ASMFC Tautog Stock Assessment

Tautog Management Board Meeting
February 5, 2015
Alexandria , VA

Tautog stock assessment contributors

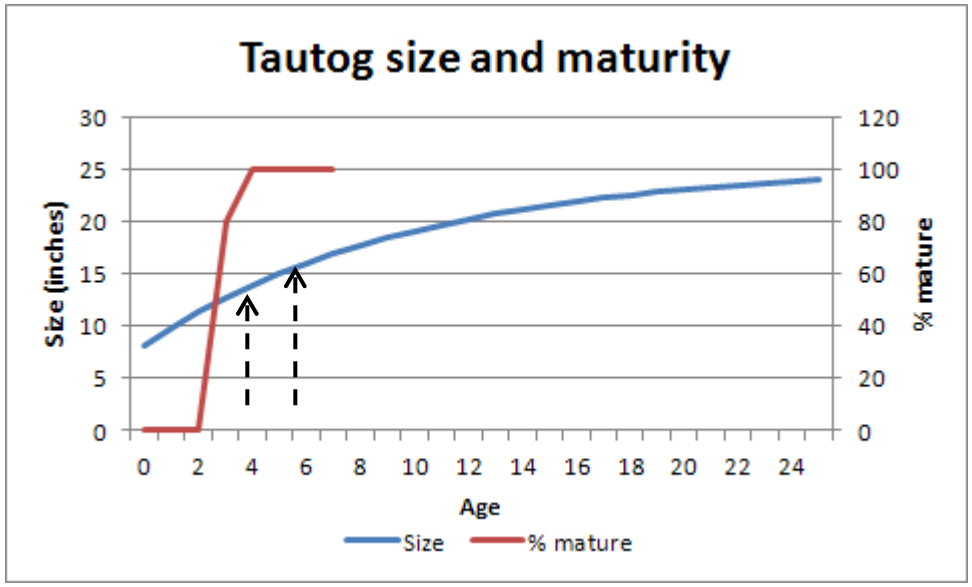
- Jeffrey Brust, chair - NJ DFW
- Paul Caruso - MA DMF, retired
- Jason McNamee - RI DEM, Technical Committee chair
- Scott Newlin - DE DNREC
- Dr. Alexei Sharov - MD DNR
- Joe Cimino - VMRC
- Dr. Katie Drew - ASMFC
- Melissa Yuen - ASMFC species coordinator

- Significant input from ASMFC Tautog Technical Committee

- **Dr. Tom Miller - UMD CBL, Integrated Peer Reviewer**

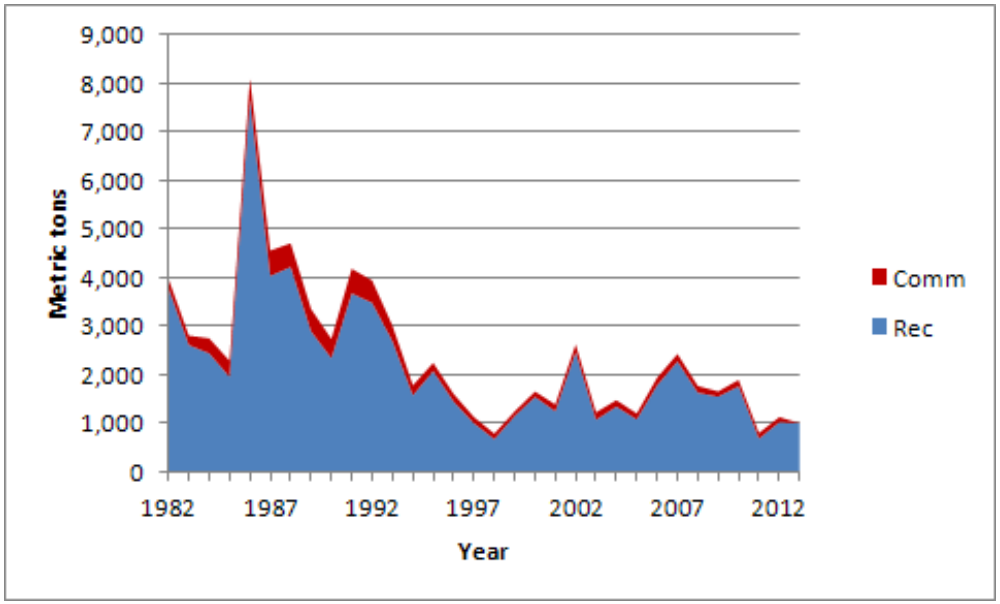
Life history

- Long lived
  - Age 30+ reported from several states
- Moderate growth
  - Recruited by age 4-6
- Mature by age 3-4



Life history

- Structure oriented
  - Hard to sample
- High site fidelity
- Limited north-south movements
- Primarily recreational harvest
  - High interannual variability



Assessment History

- All previous assessments conducted with ADAPT VPA
- Historically assessed as a coastwide stock
  - Separate north and south CAAs combined into single model
- Life history and fishery characteristics suggest regional models may be more appropriate
  - Supported by 2006 peer review panel
- Multiple regions not feasible in the past
  - Data gaps (surveys)
  - Inflexible model

New for 2015

- To address previous concerns…
- New modeling framework(s)
  - 1 data rich, 2 data poor models
  - More flexible than ADAPT
  - Allows corroboration of results
- New data inputs
  - Fishery dependent indices
  - Fill holes in survey data
- Multiple regions
  - More appropriate given species characteristics
  - Region specific management advice

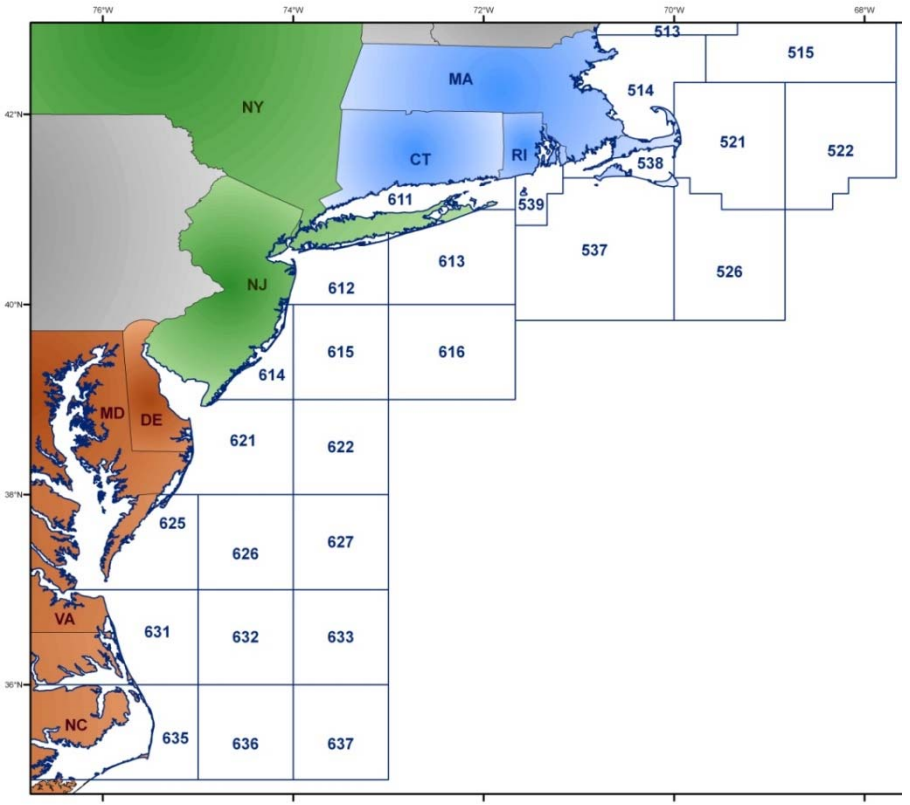
Stock structure

- Investigated several methods for guidance on regionalization
- Probably “best” thing to do is split NY at Montauk
  - Data availability
  - Political considerations
- Preferred regionalization:

  SNE

  NYNJ

  DMV
- Supported by peer review



Data sources

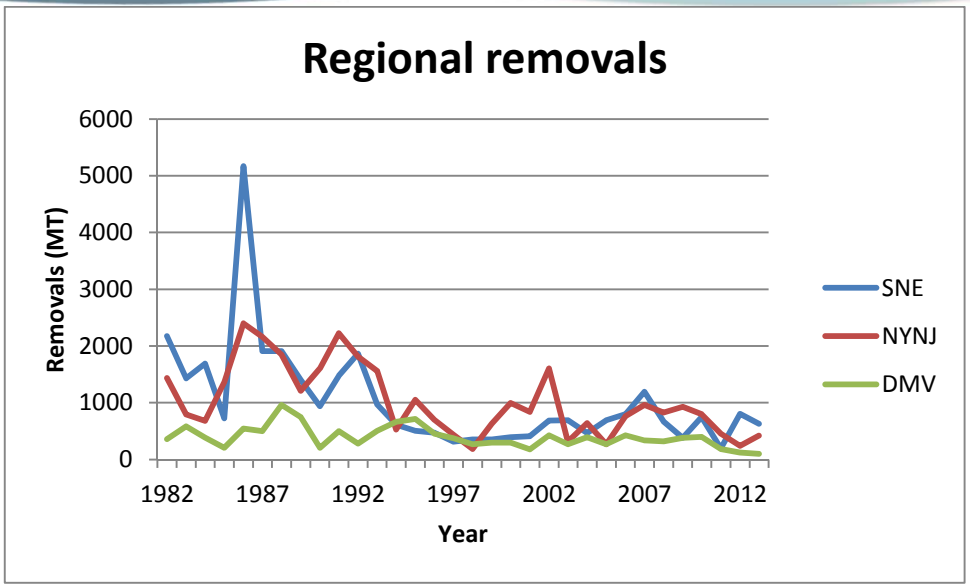
- Recreational harvest
- Recreational discards
- Commercial harvest

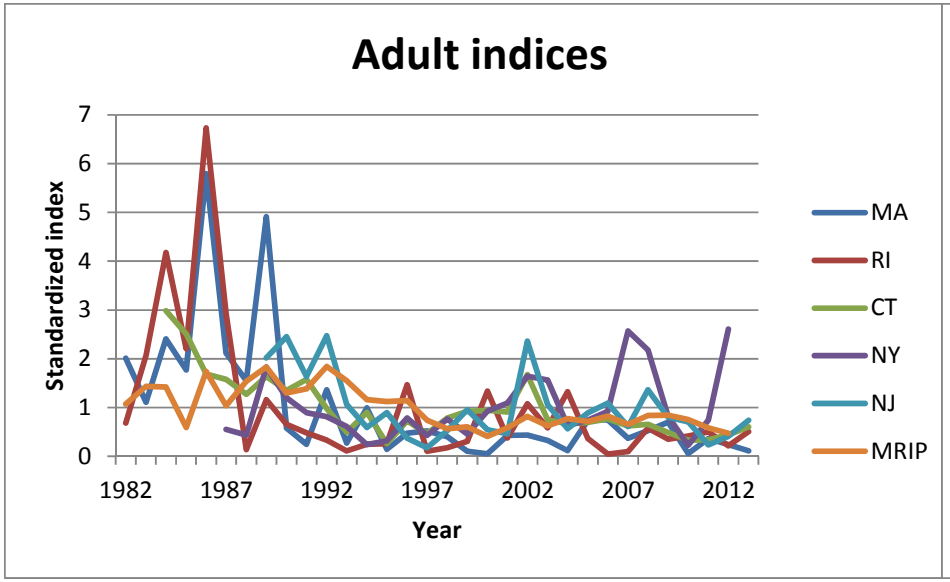
- Fishery independent abundance indices (trawl surveys)
- Fishery dependent indices (MRFSS/MRIP CPUE)

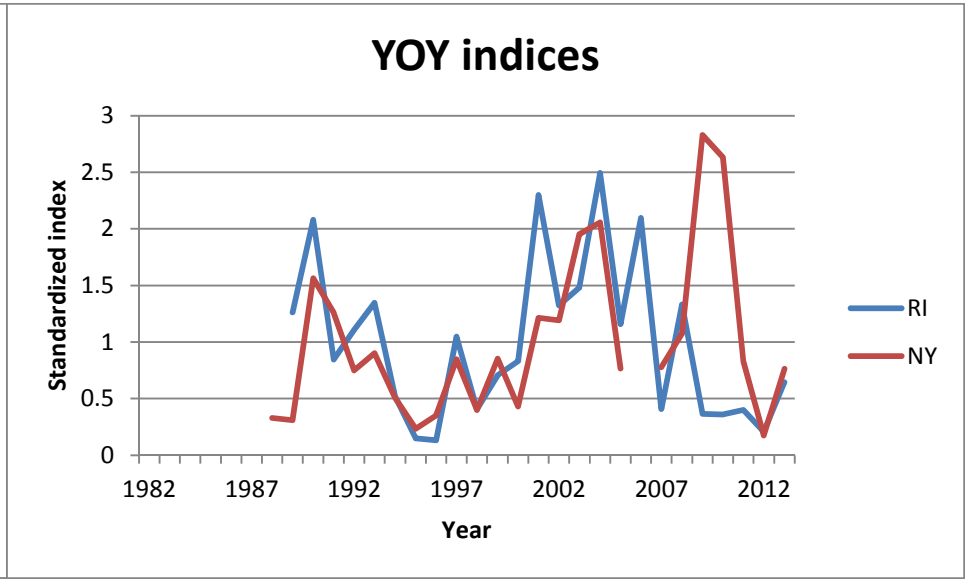
- Fishery independent and dependent biological samples
  - Include VA age data which have been validated

- Data subset to appropriate region

Adult surveys



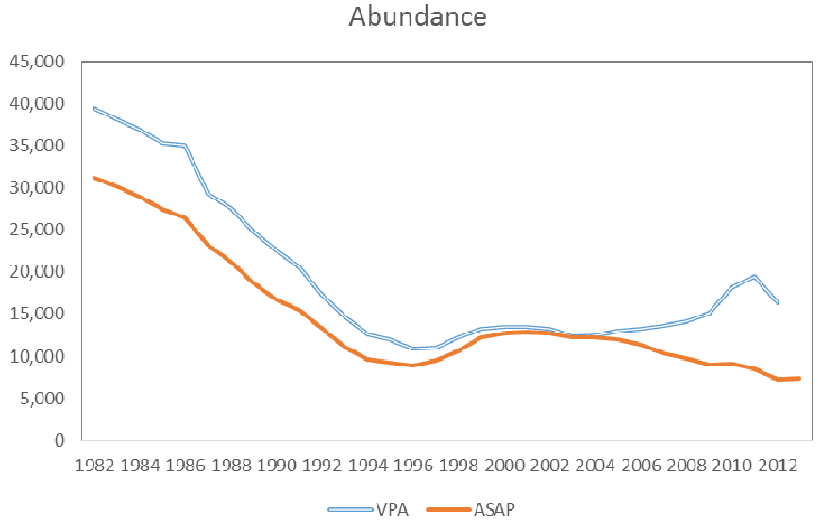


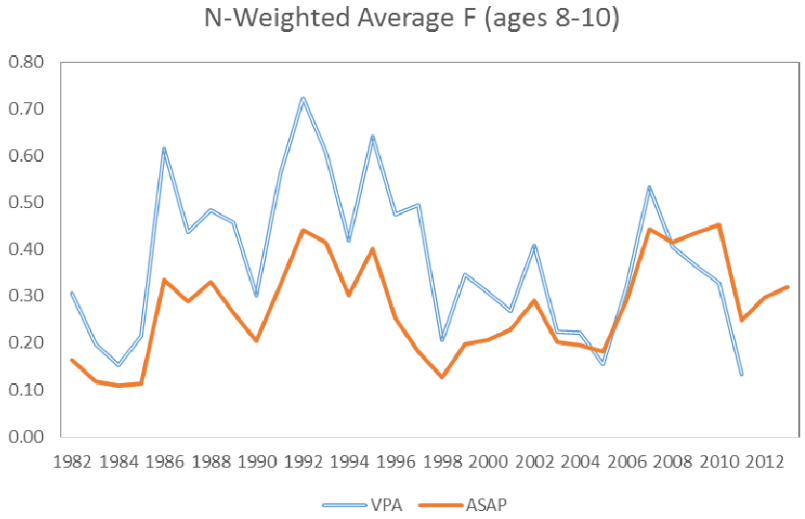


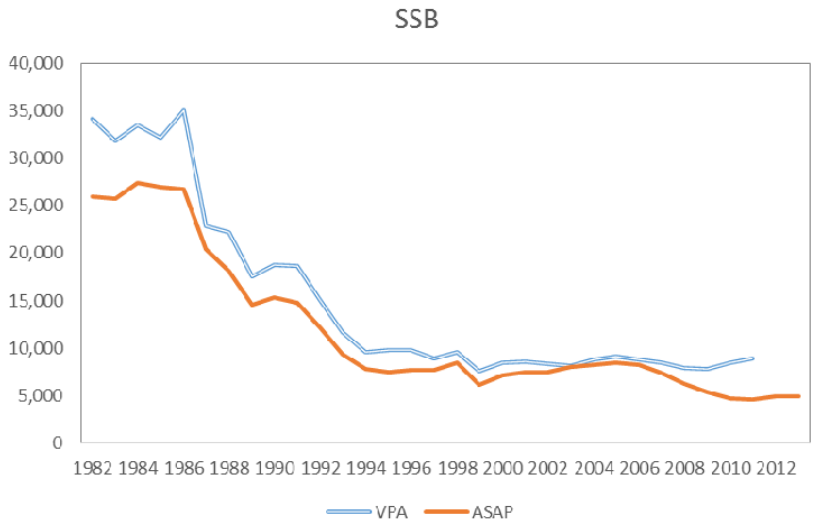
Modeling overview

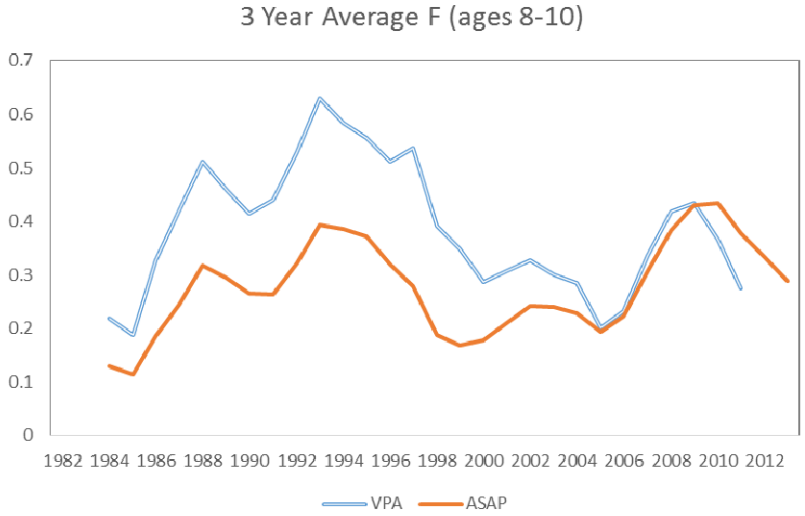
- Four population models investigated, most run at regional level
- ADAPT VPA (continuity run, coastwide only)
- Age Structured Assessment Program (ASAP)
  - Preferred model
  - Data rich
- Two data poor methods
  - Extended Depletion Based Stock Reduction Analysis (xDB-SRA)
  - Bayesian State-Space Surplus Production Model (BSSPM)
- Multiple models provide corroborative evidence
- Data poor methods in case insufficient data at regional level

Continuity Run

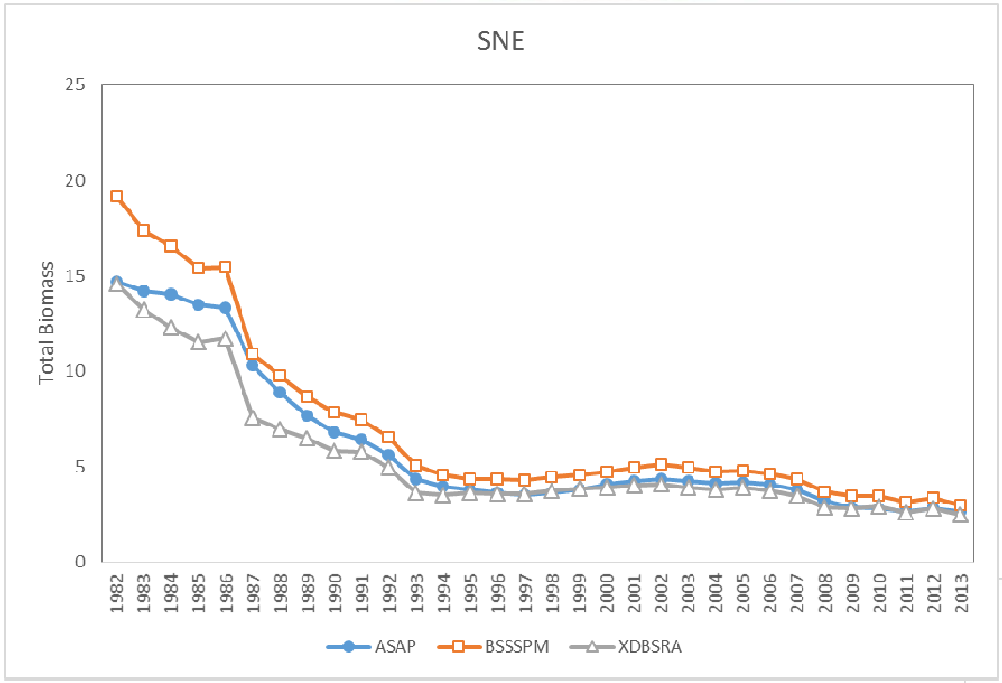


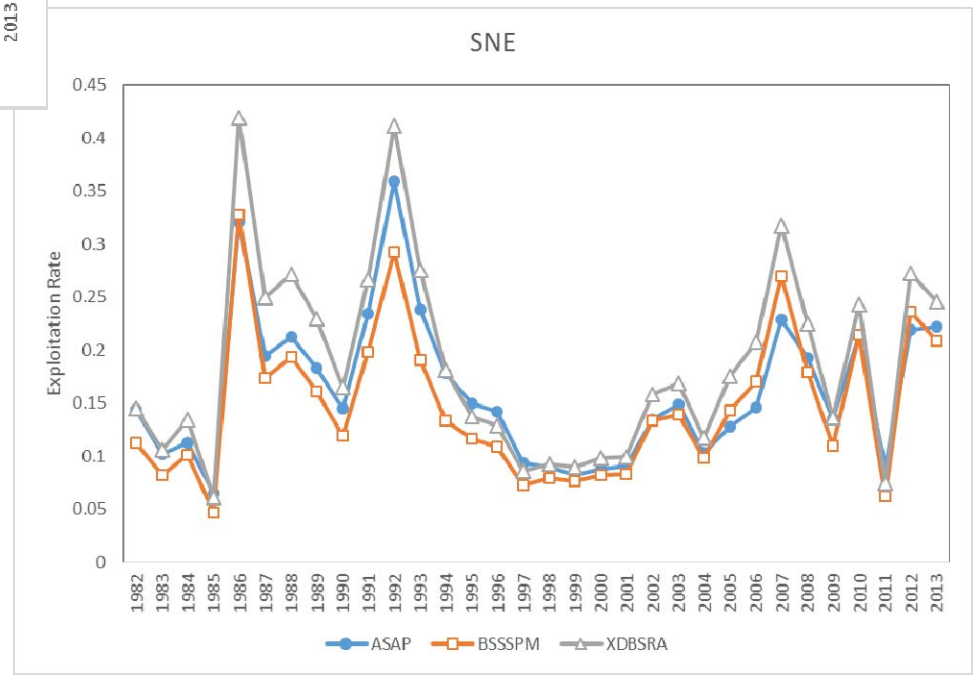




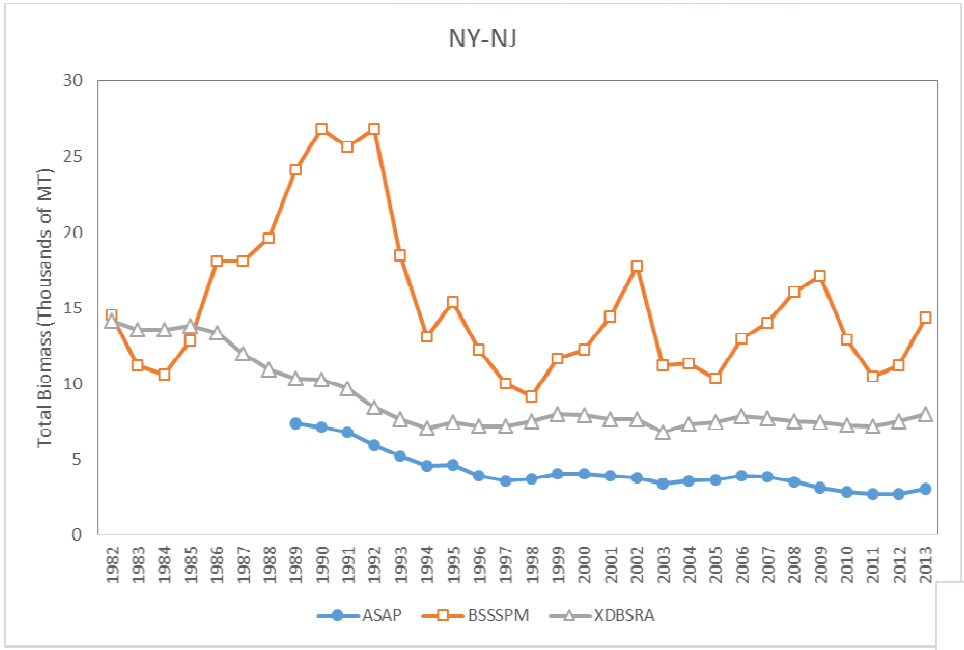


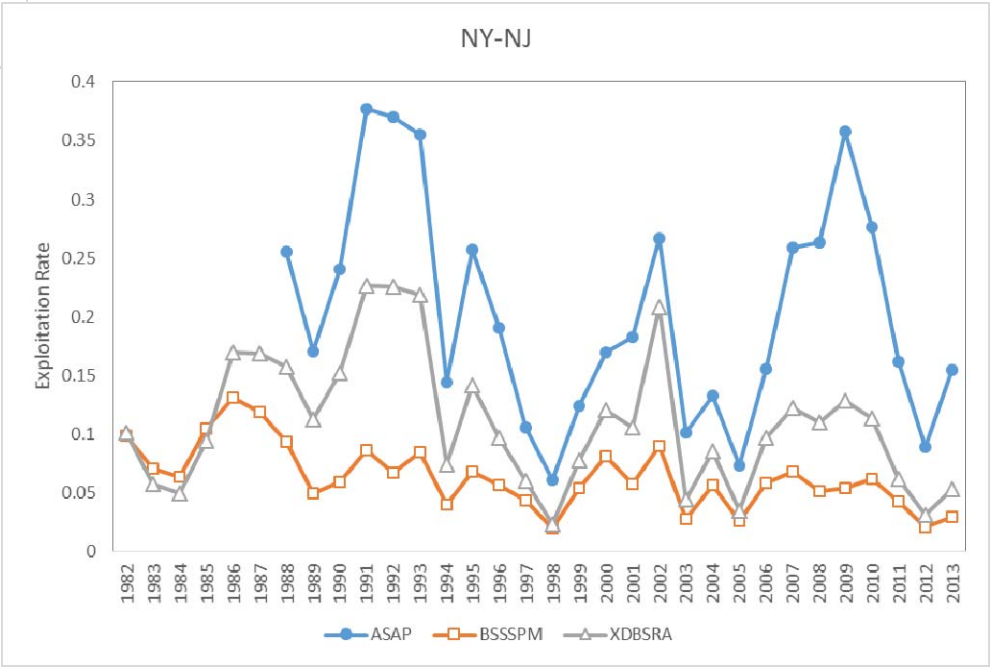
Model Comparisons: SNE



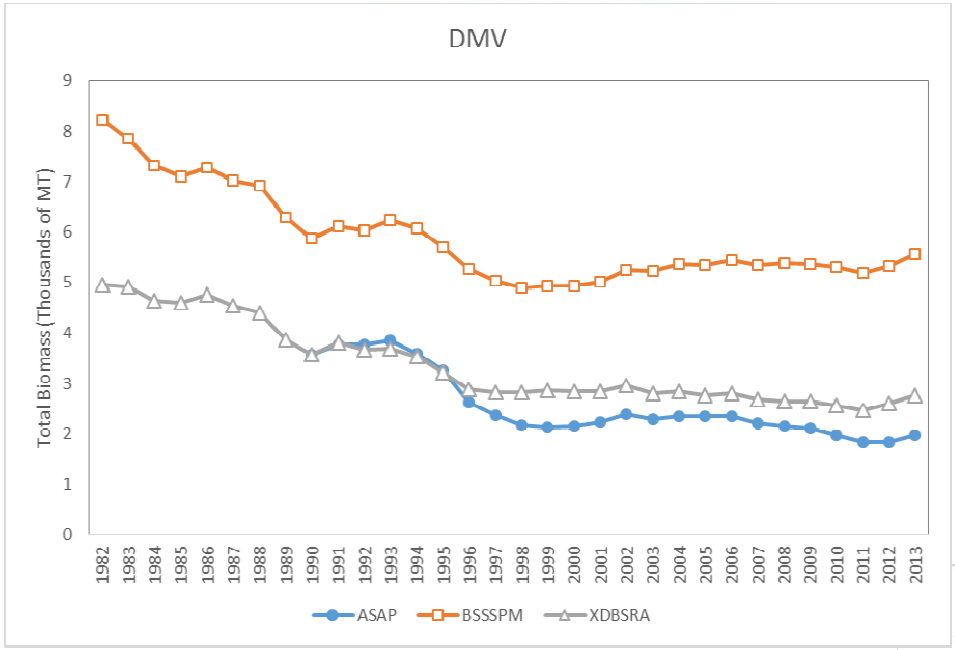


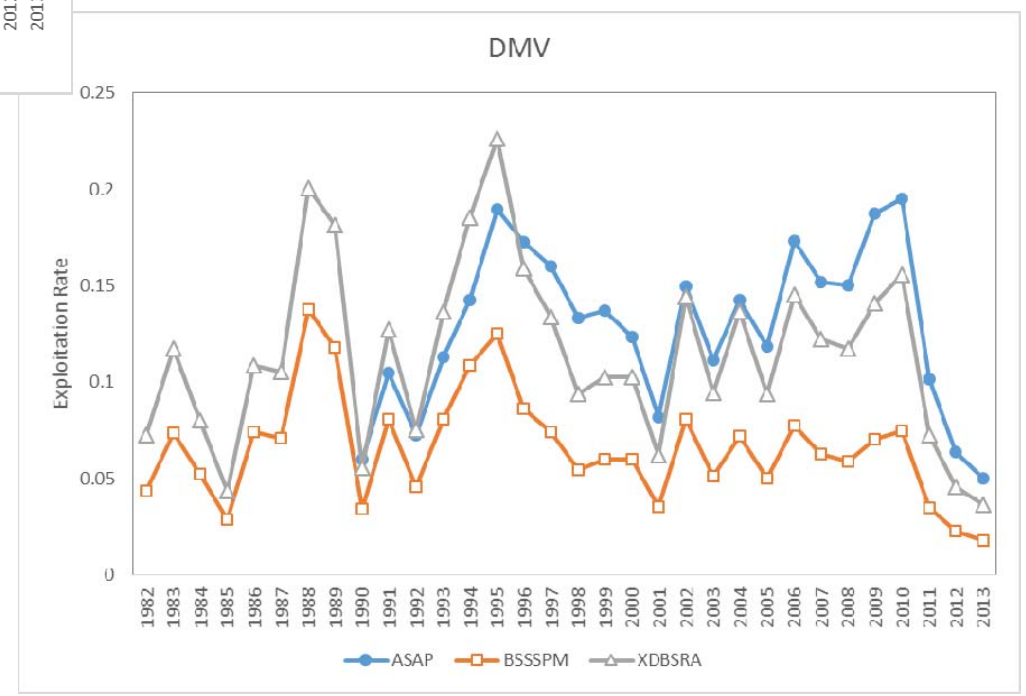
Model Comparisons: NY-NJ





Model Comparisons: DMV





Model Comparisons

- Chose ASAP for it's ability to incorporate the available age-data as well as uncertainty about the catch
- ASAP trends and estimates of total biomass and exploitation rate were similar to XDBSRA for all regions
- ASAP stock status determinations were the same as XDBSRA for all regions
- BSSPM differed in trends in the NY-NJ region, and in status for the DMV region

