



*Stock Assessment of Spotted Seatrout (*Cynoscion nebulosus*) in Virginia and North Carolina Waters, 1991–2019*

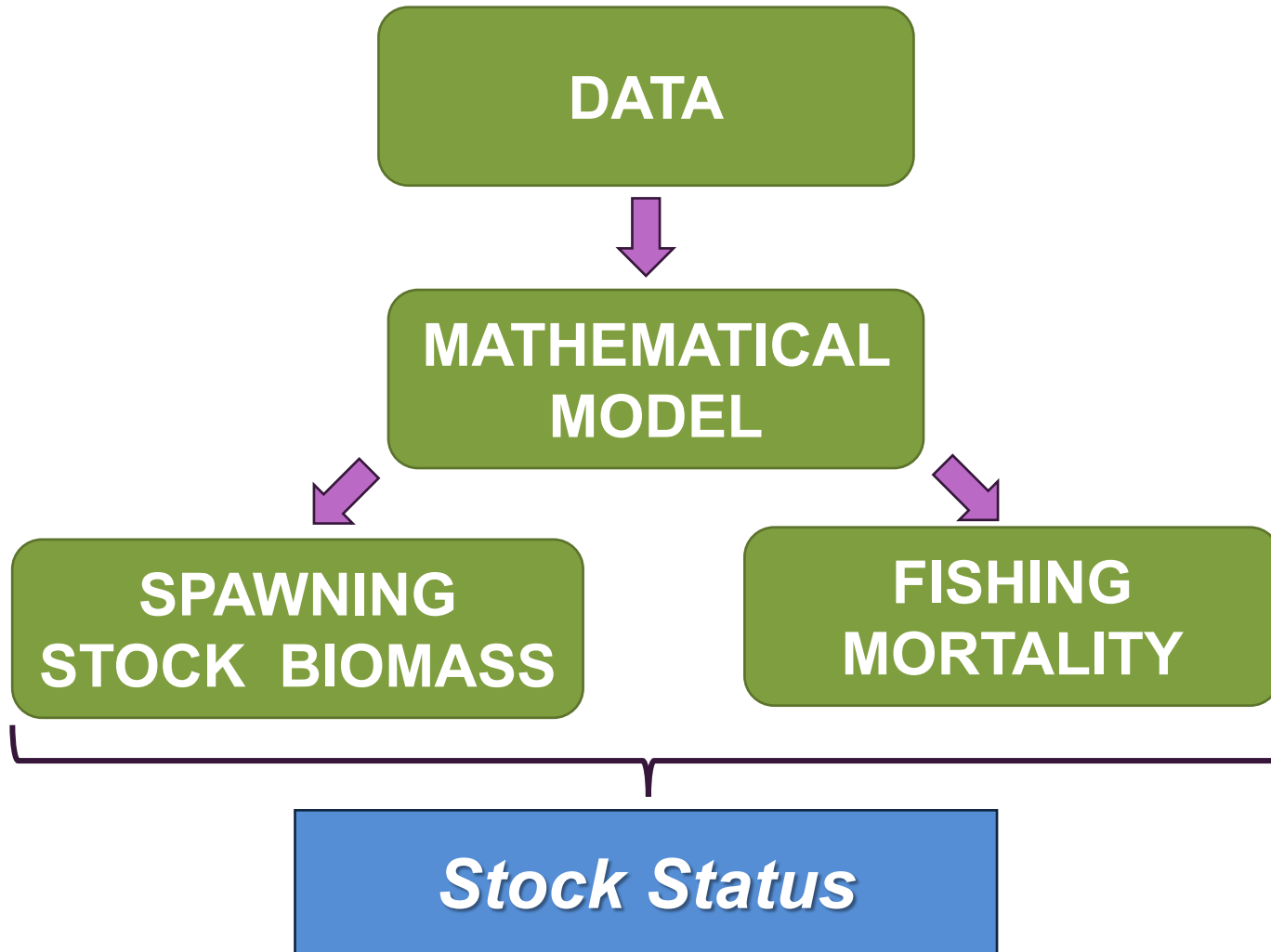
DEPARTMENT OF ENVIRONMENTAL QUALITY

Marine Fisheries

N.C. Marine Fisheries Commission Meeting | Yan Li, David Behringer & Lucas Pensinger | Nov 16-18, 2022



