Chapter 5.1

Seagrass abundance in the Maryland Coastal Bays

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Abstract
Seagrasses have significantly decreased in the Maryland Coastal Bays since 2005. The 2013 acreage represents the lowest acreage documented since 1991. Although seagrasses are found in four major segments of Maryland's Coastal Bays, they are not distributed evenly. Over 90% of all seagrasses occur along the Assateague Island shoreline. Overall watershed decreases have been between 35 and 86 percent since 2000 with Chincoteague Bay sustaining the greatest losses. Current goal attainment is only 25.5% (down from 71% attainment in 2001). Overall seagrass acreage peaked in 2001 (19,301 acres) and had significant decreases in 2005 and 2011. Current acreage is equivalent to that in 1991 signifying a 20 year regress.

Introduction

Submerged aquatic vegetation (SAV or seagrasses) have been monitored annually since 1986 through aerial surveys conducted by the Virginia Institute of Marine Sciences (VIMS) and funded by Maryland, Virginia and the federal government. General consensus among the scientific community is that, despite recent increases documented by the aerial survey, current seagrass levels are considerably lower than historic levels found in the early 1900s. In the early 1930s, eelgrass wasting disease virtually eliminated eelgrass (*Zostera marina*) along the east coast including areas in the southern Coastal Bays where it was the dominant species (Muehlstein 1989).

Water quality conditions play a critical role in seagrass distribution because they affect the amount of light they receive for growth (Stevenson *et al.,* 1993). In the Chesapeake Bay, water quality goals have been established based on depth (as an indicator of potential light availability)(Batuik et al 2000). Other important factors that may determine seagrass distribution in the Coastal Bays include percent organic content of the bay sediment (eelgrass prefers sediment with an organic content <5%) (Koch 2001).

The abundance and distribution of seagrasses are an important part of the Coastal Bays ecosystem. Seagrasses are used as a nursery for many species. Not only do seagrasses improve water quality by producing oxygen, absorbing excess nutrients and removing sediment from water, they also provide food and shelter for waterfowl, fish and shellfish. For example, research has shown that the density of juvenile blue crabs (*Callenectes*

sapidus) is 30 times greater in grass beds than in unvegetated areas (Orth and Montfrans, 2002).

Management Objective: Increase seagrass abundance to goal levels by maintaining acceptable habitat conditions for seagrass expansion.

Seagrass Abundance Indicator: Seagrass abundance (acreage)
GOAL=27,041 acres

Embayment goals

Assawoman Goal =	1,745 acres
Isle of Wight Goal =	1,476 acres
St Martin River Goal=	48 acres
Chincoteague Goal =	20,400 acres
Newport Bay Goal =	341 acres
Sinepuxent Goal =	3,031 acres

Data Sets
Seagrasses have been monitored annually in the Coastal Bays by VIMS since 1986 using aerial photography techniques timed to occur during the peak growing season of SAV in the Coastal Bays (Orth et al 2014).

Analyses
VIMS digitization of aerial photos (Orth et al 2014); Maryland Department of Natural Resources (DNR) categorization into bay segment and goal development/assessment.

Status and Trends of Seagrass Abundance
Total seagrass coverage in the Coastal Bays following the 2013 survey is shown in Figure 5.1.1. Overall, 6,903 acres of seagrass were detected, a 10% decrease from 2012 and nearly 65% loss since 2001. Descriptions of abundance in each individual bay follow:

Assawoman Bay

In 2013, there were 111 acres of seagrass in Assawoman Bay representing 4% of the goal for that segment (Figure 5.1.2). Seagrass coverage had increased annually since first being documented in 1991 and peaked in 2010 at 932 acres (53% of established goal). In 2011, this bay saw a dramatic loss and coverage has remained low.

St. Martin River

In 2013, there were 1.19 acres of seagrass in St. Martin River representing a 2% of the goal for this segment (Figure 5.1.3). SAV first appeared in St. Martin River along the Isle of Wight Management Area in 1999 and peaked in 1999 at 4.4

acres. Grasses were wiped out in 2005 and 2011 (0 acres) but continue to have minimal coverage around the Isle of Wight Management Area.

Isle of Wight

In 2013, there were 121.19 acres of seagrass in Isle of Wight Bay representing 8% of the goal for this segment (Figure 5.1.4). Seagrass coverage increased annually since it first appeared in 1992, until 2010 peak abundance of almost 520 acres. In 2011, it experienced a major decline losing 485 acres. Acreage rebounded some in 2012 and remained over 100 acres in 2012.

