Southeast Reef Fish Survey

2021 Sampling Activities and Relative Abundance

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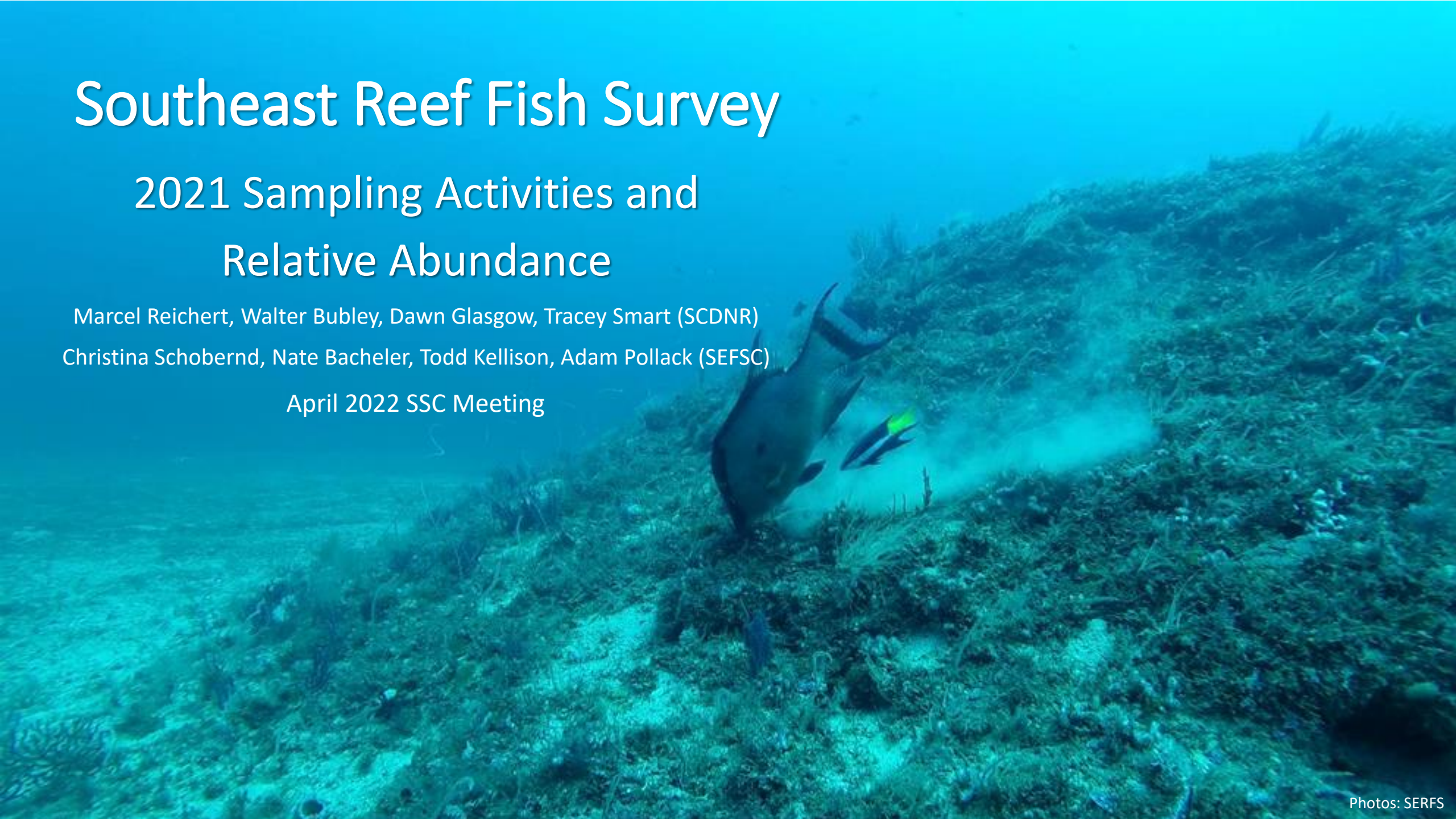
Christina Schobernd, Nate Bacheler, Todd Kellison, Adam Pollack (SEFSC)

April 2022 SSC Meeting



Photos: SERFS

Southeast Reef Fish Survey (SERFS)

Current Funding & Sampling:

MARMAP + SEAMAP-SA + SEFIS

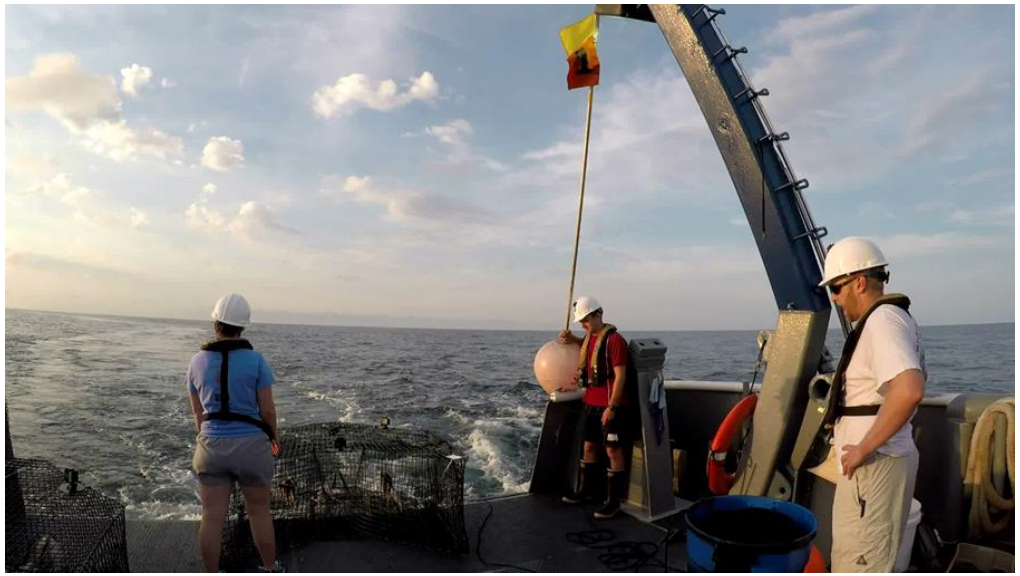
Historical Funding & Sampling:

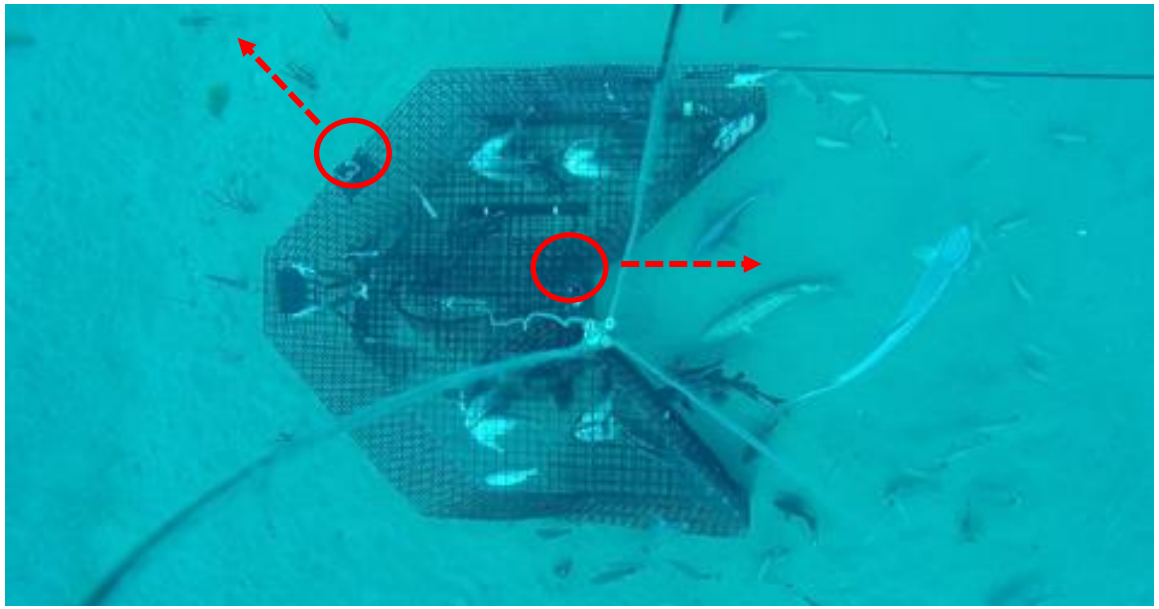
MARMAP

Marine Resources Monitoring, Assessment & Prediction Program (SCDNR)
Southeast Area Monitoring & Assessment Program - South Atlantic (SCDNR)
Southeast Fishery-Independent Survey (SEFSC)

Chevron Video Trap Sampling

- Target low to medium relief, live-bottom habitats
- Depths ~15-110 m
- Trap used consistently and standardized since 1990
- Baited with menhaden, soak time ≈90 minutes
- Since 2011: all traps have 2 video cameras





Chevron Video Trap Universe

- ≈ 4,300 trap sampling stations (NC– FL)
- ≈ 2,500 randomly selected
- Sampling mid-April – mid-October

Sample and data processing & analyses

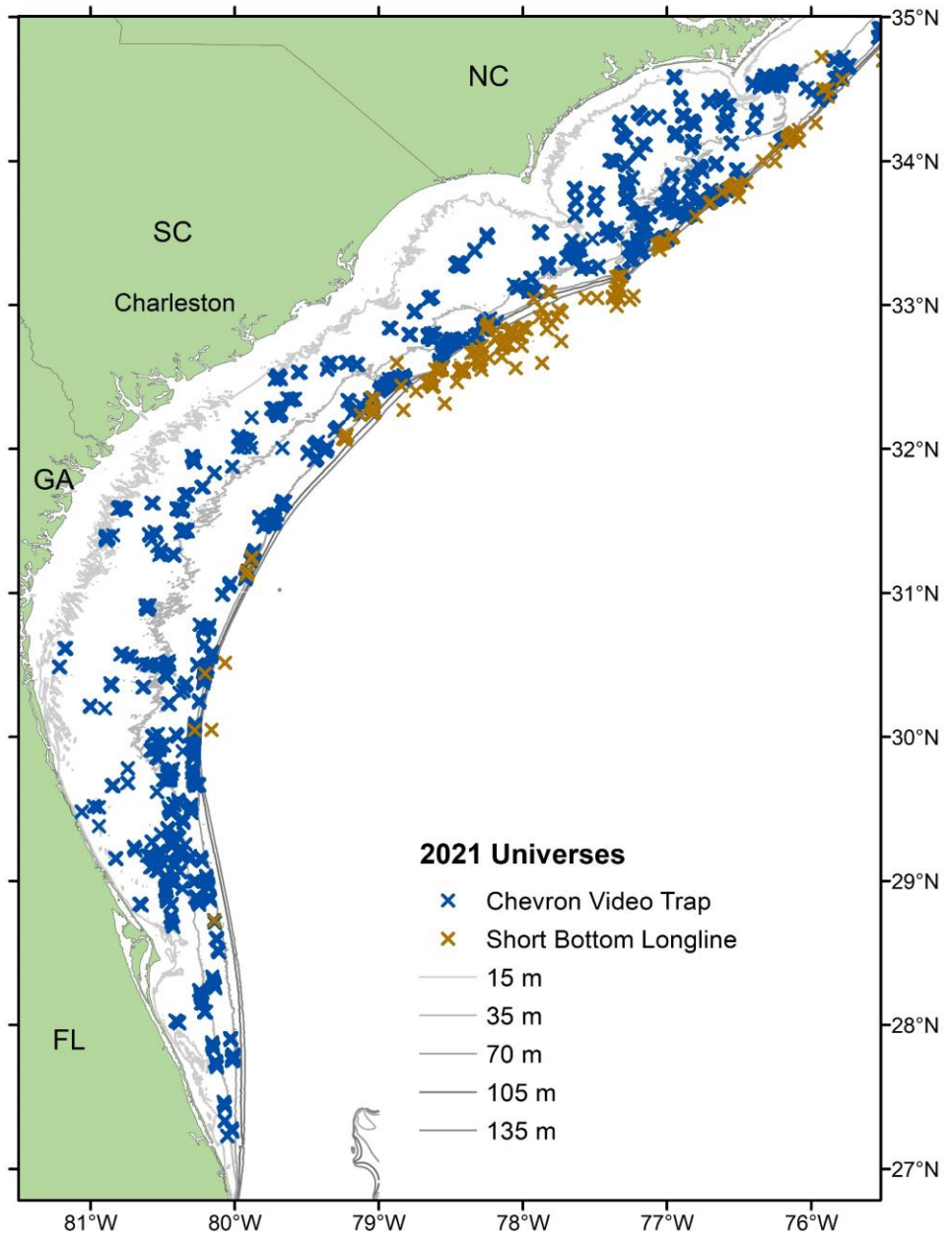
MARMAP/SEAMAP-SA (SCDNR):

- Trap and longline indices
- Life history

SEFIS (SEFSC)

- Video indices

One combined database (SEAMAP.ORG)



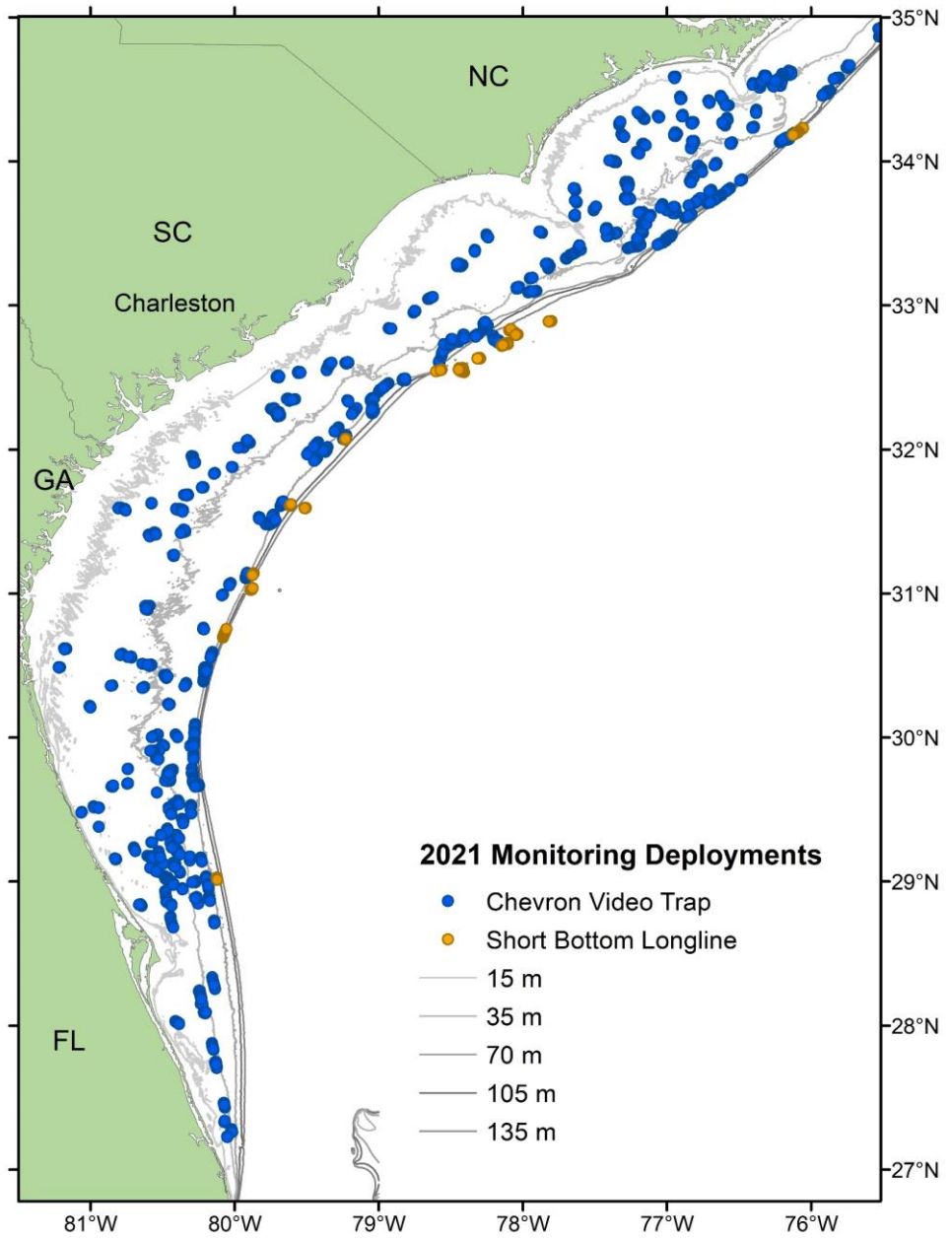
2021

No sampling in 2020 (COVID-19)

Full cruise schedule, but

- Reduced scientific crew
- Optimized # traps deployed
- Reduced life history sampling focus on otolith sampling (age)

- **118.5** days at sea
- **2,755** gear deployments
  - **2,025** Chevron Video Traps
  - **144** Short Bottom Longlines (MARFIN)
  - **351** CTD deployments
- **39,210** fish (**86** species) collected
- **6,018** fish (**33** species) processed for life history (age, repro., DNA)



Most Encountered Species 2021

Common Name (2019 CHV Rank)	Chevron	Short BLL	Total
1. *Tomtate (1)*	22,698		22,698
2. *Vermilion Snapper (3)*	3,584	1	3,585
3. *Black Sea Bass (2)*	3,583		3,583
4. *Red Snapper (6)*	1,969	9	1,978
5. *Scup/Longspine Porgy (4)*	1,834		1,834
6. *White Grunt (5)*	914		916
7. *Gray Triggerfish (8)*	890		890
8. *Red Porgy (7)*	852	10	862
9. *Sand Perch (9)*	566		566
10. *Spottail Pinfish (10)*	489		489
11. *Bank Sea Bass (11)*	430		430
12. *Knobbed Porgy (12)*	151		151
13. *Snowy Grouper**	12	107	119
16. *Silk Snapper**	68	5	73
19. *Scamp**	23	16	39
22. *Gag (20)*	26	2	28

Increase
Decrease

*Mostly due to increased SBLL efforts

Overview of Relative Abundance

- No sampling in 2020
- No update for longline indices (analyses ongoing)
- Chevron index (**1990-2021**) - Video index (**2011-2019**)
- Standardized using Zero-Inflated Negative Binomial model (ZINB)

