Oyster Monitoring and Restoration Efforts in Apalachicola Bay, Florida

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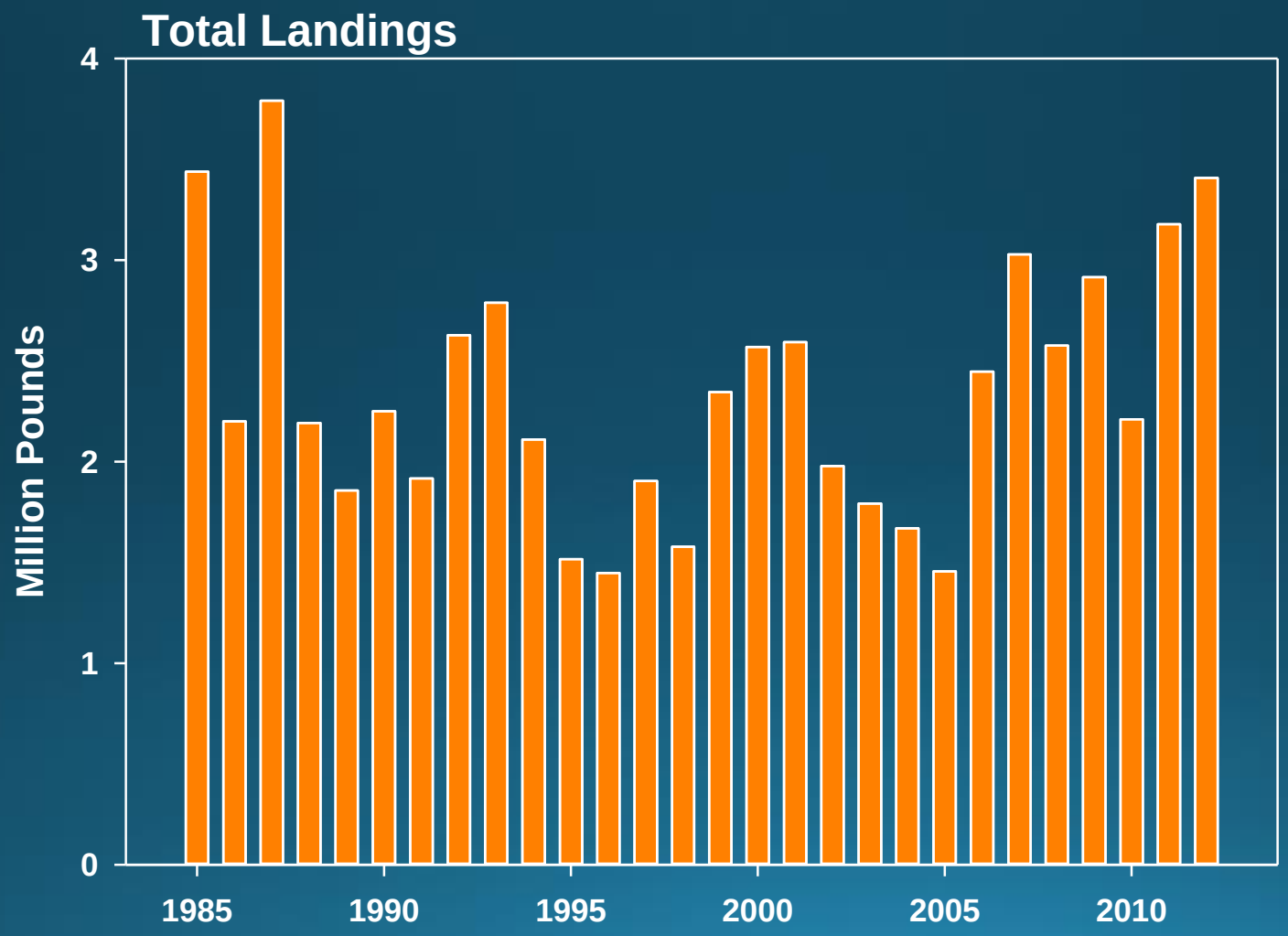
Florida Fish & Wildlife Research Institute, October 10, 2019