Reference points

- Considered both MSY-based reference points and SPR-based reference points

- Selected MSY-based reference points where possible
  - SNE

- Used SPR-based reference points as alternative
  - NYNJ and DMV

Reference Points

SNE

SSB Target	SSB_{MSY}	3,883
SSB Threshold	75% SSB_{MSY}	2,912
F Target	F_{MSY}	0.15
F Threshold	F associated w/ SSB threshold	0.20

NY-NJ

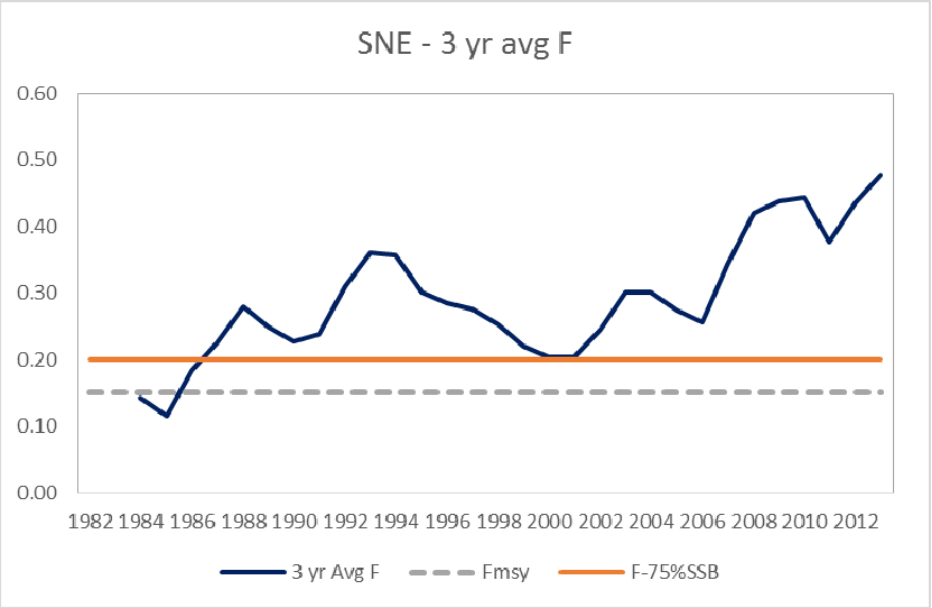
F Target	$F_{40\%}$	0.17
F Threshold	$F_{30\%}$	0.26
SSB Target	SSB associated w/ $F_{40\%}$	3,570
SSB Threshold	SSB associated w/ $F_{30\%}$	2,640

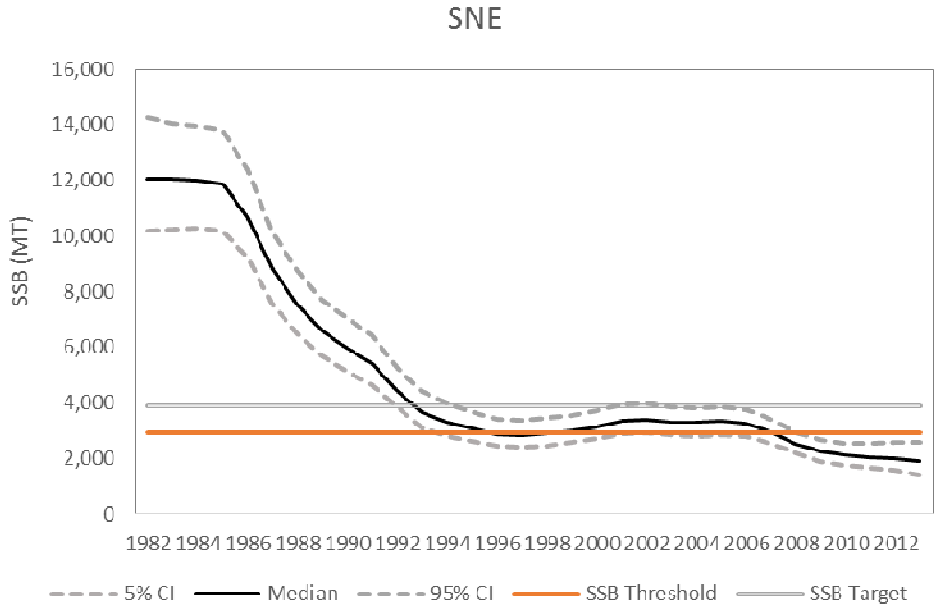
DMV

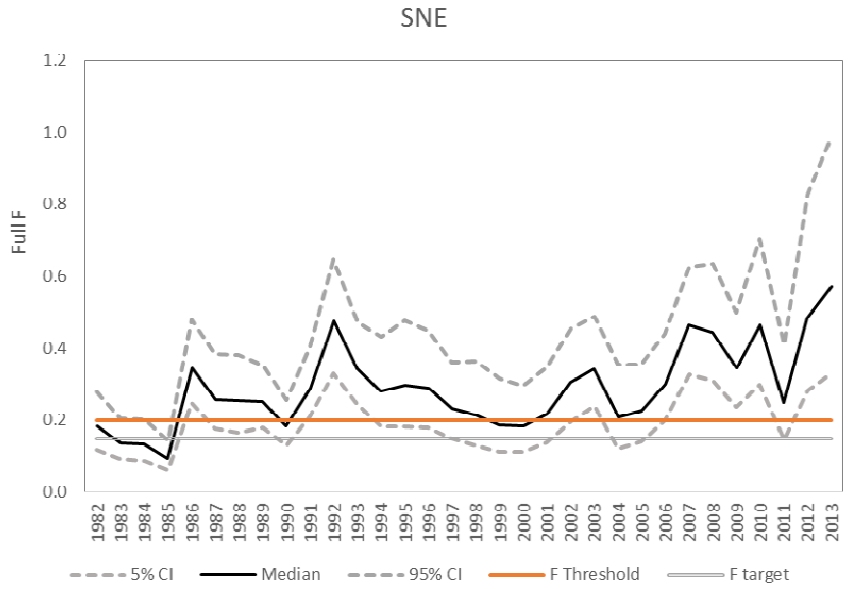
F Target	$F_{40\%}$	0.16
F Threshold	$F_{30\%}$	0.24
SSB Target	SSB associated w/ $F_{40\%}$	2,090
SSB Threshold	SSB associated w/ $F_{30\%}$	1,580

ASAP Stock Status: SNE

- B:B$_{thresh}$ = 0.63 overfished
- F:F$_{thresh}$ = 2.40 overfishing occurring



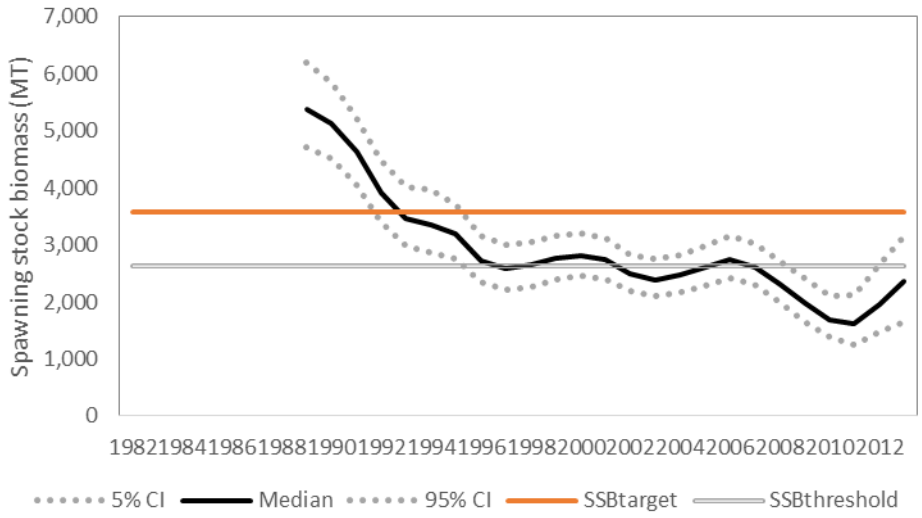


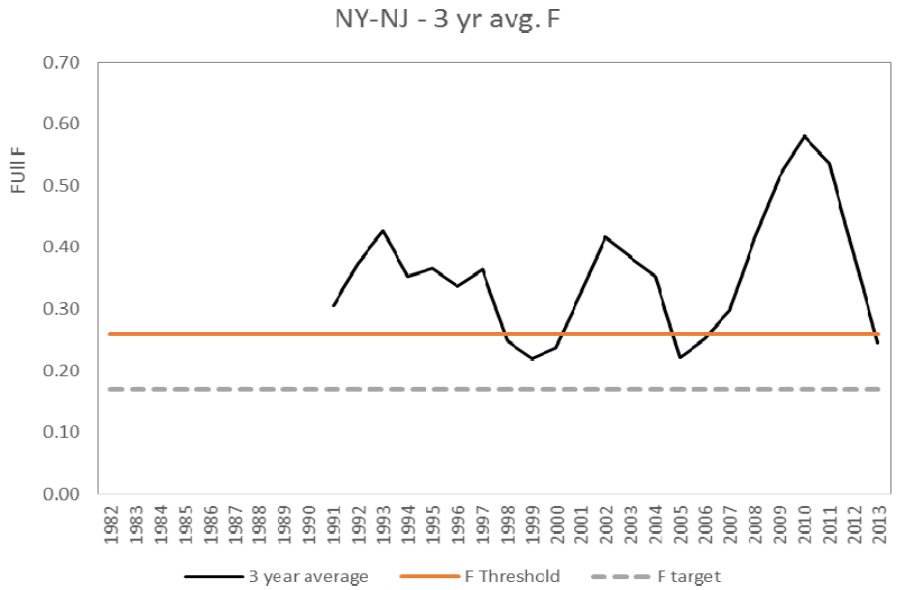


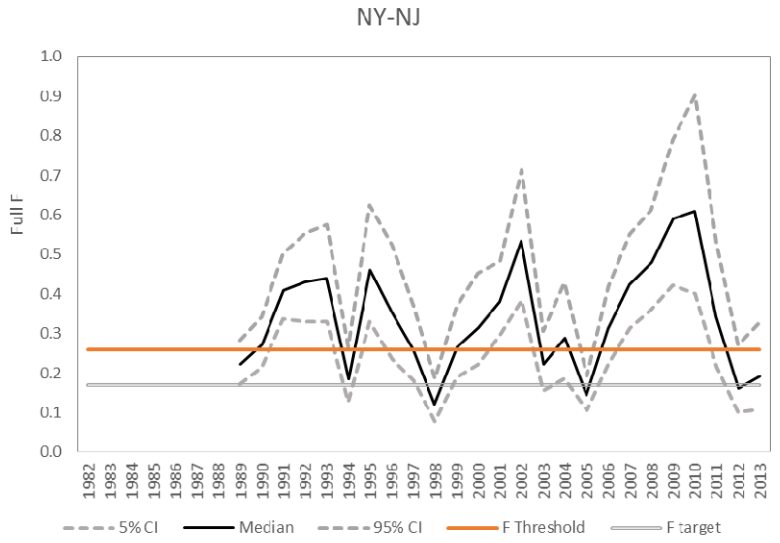
ASAP Stock Status: NY-NJ

- $B:B_{thresh} = 0.79$ overfished
- $F:F_{thresh} = 0.96$ overfishing not occurring

NY-NJ

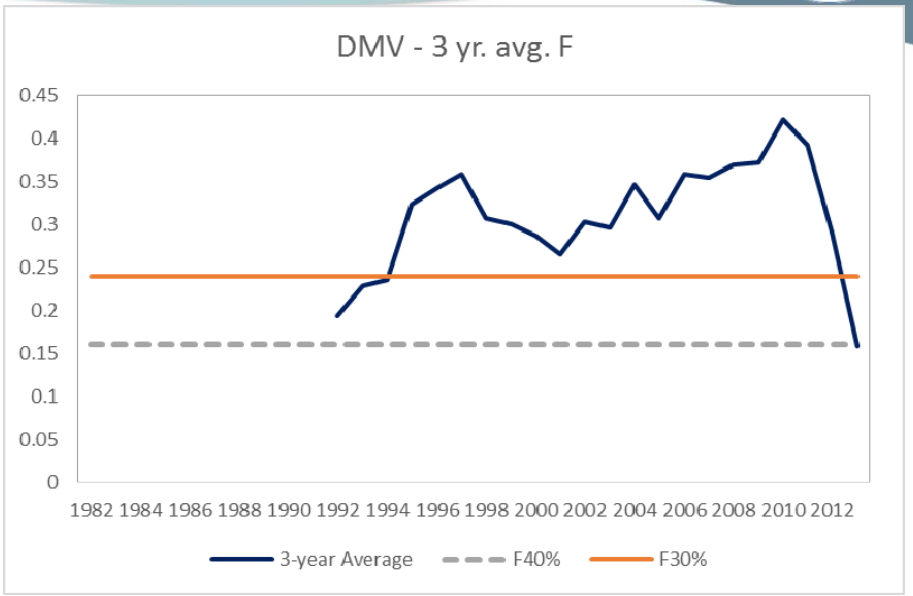


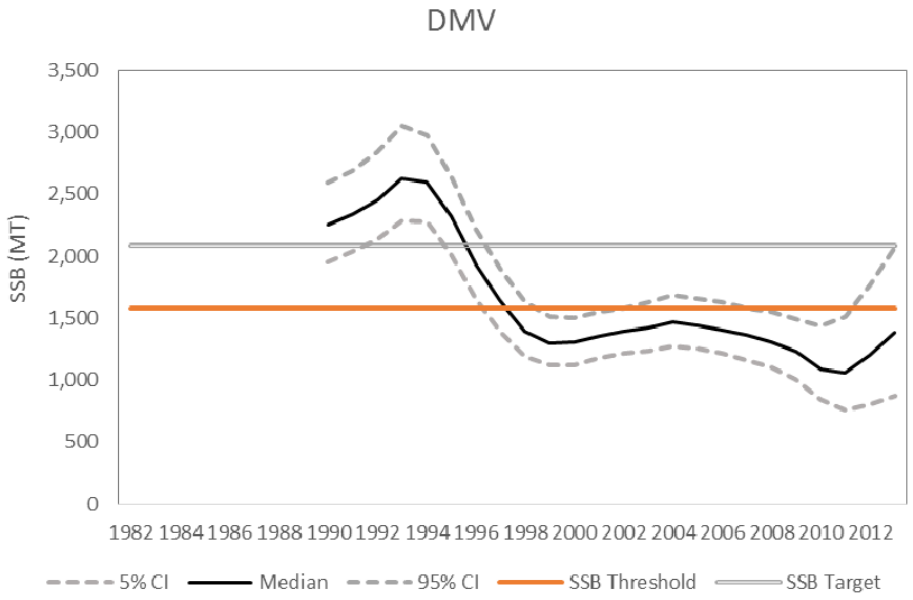


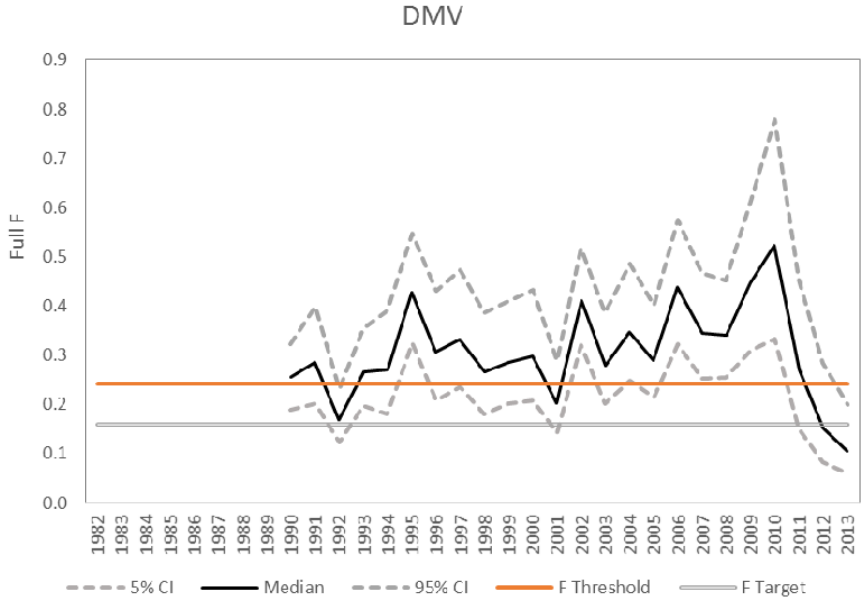


ASAP Stock Status: DMV

- $B:B_{thresh} = 0.97$ overfished
- $F:F_{thresh} = 0.71$ overfishing not occurring







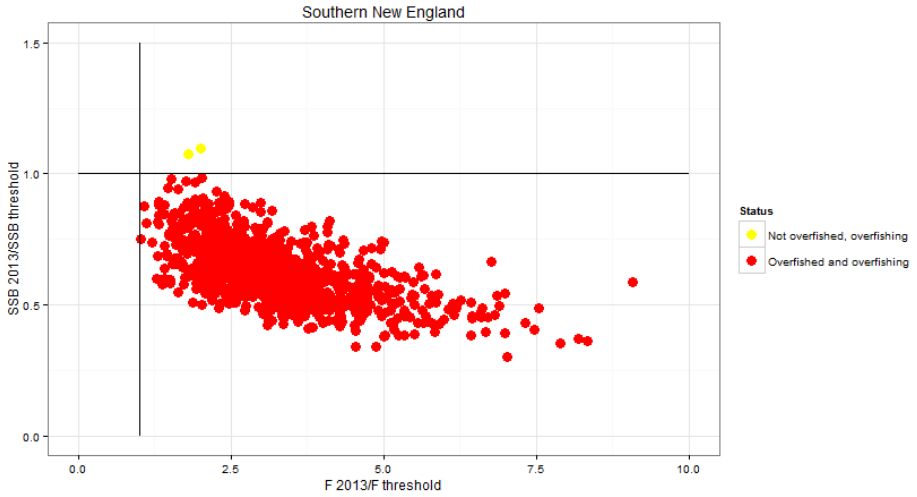
Model Status Comparisons

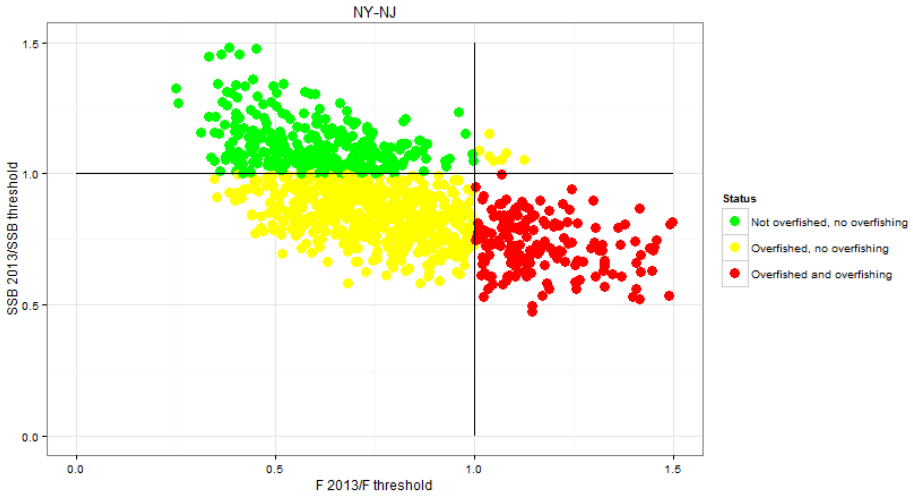
Model	ASAP	XDBSRA	BSSSPM
SNE	Overfished Overfishing	Overfished Overfishing	Overfished Overfishing
NY-NJ	Overfished No overfishing	Overfished No overfishing	Not overfished No overfishing
DMV	Overfished No overfishing	Overfished No overfishing	Not overfished No overfishing

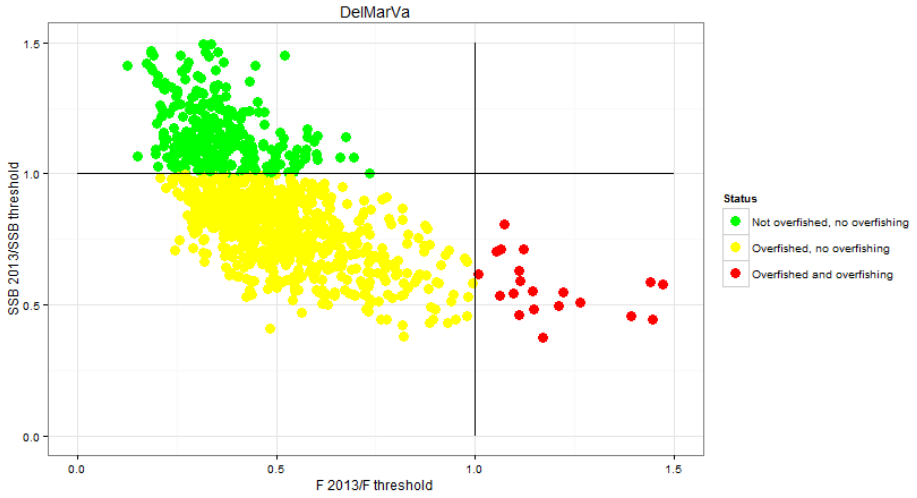
- xDB-SRA and BSSPM use MSY-based reference points for all 3 regions
- ASAP uses MSY-based reference points for SNE and SPR-based reference points for NYNJ and DMV

Stock Status Conclusions

Model	ASAP
SNE	Overfished Overfishing
NY-NJ	Overfished No overfishing
DMV	Overfished No overfishing







Conclusions

- Have moved away from coastwide model
  - More appropriate for tautog life history
- More rigorous modeling
  - More appropriate for available data and uncertainty
- Age structured model is “preferred”
- Good corroboration in results across models
  - F and B trends
  - Stock status
- Models were robust to regional configuration

Research Recommendations

- Expand biological sampling of the commercial catch for each gear type (including weight, lengths, age, sex, and discards).
- Continue collecting operculum (standard) as well as paired sub-samples of otoliths and operculum.
- Increase catch and discard length sampling from the commercial and recreational fishery
- Design a standardized, multi-state fishery independent survey for tautog along the lines of MARMAP and the lobster ventless trap survey.
- Enhance collection of age information for smaller fish (<20 cm) fill in ALKs.
- Assemble regional reference collections of paired operculum and otolith samples and schedule regular hard part exchanges.

Research Recommendations

- The TC recommends conducting an update in 2016 and a benchmark stock assessment in 2019.

Model Comparisons

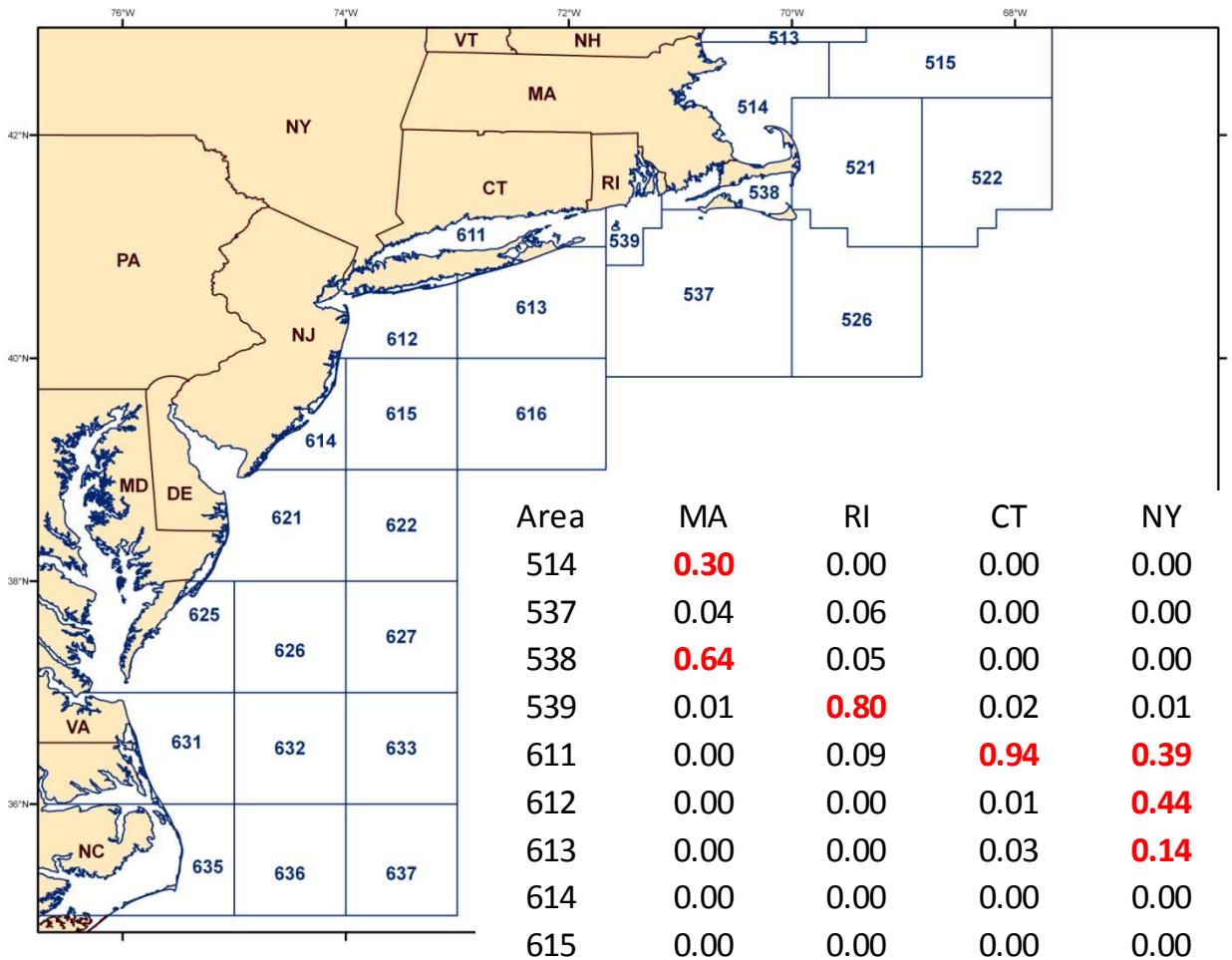
Model Comparisons

- EXTRA SLIDES

Stock structure

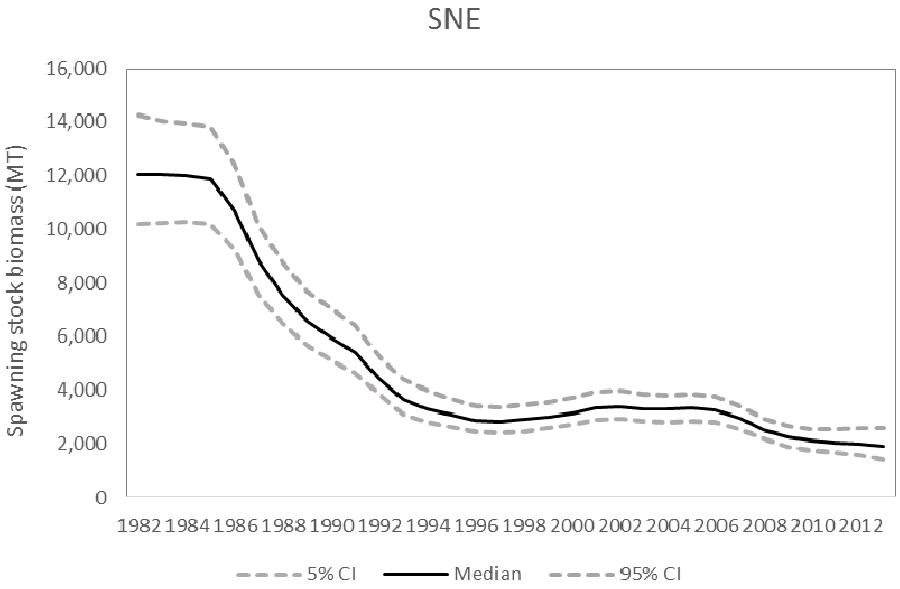
- Management unit = US territorial waters from US/Canada border to southern extent of range
- Life history suggests limited mixing of adults across range
- 2006 peer review encouraged moving towards regional models
- TC investigated several methods to determine appropriate stock structure
- Peer review supported use of patterns in distribution of fishing effort from VTR records (commercial and recreational)

