

This is a review and discussion of the 2012 stock assessment for snook (*Centropomus undecimalis*) conducted by the Fish and Wildlife Research Institute (FWRI). The Florida Fish and Wildlife Conservation Commission (Commission) is the primary managing agency for snook in Florida. The assessment includes data from 1986 through 2010. The previous snook assessment was completed in 2006. Snook is strictly a recreational fishery in Florida and is targeted for food and sport.

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Distribution and Biology

- Common in the Gulf of Mexico and along the Atlantic coast
- Common in nearshore and estuarine waters
- Genetic studies show separate stocks occur in Florida
- Live up to 21 years, grow to a maximum of 48 inches, and weigh a maximum of 38 pounds
- Eat shrimp and fish
- Spawn April through October



Snook are common in nearshore and estuarine waters along the Atlantic coast and in the Gulf of Mexico. Genetic studies have shown two distinct stocks of snook occur in Florida. They can live up to 21 years, grow to about 48 inches, and weigh up to 38 pounds. Snook eat mostly shrimp and fish. They spawn in Florida from April or May through September or October, depending on the climate. Snook are protandric hermaphrodites meaning the males reverse roles and turn into females between the ages of 1 and 7.

Current Snook Management

- **Management Goal:** 40% SPR
- **Spawning Potential Ratio:** SPR compares the spawning ability of a stock in the fished condition to the stocks spawning ability in the unfished condition
- Atlantic and Gulf stocks managed and assessed separately



Snook has been managed with a goal of 40% spawning potential ratio (SPR) since 1994. SPR compares the spawning ability of a stock in the fished condition to the stock's spawning ability in the unfished condition. More specifically, SPR is the number of eggs that could be produced by a fish incorporating fishing mortality over its lifetime divided by the number of eggs it could produce if there were no fishery. The stock assessment examines the Atlantic and Gulf stocks separately, and the Commission manages both stocks separately as well.

Current Snook Regulations

Gulf

- Slot Limit: 28 - 33 inches
- Executive Order: catch-and-release only through Aug. 31, 2012
- Closed Season: Dec. 1 - end of Feb., May 1 - Aug. 31

Atlantic

- Slot Limit: 28 - 32 inches
- Closed Season: Dec. 15 - Jan. 31, June 1 - Aug. 31

Statewide

- Allowable Gear: hook and line
- Bag Limit: 1 per harvester per day
- Snook Stamp
- No commercial harvest



Snook are managed in Rule 68B-21, Florida Administrative Code (F.A.C.) and are regulated as two separate stocks, the Atlantic stock and the Gulf of Mexico stock.

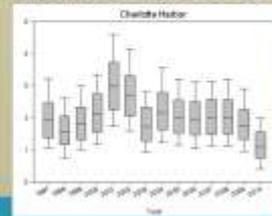
The harvest of snook from the Gulf of Mexico is currently closed, by Executive Order, due to a severe cold kill in 2010 until August 31, 2012. When the fishery is open snook must be between 28 to 33 inches to harvest. During a regular year the harvest of snook in the Gulf is prohibited from December 1 through the end of February and again from May 1 through August 31.

The impacts of the cold kill were less severe on the Atlantic coast, and the fishing season has returned to the previously established season schedule. The regular Atlantic closed season is from December 15 through January 31 and June 1 through August 31. The recreational slot limit in the Atlantic Ocean is 28 to 32 inches.

The only allowable gear for the recreational harvest of snook statewide is hook and line. There is a bag limit of one snook per harvester per day and to harvest snook in Florida a snook stamp is required in addition to a recreational saltwater fishing license. Also, snook are only allowed to be recreationally harvested because there is a prohibition on the commercial harvest and sale of snook in Florida.

Cold Kill of 2010

- Juveniles: Low catch rates in 2010 suggested a drop in abundance
- Adults:
 - **Atlantic:** 2010 catch rates were similar to catch rates in previous years
 - **Gulf:** 2010 catch rates showed a drop in snook abundance during the first half of 2010
- Snook on the Gulf coast were more severely impacted by the cold kill than Atlantic coast snook



The unseasonably cold temperatures experienced in January 2010 resulted in widespread fish kills throughout the State of Florida. Concerns over the high numbers of snook reported dead prompted the FWC to issue an Executive Order that temporarily closed harvest seasons for snook statewide.

