

# A summary of the 2013 Blue Crab Advisory Report



# Overall Stock Status and Fishery Performance

Control Rule	Reference Points			Stock Status			
	Period	Target	Threshold	2010	2011	2012	2013
<b>Exploitation Fraction</b>	Current, Female-specific	25.5%	34% (max)	18%	25%	10%	TBD
	Former, Sexes-Combined	46%	53% (max)	39%	45%	23%	TBD
<b>Abundance (millions of crabs)</b>	Current, Female-Specific	215	70 (min)	251	190	97	147
	Former, Sexes-Combined	200	86 (min)	315	254	178	189

Figure 6. The percentage of female blue crabs removed from the population each year by fishing relative to the female-specific target (25.5%) and threshold (34%) exploitation rates, 1990 through 2012. Exploitation rate (% removed) is the number of female crabs harvested within a year divided by the female population (age 0 and age 1+) estimated at the beginning of the year.

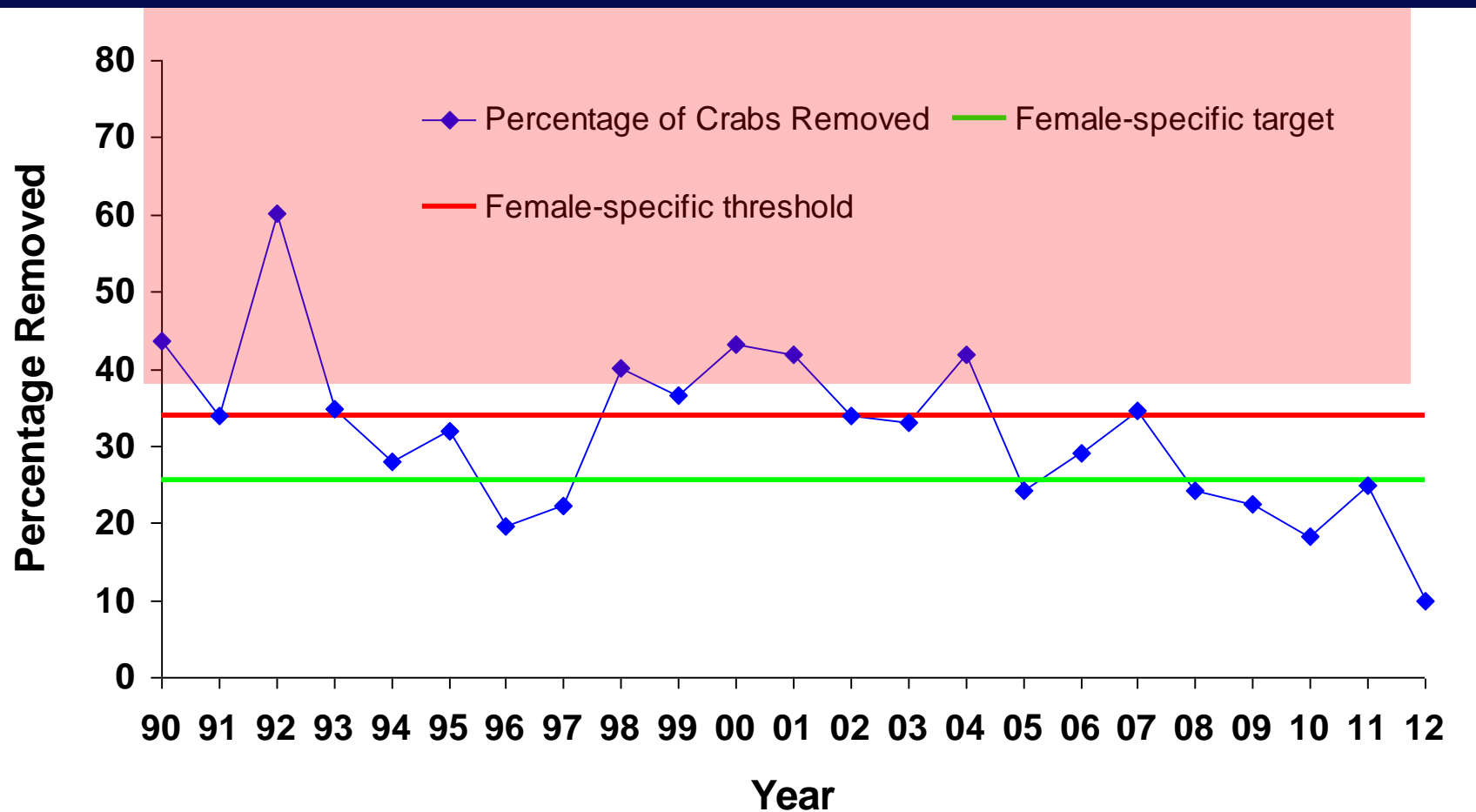


Figure 5. Winter dredge survey estimate of **abundance of female blue crabs age one year and older** (age 1+) 1990-2013 with female-specific reference points. These are female crabs measuring greater than 60mm across the carapace and are considered the 'exploitable stock' that will spawn within the coming year.