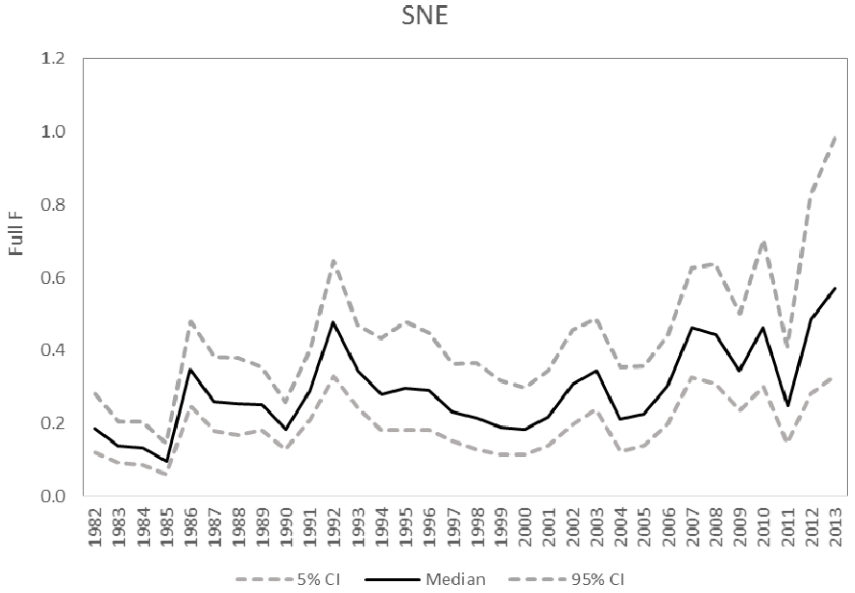
Fishing activity



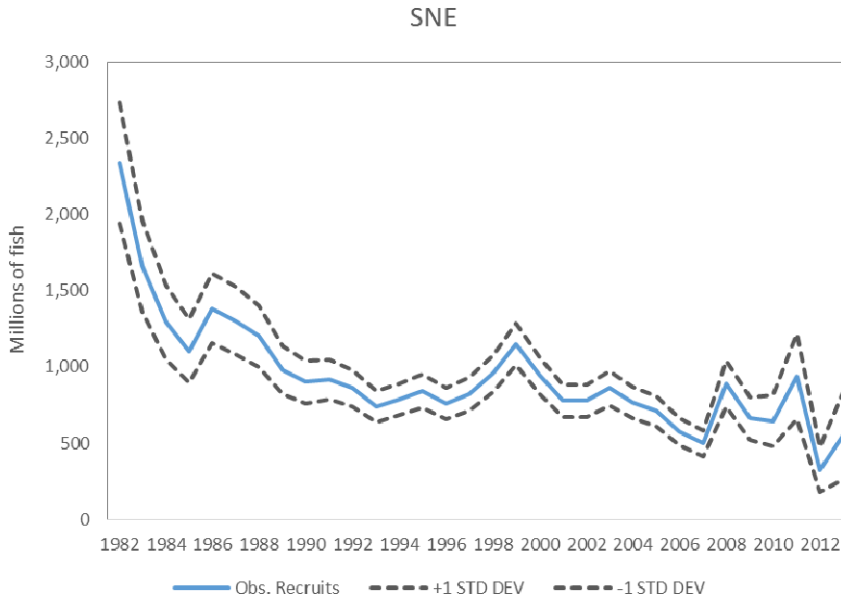
Area	MA	RI	CT	NY	NJ	DE	MD	VA
514	**0.30**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
537	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00
538	**0.64**	0.05	0.00	0.00	0.00	0.00	0.00	0.00
539	0.01	**0.80**	0.02	0.01	0.00	0.00	0.00	0.00
611	0.00	0.09	**0.94**	**0.39**	0.00	0.00	0.00	0.00
612	0.00	0.00	0.01	**0.44**	**0.47**	0.00	0.00	0.01
613	0.00	0.00	0.03	**0.14**	0.01	0.00	0.00	0.00
614	0.00	0.00	0.00	0.00	**0.22**	0.00	0.03	0.00
615	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
621	0.00	0.00	0.00	0.00	**0.21**	**1.00**	**0.77**	0.07
625	0.00	0.00	0.00	0.00	0.00	0.00	0.04	**0.52**
626	0.00	0.00	0.00	0.00	0.00	0.00	**0.16**	0.05
631	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.34**

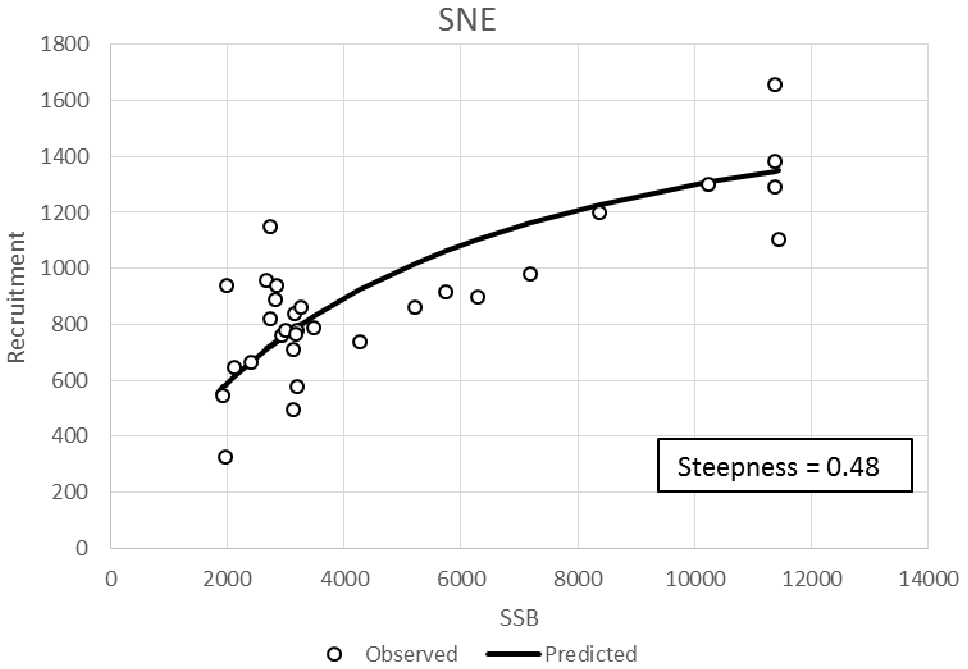
Results: SNE


SNE
Spawning stock biomass (MT)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012
5% CI
Median
95% CI


SNE
Full F
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
5% CI
Median
95% CI

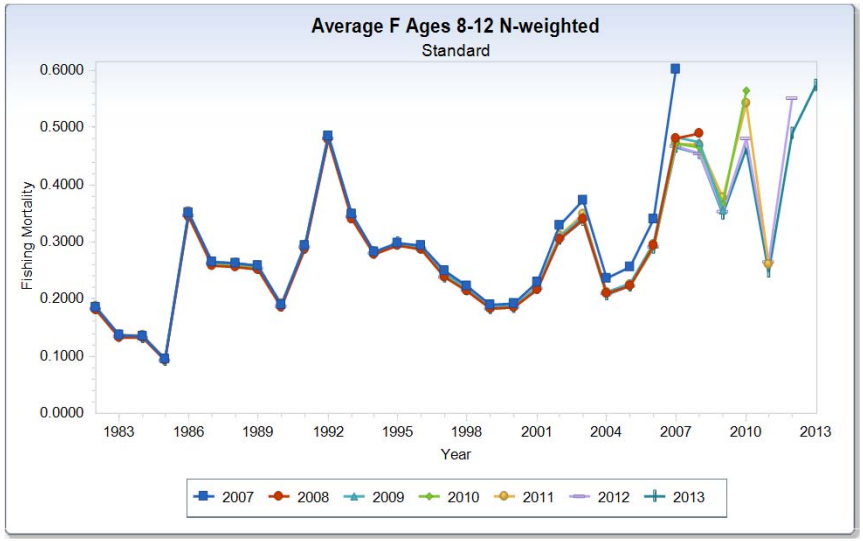
Results: SNE


SNE
3,000
2,500
2,000
1,500
1,000
500
0
Millions of fish
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012
Obs. Recruits
+1 STD DEV
-1 STD DEV

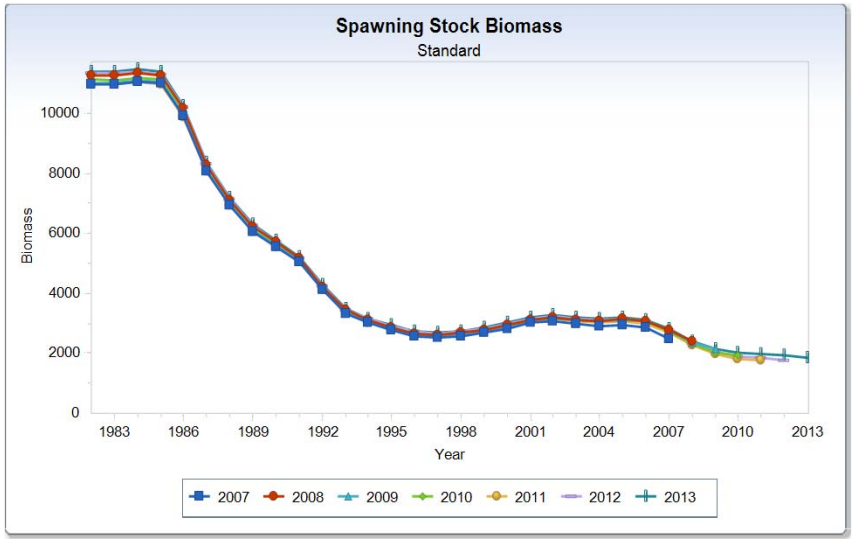

SNE
1800
1600
1400
1200
1000
800
600
400
200
0
Recruitment
0
2000
4000
6000
8000
10000
12000
14000
SSB
Steepness = 0.48
Observed
Predicted

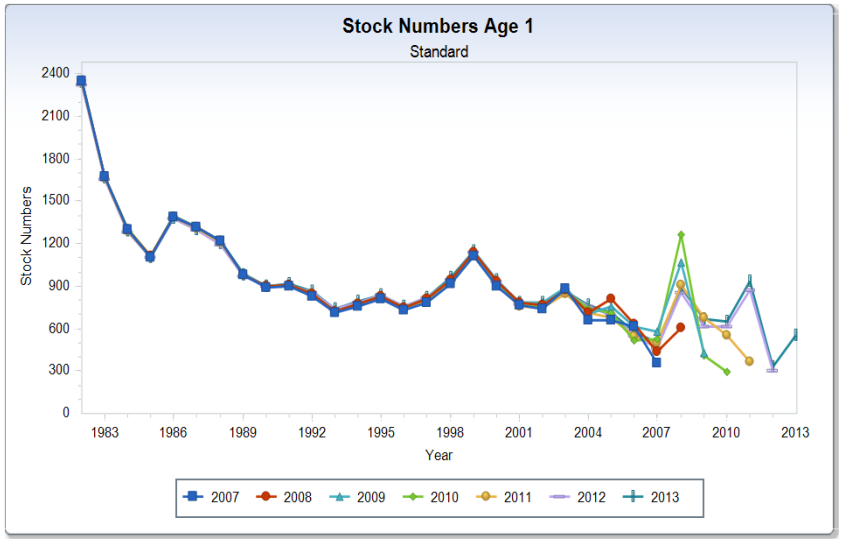
Results: SNE

Mohn's rho = 0.17



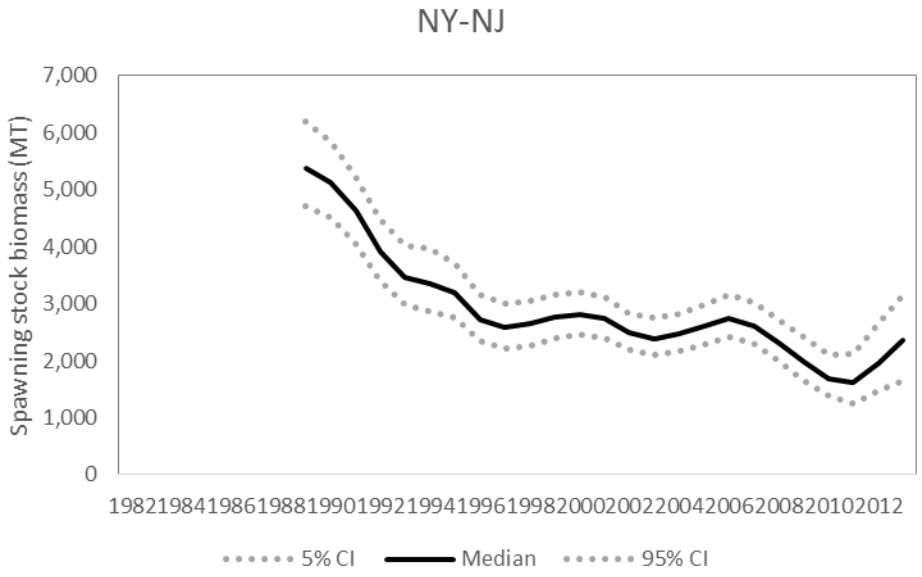
Mohn's rho = -0.04

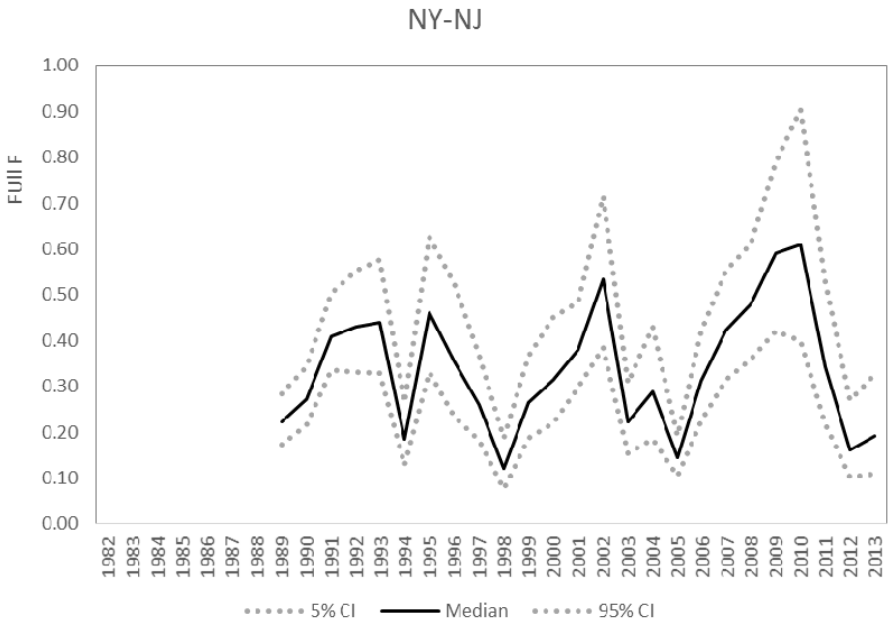




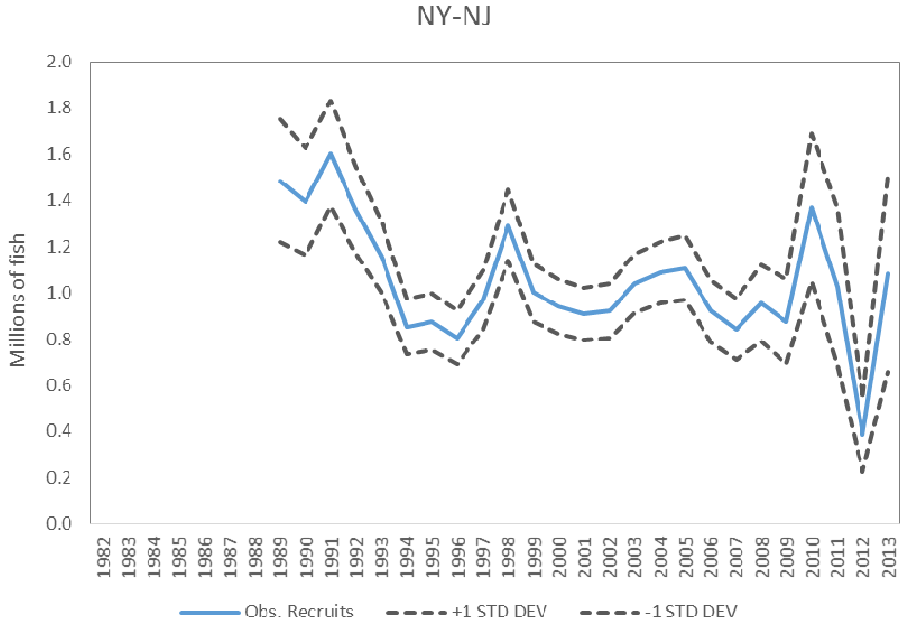
Mohn's rho = -0.33

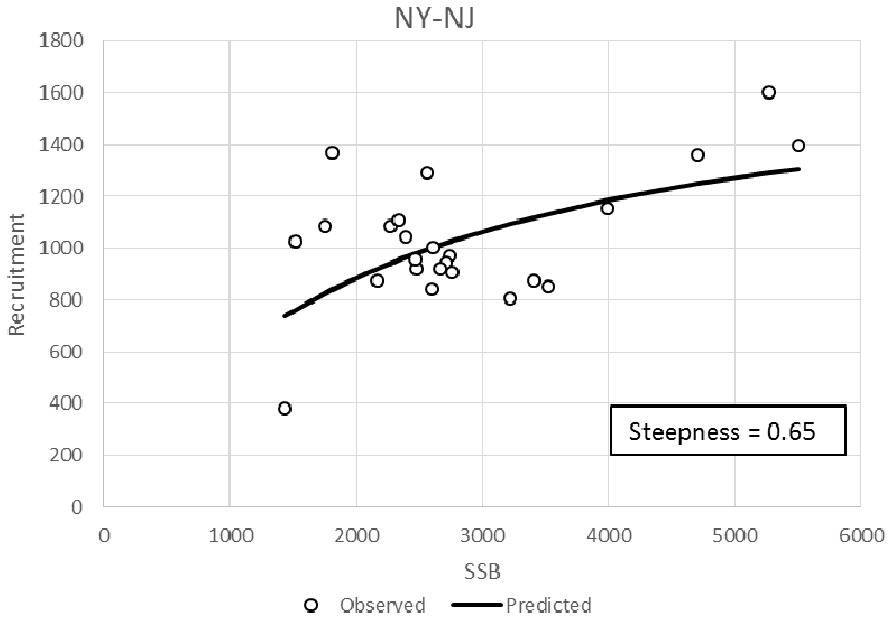
Results: NY-NJ





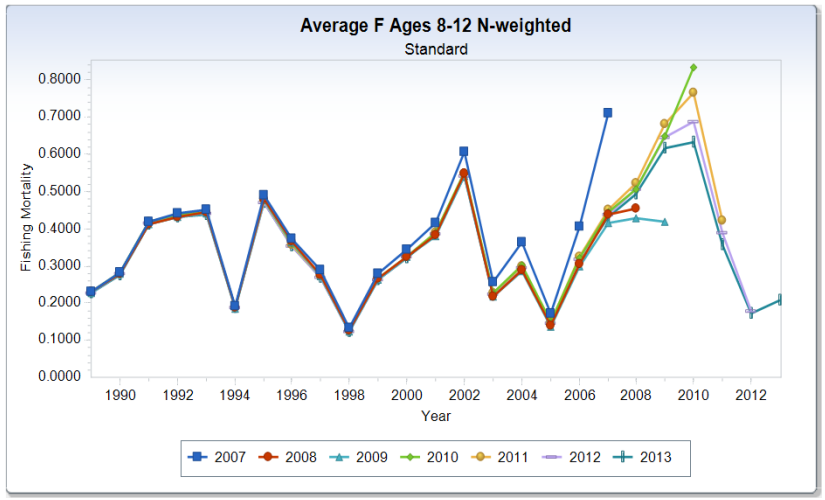
Results: NY-NJ



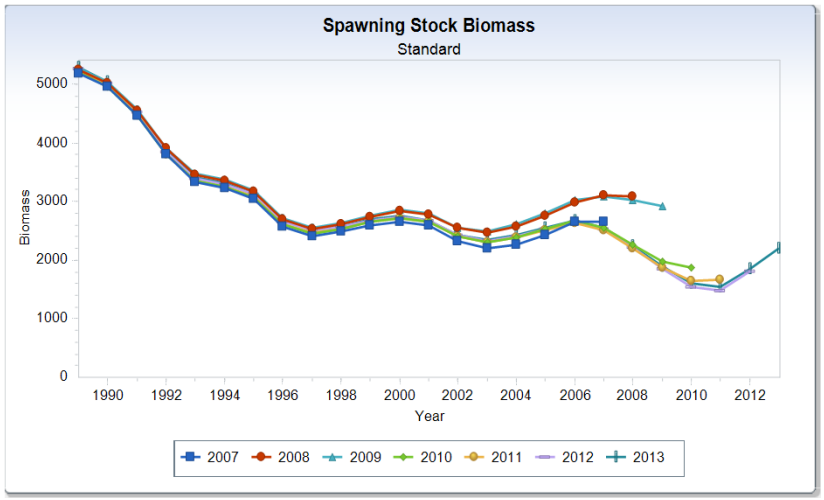


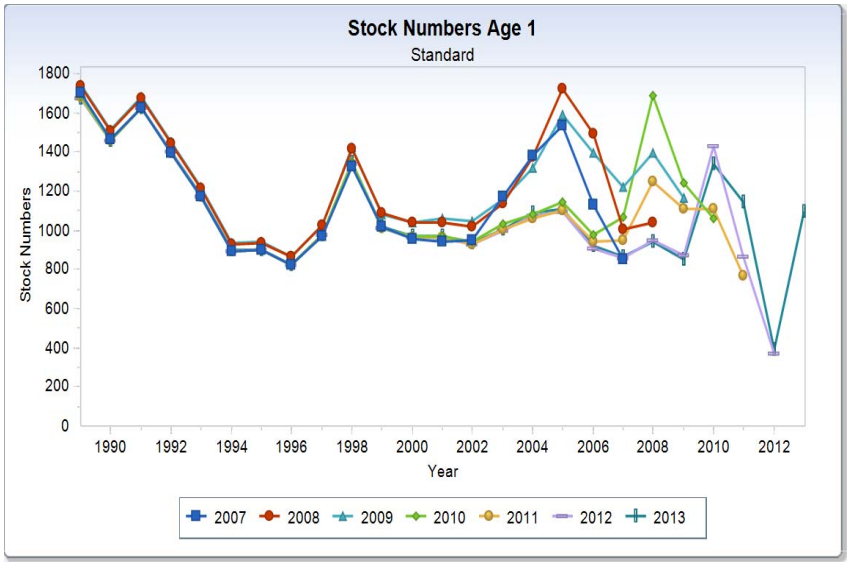
Results: NY-NJ

Mohn's rho = 0.13



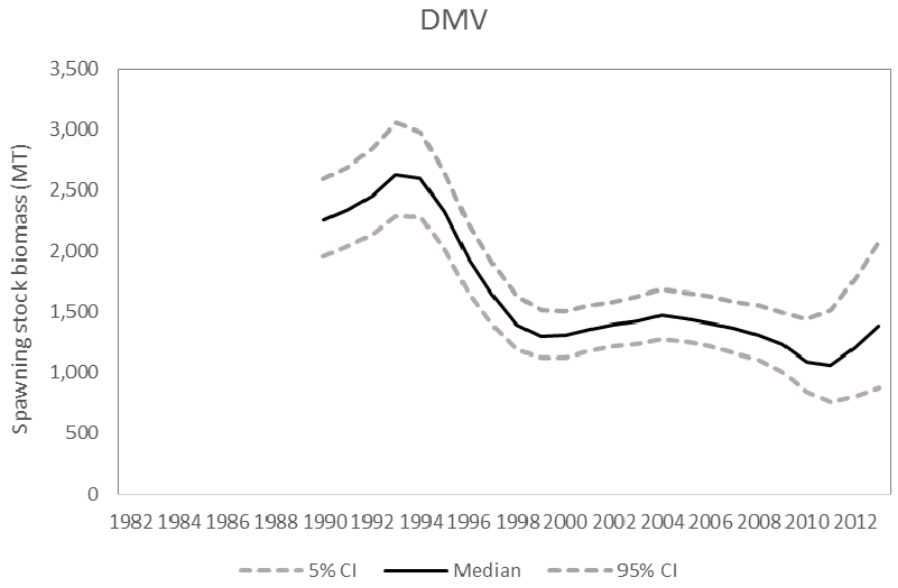
Mohn's rho = 0.19

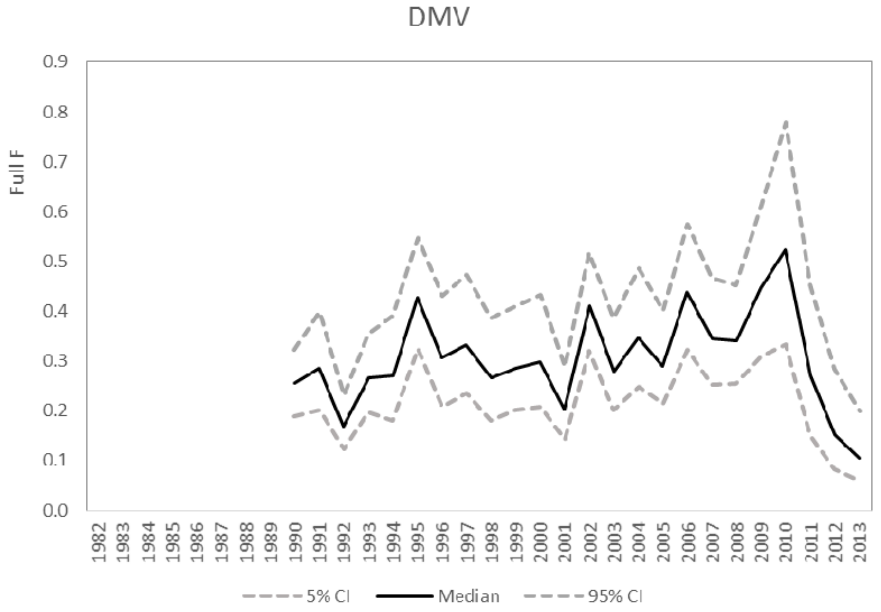




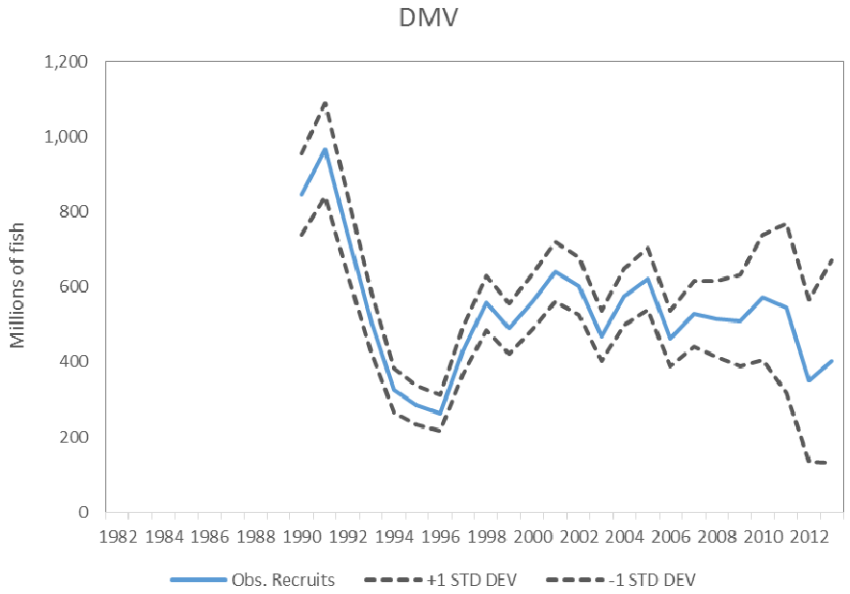
Mohn's rho = -0.03

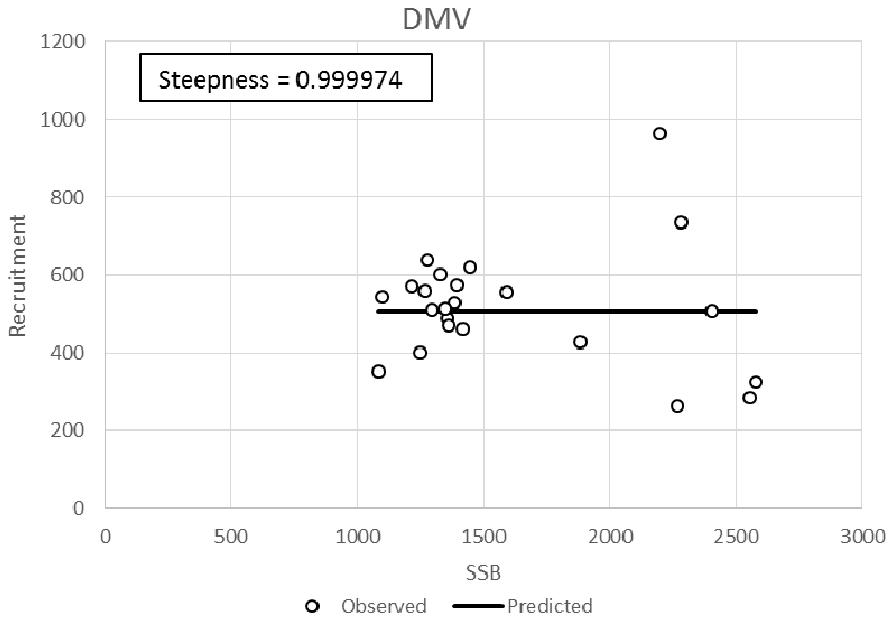
Results: DMV


DMV
Spawning stock biomass (MT)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012
5% CI
Median
95% CI


DMV
Full F
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
5% CI
Median
95% CI

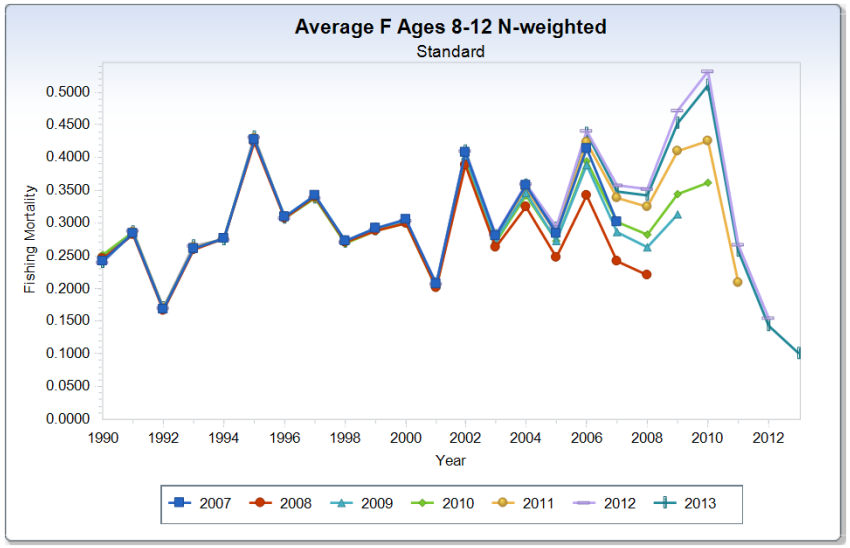
Results: DMV


DMV
1,200
1,000
800
600
400
200
0
Millions of fish
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012
Obs. Recruits
+1 STD DEV
-1 STD DEV

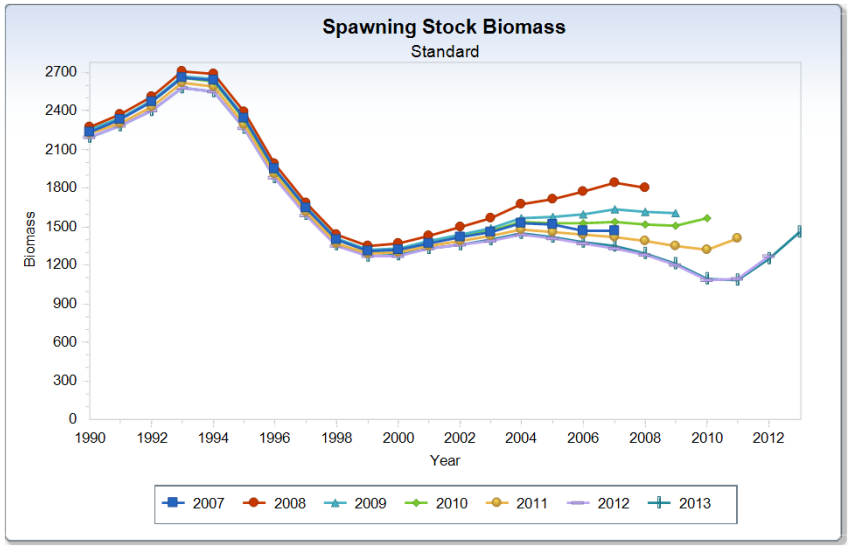

DMV
Steepness = 0.999974
1200
1000
800
600
400
200
0
Recruitment
0
500
1000
1500
2000
2500
3000
SSB
Observed
Predicted

