2014 SCALLOP PROGRAM REPORT

By

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Acknowledgment:

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Overview:

Since 2009, Sarasota County has been monitoring scallop populations of Sarasota County bays. This program helps measure the effectiveness of the Stormwater Management Plan on the Sarasota County watersheds. The bay scallop (*Argopecten irradians)* is an indicator species that is particularly sensitive to freshwater influences. Monitoring is done through adult surveys, spat collection and survival rates of caged adults. These efforts are in partnership with the Florida Fish and Wildlife Research Institute Sarasota Bay Watch and Mote Marine Laboratory.

Background:

Bay scallops live in shallow, nearshore waters along Florida's Gulf coast, from Pensacola to the Florida Keys. These bivalves are usually found nestled in seagrass beds and are easily distinguished from other bottom-dwelling animals by their electric blue eyes (FWC 2015). Scallops typically reproduce during the fall months as a response to a drop in temperature. The larvae are then planktonic for 10-14 days. After this point they settle as spat on an object, typically seagrass. This spat stays attached for approximately six weeks and eventually release to become free living scallops (FWC 2015). Factors such as salinity, food supply and biological fouling are also factors in the growth and reproduction of bay scallops (FWC 2015). Because the bay scallop typically lives only a year, this is an annual process and the scallop spawning can be seen in a yearly pattern

For more information go to:
http://myfwc.com/research/saltwater/mollusc/bay-scallops/

Methods:

Sarasota County's Scallop monitoring Program is accomplished using three methods. Since few conclusions can be made from a single approach this comprehensive program was developed. The first is Spat Monitoring which collectors (traps) simulate the natural seagrass which is the primary habitat for scallops. When scallops reproduce the drifting juveniles (spat) attach themselves to spat traps. Second, is Adult Transect Surveys which are performed by two divers searching 1m on either side of a 100m long transect line for scallops. Third, is the Scallop Cage Program which uses caged hatchery scallops that are measured monthly for survival and growth rates. Spawning cage scallops can produce millions of larva which also promotes population restoration.

(1.) Spat Monitoring

Sarasota County has been collecting scallop spat in traps since 2008 as a way to measure population abundance. The spat is collected using one half bushel citrus bags in selected areas throughout county waters including Sarasota Bay, Midnight Pass, Venice and Lemon Bay. Each month the traps are collected and sent Mote Marine Laboratory where the numbers of scallops are counted. This began with 15 locations, with two traps at each location. Spat traps were reduced to 10 in 2012 and to 6 in 2013 (Figure 1). The remaining locations were chosen based on the highest recruitment.