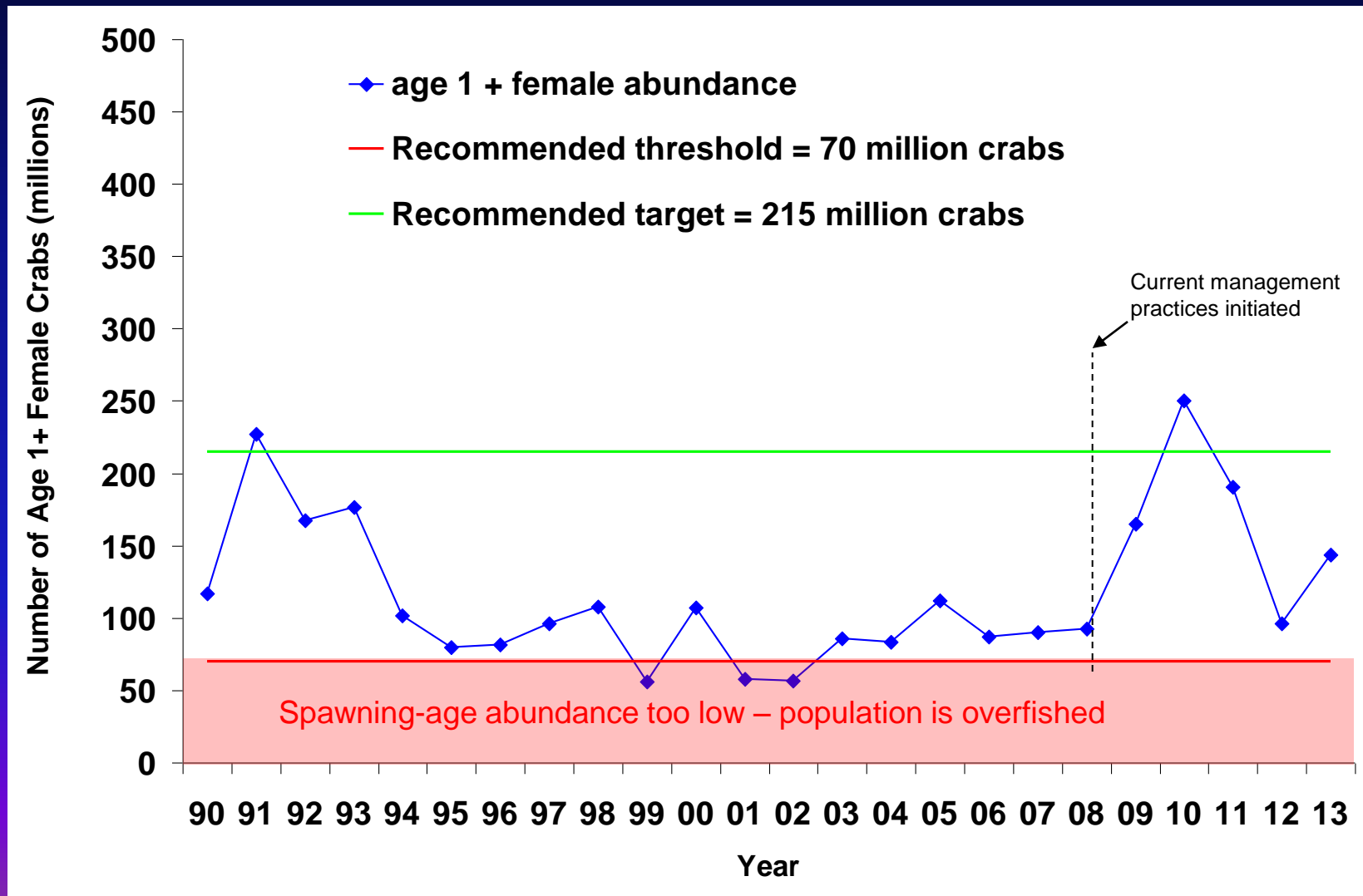


Figure 2. The female-specific control rule for the Chesapeake Bay blue crab fishery. In 2012, abundance was below the overfished target, while the exploitation rate was below the overfishing target. Reference points were derived from a statistical assessment model incorporating multiple surveys.