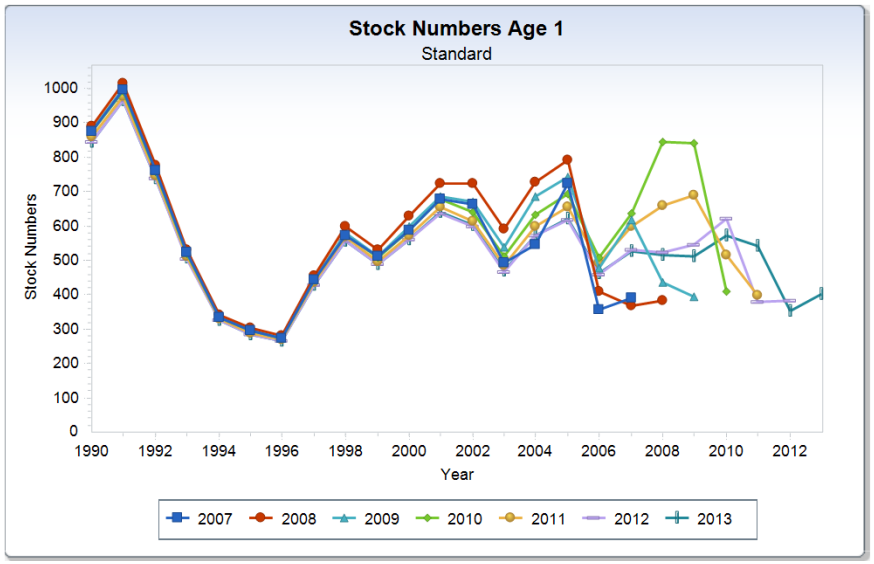
DMV: Results

Mohn's rho = -0.20



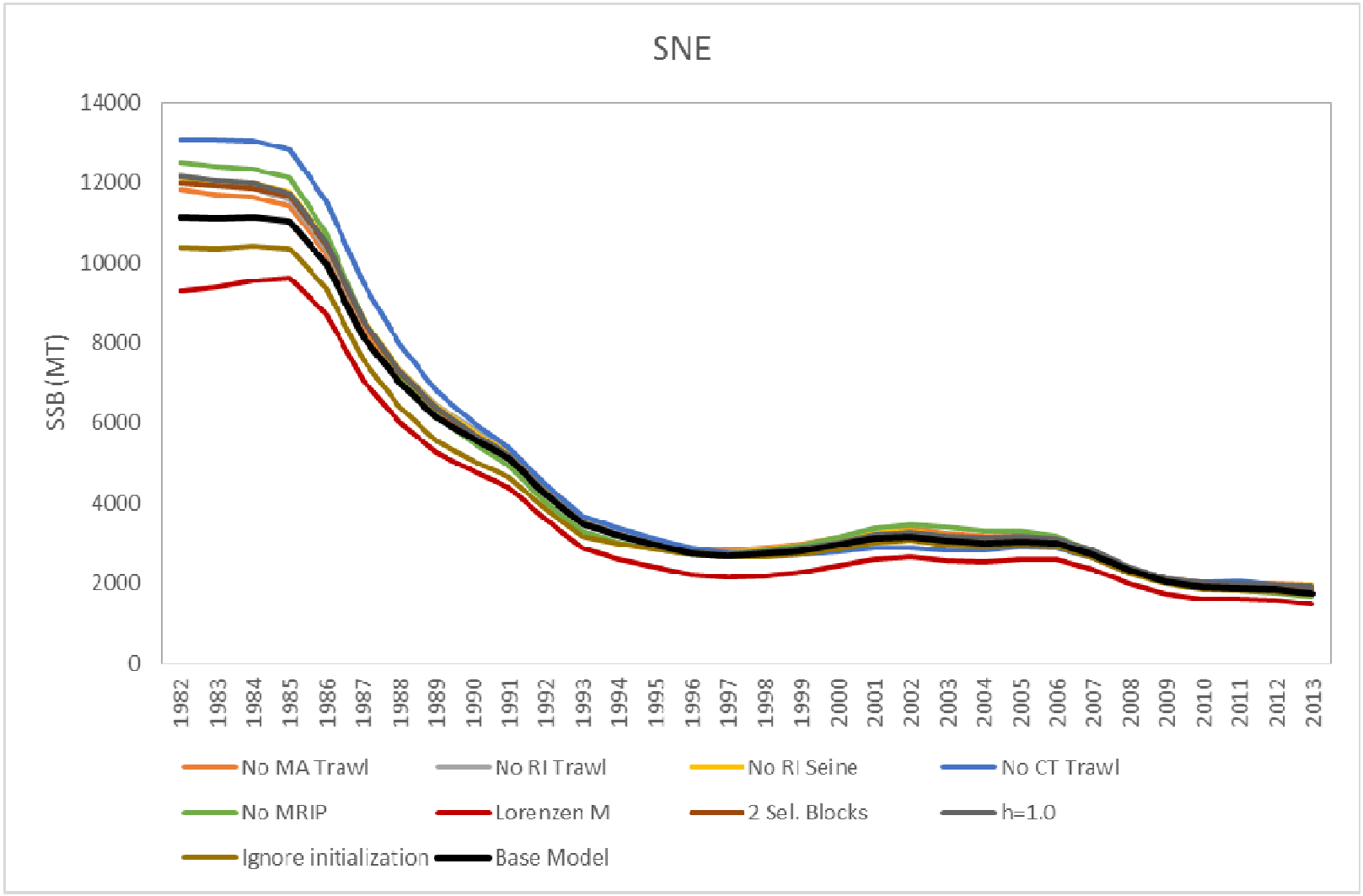
Mohn's rho = 0.26



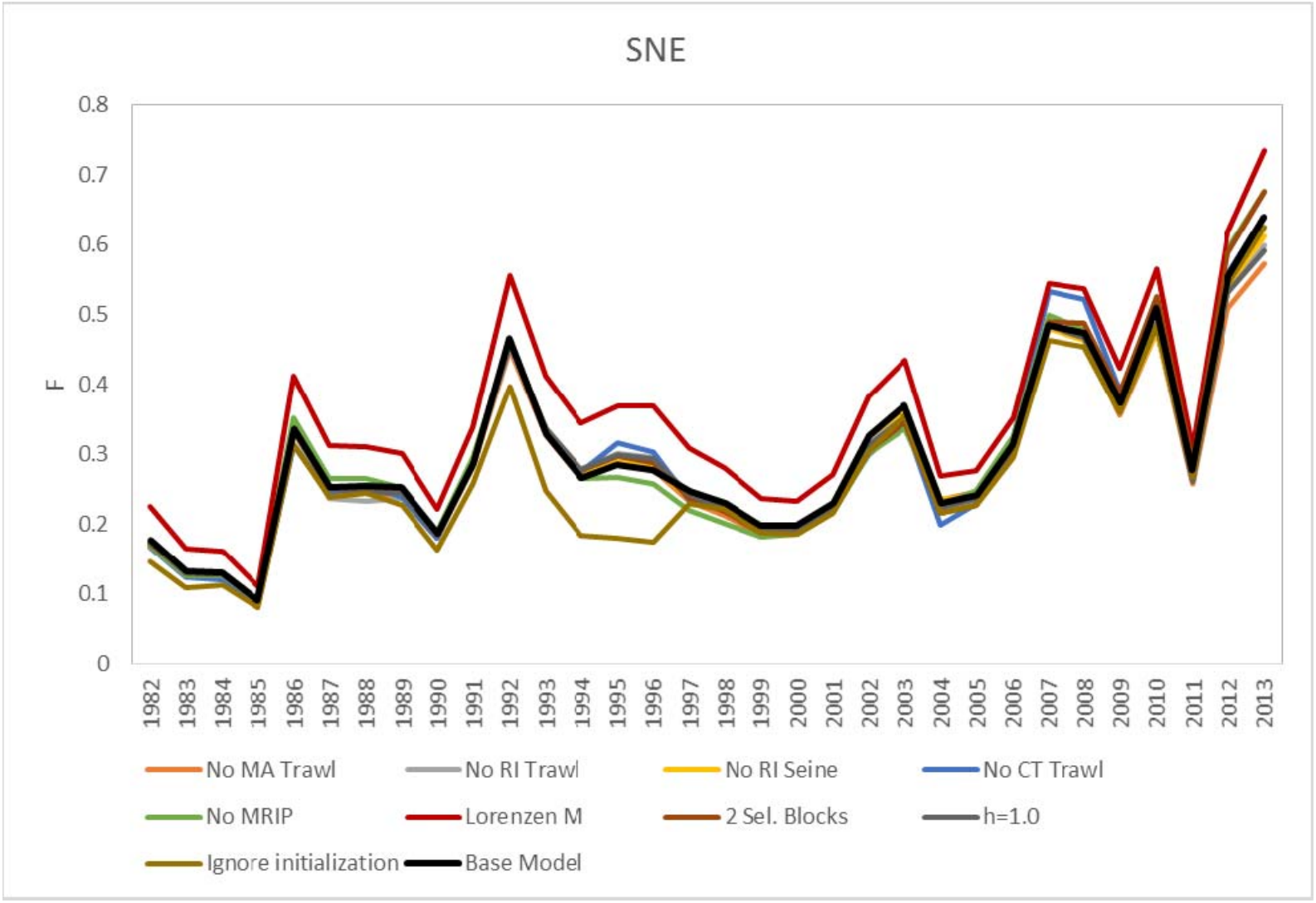


Mohn's rho = -0.20

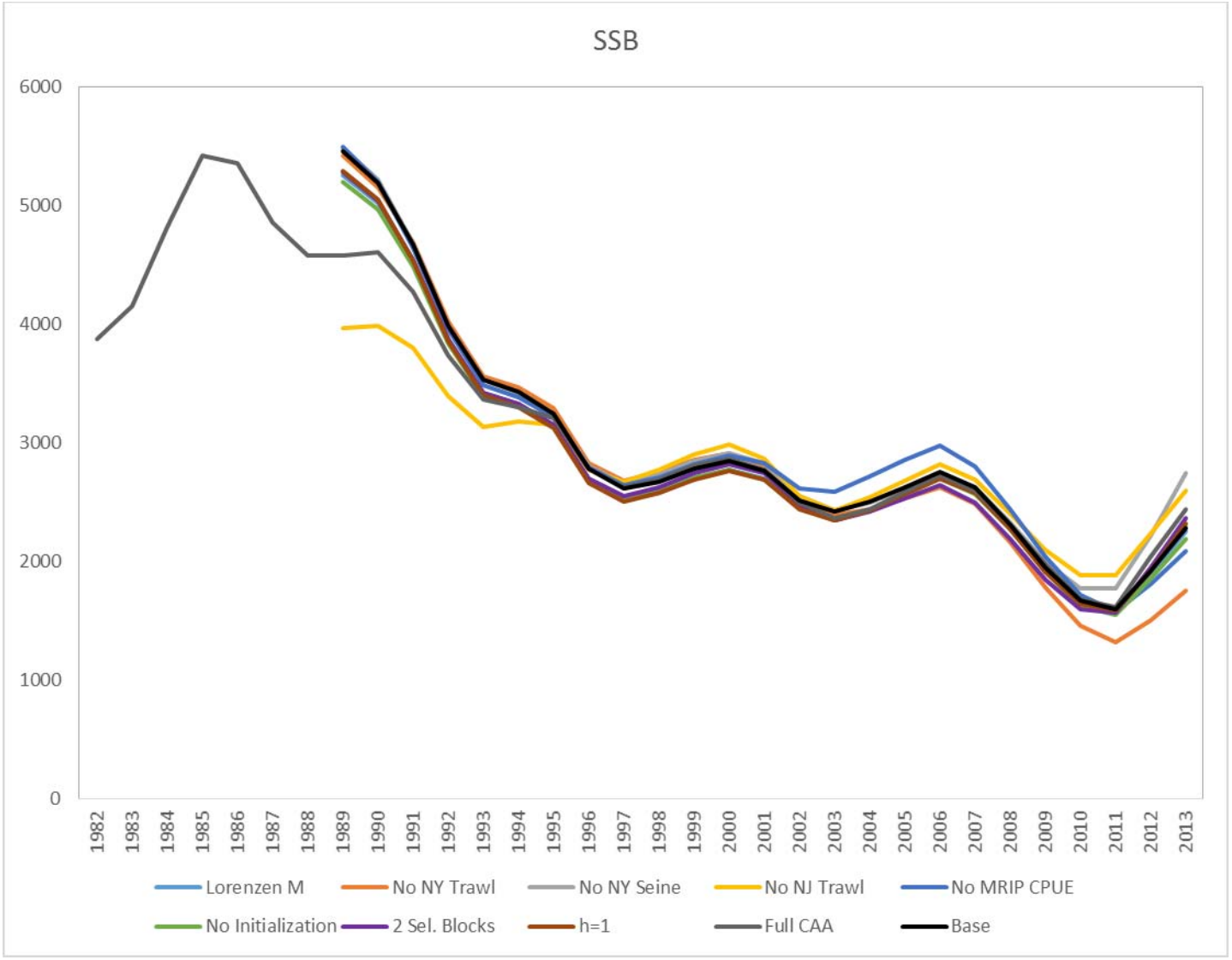
Sensitivity Runs: SNE



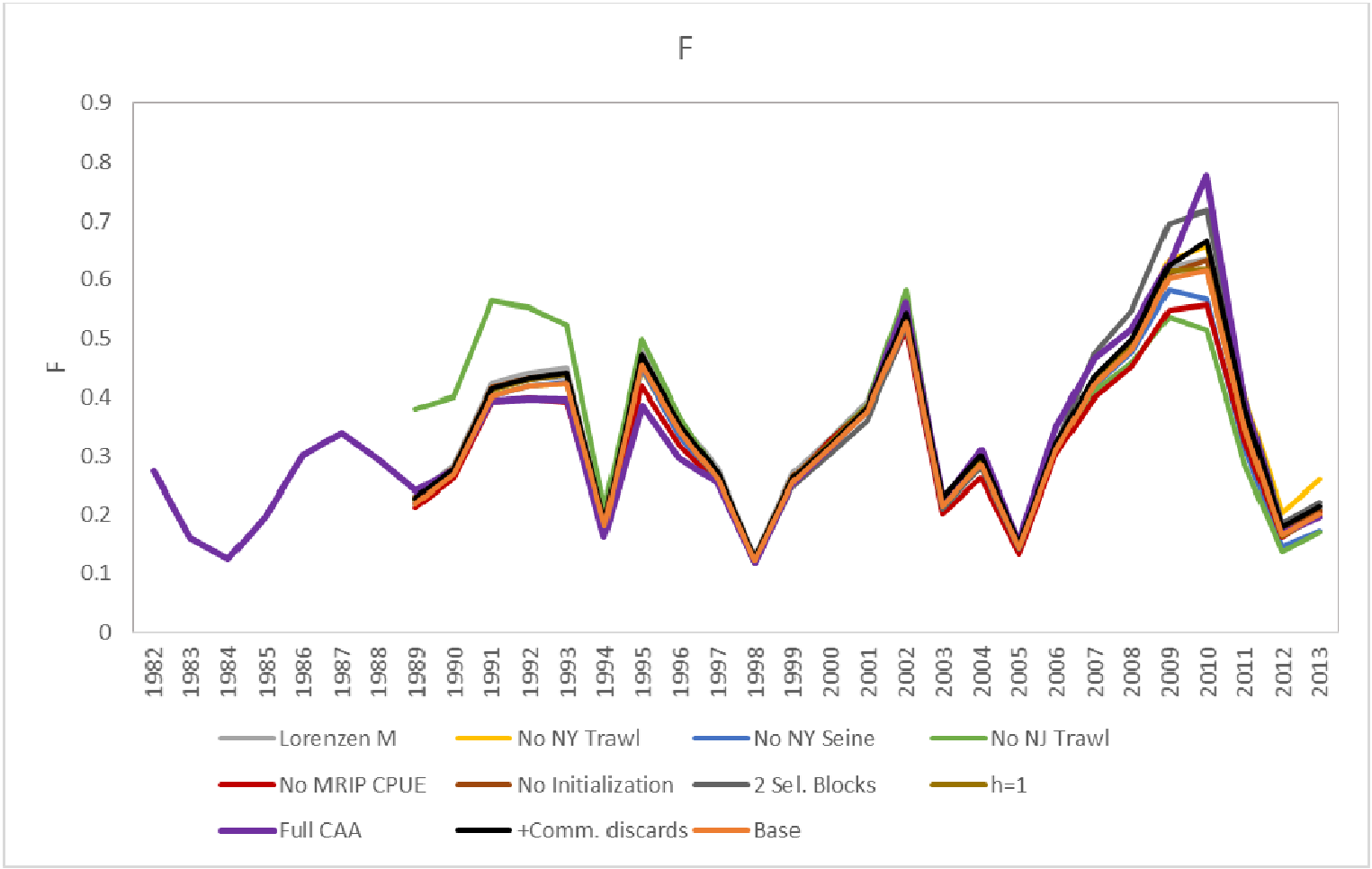
Sensitivity Runs: SNE



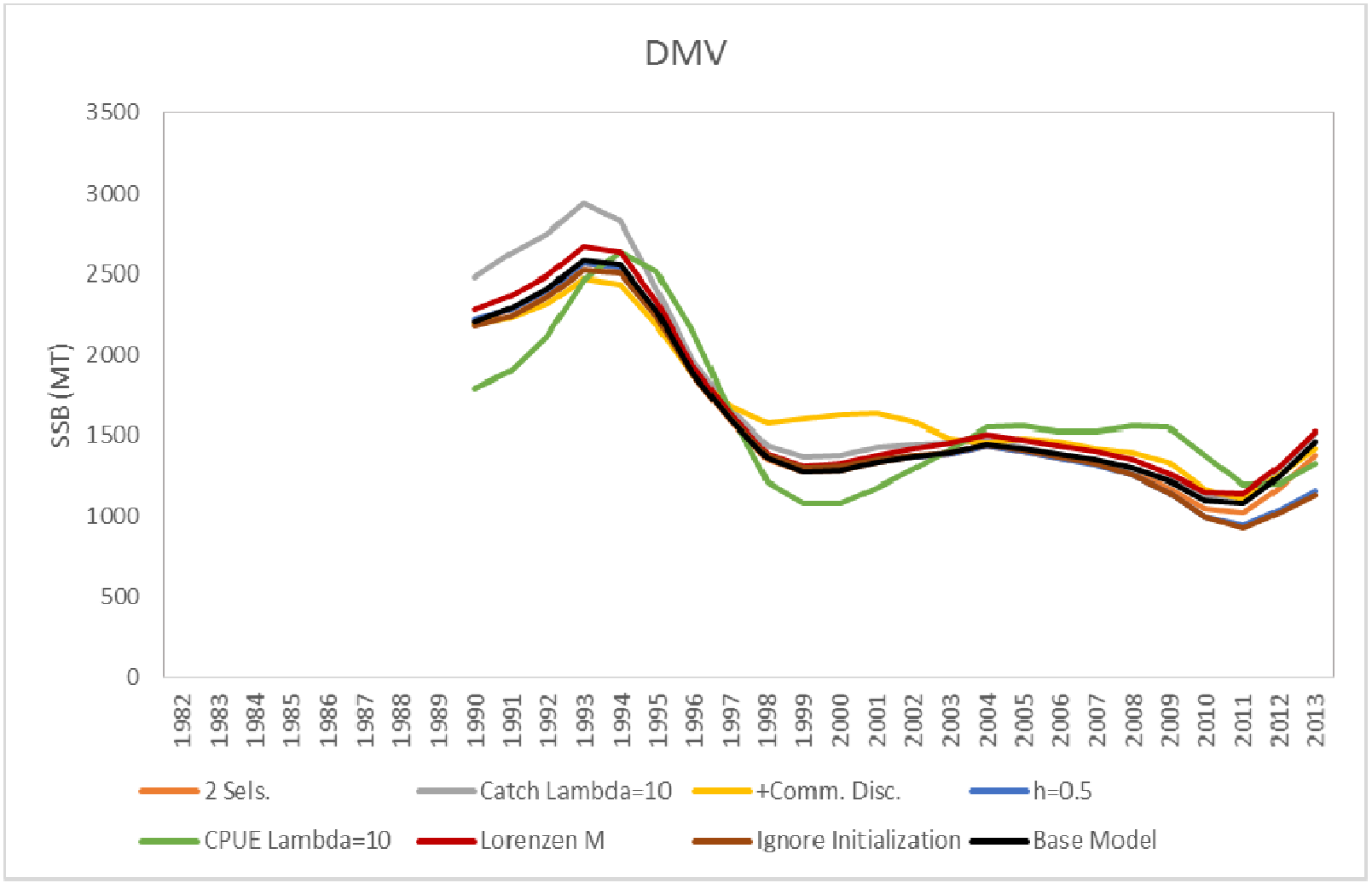
Sensitivity Runs: NY-NJ



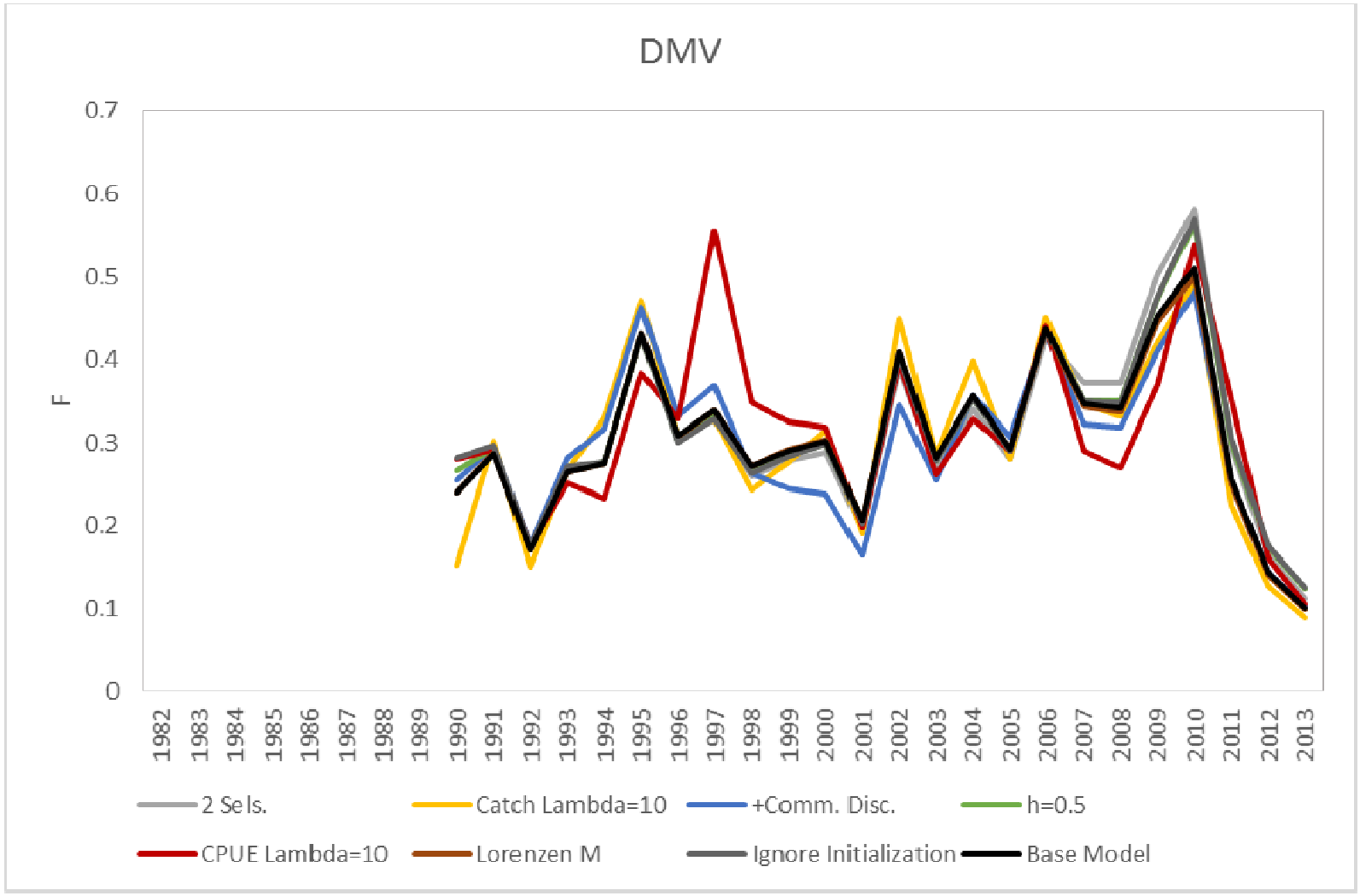
Sensitivity Runs: NY-NJ



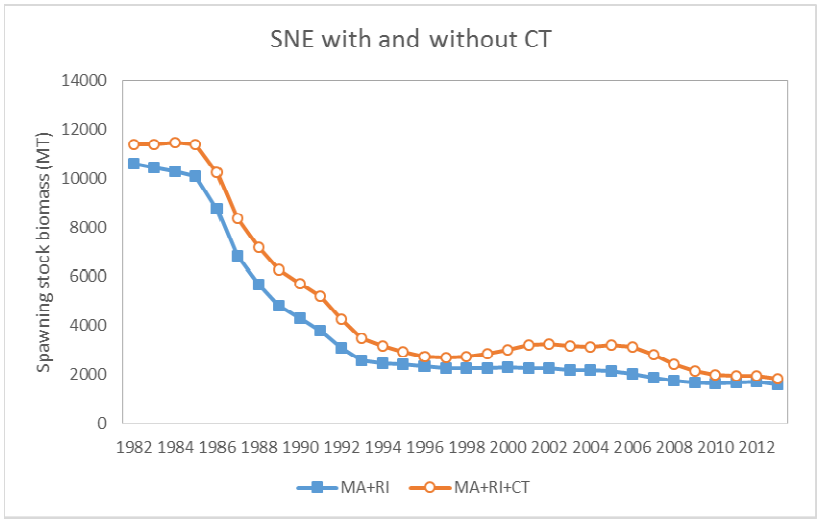
Sensitivity Runs: DMV

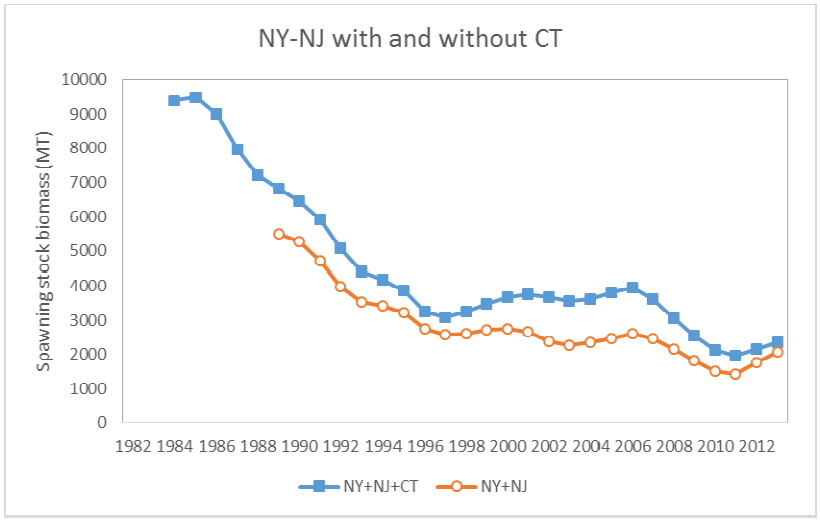


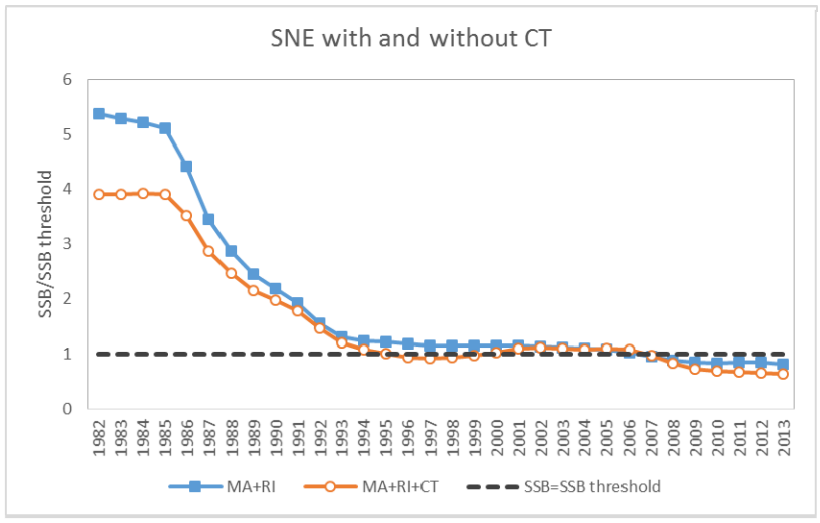
Sensitivity Runs: DMV

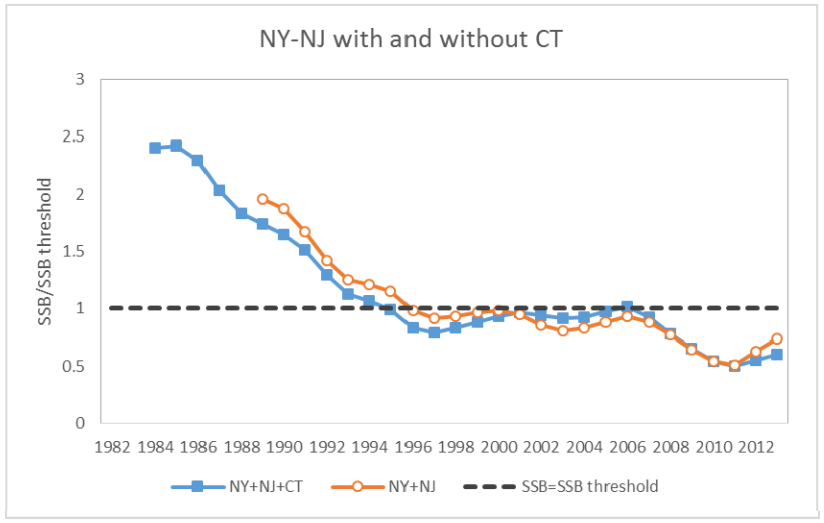


Alternate Regions

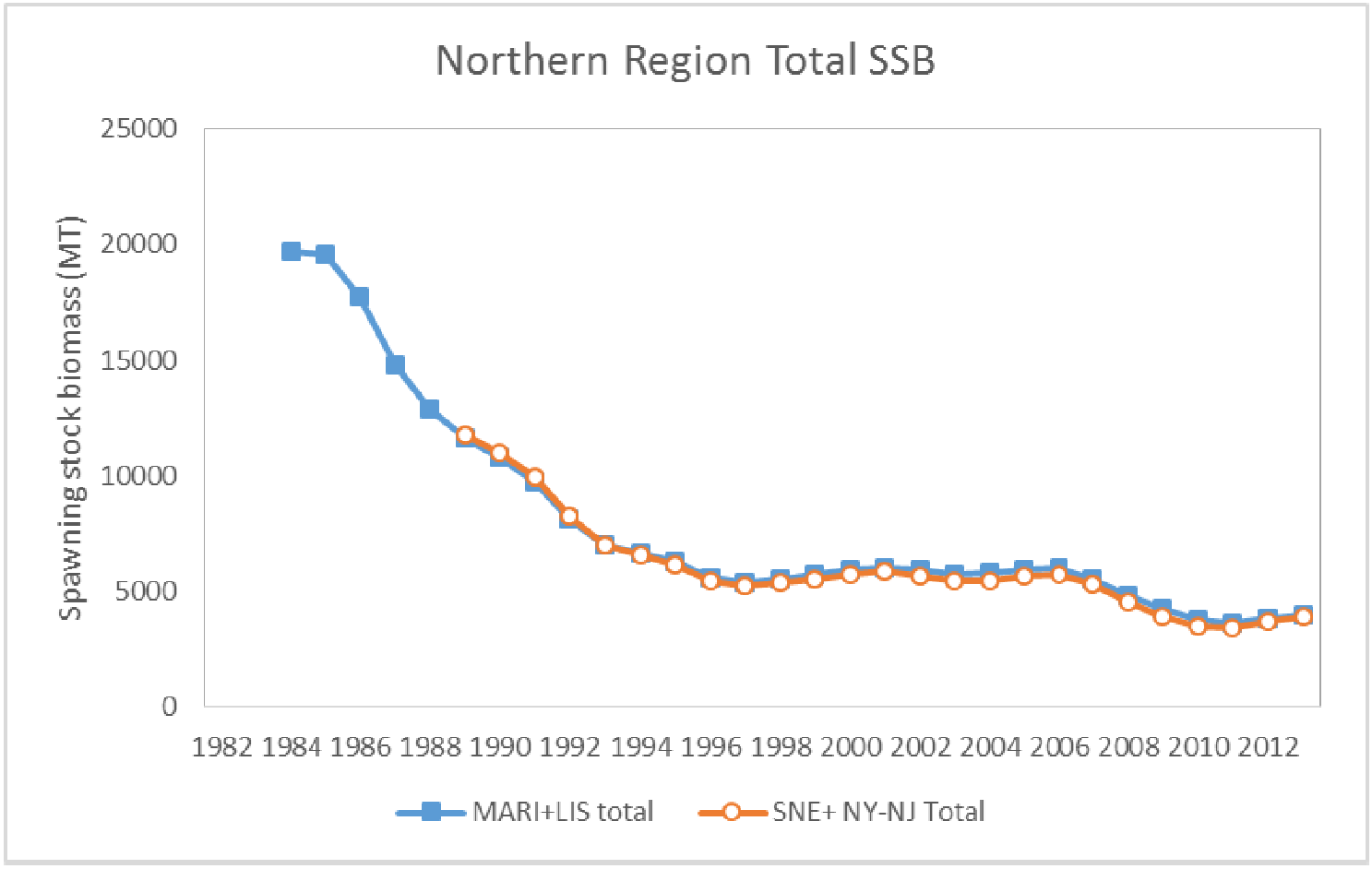




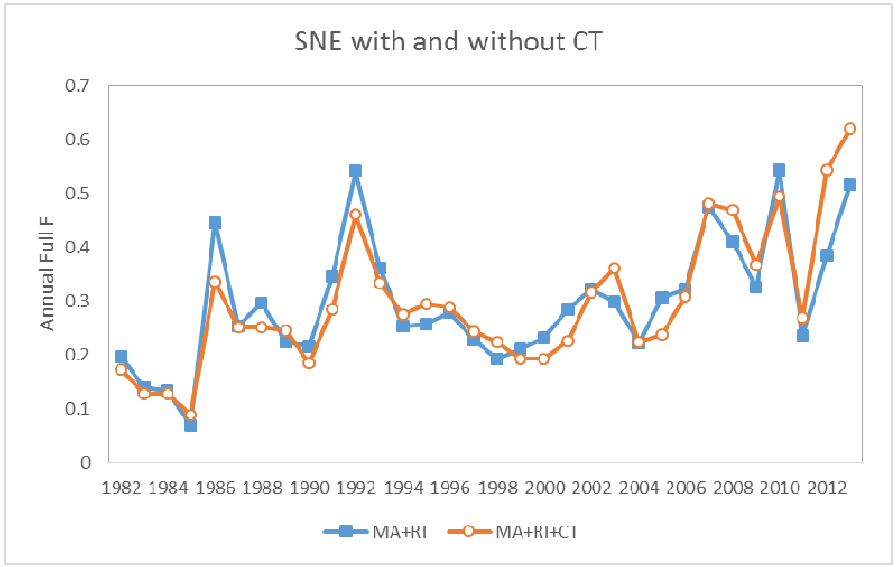


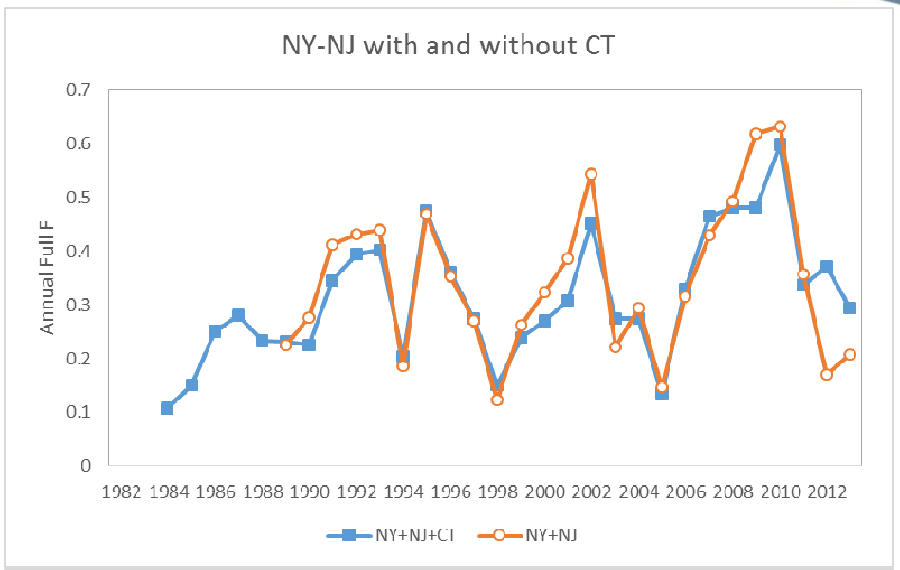


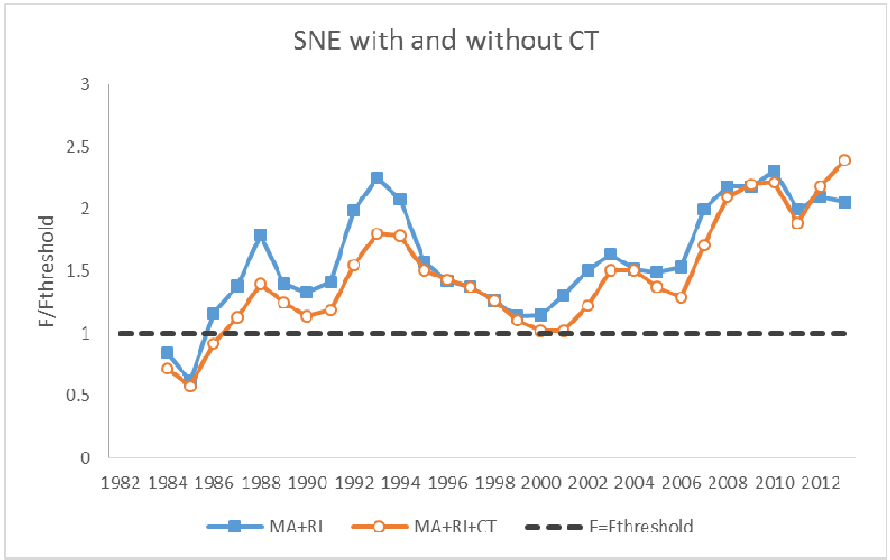
Alternate Regions

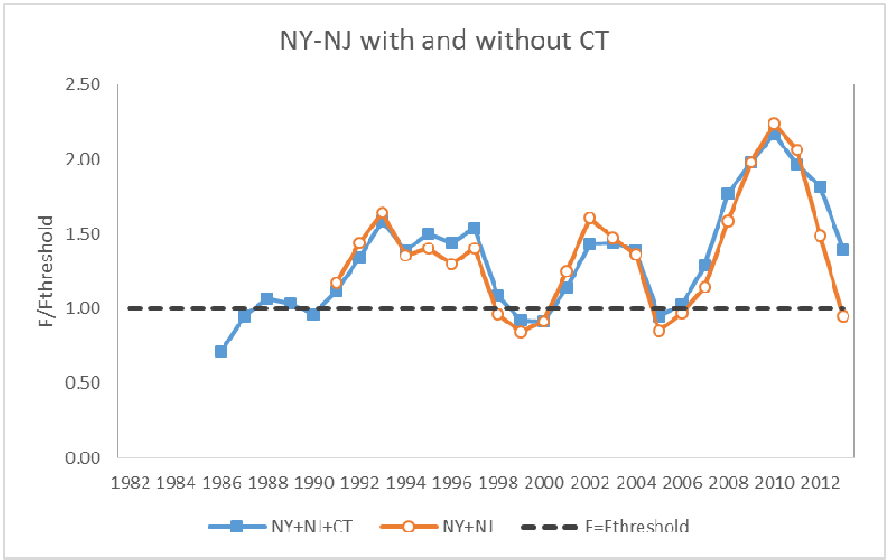


Alternate Regions