The effect of the 2010 cold kill event on juvenile snook in south Florida was assessed by reviewing annual indices of abundance generated from fishery independent surveys in Tampa Bay, Charlotte Harbor (see graph above), and the northern and southern portions of the Indian River Lagoon during the last 13 years. In general, haul seine surveys caught fewer juvenile snook than in previous years in each of the four estuaries evaluated (although lower abundance levels in 2010 were only statistically significant for the northern Indian River Lagoon and Tampa Bay).

Recreational fisheries data suggested adult snook in different parts of Florida were impacted differently by the cold kill. On the Atlantic coast, 2010 Marine Recreational Fishing Statistical Survey (MRFSS) catch rates were level with catch rates for the same time period over the past few years suggesting a smaller impact from the cold kill on adult, exploitable-sized snook. MRFSS catch rates from the Gulf coast were more variable but in general showed a proportionally larger drop in snook abundance during the first half of 2010, suggesting snook on the Gulf coast were more severely impacted by the cold kill than Atlantic coast snook.

Recent Snook Management



2006: Previous stock assessment

2007: Modified slot limits, bag limits and closed season

2009: Extended state rules into federal waters

2010: Snook cold-kill closure

2011: Snook re-opened on Atlantic coast

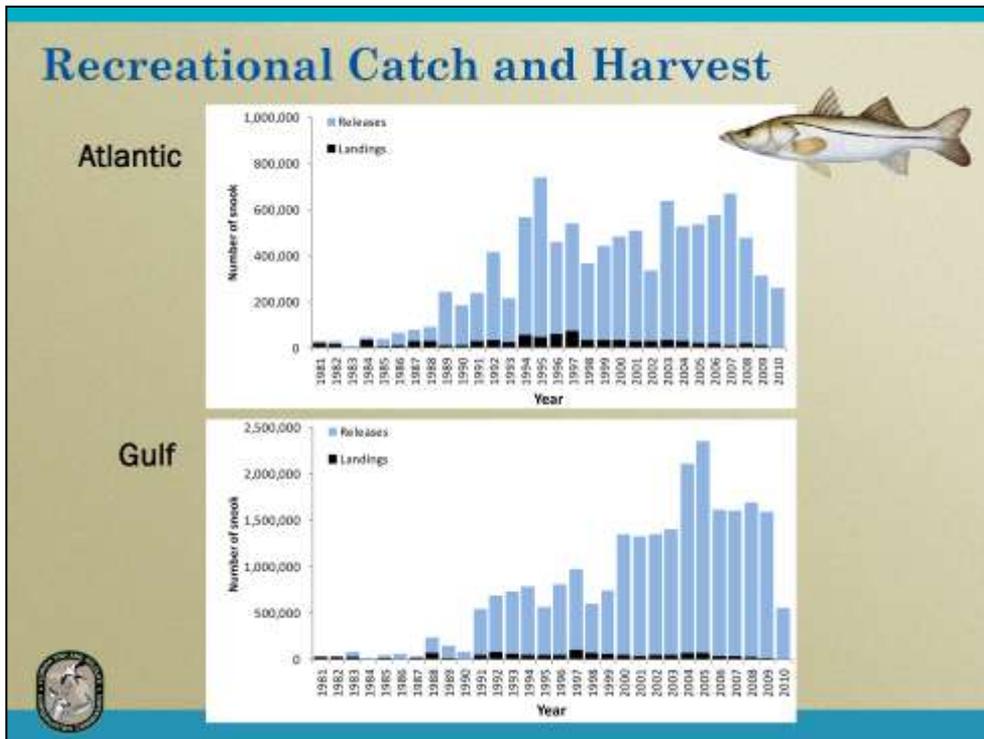
Today: Summary of the 2012 stock assessment



The Commission's last stock assessment for snook was conducted in 2006. Due to the results of the stock assessment and input from stakeholders new slot limits were created and the bag limit and closed seasons were modified in 2007. In 2009, state regulations were extended into federal waters to further protect Florida's snook population.

On January 16, 2010, a harvest closure was implemented by Executive Order due to the severe cold kill. Later in 2010, the Commission determined that the Atlantic stock had recovered enough to support a fall harvest and the fishery was reopened on September 16. The Atlantic fishery was reclosed on December 15 through August 31, 2011 to further protect the fish during the winter and spawning months. Since September 1, 2011 the Atlantic fishery has followed the established season schedule. However, it was determined the Gulf stock was more affected by the cold kill and has remained closed under Executive Order.

