

Diamondback Terrapin Bycatch Reduction Studies

Update for the Endangered
and Nongame Species
Advisory Committee

9/20/2024



Project Background

- Bureau of Marine Fisheries fully supports efforts to reduce terrapin bycatch
- Also charged with supporting a biologically and economically sustainable blue crab fishery
- BRDs reduce harvest of blue crabs
 - “Not significant” ≠ “none”
 - Compounded by price of large crabs
 - Economic hardship
- Investigate BRD sizes that achieve DBT reduction without affecting harvest

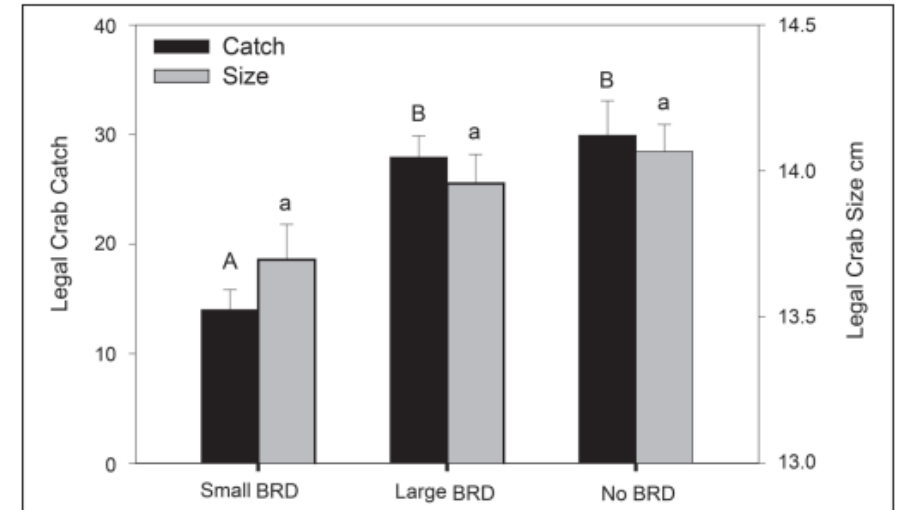
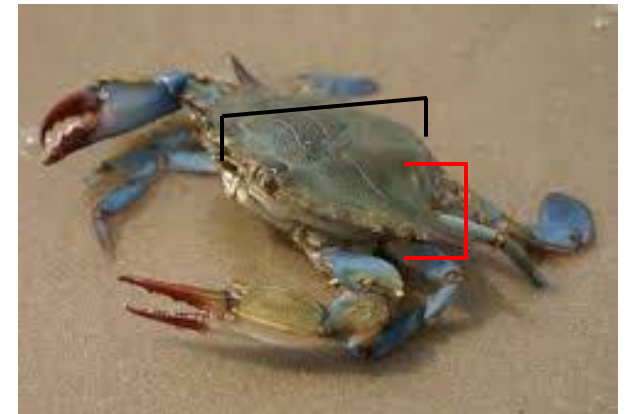
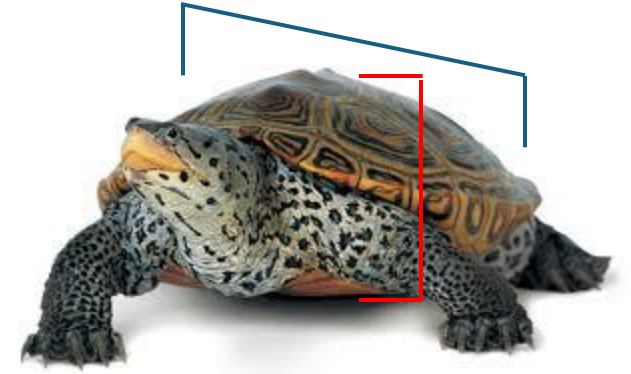


Figure 3. Comparison of average total legal crab catch and average crab size from pots conforming to different BRD regulations ($n = 10$ pots for each BRD group). Capital and lowercase letters refer to the results of post-hoc comparisons among pot types with respect to crab catch and crab size, respectively.