Exploitation: target is 25.5%, threshold is 34%

Abundance: target is 215 million crabs, threshold is 70 million crabs

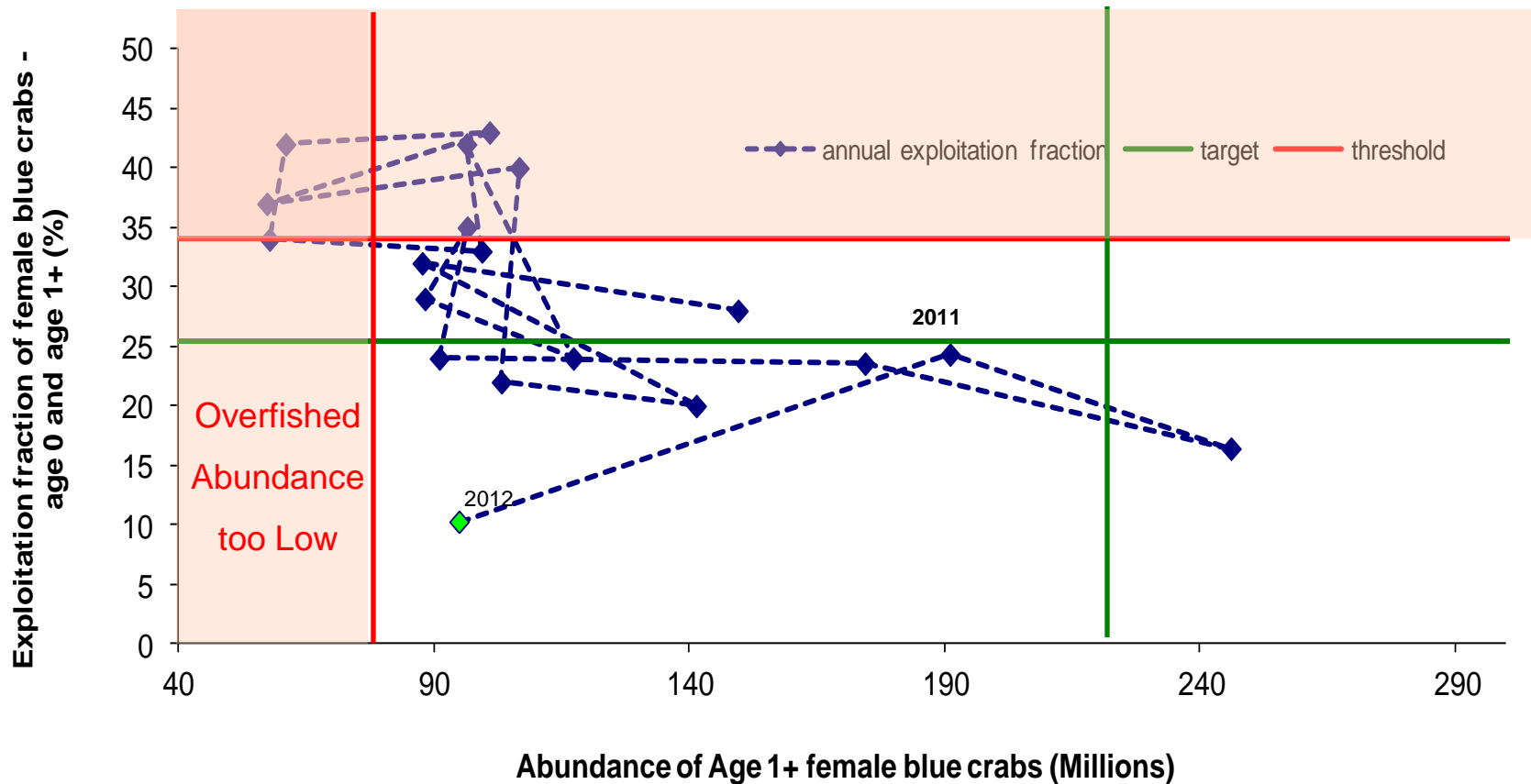


Figure 1. Winter dredge survey index of total blue crab abundance (density of males and females, all sizes combined) in Chesapeake Bay, 1990 through 2013. Error bars represent 95% confidence intervals.

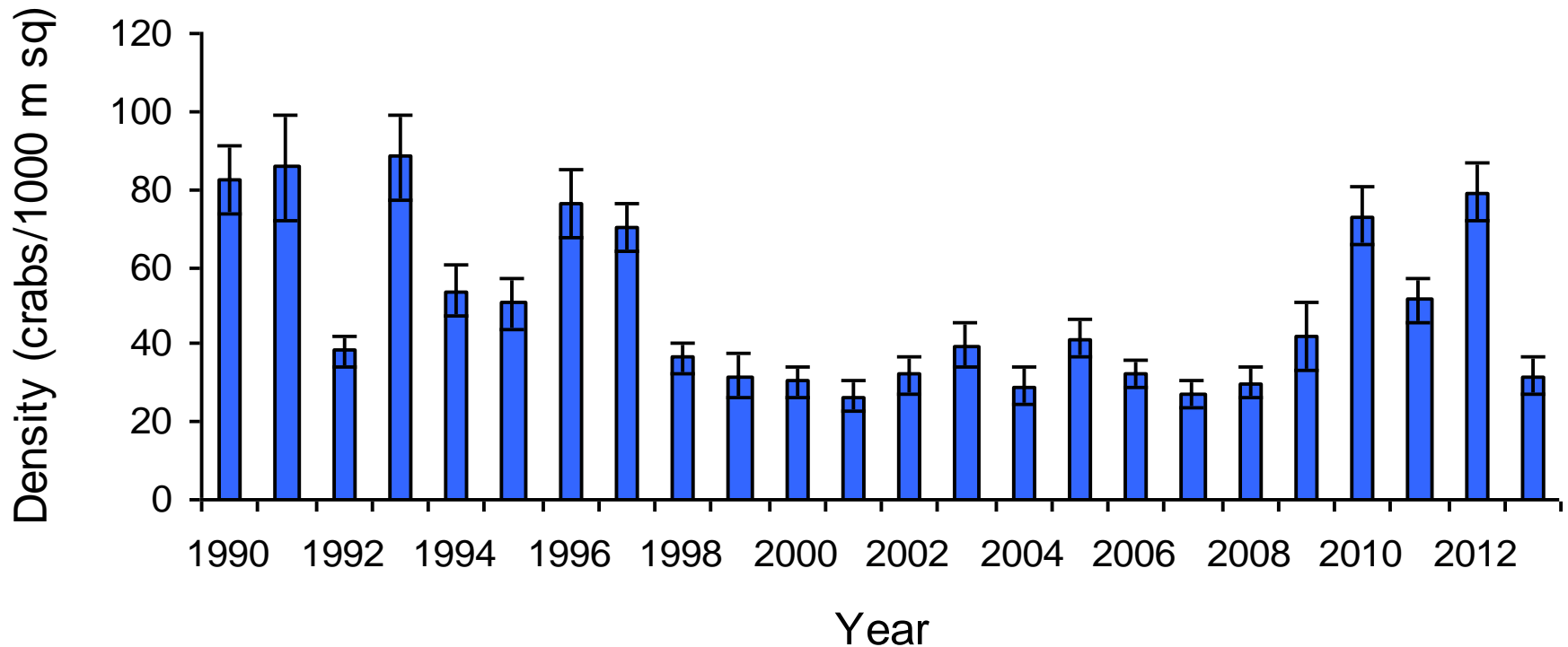


Figure 9. Winter dredge survey estimate of **abundance of juvenile blue crabs (age 0)**, 1990-2013. These are male and female crabs measuring less than 60mm across the carapace. Error bars represent 95% confidence intervals.

