

Fishery Independent Reef Fish Monitoring in the SE



An overview



DNR



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MARMAP SEAMAP-SA SEFIS

MArine Resources Monitoring, Assessment, and Prediction (SC-DNR)
South East Area Monitoring and Assessment Program – S. Atlantic (SC-DNR)
South East Fishery Independent Survey (SEFSC)

Collect fishery-independent information for
commercially and recreationally important
reef fish populations and associated habitats
from Cape Hatteras, NC to St. Lucie Inlet, FL.



Provide data and analyses to
State and Fed. Agencies, FM Council, ASMFC, SEDAR and others
in support of fisheries management

- MARMAP in place since 1972 (40 years!)
- Live bottom sampling using fish traps since 1978
- Sampling same habitat using standard sampling methods
- 2009: SEAMAP - SA Reef Fish Survey
- 2010: SEFIS Video survey



- Ongoing long-term monitoring
- Provides index of relative abundance (annually)
- Source for age, reproductive, and other biological information
- Document impacts of fishing
- Update and feedback as to the impact of regulations
- Information for stock assessments (SEDAR) and management
- Supplemental fisheries dependent data where needed



Life history information

Species ID (morph. charact.)

Length and weight

Otoliths – spines (age)

Gonad tissue
(sex, fecundity, maturity, transition)

Stomachs (diet composition)

Various other tissues (DNA, etc.)



Age and growth

Processing of otoliths and spines (whole or sectioned)

Validation and calibration, development of techniques.

Data: L / W relationships, length and age compositions, length at age, growth parameters, maximum age

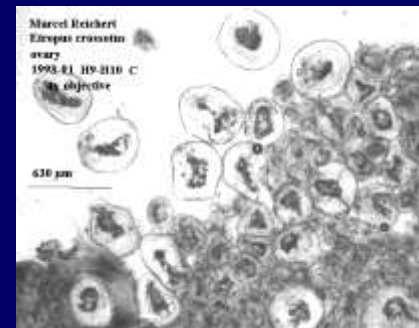
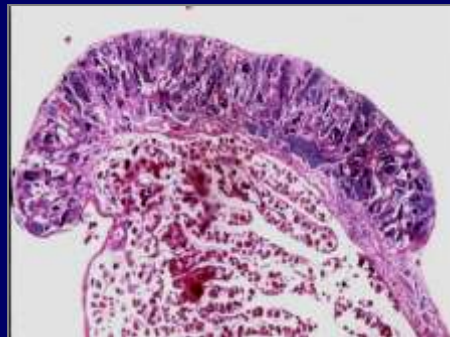


Reproduction

Processing and examination using histology and other techniques

Validation, calibration, and development of techniques and procedures

Data: Sex (ratio), fecundity, size and age at maturity and sex transition, etc.



R/V Palmetto



SAMPLING

Vessels:

R/V Palmetto (DNR)

R/V Savannah (SKIO)

Each vessel

40 - 60 days at sea/yr

5 -14 days per cruise

R/V Lady Lisa



R/V Lady Lisa (DNR)