# *Stock Assessments*



- Time series: 1991 through 2019
- Two seasons:
  - Season 1: non-winter season, Mar 1 – Nov 30
  - Season 2: winter season, Dec 1 – Feb 28/29 of the following year

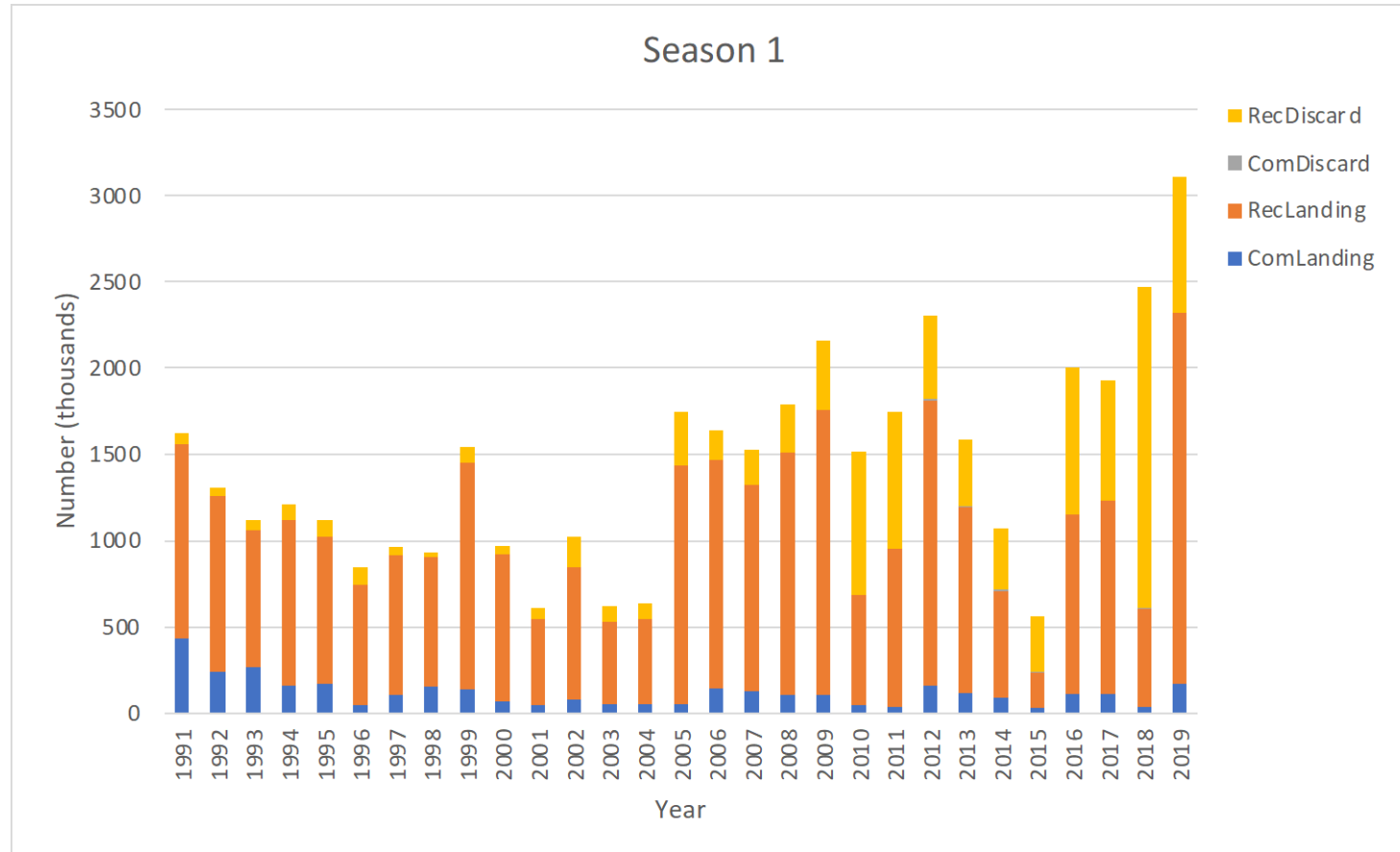


- Fisheries-dependent (NC+VA)
  - Commercial landings and discards
  - Recreational landings and discards
  - Biological data (length, weight, age)
- Fisheries-independent (NC)
  - Gill-net survey (Program 915 Spring and Fall indices)
  - Biological data (length, weight, age)