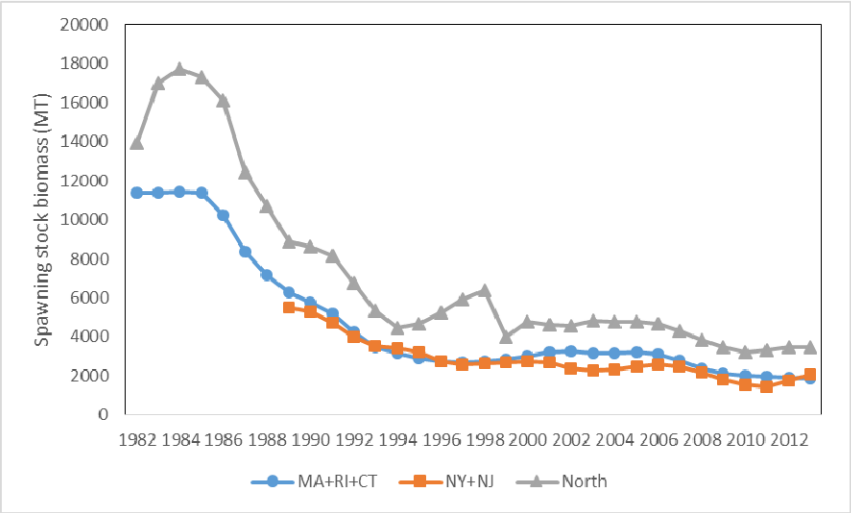


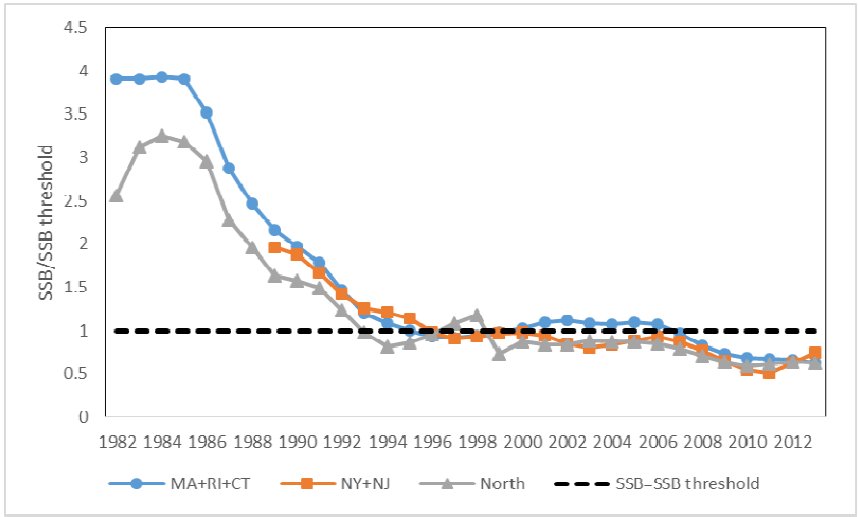




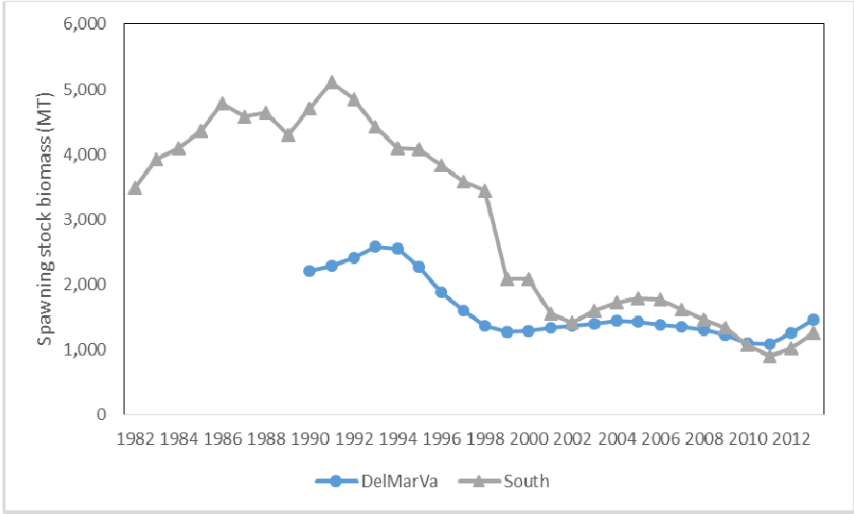
Alternate Regions

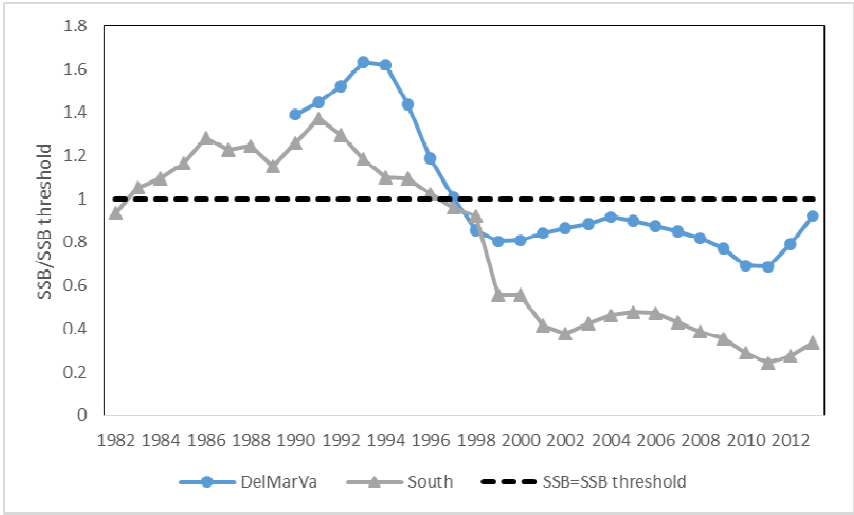
Northern Regions (North, SNE, NY-NJ)





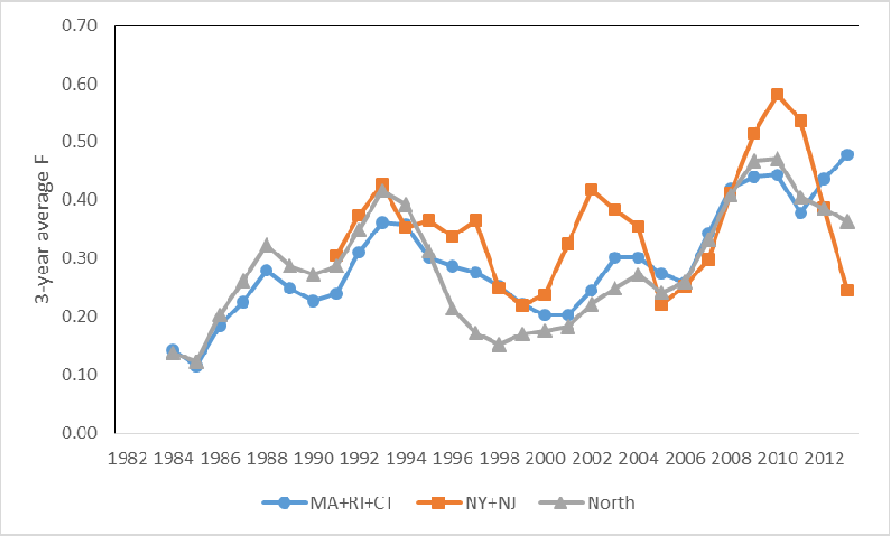
Southern Regions (South, DMV)

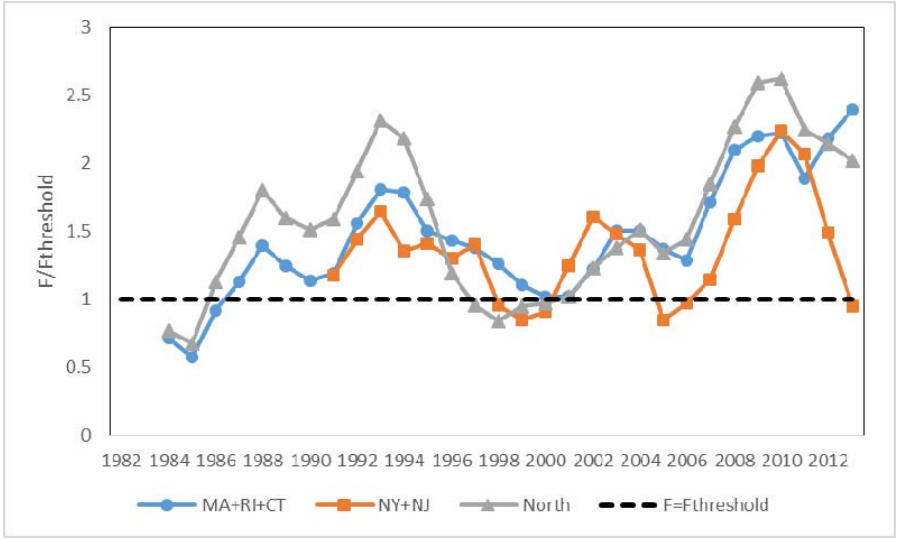




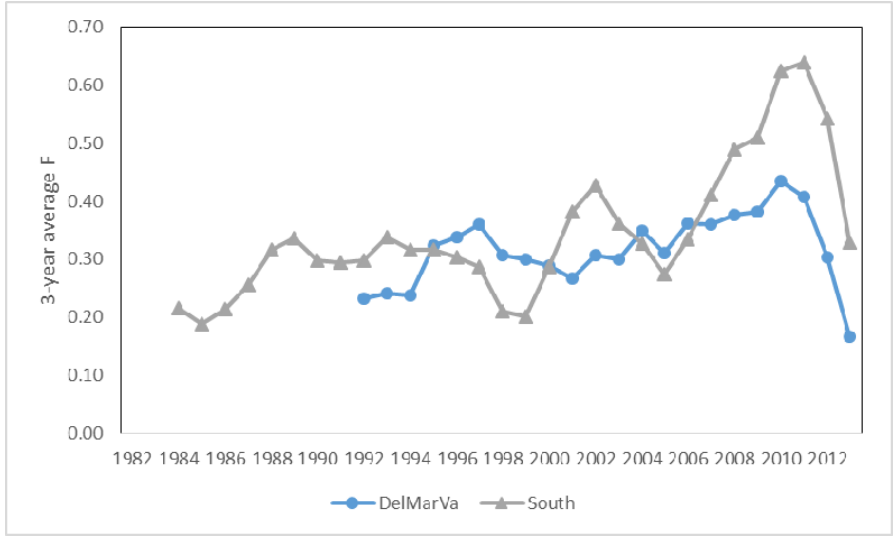
Alternate Region

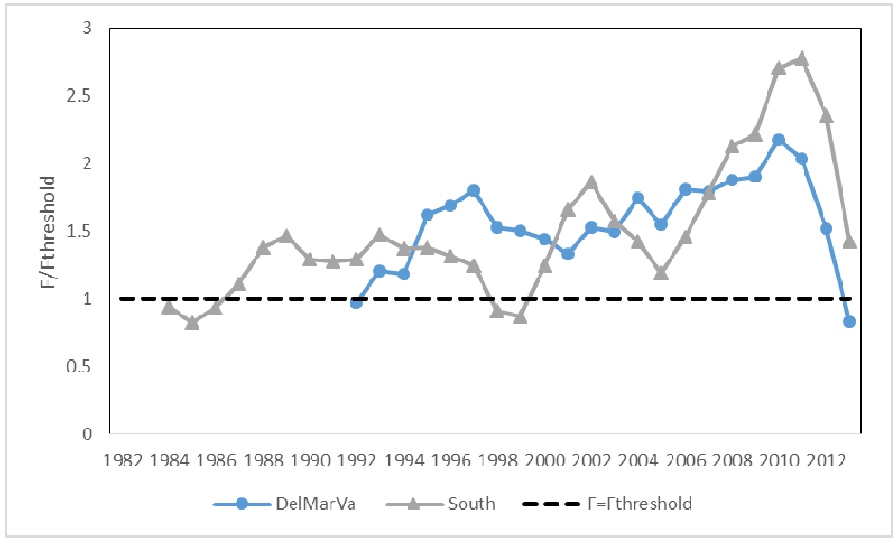
Northern Regions (North, SNE, NY-NJ)





Southern Regions (South, DMV)



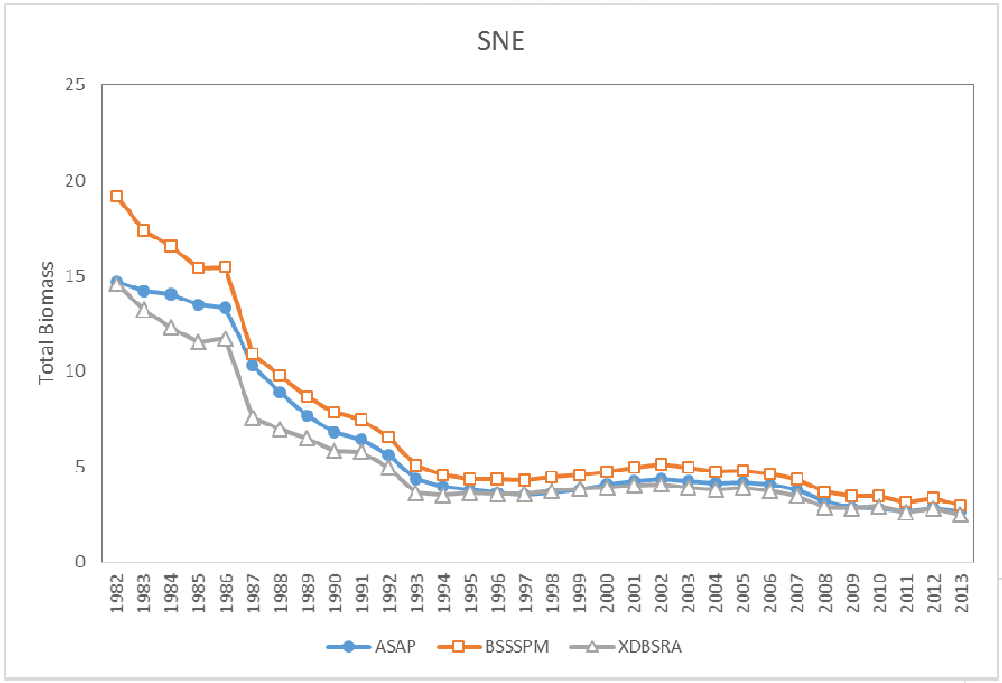


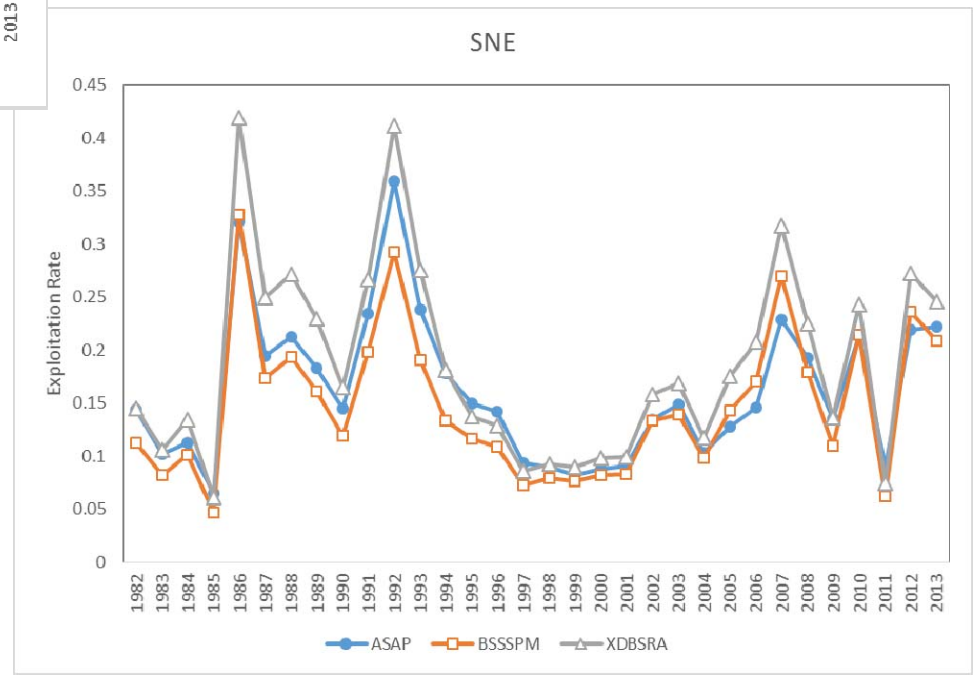
Reference Points

	SNE	NY-NJ	DMV
F_{MSY}	0.15	0.16	*0.5*
$F_{30\%}$	0.44	0.26	0.24
$F_{35\%}$	0.33	0.22	0.19
$F_{40\%}$	0.26	0.17	0.16
$F_{50\%}$	0.16	0.12	0.11

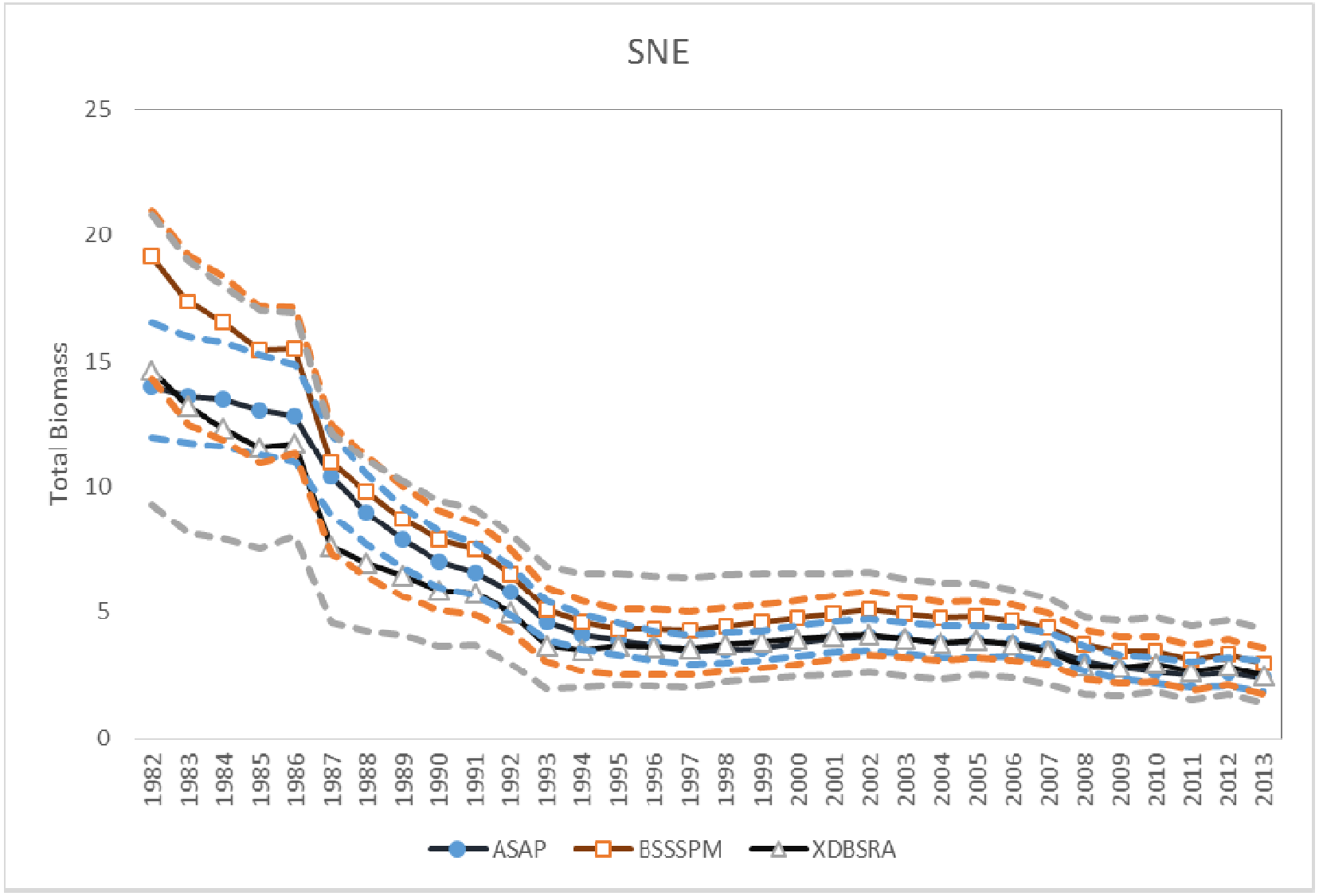
	SNE	NY-NJ	DMV
SSB_{MSY}	3,883	4,616	*867*
$SSB_{30\%}$	2,310	2,640	1,580
$SSB_{35\%}$	2,715	3,620	1,870
$SSB_{40\%}$	3,090	3,570	2,090
$SSB_{50\%}$	3,940	5,160	2,610