Sinepuxent

In 2013, there were 1,274.22 acres of seagrass in Sinepuxent Bay representing 42% of this segments goal (Figure 5.1.5). Seagrass coverage peaked in 2004, with 2,282 acres and despite losses in 2005, remained fairly high until 2011 when coverage began a declining trend.

Newport

In 2013, there were 27.4 acres of seagrass in Newport Bay representing 8% of this segments goal (Figure 5.1.6). Seagrass coverage increased from 1990 when it first appeared to 2001 (peak 121 acres). Grasses are mostly located along the lower eastern shore of the bay. After 2001, grasses began to decline and in 2005 Newport Bay had significant decreases. However, grasses were regaining acreage through 2010 when a declining trend returned.

Chincoteague Bay

In 2013, there were 5,405 acres of seagrass in Chincoteague Bay representing 26.5% of the goal for this segment (Figure 5.1.7). This segment has experienced the largest loss in acreage from its peak of 16,349 acres in 2001. Since 2001 there has been a generally steady decrease in coverage (small increase in 2009 and 2010).

Seagrass Abundance Summary

Seagrasses are an important indicator of bay health. The largest distribution of seagrass in the Coastal Bays occurs in Chincoteague Bay (5,405 acres) (Figure 5.1.1) with Sinepuxent Bay having the best goal attainment (42%) (Figure 5.1.5). Distribution of seagrasses in the northern bays and Newport Bay is limited, presumably due to poorer water quality conditions (see Chapter 4 of this report).

Results for 2013 show that seagrass acreage decreased 26% from 9,319 acres in 2007 to approximately 6,903 acres in 2013 (Figure 5.1.8). Overall trends show that SAV acreage in the Maryland Coastal Bays peaked in 2001 (19,301 acres) and had significant decreases in 2005 and 2011. Current acreage is equivalent to that in 1991 signifying a 20 year regress (Figure 5.1.8).

Density is not currently an approved indicator by the scientific and technical advisory committee but was examined. Biomass has been reduced especially the densest beds, despite generally improving water quality trends. If water quality trends continue, seagrasses should also begin to show improvements. Some possible causes for decreasing seagrass are explored in Chapter 5.3.

References

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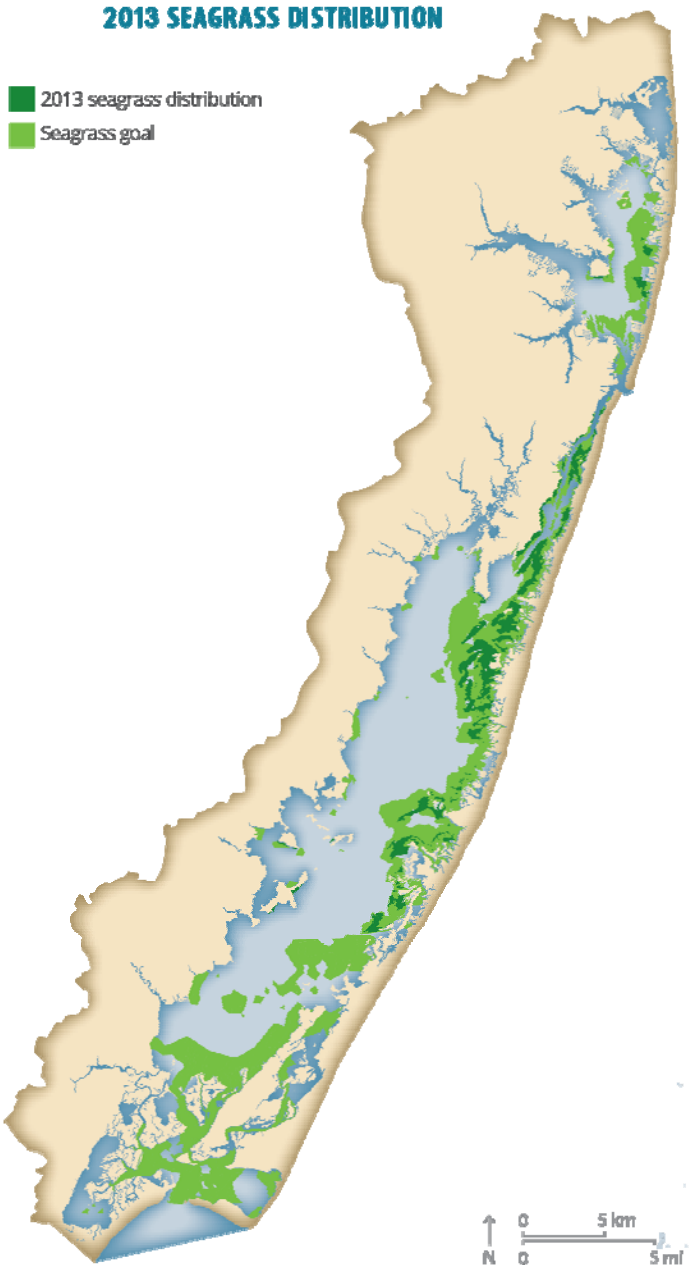

