# FLORIDA BAY SCALLOP 2015 ANNUAL REPORT

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

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**PROGRAM OVERVIEW**

This report summarizes bay scallop (*Argopecten irradians*) research conducted by the Molluscan Fisheries program at the Florida Fish and Wildlife Conservation Commission's (FWC) Fish and Wildlife Research Institute (FWRI) during the calendar year 2015. Methods and results are reported for abundance and recruitment monitoring conducted along the west coast of Florida from St. Andrew Bay to Pine Island Sound.

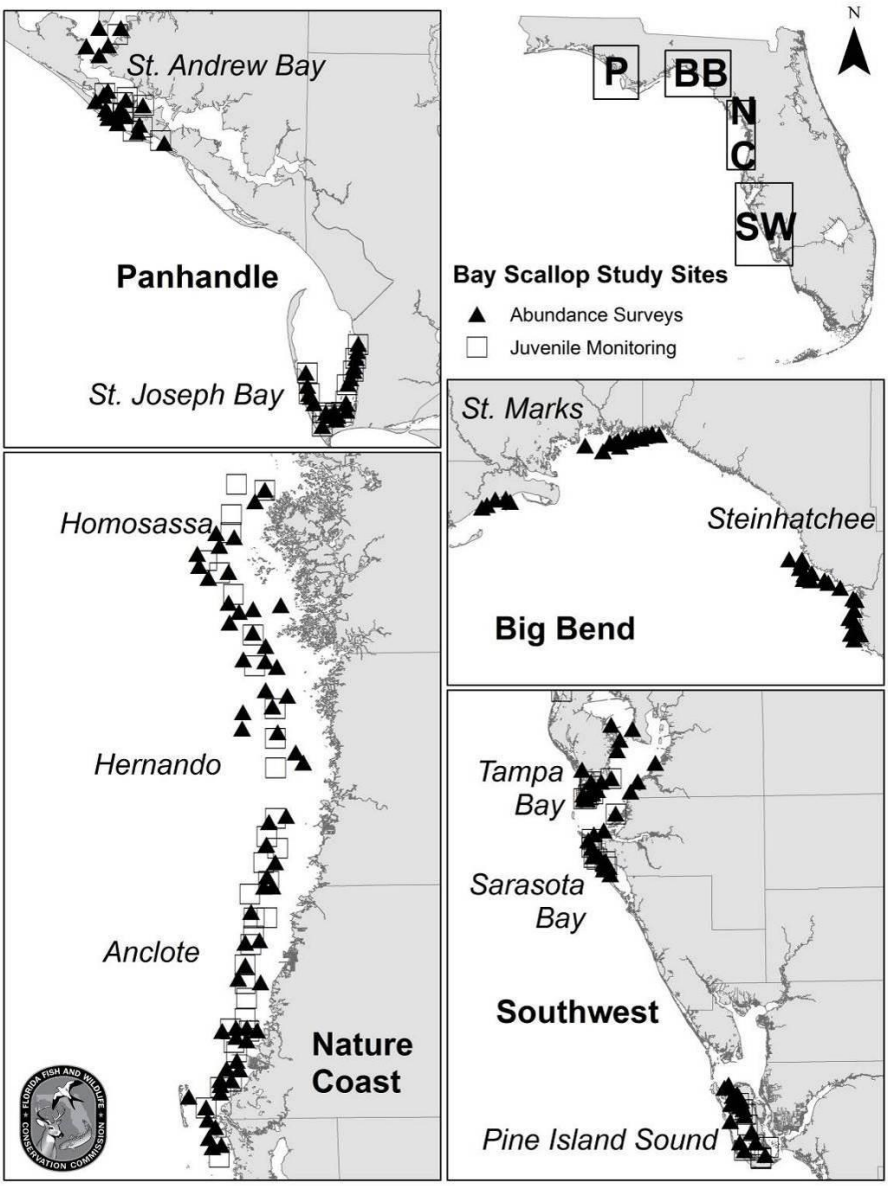


**Figure 1**. Geographic regions of bay scallop study sites with abundance and juvenile monitoring station locations.

**INTRODUCTION**

Historically, bay scallops occurred in Florida from West Palm Beach on the Atlantic coast to Pensacola in the state's northwest corner. However, in recent decades their range has decreased considerably and they have all but disappeared in some areas. Today, Florida's bay scallops occur in isolated populations scattered along the Gulf Coast from Pine Island Sound in Lee County to St. Andrew Bay in Bay County. The majority of scallops are found in vast seagrass beds located within the Nature Coast and Big Bend regions.