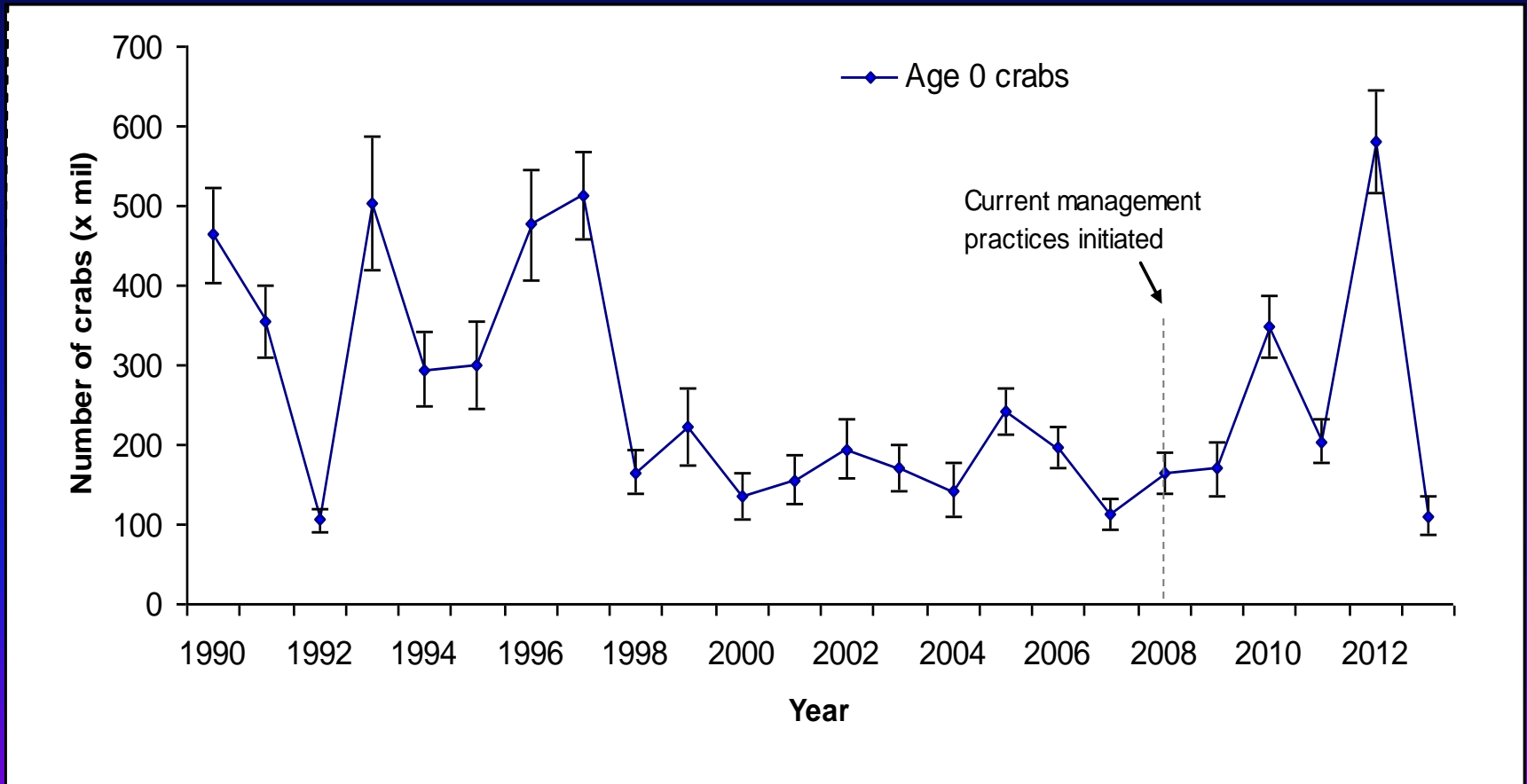
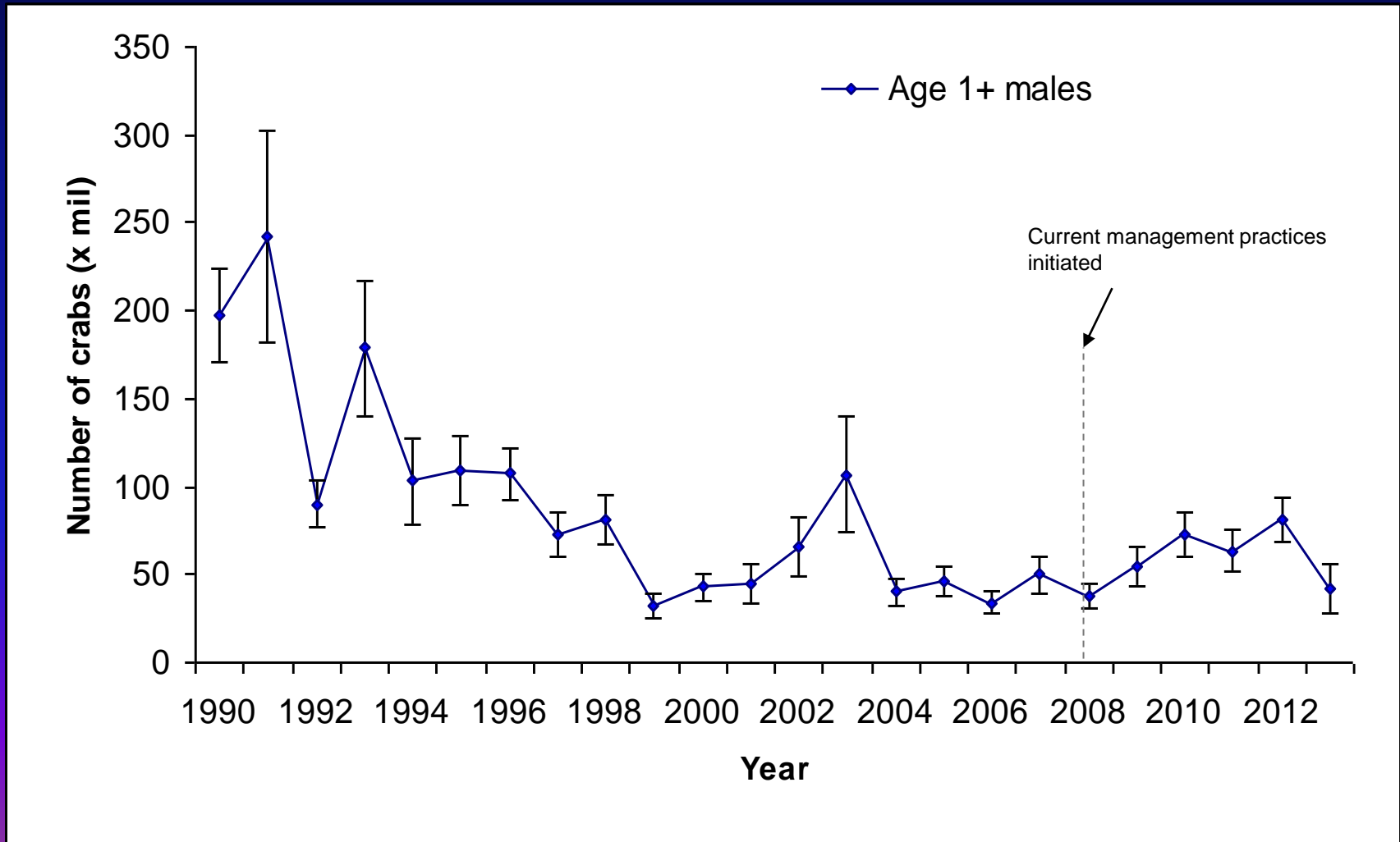