Figure 5.1.1 Seagrass goal (light green) compared to the 2013 distribution of seagrass coverage in the Coastal Bays (dark green) - Virginia Institute of Marine Science aerial survey.

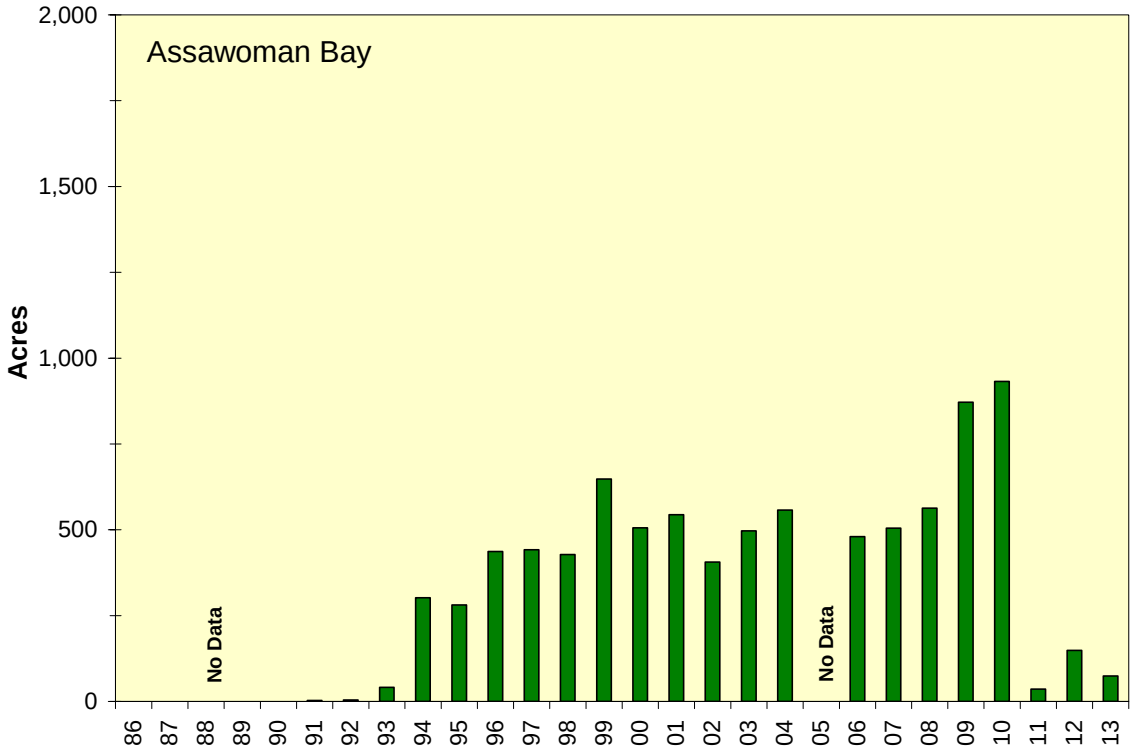

Figure 5.1.2 Annual seagrass acreage in Assawoman Bay 1986-2013. Seagrass goal is 1,745 acres.

