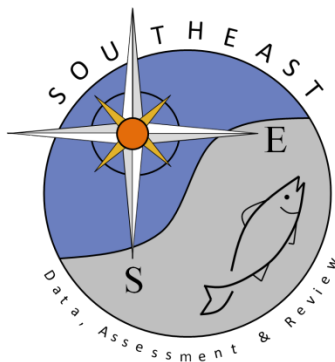


# Review of Available Length Composition Data Submitted for use in the SEDAR 39 *Mustelus canis* Atlantic Stock Assessment

Dean Courtney

SEDAR39-AW-01

10 September 2014



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# **Review of Available Length Composition Data Submitted for use in the SEDAR 39 *Mustelus canis* Atlantic Stock Assessment**

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Sept 10, 2014

## **SUMMARY**

Length composition data for *Mustelus canis* from the northwest Atlantic were submitted during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment. This working paper reviewed each length data set submitted from the Atlantic during the SEDAR 39 DW. Options were then identified for possible uses of the length composition data in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

## **1. INTRODUCTION**

Length composition data for *Mustelus canis* from the northwest Atlantic were submitted during the SEDAR 39 Data Workshop (DW) for possible used in the SEDAR 39 *Mustelus canis* Atlantic stock assessment. This working paper reviewed each length data set submitted from the Atlantic during the SEDAR 39 DW.

## **2. METHODS**

The length composition data were summarized separately for accepted indices, catch, and rejected indices. Options were then identified for possible uses of the length composition data in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

## **3. RESULTS**

Available length composition data were summarized for each length data set submitted for *Mustelus canis* from the northwest Atlantic during the SEDAR 39 Data Workshop (DW) (Figures 1 – 3; Tables 1 – 3; Appendix A).

## **4. DISCUSSION**

Options were identified for possible uses of the length composition data in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

#### **4.1. Accepted Indices**

The following options were identified for length composition data obtained from accepted indices:

1. Use the length compositions from each accepted CPUE index to represent the selectivity of the index;
2. Use sex combined (or unknown sex) length compositions from each accepted CPUE index; and
3. Use sex specific length compositions, where available, from each accepted CPUE index (Figure 1; Table 1).

#### **4.2. Catch**

The following options were identified for length composition data obtained from observed catch:

1. Use Northeast Observer Program sink gillnet (NE-GNOP) length compositions to represent the selectivity of the commercial gillnet catch;
  - 1.a. Split the NE-GNOP length compositions (and the commercial gillnet catch) into kept and discarded catch;
2. Use the Northeast Observer Program otter trawl (NE-TOP) length compositions to represent the selectivity of the commercial trawl catch;
  - 2.a. Combine NE-TOP length compositions (kept, discarded, and unknown disposition);
3. Exclude Southeast Observer Program gillnet (SE) GNOP and bottom longline (SE) BLLOP length compositions as they may not be representative of commercial catch from the northeast;
  - 3.a. Include SE GNOP length compositions in exploratory analysis if time permits;
4. Include Southeast Observer Program bottom longline (SE BLLOP) length compositions to represent the length composition of longline catch because most longline catch appears to be from N. and S. Carolina where the SE BLLOP operates
5. Use Marine Recreational Information Program (MRIP/MRFSS) length compositions to represent the selectivity of the recreational catch;
6. Use sex combined (or unknown sex) length compositions from each catch data set; and
7. Use sex specific length compositions, where available, from each catch data set (Figure 2; Table 2).

#### **4.3. Rejected Indices**

The following options were identified for length composition data obtained from rejected indices:

- 1 Exclude length compositions from rejected indices because the CPUE series have all been rejected and because other length compositions are available from the accepted CPUE indices, which may more accurately reflect the length composition of sharks captured in those data series; and
  - 1.a. Include length compositions from rejected indices (Figure 3; Table 3) in exploratory analysis if time permits.

Table 1. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for accepted indices during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

Name (and acronym used in this report)	Years of coverage	State	Sex specific data (Yes or No)	N (n)	Index rank <sup>3</sup>	SEDAR 39 Data Workshop document number	Provider	Index number
Northeast Fisheries Science Center Fall Trawl Survey North of Cape Hatteras (NEFSC Fall Trawl-N)	1972-2012	MA-NC	Yes	3,078 <sup>1</sup>	Rank 1	SEDAR 39-DW-24	NEFSC (Woods Hole)	1.1
NEAMAP Shallow Water Fall Trawl Survey (NEAMAP Fall Trawl)	2007-2012	MA-NC	Yes	4,317 <sup>1</sup>	Rank 2	SEDAR 39-DW-30	VIMS	1.2
Massachusetts Department of Marine Fisheries Fall Trawl Survey (MA DMF Fall Trawl)	1978-2012	MA	Yes	1,764 <sup>1</sup>	Rank 3	SEDAR 39-DW-24	NEFSC (Woods Hole)	1.3
Rhode Island Department of Environmental Management trawl surveys (RI DEM Seas Trawl)	1980-2012	RI	Yes	(n = 666 <sup>2</sup> )	Rank 3	SEDAR 39-DW-10	NEFSC (Narragansett)	1.4
Connecticut Department of Energy and Environmental Protection Long Island Sound trawl surveys (CT DEEP Trawl)	1989-2012	CT/NY	Yes	(n = 4,112 <sup>2</sup> )	Rank 3	SEDAR 39-DW-12	NEFSC (Narragansett)	1.5
Delaware Division of Fish and Wildlife trawl surveys (DE Trawl)	1966-1971; 1974; 1997-2012	DE	No	(n = 16,113 <sup>2</sup> )	Rank 3	SEDAR 39-DW-15	NEFSC (Narragansett)	1.6
New Jersey Division of Fish and Wildlife trawl surveys (NJ DFW Trawl)	1988-2012	NJ	No	(n = 69,871 <sup>2</sup> )	Rank 3	SEDAR 39-DW-14	NEFSC (Narragansett)	1.7
SEAMAP South Atlantic Shallow Water Trawl Survey (SEAMAP-SA Trawl)	1994-2012	FL-NC	Yes	(n = 4,136 <sup>2</sup> )	Rank 4	SEDAR 39-DW-02	SEFSC (Panama City)	1.8

<sup>1</sup> Sample size (N) indicates the number of records obtained from the mean number measured at length per tow (NEFSC survey data).

<sup>2</sup> Sample size (n) indicates the number of lengths measured.

<sup>3</sup> The relative ranking assigned to each index at the SEDAR 39 Data Workshop.

Table 2. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for observed catch (commercial and recreational) during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

Name (and acronym used in this report)	Years of coverage	State	Sex specific data (Yes or No)	N (n)	Index rank	SEDAR 39 Data Workshop document number	Provider	Index number
Northeast Observer Program Sink Gillnet (NE GNOP; Combined Mesh, Kept)	1992-2012	MA-NC	Yes	8,016 <sup>1</sup> (n = 11,751 <sup>2</sup> )	NA	SEDAR 39-DW-25	NEFSC (Woods Hole)	<b>2.1</b>
Northeast Observer Program Sink Gillnet (NE GNOP; Combined Mesh, Discard)	1992-2012	MA-NC	Yes	8,016 <sup>1</sup> (n = 2,337 <sup>2</sup> )	NA	SEDAR 39-DW-25	NEFSC (Woods Hole)	<b>2.2</b>
Northeast Observer Program (Otter Trawl) (NE TOP; Combined Mesh and Disposition)	1994-2012	MA-NC	Yes	2,606 <sup>1</sup> (n = 3,623 <sup>2</sup> )	NA	SEDAR 39-DW-25	NEFSC (Woods Hole)	<b>2.3</b>
Southeast Gillnet Fishery Observer Program (SE GNOP)	2005-2012	FL-NC	Yes	(n = 645 <sup>2</sup> )	NA	SEDAR 39-DW-03	SEFSC- (Panama City)	<b>2.4</b>
Southeast Bottom Longline Observer Program (SE BLLOP)	1994-2012		Yes	(n = 507 <sup>2</sup> )	NA	SEDAR 39-DW-03	SEFSC- (Panama City)	<b>2.5</b>
Marine Recreational Information Program (MRIP; MRFSS)	1981-2012	FL-ME	No	(n = 1,562 <sup>2</sup> )	NA	SEDAR 39-DW-03	SEFSC- (Panama City)	<b>2.6</b>

<sup>1</sup> Sample size (N) indicates the number of records obtained from each subsample (NEFSC Observer Program data)

<sup>2</sup> Sample size (n) indicates the number of lengths measured.

Table 3. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for rejected indices during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment.