	#2	#1	Jumbo
	<5.5"	5.5-6.25"	6.25"+
Somer Point Crab Co	\$20	\$35	
Shag's Crabs and Seafood	\$29	\$49	\$74

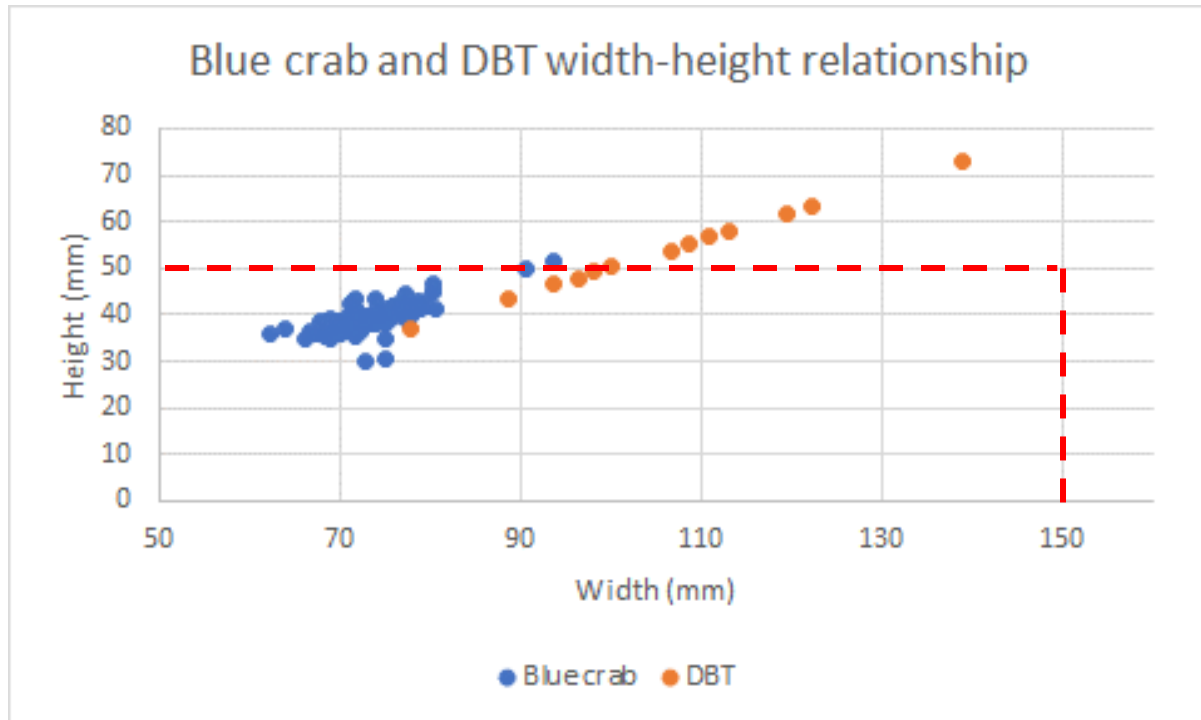
Morphometric data

- Measure crabs and DBT in both width and height
- Compare to various BRD sizes
- Evaluate what could optimize both harvest and bycatch reduction