Model Comparisons: SNE

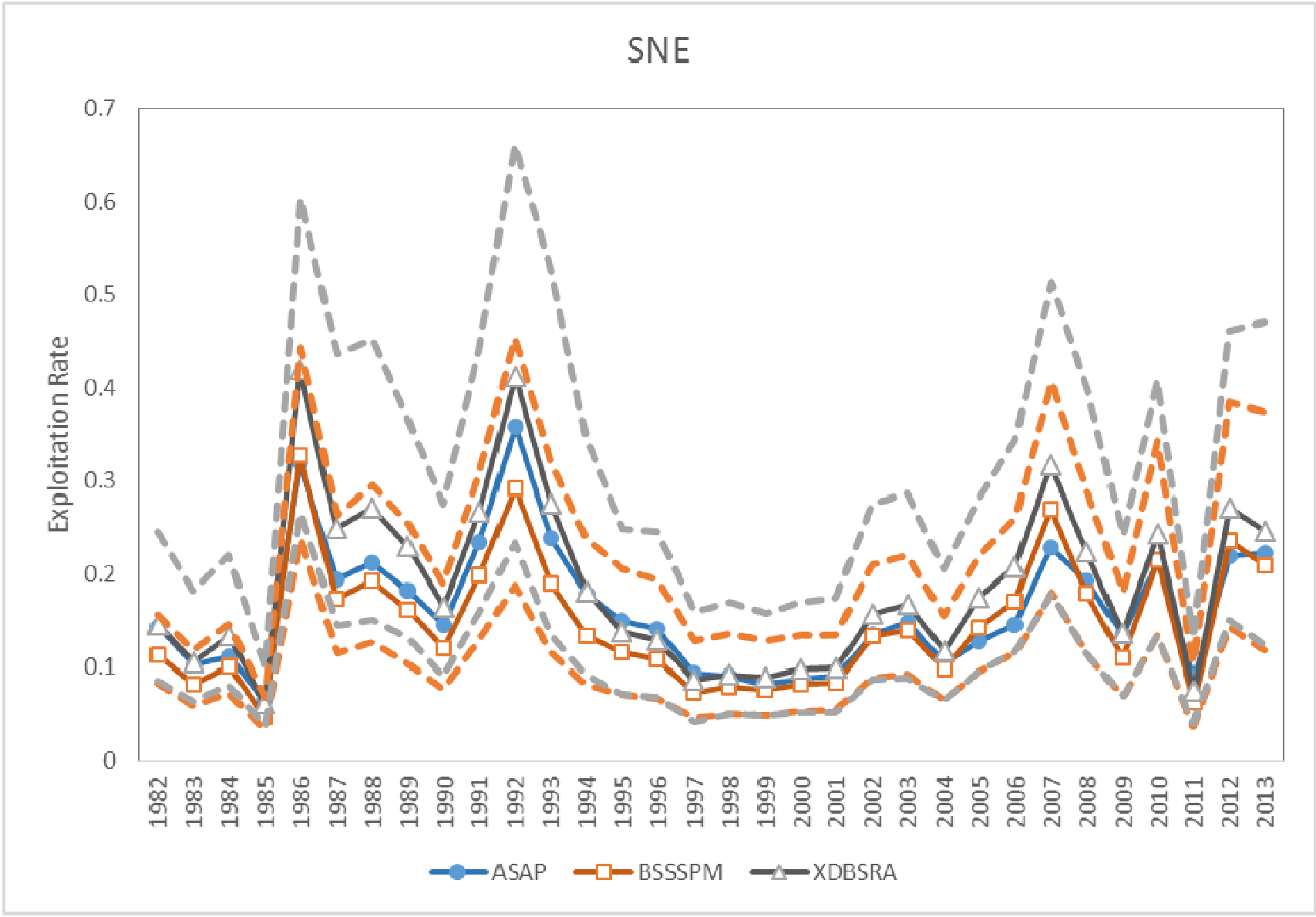




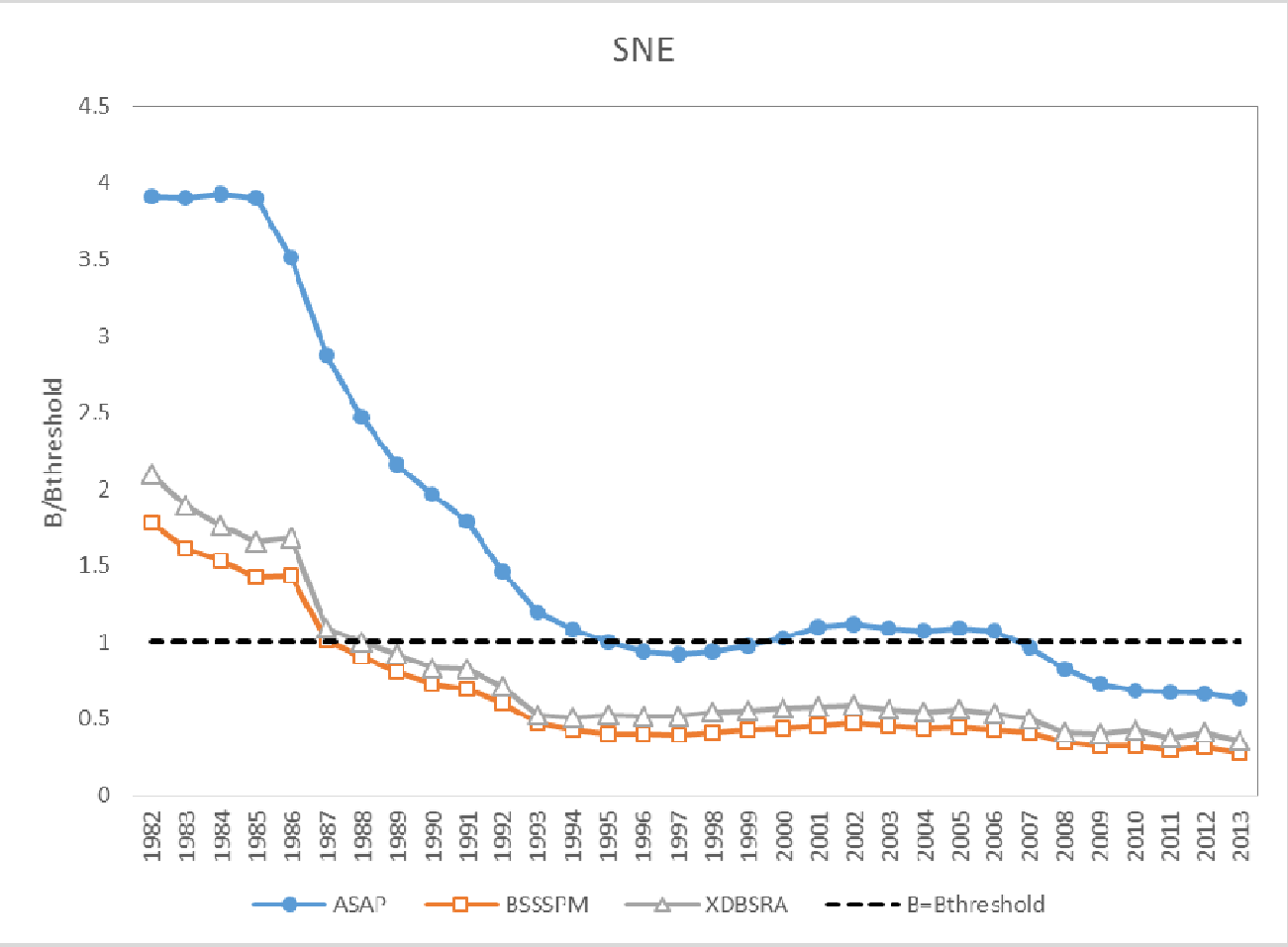
Model Comparisons: SNE



Model Comparisons: SNE



Model Comparisons: SNE

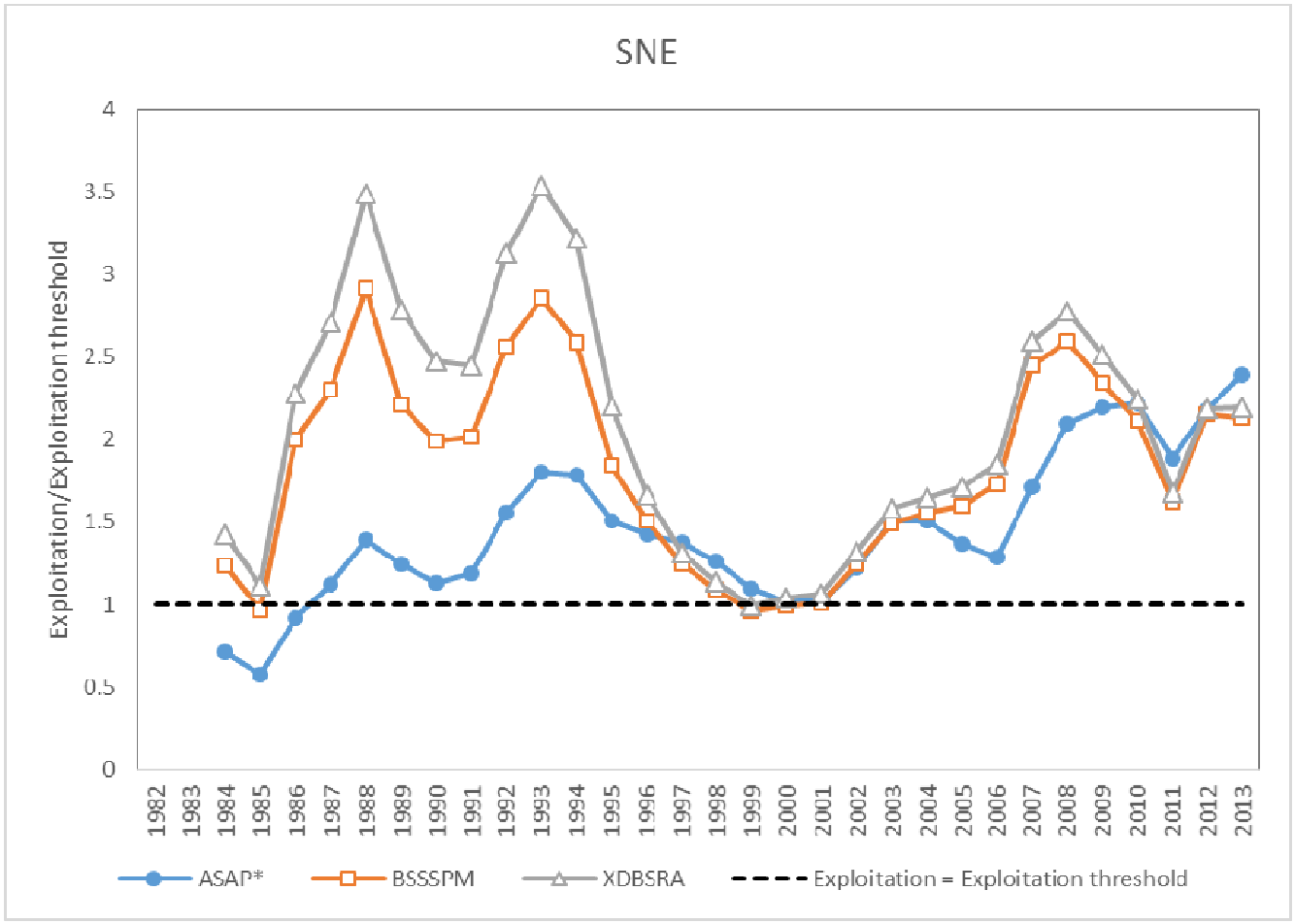


Status Determination:
Overfished

$B/B_{threshold}$
$SSB/SSB_{threshold}$

$B_{threshold}$ = 75% B_{MSY}
$SSB_{threshold}$ = 75% SSB_{MSY}

Model Comparisons: SNE

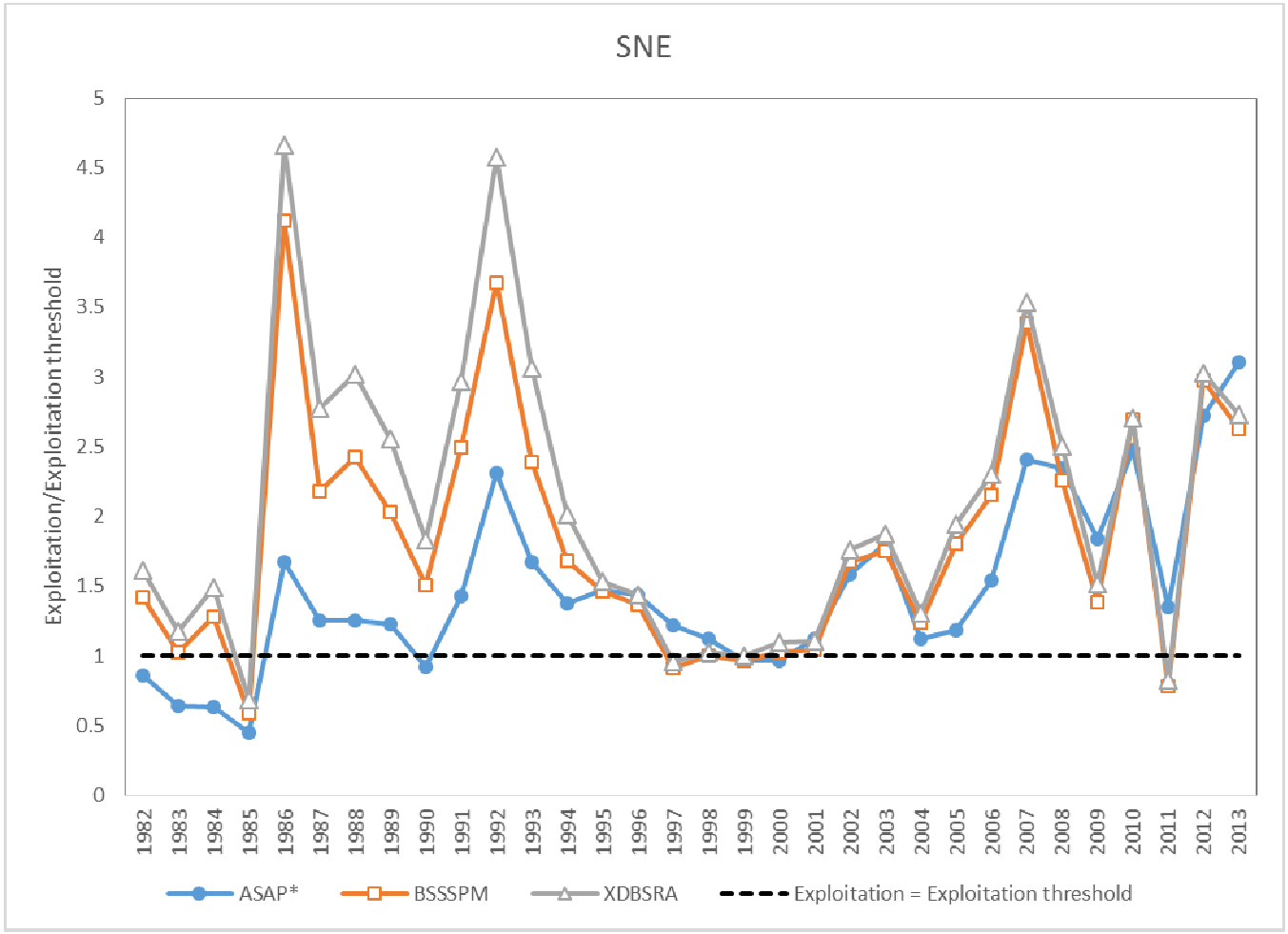


Status Determination:
Overfishing

3 yr avg $U/U_{threshold}$
3 yr avg $F/F_{threshold}$

$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{75\% SSBMSY}$

Model Comparisons: SNE

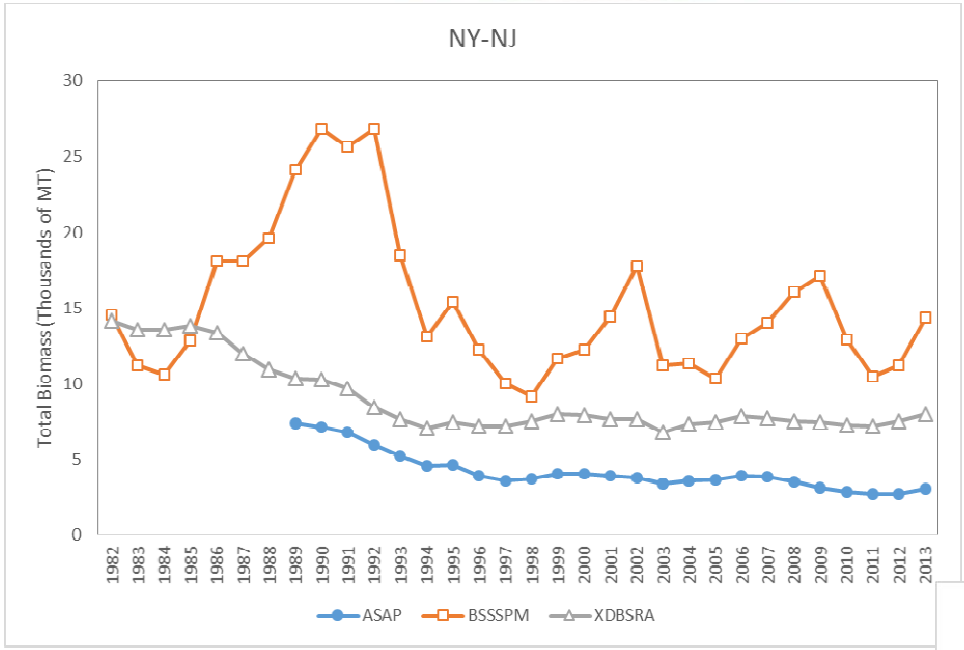


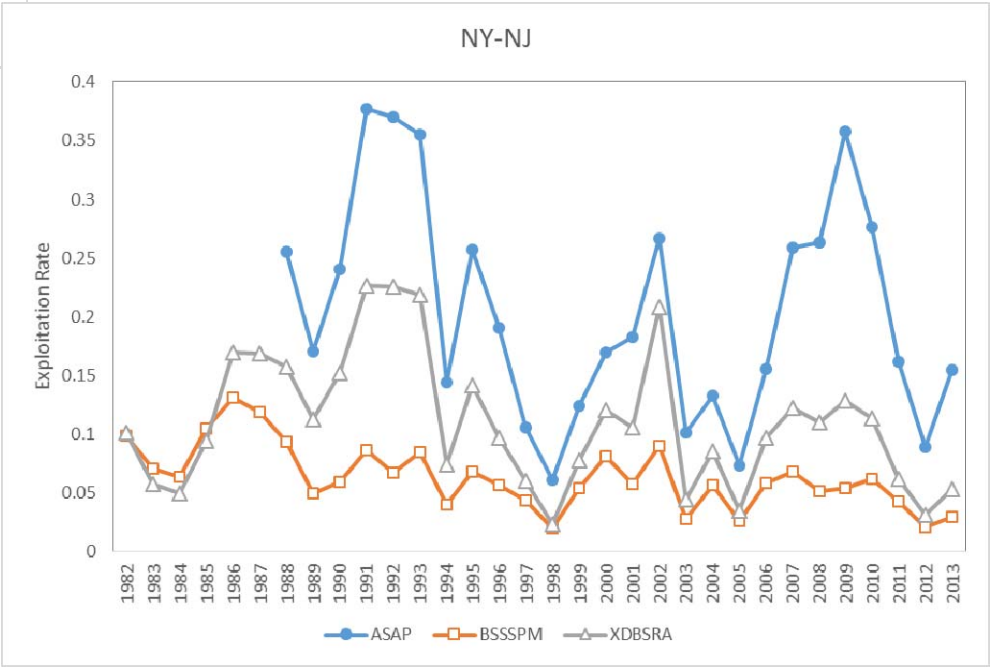
Status Determination:
Overfishing

$U/U_{threshold}$
$F/F_{threshold}$

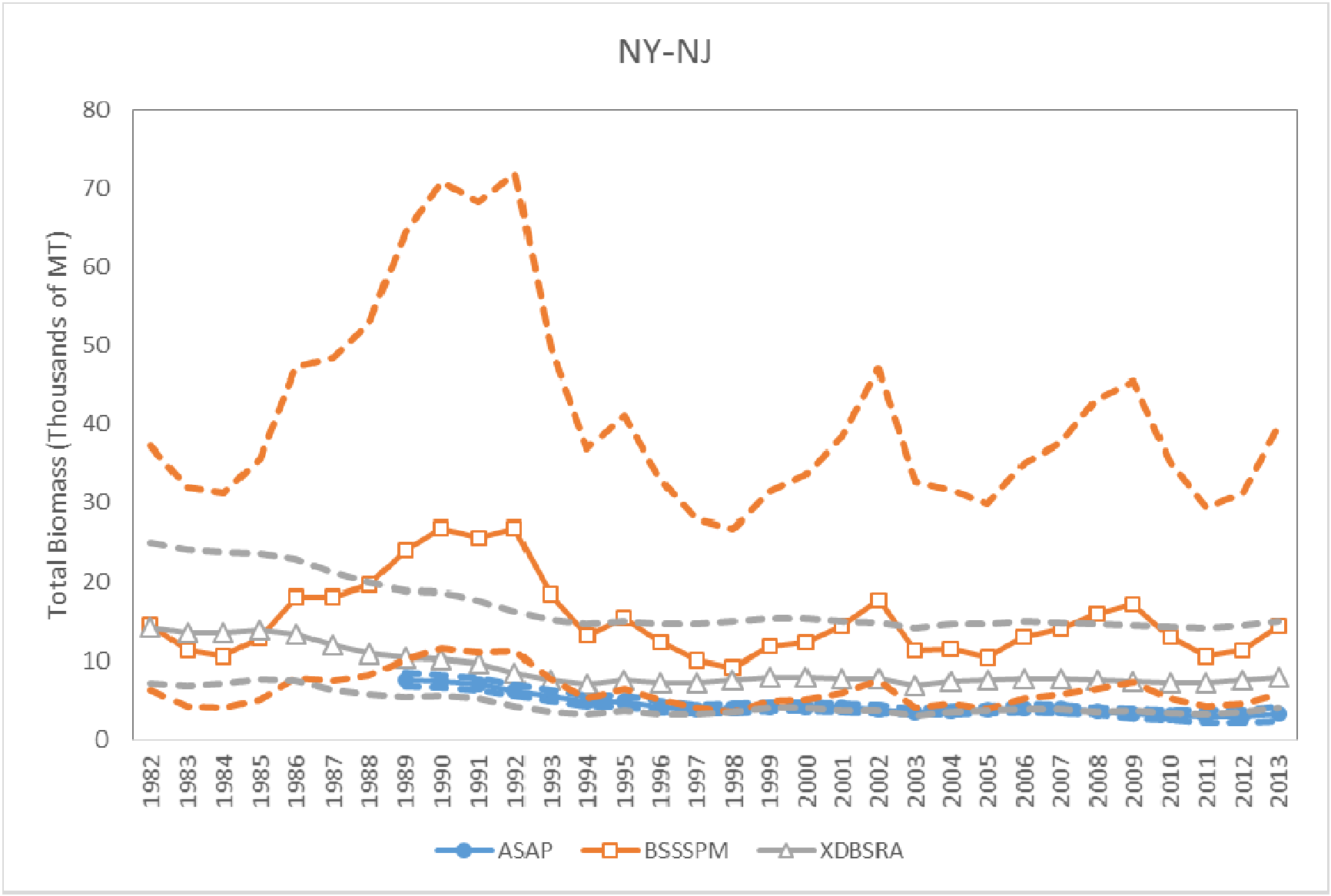
$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{75\% SSBMSY}$

Model Comparisons: NY-NJ

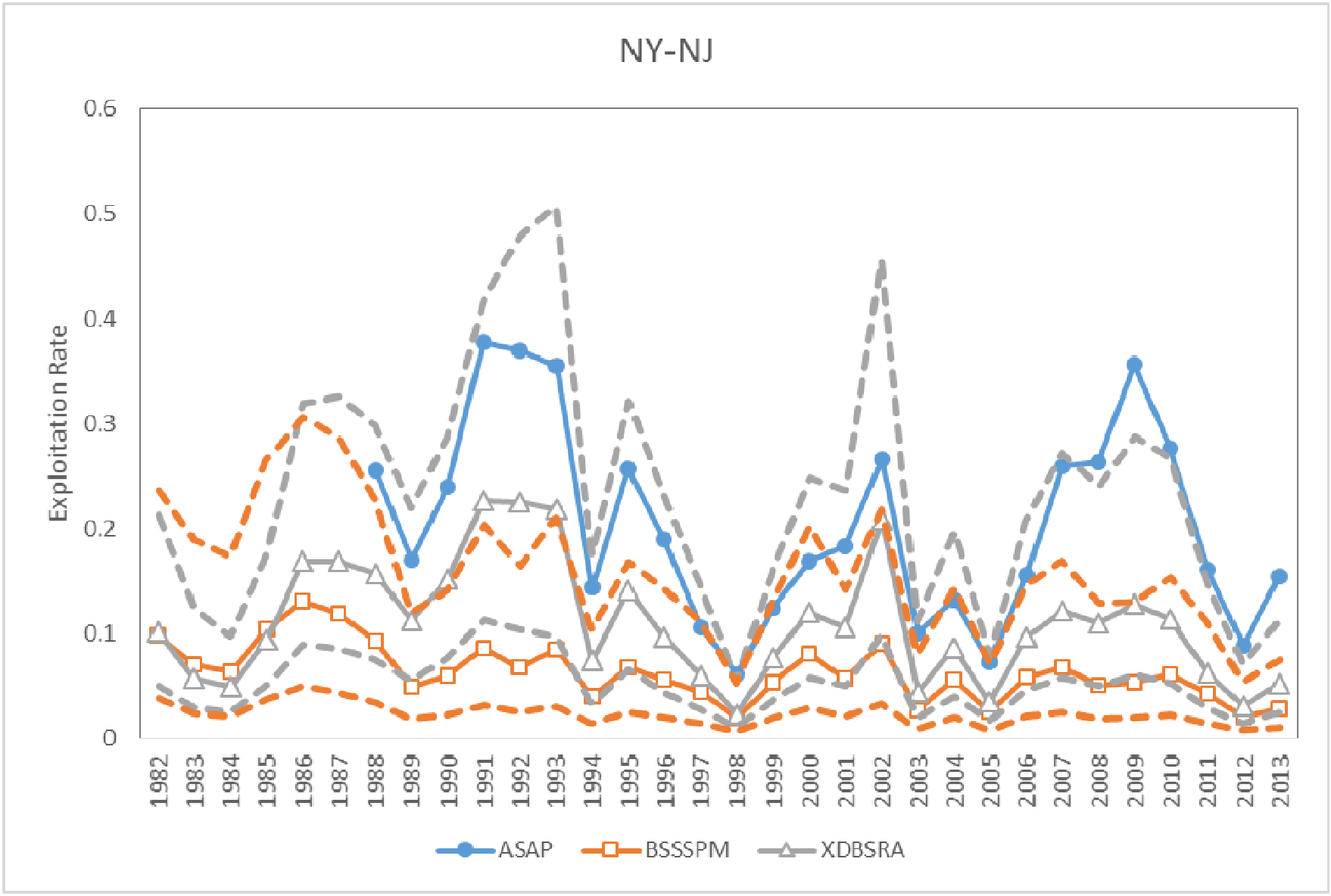




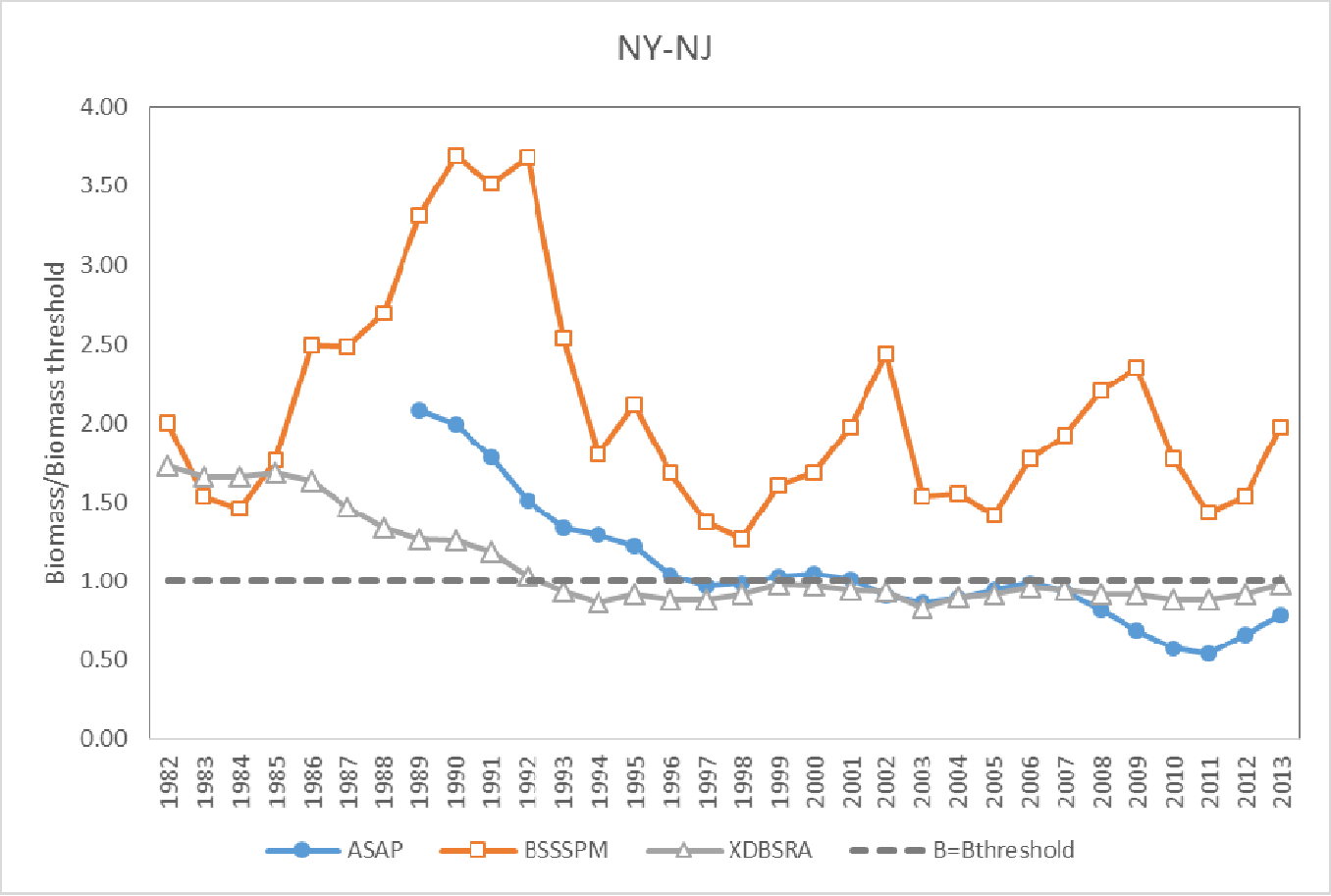
Model Comparisons: NY-NJ



Model Comparisons: NY-NJ



Model Comparisons: NY-NJ



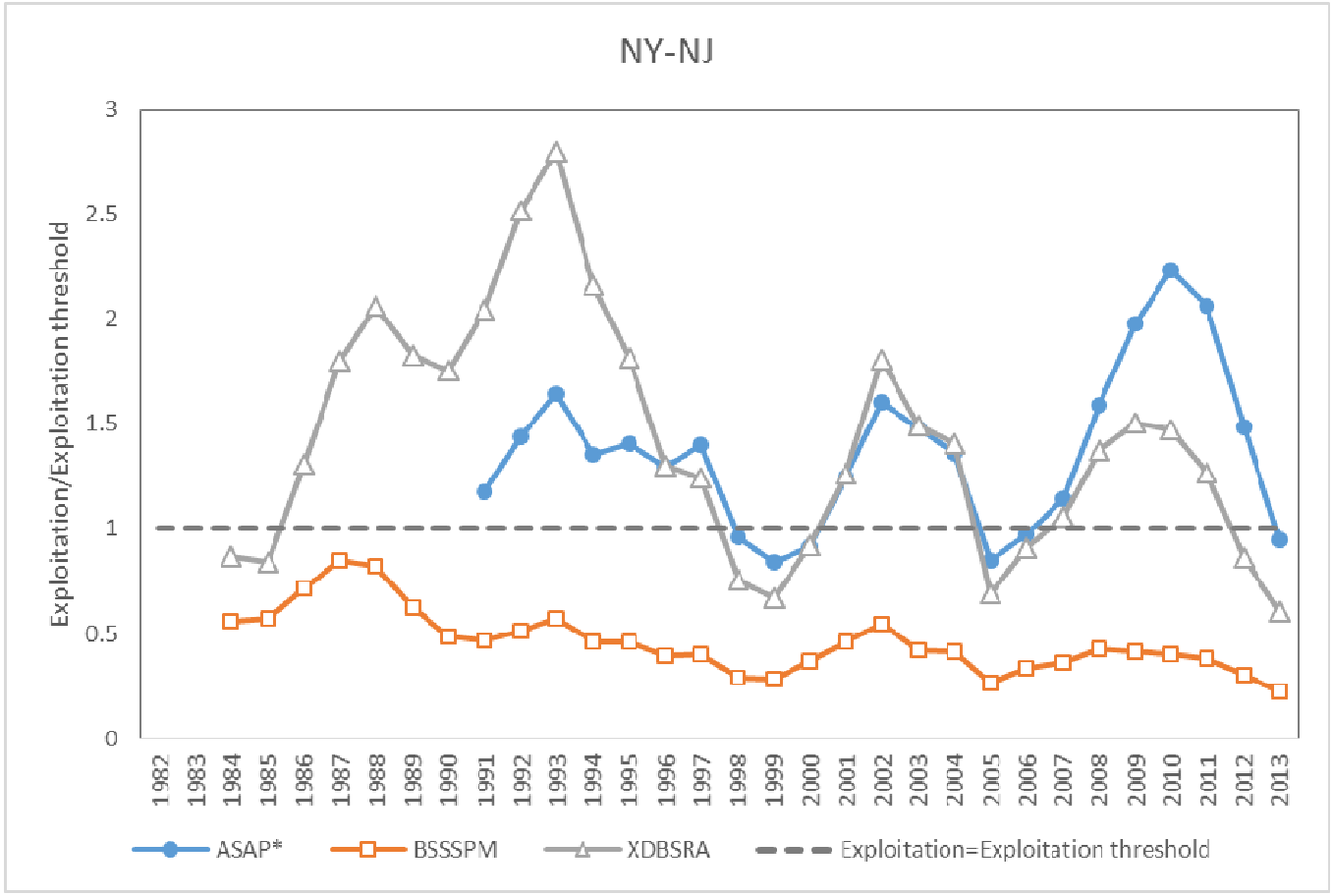
Status Determination:
ASAP + XDBSRA
Overfished