Florida Oyster Fishery

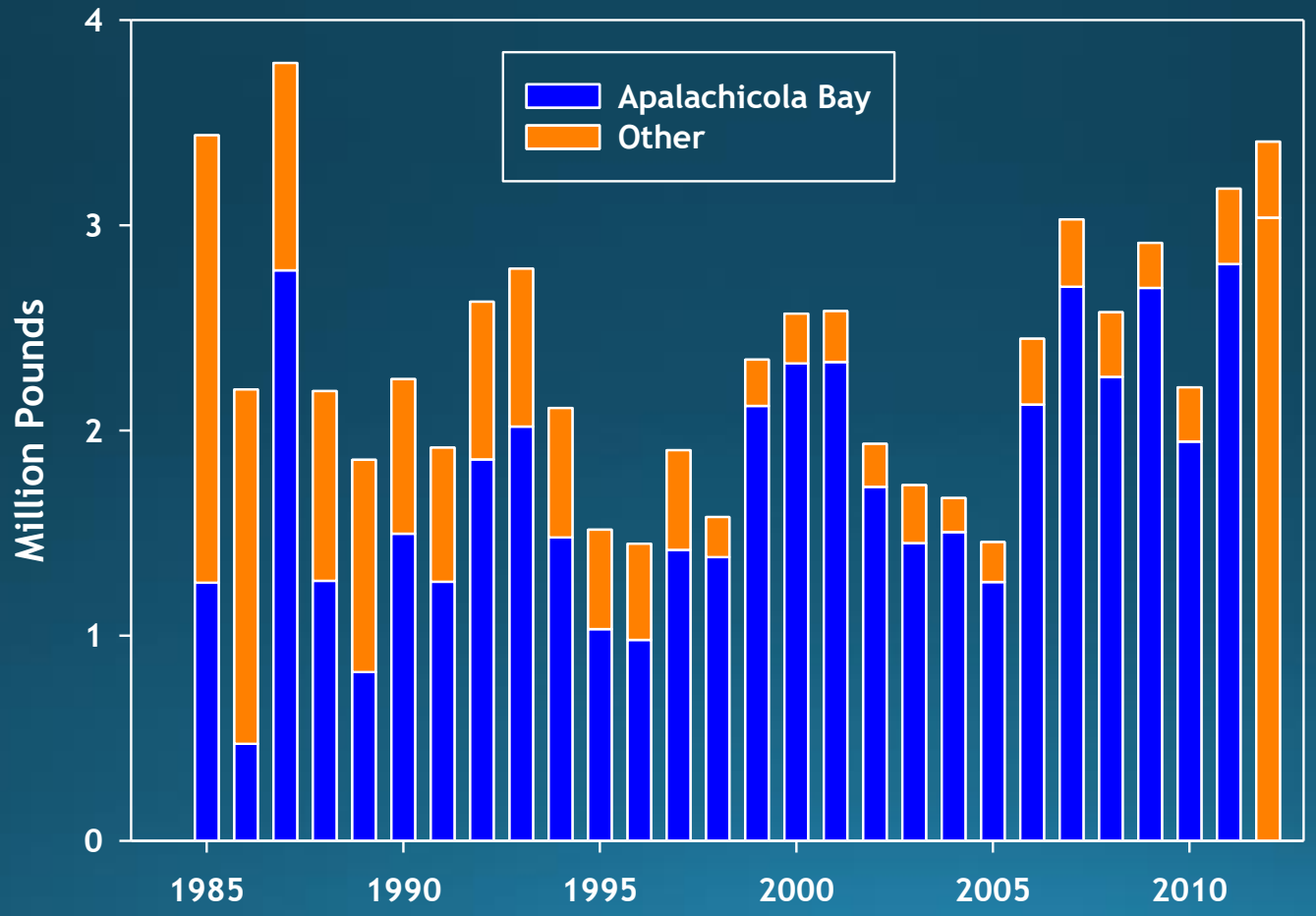
Statewide average: 2.3 million lbs, $4.3 million