  Most appropriate method, reduces uncertainty

Traps:

- Number of fish
- Trap soak time

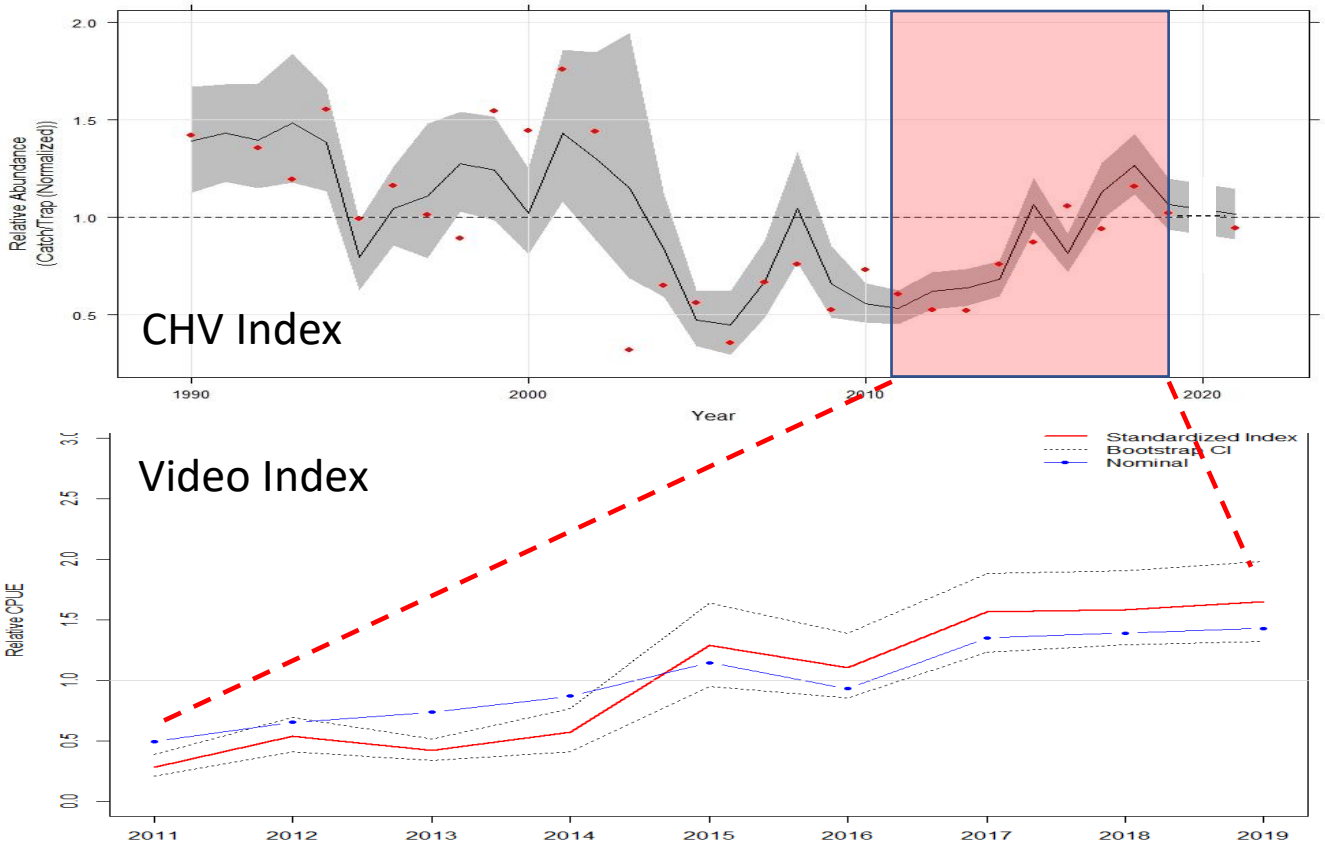
Videos:

- MeanCount method
- 10 min after trap lands on bottom
- One snapshot every 30 s for 20 min

Indices- Example

Normalized to long-term average (dashed or solid line at 1)

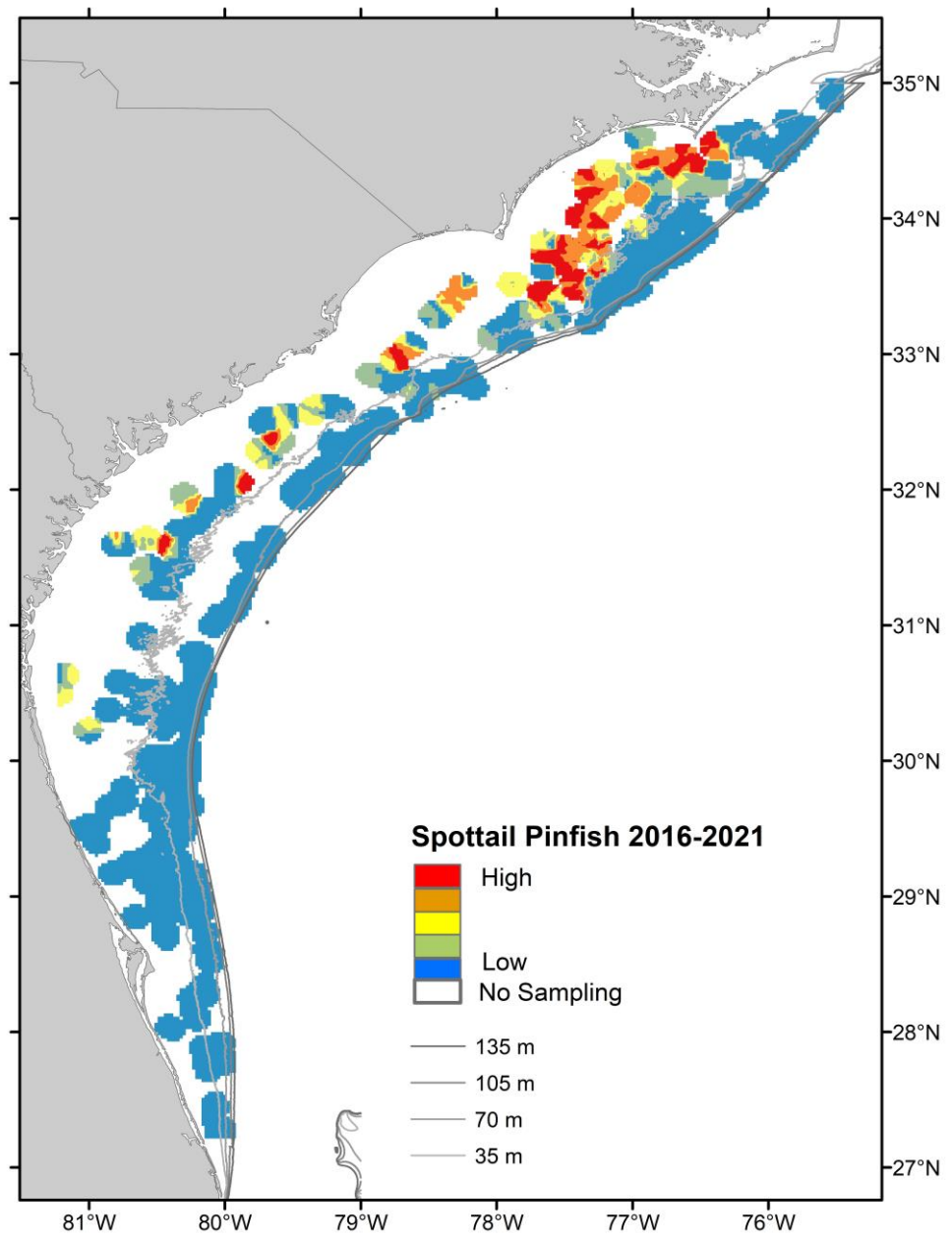
e.g. 2 = twice long-term average, and 0.5 = half long-term average



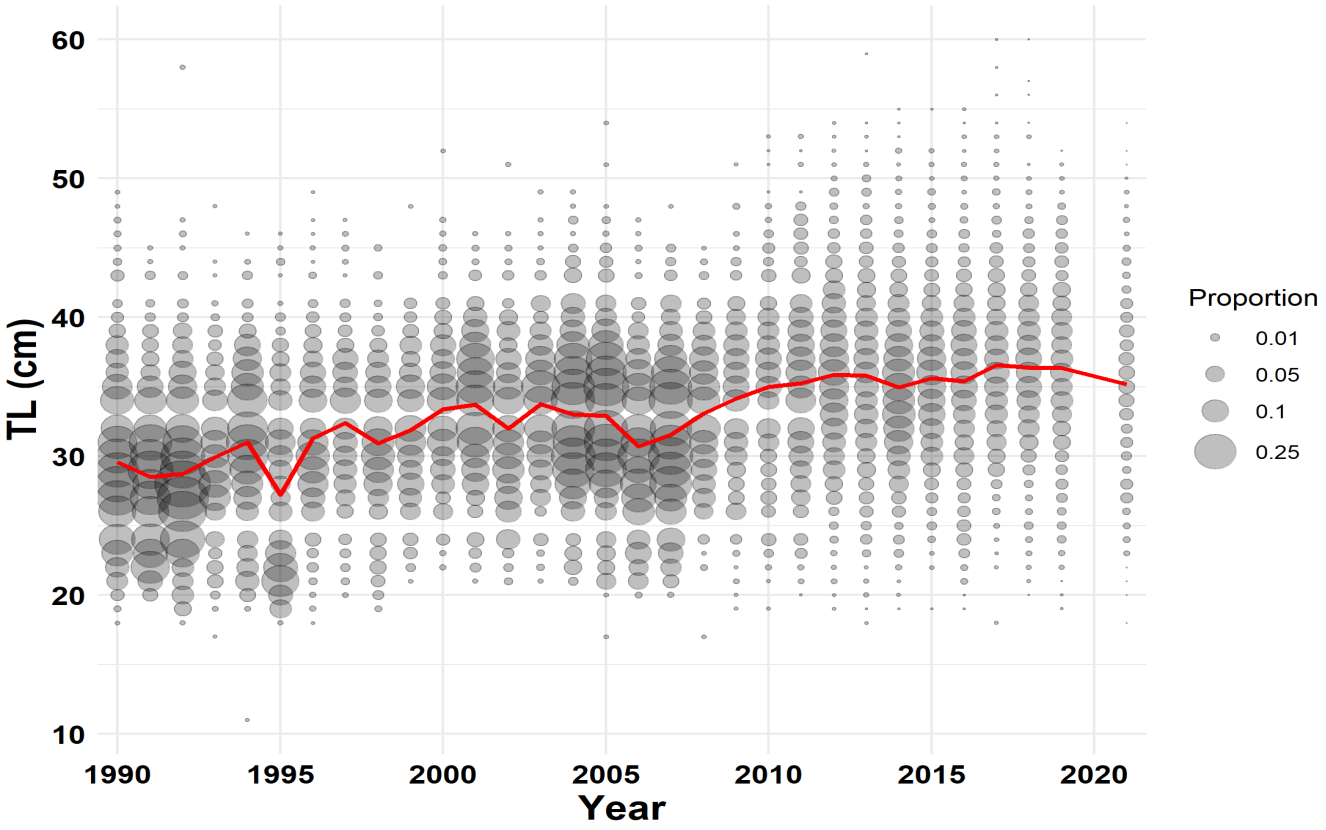
Gear	ZINB Index	95% C.I.	Nominal Values
CHV	Black Line	Gray Shading	Red Dots
Video	Red Line	Dotted Lines...	Blue Dots & Line

Maps- Example

- Nominal CHV abundance in quartiles
  - # fish / trap hour
- 2016-2019 & 2021
- Cooler colors => lower nominal abundance
- Warmer colors => higher nominal abundance
- White => no sampling



Length Compositions- Example



- Chevron Trap Only
- Maximum (Pinched) Total Length (cm)
- 1-cm Length Bins
- Bubble size = # fish in length bin / total fish measured in a year
- Red Line = Average TL
- "Missing" length bins in some graphs are effect of converting between FL & TL and rounding to cm

Relative Abundance Overview Caveats

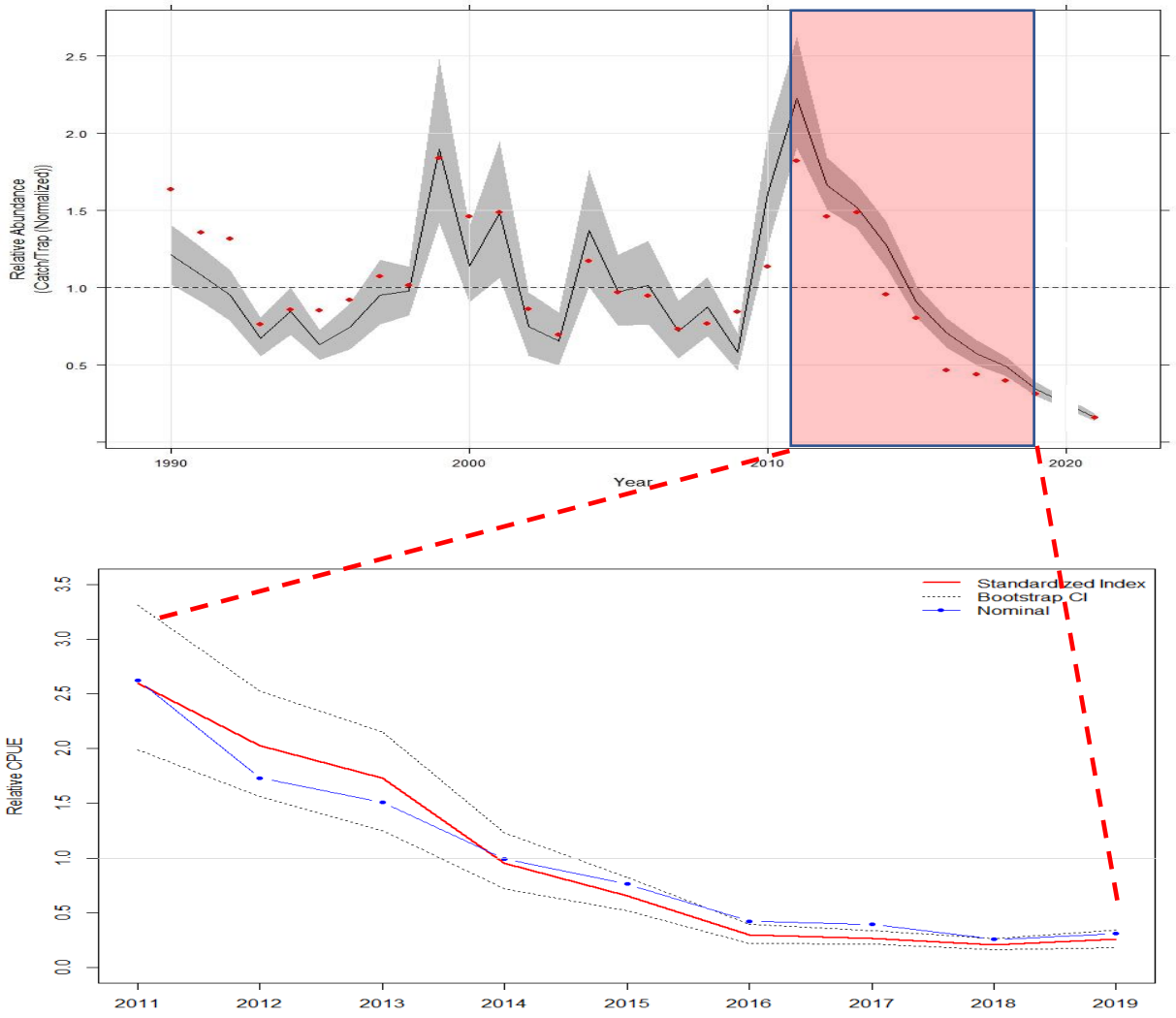
- Not an update of stock status
- Trap: Constraints, stratification, units, and models may be different from those used in (SEDAR) stock assessments
- Video: Index for species that have been assessed through SEDAR, with video index model used in the assessment
- Not all species have been assessed or updated (SEDAR) and not all updated trends and analyses have been discussed in assessment framework

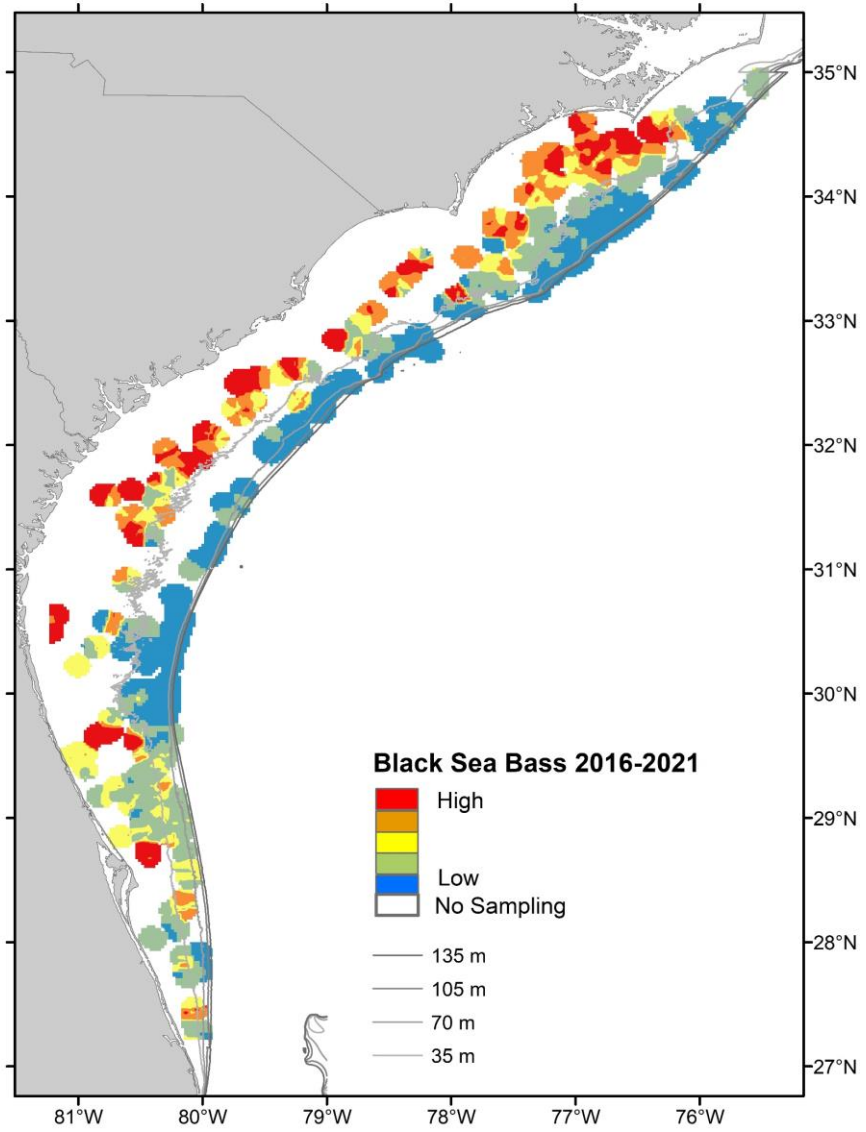
Fishery-Independent Abundance Trends 2021