10 - 25 days at sea/yr

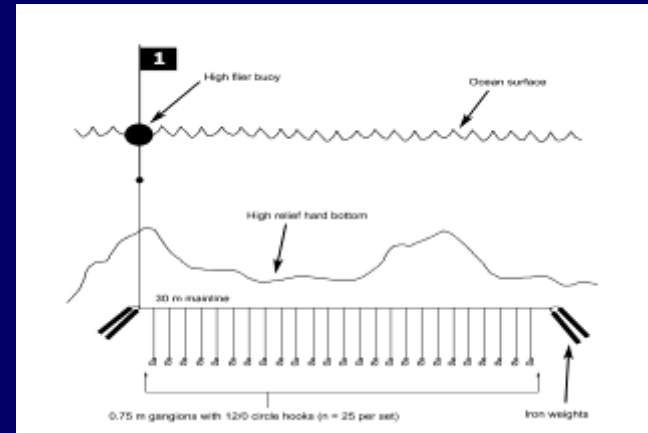
5 days per cruise

Primary fishing gears

CHEVRON fish trap



Short bottom long-line



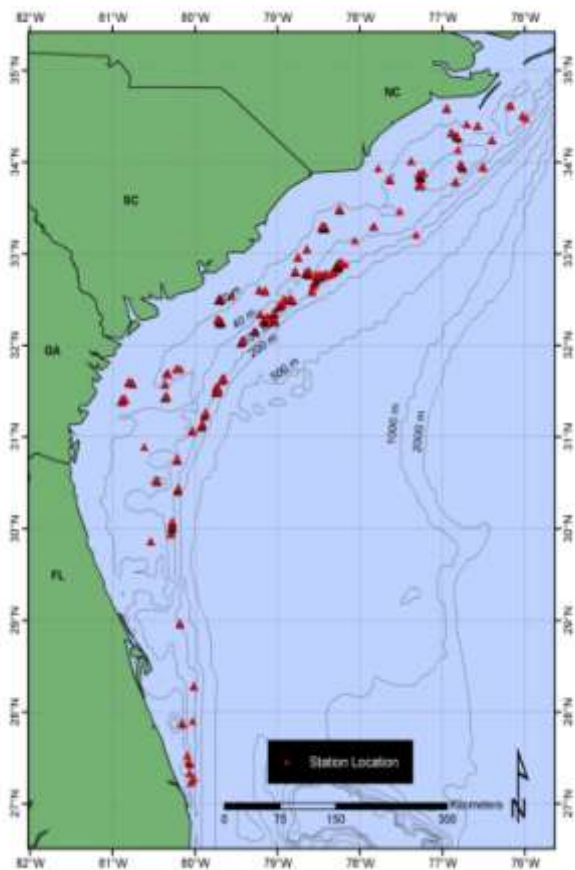
Long bottom long-line

Hook and line

CTD

Under water video and photos

CHEVRON fish trap



Used consistently since 1988 (MARMAP)
Baited with clupeids
Used in depths of < 90 m (300 ft.)
Soak time ± 90 minutes
Target species:
snapper grouper complex

