Committee on the Status of Endangered Wildlife in Canada). Although Canada is not famous for its coral reef fishes (!), COSEWIC is widely respected and discussion of the problem of aggregating species in the fishery context and outcome of this workshop gives the issue a valuable profile in North America.

Conferences: At the Indo-Pacific Fish Conference (15-20 May) in Taipei, Taiwan, a number of presentations on spawning aggregations will be presented during a session initiated by SCRFA on reef fish conservation. The purpose of the session is to explore practical approaches to reef fish management, address important conceptual issues and identify areas in need of greater attention and focus. A SCRFA members' meeting will be held during the conference (details available on the IPFC website). SCRFA will also be represented at the upcoming International Marine Protected Areas Conference (IMPAC) (23-27 October) in Australia.

Yvonne Sadovy
Director/Secretary

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CARIBBEAN AND ATLANTIC

Bahamas

A two-month fishing ban went into effect on 16 December, 2004, and ran through to 16 February, 2005, for Nassau grouper (*Epinephelus striatus*). According to the Minister of Agriculture and Fisheries, Alfred Gray, the ban is to ensure that the much sought-after Nassau Grouper is around for years to come. Minister Gray ordered the closure of nine areas well-known for grouper spawning aggregations. These areas include a site each in Mayaguana, Great Inagua, Acklins, Cay Verde, Columbus Cay, Ragged Island, South Long Island, and two on the western Great Bahama Bank.

The Nassau grouper is the most important finfish resource in the Bahamas, according to the Bahamas Fishery Department, and a valuable source of local income. Fisheries data show that in 2003, approx 1,000 kg of Nassau grouper were taken for commercial use, (this does not include fish taken for subsistence and recreational fishing) and that 60% of the landings occurred during the spawning season of December and January. This compares with approximately 360,000 kg of landings in 1992 so there has been a striking decline over the intervening 10-year period. Research has indicated that the Bahamas is among the last areas where the Nassau grouper is still in abundance, and if preventative measures are not effectively taken, the species could take a long time to recover. The recent ban was widely supported in the fishing community, although fisheries officers encountered several Bahamian fishing vessels with Nassau groupers during the protected season. The Bahamas Reef Environment Education Foundation (www.breef.org) has been active in working towards aggregation protection.

Note: elsewhere, the Nassau grouper has been protected by spawning season closures; in 2002 Belize protected 11 of the 16 known aggregation sites year-round, and in 2003 the Cayman Islands banned fishing on its spawning sites for eight years.

Bermuda

On 1 May, 2005, the black grouper, *Mycteroperca bonaci*, was protected in Bermuda through a seasonal area closure according to Bermuda's Department of Environmental Protection. Two putative black grouper spawning aggregation sites had been identified near the edge of Bermuda's northeast reef platform, through information provided by fishers. The sites are in the same general area as two red hind (*Epinephelus guttatus*) sites that have been seasonally closed (1 May - 31 August) for many years. The boundaries of this site were later redefined to include all four aggregations (2 red hind and 2 black grouper), and the area will shortly be demarcated with buoys. No fishing of any kind is permitted during the specified closed season. The sites will be monitored and a detailed study will commence in June. This is great news for Bermuda. Brian Luckhurst (SCRFA Board member) is the Senior Fisheries Scientist in Bermuda Fisheries. For more information contact Brian by email: bluckhurst@gov.bm.

Brazil

There is no consistent information on the possible existence and location of spawning aggregations of threatened reef fish species along the tropical southwestern

Atlantic (Brazil). As a result, in November 2004, SCRFA Board member Enric Sala and coworkers started a project to determine the existence and location of spawning aggregations of threatened reef fishes in the Abrolhos Bank, Brazil, the largest and richest reef complex within the South Atlantic. At least three species listed as threatened on the IUCN red list, and that aggregate to spawn in the Caribbean, also occur in Abrolhos, including one 'Critically Endangered' serranid, the jewfish or Goliath grouper (*Epinephelus itajara*), and two 'Vulnerable' lutjanids, the cubera snapper (*Lutjanus cyanopterus*) and the mutton snapper (*L. analis*).