Species	CHV	Video
Black Sea Bass	X	X
Gag Grouper	X	X
Red Grouper	X	X
Scamp (& Yellowmouth)	X	X
Red Snapper	X	X
Vermilion Snapper	X	X
Red Porgy	X	X
Gray Triggerfish	X	
White Grunt	X	
Tomtate	X	

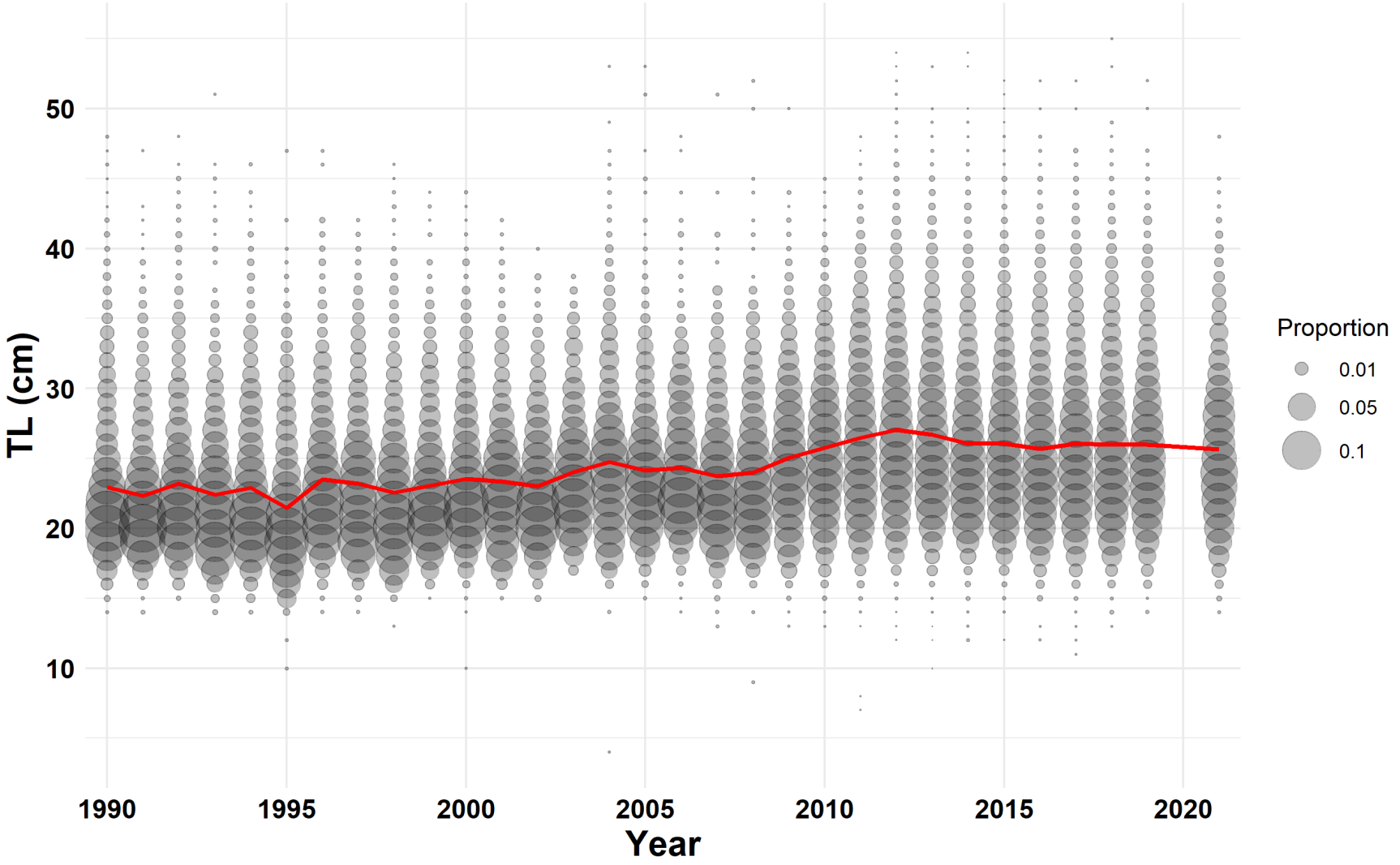
Photo: SERFS

Black Sea Bass

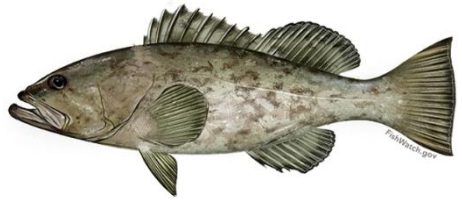


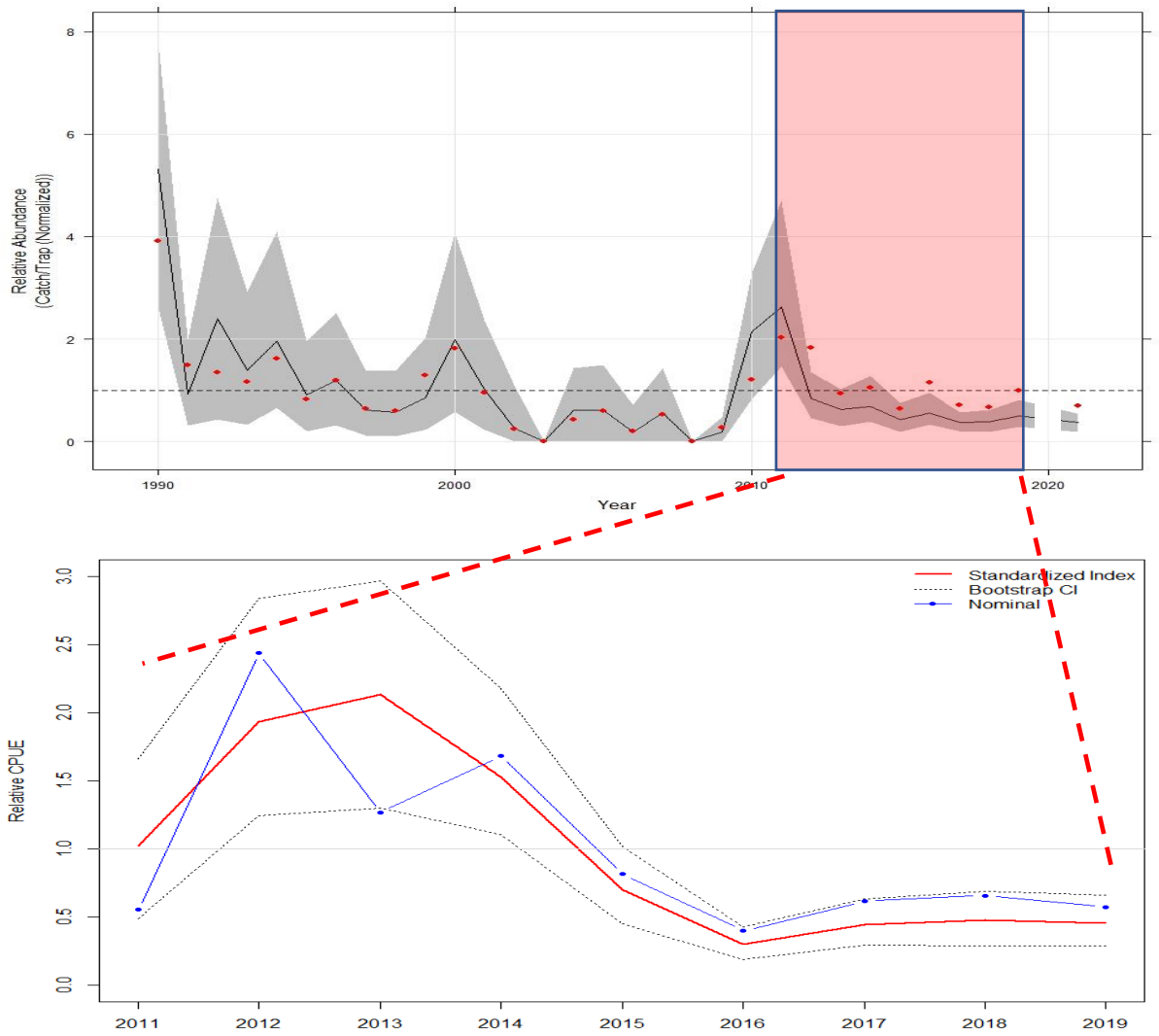


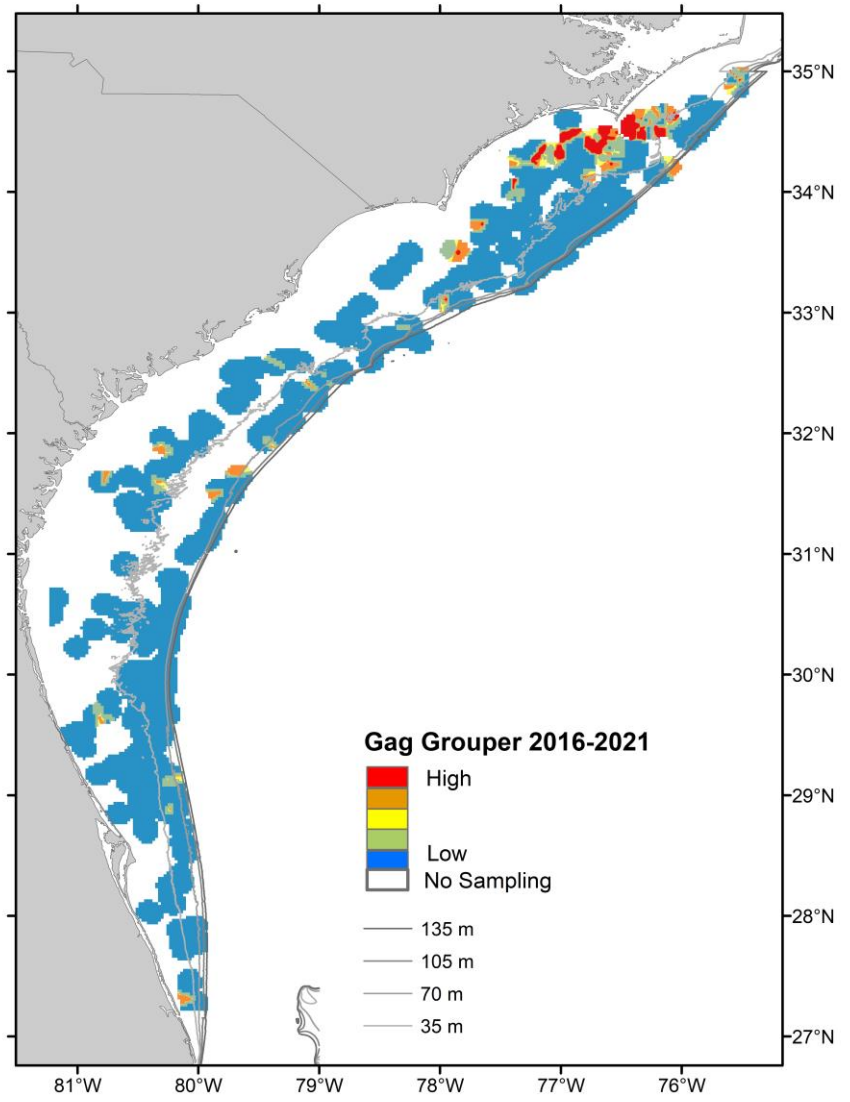
Black Sea Bass



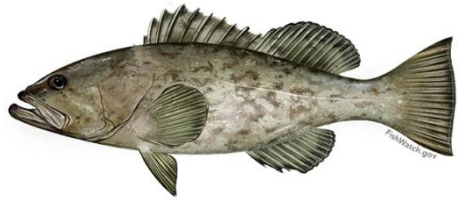
Gag

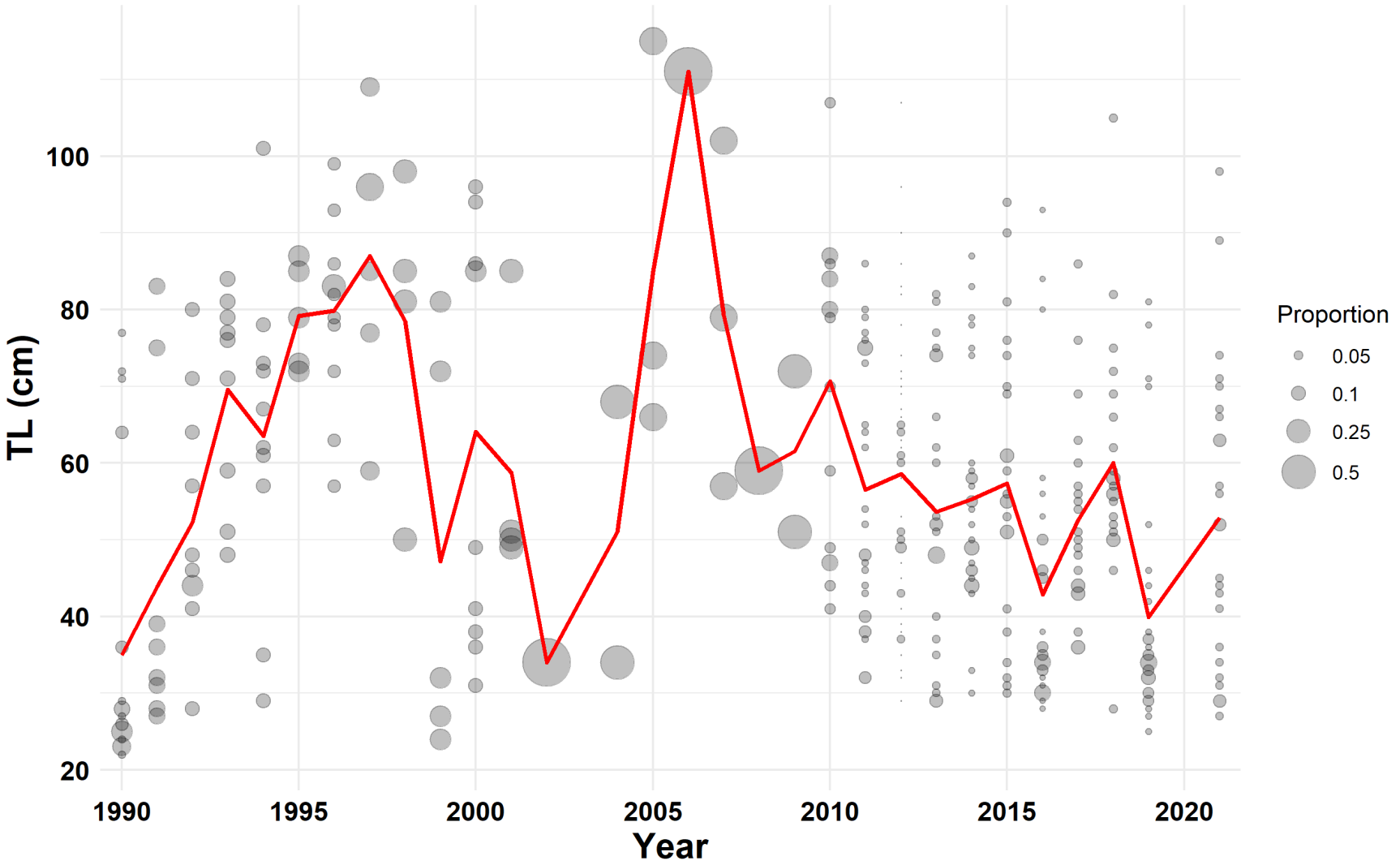



Relative Abundance
(Catch/Trap (Normalized))
Year
Relative CPUE
Standardized Index
Bootstrap CI
Nominal