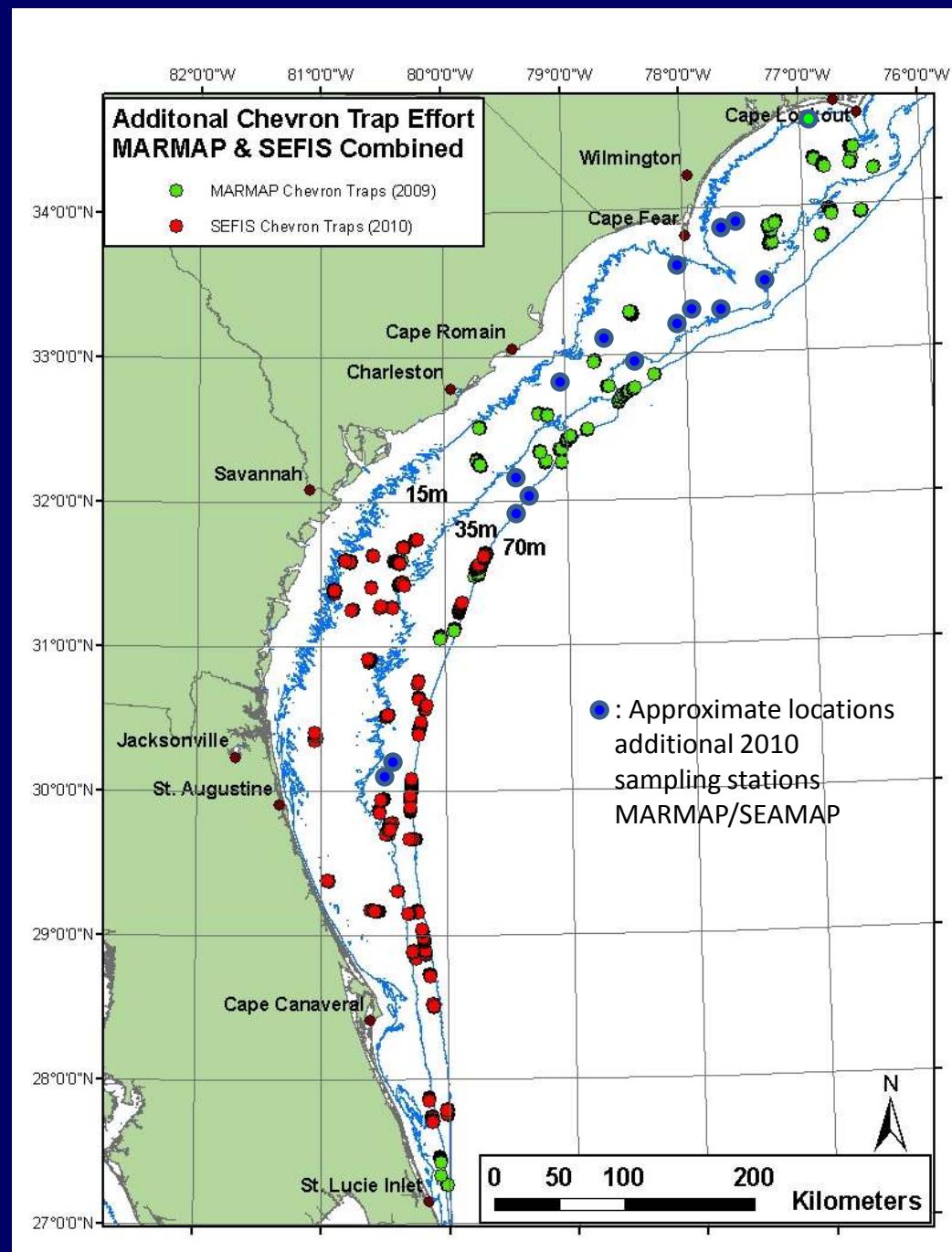


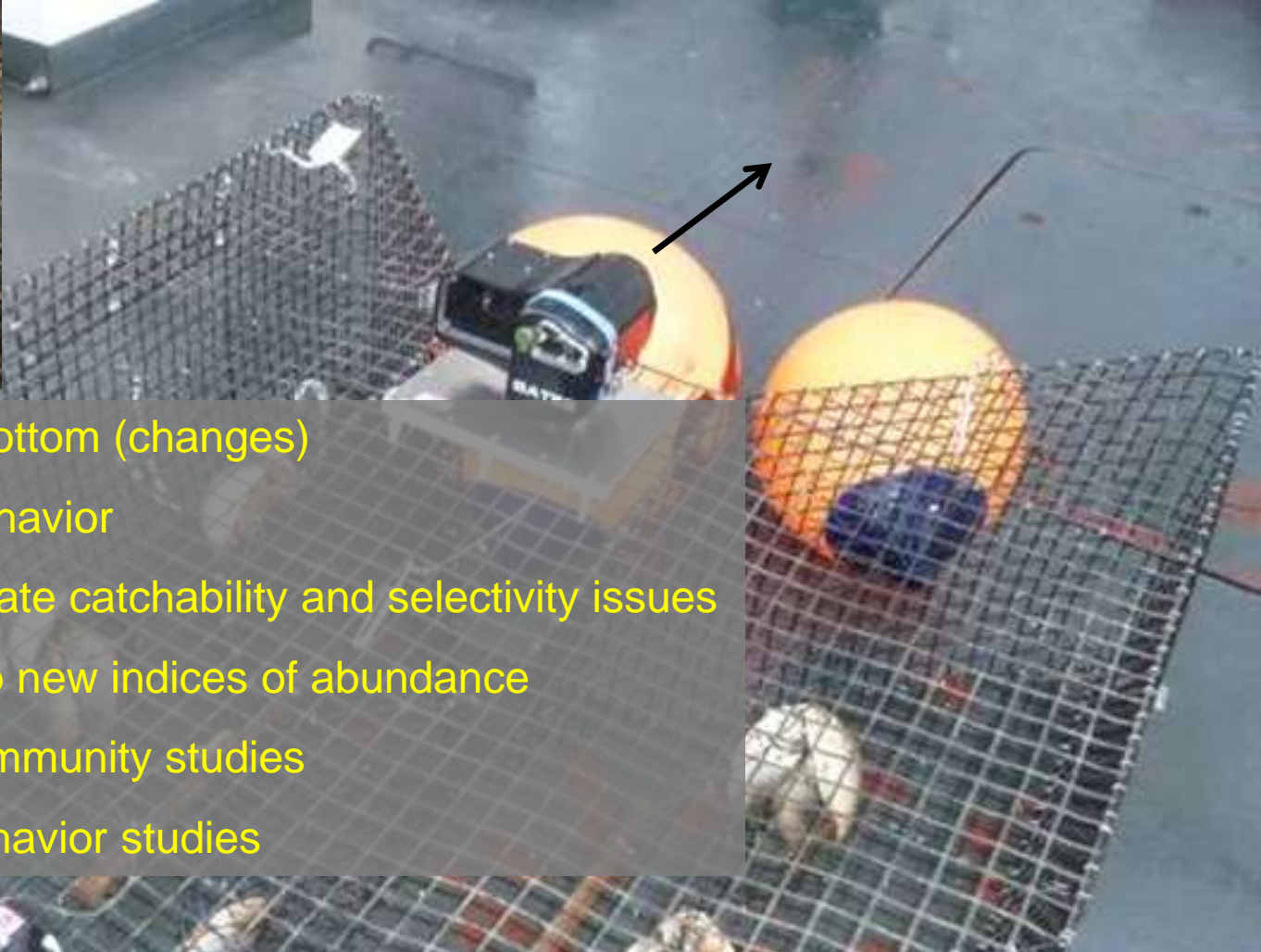
>3,000 stations in universe
>1,200 randomly selected
>1,000 sampled annually