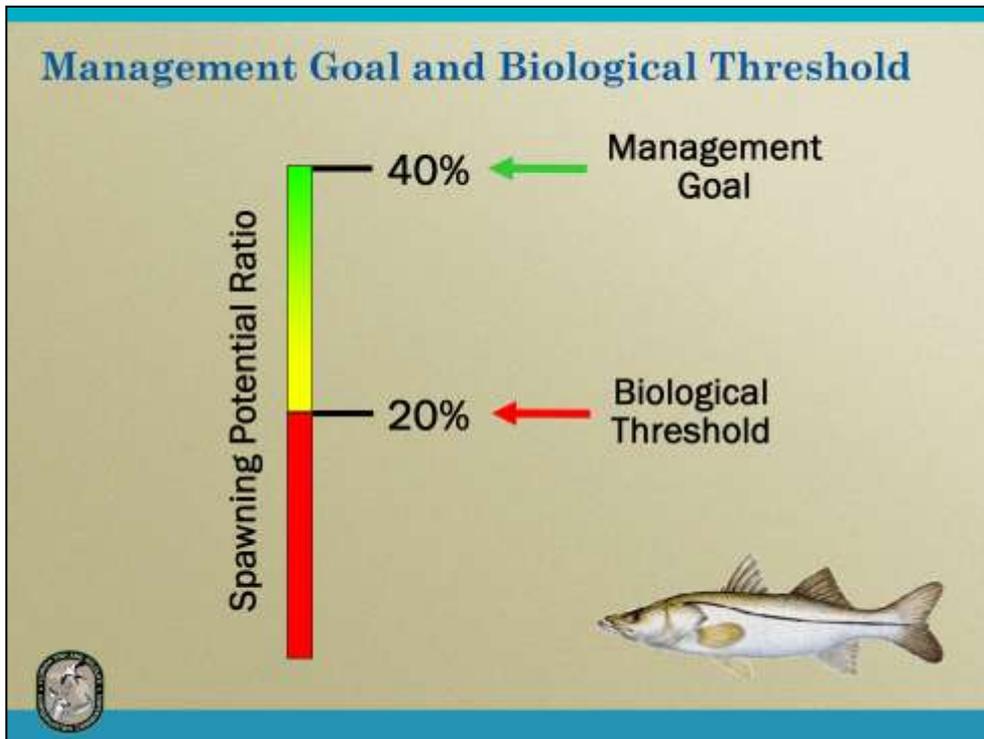
The following slides present a summary of the 2012 stock assessment results.



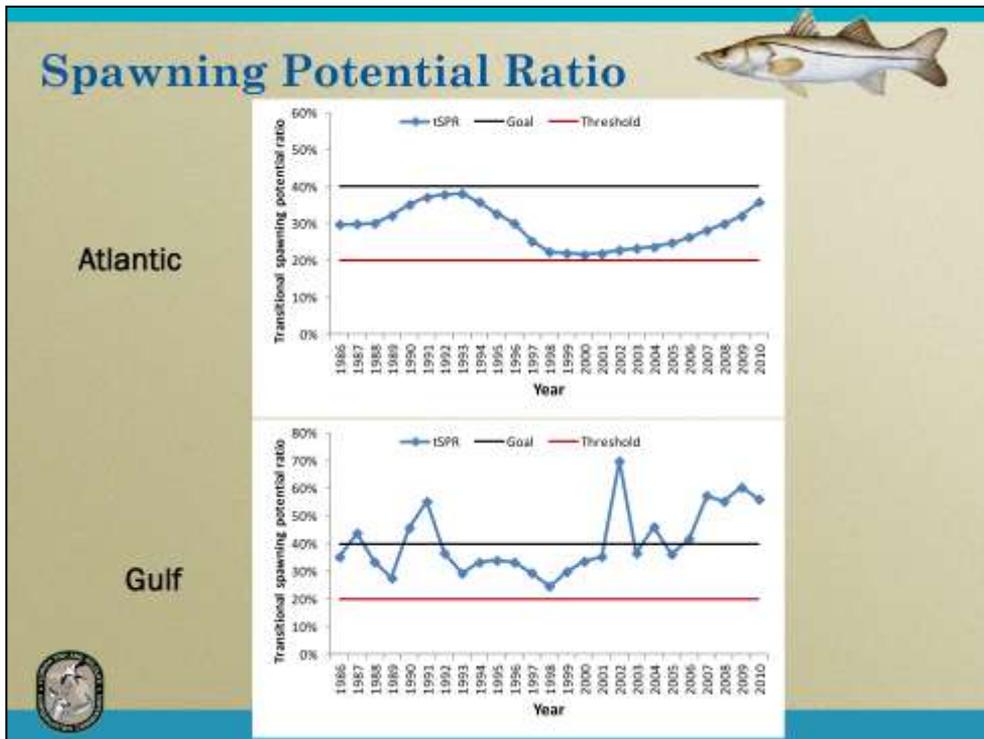
These graphs show the recreational catch from 1981-2010, divided into fish that were caught and released (blue) and those that were landed or harvested (black).