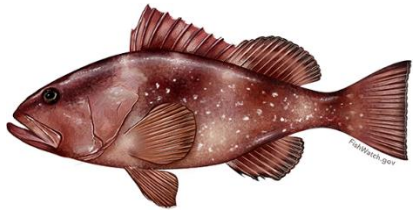

Gag Grouper 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m

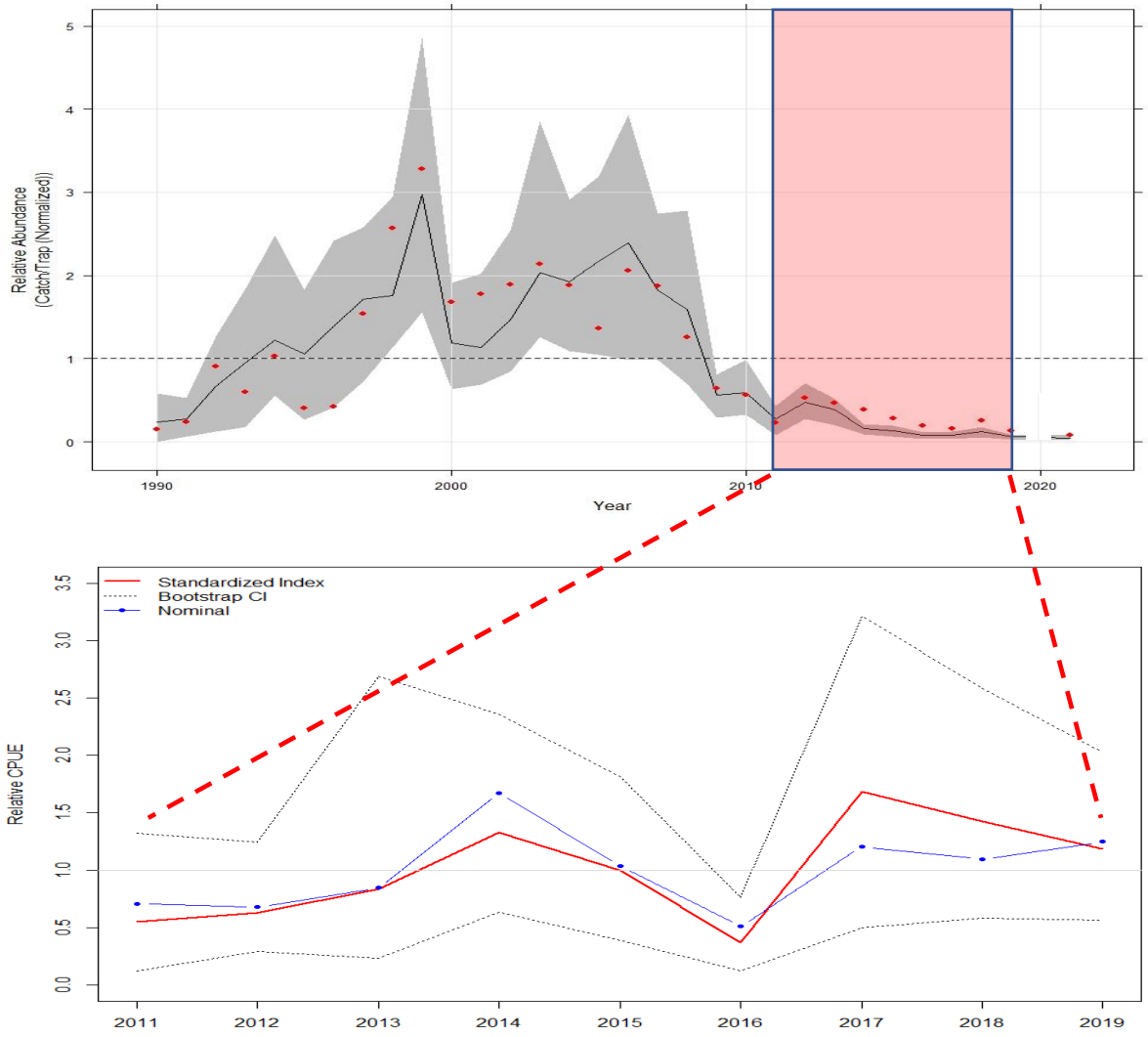
Gag

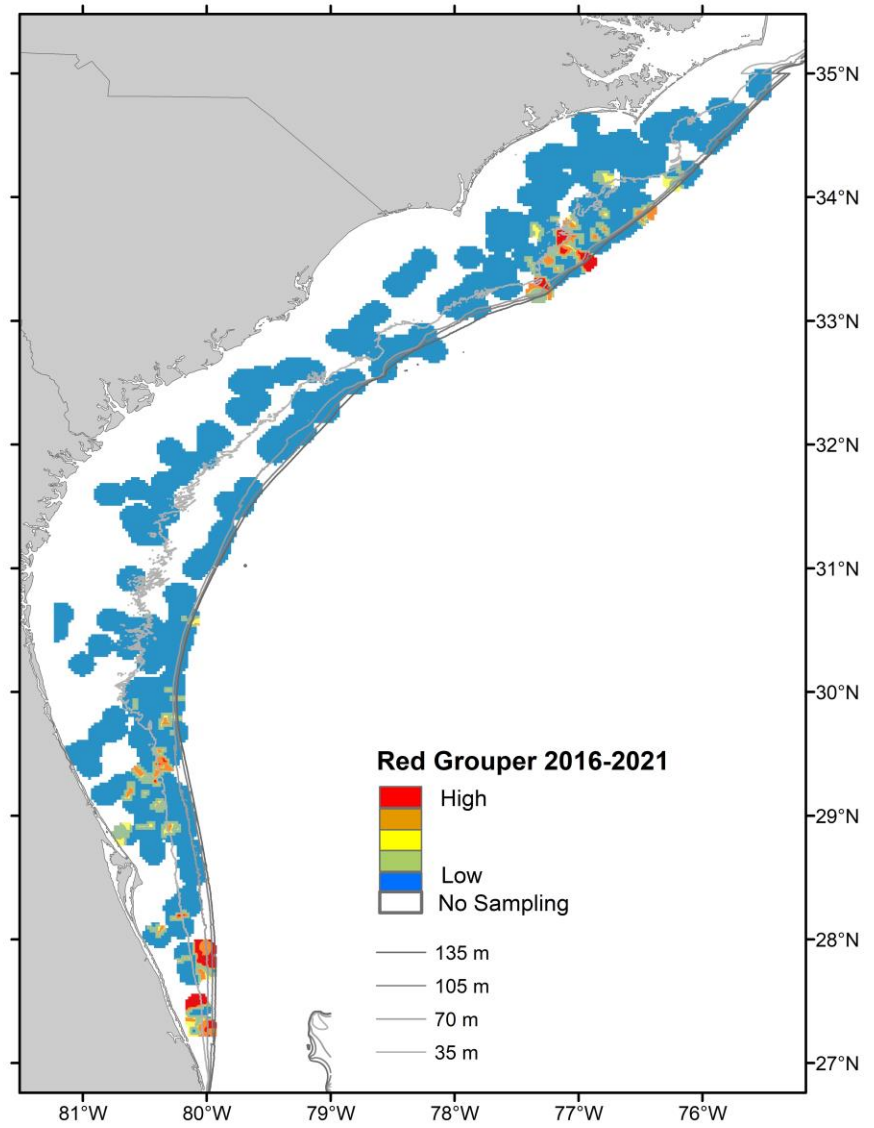



TL (cm)
100
80
60
40
20
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.05
0.1
0.25
0.5

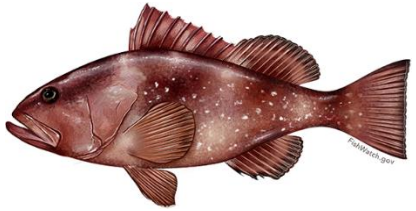
Red Grouper

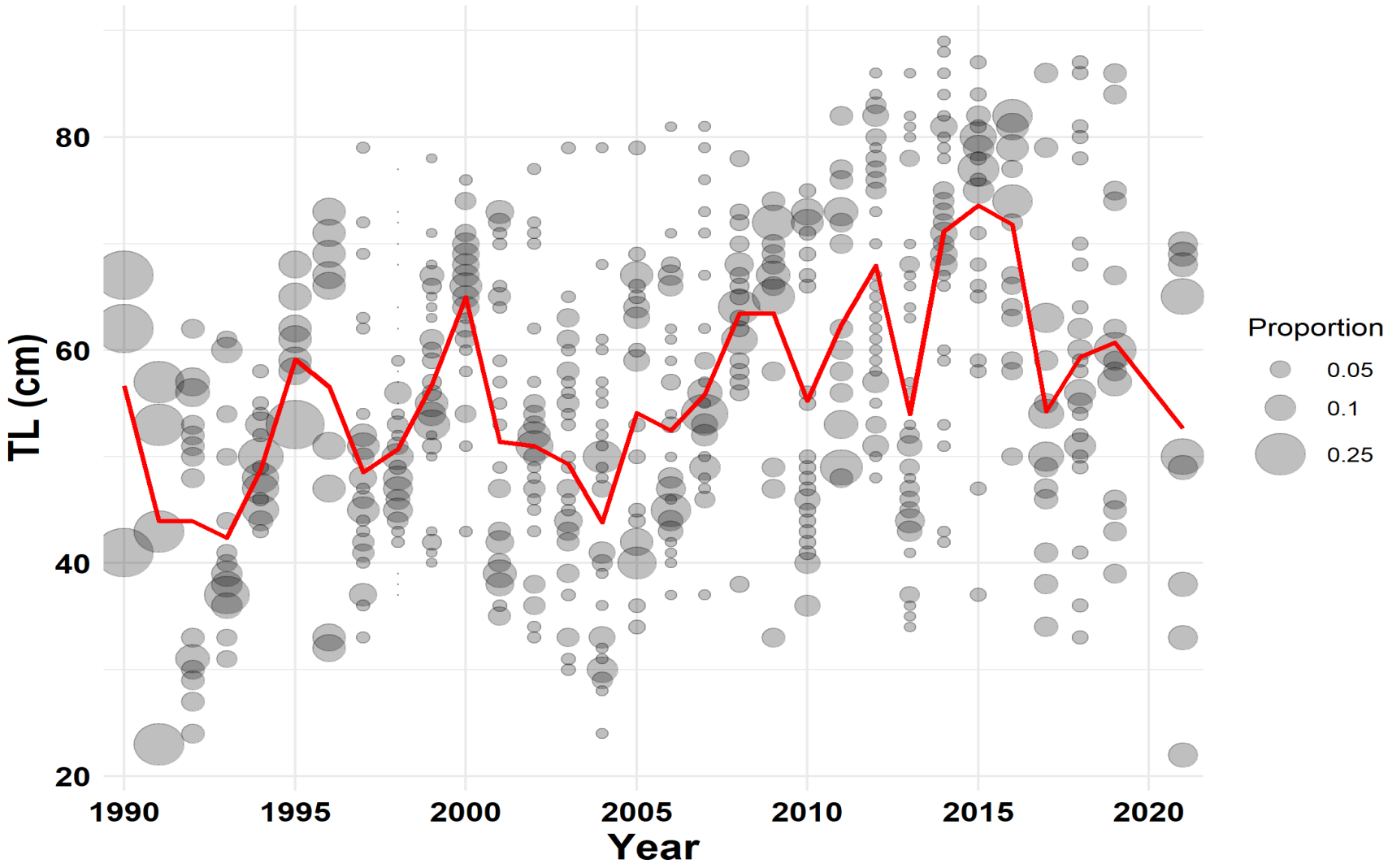



Relative Abundance
(Catch/Trap (Normalized))
Year
1990
2000
2010
2020
Standardized Index
Bootstrap CI
Nominal
Relative CPUE
2011
2012
2013
2014
2015
2016
2017
2018
2019

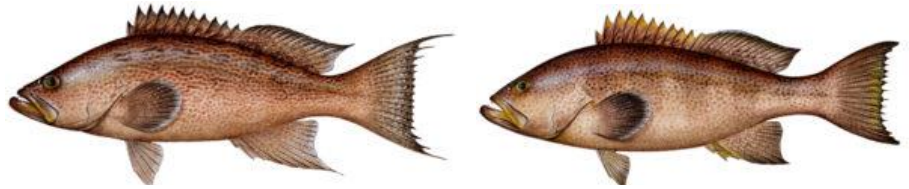

Red Grouper 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m
35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
81°W
80°W
79°W
78°W
77°W
76°W

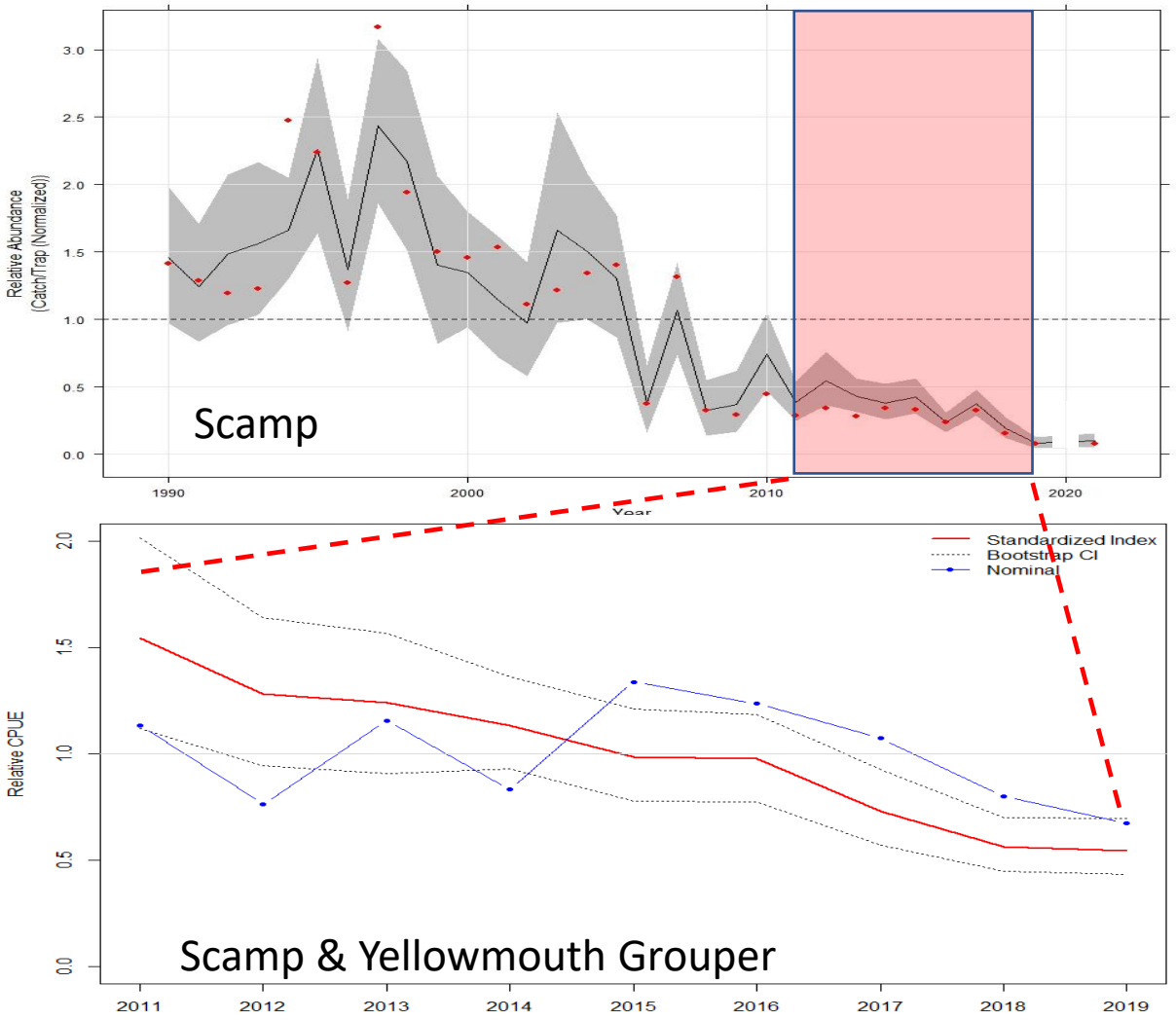
Red Grouper

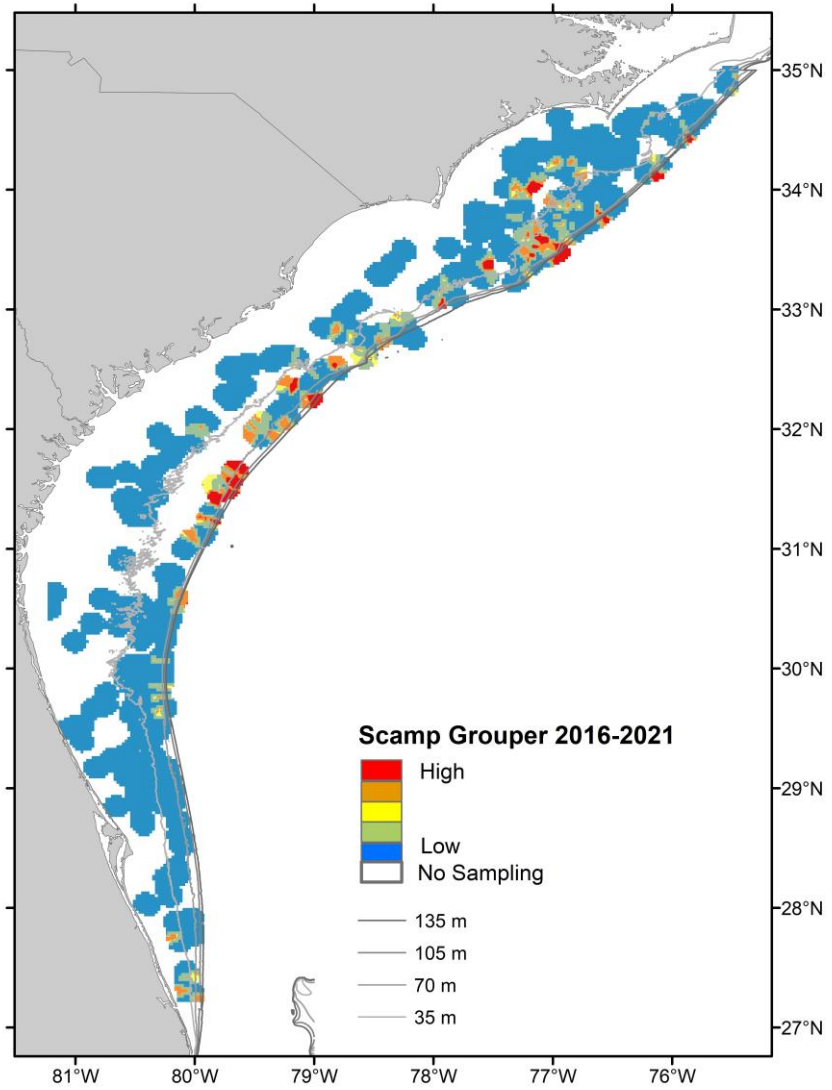



TL (cm)
80
60
40
20
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.05
0.1
0.25