New efforts (2010-2011):
MARMAP/SEAMAP-SA/SEFIS
2010 – 2011:

2010: 939 total trap deployments

- Expansion of sampling area
- SEFIS focus = GA and FL
- MARMAP/SEAMAP focus = SC and NC
- Addition of video survey
- Bottom mapping
- Additional analyses/research (support stock assessments)





Verify bottom (changes)

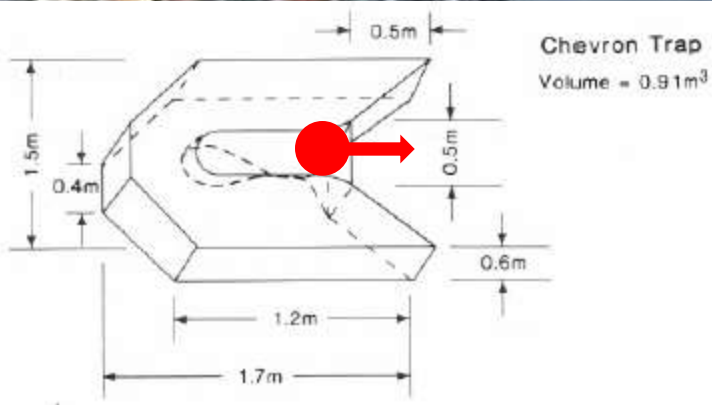
Trap behavior

Investigate catchability and selectivity issues

Develop new indices of abundance

Fish community studies

Fish behavior studies



Short bottom long-line

Used since 1978 (halted in 2012!)

Areas of high relief in depths >90 m

20 baited (squid) hooks

Soak time 90 minutes

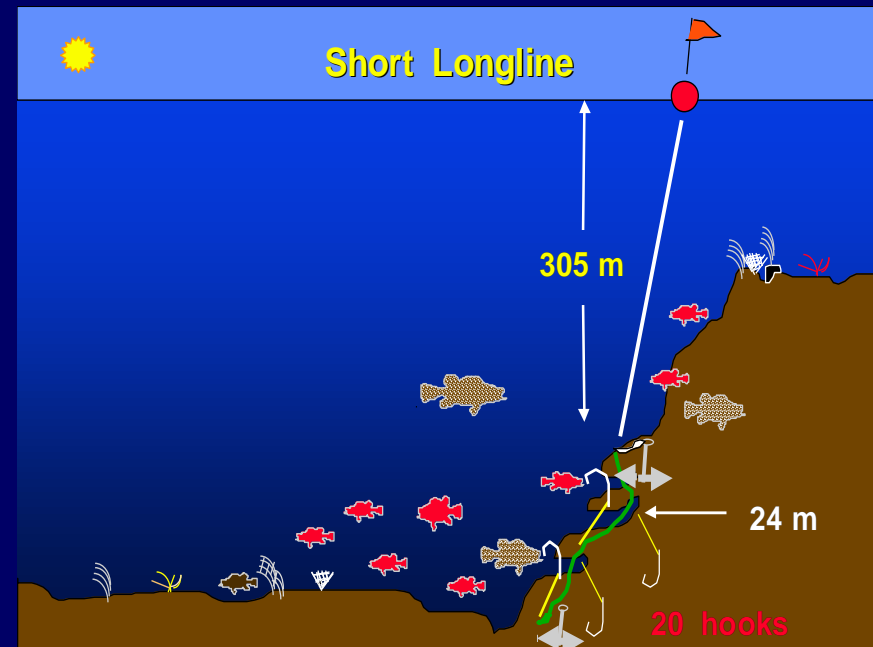
≈1,000 stations

≈100-150 randomly selected and sampled

Halted in 2012 due to funding

Species:

snowy grouper, jacks, tilefish, speckled hind



Long bottom long-line

100 baited (squid) hooks
≈ 200 m (600 ft.) on mud bottom

Halted in 2012 due to funding

Species: golden tilefish



Hook and line - rod and reel

Depths of <90 m (300 ft.)