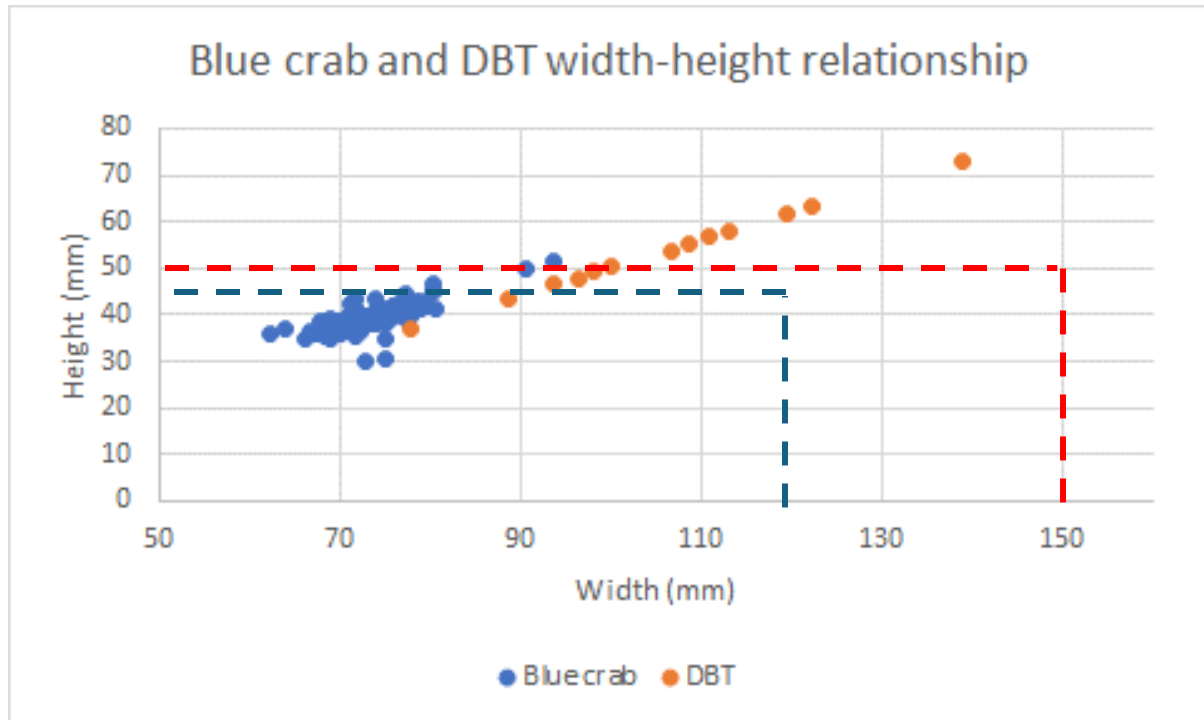
Morphometric data

- Crabs and DBT constrained by height, not width in current TEDs (5 x 15 cm)



DBT data from Atkinson 2014, courtesy of Dr. Wnek