Name	Years of coverage	State	Sex specific data (Yes or No)	N (n)	Index rank <sup>3</sup>	SEDAR 39 Data Workshop document number	Provider	Index number
NEFSC Trawl Survey (Spring North)	1973-2012	MA-NC	Yes	2,132 <sup>1</sup>	NA	SEDAR 39-DW-24	NEFSC (Woods Hole)	<b>3.1</b>
NEFSC Trawl Survey (Spring South)	1974-2011	NC-FL	Yes	681 <sup>1</sup>	NA	SEDAR 39-DW-24	NEFSC (Woods Hole)	<b>3.2</b>
MA Dept of Mar Fish Trawl Survey (Spring)	1978-2012	MA	yes	433 <sup>1</sup>	NA	SEDAR 39-DW-24	NEFSC (Woods Hole)	<b>3.3</b>
NEFSC Trawl Survey (Winter North)	1992-2007	MA-NC	Yes	1,484 <sup>1</sup>	NA	SEDAR 39-DW-24	NEFSC (Woods Hole)	<b>3.4</b>
Northeast Fisheries Observer Program (Anchored sink gillnet)	1995-2012	NC – Maine	Yes	(n = 12,052 <sup>2</sup> )	NA	SEDAR 39-DW-09	NEFSC (Narragansett)	<b>3.5</b>
Northeast Fisheries Observer Program (Drift sink gillnet)	2001-2012	NC – Mid. Atl.	Yes	(n = 1,130 <sup>2</sup> )	NA	SEDAR 39-DW-09	NEFSC (Narragansett)	<b>3.6</b>
Northeast Fisheries Observer Program (Otter trawl)	1996-2012	NC – Maine	Yes	(n = 3,575 <sup>2</sup> )	NA	SEDAR 39-DW-09	NEFSC (Narragansett)	<b>3.7</b>
North Carolina Division of Marine Fisheries Ocean Gillnet Program	2009-2012	NC	No	(n = 224 <sup>2</sup> )	NA	SEDAR 39-DW-17	NEFSC (Narragansett)	<b>3.8</b>
South Carolina Department of Natural Resources Red Drum Longline Survey	1995-2006	SC	Yes	(n = 853 <sup>2</sup> )	NA	SEDAR 39-DW-19	NEFSC (Narragansett)	<b>3.9</b>
University of North Carolina Shark Longline Survey south of Shackleford Banks	1972-2011	NC	Yes	(n = 706 <sup>2</sup> )	NA	SEDAR 39-DW-18	NEFSC (Narragansett)	<b>3.10</b>
Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Longline Survey Delaware Bay	2003-2012	DE/NJ	Yes	(n = 2,160 <sup>2</sup> )	NA	SEDAR 39-DW-16	NEFSC (Narragansett)	<b>3.11</b>

<sup>1</sup> Sample size (N) indicates the number of records obtained from the mean number measured at length per tow (NEFSC survey data).

<sup>2</sup> Sample size (n) indicates the number of lengths measured.

<sup>3</sup> These indices were rejected for use in the SEDAR 39 stock assessment during the SEDAR 39 Data Workshop.



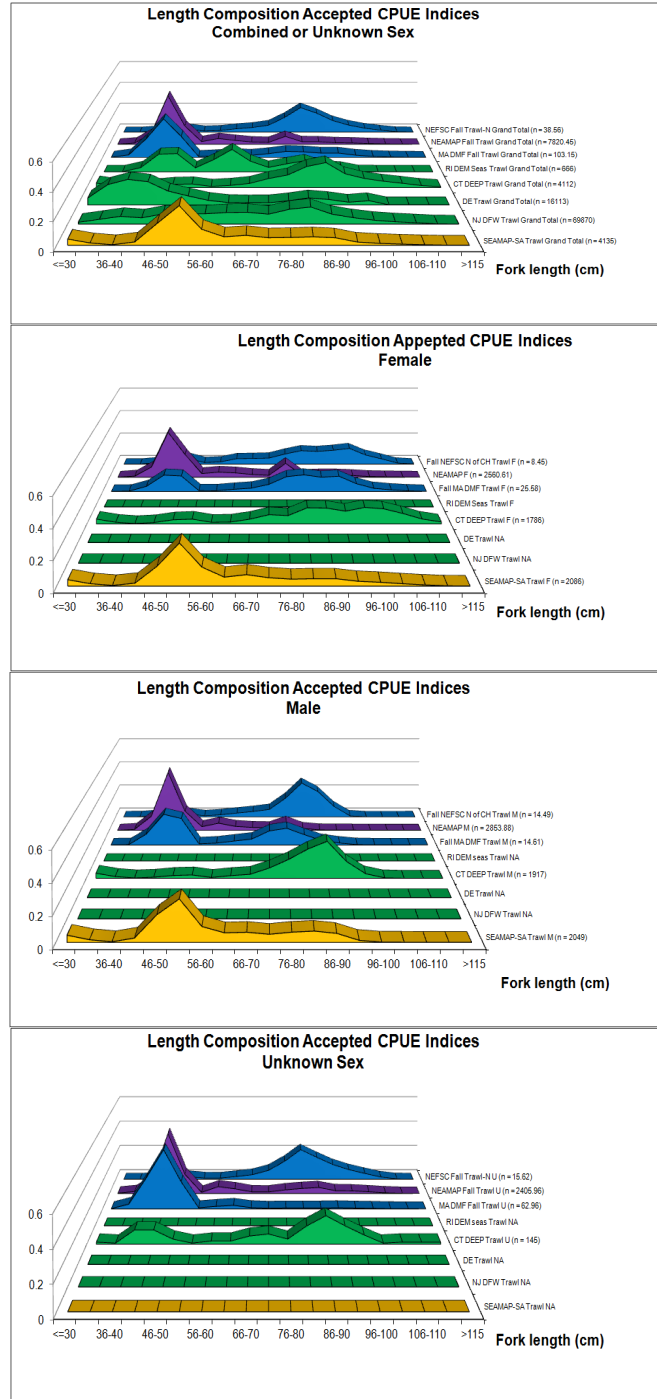


Figure 1. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for accepted indices during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment (Table 1).

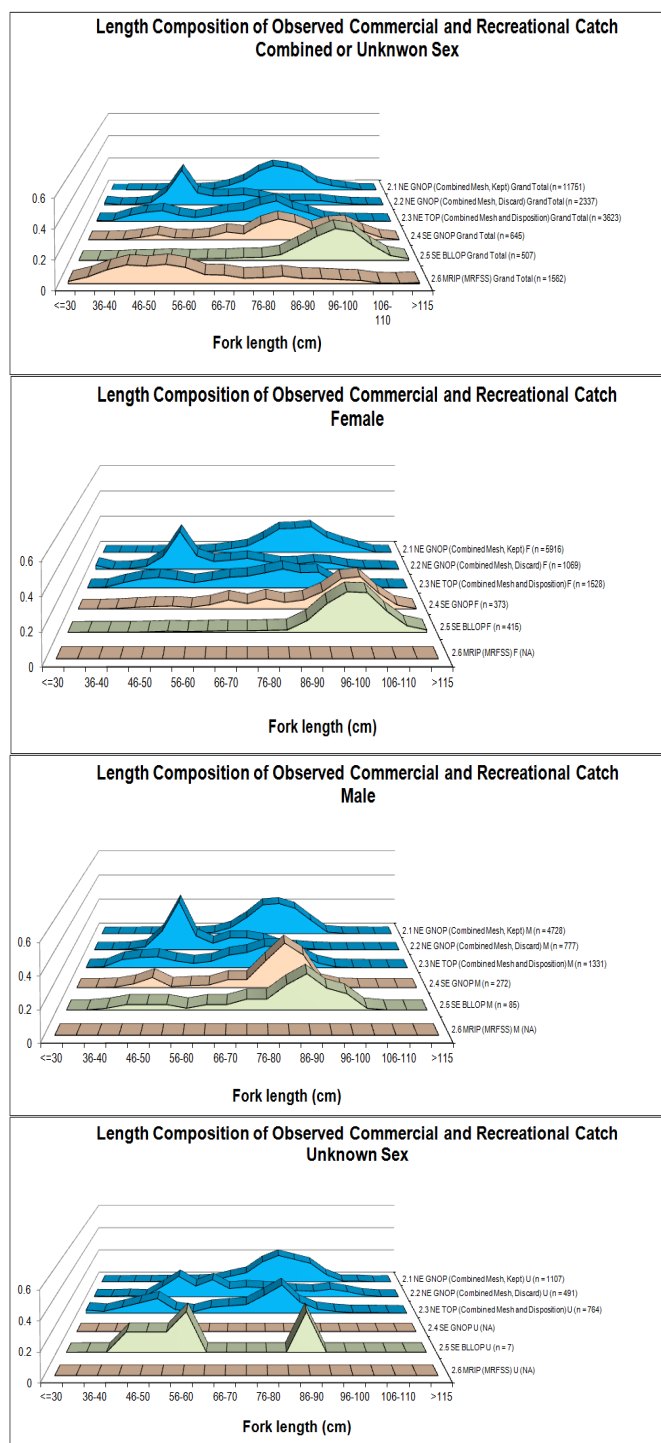


Figure 2. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for observed catch (commercial and recreational) during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment (Table 2).