The researchers did not find spawning aggregations of reef fishes during this project, although they obtained evidence, from fisher interviews, that some might exist. Based on this work, it appears that fishers of Caravelas, and other smaller villages near the Abrolhos Bank, do not have the traditional knowledge of older fishing cultures comparable to those in Polynesia, Micronesia, and parts of the Caribbean. The information on the location and timing of spawning aggregations of commercial reef fishes obtained during interviews with fishers was ambiguous, and sometimes contradictory. This suggests either that they do not know of the existence, location and timing of fish spawning aggregations, or that these had mostly depleted before the present fisher generation. Or, of course, it could suggest a reluctance to reveal them.

Like many other places, fishing on the Abrolhos Bank heavily targets large reef fish species known to spawn in aggregations. Although presently protected by a specific law, due to its endangered species status, the jewfish *Epinephelus itajara* is still caught by traditional and artesanal fishers in Abrolhos. The rainbow parrotfish, *Scarus guacamaia*, is ecologically, if not biologically, extinct in Brazilian waters, as its last positive record, substantiated with museum specimens, tracks back to the nineteenth century. The cubera snapper *Lutjanus cyanopterus* and the tiger grouper *Mycteroperca tigris* are also very rare and no longer support specific fisheries. Only one species, the black grouper, *Mycteroperca bonaci*, is still common in the Abrolhos National Park, although it is depleted outside the park's boundaries.

Cuba

The status of this, once important, fishery appears to be so poor that local production is insufficient to supply the local tourism market.

Cuba has a long history of fishing Nassau grouper, *Epinephelus striatus*; indeed, historically, a high proportion of annual landings for this species came from spawning aggregations when the species was easy to catch in large numbers. Landings declined from 1,400,000 kg in the 1960s to almost none by the later 1990s. These aggregations have not been protected or managed by the government. Details of the current condition of the fishery of the Nassau grouper have been difficult to come by but indications are that the species is not in good condition. The status of this, once important, fishery appears to be so poor that local production (including production from both local waters and from non-Cuban waters i.e., the large Cuban fleet fishing in the Campeche Bank) is insufficient to supply the local tourism market, and the species is now too expensive for Cubans to buy. The Cuban government has approached foreign dealers in an attempt to import Nassau grouper into Cuba. Is this a further signal that this species is in bad shape?

INDO-PACIFIC

Australia

The first of the legislated spawning closure periods for the Great Barrier Reef was implemented as closed seasons for all coral reef fin fish in October, November and December 2004. Although there was a little confusion on the actual start time of the closures, they went fairly smoothly. The next round of spawning closures will start in September 2005. For more information on the spawning closures visit www.dpi.qld.gov.au/fish.guide, and for information on fish spawning aggregations on the Great Barrier Reef visit www.GBRMPA.gov.au.

Several primary spawning aggregation sites for coral trout (*Plectropomus leopardus*) and other serranids were included in closed areas under the new Zoning Plan for the Great Barrier Reef Marine Park in 2004. These aggregation sites will be monitored annually during the spawning season for coral trout to determine any changes in aggregation numbers over time. Two of these spawning sites have now been monitored for over 14 years.

Potato cod (*Epinephelus tukula*), Queensland grouper (*Epinephelus lanceolatus*), humphead (Maori or Napoleon) wrasse (*Cheilinus undulatus*), barramundi cod (*Cromileptes altivelis*) and all *Epinephelus* species over 100 cm are now fully protected on the Great Barrier Reef. For more information, contact Martin Russell by email m.russell@gbrmpa.gov.au.

Eastern Pacific – Sea of Cortez

Very few MPAs in the eastern Pacific have been designated or located specifically to protect fish spawning aggregations. Enric Sala (Scripps Institution of Oceanography) reports from the Sea of Cortez, that one aggregation of leopard grouper (*Mycteroperca rosacea*) is protected in the Cabo Pulmo National Park, at least two more in the Loreto Marine Park, and another in the San Pedro Martir Reserve. As well, the core area of the Upper Gulf and Colorado Delta Biosphere Reserve "protects" the spawning aggregations of the big sciaenid (croaker) the totoaba (*Totoaba macdonaldi*); although not a reef fish, aggregations of several species in this family can be extremely vulnerable to seasonal fisheries and thus has this characteristic in common with some reef fish families. However, despite these various parks and reserves, Enric notes that the small sizes of the no-take areas involved are likely to be insufficient to adequately protect the spawning sites.