# Landings & Discards

## Season 1 (non-winter): March–November

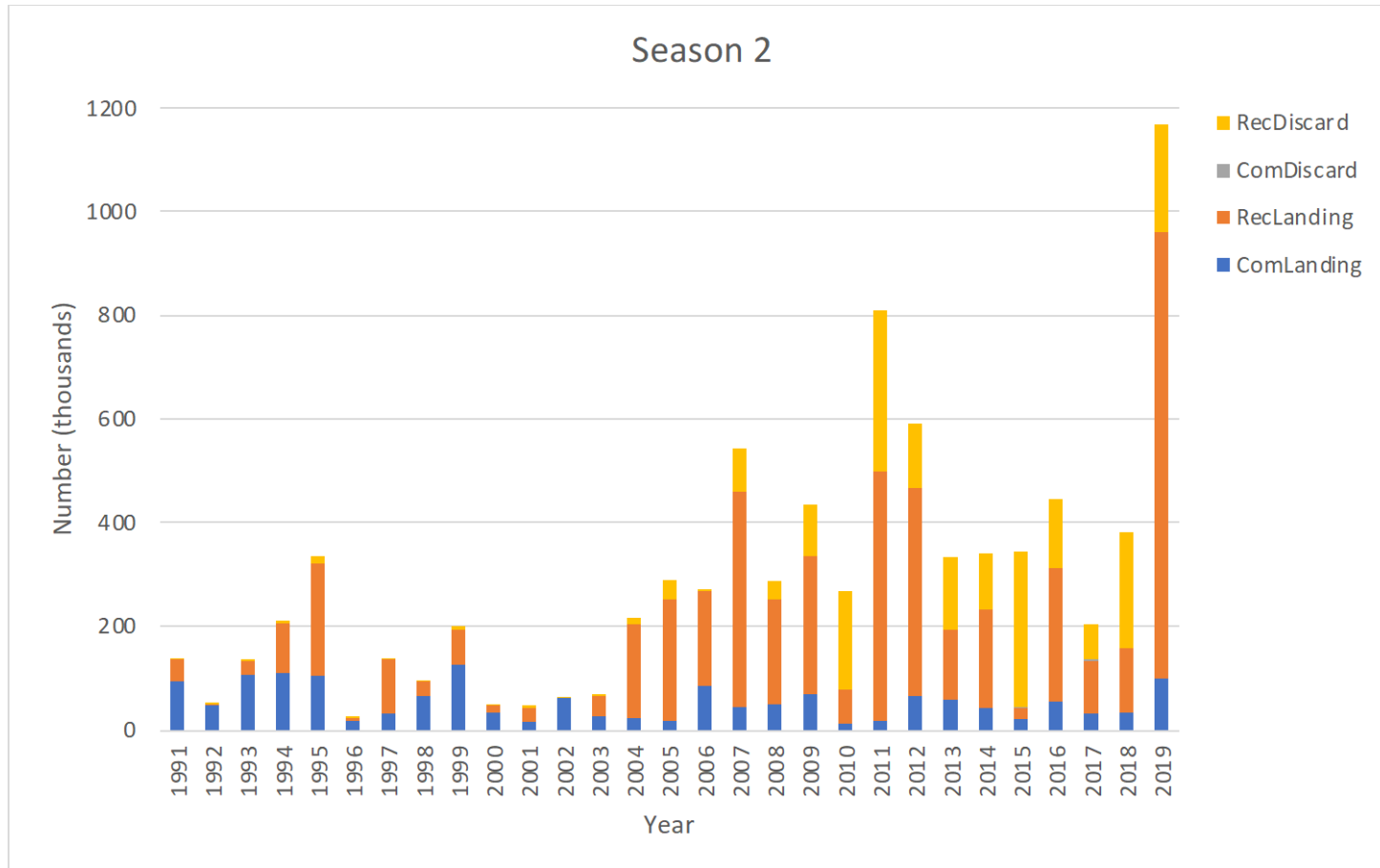


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# Landings & Discards

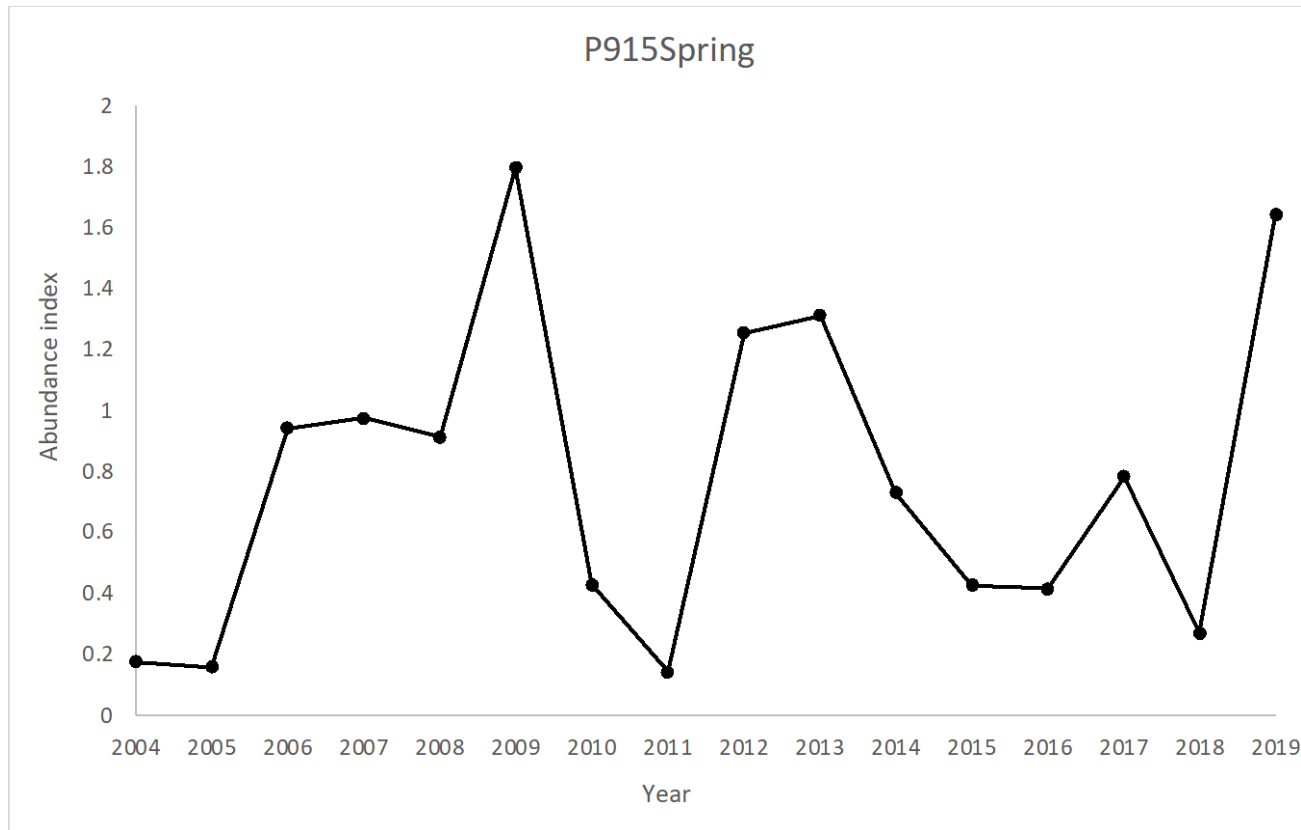
## Season 2 (winter): December–February



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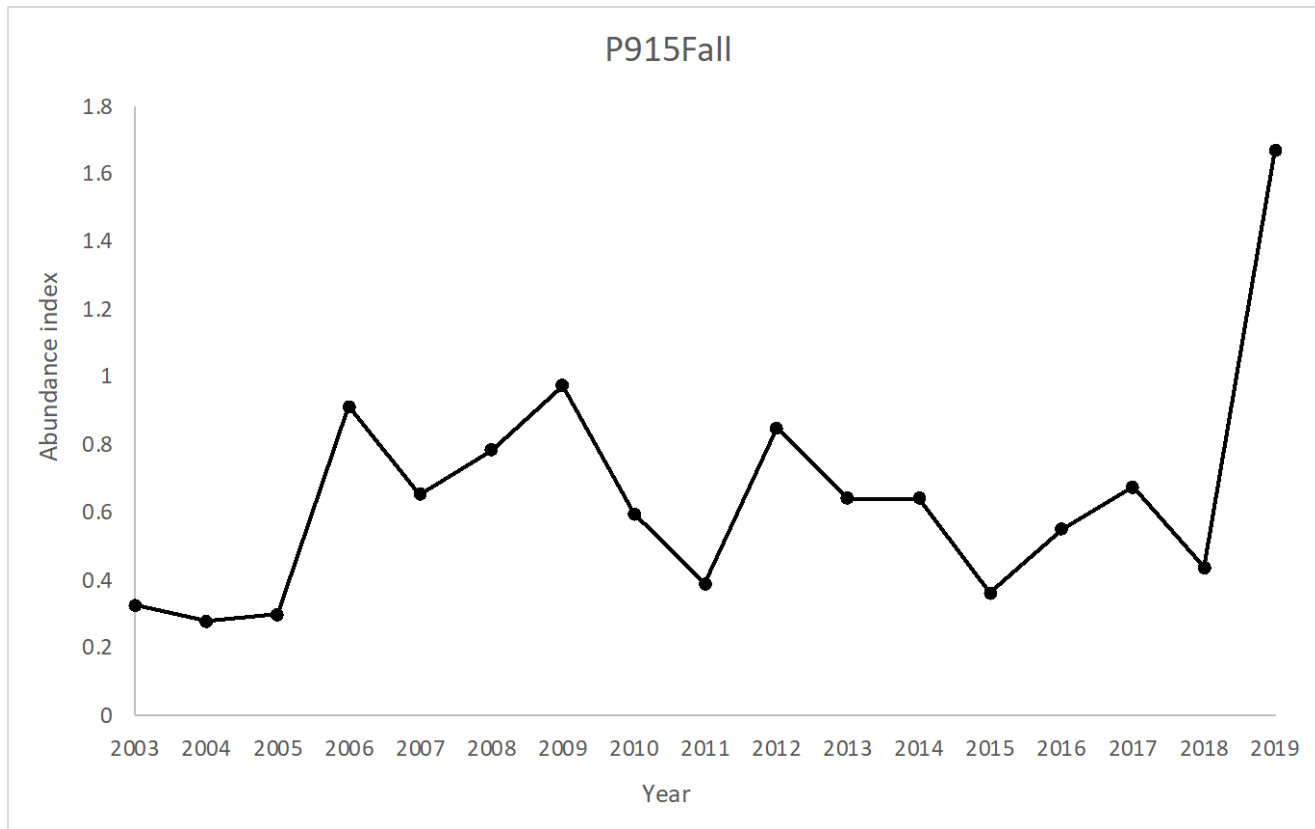
# Gill-Net Survey (P915 Spring Index) April–June



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# Gill-Net Survey (P915 Fall Index) September–November



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# Stock Status—Reference Points

- Spawning potential ratio (*SPR*)
  - Threshold: 20%
  - Target: 30%
- Fishing mortality (*F*)
  - Threshold:  $F_{20\%}$
  - Target:  $F_{30\%}$
  - $F_{\text{terminal}} / F_{20\%} > 1 \rightarrow$  overfishing is occurring
- Spawning stock biomass (*SSB*)
  - Threshold:  $SSB_{20\%}$
  - Target:  $SSB_{30\%}$
  - $SSB_{\text{terminal}} / SSB_{20\%} < 1 \rightarrow$  stock is overfished