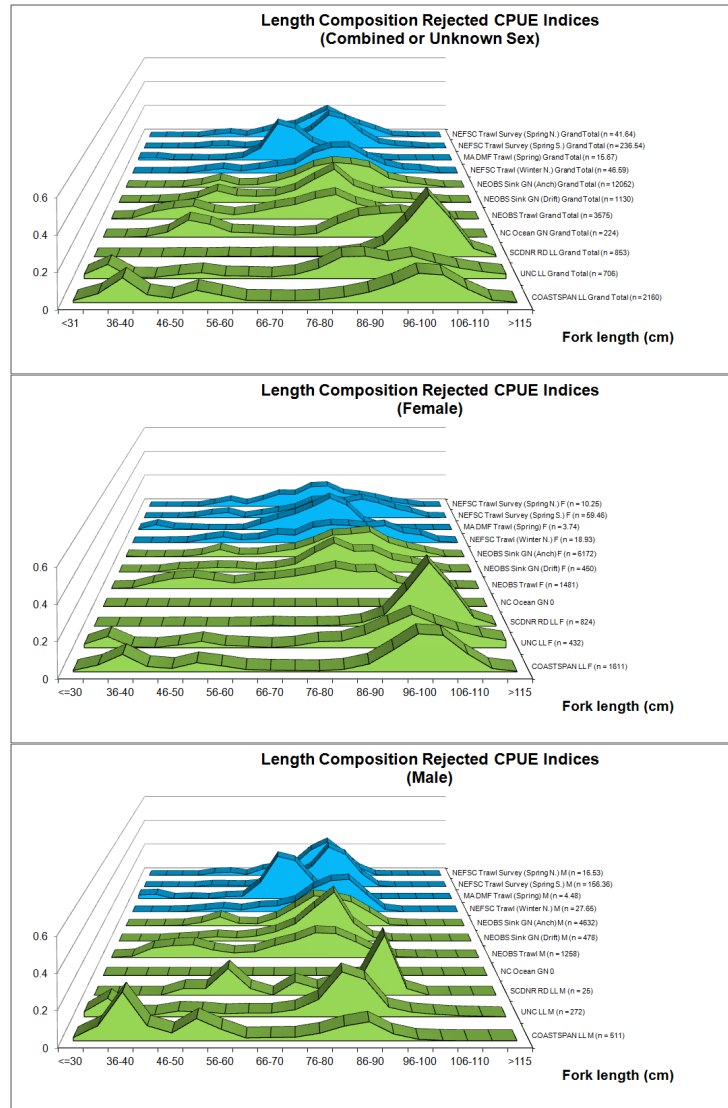


Figure 3. Available length composition data for *Mustelus canis* from the northwest Atlantic submitted for rejected indices during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment (Table 3).

**Appendix A –Annual Length Compositions for *Mustelus canis* From the Northwest Atlantic Submitted During the SEDAR 39 Data Workshop (DW) for Possible use in the SEDAR 39 *Mustelus canis* Atlantic Stock Assessment**

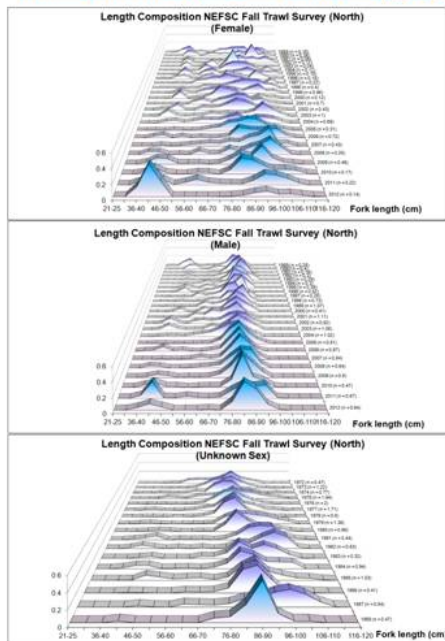
Length compositions for *Mustelus canis* are plotted below from data submitted during the SEDAR 39 Data Workshop (DW) for possible use in the SEDAR 39 *Mustelus canis* Atlantic stock assessment (Adapted from a presentation submitted during SEDAR 39 Assessment Webinar I).

# 1.1 NEFSC Fall Trawl Survey (North)

Northeast Fisheries Science Center trawl surveys (Fall, N of Cape Hatteras)

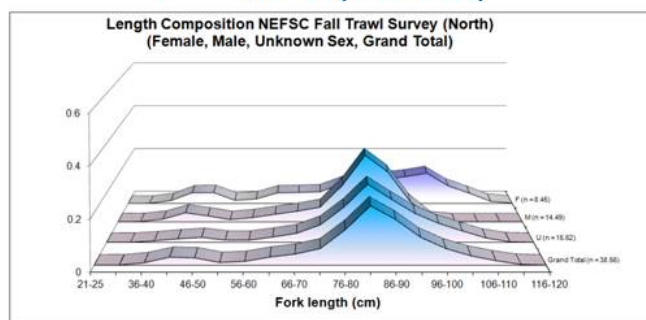
CPUE  
(Rank 1)

SEDAR39-DW-24  
NEFSC (Woods Hole)



## NEFSC Fall Trawl Survey (N.)

- 1972-2012
- Sex specific stratified mean numbers per tow
- N = 3,078 (records)



## 1.2 NEAMAP Fall Trawl Survey

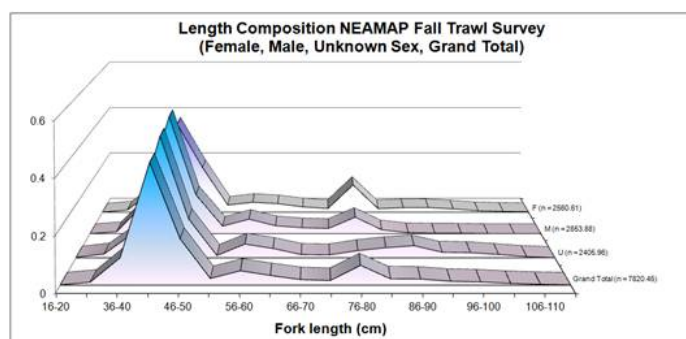
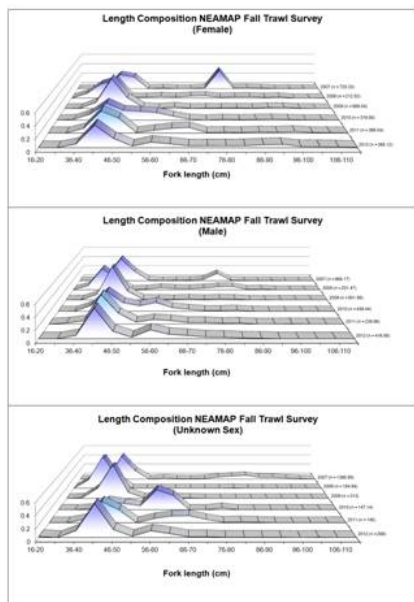
Fall NEAMAP Trawl survey

CPUE  
(Rank 2)

SEDAR39-DW-30  
VIMS

### NEAMAP Fall Trawl Survey

- 2007-2012
- Sex specific subsample
- N = 4,317 (records)



## 1.3 MA DMF Fall Trawl Survey

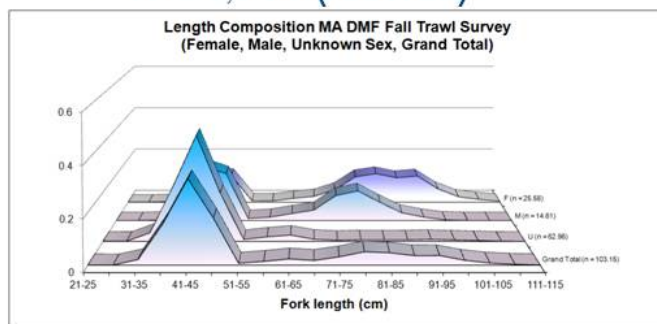
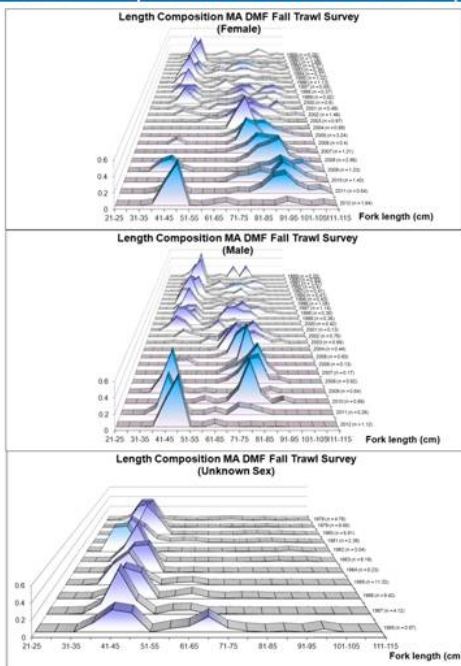
Massachusetts Department of Marine Fisheries trawl surveys (Fall)

CPUE  
(Rank 3)

SEDAR39-DW-24  
NEFSC (Woods Hole)

### MA DMF Fall Trawl Survey

- 1978-2012
- Sex specific stratified mean numbers per tow
- N = 1,764 (records)