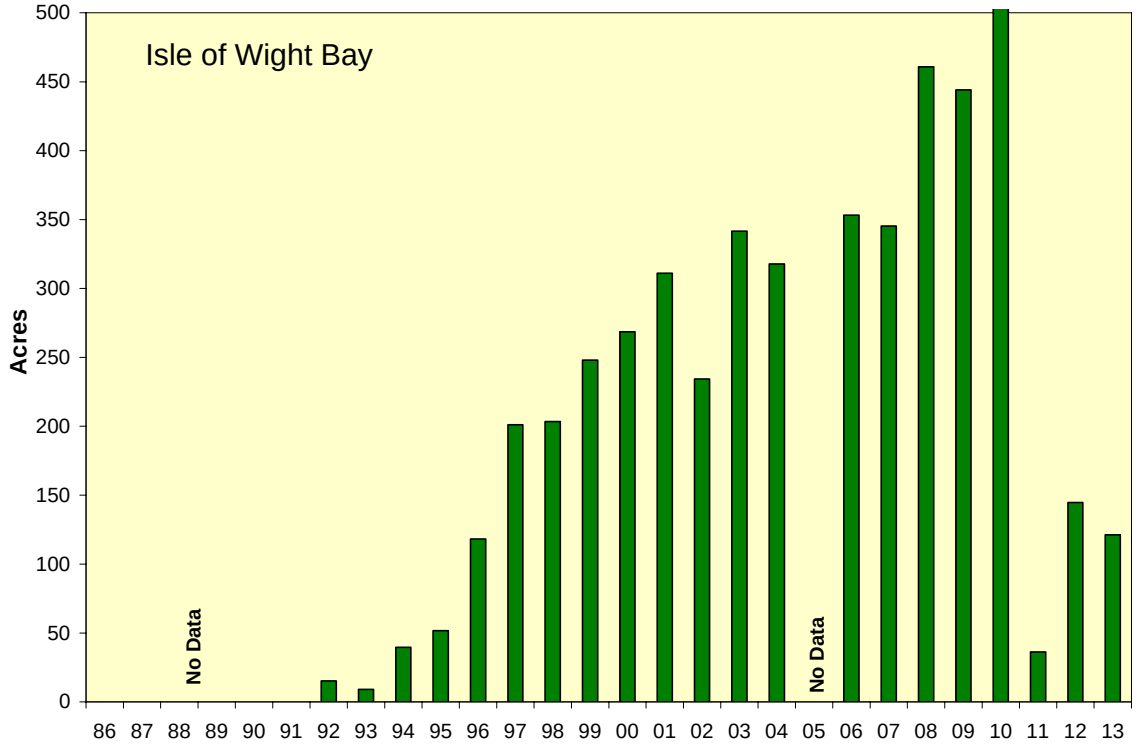

Figure 5.1.3 Annual seagrass acreage in Isle of Wight Bay 1986-2013. Seagrass goal is 1,476 acres.