Florida Oyster Fishery

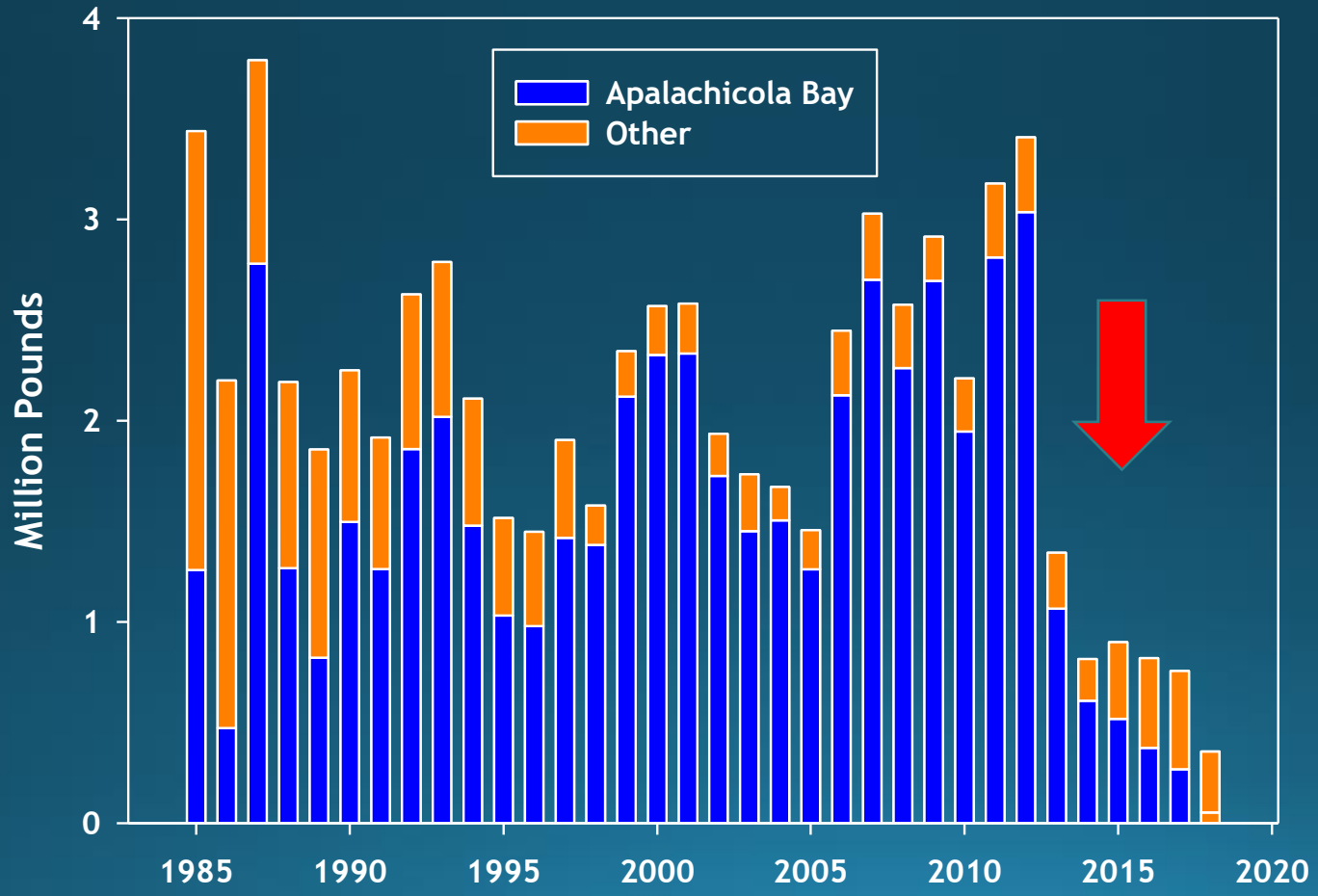
Majority of Florida landings from Apalachicola Bay

- ~90% from 1998 to 2012
- Average 1.8 million lbs, $3.4 million from 1985 to 2012



Oyster Fishery Collapse

Combination of poor environmental conditions, poor oyster survival, substrate loss, increased fishing pressure, etc. led to a collapse of the fishery in late 2012