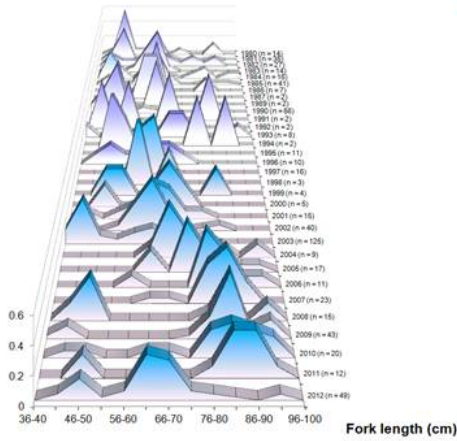
## 1.4 RI DEM Seasonal Trawl Survey

Rhode Island Department of Environmental Management trawl surveys

CPUE  
(Rank 3)

SEDAR39-DW-10  
NEFSC (Narragansett)

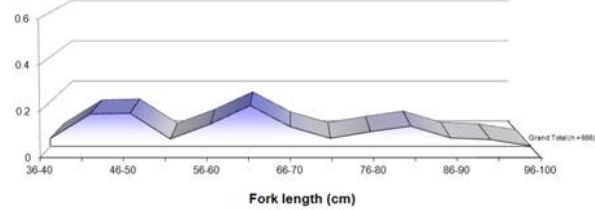
Length Composition RI DEM Seasonal Trawl Survey  
(Unknown Sex)



### DEM Seas Trawl Survey

- 1980-2012
- Sex unknown
- All sharks measured
- N = 666 (lengths measured)

Length Composition RI DEM Seasonal Trawl Survey  
(Grand Total)



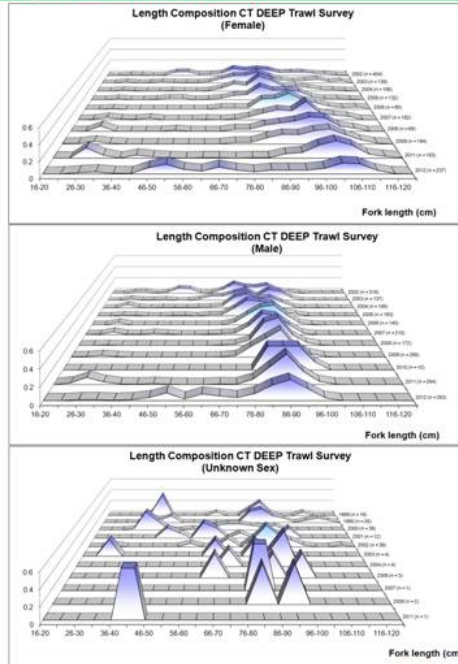


# 1.5 CT DEEP Trawl Survey

Connecticut Department of Energy and Environmental Protection  
Long Island Sound trawl surveys

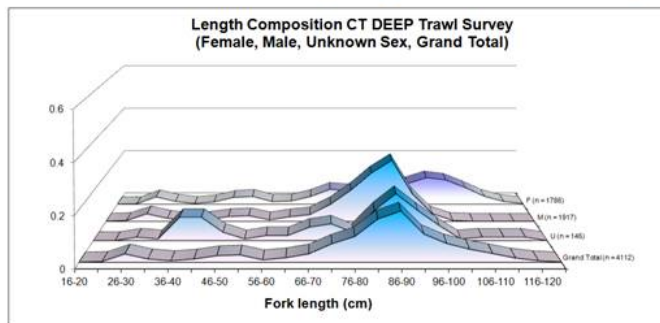
CPUE  
(Rank 3)

SEDAR39-DW-12  
NEFSC (Narragansett)



## CT DEEP Trawl Survey

- 1989-2012
- Sex specific
- All sharks measured
- N = 4,112 (lengths measured)

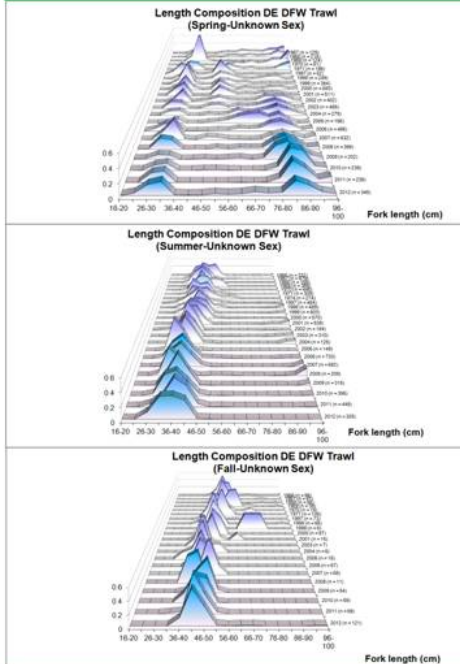


## 1.6 DE DFW Trawl Survey

Delaware Division of Fish and Wildlife trawl surveys

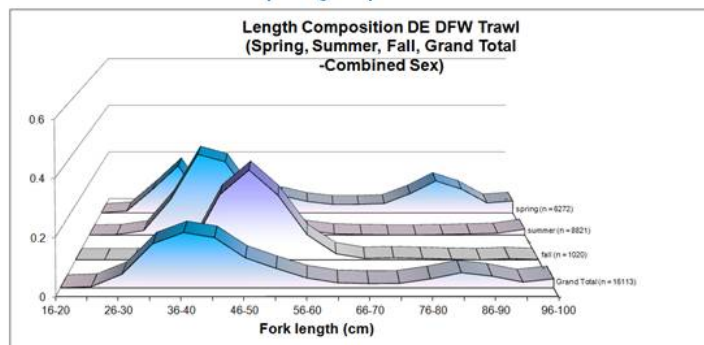
CPUE  
(Rank 3)

SEDAR39-DW-15  
NEFSC (Narragansett)



### DE DFW Trawl Survey

- 1996-2012 (intermittent)
- Sex unknown
- First 50 sharks measured; 70% of tows caught less than 50 sharks and over half (52%) of the remaining tows contained less than 100 sharks
- N = 16,113 (lengths measured)
- Assume a plus group at 100 cm FL



NOAA FISHERIES

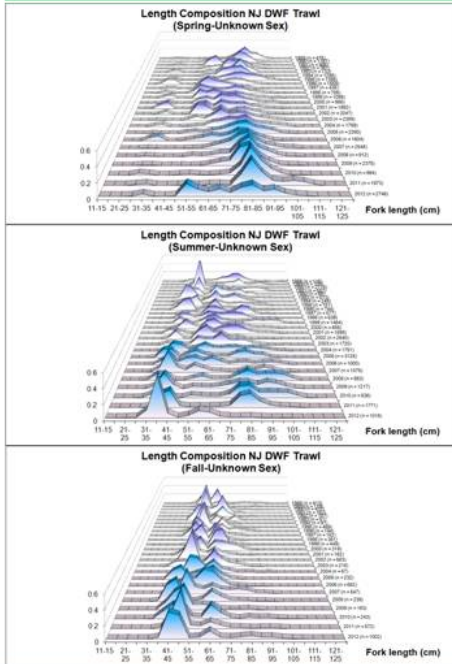
U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 14

## 1.7 NJ DFW Trawl Survey

New Jersey Division of Fish and Wildlife trawl surveys

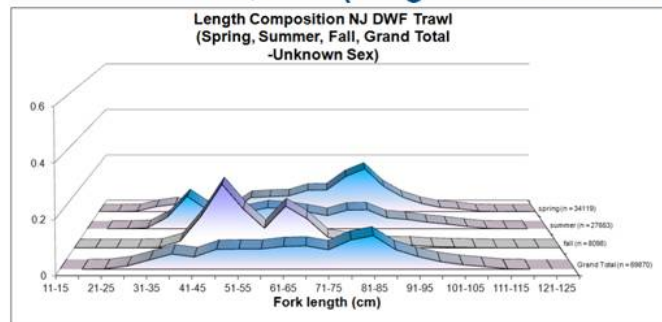
CPUE  
(Rank 3)

SEDAR39-DW-14  
NEFSC (Narragansett)



### NJ DFW Trawl Survey

- 1988-2012
- Sex unknown
- All sharks measured
- N = 69,871 (lengths measured)