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- Proposed TEDs (4.5 x 12 cm) provide additional protection to DBT, but at the expense of crabs.

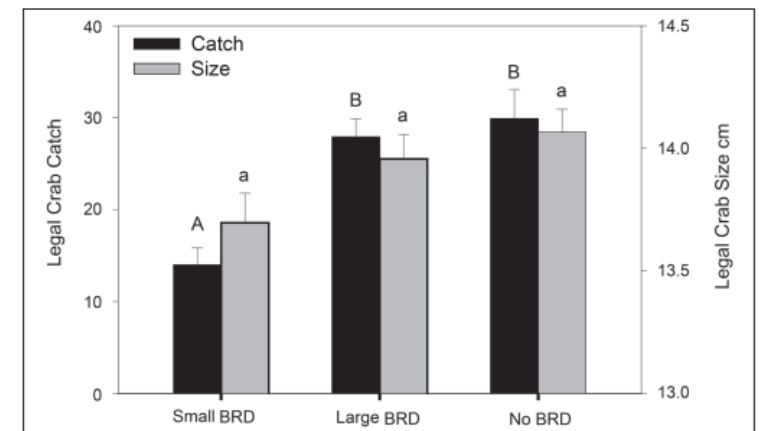
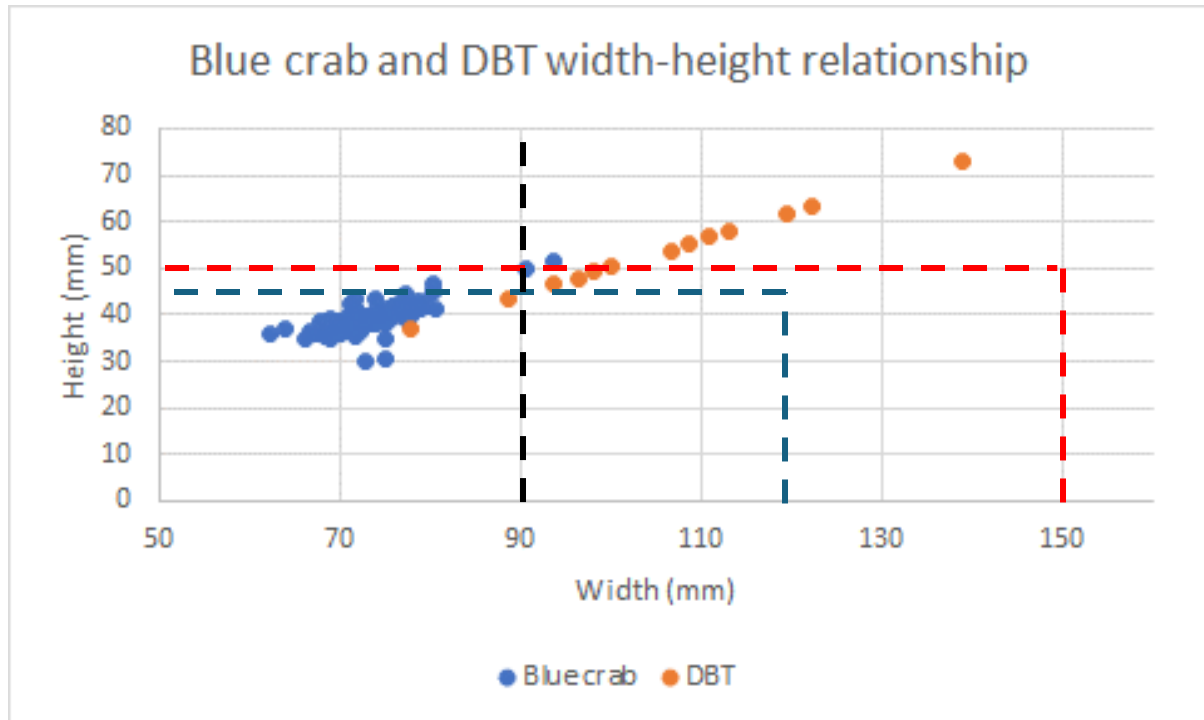