Figure 8. Winter dredge survey estimate of **abundance of male blue crabs age one year and older (age 1+)** 1990-2013. These are male crabs measuring greater than 60mm across the carapace and are considered the 'exploitable stock' capable of mating within the coming year. Error bars represent 95% confidence intervals.






# Background: Male Reference Points

## CBSAC to provide guidance

- CBSAC Charged with developing male reference points in August 2011.

Fisheries GIT Tasking CBSAC to Develop New Blue Crab Abundance Targets	Long-Term (June 2012)
<b>Background:</b>	<b>Recommendations:</b>
<p>In 2008, the Chesapeake Bay interim abundance target was intended as an interim target. This target has been revised. In 2010, the Executive Order for the Chesapeake Bay "Maintain sustainable" (Maintain sustainable) in 2011 and outcome was different. Management of the interim blue crab stock assessment new blue crab target policy ahead of time occur before mid-2011.</p> <p>On August 9, 2011, 20 crabs in the Chesapeake Bay Implementation revising the current results which may be female based at</p>	<p>CBSAC, under guidance from the Fisheries GIT, should review and provide recommendations for revised reference points based upon the 2011 Blue Crab Stock Assessment. The Fisheries GIT requests CBSAC to include those recommendations in a report to be completed by October, 2011. This report should:</p>
<b>Recommendations:</b> CBSAC, under guidance from the Fisheries GIT, should review and provide recommendations for revised reference points based upon the 2011 Blue Crab Stock Assessment. The Fisheries GIT requests CBSAC to include those recommendations in a report to be completed by October, 2011. This report should:	<b>Near-Term (October, 2011)</b>
<b>Near-Term (October, 2011)</b> 1) Provide guidance for the management agencies on: a. Implementation of the biological reference points developed within the 2011 assessment b. Methods for determining appropriate reference points for the male component of the population. 2) Provide a description of how the reference points recommended/proposed under task 1 differ from the current reference points. 3) Prioritize research needs and science gaps – as identified in the 2011 assessment and Center for Independent Experts (CIE) review.	<ol style="list-style-type: none"><li>1) Provide guidance for the management agencies on:<ol style="list-style-type: none"><li>a. Implementation of the biological reference points developed within the 2011 assessment</li><li>b. Methods for determining appropriate reference points for the male component of the population.</li></ol></li><li>2) Provide a description of how the reference points recommended/proposed under task 1 differ from the current reference points.</li><li>3) Prioritize research needs and science gaps – as identified in the 2011 assessment and Center for Independent Experts (CIE) review.</li></ol>



# Male Blue Crab

- There is a growing concern that the exploitation on male crabs may create a imbalance between number of mature male and female crabs.
- There is currently no evidence that suggests females are maturing without finding mates
- Managers and researchers have not yet determined the critical operational sex ratio that may create a situation of sperm limitation.
- CBSAC recommends a precautionary approach to avoid exceeding historical bounds.