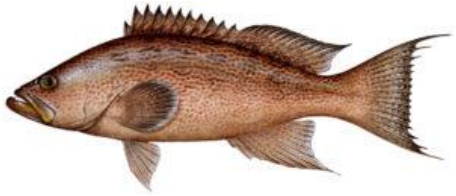
Scamp & Yellowmouth

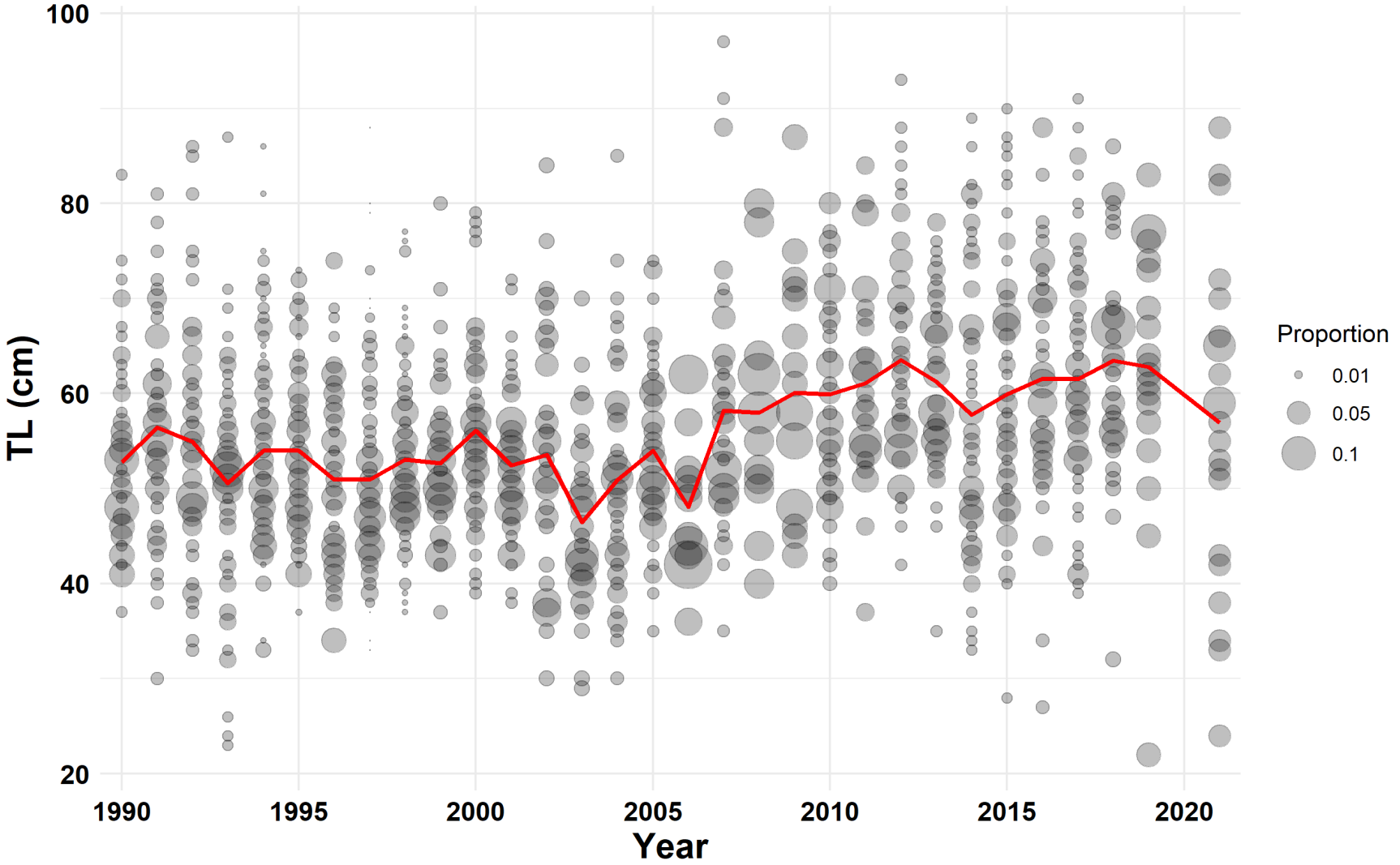




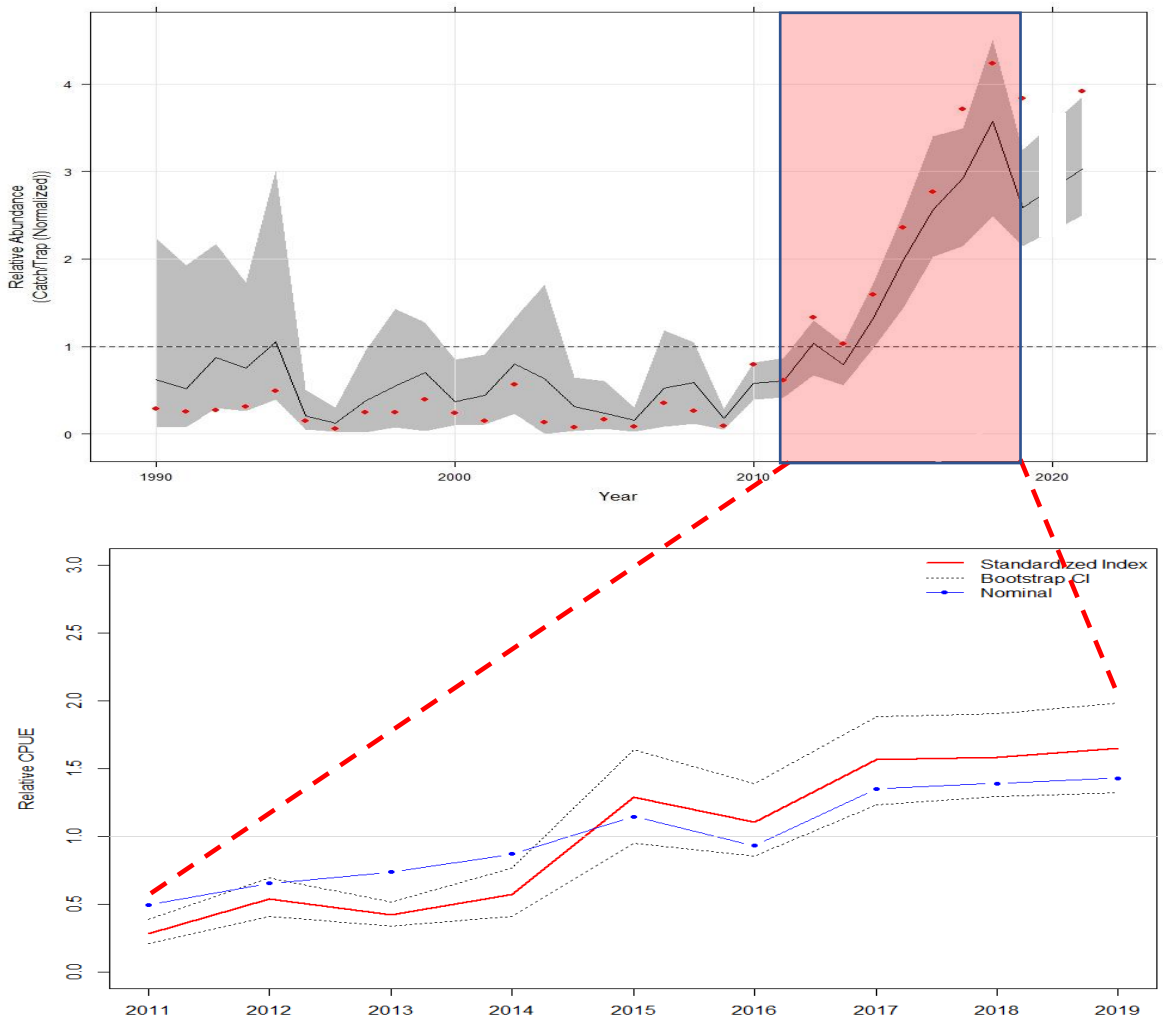


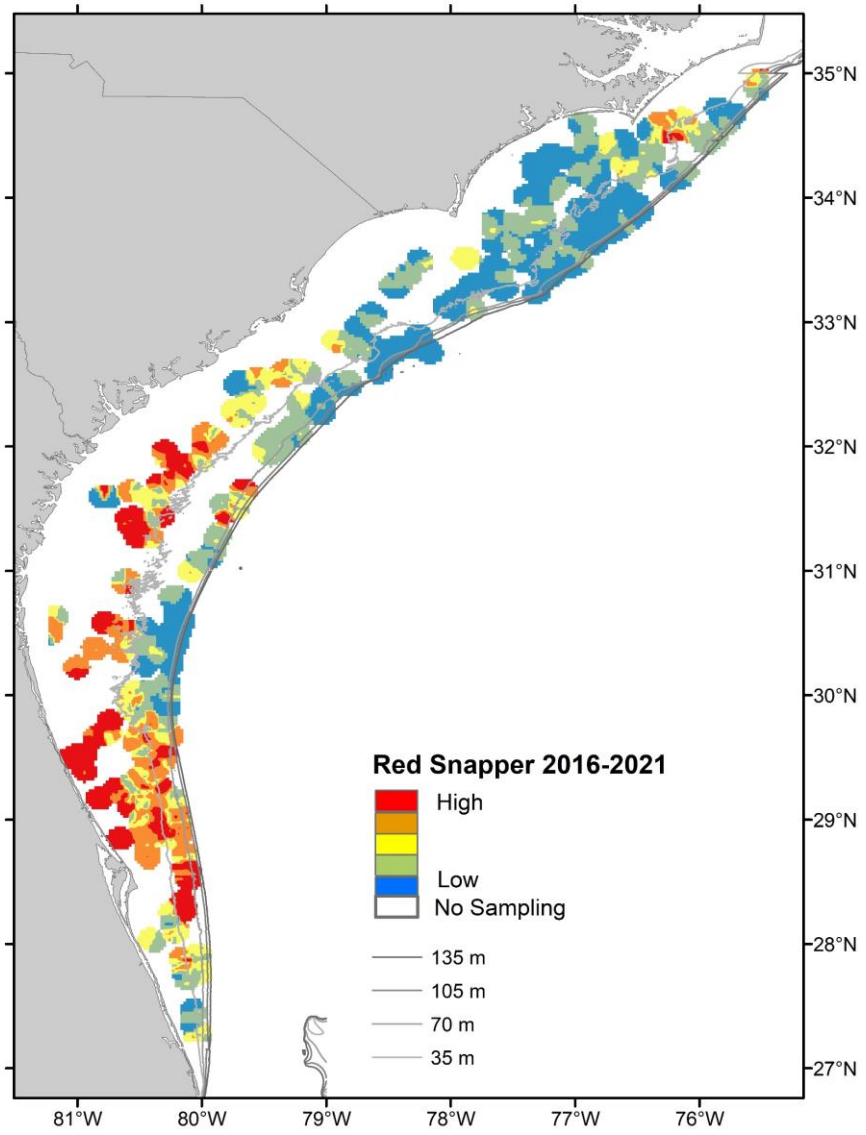
Scamp



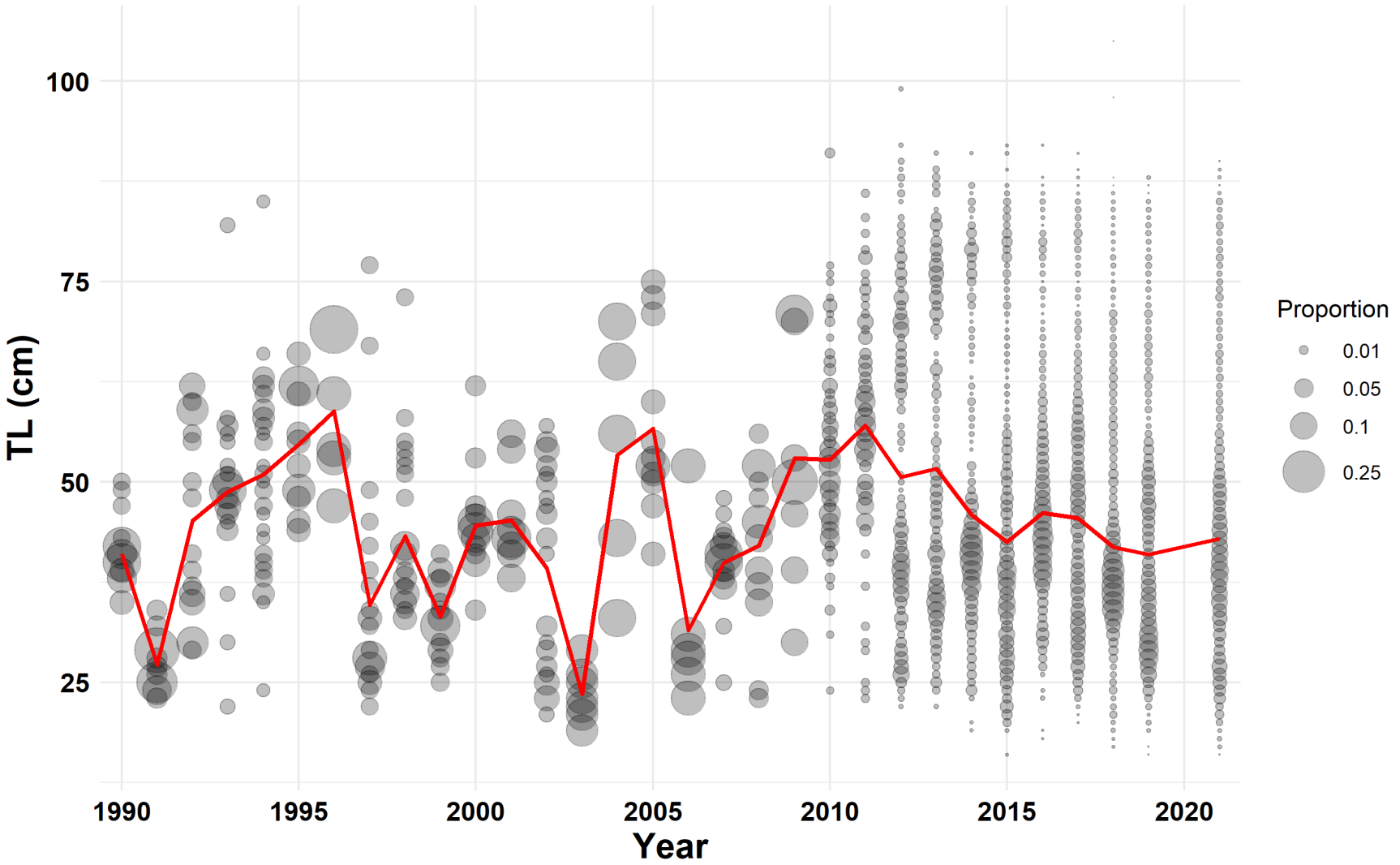

100
80
60
40
20
TL (cm)
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.01
0.05
0.1

Red Snapper

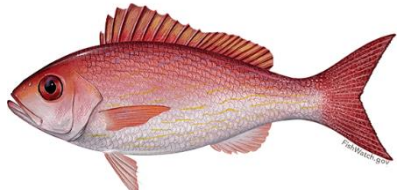

Relative Abundance (Catch/Trap (Normalized))
Year
1990
2000
2010
2020
Standardized Index
Bootstrap CI
Nominal
Relative CPUE
2011
2012
2013
2014
2015
2016
2017
2018
2019

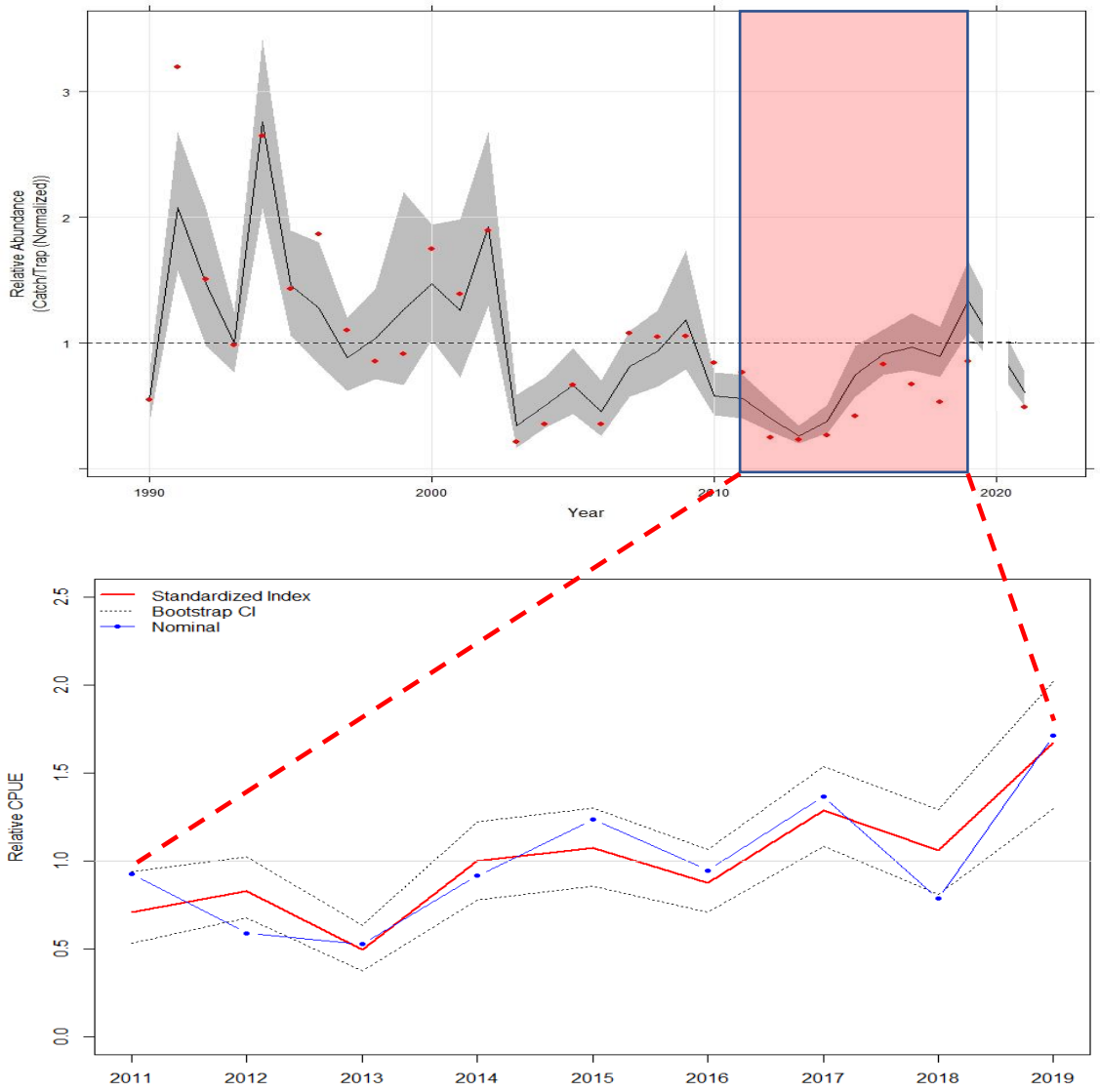

Red Snapper 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m
35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
81°W
80°W
79°W
78°W
77°W
76°W