BSSSPM
Not Overfished

$B/B_{threshold}$
$SSB/SSB_{threshold}$

$B_{threshold} = 75\% B_{MSY}$
$SSB_{threshold} = SSB_{30\%SPR}$

Model Comparisons: NY-NJ

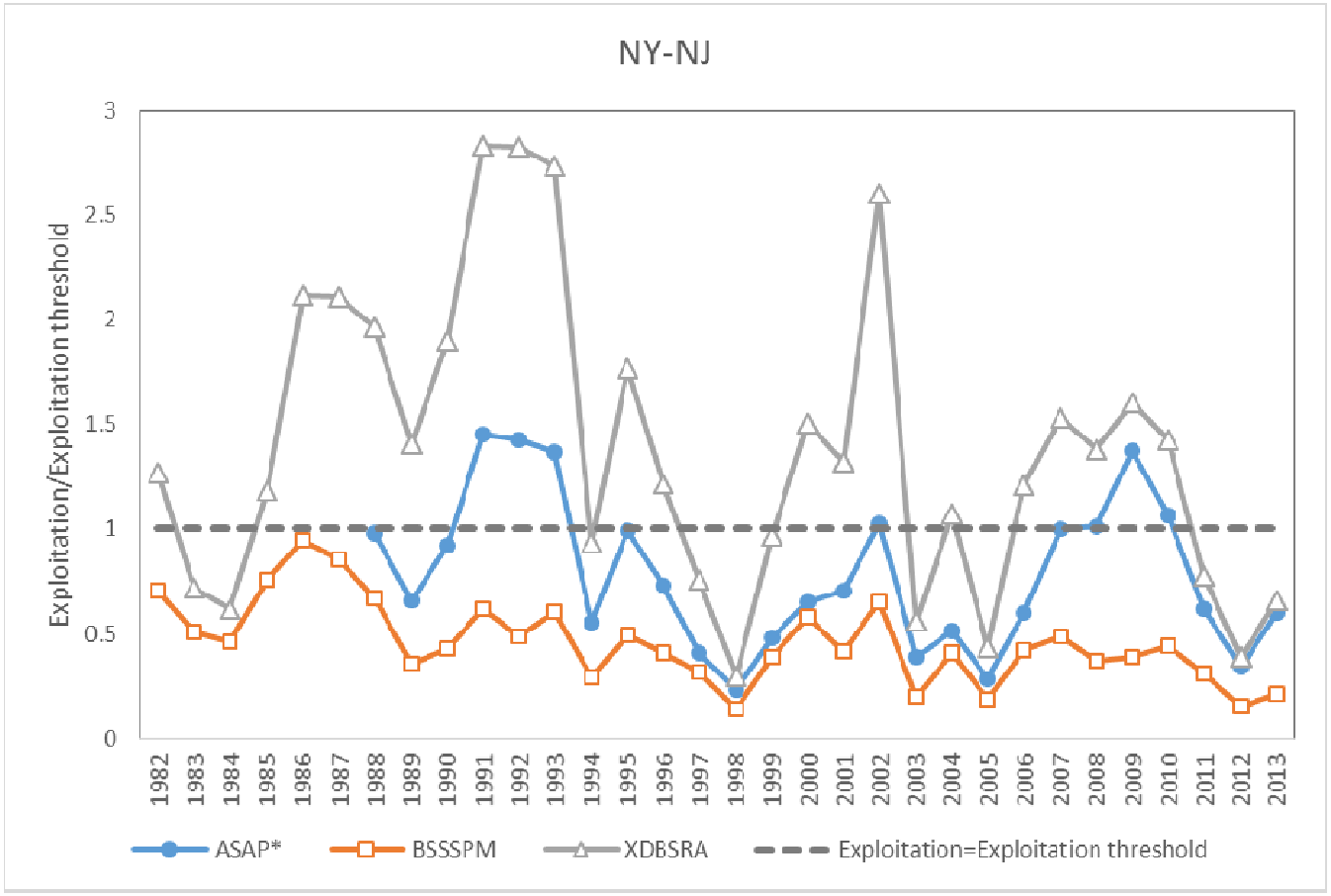


Status Determination:
Not overfishing

3 yr Avg. $U/U_{threshold}$
3 yr Avg $F/F_{threshold}$

$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{30\%SPR}$

Model Comparisons: NY-NJ

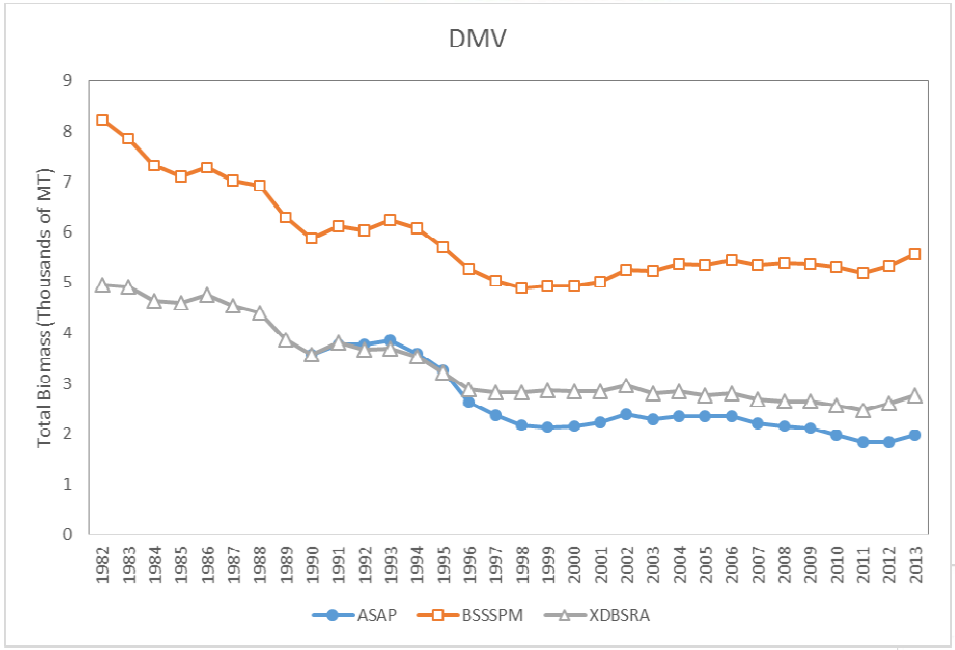


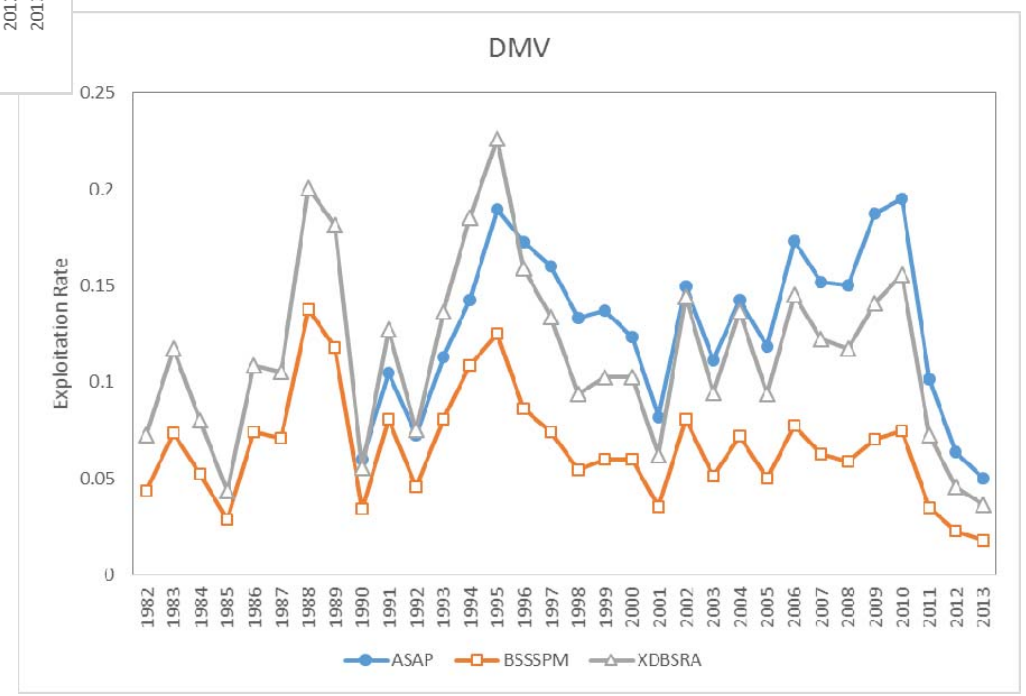
Status Determination:
Not overfishing

$U/U_{threshold}$
$F/F_{threshold}$

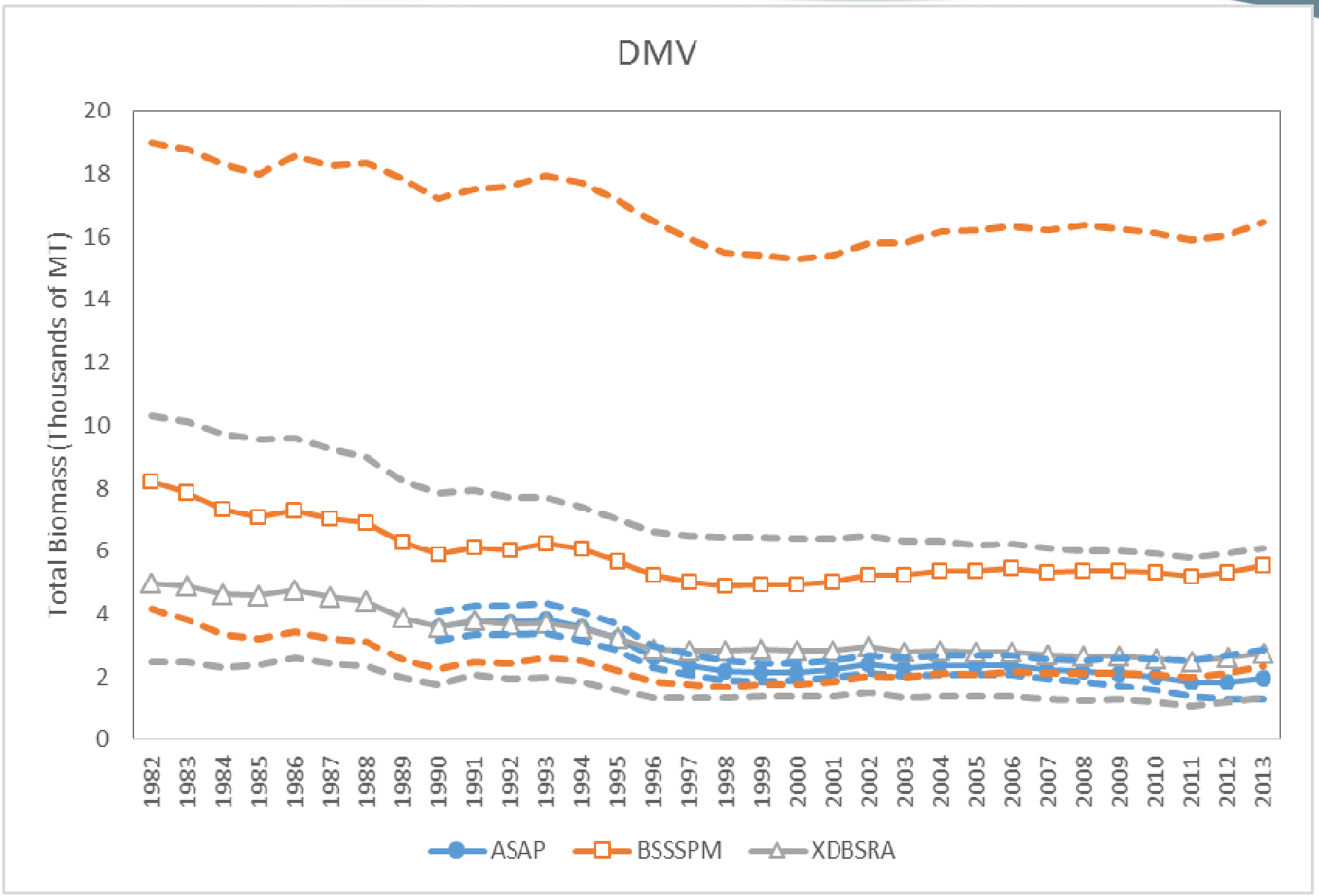
$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{30\%SPR}$

Model Comparisons: DMV

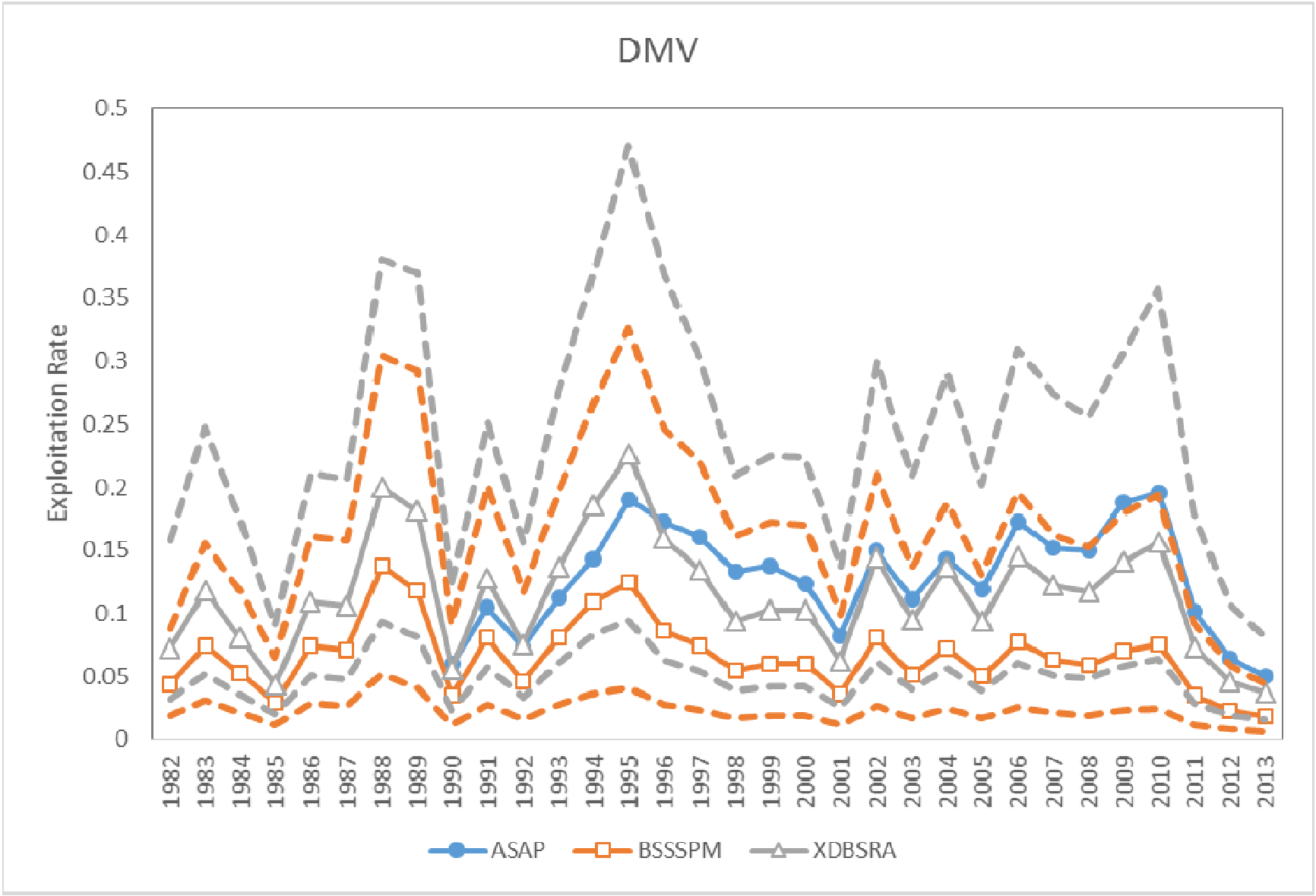




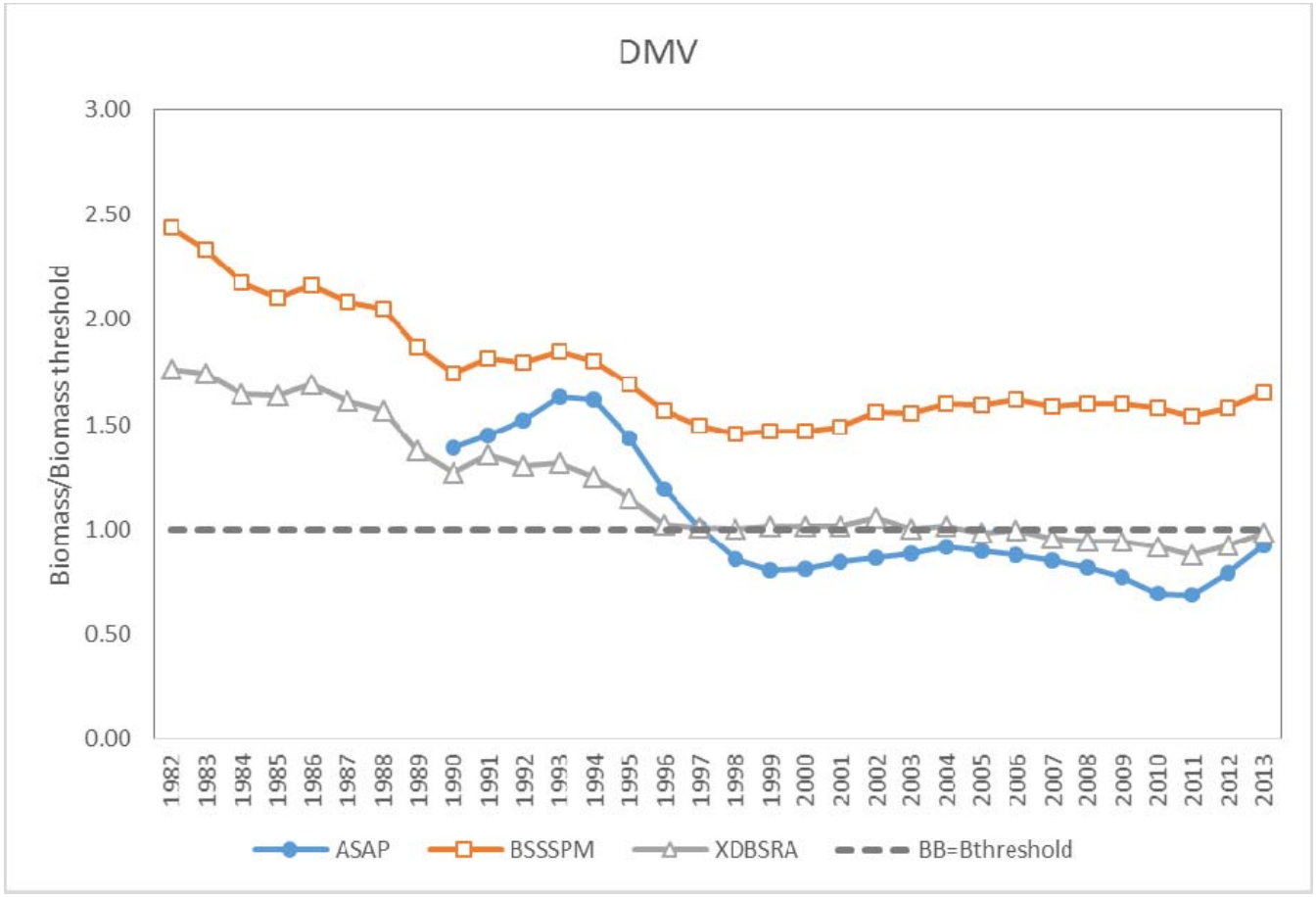
Model Comparisons: DMV



Model Comparisons: DMV



Model Comparisons: DMV



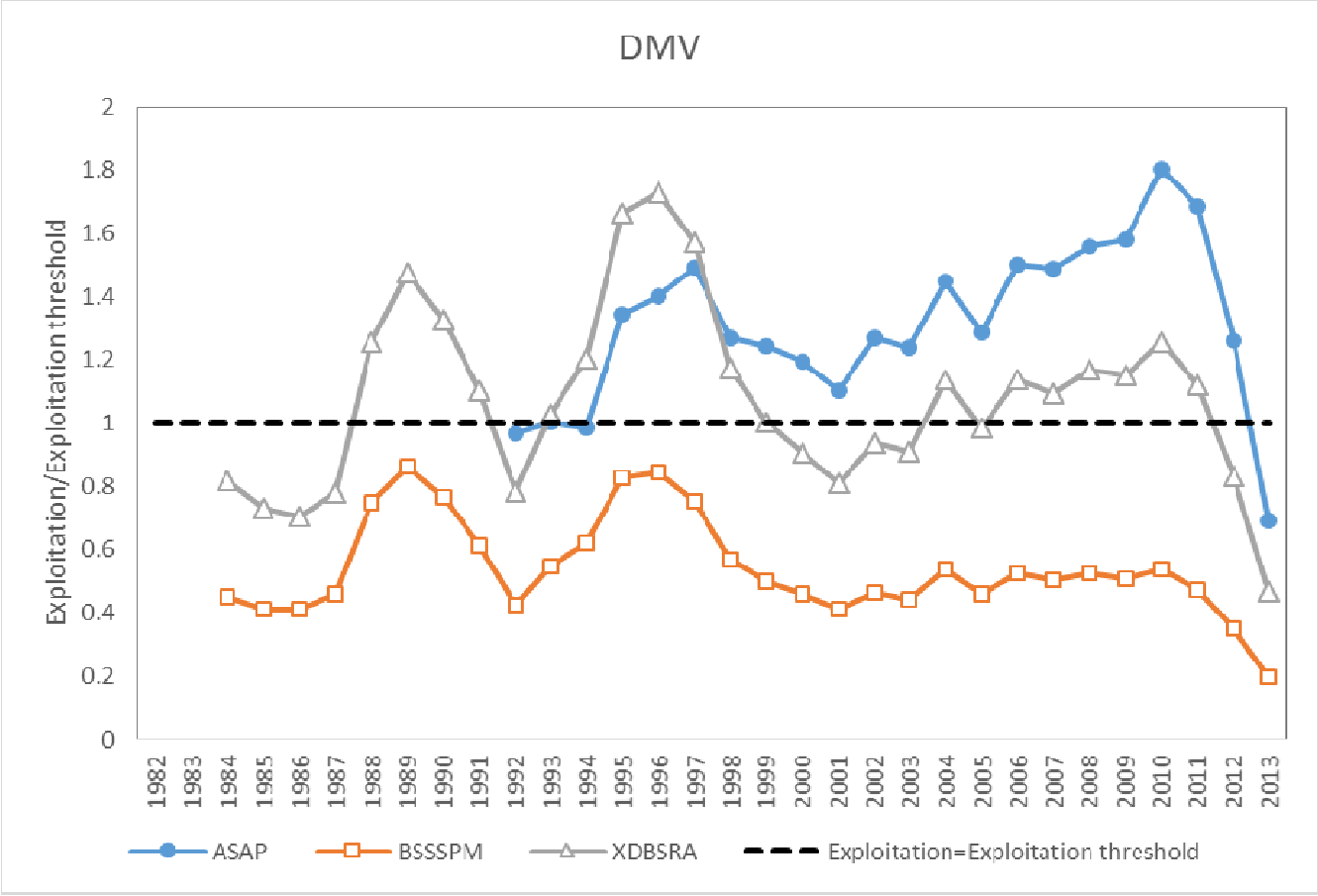
Status Determination:
ASAP + XDBSRA
Overfished