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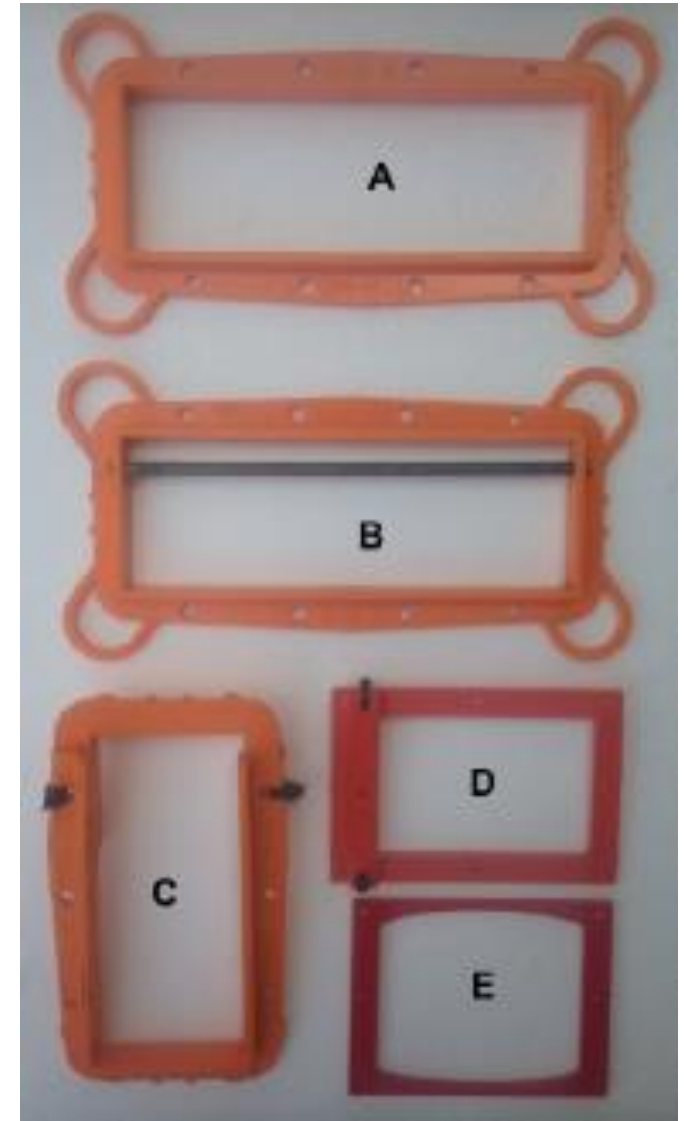
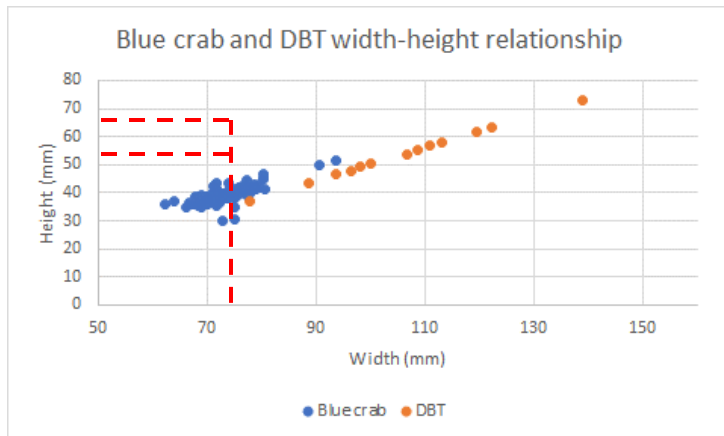