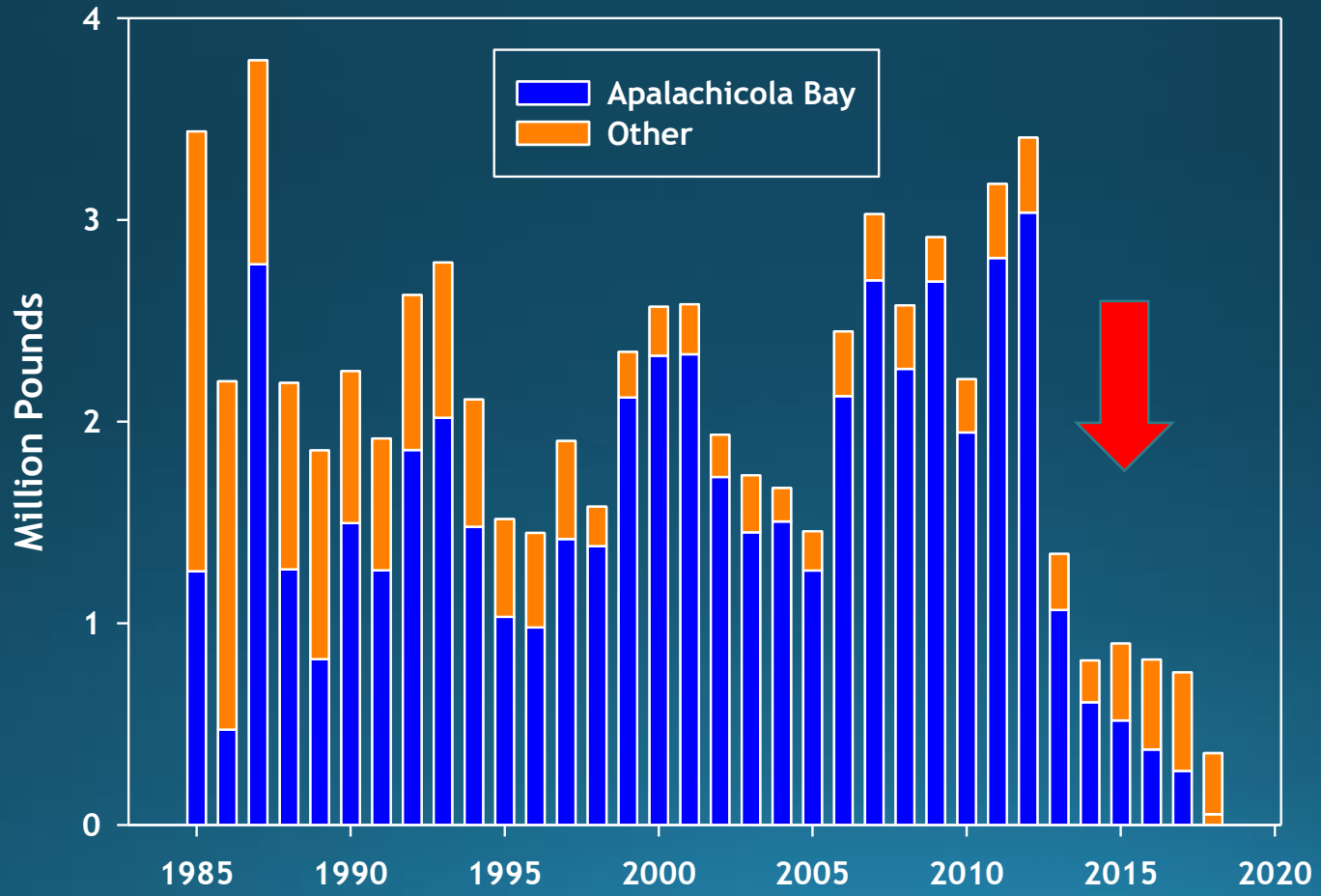


Oyster Fishery Collapse

2018 Statewide Landings: ~525,000 lbs (15% of 2012)

2018 AB Landings: ~56,000 lbs (2% of 2012)

- Now only 11% of total landings



NFWF Oyster Restoration

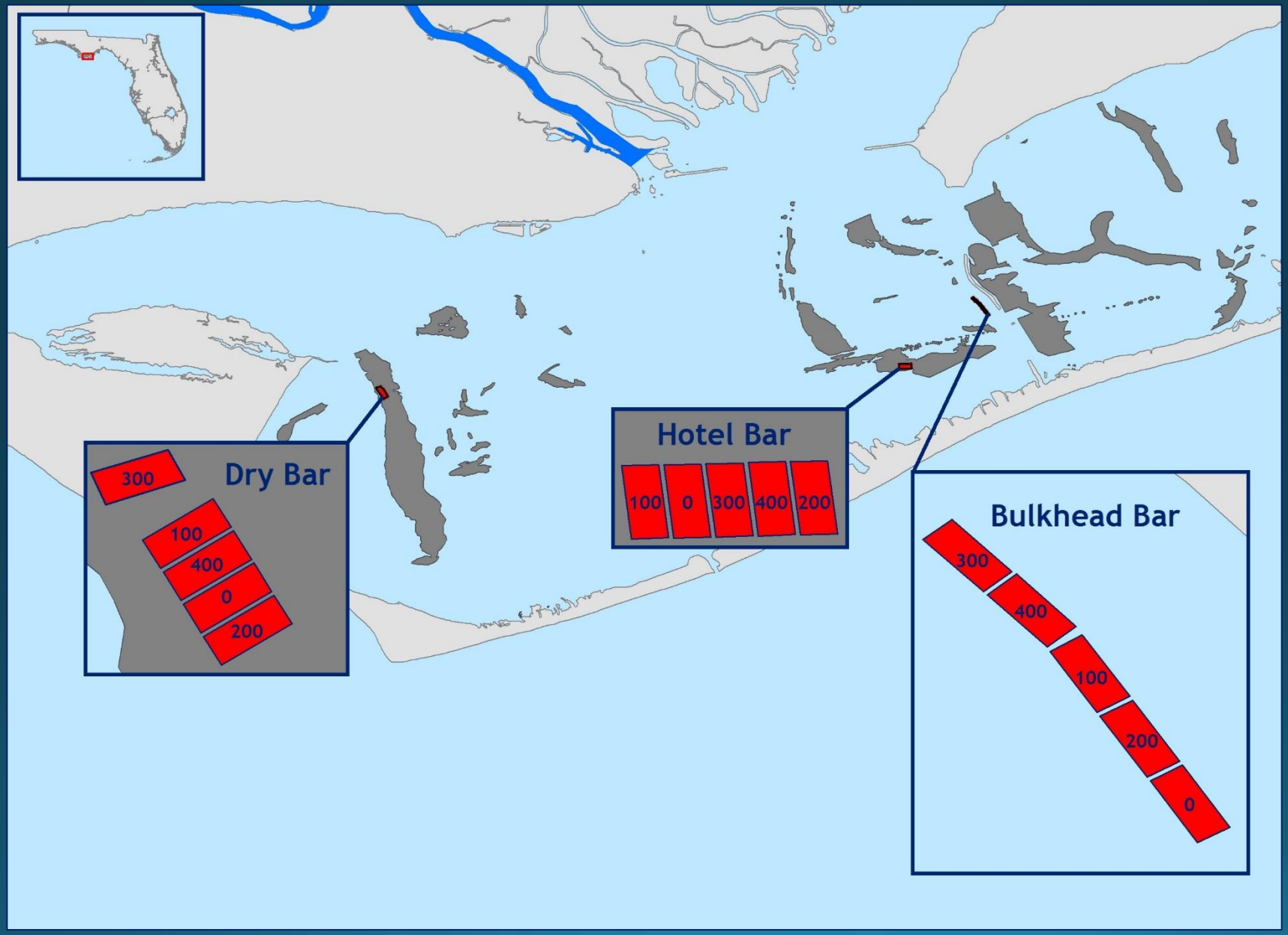
National Fish & Wildlife Foundation, Gulf Environmental Benefit Fund – Oil Spill Money

- Cultching at three 10-acre sites:
  - Dry Bar, Hotel Bar, and Bulkhead Bar
- Each site has five 2-acre plots planted with different densities of fossil shell cultch:
  - 0, 100, 200, 300, and 400 yds^3/ac

Purpose is to identify most optimal and cost effective shell cultching strategies for future restoration efforts

Karl Havens, Florida Sea Grant

NFWF Sites


Dry Bar
300
100
400
0
200
Hotel Bar
100
0
300
400
200
Bulkhead Bar
300
400
100
200
0

NFWF Oyster Restoration

Collaborative Project

- FDACS – planning and oversight of barge shelling
- FWC – monitoring oyster density and size structure; and predator densities
- University of Florida – monitoring oyster health and condition, community outreach and communications
- University of New Hampshire – mapping and groundtruthing of study sites