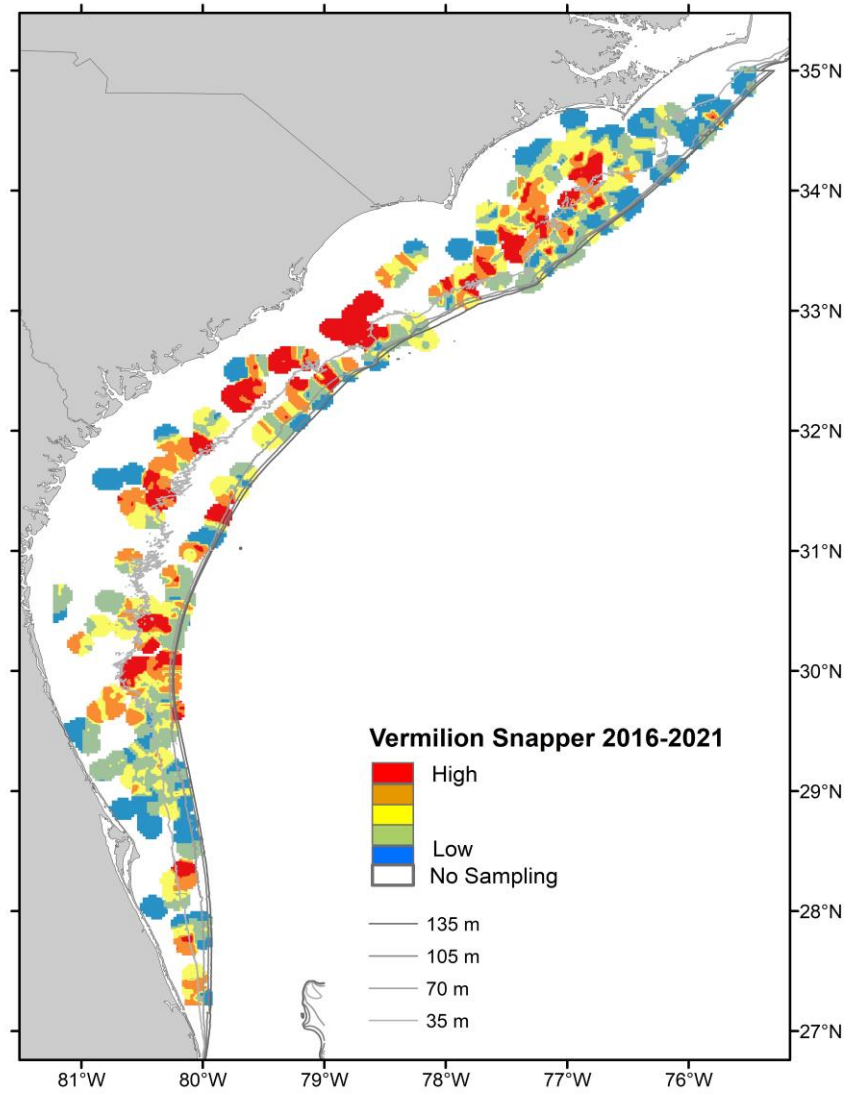
Red Snapper


100
75
50
25
TL (cm)
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.01
0.05
0.1
0.25

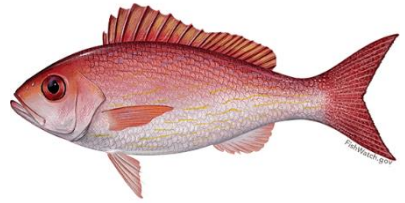
Vermilion Snapper

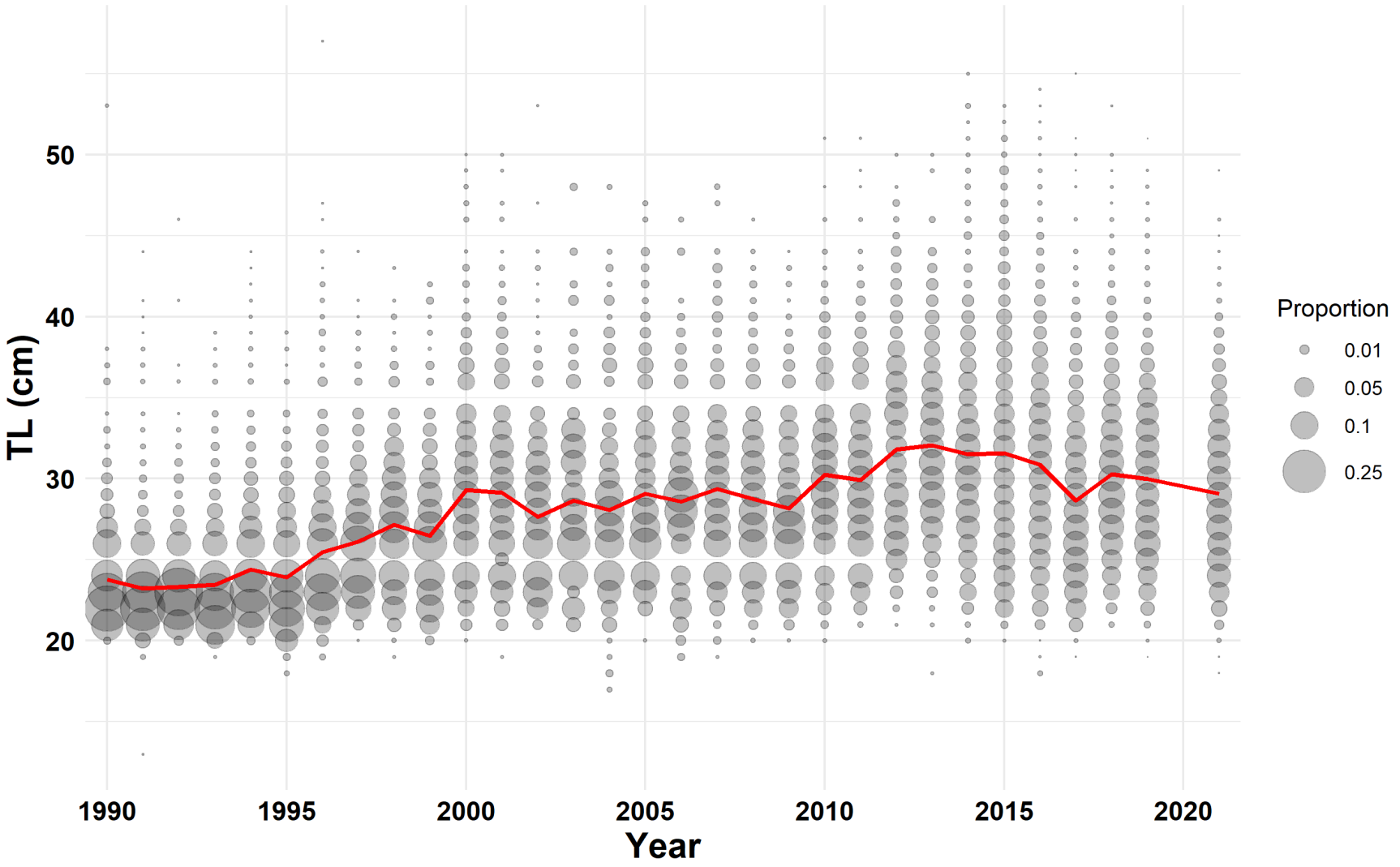




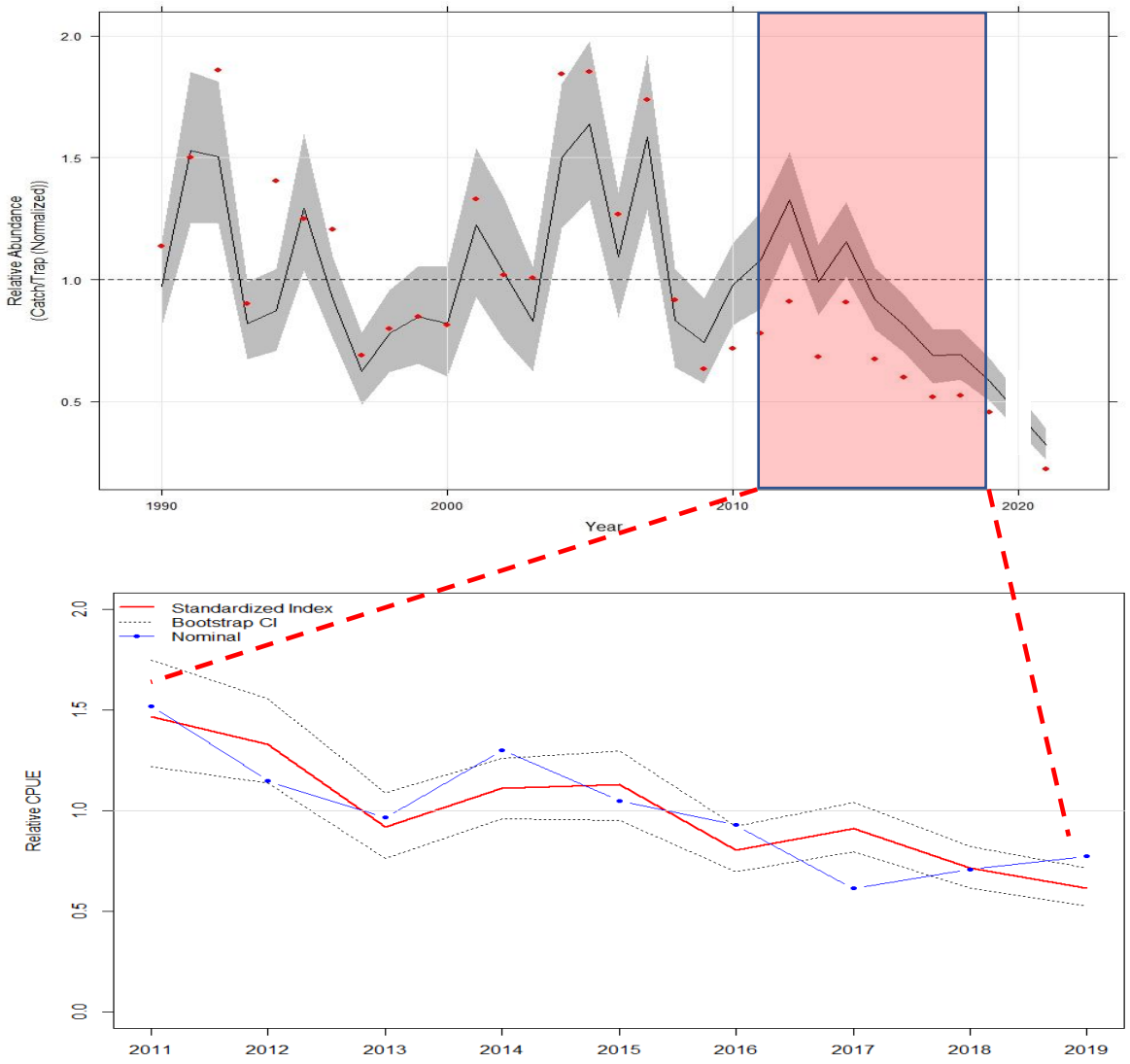


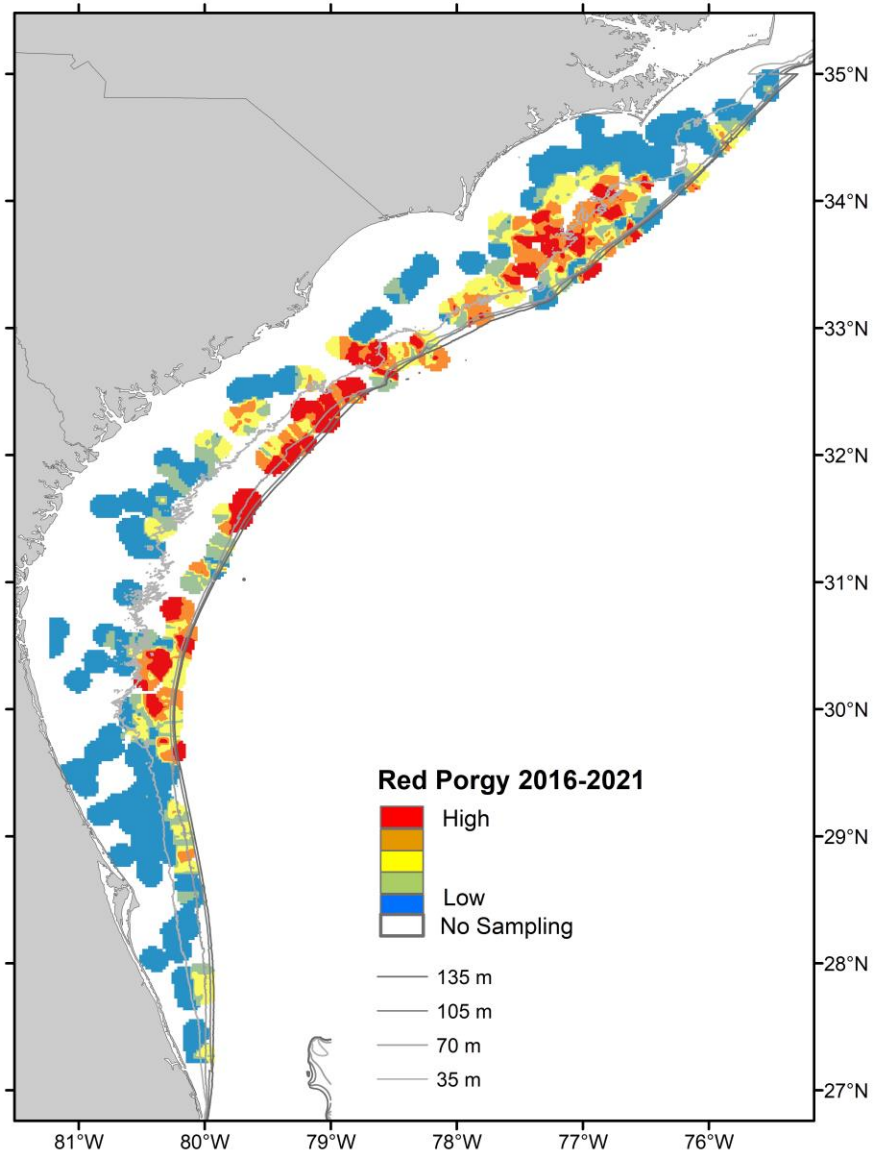
Vermilion Snapper



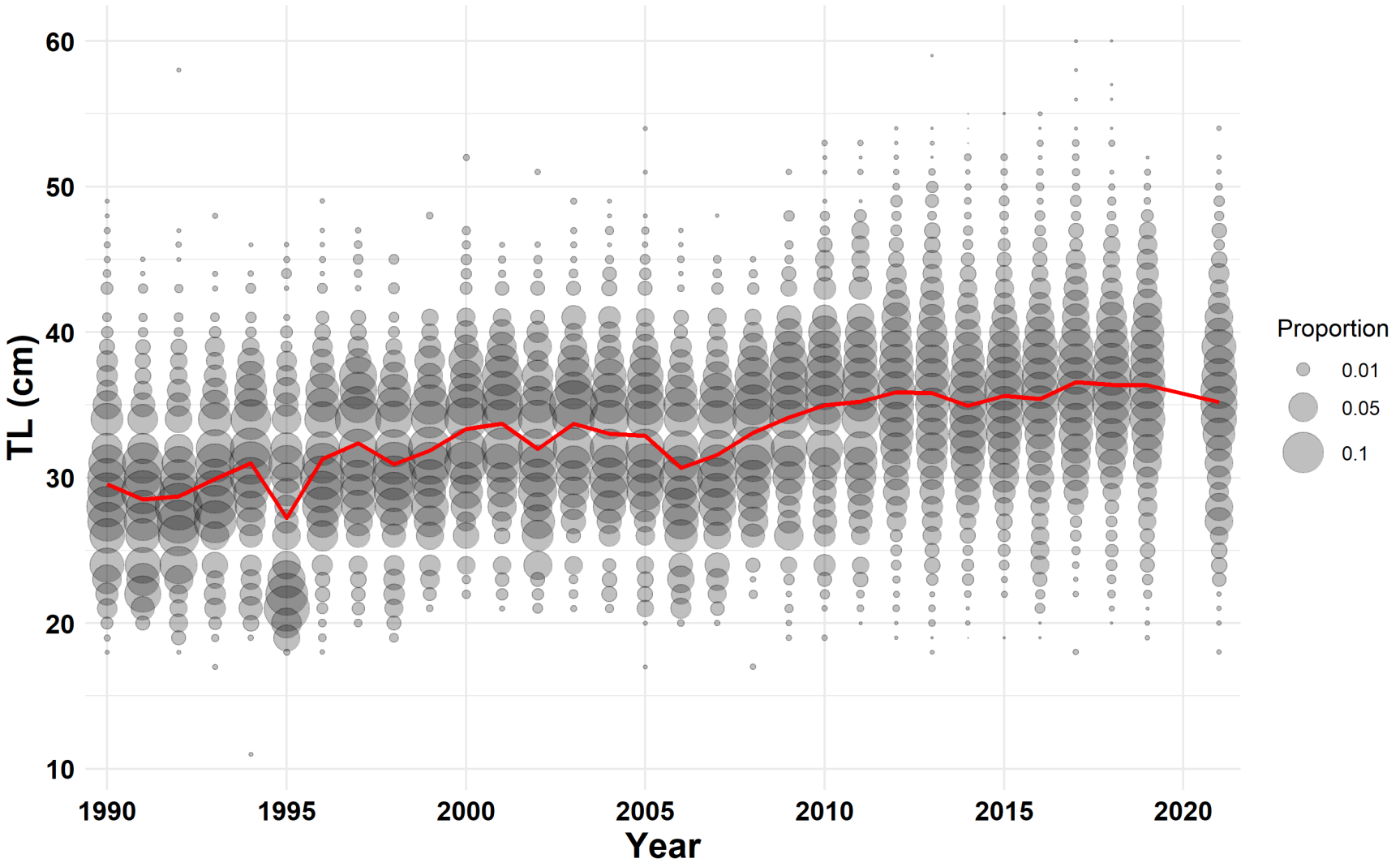


Red Porgy

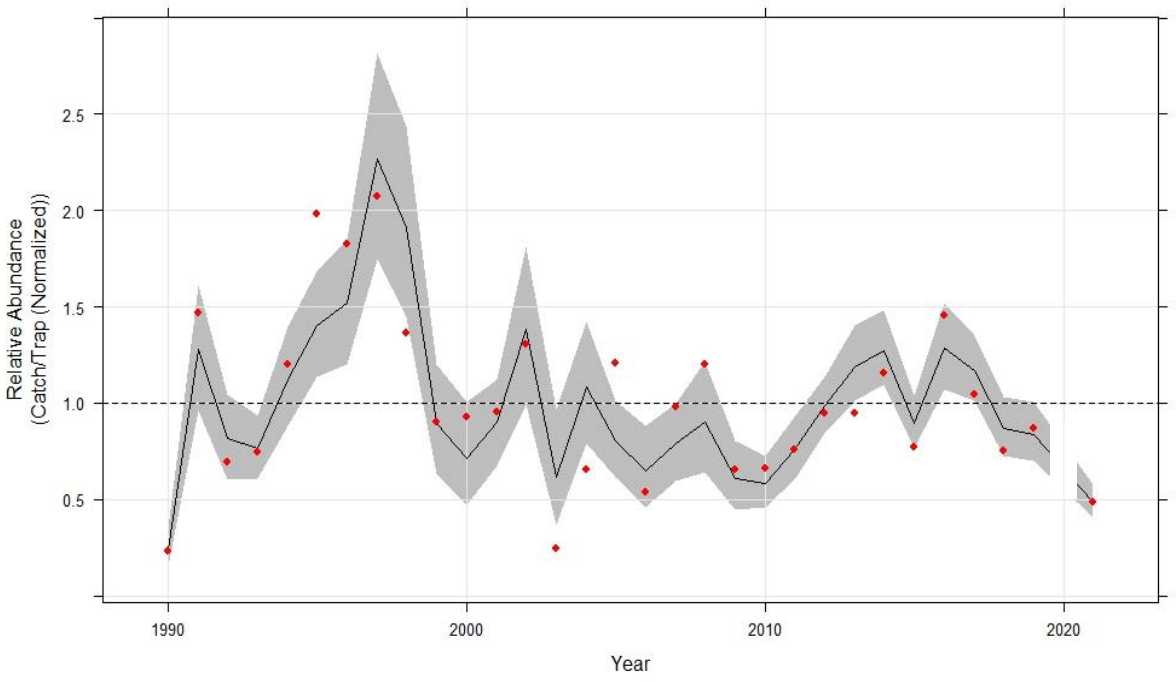

Relative Abundance
(Catch/Trap (Normalized))
2.0
1.5
1.0
0.5
1990
2000
2010
2020
Year
Standardized Index
Bootstrap CI
Nominal
Relative CPUE
2.0
1.5
1.0
0.5
0.0
2011
2012
2013
2014
2015
2016
2017
2018
2019