U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 15

## 1.8 SEAMAP-SA Trawl Survey

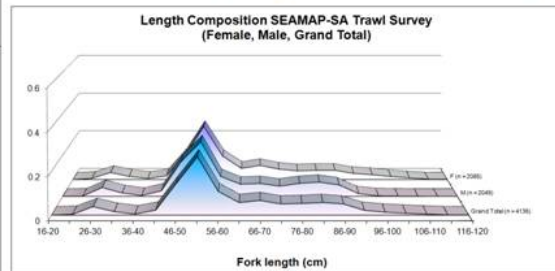
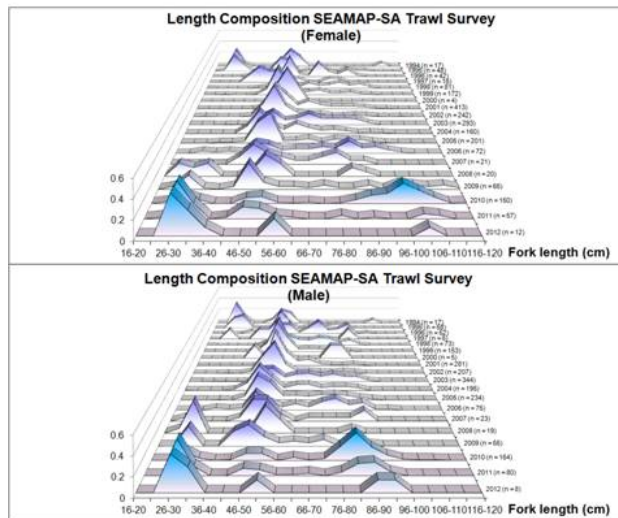
SEAMAP South Atlantic Shallow Water Trawl Survey

CPUE  
(Rank 4)

SEDAR39-DW-02  
SEFSC (Panama City)

### SEAMAP-SA Trawl Survey

- 1994-2012
- Sex specific
- Assume all sharks measured
- N = 4,136 (lengths measured)

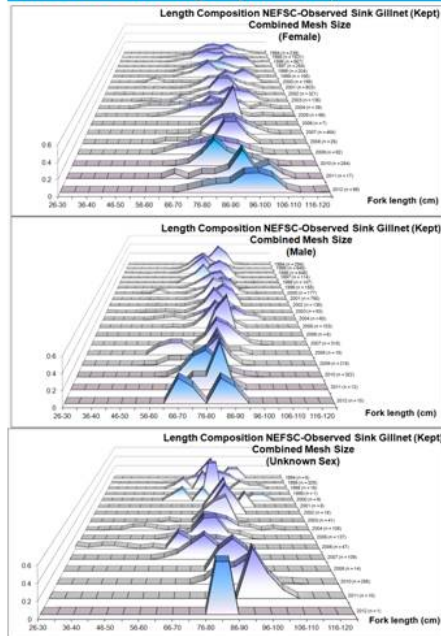


## 2.1 NE GNOP Combined Mesh, Kept

Northeast Observer Program (Sink Gillnet)

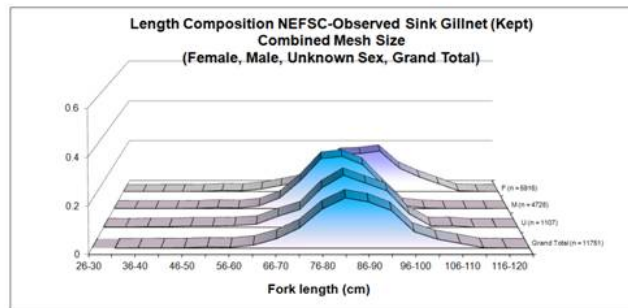
SEDAR39-DW-25

NEFSC (Woods Hole)



### NEFSC Observer (Sink Gillnet-Kept)

- 1994-2012
- Sex specific (yes)
- Disposition (Kept)
- N = 6,433 (records)
- n = 11,751 (lengths measured)



NOAA FISHERIES

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 27

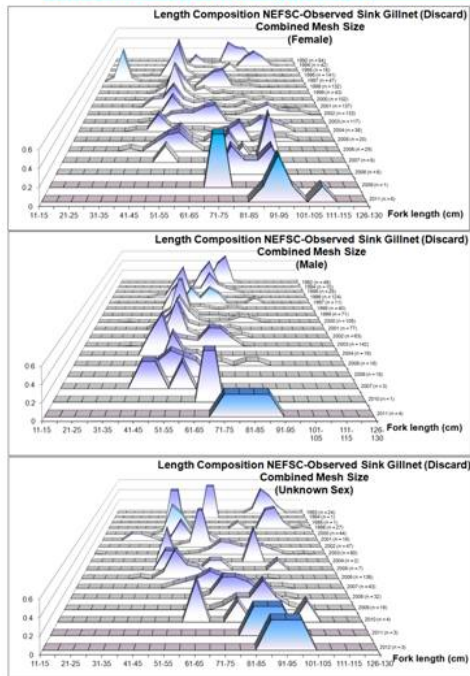


## 2.2 NE GNOP Combined Mesh, Discard

Northeast Observer Program (Sink Gillnet)

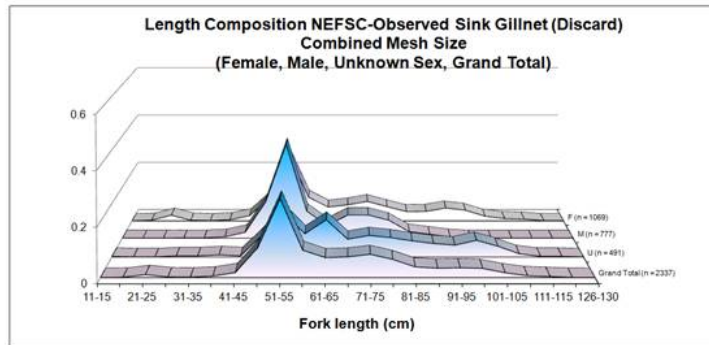
SEDAR39-DW-25

NEFSC (Woods Hole)



NEFSC Observer (Sink Gillnet-Discarded)

- 1992-2012
- Sex specific (yes)
- Disposition (Discard)
- N = 1,546 (records)
- n = 2,337 (lengths measured)



NOAA FISHERIES

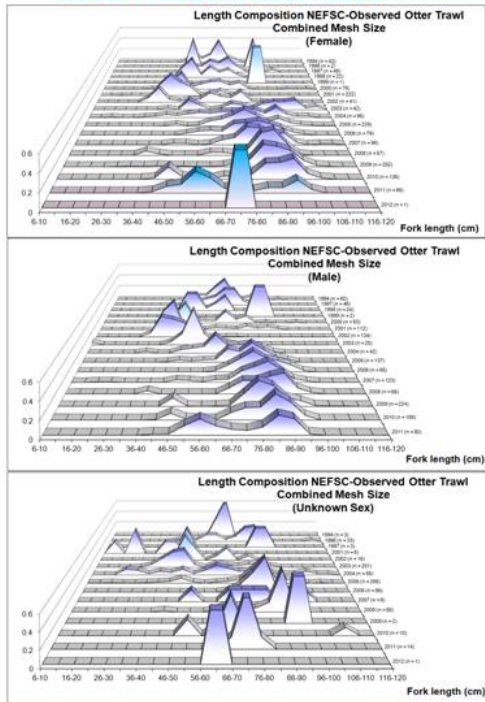
U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 28

## 2.3 NE TOP Combined Mesh and Disposition

Northeast Observer Program (Otter Trawl)

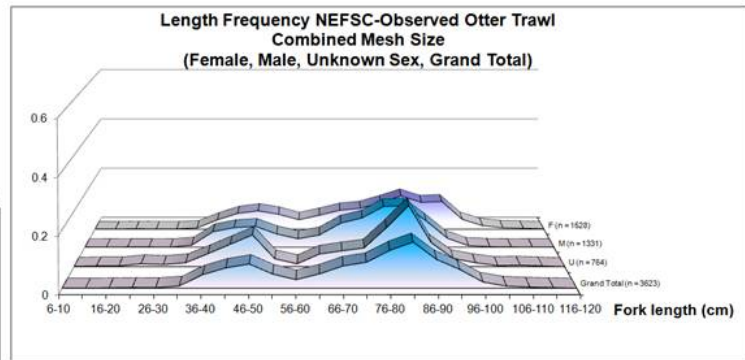
SEDAR39-DW-25

NEFSC (Woods Hole)



### NEFSC Observer (Otter Trawl)

- 1994-2012 (2011)
- Sex specific (yes)
- Disposition (Combined-Kept, Discarded, Unknown)
- N = 2,606 (records)
- n = 3,623 (lengths measured)



## 2.4 SE GNOP

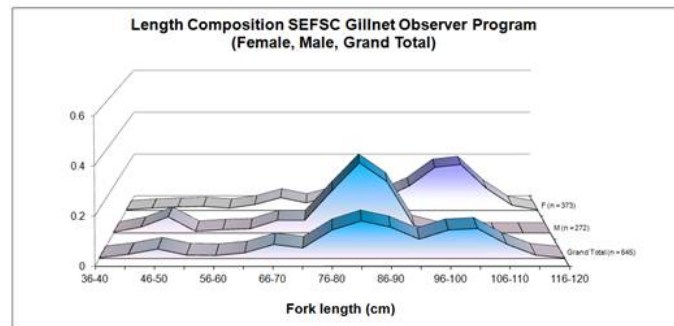
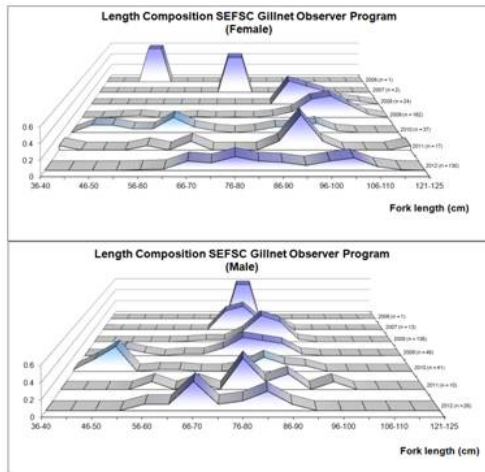
(SE) Gillnet Fishery Observer Program