Joe Shields, FDACS

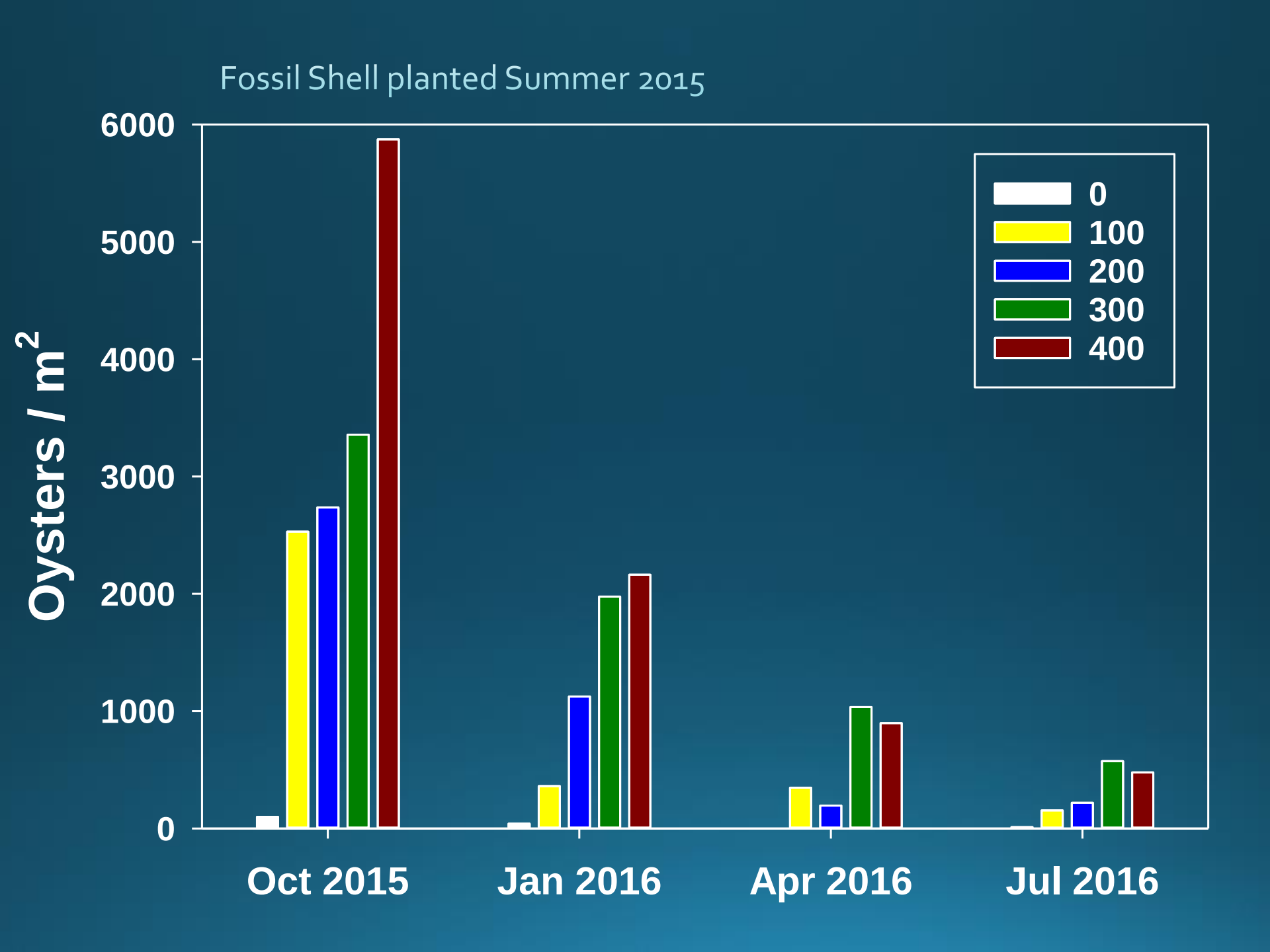
Fossil Shell planted Summer 2015

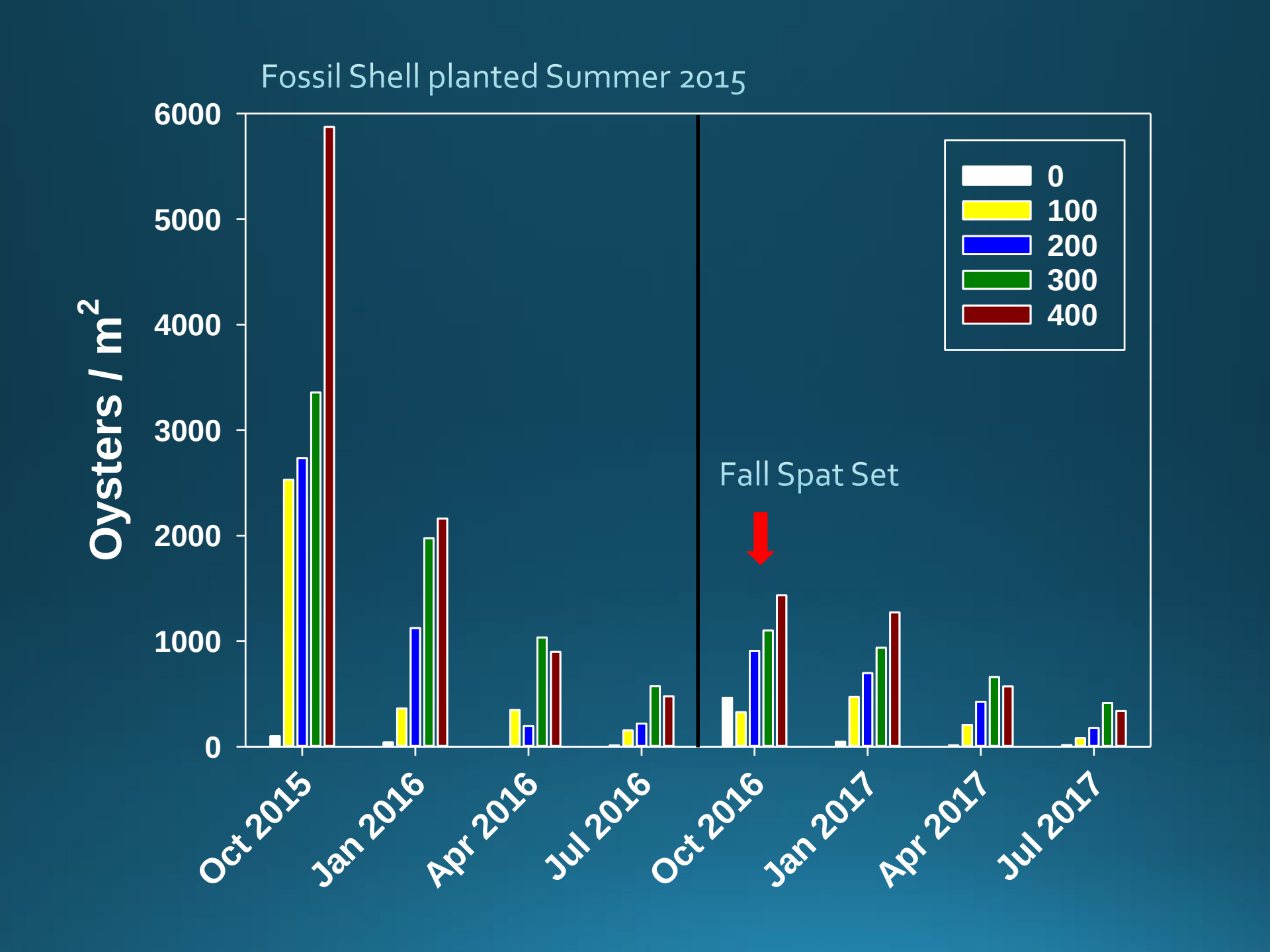
Oysters / m^2

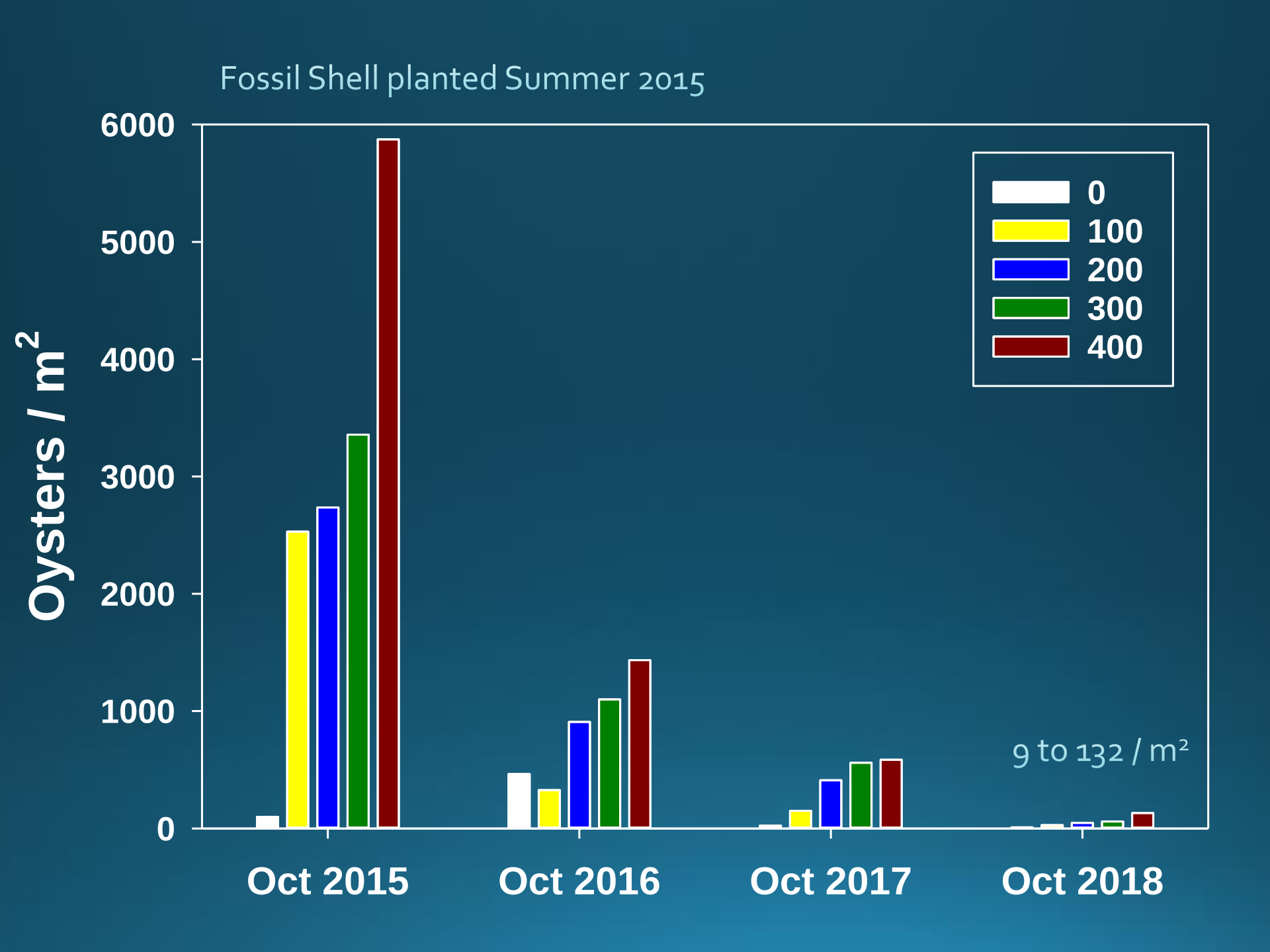
6000
5000
4000
3000
2000
1000
0

0
100
200
300
400

Oct 2015


Fossil Shell planted Summer 2015
Oysters / m2
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
Oct 2015
Jan 2016
Apr 2016
Jul 2016


Fossil Shell planted Summer 2015
Oysters / m2
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
Fall Spat Set
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017


Fossil Shell planted Summer 2015
Oysters / m2
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
9 to 132 / m²
Oct 2015
Oct 2016
Oct 2017
Oct 2018

Fishing Effects on Bar Restoration

Shelled sites opened to harvest once all plots have minimum of 10 legal-sized oysters/m²

	Quarter	Bulkhead Bar					Dry Bar					Hotel Bar				