= OSR



# Male Conservation Triggers

CBSAC recommends a revised set of conservation triggers for male crabs based on male exploitation and on the former management framework. Conservation measures should be considered for male blue crabs if either of the following occurs:

- 1) The current male exploitation rate exceeds 62% which is the second highest exploitation fraction observed for male crabs since 1990.
- 2) If female exploitation is below the established overfishing threshold of 34% and the total annual exploitation rate of male and female crabs exceeds the threshold defined by the previous control rule (53% of crabs, both sexes).

Figure 3. One of two male-specific triggers for the Chesapeake Bay blue crab fishery. The percentage of male crabs removed from the population each year by fishing, 1990 through 2012.

Exploitation rate (% removed) is the number of male crabs harvested within a year divided by the male population estimate (age 0 and age 1+) at the beginning of the year.

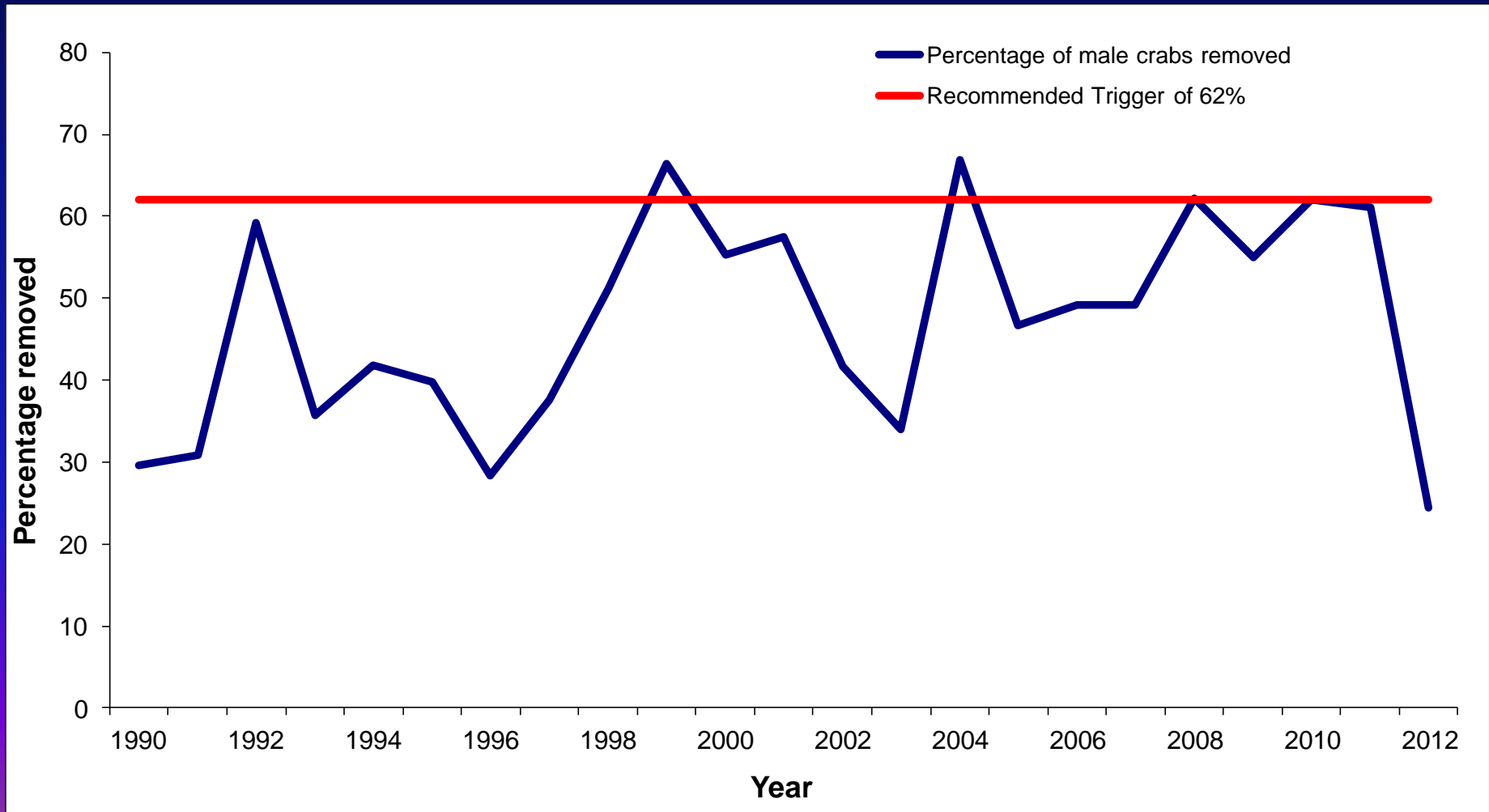


Figure 4. One of two male-specific triggers for the Chesapeake Bay blue crab fishery. The percentage of male and female crabs removed from the population each year by fishing relative to previously used target (46%) and threshold (53%) exploitation rates, 1990 through 2012. Exploitation rate (% removed) is the number of crabs harvested within a year divided by the population of all crabs estimate at the beginning of the year.