DBT data from Atkinson 2014, courtesy of Dr. Wnek

- Crabs and DBT constrained by height, not width in current TEDs (5 x 15 cm)
- Proposed TEDs (4.5 x 12 cm) provide additional protection to DBT, but at the expense of crabs.
- Could *theoretically* get the same DBT savings just by reducing the width (eg 5 x 9 cm)

Similar studies

- Several studies show *increased* crab catch with 5 x 10 cm TEDs
- SC DNR tested multiple sizes
- Optimum size 5.1-6.4 x 7.3 cm



Project Background

- Move from theory to proof of concept...sort of
- Field and tank trials with different sized BRDs
- First hand knowledge
- Evaluate “novel” 5 x 9 size



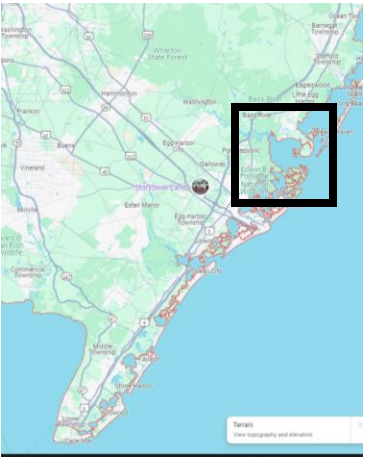
Project Design

- Survey conducted out of Nacote Creek Research Station on the Great Bay and Mullica River.
- 36 Chesapeake style commercial crab pots (18 in the bay, 18 in the river).
- 2 different size BRDs used in pots along with pots without BRDs.
- 24-hour soak time.
- GPS location, water depth, distance from shore.
- All crabs, fish, terrapins measured and recorded along with environmental conditions.

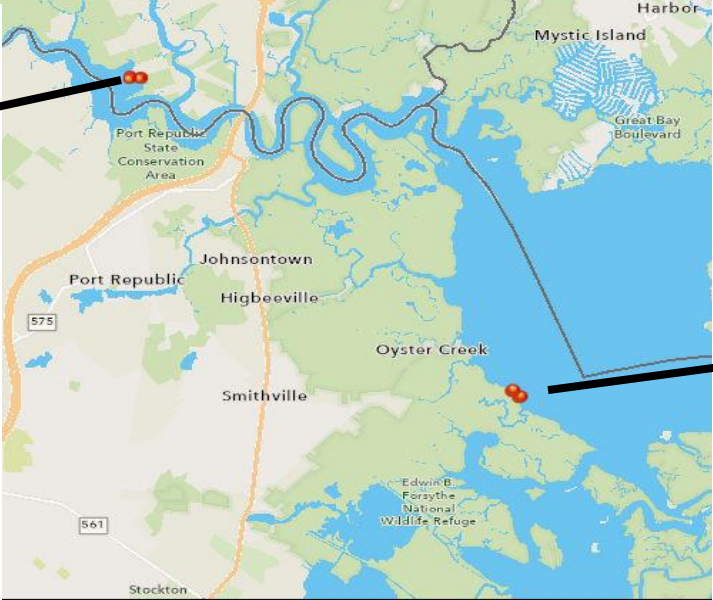
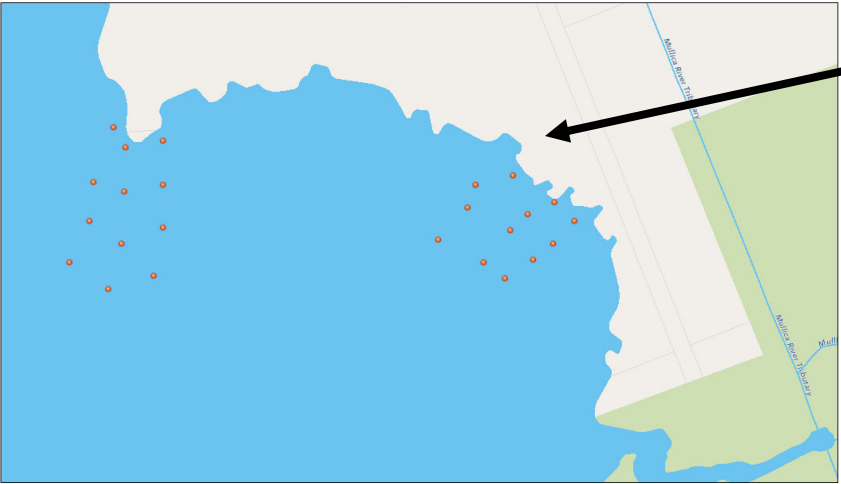