Figure 1: Spat Monitoring Locations

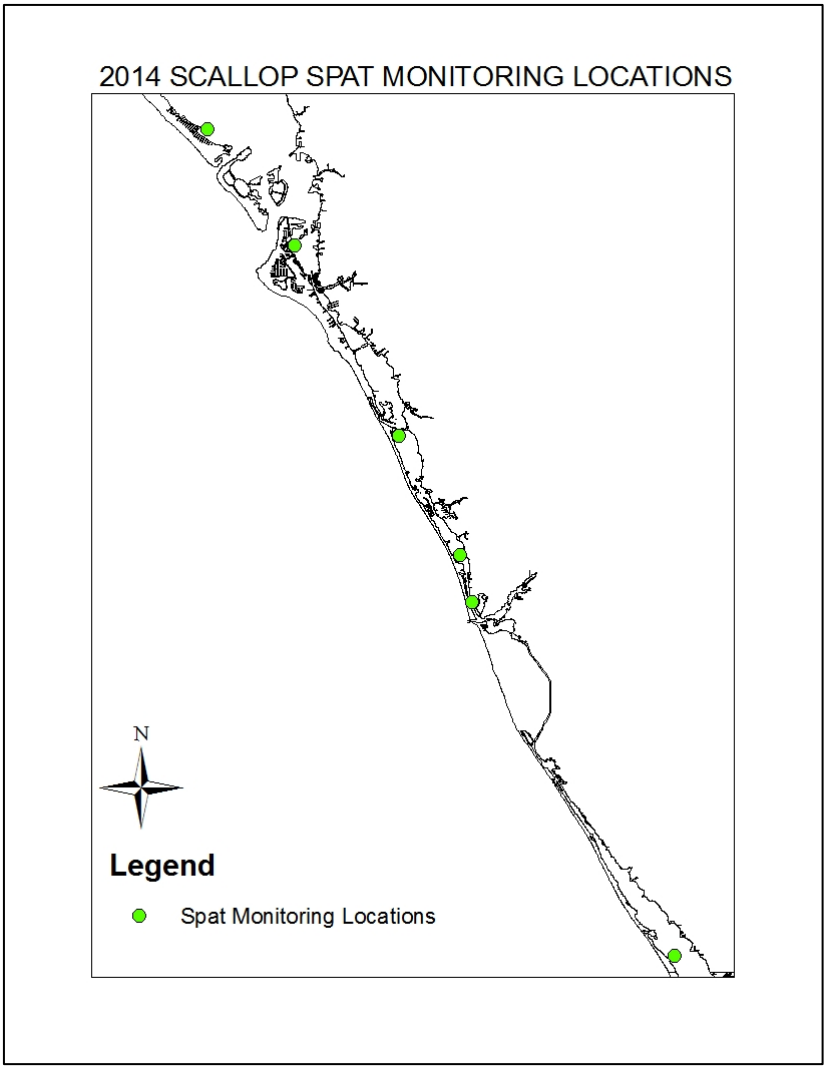


Figure 2: Spat Abundance