Scallops are generally located in near-shore coastal and estuarine waters with higher salinities (saltiness). They are usually found in shallow water (less than 10 ft) and within or near seagrass beds. They prefer *Thalassia testudinum* (turtle grass) but have also been observed in *Syringodium filiforme* (manatee grass), *Halodule wrightii* (shoal grass), macroalgae and hard bottoms.

Most Florida bay scallops only live for one year and rapid changes, usually a sharp decrease, in water temperature trigger the adults to spawn. The majority of spawning occurs in the fall and a single scallop is capable of producing millions of eggs at once, but only a small fraction of those survive. Fertilization occurs outside the scallops' bodies and it takes approximately 36 hours for fertilized eggs to become tiny larvae, known as veligers. Larval scallops are pelagic, meaning they drift in the water column. The larval period lasts for 10 to 14 days and during that time they may be carried a considerable distance from where they were spawned. While drifting, the larvae develop a shell and metamorphose into juvenile scallops, commonly called spat. The spat settle out of the water column and attach to seagrass blades using thin, silky fibers called byssal threads. Approximately 90 percent of spat will die within six weeks of settlement. Those that survive eventually detach from the seagrass and fall to the bottom where they remain for the rest of their lives.

Each year, each local population must produce enough offspring to replenish itself or receive offspring from neighboring populations to remain stable. Scallops are extremely sensitive to changing environmental conditions such as seagrass losses, increases in fresh water, suspension of sediments, pollution and harmful algal blooms, some of which can be fatal. Because of this sensitivity and the fact that they only live one year, local populations are more susceptible to periodic collapses and natural recovery of a collapsed population can take years. When two or more neighboring populations collapse the chance of a natural recovery decreases and a regional collapse can occur. Over time, reductions in Florida's historic bay scallop population have resulted in the smaller, more localized populations that FWRI biologists monitor today.

## METHODS

### Abundance Surveys

A total of 170 stations were surveyed gulf-wide in 2015 via underwater surveys, 82 in areas open to recreational harvest and 88 in closed areas. At each station, a 300-m (984-ft) weighted transect line was deployed off the side of a FWC research vessel and two divers, one on each side, searched a combined 2-m width (6 ½ ft) along the length of the line counting all scallops within that set area. The station totals were combined for each study site and an average number of scallops per station was calculated. Those averages were then classified as either Collapsed (< 6 scallops per station), Vulnerable (6 – 60 scallops per station) or Stable (>60 scallops per station). Those classifications were determined based on previous studies. Scallop populations that are classified as Stable are capable of producing detectable recruits during the winter settlement period. Vulnerable populations are highly sensitive to localized conditions (habitat loss, water quality, predation, etc.) and recruitment is more variable. Collapsed populations are generally not capable of producing detectable recruits and rely on neighboring populations or targeted enhancement efforts to recover.

### Juvenile Monitoring

Monitoring was conducted year-round using collectors designed to mimic seagrass blades. Collectors were comprised of a section of plastic mesh stuffed inside a half bushel citrus bag with a small round float attached at one end. The collector was then attached to a length of rope that was anchored to a cement block and supported at the water's surface with a buoy. A single collector was deployed at each station and allowed to soak for eight weeks prior to retrieval. An additional collector was deployed at the same station, four weeks later, and similarly allowed to soak for eight weeks. This overlapping deployment schedule ensured that any settlement that occurred just prior to recovery of one series of collectors would be detected on the overlapping collector. Upon recovery, collectors were returned to the laboratory for visual examination and enumeration of all scallops. In order to standardize the data, the number of scallops found on a collector was divided by the number of days that the collector was deployed. For reporting purposes those standardized data were averaged per deployment period and graphically reported by retrieval date. A successful summer crop within a site relies on a high rate of scallop recruitment during the winter months.