SEDAR39-DW-03

SEFSC (Panama City)

### SEFSC Observer (Gillnet)

- 2005-2012
- Sex specific (yes)
- Disposition (NA)
- n = 645 (lengths measured)





## 2.5 SE BLOP

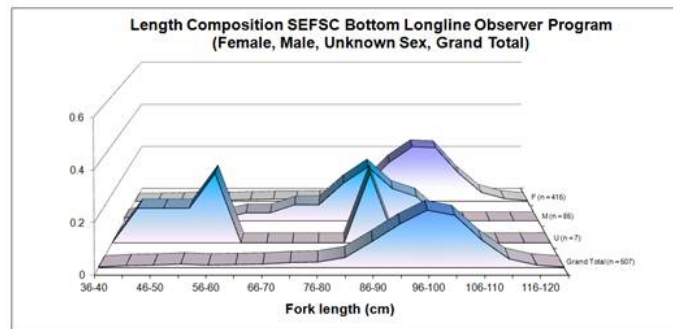
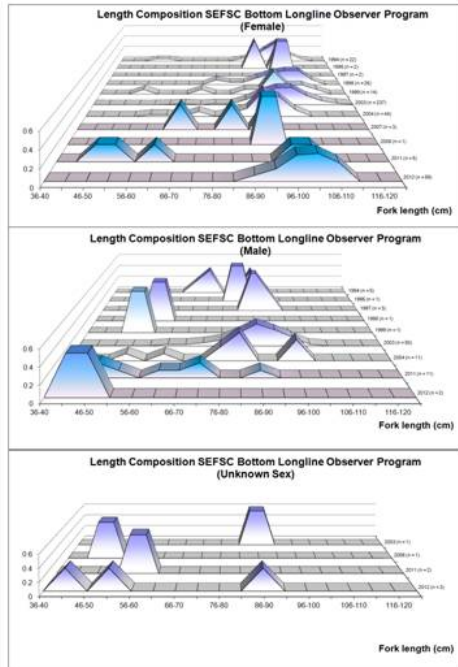
(SE) Bottom Longline Observer Program

SEDAR39-DW-03

SEFSC (Panama City)

### SEFSC Observer (Bottom Longline)

- 1994-2012
- Sex specific (yes)
- Disposition (NA)
- $n = 507$  (lengths measured)

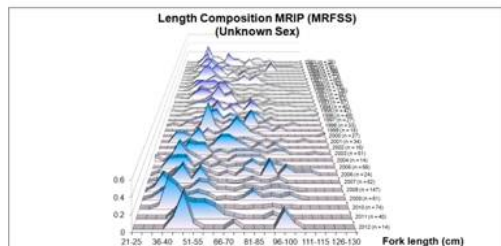


## 2.6 MRIP (MRFSS)

Marine Recreational Information Program

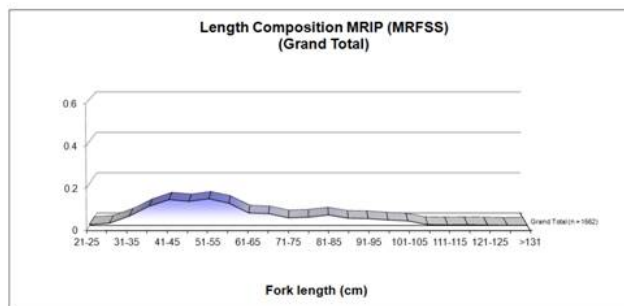
SEDAR39-DW-03

SEFSC (Panama City)



### MRIP (MRFSS) Recreational Catch

- 1981-2012
- Sex specific (no)
- Disposition (NA)
- n = 1,562 (lengths measured)

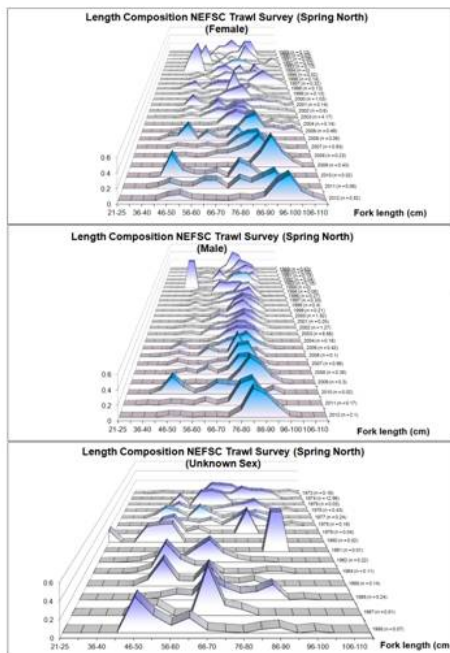


## 3.1 NEFSC Trawl Survey (Spring North)

NEFSC Spring Trawl Survey (North)

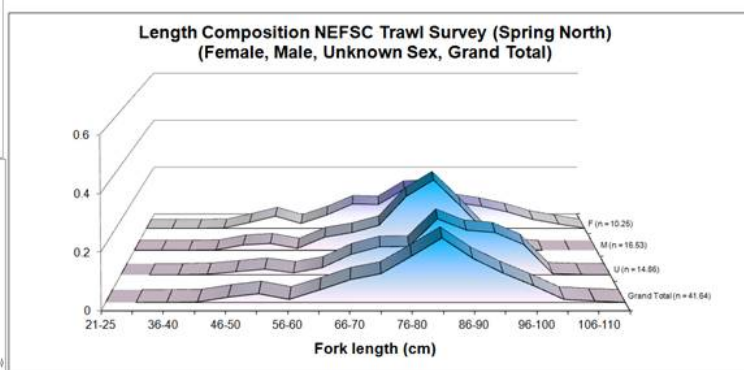
SEDAR39-DW-24

NEFSC (Woods Hole)



### NEFSC Trawl Survey (Spring N.)

- 1973-2012
- Sex specific stratified mean numbers per tow
- N = 2,132 (records)



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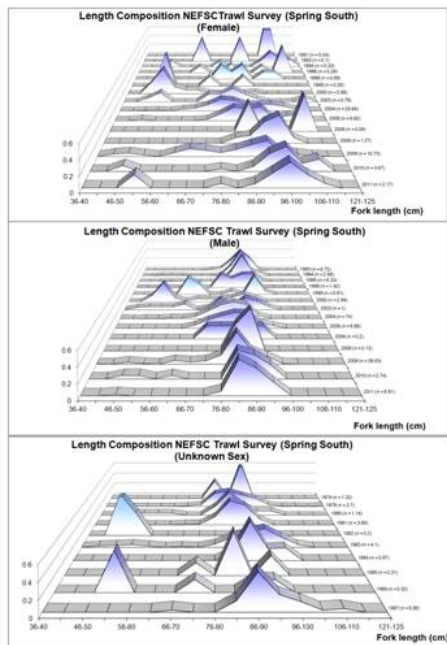
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## 3.2 NEFSC Trawl Survey (Spring South)

NEFSC Spring Trawl Survey (South)

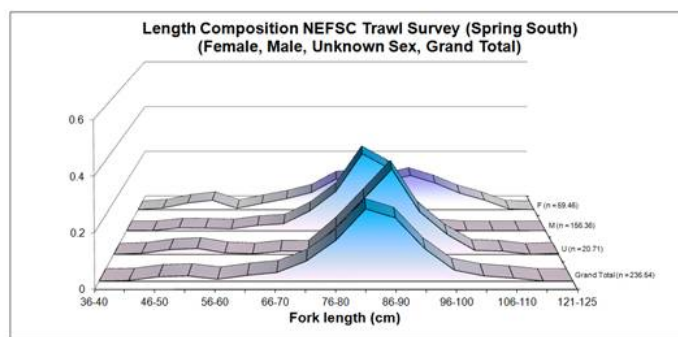
SEDAR39-DW-24

NEFSC (Woods Hole)



### NEFSC Trawl Survey (Spring S.)

- 1974-2011
- Sex specific stratified mean numbers per tow
- N = 681 (records)