Location

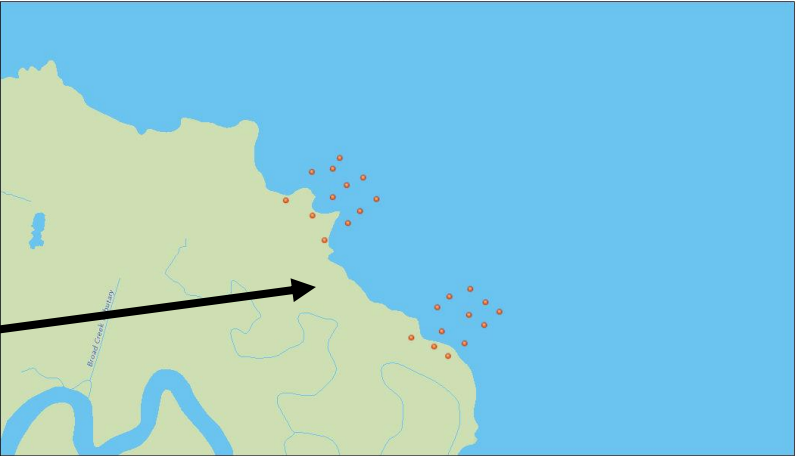
Crab Pot Survey Locations - June



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Bycatch Reduction Devices

- New Jersey BRD – 5 x 15 cm
 - Only used in the survey for May and June. Discontinued after discussions that there has been enough research conducted on this BRD.
- Chesapeake BRD – 4.5 x 12 cm
- South Carolina BRD – 5.1 x 7.3 cm
 - This BRD was hard to find a manufacturer to make and took a long time to make. This BRD replaced the New Jersey BRD in July and will be evaluated through the rest of the survey.
- Novel 5 x 9 cm was not tested...yet

Sampling schedule

- Sampling conducted first week of the month
- Pots set on Monday
- Pots checked and reset on Tuesday
- Pots checked and pulled on Wednesday

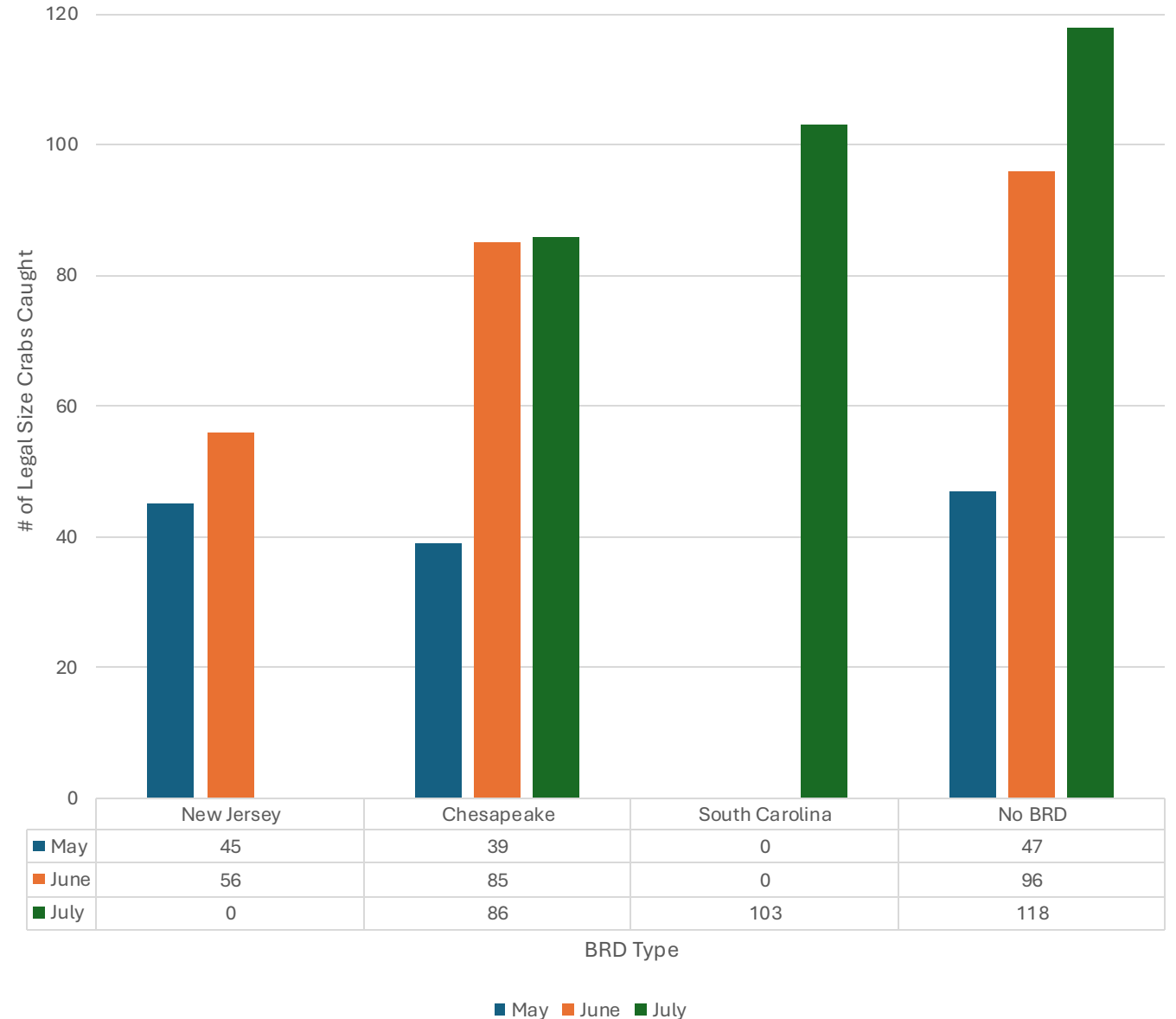
		NJ	Chesapeake	SC	Novel
	None	5x15	4.5x12	5.1x7.3	5x9
May	X	X	X		
June	X	X	X		
July	X		X	X	
Aug	x		x	x	
Sept	x		x	x	
Oct					