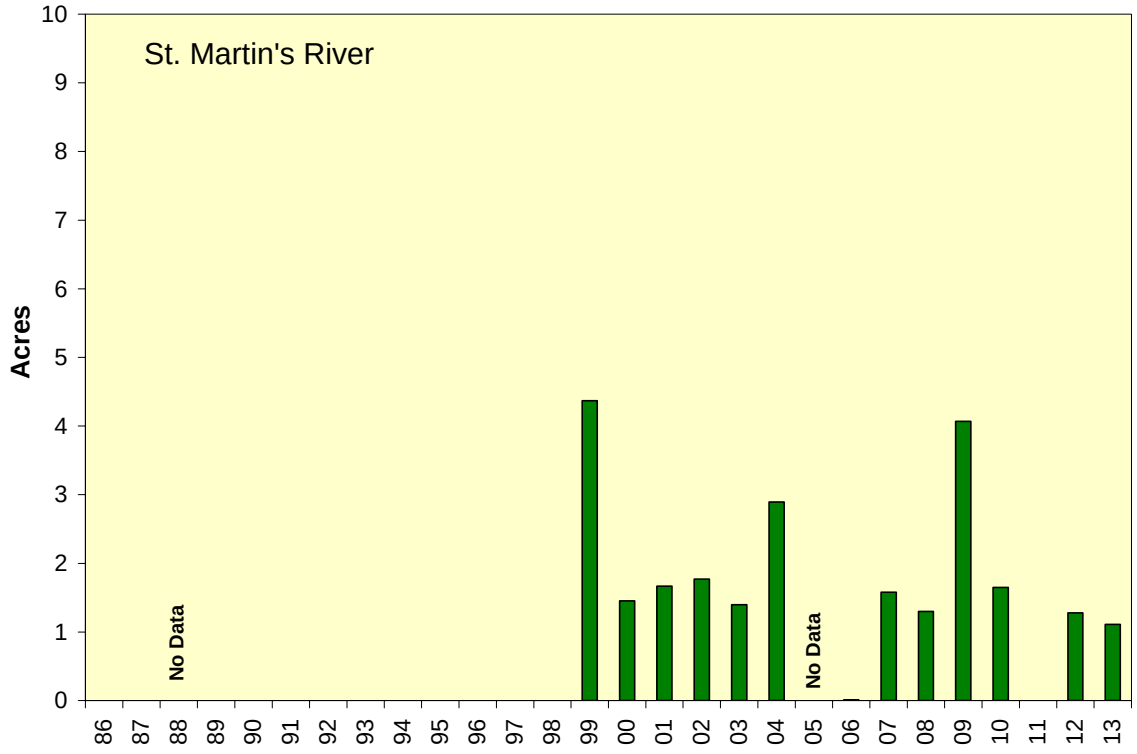

Figure 5.1.4 Annual seagrass acreage in the St. Martin River 1986-2013. Seagrass goal is 48 acres.

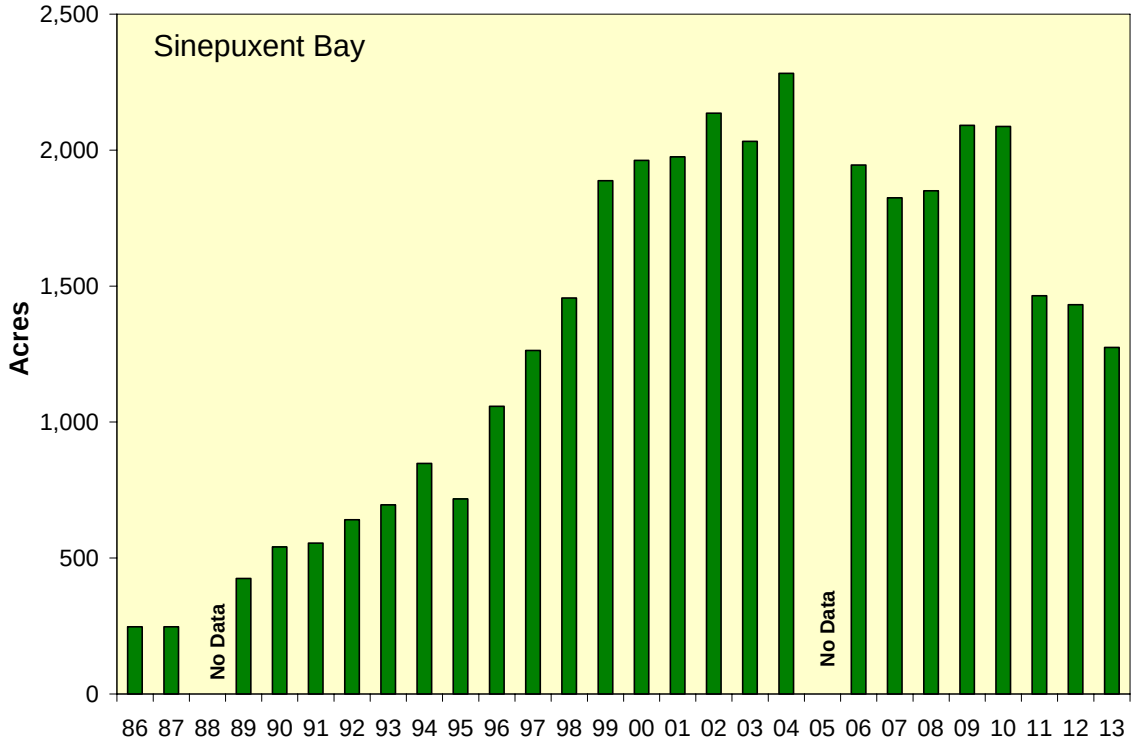

Figure 5.1.5 Annual seagrass acreage in Sinepuxent Bay1986-2013. Seagrass goal is 3,031 acres.