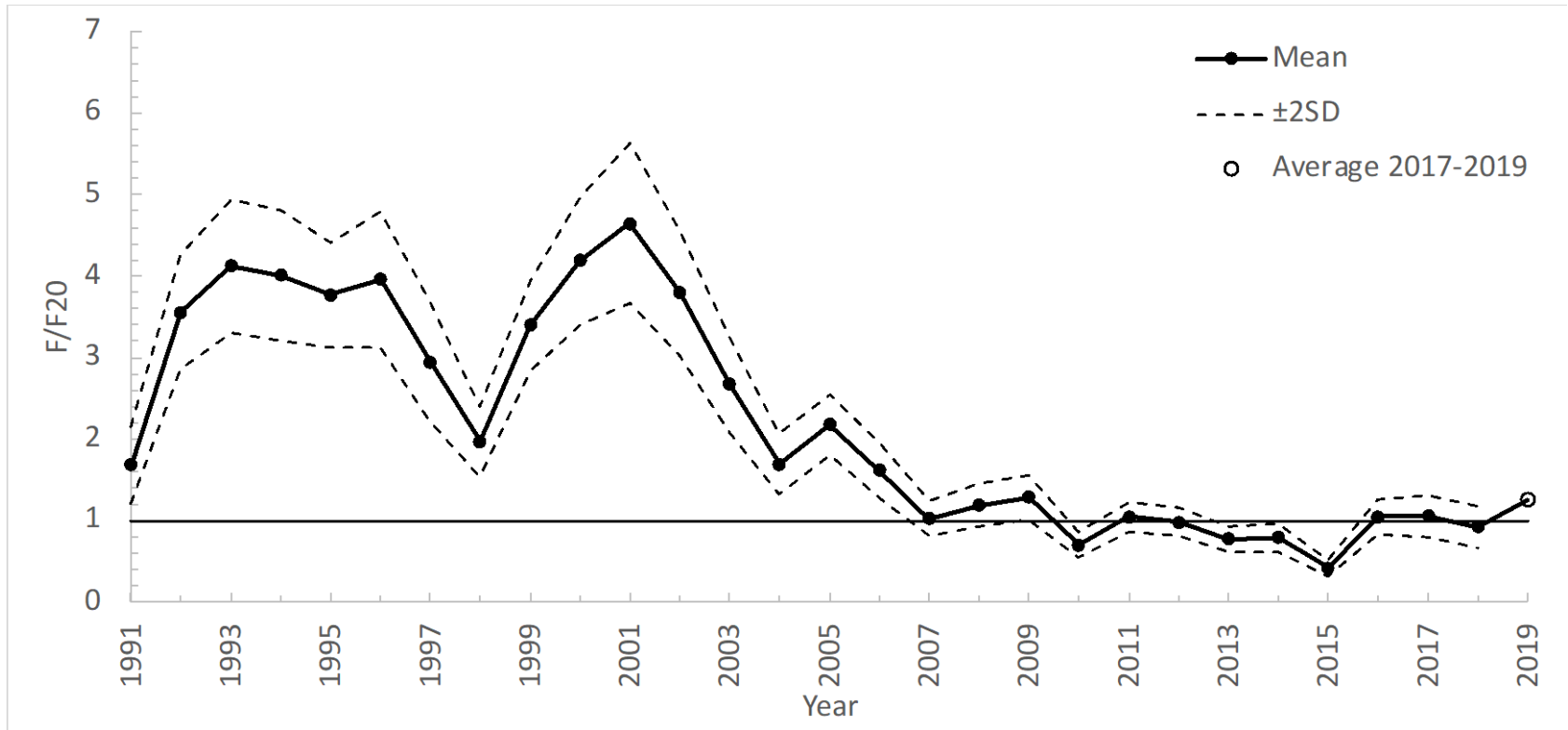


# *Stock Status—Reference Points*

- Terminal year estimates ( $F_{2019}$  and  $SSB_{2019}$ )
  - Three-year (2017–2019) average weighted by the inverse of uncertainty (coefficient of variation, CV)