East Africa

Preliminary field work has been conducted using fishery interviews to determine whether there are spawning aggregations in Kenya, Tanzania and Mozambique. Results revealed awareness of reef fish spawning aggregations by some local fishers. Since fishers in southern Kenya provided some of the best information, a study was undertaken to verify the information provided on the existence of coral reef fish spawning aggregations. The specific objectives were to identify species that form spawning aggregations and the location of key spawning aggregations, as well as to identify the timing of aggregation. Collection of information on the spawning seasons of key aggregation species will be incorporated into the ongoing, long- term, fisheries catch monitoring system conducted by the

More Information

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

SCRFA work will soon commence once again in Fiji with additional fisher interviews, and underwater surveys designed to validate information collected in earlier surveys.

Coral Reef Degradation of the Indian Ocean (CORDIO) and Kenya Marine Fisheries Research Institute (KMFRI). IUCN (World Conservation Union) and other organizations have facilitated the study.

Recommendations from this project will ultimately be made to protect identified aggregations through an improved network and zoning system for MPAs or/and improved fisheries management. A report will be available in July, 2005, and further work will include verification of spawning by periodic collection and analysis of ovaries.

Initial fisher interviews showed that some fishers and dive operators knew about fish spawning aggregations but often did not fully understand the phenomenon. Spawning aggregations were reported for *Siganus sutor* and *S. argentimaculatus.* Aggregations of *Epinephelus fuscoguttatus* were rarely reported, but large numbers, i.e. between 15-20 on reef promontories of 50x50 m, were seen during the new moon, exhibiting behaviours that, elsewhere, are associated with the spawning season.

Fiji

SCRFA work will soon commence once again in Fiji with additional fisher interviews, and underwater surveys designed to validate information collected in earlier surveys. We are variously collaborating with the Foundation of the Peoples of the South Pacific International (FSPI), Fiji Fisheries Department (Research), Tagituba Initiative and WWF on aggregation-related work.

The SeaWeb communications programme to advance ocean conservation in the western Pacific conducted a workshop in Fiji earlier this year covering media issues and conservation outreach. The SCRFA DVD on spawning aggregations, 'Seeds of the future: Fijian spawning aggregations' was aired to top NGOs and media in Fiji and copies distributed for wider dissemination. SeaWeb is a communications-based nonprofit organization that uses social marketing to advance ocean conservation: http://www.seaweb.org/

Pohnpei

Mark Tupper (University of Guam Marine Laboratory) and Kevin Rhodes (Pacific Marine Science and Conservation) are working in Pohnpei to evaluate the effectiveness of an existing marine protected area (MPA) in conserving reproductively active squaretail coralgrouper, *Plectropomus areolatus*, over the 5-month spawning season. Using acoustic and conventional tag-recapture techniques, the study is measuring sex-specific residency times, and patterns and distance of movement, including within, to, and away from the fish spawning aggregation site. The study is also estimating the spawning population and the relative proportion and frequency of adult individuals participating monthly.

Forty squaretail coralgrouper were internally tagged at the aggregation site in January (20 males) and February (20 females) 2005 using Vemco® V-16 acoustic tags. Tag transmissions are recorded by seven moored Vemco® VR2 receivers placed centrally within the site (n=1), at MPA boundaries (n=2), at adjacent channel locations (up to 10 km from the MPA) (n=2), and at distant locations along the barrier reef (up to 7 km from the aggregation site) (n=2). Conventional spaghetti tags were implanted into 540 fish with an ultimate goal of 700 tags

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deployed within the reproductive period in 2005. Fishes were sexed and measured prior to release.

