

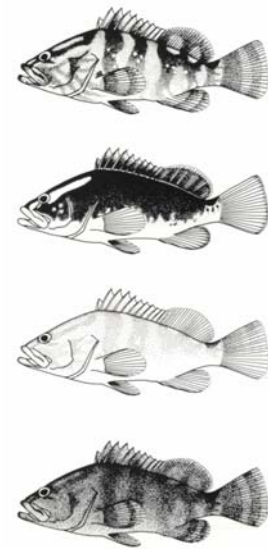
# Information Circular No 2: The Belize Spawning Aggregation Working Group

Princess Margaret Drive, Belize City  
Tel: 501-223-2623

Belize, Central America  
email: species@btl.net

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Shown at right: Four color-phase changes of the Nassau Grouper,  
*Epinephelus striatus*.



This month marks the third year of activities by the Belize Spawning Aggregation (SPAG) Working Group. The primary goal of the Working Group is to monitor the status of the few remaining Nassau grouper spawning sites (Dec.-Mar.) in Belize. However, many of these sites attract multiple species, so monitoring has been expanded to monthly censuses at three sites for the period of one year. This initiative is supported financially by the Mesoamerican Barrier Reef System project. The target sites are Lighthouse Reef, Bacalar Chico and Sapodilla Cayes. In addition, the Friends of Nature, in collaboration with The Nature Conservancy, has collected the most comprehensive data on spawning aggregations yet, with 20 consecutive months of data at Gladden Spit Marine Reserve where over 15 different species of fish are known to aggregate for spawning. Some preliminary trends/results of the Nassau grouper monitoring are included below, and the discussion will continue in subsequent newsletters as additional data are collected.

### Update for 2004 Grouper Spawning Season

Because of financial & logistical constraints the Working Group chose seven of the 11 permanently protected spawning sites to monitor in 2004: Rocky Pt., Dog Flea Caye, Sand Bore (Lighthouse Reef), Caye Glory, Northeast Pt. (Glover's Reef), Gladden Spit and Nicholas Caye. The results for these sites are recorded in the following table, along with the results of the previous season.

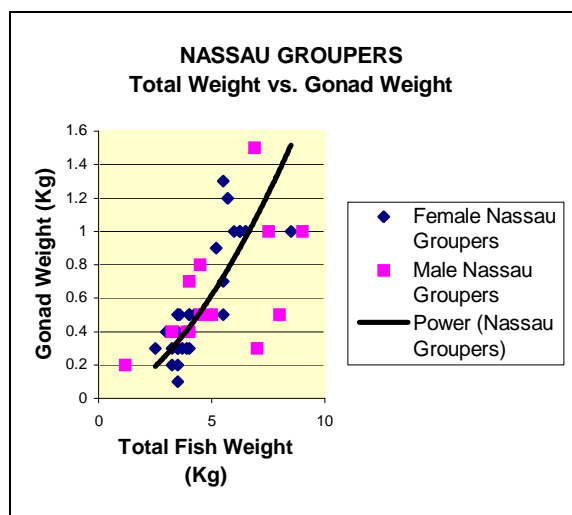
#### Maximum Nassau Grouper Counts for 2004

Site	# fish 2004	# fish 2003
Rocky Point	200	0
Dog Flea Caye, Turneffe	100 *	1,500
Sandbore, Lighthouse	2,500	1,800
Caye Glory	1,000	1,000
NE Pt., Glover's	1,700	2,400
Gladden Spit	450	250
Nicholas Caye	~50	52

(\* Different dive team used and precise location in question)

When reviewing the numbers above, keep in mind original spawning aggregations are believed to have numbered an order of magnitude higher with tens of thousands of fish. It is also understood that visual counts by divers are only estimates, and there is currently no way to calibrate counts between different divers. Furthermore, counts can be affected by conditions at the site. For example many monitoring teams reported poor conditions with very rough seas during this spawning season. Therefore differences of even hundreds of fish are not statistically significant and it will take years of data (at least 5-10) before any population trends can be identified.

Two SPAG sites remain open to fishing, and three licenses were issued to fishers at Maugre Caye, Turneffe Islands. Only two fishermen, however, fished at this site. Catch data for Maugre Caye were reported, as required by these licenses. Analysis of the data shows that of the total catch of 58 Nassau groupers, 88% were in the size range of 50 – 69 cm total length; only six fish were 70-79 cm long. Average size is an important parameter to measure because the smaller the fish, the less the reproductive potential, as demonstrated clearly in the graph below that shows the relationship between total weight and gonad weight – larger groupers produce more eggs and spawn, proving that bigger fish means more eggs.



The catch per unit effort (CPUE) was 7.2 fish/day, representing the rate of catch of two fishers in one boat over four days. This compares favorably with the CPUE reported by Dr. Enric Sala for Northeast Pt. at Glover's, which was 0.8 – 1.1 fish/day 1999 and 3.1 fish/day in 2001. The ratio of females to males was 2.1:1, demonstrating that the population is skewed. Overfishing often results in loss of larger males, resulting in a high ratio of females to males in the population, causing sperm limitation that can lead to possible spawning failure and eventual decline in abundance. Therefore the sex ratio is another important parameter to monitor.

Protecting SPAG sites is only the first step to ensure grouper population recovery. While many Caribbean nations have followed suit, including the Cayman Islands who have now closed eight spawning sites for eight consecutive years, further measures need to be taken. For example size limits on fish could be recommended, and most importantly nursery habitats need to be identified and protected. Spawning is only a brief part of the fish's life cycle. Nursery and juvenile habitats, particularly mangroves and shallow sea grass beds, are being lost to development. This loss of critical habitats threatens many populations of commercially important fish.

If you would like more information about the Nassau Grouper, the Belize Spawning Aggregation Committee, or anything mentioned in this newsletter, please contact Roberto Pott, Chairperson, Spawning Aggregation Working Group, at the Belize Audubon Society, 12 Fort Street, P.O. Box 1001, Belize City, Belize, Central America. Tel: (501) 223-5004/4987/4988, Fax: (501) 223-4985, E-mail: [research@bas.bz](mailto:research@bas.bz).