All bottom types

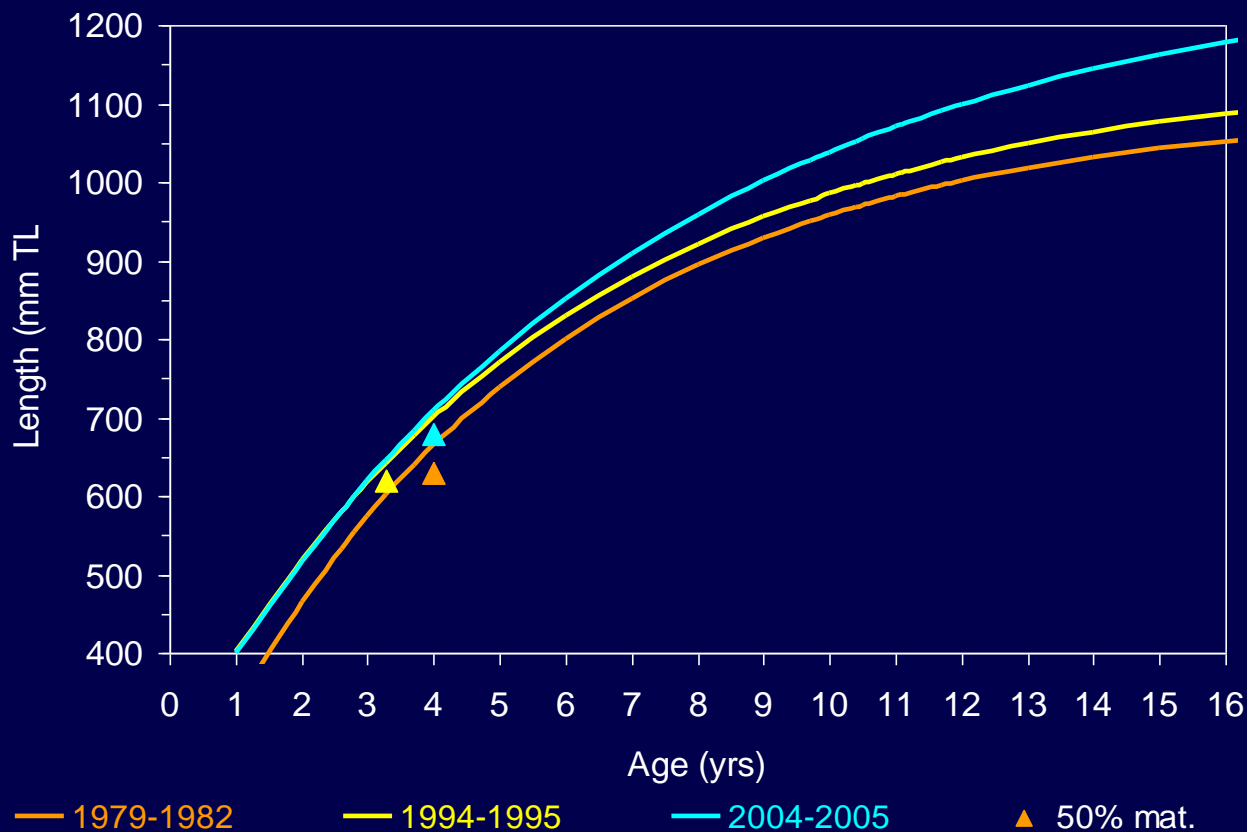
Supplemental sampling

Oceanographic data CTD



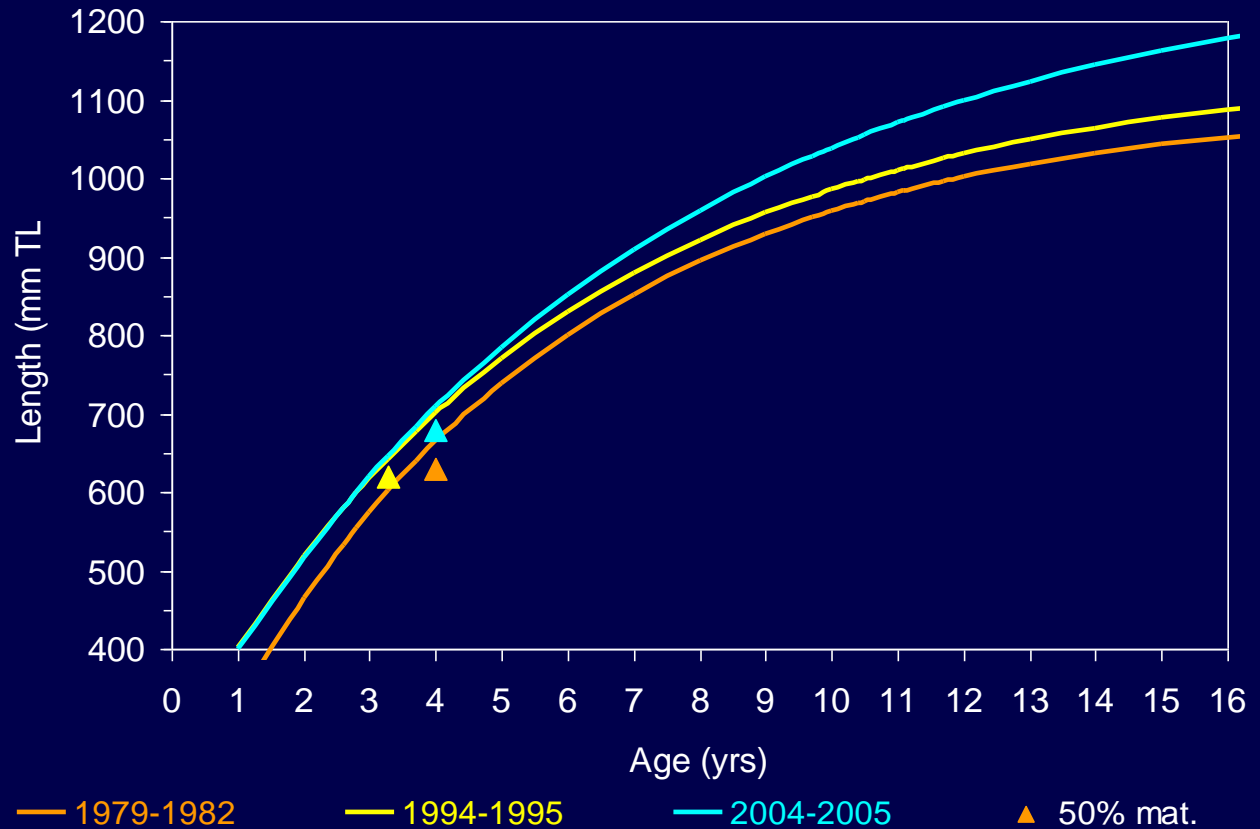
Some examples gag, scamp and red porgy

Maturity in female gag



Period	Size at 50% maturity			Age at 50% maturity		
	TL (mm)	95% CI	n	year	95% CI	n
1977-82	630	602-650	471	4.0	3.7-4.2	321
1994-95	620	610-629	3679	3.2 *	2.8-3.5	624
2004-05	680 *	674-685	1239	4.0	3.8-4.1	1276

Maturity in female gag



Gag - changes in transition and sex ratio

Period	Size at 50% transition			Age at 50% transition			sex ratio
	TL (mm)	95% CI	n	(yr)	95% CI	n	males + trans
1977-82	995 *	980-1013	501	11.1	10.4-12.1	300	19.4%
1994-95	1024 *	1011-1041	3836	11.1	10.1-13.1	946	5.5%
2004-05	1049 *	1030-1074	1003	10.4 *	9.8-11.3	1047	8.2%