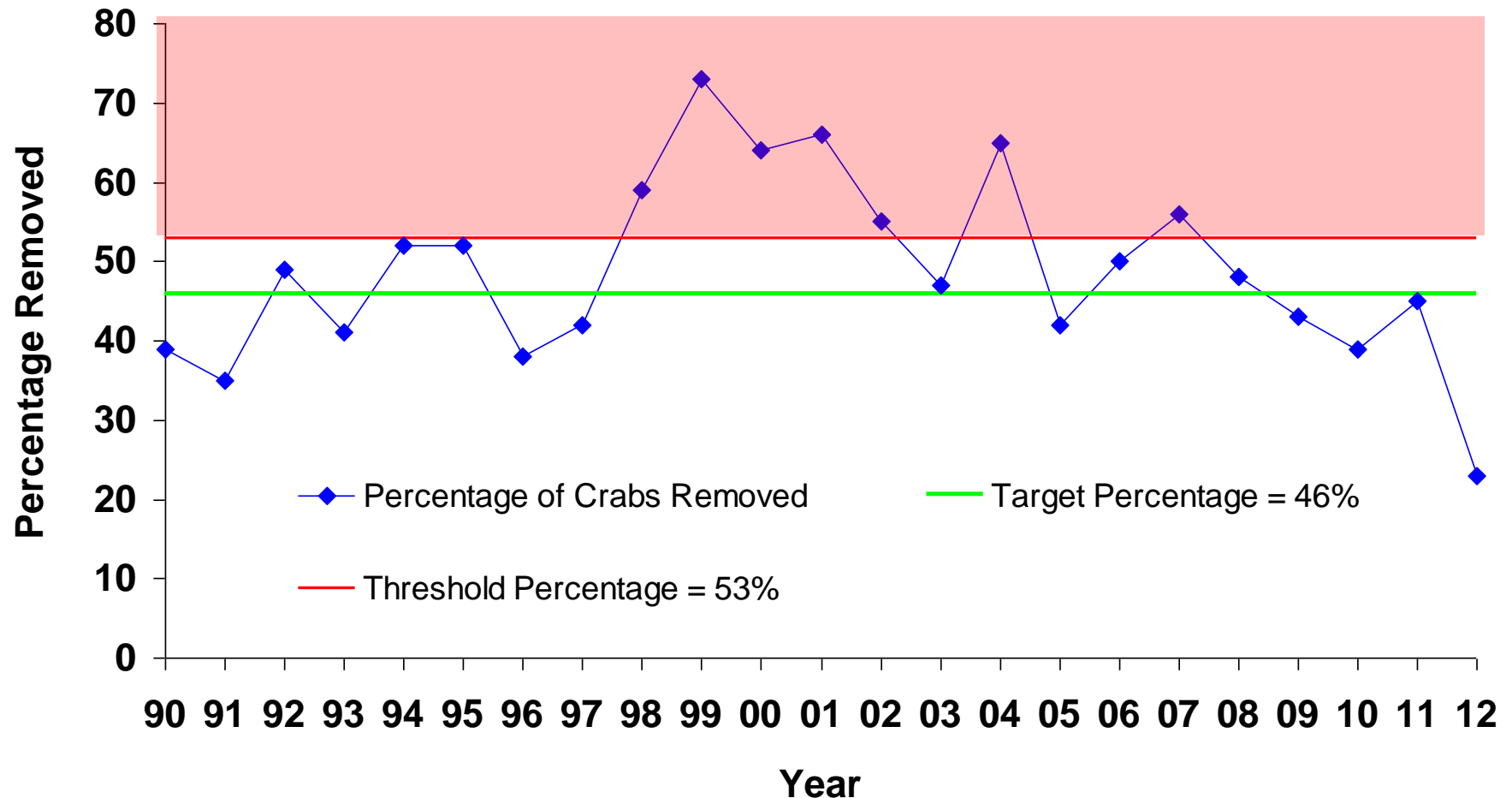
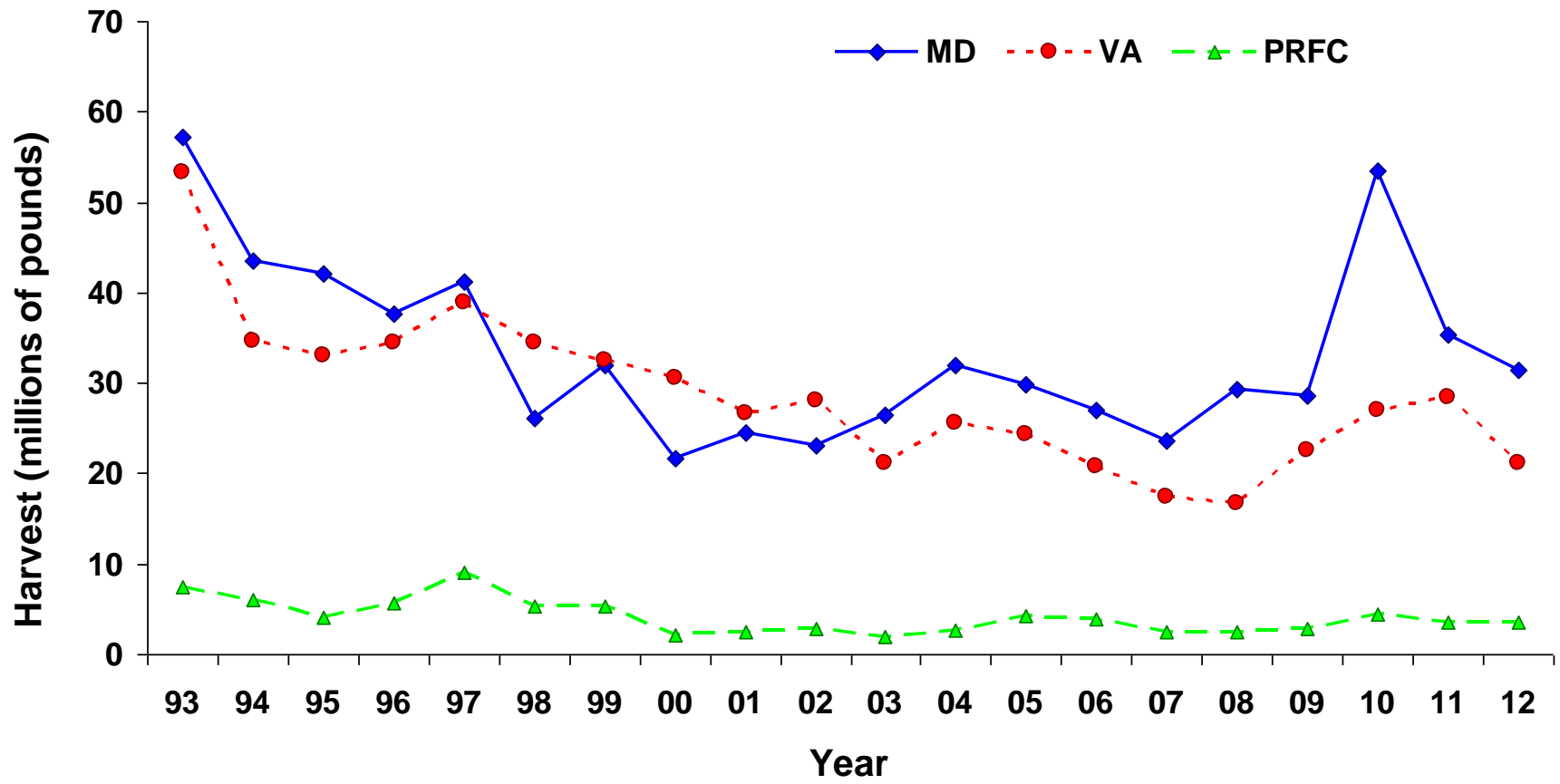