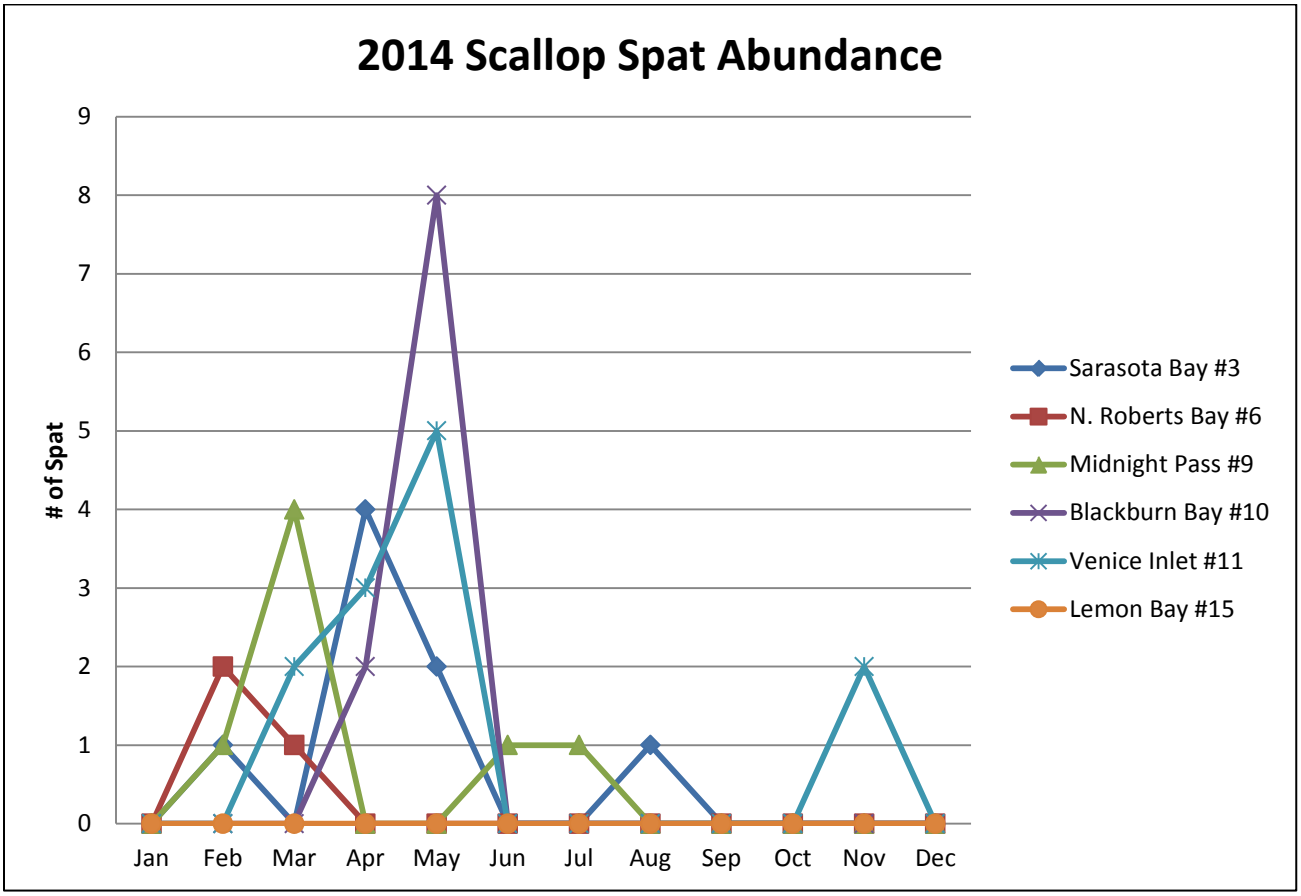
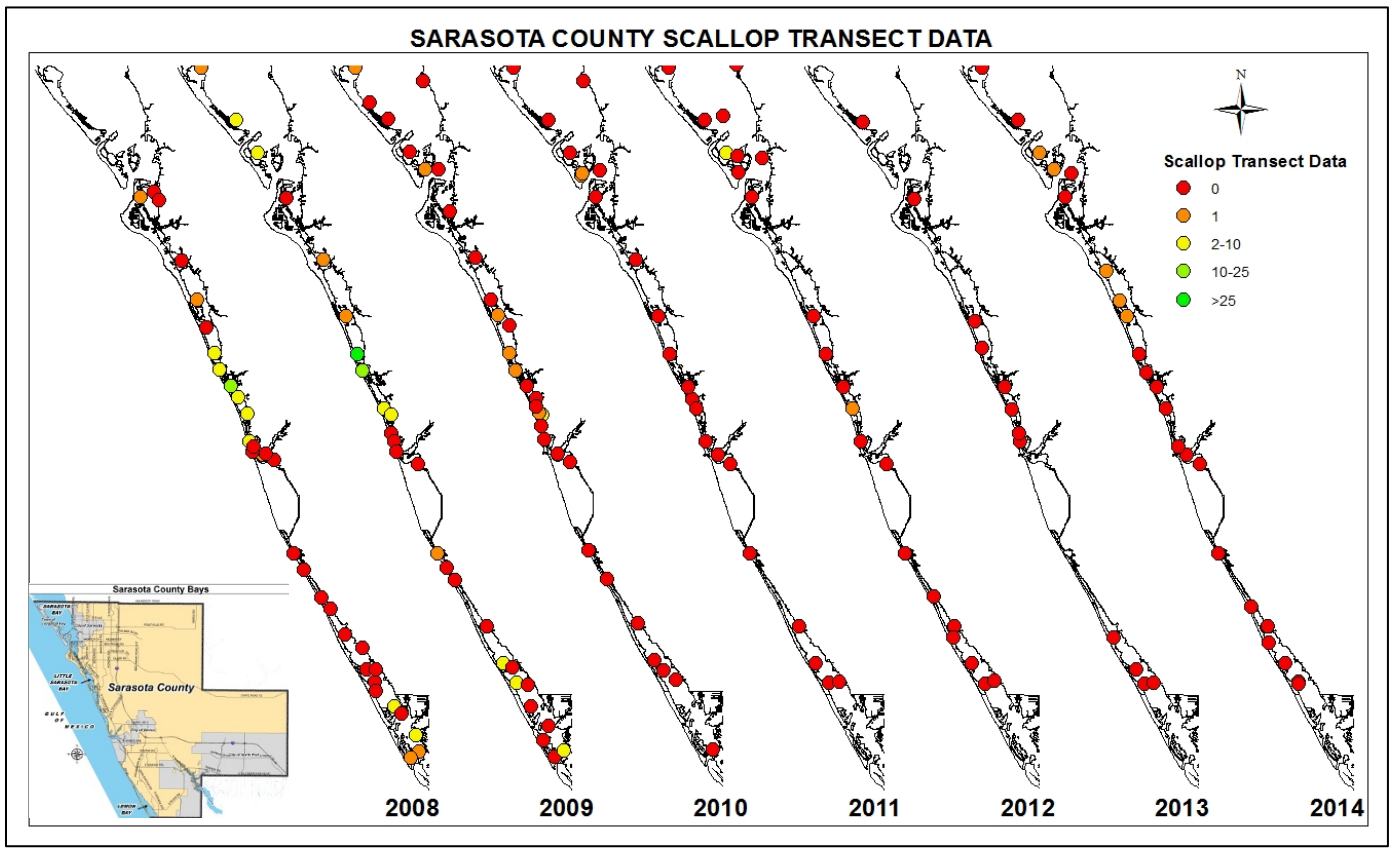