**RESULTS**

**Abundance Surveys**

*Open Harvest Area*

The 2015 bay scallop open harvest area included waters in the following counties: Gulf (Panhandle region), Franklin-Wakulla and Taylor-Dixie (Big Bend region) and Citrus-Hernando (Nature Coast region). Results for 2015 and the previous five years are plotted in Figure 2. The number of scallops counted increased in three of the four areas and declined slightly in Gulf County. The largest increase was seen in Franklin-Wakulla which rebounded from near zero to well into the stable classification (>60 scallops per station). In 2012 and 2013 the Big Bend region was hit by tropical disturbances that greatly increased rain totals and runoff. Salinities and clarity declined, resulting in smothered seagrasses and a collapse of the 2014 scallop population. The 2015 scallop recovery in Franklin-Wakulla and Taylor-Dixie was most likely due to the absence of those heavy rains in 2014. There were no tropical events in the Gulf in 2015 but there was a strong El Niño observed which has similar effects (increased rain and runoff, decreased water quality) and may impact the 2016 scallop crop.

Although the Gulf County area wasn't impacted by those same heavy rains, averages have been at lower at this site in 2012-2015. For each of those years the average number of scallops observed was 25 percent of the abundance level defined as a stable population (≥60 scallops per station). On top of those declines an intense and prolonged red tide was observed in coastal waters from Gulf County west to Escambia County in late 2015. High cell counts that are fatal to bay scallops were recorded from September through December and coincided with the scallop spawning and larval settlement periods. Figure 3 illustrates the recruitment rates observed during each peak settlement period (November through January) since 2010 observed on Gulf County collectors. There were no recruits observed this winter (2015-2016). Scientists consider this to be a total recruit failure and few, if any, scallops are anticipated to be present in St. Joseph Bay this summer. Red tide was not observed in the other areas open to harvest in 2015.

*Closed Harvest Areas*

The 2015 bay scallop closed harvest area included waters in the following counties: Bay (Panhandle region), Pasco-Pinellas (Nature Coast region) and Pinellas-Manatee and Lee (Southwest region). Results for 2015 and the previous five years are plotted in Figure 4. Increases in abundance were observed at three of the four sites in 2015, but averages at all sites remained below the stable classification level (≥60 scallops per station). Both the St. Andrew Bay (Bay County) and Tampa Bay area (Pinellas, Hillsborough, Manatee Counties) increased from zero or near zero to approximately 40 scallops per station. Scallop populations in the closed areas continue to fluctuate wildly from year to year, a sign of their instability. This may be due in part to the dynamics

of enclosed bay systems. Open coastal coastlines can flush harmful algal blooms and dilute freshwater intrusions much faster but closed systems tend to hold onto red tide and reduced quality waters longer.

There were two simultaneous red tides that impacted closed areas in both the Panhandle and Southwest regions in late 2015. High cell counts that are fatal to bay scallops were recorded from September through December in the Panhandle and from October to February 2016 in the Southwest. Those blooms coincided with the scallop spawning and larval settlement periods. As a result recruitment in those study sites plummeted and very few scallops are anticipated to be present in closed harvest areas of the Panhandle this summer.

**CONCLUSIONS**

The overall number of scallops observed per station increased from summer of 2014 to 2015 and scallops were observed at 146 of the 170 stations surveyed. A wide distribution can help in years when local areas get hit with an extinction level event if that event is localized, but widely distributed scallops at low numbers will have reduced fertilization, and produce fewer larvae. Out of the 146 stations that had scallops present, only 26 had 60 or more scallops, what FWRI biologists refer to as a patch capable of increased fertilization success. Subsequent year classes have shown to be higher when a large number of those scallop patches are observed, probably because there are more scallops closer to each other during the spawning season and so fertilization occurs more frequently.