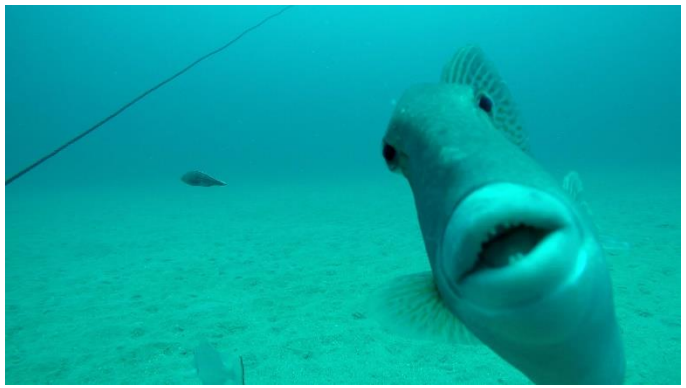

35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
81°W
80°W
79°W
78°W
77°W
76°W
Red Porgy 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m

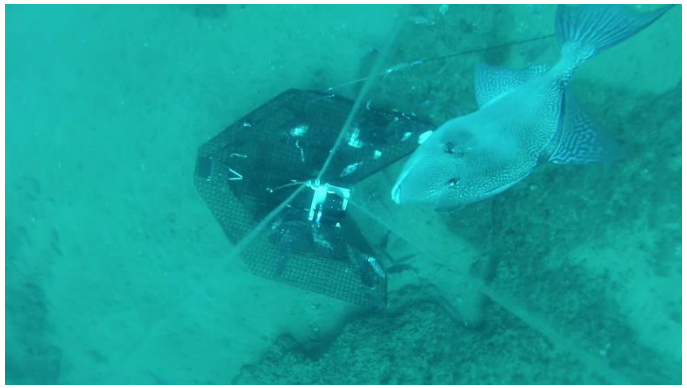
Red Porgy

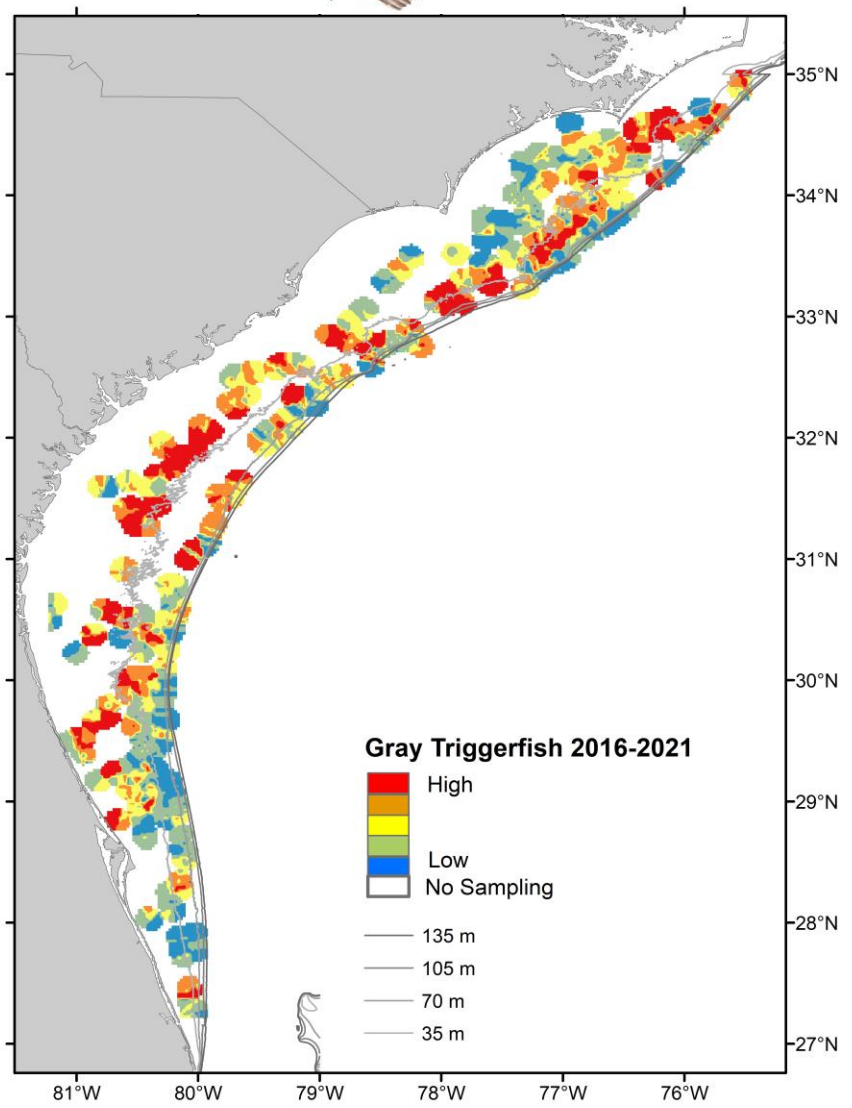

60
50
40
30
20
10
TL (cm)
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.01
0.05
0.1