Figure 2 shows a sharp rise in spat landings from February through June. Previous data has shown scallops are triggered to spawn with a cold snap in the weather. This spawn likely occurred in December or January. Lemon Bay remained flat throughout the year and this data further supports the lack of adult scallops found during transect surveys.

(2.) Adult Transect Surveys

Transect surveys are done throughout Sarasota County to count adult scallops in the bays. The number of scallops found along the transect survey lines and number of transects are recorded. Additional data such as seagrass cover, species and other biology are also noted.

Figure 3: Adult Scallop Counts (County Staff Only)



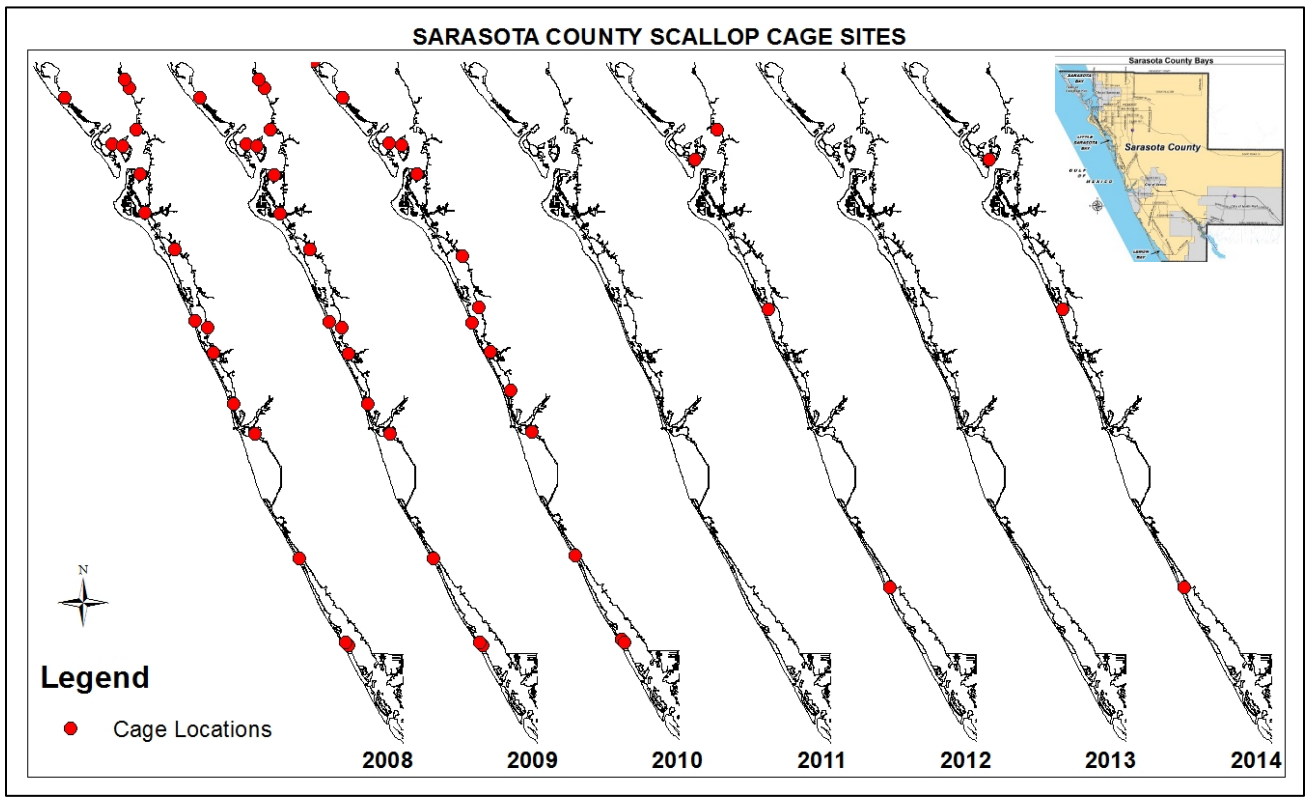
The yearly transect data shows a significant presence of adult scallops in 2008 and subquent decline in abundance leading to 2013 where none were found. There is a correlation between rainfall data and scallop abundance. Rainfall data indicates below average rainfall from 2008 through 2010 and a trasition to above average during the following years.