Due to the 2-week pelagic stage of scallop larvae, recruits may be transported from neighboring populations and help increase populations that may be low. Unfortunately for the 2016 scallop crops, both the Panhandle and Southwest regions were impacted by widespread, prolonged and intense red tides in late 2015 and it is doubtful that there were any larvae available for transport within or between sites during the winter 2015 and spring 2016 for those two regions.

While those harmful algal blooms didn't seem to effect the Big Bend or Nature Coast regions, these regions were affected by the strong El Niño rains which may reduce abundances at those sites in 2016. Similar conditions resulted in poor summer crops in 1998 and 2004. This year, recruits were observed on collectors deployed in the Big Bend and Nature Coast regions during the peak settlement period, and collapses of scallop populations at those regions in summer 2016 are not anticipated. However, since the Gulf County scallop population is anticipated to be low, harvest pressure on those Big Bend and Nature Coast counties may increase. Harvest periods, harvest locations and fishing regulations are subject to change. Current rules and regulations can be reviewed at http://www.myfwc.com/fishing/saltwater/regulations/bay-scallops/.

**RESTORATION AND ENHANCEMENT EFFORTS**

As part of the Natural Resource Damage Assessment (NRDA) phase III response from the Deepwater Horizon oil spill that occurred in 2010, FWRI was awarded a grant to stabilize local scallop populations in the Panhandle region over a 10-year period. FWRI biologists established potential sites and initiated recruitment monitoring in late 2015. Restoration efforts conducted in 2016 will focus on St. Joseph and St. Andrew Bays and will consist of collecting wild juveniles and adults, if available, and placing them in underwater cages, where they will be protected from predators and in close proximity to each during spawning. If wild scallops are not available then FWRI biologists will work with a scallop hatchery to produce scallops and follow the same underwater caging method. These scallops are not intended for harvest, but to supplement natural spawning populations.

While enhancing those scallop populations, the biologists will also establish monitoring protocols to estimate harvest effort during the recreational season including aerial surveys, angler intercept surveys and on the water visual surveys. Informal surveys have been conducted via online surveys since 2011 to determine where, when and how many people were harvesting bay scallops during the recreational season. Results from those surveys are listed in Table 1. The majority of responses were from Citrus County and results suggested that the average harvest rate was slightly less than the maximum allowable harvest of one pint per person per day.

FWRI biologists will continue to consult with and advise staff from external agencies like Sarasota Bay Watch, Mote Marine Laboratory and Charlotte County Sea Grant during local restoration efforts in the Southwest region. Those agencies raise or are awarded funds to purchase ready-to-set scallop larvae from Bay Shellfish Company, Inc. and free-release them into local waters. If available, a portion of the larval batch is raised at the hatchery and those juvenile scallops are either planted in volunteer cages or released directly into seagrass beds.

**ACKNOWLEDGEMENTS**

Members of the Molluscan Fisheries research group at the Fish and Wildlife Research Institute who participated in portions of this project during 2015 include: Stephen Geiger, Melanie Parker, Sarah Stephenson, Richard Radigan, Christopher Kirby, Benjamin Gutzler, Matthew Davis, Britt Burke and Amanda Kelley. Eric Milbrant and Mark Thompson with Sanibel-Captiva Conservation Foundation assisted with juvenile monitoring in Pine Island Sound. Numerous Sarasota Bay Watch staff and volunteers as well as Mote Marine Laboratory scientists and volunteers conducted restoration efforts in Sarasota Bay. Elizabeth Staugler with University of Florida – IFAS and a network of volunteers conducted juvenile monitoring and restoration efforts in Charlotte County.

**Table 1**. The total number of surveys submitted, average number of people harvesting, total volume of whole scallops (gallons) harvested and the total volume of scallop meats (pints) harvested each year via online web survey.

| Year | Total # Responses | Average # of Harvesters | Total # Gallons Harvested | Total # Pints Harvested |
|---|---|---|---|---|
| 2011 | 240 | 3.8 | 1323 | 181 |
| 2012 | 219 | 3.9 | 949 | 225 |
| 2013 | 440 | 4.1 | 2537 | 283 |
| 2014 | 344 | 4.2 | 1619 | 291 |
| 2015 | 262 | 4.2 | 1145 | 253 |