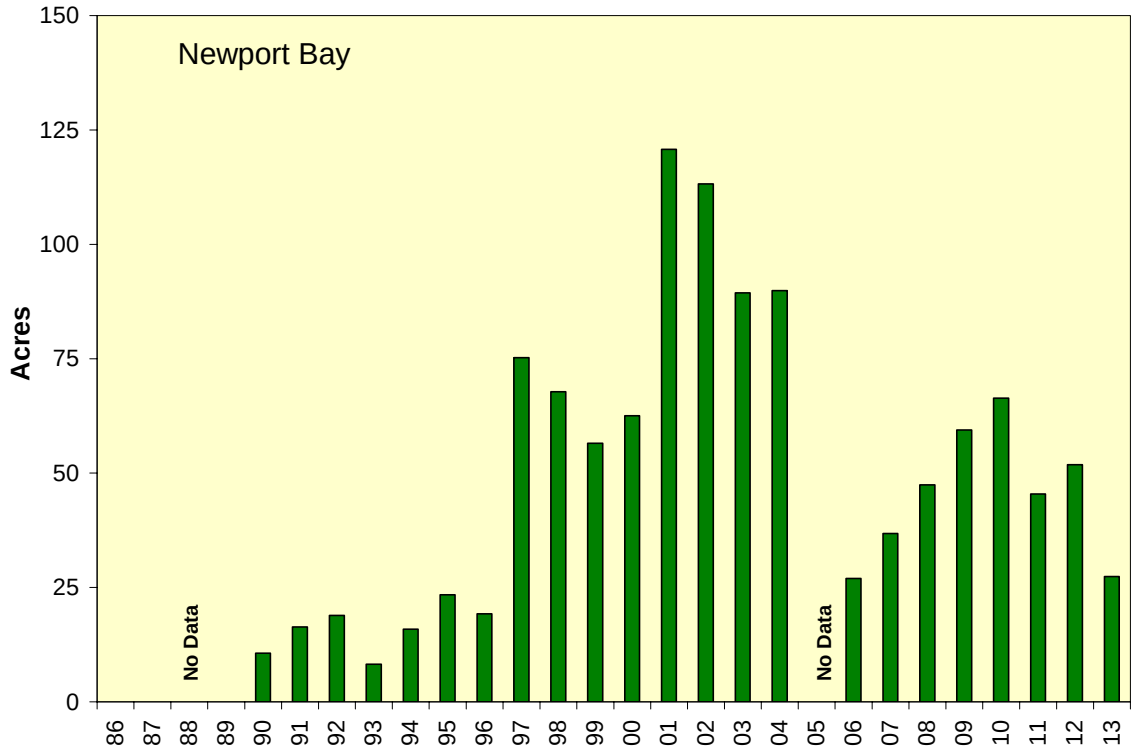

Figure 5.1.6 Annual seagrass acreage in Newport Bay 1986-2013. Seagrass goal is 341 acres.