		0	100	200	300	400	0	100	200	300	400	0	100	200	300	400
Jan 2016	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0
	3	0	1	0	3	1	0	0	0	0	0	0	5	3	131	109
	4	0	4	2	3	6	0	0	0	26	0	0	0	42	24	112
	5	0	15	20	27	60	0	0	0	5	0	5	0	38	12	49
Jan 2017	6	0	41	61	43	52	0	0	0	11	0	0	0	8	13	81
	7	0	18	9	58	57	0	0	0	9	0	0	0	34	16	44
	8	0	0	2	9	12	0	0	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan 2018	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

47%

NFWF – Alternative Plan

SHELL BUDGET MODEL

- Extreme natural interannual variation in oyster numbers/biomass
- Oysters create their own habitat
- So… Soniat et al (2012, 2014) created a Sustainable Fisheries Model (SFM) with two biological reference points:
  1) Abundance/Biomass
  2) Substrate – specifically, no net shell loss

…only if habitat integrity is preserved can oyster populations achieve sustainability over long-term…

NFWF – Alternative Plan

SHELL BUDGET MODEL

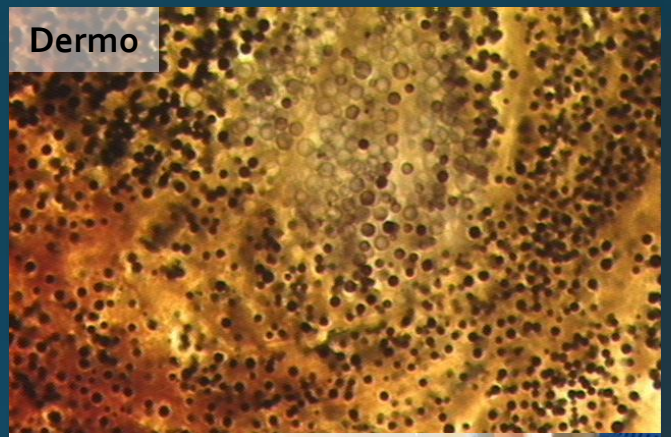
- SFM incorporates stock assessment data with a Constancy Carbonate Model
  - Constancy Carbonate Model accounts for amount of shell/substrate on the reef
- SFM estimates sustainable harvest numbers for oysters
  - Sustainability = No Net Loss of Surficial Substrate
- Currently being used in Louisiana and new SK funding to develop for all Gulf states
  - Tool for sustainably managing commercially harvested oysters
  - Increasing benefits from restoration efforts so long-term rather than short-term solutions

Summary

Oyster densities in Apalachicola Bay are low and most oysters are spat

Causes?

- Higher salinity regime
  - Predation
  - Shell Pests
  - Disease
- Overfishing/Poaching
- Loss of Substrate
  - Increased sedimentation
- Need for Adaptive Management



Questions?