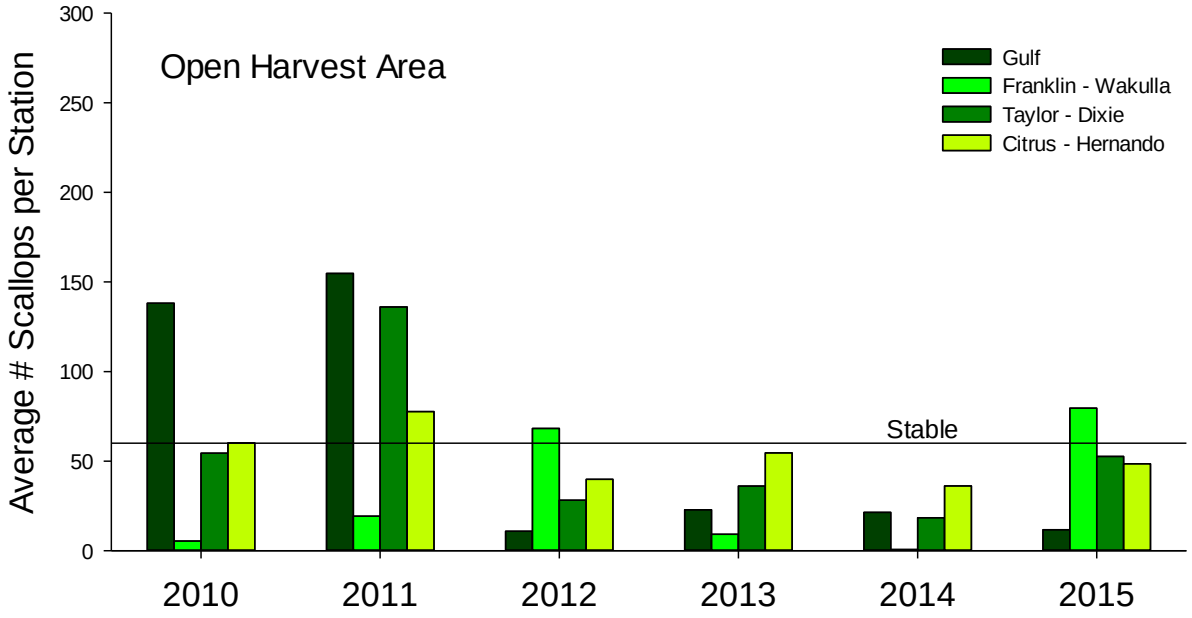


**Figure 2**. Results of scallop abundance surveys conducted each June from 2010–2015 in counties open to recreational harvest: Gulf, Franklin-Wakulla, Taylor-Dixie and Citrus-Hernando. The solid line represents an average of 60 scallops per station above which populations are classified as Stable.