Figure 10. Maryland , Virginia and PRFC Chesapeake Bay commercial blue crab harvest in millions of pounds, 1993-2012.



# Future Research Needs

(p.1 of 2)

**8.1 Increased accountability and harvest reporting for both commercial and recreational fisheries:** Improving commercial and recreational blue crab harvest accountability.

**8.2 Gear efficiency pertaining to selectivity of WDS methods:**

The WDS survey methods to estimate gear efficiency differ between the two states. CBSAC recommends continuation of a comprehensive comparison between MD and VA WDS methodologies and gear.

**8.3 Over-wintering mortality:**

Examine WDS data to see if there are available data that may better describe overwintering mortality.

**8.4 Recruitment:**

Based on the results of the 2012-2013 WDS, a large number of recruits disappeared from the stock since the 2011-2012 WDS

# Future Research Needs

(p.2 of 2)

## **8.5 Investigation of the potential for sperm limitation:**

An analysis of age composition of mature females over the history of the WDS to determine if sperm limitation has occurred.

## **8.6 Operational sex ratio:**

A summer month survey would provide a more accurate depiction of the operational sex ratio. CBSAC recommends that this summer survey should be explored.

## **8.7 Other sources of incidental mortality:**

CBSAC also recommends analyzing the magnitude of other sources of incidental mortality to improve reliability of exploitation fraction estimates and inform future assessments.

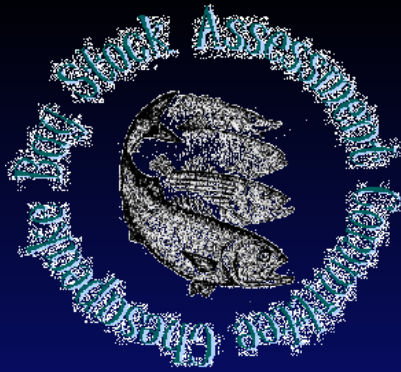
## **8.8 Collaborative Bay-wide fishery independent survey:**

A collaborative and coordinated Bay-wide, fishery-independent survey focused on the spring through fall distribution and sex specific abundance.



# Future Plans

- CBSAC will meet to discuss the future research and critical data needs this summer.
  - Address the data gaps that would best support blue crab management.
- CBSAC will determine high priority research needs considering cost, duration, and management need.
- CBSAC will present any recommendations to SFGIT for endorsement and consideration by state jurisdictions.
- Questions?



# Acknowledgments

Joe Grist (Chair)

Lynn Fegley

Derek Orner

Tom Miller

Daniel Hennen

Alexei Sharov

Rob O'Reilly

Mike Seebo

John Hoenig

Rom Lipcius

Amy Schueller

Eric Johnson

Glenn Davis

Allison Watts

John McConaugha

Andrew Turner (Coordinator)

Virginia Marine Resource Commission

Maryland Department of Natural Resources

NOAA Chesapeake Bay Office

UMCES, Chesapeake Biological Laboratory

NMFS, Northeast Fisheries Science Center

Maryland Department of Natural Resources

Virginia Marine Resource Commission

Virginia Institute of Marine Science

Virginia Institute of Marine Science

Virginia Institute of Marine Science

NMFS, Southeast Fisheries Science Center

University of North Florida

Maryland Department of Natural Resources

Virginia Marine Resources Commission

Old Dominion University

NOAA Chesapeake Bay Office/Versar