# Stock Status—Fishing Mortality



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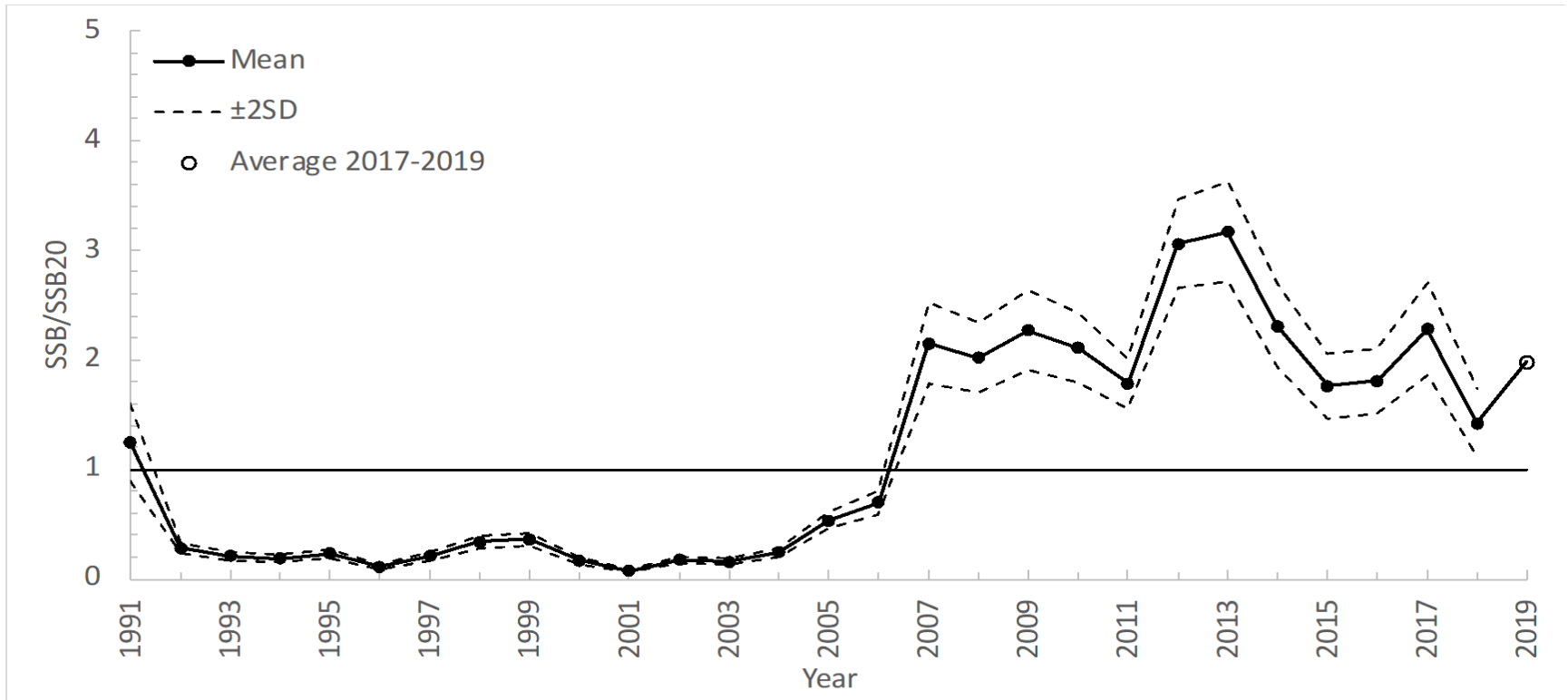


# *Stock Status—Fishing Mortality*

- $F_{2019} = 0.75$
- $F_{20\%} = 0.6$  (threshold)
- $F_{30\%} = 0.38$  (target)
- $F_{2019} / F_{20\%} = 1.3$
- $F_{2019} / F_{20\%} > 1 \rightarrow$  overfishing is occurring



# Stock Status—Spawning Stock Biomass



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# *Stock Status—Spawning Stock Biomass*

- $SSB_{2019} = 2,259$  mt (4.98 million lb)
- $SSB_{20\%} = 1,143$  mt (2.52 million lb; threshold)
- $SSB_{30\%} = 1,714$  mt (3.78 million lb; target)
- $SSB_{2019} / SSB_{20\%} = 2.0$
- $SSB_{2019} / SSB_{20\%} > 1 \rightarrow$  stock is NOT overfished



# Summary

- The 2019 spotted seatrout (NC+VA) stock is NOT overfished but overfishing is occurring
- Next step: Fisheries Management Plan development