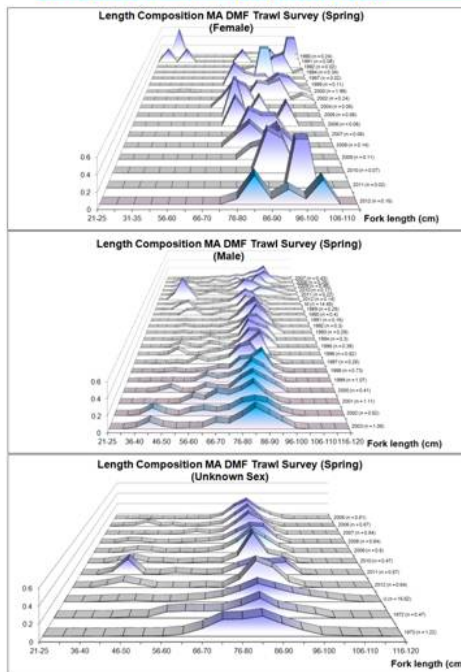


### 3.3 MA DMF Trawl Survey (Spring)

MA Dep. of Marine Fish. Spring Trawl Survey

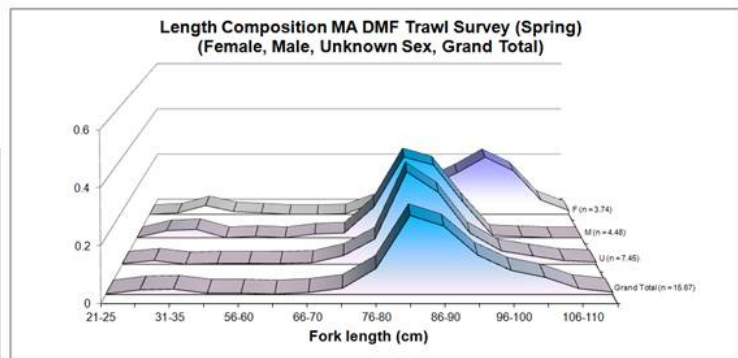
SEDAR39-DW-24

NEFSC (Woods Hole)



#### MA DMF Trawl Survey (Spring)

- 1978-2012
- Sex specific stratified mean numbers per tow
- N = 433 (records)

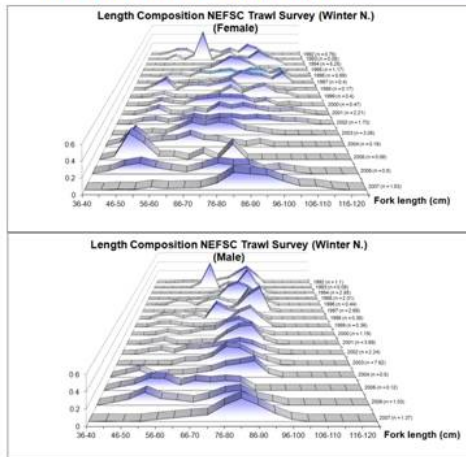


## 3.4 NEFSC Trawl Survey (Winter North)

NEFSC Winter Trawl Survey (North)

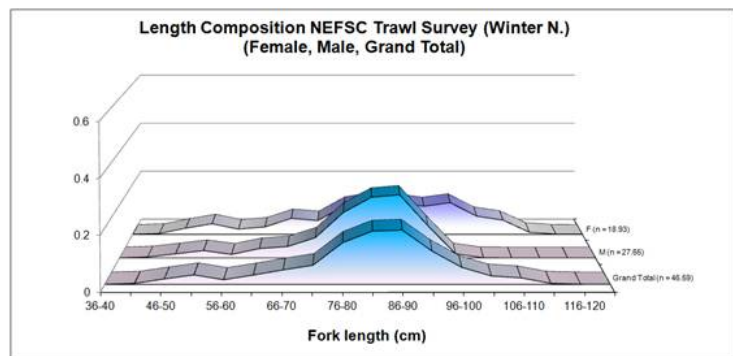
SEDAR39-DW-24

NEFSC (Woods Hole)



### NEFSC Trawl Survey (Winter N.)

- 1992-2007
- Sex specific stratified mean numbers per tow
- N = 1,484 (records)



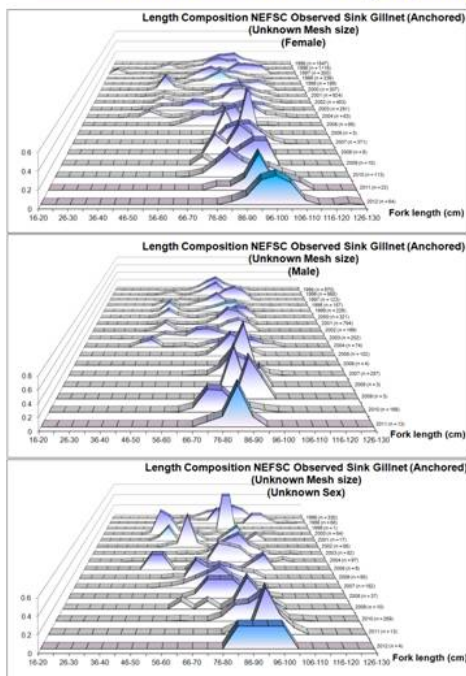


## 3.5 NEFSC Observed Sink Gillnet (Anchored)

Northeast Fisheries Observer Program (Anchored Sink Gillnet)

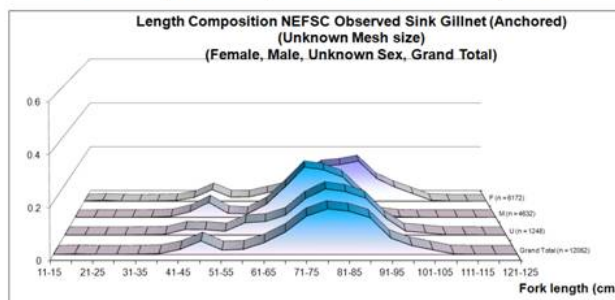
SEDAR39-DW-09

NEFSC (Narragansett)



### NE OBS Sink GN (Anchored - by sex)

- Same as NEFSC Observer Program Sink Gillnet SEDAR39-DW-25 (Series #2.1 above,  $n = 14,178$ ), except that all mesh sizes have been combined and drift sink gillnet data have been excluded
- 1995-2012
- Sex specific (yes)
- Disposition (NA)
- Season (yes, combined)
- $n = 12,052$  (lengths measured)
- Relatively fewer lengths measured in recent years

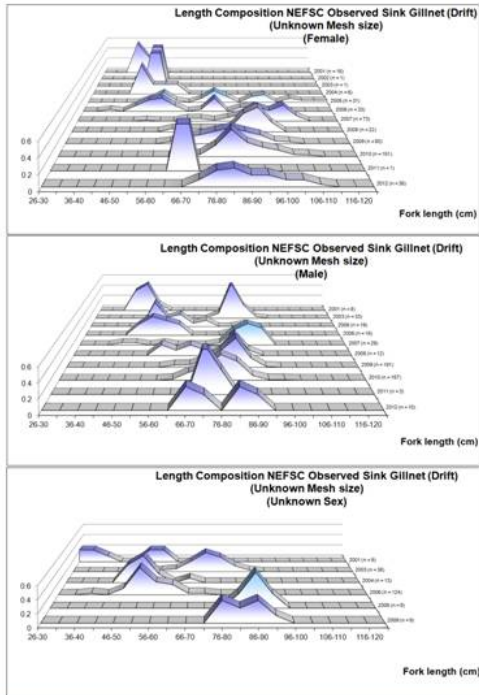


## 3.6 NEFSC Observed Sink Gillnet (Drift)

Northeast Fisheries Observer Program (Drift Sink Gillnet)

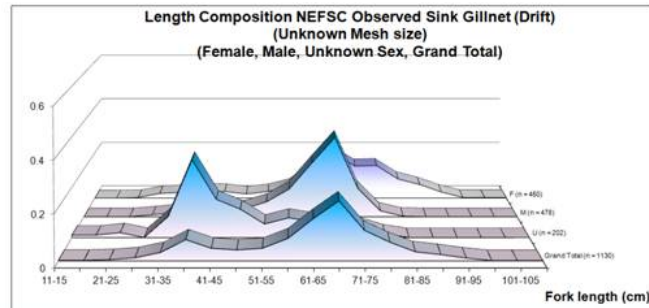
SEDAR39-DW-09

NEFSC (Narragansett)



### NEOBS Sink Gillnet (Drift - by sex)

- Same as NEFSC Observer Program Sink Gillnet SEDAR39-DW-25 (Series #2.1 above,  $n = 14,178$ ), except that all mesh sizes have been combined and this data set is just drift sink gillnet data
- 2001-2012
- Sex specific (yes)
- Disposition (NA)
- Season (yes, combined)
- $n = 1,130$  (lengths measured)
- A high proportion of small sharks have unknown sex



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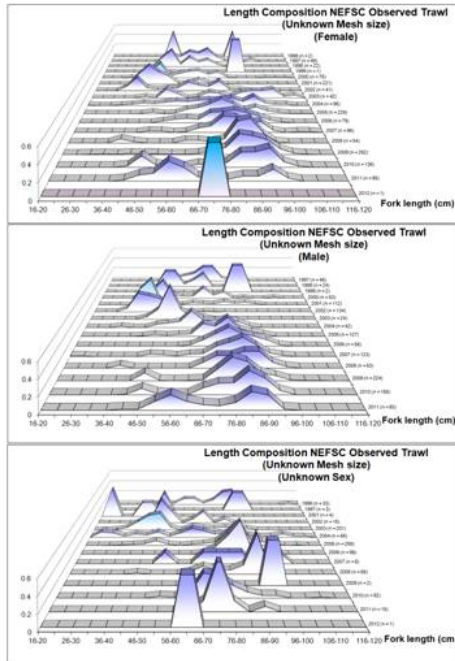