Angler interviews indicate recreational anglers in Florida release more than 90% of the snook they catch, and since 2005 release more than 95%. In 2010, the total catch, including the number of fish released, was 260,000 fish on the Atlantic coast and 556,000 fish on the Gulf coast. On the Atlantic coast, the total catch of snook peaked at 739,000 fish in 1995, on the Gulf coast, catch peaked at 2,348,000 fish in 2005.

In 2010, there are no landings shown on the graph because harvest was closed in early January on both coasts.



This diagram shows the difference between the biological threshold and the Commission management goal for snook. Recent analyses by FWRI indicate that the biological threshold for maintaining sustainable populations of snook is around 20% SPR. The threshold is a biological benchmark level that would indicate a decline in the stock over time and would require management action to correct the situation to prevent harm to the species' reproductive capacity. An SPR below 20% indicates to managers that the stock is in decline and requires management action.

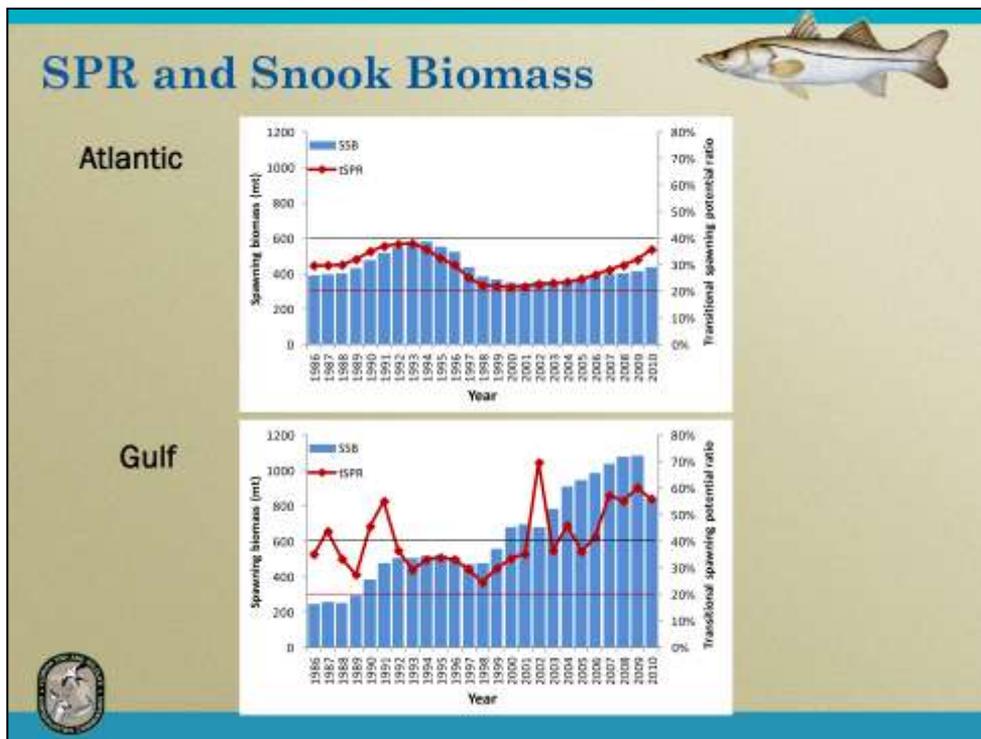


This slide shows the stock assessment (2012) generated SPR values for snook on the Atlantic and Gulf coasts.