# *Questions?*



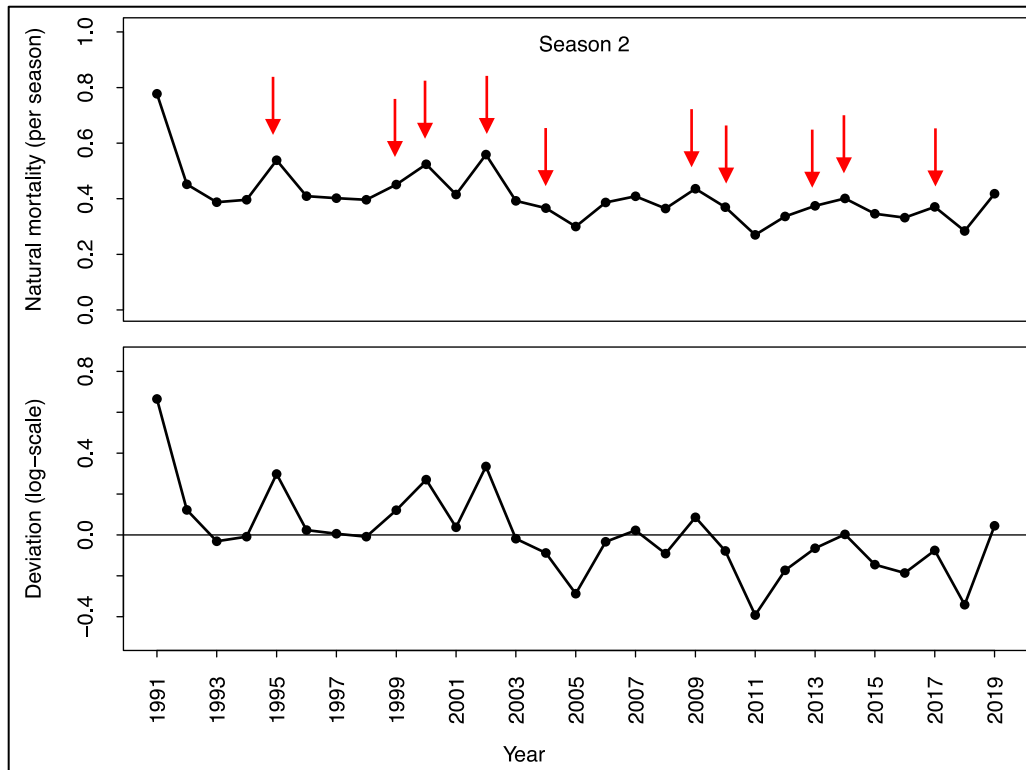




Data	Unit	CV/SE	Availability	Length composition
<b>Landings</b>				
ComLanding	Number	0.05	1991–2019	1991–2019
RecLanding	Number	0.1	1991–2019	1991–2019
<b>Discards</b>				
ComDiscard	Number	0.25	1991–2019	NA
RecDiscard	Number	0.25	1991–2019	NA
<b>Indices</b>				
P915NorthSpring	Number per unit effort	Estimated	2004–2019	2004–2019
P915NorthFall	Number per unit effort	Estimated	2003–2019	2003–2019

Note: Newly calibrated Marine Recreational Information Program (MRIP) data; recreational landing and discard input 3 times those in 2015 assessment

# Natural Mortality: Season 2



## Cold-stun records:

Year	Month	Stock Assessment Year
1995	December	1995
2000	January	1999
2001	January	2000
2003	January	2002
2004	December	2004
2010	January	2009
2010	December	2010
2014	January	2013
2015	February	2014
2018	January	2017

## *Current Stock Status*

- $F_{2019} = 1.51$  per year
- $F_{20\%} = 0.69$  per year (threshold)
- $F_{30\%} = 0.44$  per year (target)
- $F_{2019}/F_{20\%} = 2.19 > 1 \rightarrow$  Overfishing is occurring
  
- $SSB_{2019} = 2,337$  mt (5.15 million lb)
- $SSB_{20\%} = 832$  mt (1.84 million lb; threshold)
- $SSB_{30\%} = 1,251$  mt (2.76 million lb; target)
- $SSB_{2019}/SSB_{20\%} = 2.8 > 1 \rightarrow$  Stock is NOT overfished