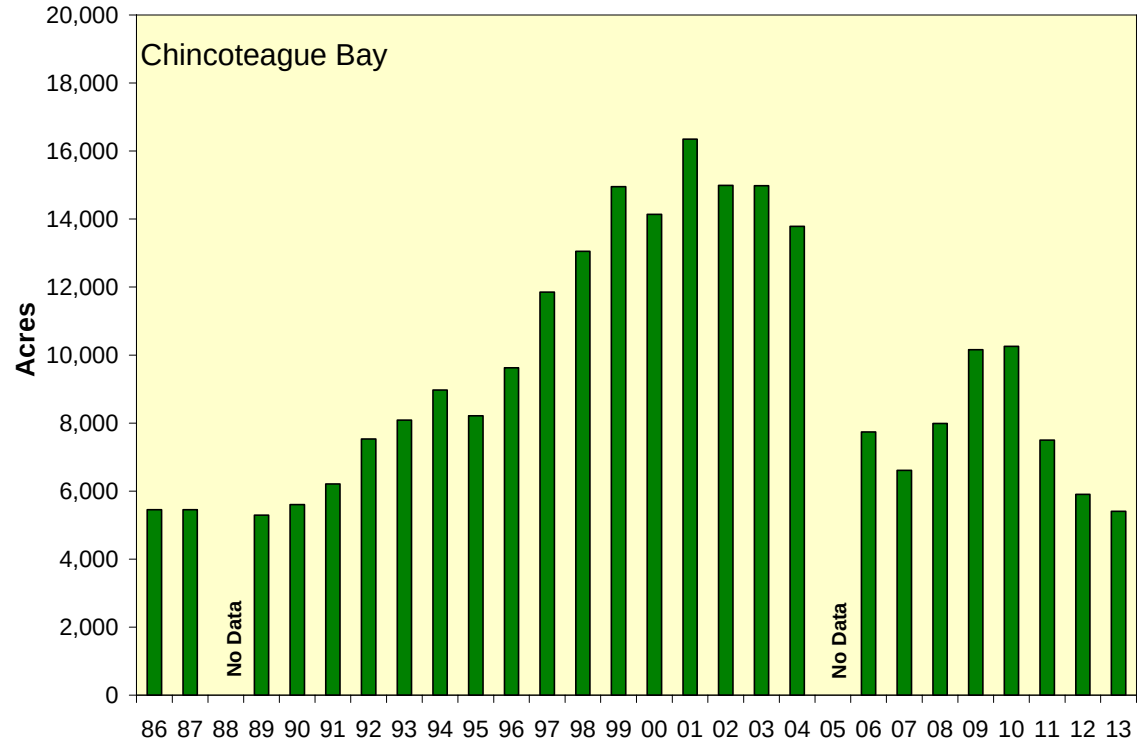

Figure 5.1.7 Annual seagrass acreage in Chincoteague Bay 1986-2013. Seagrass goal is 20,400 acres.

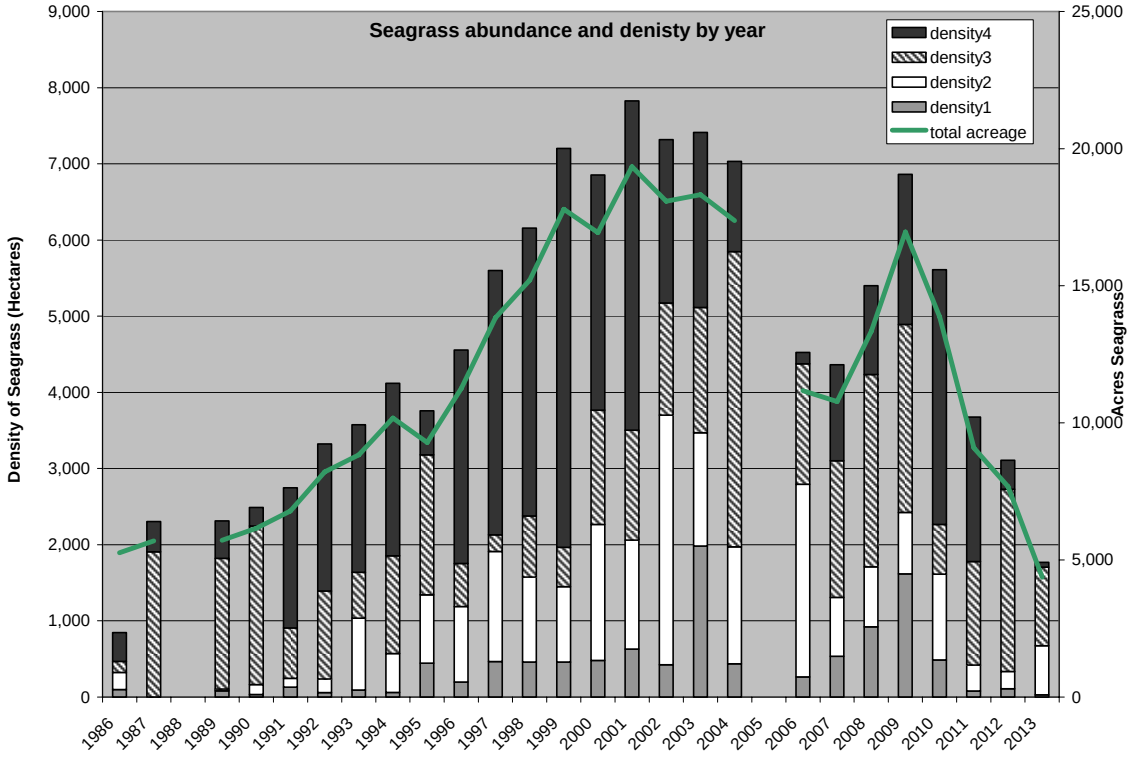

Figure 5.1.8 Hectares of seagrass by year (1986-2013) and density classes (density 1 <10% coverage; density 2 coverage =10-40%; density 3 = 40-70% coverage; density 4 >70% coverage).