According to the stock assessment, the SPR values are increasing on the Atlantic Coast and are approaching the Commission’s management goal of 40% SPR. The latest SPR value in the assessment (2010) was 36% compared to an SPR value of 25% in 2006. SPR values indicate that if fishing mortality rates continue at 2010 levels, snook should achieve the Commission’s goals on the Atlantic coast.

The SPR values from the stock assessment for the Gulf stock are well above the management goal of 40% SPR. However, there are limitations to using SPR as the only metric for stock status. SPR was devised to evaluate the effect of fishing mortality on a stock. Natural mortality events, such as red tides or cold kills are not directly revealed in SPR model results. Stocks, like the Gulf snook stock, that are more vulnerable to episodic environmental effects (such as red tides and cold kills) should be assessed using additional information when possible.

Due to the Gulf stock’s vulnerability to these environmental impacts a model that incorporated red tides and cold-kill events was used for the Gulf. However, even with this model the estimated 2010 SPR value for the Gulf stock was 53%. Since this value is still probably too high (but well above the biological threshold of 20% SPR), it is advisable to look at other metrics, such as Spawning Stock Biomass (SSB) to get a better idea of the status of the Gulf stock after the cold kill of 2010.



To get another perspective on the status of the stocks, this slide shows the stock assessment generated SPR values for snook on the Atlantic and Gulf coasts compared with spawning stock biomass. SSB is the total weight of reproductive individuals in a population.

For the Atlantic stock, SSB is following the SPR trend and both the SPR and the SSB are increasing over the last three years. This tells us that SPR is a reasonable metric to use for the Atlantic stock, where red tides and cold kills are less severe, and that the stock is increasing in size.

In comparison, the Gulf SSB dropped significantly in 2010 and the SPR only dropped slightly. This illustrates how SPR is not able to properly represent the magnitude of the drop from the cold kill. About 20% of SSB was lost due to the cold kill in 2010. This dropped the Gulf stock back to its abundance level in 2003/2004.

Assessment Summary



Atlantic

- SPR at 36%
- Approaching management goal at the current rate of effort and mortality

Gulf

- Reduced by cold kill of 2010
- SPR values not reflective of stock status
- Adult biomass dropped nearly 20% (back to 2003 levels)
- Juveniles most affected by cold kill
 - Effects not realized for 5 years in adult spawning stock
- However, stock well above biological threshold



In summary, the Atlantic stock is at 36% SPR and approaching the management goal. The stock should reach the goal soon if the current levels of mortality and effort continue.

The Gulf stock was reduced by the cold kill of 2010, however, the SPR values do not reflect this reduction. According to the SSB, adult stock biomass dropped nearly 20% (back to 2003/2004 levels). Further, we know from estuarine sampling that juvenile snook were most affected by the cold kill, meaning the total effects of the cold kill on the spawning stock will not be realized for at least five more years. However, the stock is likely well above the biological threshold and the low fishing mortality rates provided by the current management regime should allow the stock to rebuild in a few years.

Staff Recommendation



Atlantic

- Maintain existing regulations for the Atlantic Coast

Gulf

- Maintain existing regulations for the Gulf Coast and allow Executive Order to expire
 - Stock above biological threshold, will continue to grow
 - 2007 regulatory changes helped buffer stock from cold kill
 - Harvest has been prohibited for 2.5 years
 - Current slot limit will protect juveniles most affected by cold kill
 - Would open on Sept. 1 and return to regular season
- Next FWC assessment due in 2015 if no management changes are made
- Consider other metrics in addition to SPR to assess population



Based on the results of the 2012 snook stock assessment, staff recommends maintaining the existing regulations for snook on the Atlantic Coast.

Staff also recommends maintaining the existing regulations and allowing the Executive Order to expire for the Gulf Coast for the following reasons: the stock is likely well above the biological threshold, the management changes that were implemented in 2007 should promote stock rebuilding and help buffer the stock from future mortality events, and the current slot limit will protect juveniles as well as the largest individuals in the population. Harvest has been prohibited for over two and a half years and extending the closure for one or two more years may not result in any great increase in stock size, because the juveniles that were most affected by the cold kill are already protected by the slot limit as well as the largest, most reproductively important individuals in the population.

If no management action is taken, the Executive Order will expire on August 31 and the Gulf stock will re-open on September 1, 2012 and return to the regular season structure.

The next FWC assessment is scheduled to be completed in 2015 if no management changes are made. Between now and the next assessment staff will consider what metric or suite of metrics would more accurately reflect stock status and allow consideration of natural mortality events.