(3.) Cage Program

The scallop cages were placed off volunteer docks from 2008-2010 (Figure 4.). The volunteers cleaned and measured the scallops each month. The program was discontinued in 2011 and in 2013 due to lack of availability of juvenile scallops for the cages. The procedure given to the volunteers is included as *appendix I.*

In 2012 the cages were moved from dock locations out into seagrass beds (Figure 4.). The cages were elevated on PVC stands to prevent harm to the seagrass and help relieve gastropod predation. County staff along with volunteers cleaned and monitored the cages by boat.

Figure 4: Scallop Cage Sites



In March of 2014, three cages were seeded at locations in Sarasota Bay, Midnight Pass and Lemon Bay (Figure 4.). The Midnight Pass cage was lost after the initial deployment. The remaining cages survived through August. The growth rates ranged from 7-9mm per month for the first 3 months then showed signs of slowing for the remaining months (Figure 5). This coincides with a sharp mortality rate which occurred around June (Figure 6). The growth rate shift can be attributed to the environmental factors causing a die-off of the smaller less tolerant scallops first.

Figure 5: Growth Rates

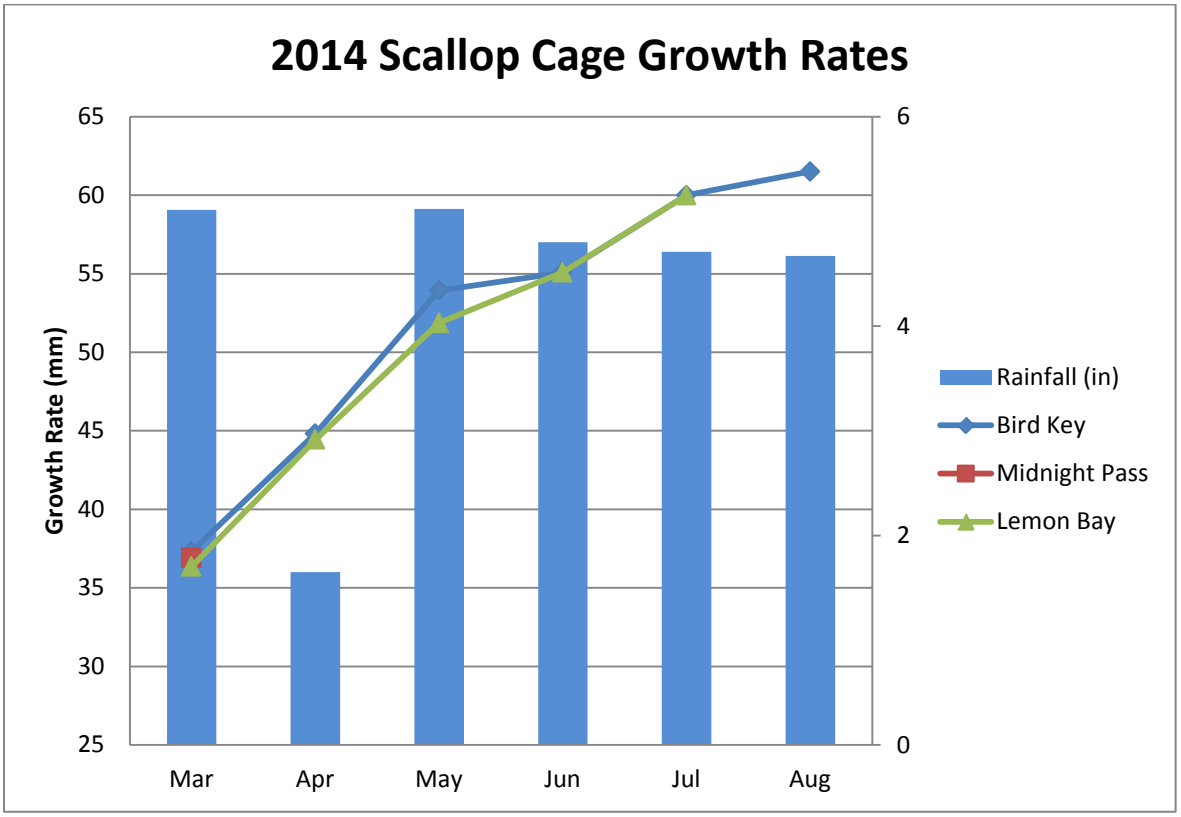
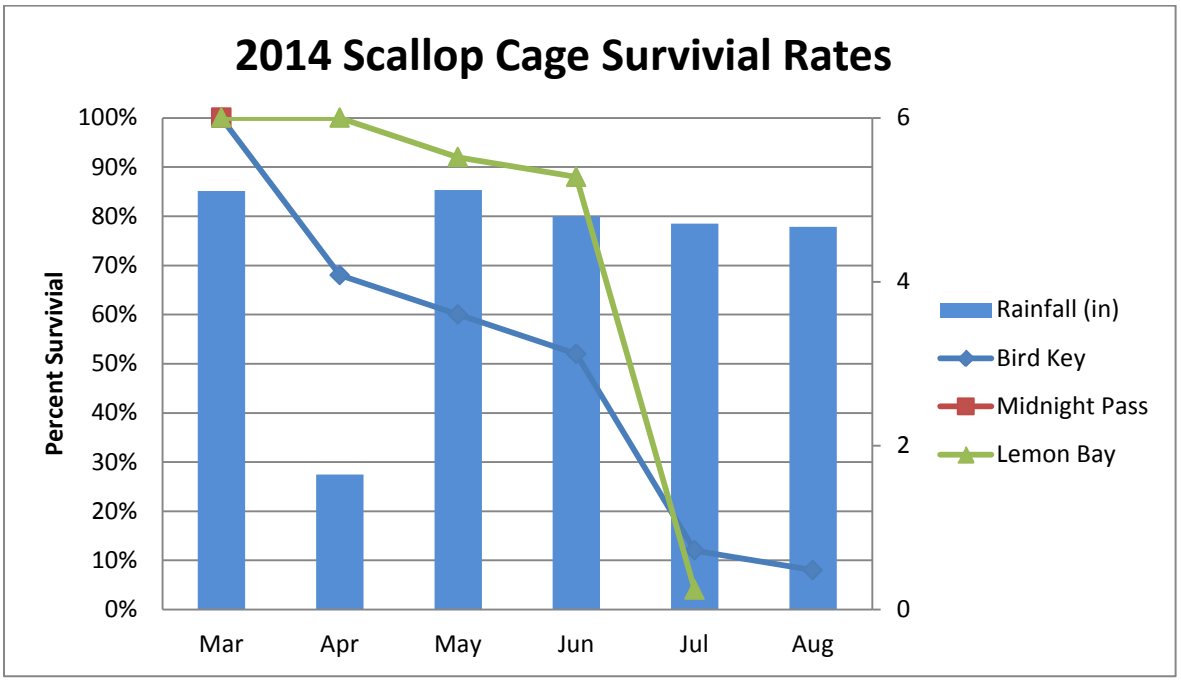