Preliminary findings suggest that squaretail coralgrouper in Pohnpei utilize specific predictable migratory pathways to arrive and depart aggregation sites. Within the reproductive season, post-spawn individuals migrate over relatively short distances (e.g. < 10 km) and use common areas between spawning months for feeding and other non-reproductive activity. During the first 'reproductive' month of 2005, the aggregations appeared to contain mainly males. These fish remained at the site over an entire lunar cycle until females first arrived in Month 2 of the reproductive season. In all subsequent months, individuals dispersed from the site following spawning. During the spawning season, tagged individuals, primarily males, are returning each month to aggregation sites over periods ranging from 1-3 months (according to available information to date) and in varying proportions relative to the total number tagged. It is hoped that the findings will help to improve management of this species in Pohnpei.

Seychelles

Much progress has been made in the Seychelles recently with documenting several spawning sites for serranids. Hopefully this information will feed into the progression of management arrangements directed to protect these spawning aggregations. Jan Robinson from the Seychelles Fishing Authority is compiling these data and can be contacted on email for more information (jrobinson@sfa.sc).

Martin Russell recently led an Australian team to assess the impact of the recent tsunami on coral reefs and associated fisheries in the Seychelles. The information is currently being assessed and will be made available in an AusAID report to the Government of the Seychelles by Mid 2005. The impact on fish spawning aggregations is likely to be minimal.

Solomon Islands/Papua New Guinea

A project on destructive fishing has been conducted in the Solomon Islands and Papua New Guinea since 2003 that includes an aspect related to spawning aggregations. The project has three broad objectives: (1) to develop and facilitate the application of cost-effective management controls on the exploitation of reef fish resources; (2) to strengthen the capacity to assess, monitor and manage aggregating reef fish resources; and (3) to raise the awareness and appreciation of the vulnerability of aggregating reef fish populations and associated ecosystems. This project is run by The Nature Conservancy and aims to conserve spawning aggregation sites used by commercially important groupers, specifically the squaretail coralgrouper (*Plectropomus areolatus*), brown-marbled grouper (*Epinephelus fuscoguttatus*), and the camouflage grouper (*Epinephelus polyphekadion*).

Richard Hamilton has been collecting information from a range of target sites and communities since 2004 and reports that the intention is not to protect all spawning aggregations, but to develop the necessary tools and approaches required to protect aggregations through working at selected sites. Results and lessons learned will be shared with other agencies and organizations working in similar situations. Using a fisher survey protocol adapted from his earlier work with SCRFA in the same countries, interviews were conducted to determine the

locations and times of spawning, the impacts of different fishing activities and other information relevant to management. Community-based management measures currently in effect include a ban on destructive fishing practices such as spearfishing at aggregation sites, harvesting restrictions and temporary spawning site closures.

Results indicate that, while subsistence fishing has long been practiced on aggregations in many areas, artesanal fishing and live reef fishing operations have markedly increased fishing pressure on known grouper aggregation sites in recent decades. Night-time spearfishing is a particular concern. As one example, a two-year seasonal live fish operation in Roviana Lagoon targeting an aggregation site pushed the aggregation to the point of localized extinction. Historically, this aggregation had evidently (according to interviews) supported large numbers of *P. areolatus* and *E. fuscoguttatus* and had been exploited for subsistence purposes for generations. During aggregation seasons in 1996 and 1997, approximately 3-4,000 kg of live groupers were removed from this site and fishers subsequently noticed a major decline in catch rates. In 2001, when live fish operators returned, local fishers informed them that it was no longer worth targeting the site as the aggregations had not reformed since 1997. In Kavieng, live fishing operations are reported to have seriously affected many aggregation sites. One site where *P. areolatus* aggregates was evidently completely fished out in 2000 by a combination of live fishing and night-time spearfishing.

PUBLICATIONS

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Note also that the next issue (No. 14) of the Live Reef Fish Bulletin, produced by the Secretariat of the Pacific Community, will have spawning aggregation articles of interest in relation to the live reef food-fish trade (http://www.spc.org.nc/coastfish/News/LRF/lrf.htm).

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