Gray Triggerfish

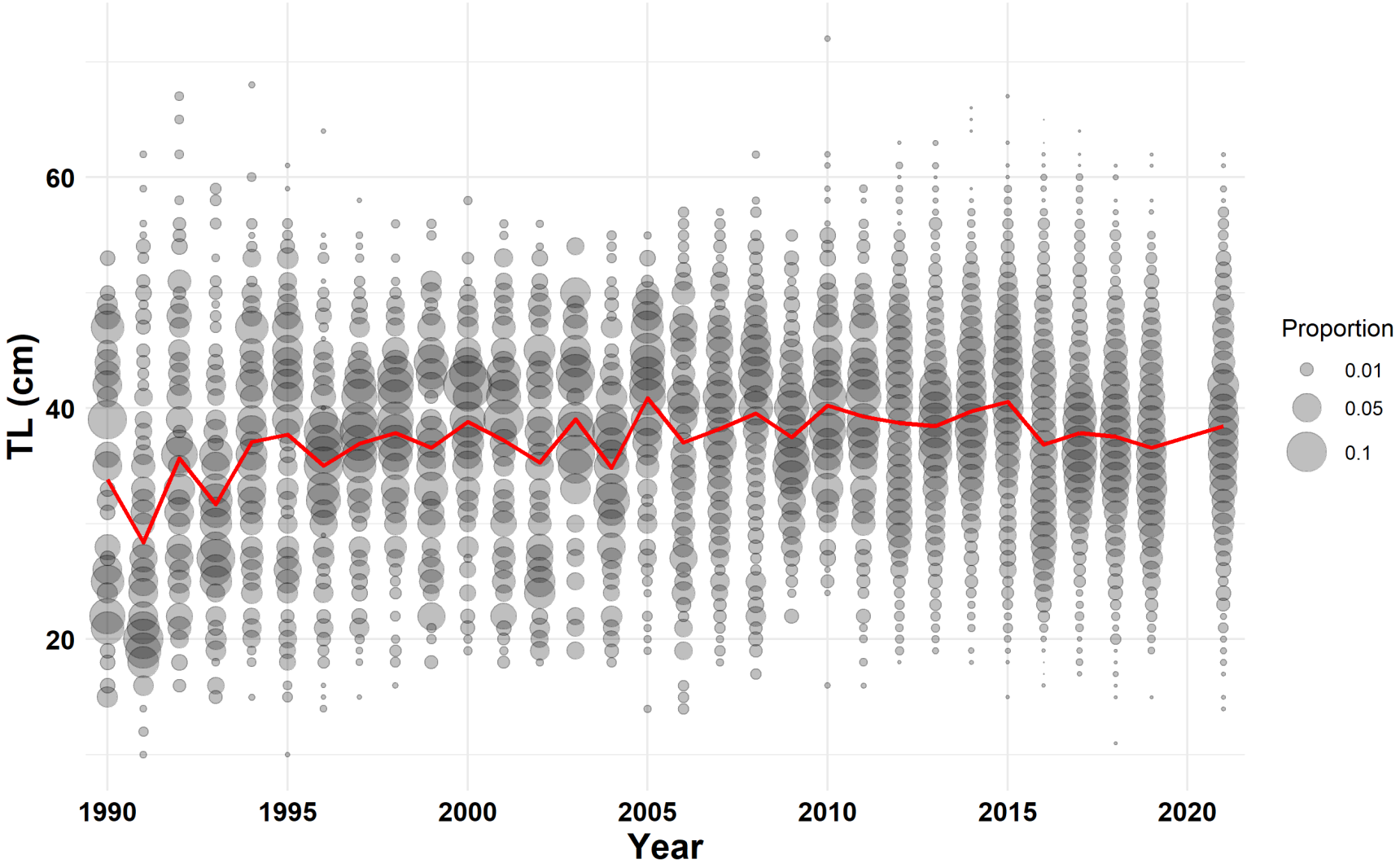




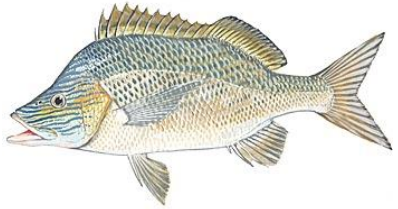


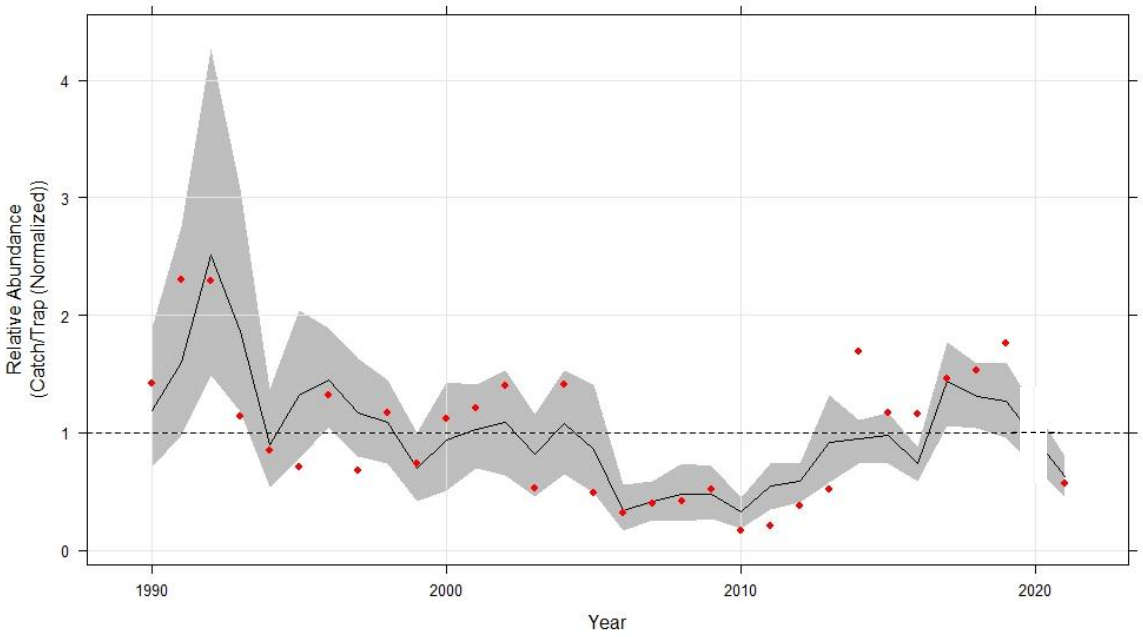


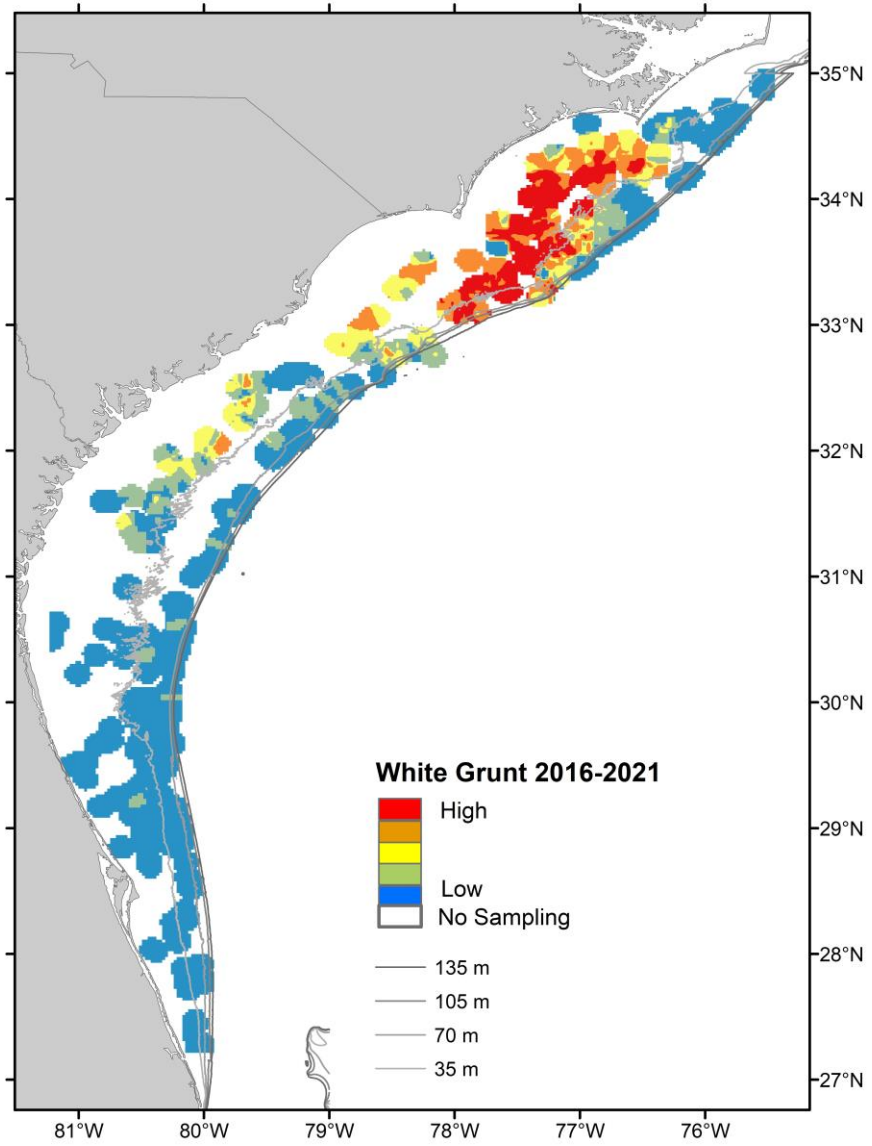
Gray Triggerfish



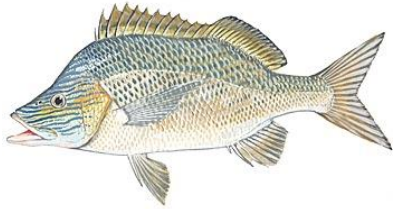
White Grunt

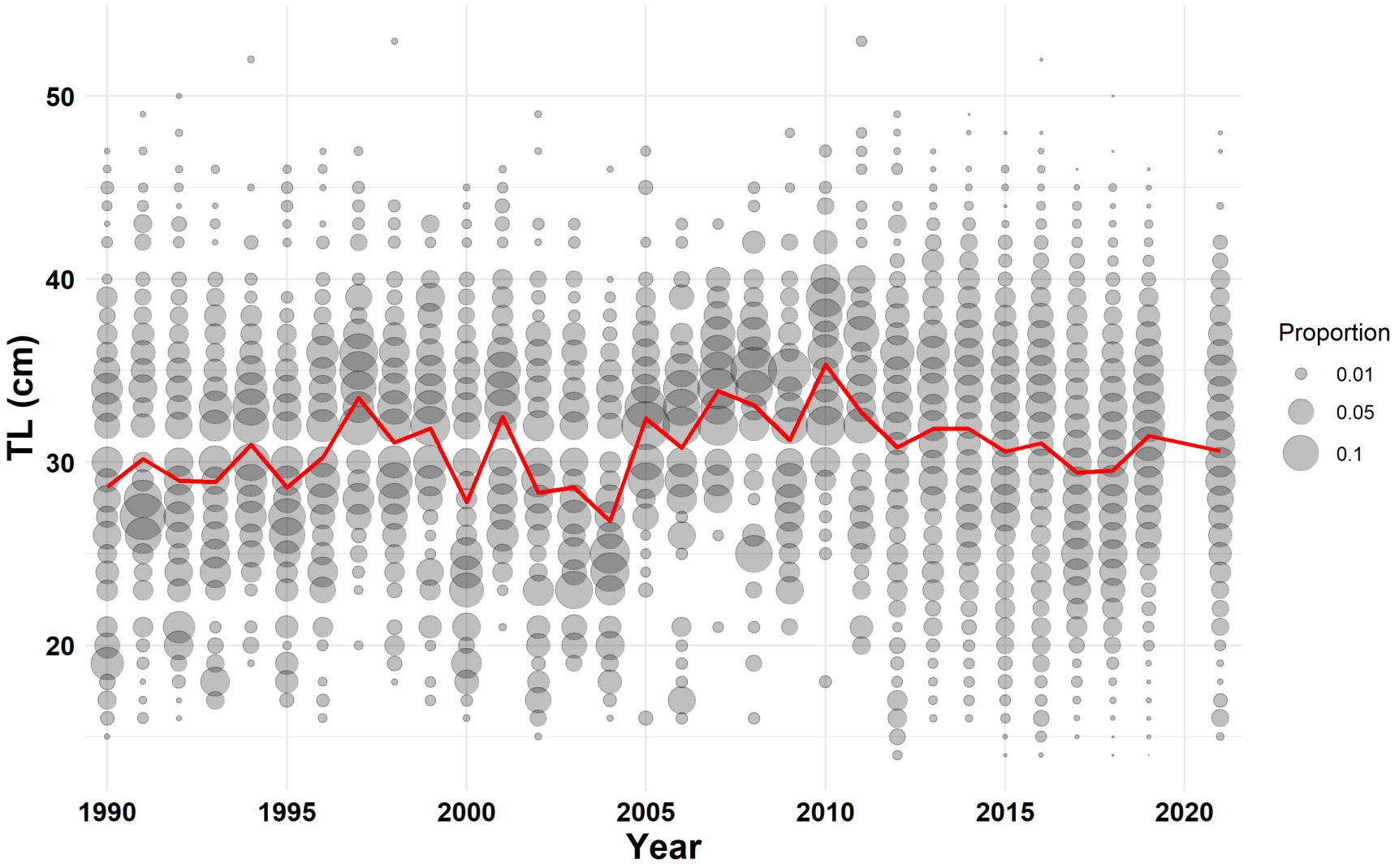



Relative Abundance
(Catch/Trap (Normalized))
0
1
2
3
4
1990
2000
2010
2020
Year

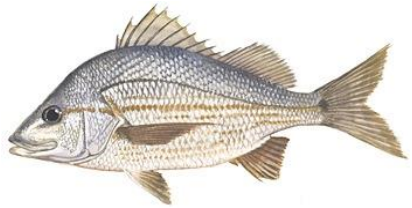

35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
81°W
80°W
79°W
78°W
77°W
76°W
White Grunt 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m

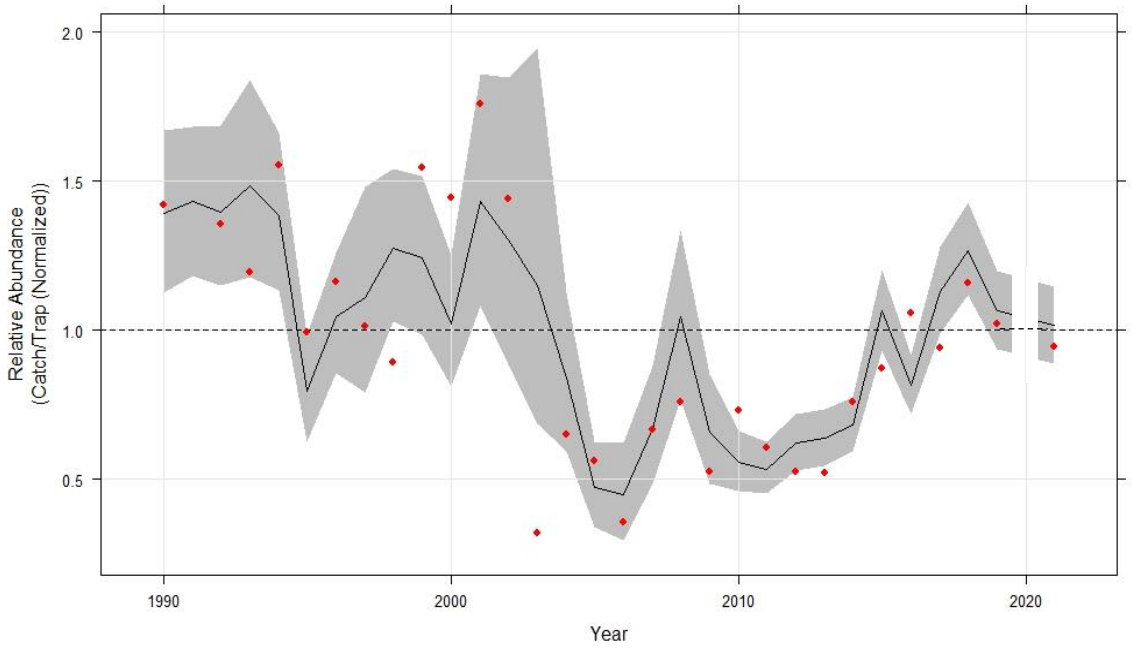
White Grunt

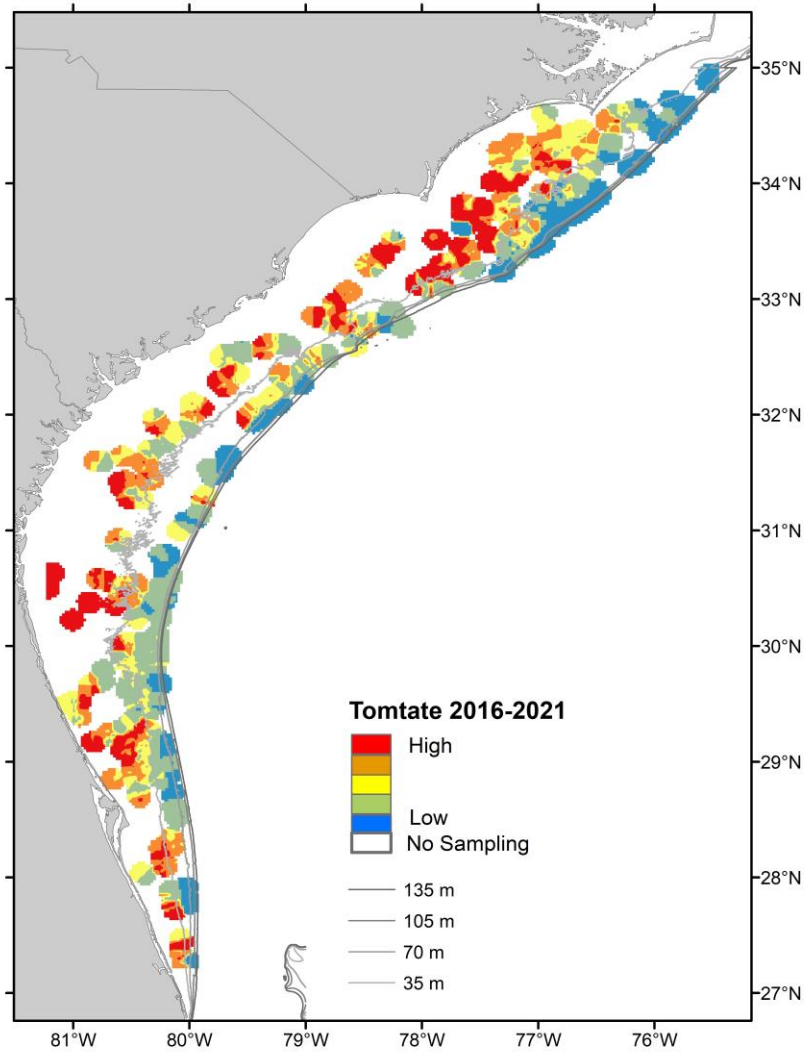



50
40
30
20
TL (cm)
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.01
0.05
0.1

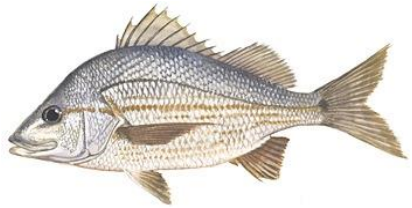
Tomtate

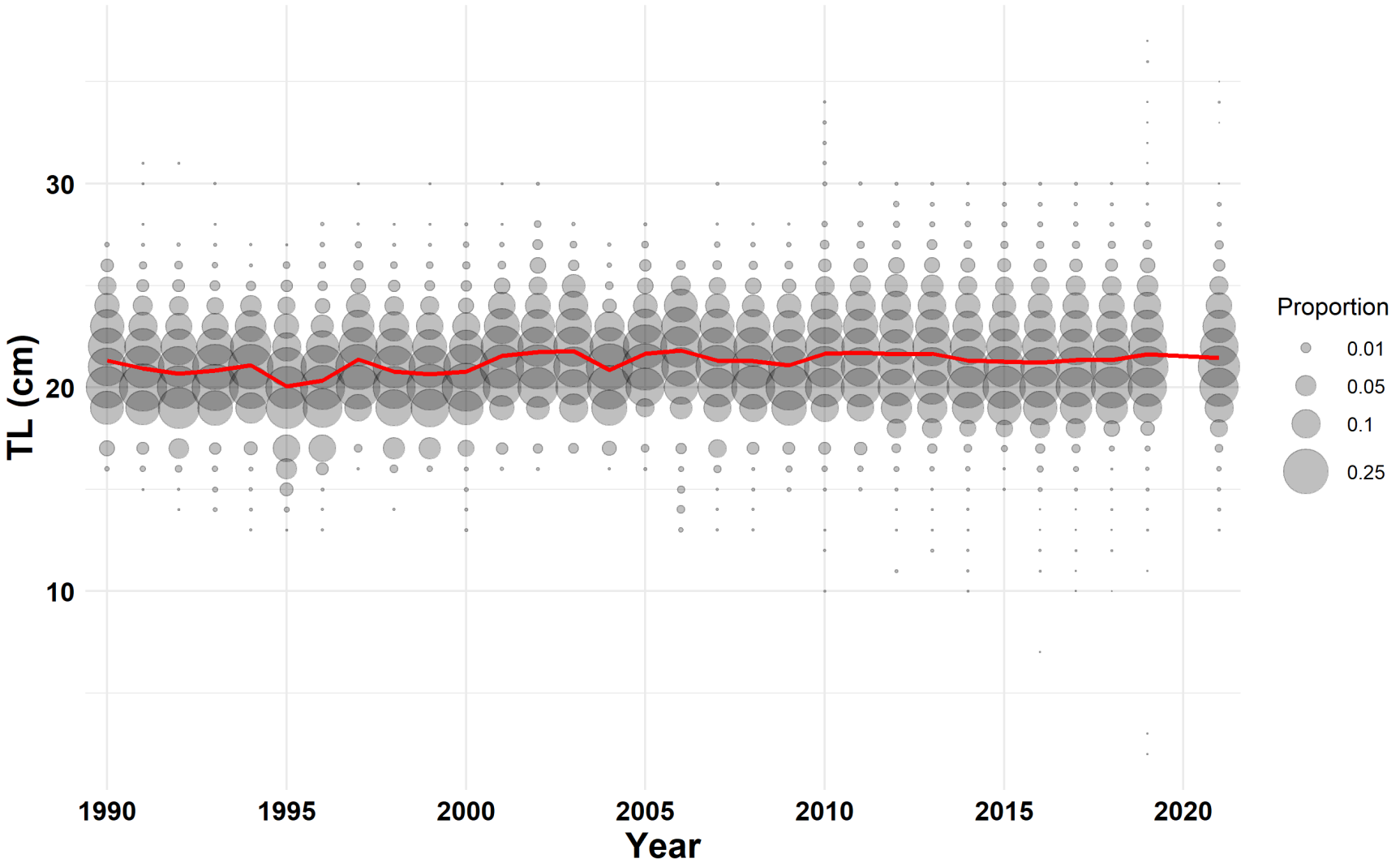



Relative Abundance
(Catch/Trap (Normalized))
2.0
1.5
1.0
0.5
1990
2000
2010
2020
Year

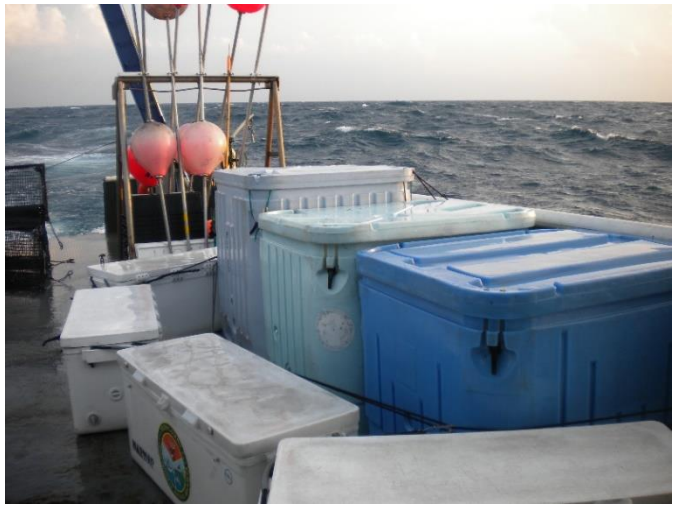

35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
81°W
80°W
79°W
78°W
77°W
76°W
Tomtate 2016-2021
High
Low
No Sampling
135 m
105 m
70 m
35 m

Tomtate



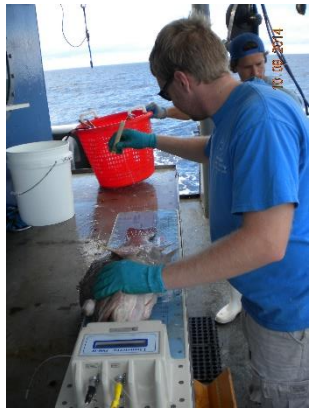

TL (cm)
30
20
10
1990
1995
2000
2005
2010
2015
2020
Year
Proportion
0.01
0.05
0.1
0.25

2022 SERFS Plans



Sampling Season:

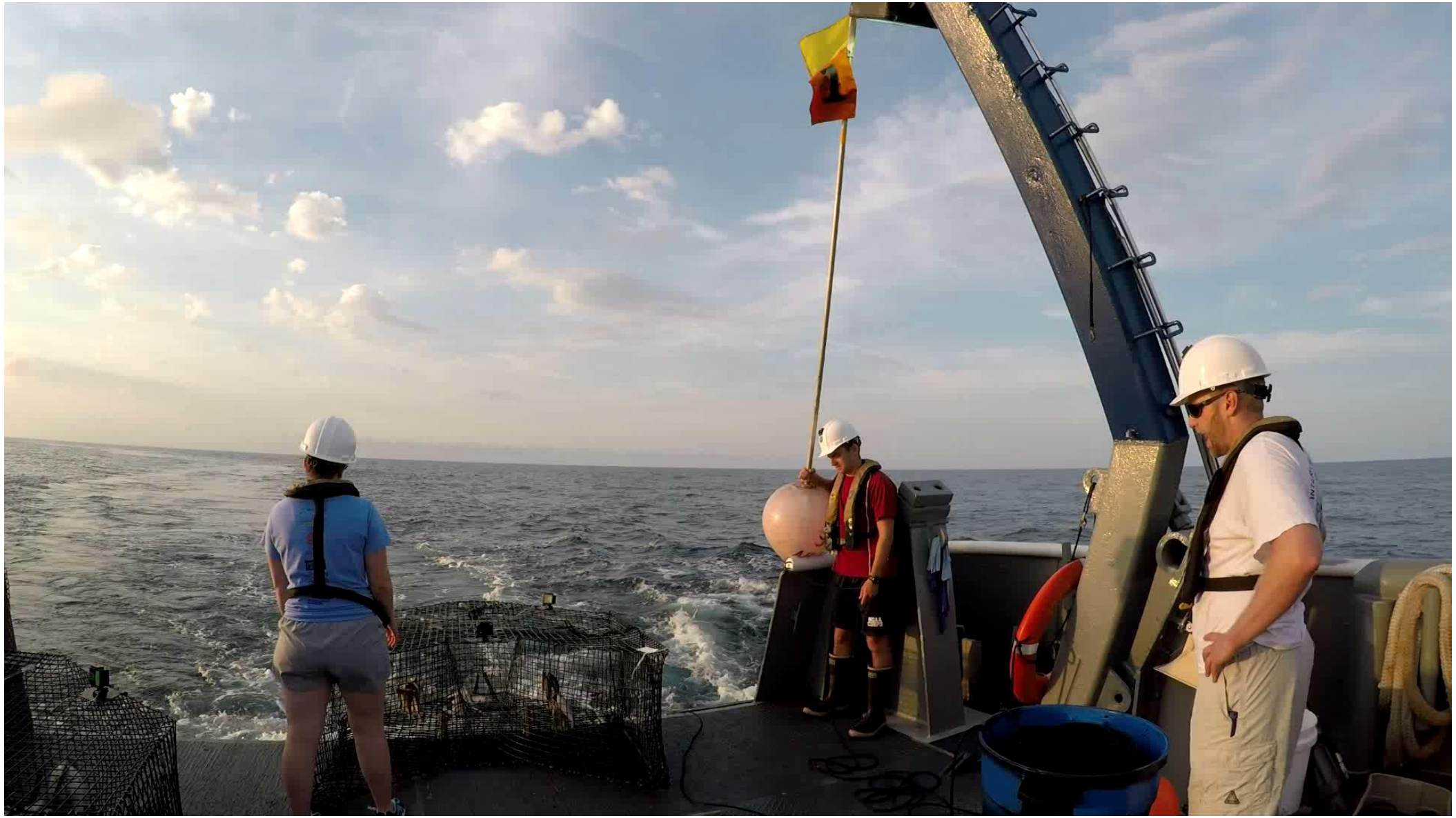
- Mid-April –> Mid-October
- ≈ 100 days at sea
- 3 vessels- Chevron Trap
- Complete scientific crew
- Full life history sampling



Acknowledgements:

MARMAP/SEAMAP-SA/SEFIS
Staff & Students
Research Vessel Crews
Past and Present

NOAA funding
SCDNR support



Questions?