Use of additional fish. dep. sampling



scamp

1979-89

38%

1990-97

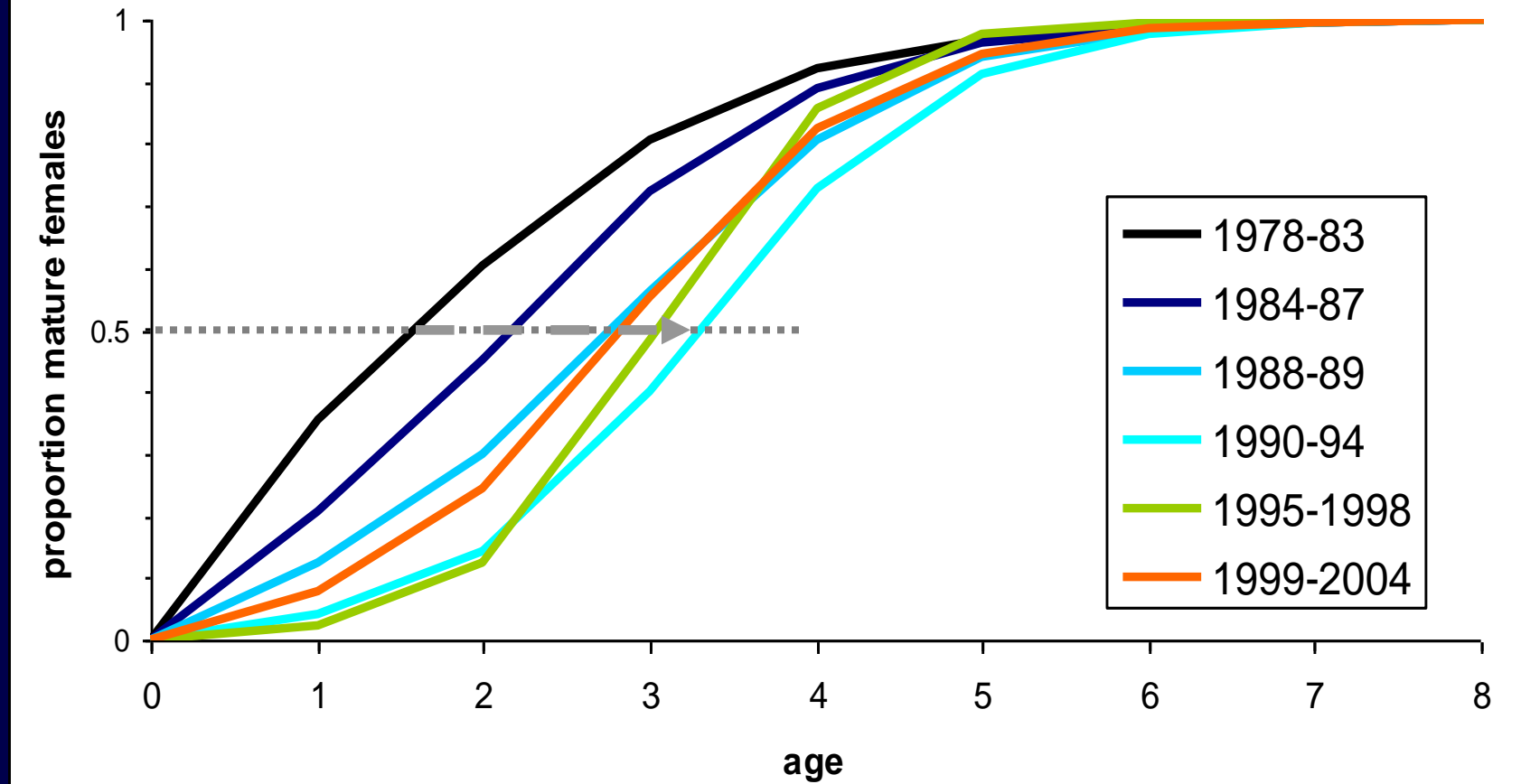
28%



Red porgy maturity

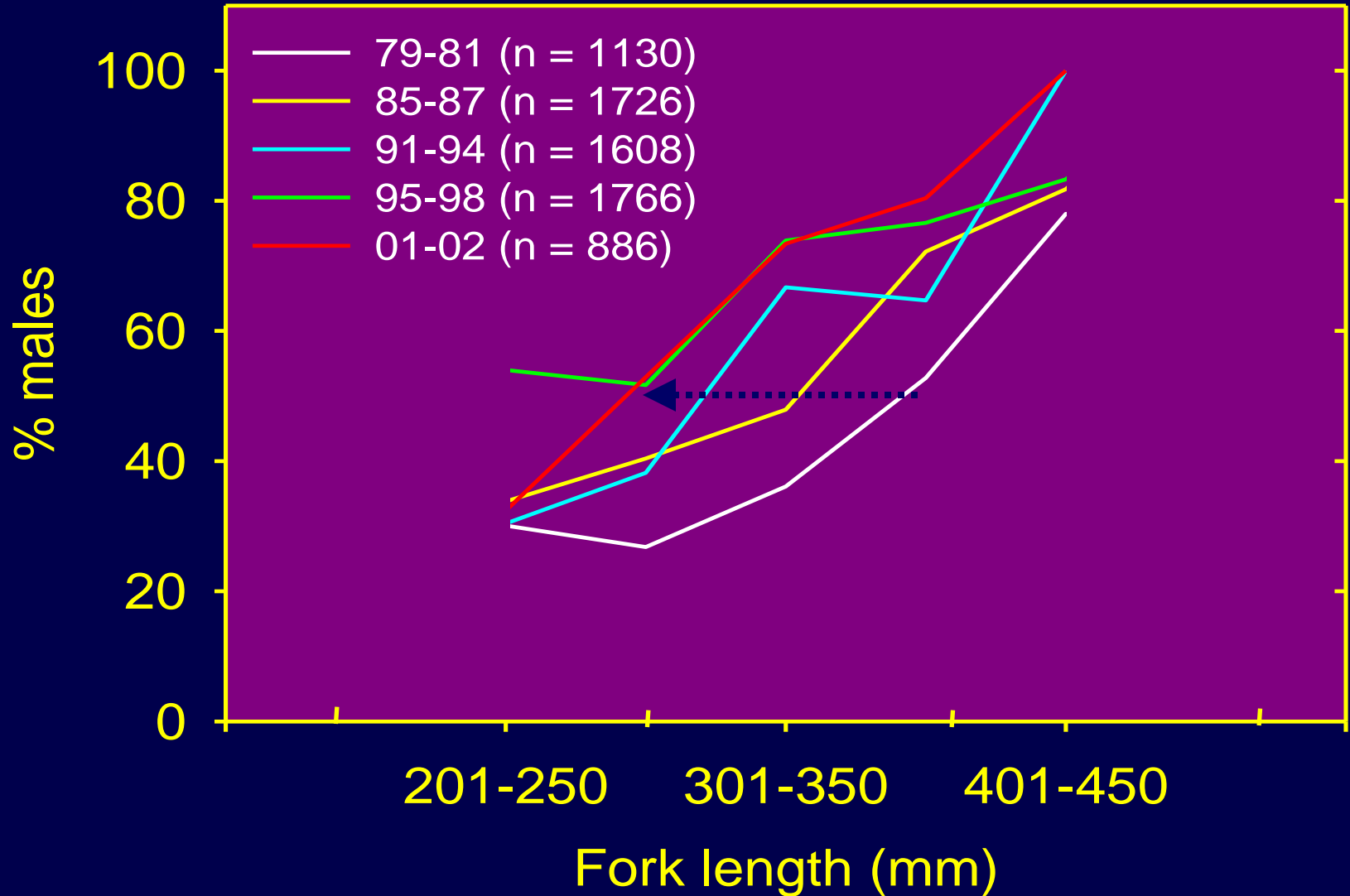


Female red porgy



Red porgy

Sex ratio - fishery independent



Data challenges and considerations for protogynous hermaphrodites

- Histology needed for accurate determination of maturity and transition.
- Transition often takes place around spawning period
- Transition can be a rapid process (days - wks)
- Presence of primary males in some species (e.g. black sea bass).
- Sex transition as juveniles in some species (e.g. red porgy)
- Need for large sample size for reliable sex ratio and transition data
 - Low % males, especially in heavily exploited large hermaphroditic species that are forming spawning aggregations
- Often multiple gears needed for reliable estimates
 - (e.g. traps and long-lines)
- Use of genetic techniques

Data challenges for protogynous hermaphrodites

Thoughtful sampling design (e.g., month, water depth, latitude, lunar phase) is important when investigating reproduction these species.

Fish. Indep. sampling:

- Low #'s in catches (esp. males) for many species.

- Rarely year round sampling

Fish. Dep. sampling:

- Regulations for many species (lengths, trip limits, etc.)

- Spawning and area closures

- “Quota” closures

- Special projects needed with careful design

- for representative samples.

The image is a collage of four underwater photographs. The top-left photo shows a shark swimming in clear, blue water. The top-right photo shows a ray swimming over a sandy seabed. The bottom-left photo shows a shark swimming in a shallow, sandy area. The bottom-right photo shows a large, spotted shark swimming over a sandy seabed with some coral. The text "THANK YOU" is centered in the middle of the collage in a bold, yellow, sans-serif font.

THANK YOU