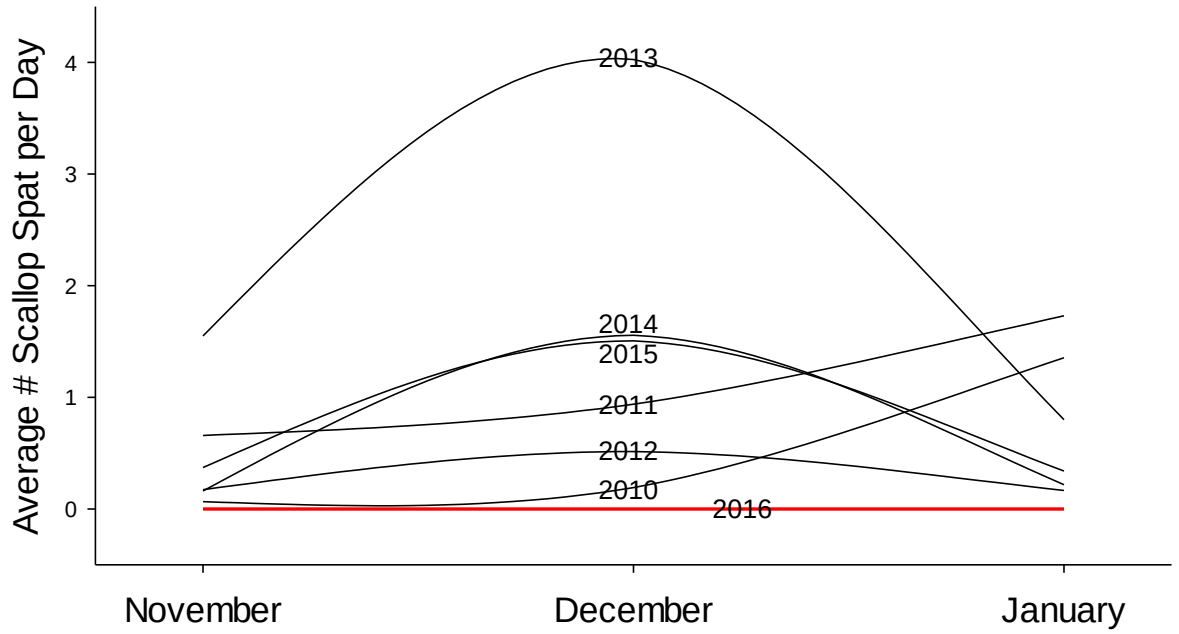


**Figure 3.** A comparison of the Gulf County scallop recruitment rates observed during each peak settlement period (November through January) since 2010. The red line represents the amount of recruits available for the 2016 scallop population.

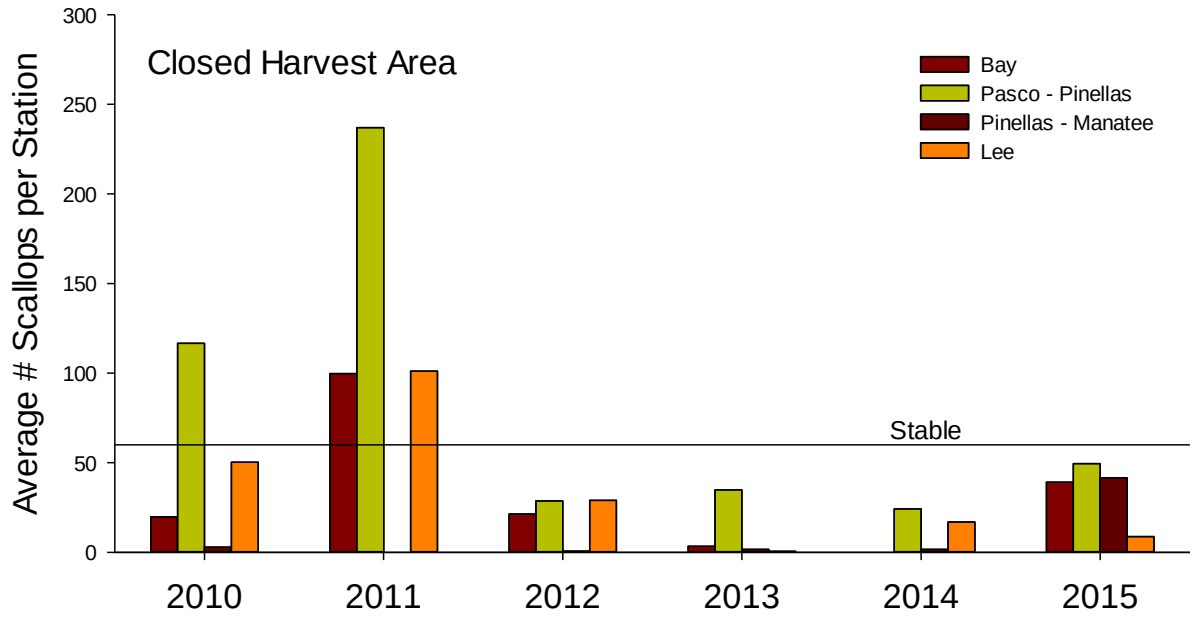


**Figure 4**. Results of scallop abundance surveys conducted each June from 2010–2015 in counties closed to recreational harvest: Bay, Pasco-Pinellas, Pinellas-Manatee and Lee. The solid line represents an average of 60 scallops per station above which populations are classified as Stable.