Legal Crabs

- Legal size in NJ for a hard crab is 4.5” (rec) and 4.75” (com).
- For this project, any crab over 4.5” (114 mm) is considered legal size.
- **!!!!PRELIMINARY RESULTS!!!!**
- Early data show that all BRDs reduce legal catch compared to no BRD
- Of the BRDs, NJ style performs worst and SC style performs best

Number of Legal Size Crab Caught per Month and BRD

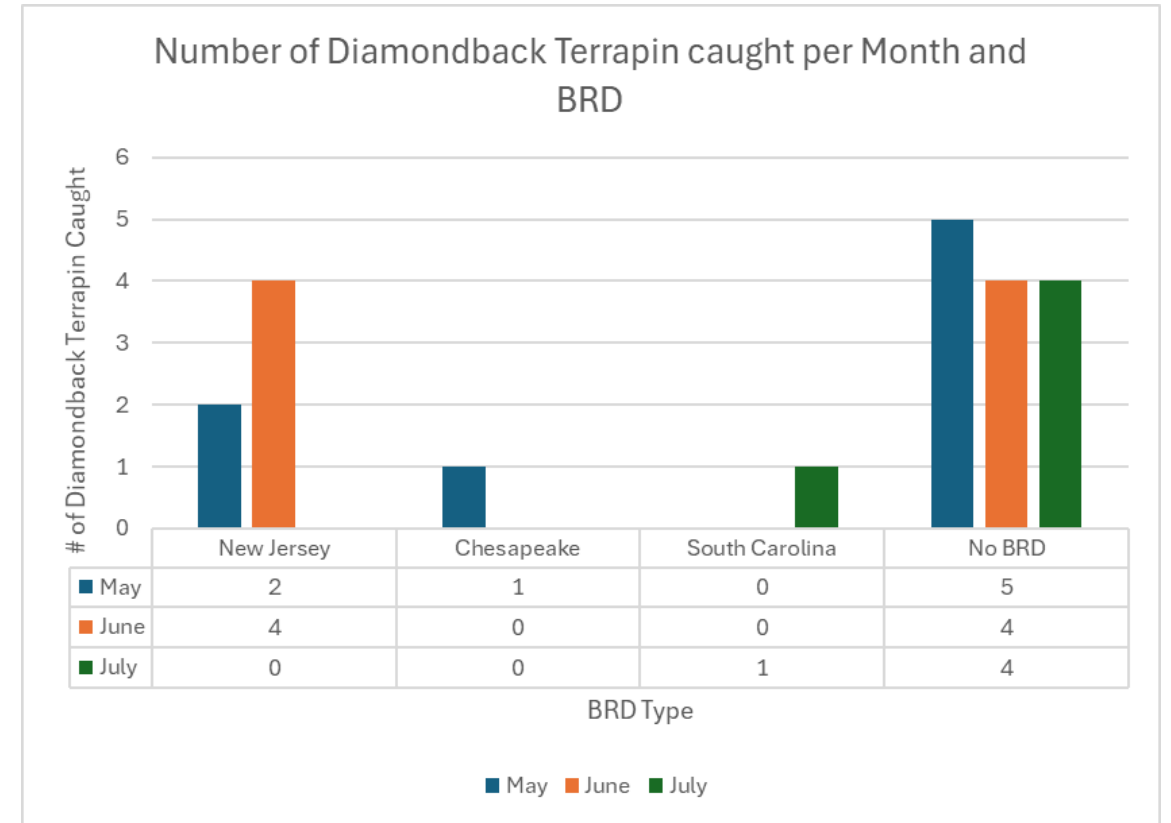




Number 1 Crab

- Most valuable crab to the commercial harvester.
- Can sell at retail sometimes double or triple the price of a number 2 crab depending on the market.
- Grading can vary depending on the market but for this project anything over 5.5" (139 mm) is considered a #1 crab.
- When caught biologist measure carapace width, length and height along with weight

	May	June	July
New Jersey	3	2	N/A
Chesapeake	3	2	3
South Carolina	N/A	N/A	2
No BRD	1	4	9



Number of Diamondback Terrapins Caught

- When captured biologist measure carapace length, width and height of each terrapin.
- Each BRD type did capture a terrapin but pots with no BRDs did capture more.

PICK UP DATE	DISTANCE FROM SHORE (FT)	WATER DEPTH (FT)	BRD	CARAPACE LENGTH (MM)	CARAPACE WIDTH (MM)	CARAPACE HEIGHT (MM)	GENDER	ALIVE/ DEAD
5/7/2024	82.5	5.5	No BRD	105.1	83	48.18	X	A
5/7/2024	82.5	5.5	No BRD	156.36	119.25	64.82	X	A
5/8/2024	177.4	5.5	New Jersey	97.19	81.44	44.09	X	A
5/8/2024	159.4	6	Chesapeake	98.88	84.26	39.41	X	A
5/8/2024	76.9	6	New Jersey	113.88	93.58	48.67	X	A
5/8/2024	82.5	6	No BRD	100.59	79.06	47.01	X	A
5/8/2024	82.5	6	No BRD	95.82	76.47	40.89	X	A
5/8/2024	233.1	6	No BRD	184.21	140.27	73.14	X	A
6/4/2024	82.9	5.5	New Jersey	101.73	82.61	45.02	X	D
6/4/2024	107.3	4.5	New Jersey	107.48	83.85	44.81	X	A
6/4/2024	105.5	4	No BRD	168.84	133.09	65.59	F	A
6/5/2024	82.9	6	New Jersey	168.44	93.2	47.66	X	D
6/5/2024	160.1	5	No BRD	152.02	79.17	41.83	X	A
6/5/2024	160.1	5	No BRD	143.55	112.74	61.24	X	A
6/5/2024	154.1	3.5	New Jersey	100.01	75.62	43.24	X	A
6/5/2024	110.2	5	No BRD	116.49	92.78	46.29	X	D
7/9/2024			South Carolina	120	94	46	M	D
7/9/2024			No BRD	161	126	65	F	A
7/9/2024			No BRD	138	112	55	X	D
7/10/2024			No BRD	155	123	60	X	D
7/10/2024			No BRD	165	141	72	F	D

- Sample terrapin data collected while in the field.
- Not shown but DBT mortality increased with water temperature (~24 hour soak)
- Look for correlations with depth and distance from shore



Additional Bycatch

- Bycatch data for fish, sharks and other crustaceans not yet analyzed
- But...
- BRD's do not seem to exclude most fish, shark(dogfish) or other crustaceans
- **Main exception** is whelk, which is a valuable bycatch species for the commercial crab industry.

What's Next?

- Sampling will continue through October.
- Coordinating with John Wnek at MATES for tank studies (including 5x9)
- Bureau of Marine Fisheries and Endangered and Nongame Species Program will discuss next course of action.
- Stakeholder feedback, involvement?
- Creating the perfect BRD that satisfies all parties.