Figure 6: Survival Rates



Analysis:

Scallops are triggered to spawn by drops in temperature. While the timing of major temperature drops vary year to year, it is observed that scallops begin spawning in late fall and through parts of the winter. Spat numbers increase in February and continue to be present until summer months. Spat settles from larva approximately 10-14 days after spawning and can remain attached for six weeks or more.

Conclusion:

Most areas of the bay have seen a dramatic decline and collapse of bay scallops over recent years. Scallops and in particular scallop larva are known to be vulnerable to freshwater inflows to the estuary. Runoff from developed landscapes is deleterious to scallop survival. The population did collapse in 2010 and has not made a major recovery. Scallops still show presence in the bay and are still reproducing. Therefore, water quality has not dropped below tolerable level for the organisms. Lemon Bay had no adult scallops found during transect surveys or spat landings in 2014. However it has shown to have comparable scallop cage survivability rates as the cages in other bays.

Next Steps:

Sarasota County was an innovator in creating a local scallop monitoring program as a tool to measure success with watershed management. The County continues to work with partners at Florida Fish and Wildlife Commission (FWC), Sarasota Bay Watch, Mote Marine Laboratory and citizen volunteers and continues to learn how to use scallops as an indicator and support restoration of scallops to their former abundance.

Appendix I:

Volunteer Instructions

1. With gloves on, pull up cage from underneath dock, cut off the plastic cable ties holding the cage door closed.
2. Remove scallops from cage and place in a bucket of seawater; throw away any dead scallops (open shells).
3. Remove fouled cage and attach clean cage to dock line using snap-link.
4. Keep fouled cage out of water and allow it to dry for 4 weeks, then use the scraper and brush to clean the fouling organisms off the outside of the cage.
5. Fill in the date, site/address, and your name on the data sheet.
6. Count and record the number of live and dead (shells only) scallops in the cage.
7. Use the calipers to measure the shell height of the live scallops remaining and record the values on the data sheet provided.
    a. Shell height is the distance from the bottom hinge of the scallop to the top of the shell edge. (Example of scallop shell height measurement on data sheet).
    b. Shell heights are recorded in millimeters.
8. Remove large fouling organisms such as tunicates (sea squirts) from the scallops. Hard to remove fouling organisms like barnacles and oysters may remain on the scallop shells in order to prevent ripping shells apart during cleaning. Use a scrub brush to remove any mud or slime coating the shells.
9. Once the scallops have been measured and cleaned place them back in the cage and use cable ties to secure the door. This will prevent predators such as crabs from entering the cage and eating the scallops.
10. Lower the cage back into the water.
11. Save data sheet for Sarasota County or Fish and Wildlife scientists.

Bibliography:

Florida Fish and Wildlife Conservation Commission (FWC)"Bay Scallops General Information." *Florida Fish and Wildlife Research Institute*, n.d. Web. 5 Jun 2015. <http://myfwc.com/research/saltwater/mollusc/bay-scallops/information/>.

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