## 3.7 NEFSC Observed Trawl

Northeast Fisheries Observer Program (Otter trawl)

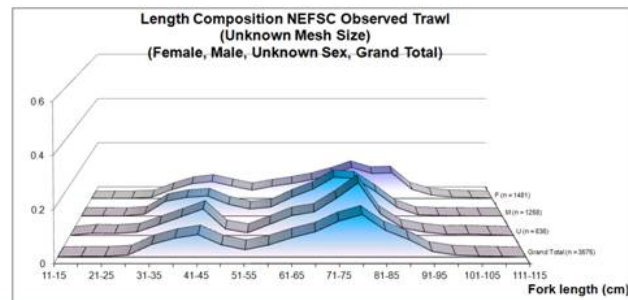
SEDAR39-DW-09

NEFSC (Narragansett)



### NEOBS Trawl (Combined Mesh by sex)

- Same as NEFSC Observer Program Sink Gillnet SEDAR39-DW-25 (Series #2.3 above  $n = 3,623$  records), except that all mesh sizes have been combined
- 1996-2012
- Sex specific (yes)
- Season (combined)
- $n = 3,575$  (lengths measured)

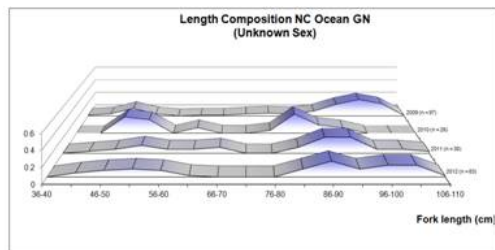


## 3.8 North Carolina Ocean Gillnet

North Carolina Division of Marine Fisheries Ocean Gillnet Program

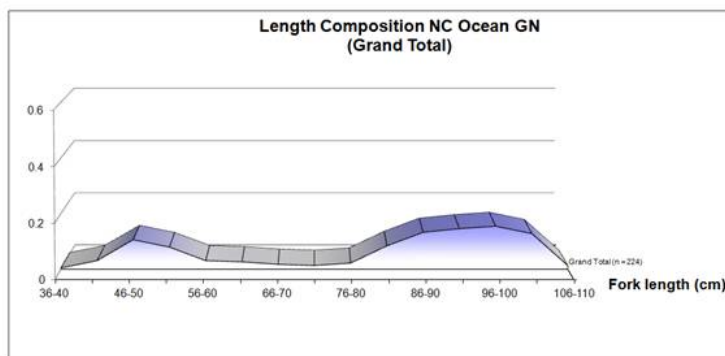
SEDAR39-DW-17

NEFSC (Narragansett)



### NC Ocean GN

- 2009-2012
- Sex specific (no)
- n = 224 (lengths measured)
- Index not used

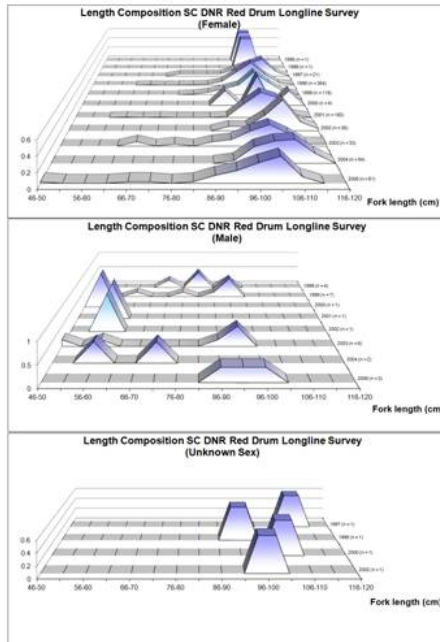


## 3.9 South Carolina DNR Red Drum Longline

South Carolina Department of Natural Resources Red Drum Longline Survey

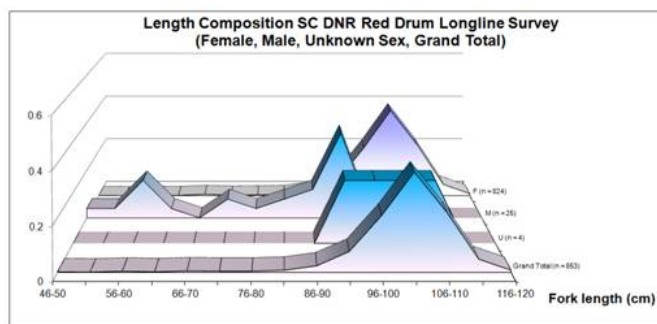
SEDAR39-DW-18

NEFSC (Narragansett)



### SC DNR Red Drum Longline Survey

- 1995-2006
- Sex specific (yes)
- n = 853 (lengths measured)



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## 3.10 UNC Longline Survey

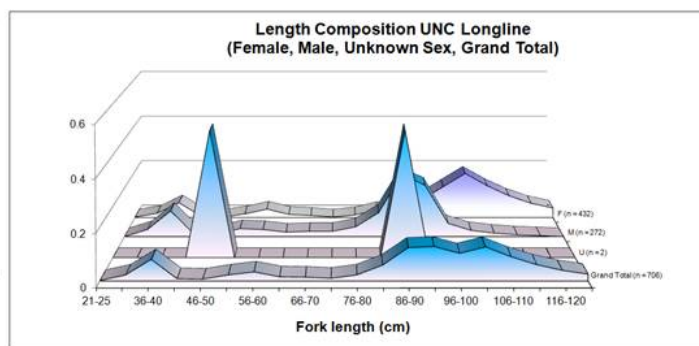
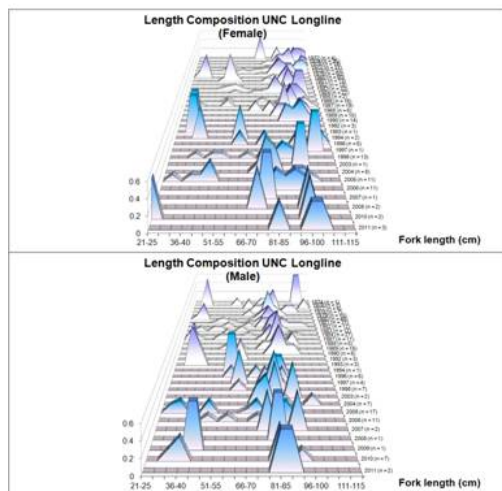
University of North Carolina Shark Longline Survey South of Shackleford Banks

SEDAR39-DW-18

NEFSC (Narragansett)

### UNC Longline Survey

- 1972-2011
- Sex specific (yes)
- n = 706 (lengths measured)
- Index not used

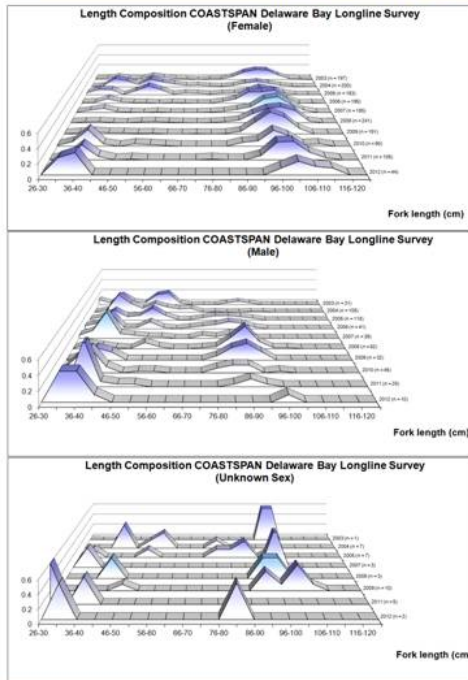


## 3.11 COASTSPAN Longline Survey Delaware Bay

Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Longline Survey in Delaware Bay

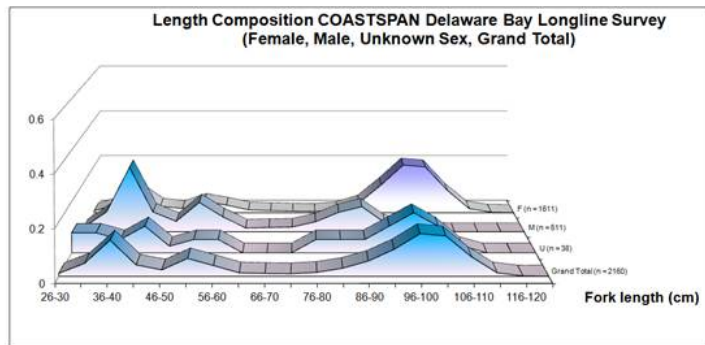
SEDAR39-DW-16

NEFSC (Narragansett)



### COASTSPAN Longline Survey Delaware Bay

- 2003-2012
- Sex specific (yes)
- n = 2,160 (lengths measured)
- Index not used



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