BSSSPM
Not Overfished

$B/B_{threshold}$
$SSB/SSB_{threshold}$

$B_{threshold} = 75\% B_{MSY}$
$SSB_{threshold} = SSB_{30\%SPR}$

Model Comparisons: DMV

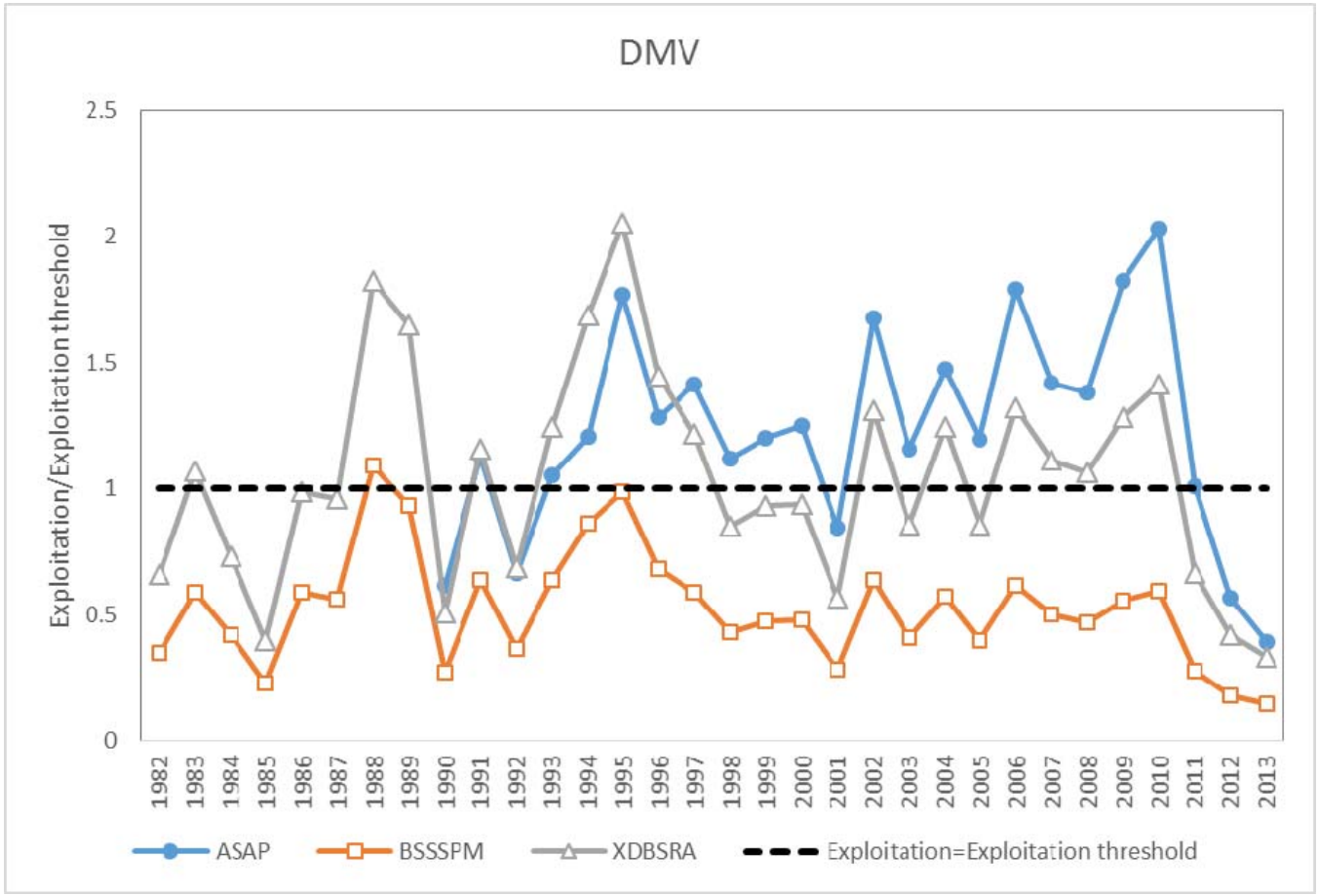


Status Determination:
Not overfishing

3 yr Avg. $U/U_{threshold}$
3 yr Avg $F/F_{threshold}$

$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{30\%SPR}$

Model Comparisons: DMV

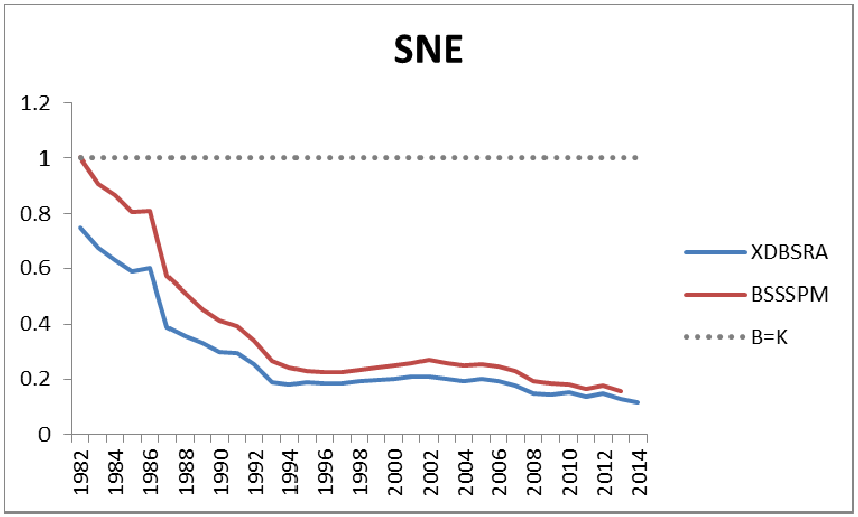


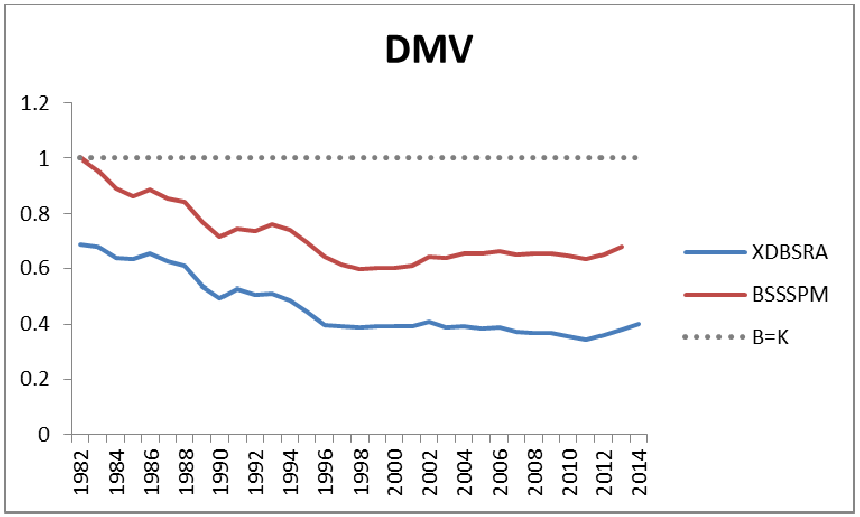
Status Determination:
Not overfishing

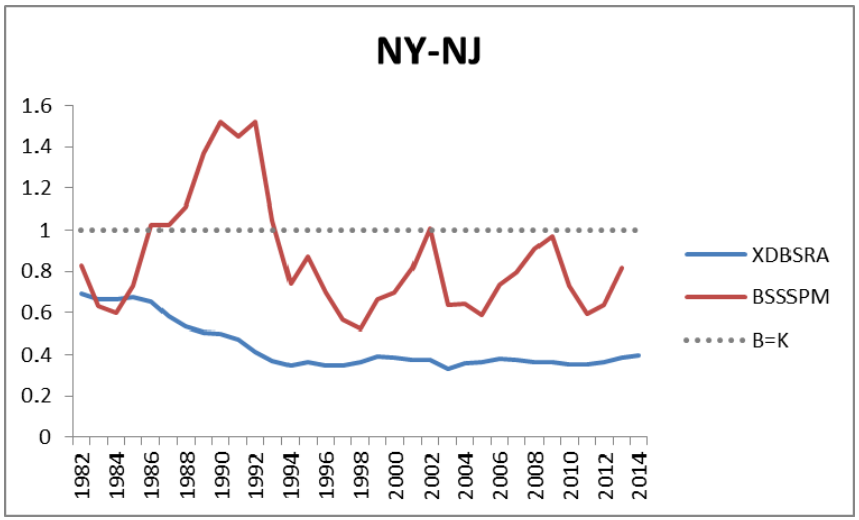
$U/U_{threshold}$
$F/F_{threshold}$

$U_{threshold} = U_{MSY}$
$F_{threshold} = F_{30\%SPR}$

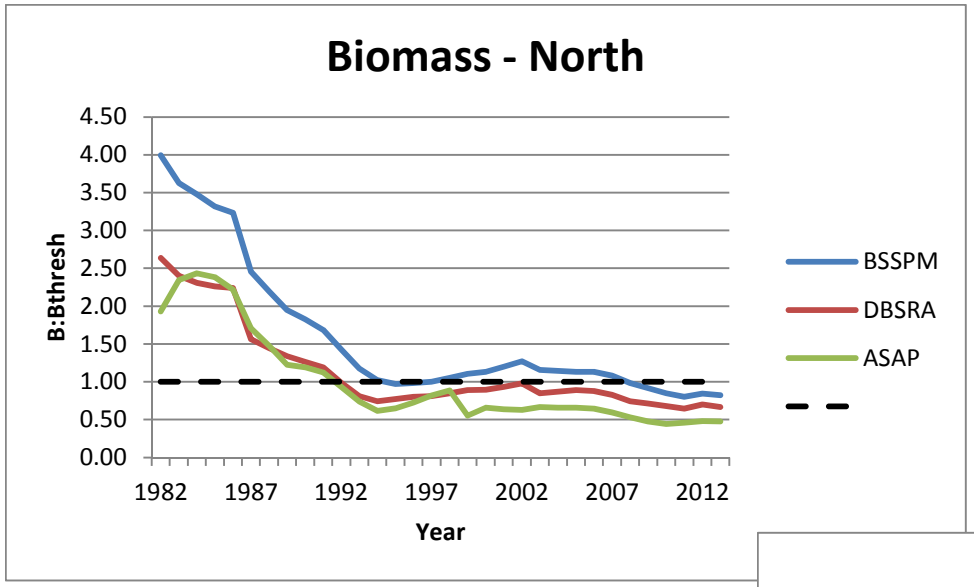
Relative to K

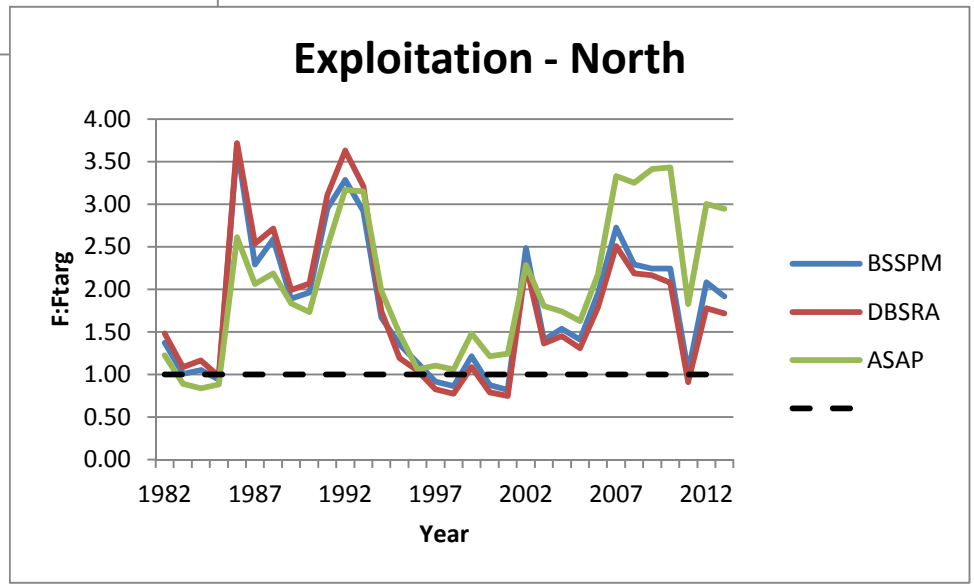




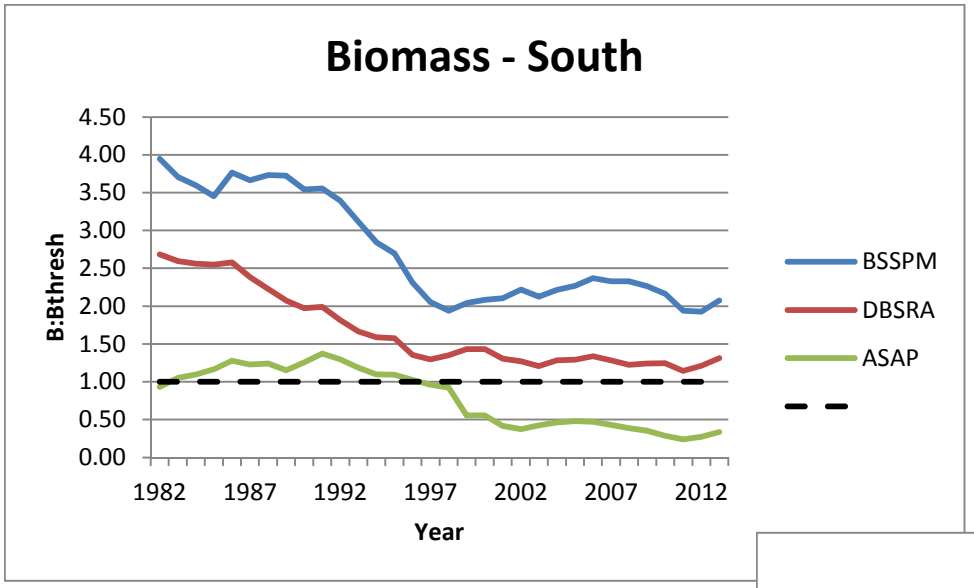


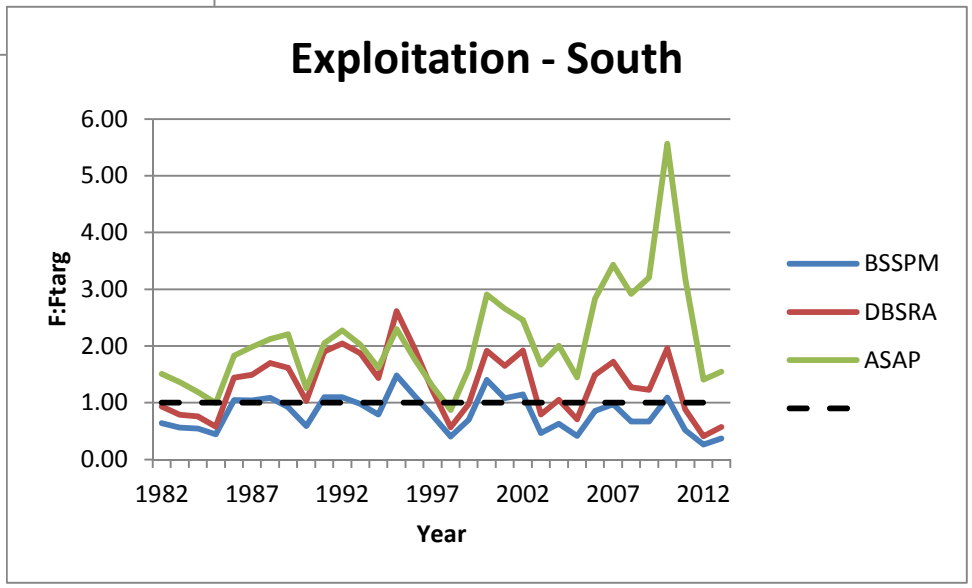
North (MA-NY) region



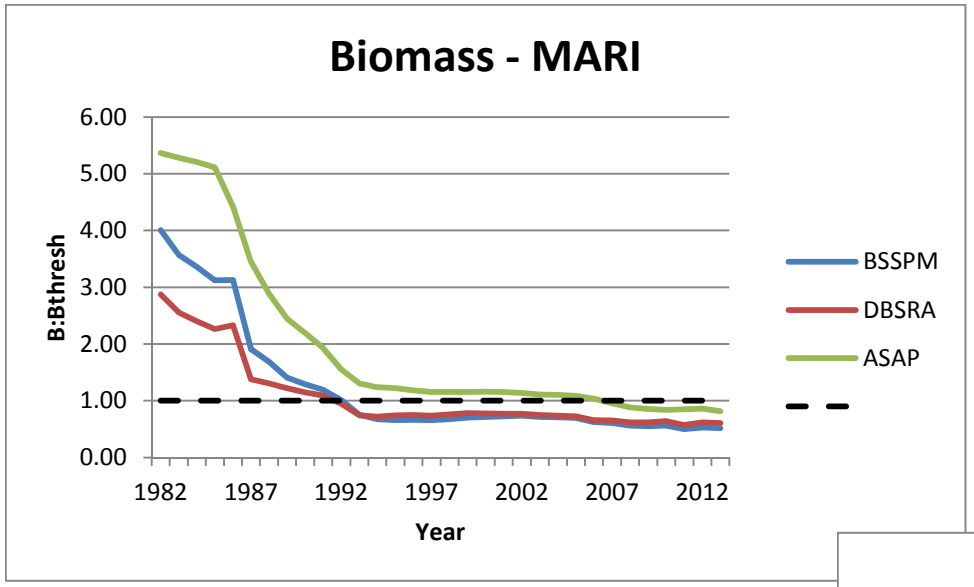


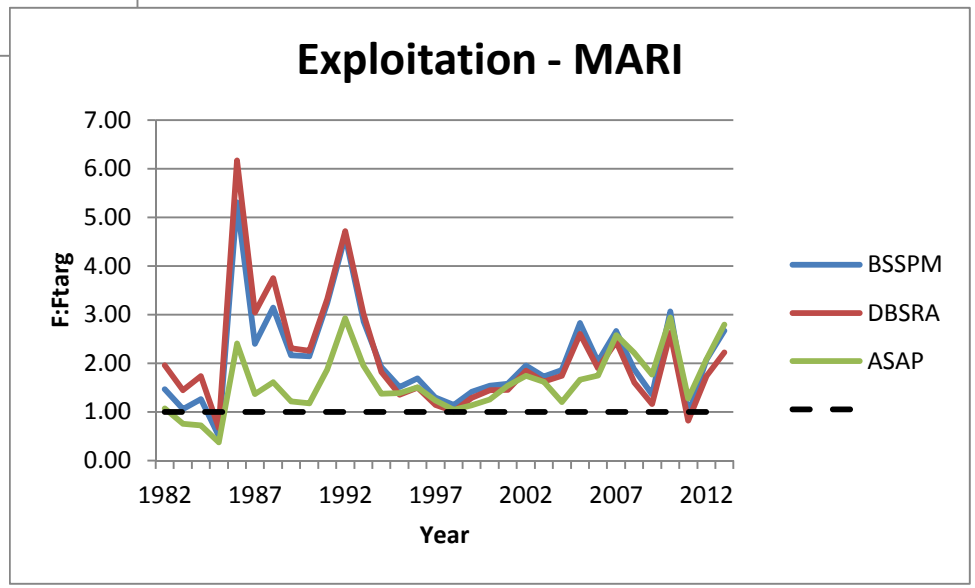
South (NJ-DE) region





MA-RI region


Biomass - MARI
B:Bthresh
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1982
1987
1992
1997
2002
2007
2012
Year
BSSPM
DBSRA
ASAP


Exploitation - MARI
F:Ftarg
7.00
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1982
1987
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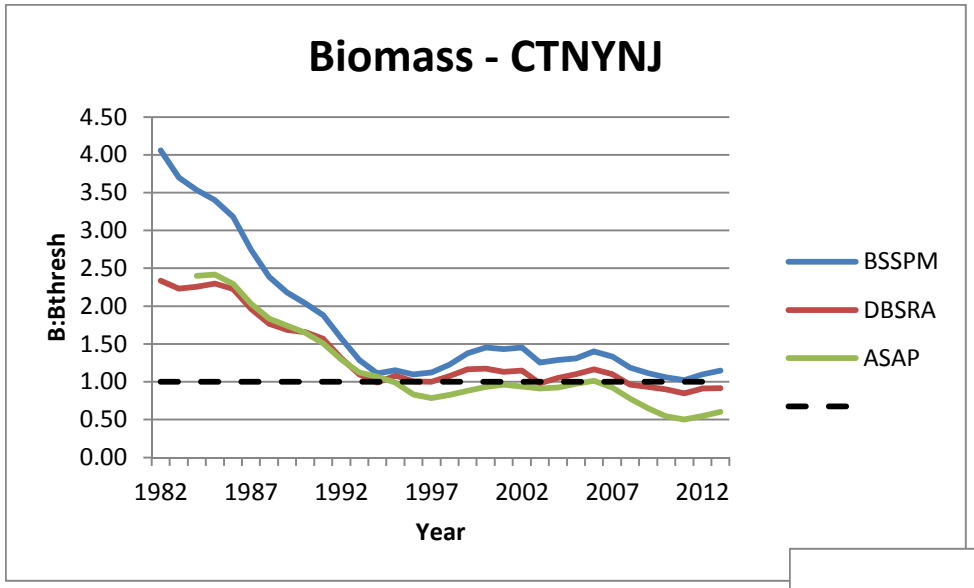
1997
2002
2007
2012
Year
BSSPM
DBSRA
ASAP

CT-NJ region


Biomass - CTNYNJ
B:Bthresh
4.50
4.00
3.50
3.00
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1982
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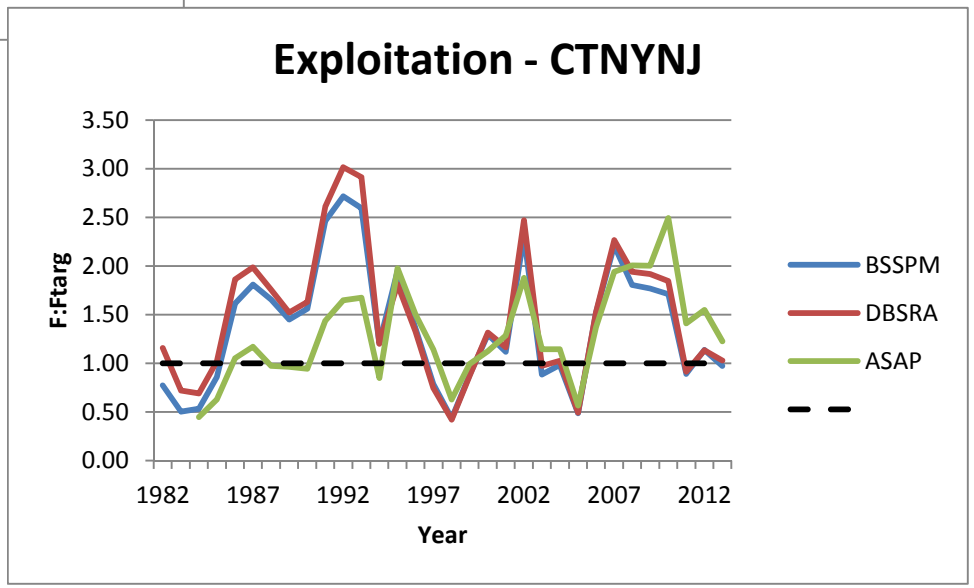
Year
BSSPM
DBSRA
ASAP


Exploitation - CTNYNJ
F:Ftarg
3.50
3.00
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1982
1987
1992
1997
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Year
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ASAP

Tautog
Assessment Peer Review Report

Presented to ASMFC Tautog
Management Board

February 5, 2015

Tautog Assessment Peer Review

1. Tautog Assessment Subcommittee and Technical Committee developed assessment

2. External Peer Review Panel: Chair + 3 Independent Experts

    - Emphasis on reviewing only the science/assessment

3. Panel Product: Stock Assessment Peer Review Report

    Winter Meetings Materials - http://www.asmfc.org/home/2015-winter-meeting

ASMFC Tautog Stock Assessment Review Panel
November 11-14, 2014
Virginia Beach, Virginia

Dr. Cynthia Jones, Panel Chair, Old Dominion University

Dr. Gary Nelson, Massachusetts Division of Marine Fisheries

Dr. Yan Jiao, Virginia Polytechnic University

Dr. Jason Cope, NMFS Northwest Fisheries Science Center

Review Panel Overall Findings

- Panel finds stock assessment acceptable for management use
- Panel agrees with assessing the stocks by region, not coast wide
- Panel conclusions on stock status by region:
  - Southern New England is overfished, overfishing is occurring
  - New York-New Jersey is overfished, overfishing not occurring
  - DelMarVa is overfished, overfishing not occurring

Assessment Terms of Reference

ToR 1: Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:

- Presentation of data source variance (e.g., standard errors).
- Justification for inclusion or elimination of available data sources.
- Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, ageing accuracy, sample size).
- Calculation and/or standardization of abundance indices.

Panel Conclusions:

1. SASC provided a thorough evaluation of all data sources, including fishery-dependent and fisheries-independent data sets.
2. SASC developed 4 criteria for retaining or eliminating data sets that the Review Panel considered reasonable and agreed with how criteria were employed.
3. Review Panel agreed there was evidence of spatial differences in the data and therefore reasonable to use the three regions for assessment and management purposes.
4. Even though MRFSS/MRIP recreational survey estimates are based on low sample sizes, the Review Panel agreed estimates were sufficient for the stock assessment.
5. Review Panel agreed the sample sizes for age-length keys were adequate for development of annual age-length keys (ALKs).
6. Review Panel agreed the standardizations were appropriate for the one fisheries-dependent and four fisheries-independent surveys included in the stock assessment, but concerned the recreational CPUE was the only index available for the DMV region.

ToR 2: Evaluate the assumptions of stock structure and the geographical scale at which the population was assessed.

Panel Conclusions:

1. Review Panel agreed with the 3 region modeling approach as the preferred choice in the assessment
2. There are limited data at fine-scale to support more localized models; recommend collecting such data to improve regional model performances

ToR 3: Evaluate the methods and models used to estimate population parameters (e.g., F, biomass, abundance) at the coastwide and regional basis, including but not limited to:

- Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
- If multiple models were considered, evaluate the analysts' explanation of any differences in results.
- Evaluate model parameterization and specification.
- Evaluate the diagnostic analyses performed, including sensitivity analyses to determine model stability and potential consequences of major model assumptions.

ToR 3

Panel Findings:

ASAP model made the most use of available data, with three major advantages over other models

- use of age structure, indices of abundance, and selectivity estimation

xDB-SRA estimates were similar to ASAP but with greater uncertainty

BSSSP models deviated from other models in trend and absolute biomass and was not age-structured

Review Panel endorsed the use of the ASAP model

ToR 4: Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

<u>Panel Findings:</u>

Largest sources of uncertainty are the quality of the recreational catch history, lack of catch data before the 1980s, and low biological sampling.

The Panel agreed with the methods used for characterizing uncertainty

- ASAP Monte Carlo Markov Chain runs (MCMCs)
- xDB-SRA Sampling Importance Resampling (SIR)
- BSSSP Gibbs sampling

ToR 5: Evaluate the best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative methods/measures.

Panel Findings:

The Panel agreed that the regional ASAP model results provided the best estimates. The SNE and NY-NJ regions show a decline in abundance/biomass with a slight increase in the past 2 years; the DMV also has a declining trend but less severe.

The Panel found that this assessment is a significant advance since the previous assessment.

ToR 6: Evaluate the choice of biological or empirical reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.

<u>Panel Findings:</u>

The new reference points should be used and the Panel agrees with the stock determinations.

The SNE stock is overfished and overfishing is occurring. The NY-NJ and DMV stocks are overfished but overfishing is not occurring.

ToR 7: Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

Panel Recommendations:

The Panel agrees that the recommendations provided by the SASC are needed to improve future assessments.

Additional recommendations are:

- Obtain biological metrics to match the spatial scale of the proposed models, to determine if there is biological justification for such models.
- Develop an alternative flexible selectivity curve to use in the stock assessment model given the characteristics of multiple gear types in the tautog fisheries.
- Collect otoliths in addition to opercula from individual fish; invest in otolith
- microchemical analyses and next-generation sequencing to resolve finer-scale
- spatial issues.
- Consider using alternative catch-at-age modeling frameworks (e.g., Stock
- Synthesis) in order to overcome some constraints of the ASAP model in the NMFS Toolbox. Simpler methods, such as xDB-SRA, can also be performed in Stock Synthesis, providing a common modeling framework to develop and compare different models and their specifications.

ToR 8: Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.

<u>Panel Recommendations:</u>

An assessment update is suggested in another year to check the change of the fishery and population status and the appropriateness of the recommended BRPs from the 3 region- scale models.

The next benchmark assessment may be done in 3 years or sooner depending on the results of the update.

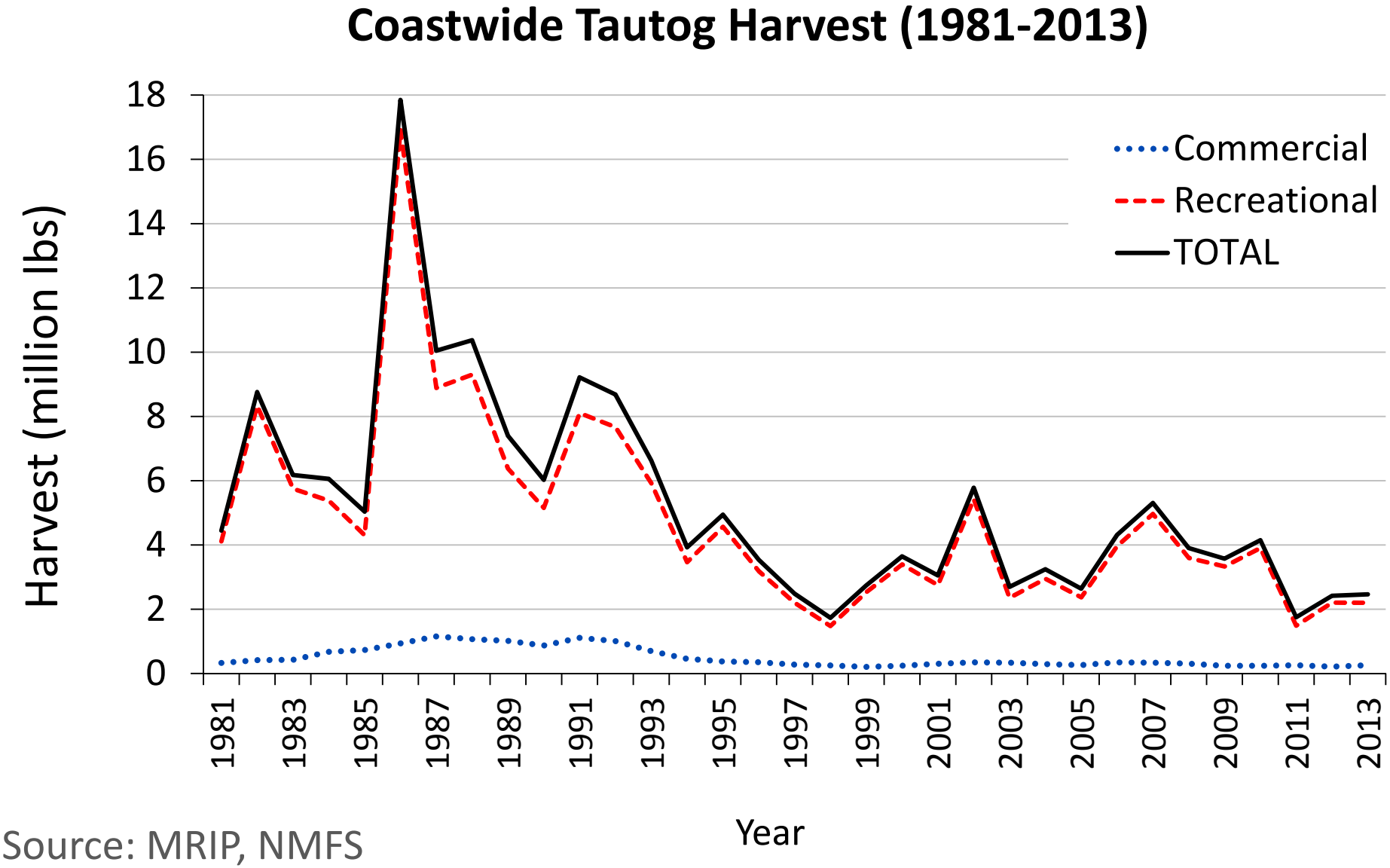
Review Panel Overall Findings

- Data used in the stock assessment were appropriate and well considered. Although there are limitations to the catch history, it provides sufficient quality for use in an age-structured model.
- Of the models evaluated, ASAP provides estimates with the best properties (age-structure; abundance and biomass measures; less uncertainty).
- The use of regional models is acceptable.
- The BRPs are appropriate but because there are difference between the cumulative regional SSB_{BPR} and coastwide, these should be used with precaution.
- The SNE stock is overfished and overfishing is occurring. The NY-NJ and DMV stocks are overfished but overfishing is not occurring.

Review of the Tautog FMP and State Compliance 2013 Fishing Year

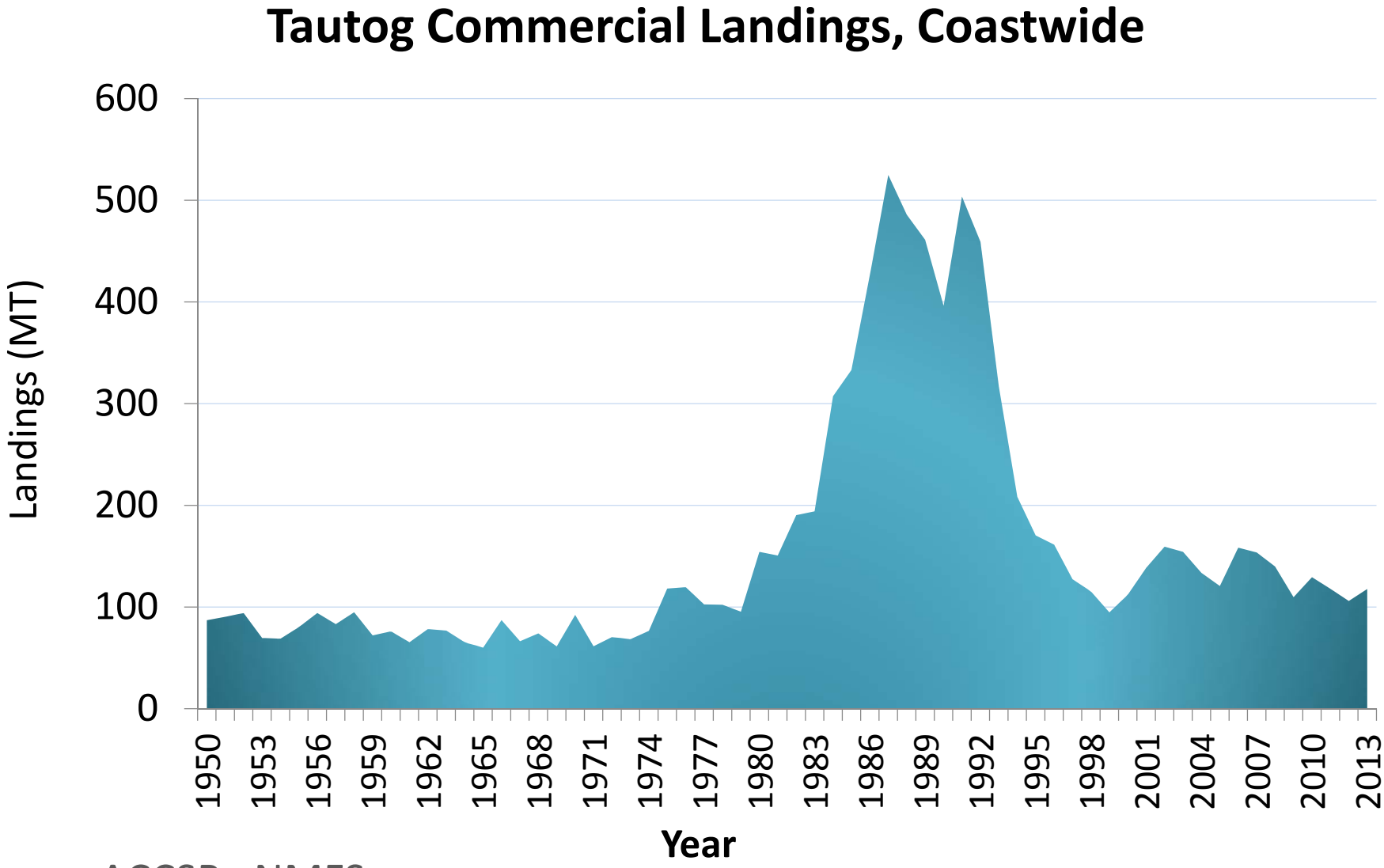
Presented to the
ASMFC Tautog Management Board
February 5, 2015

Status of the Fishery



Source: MRIP, NMFS

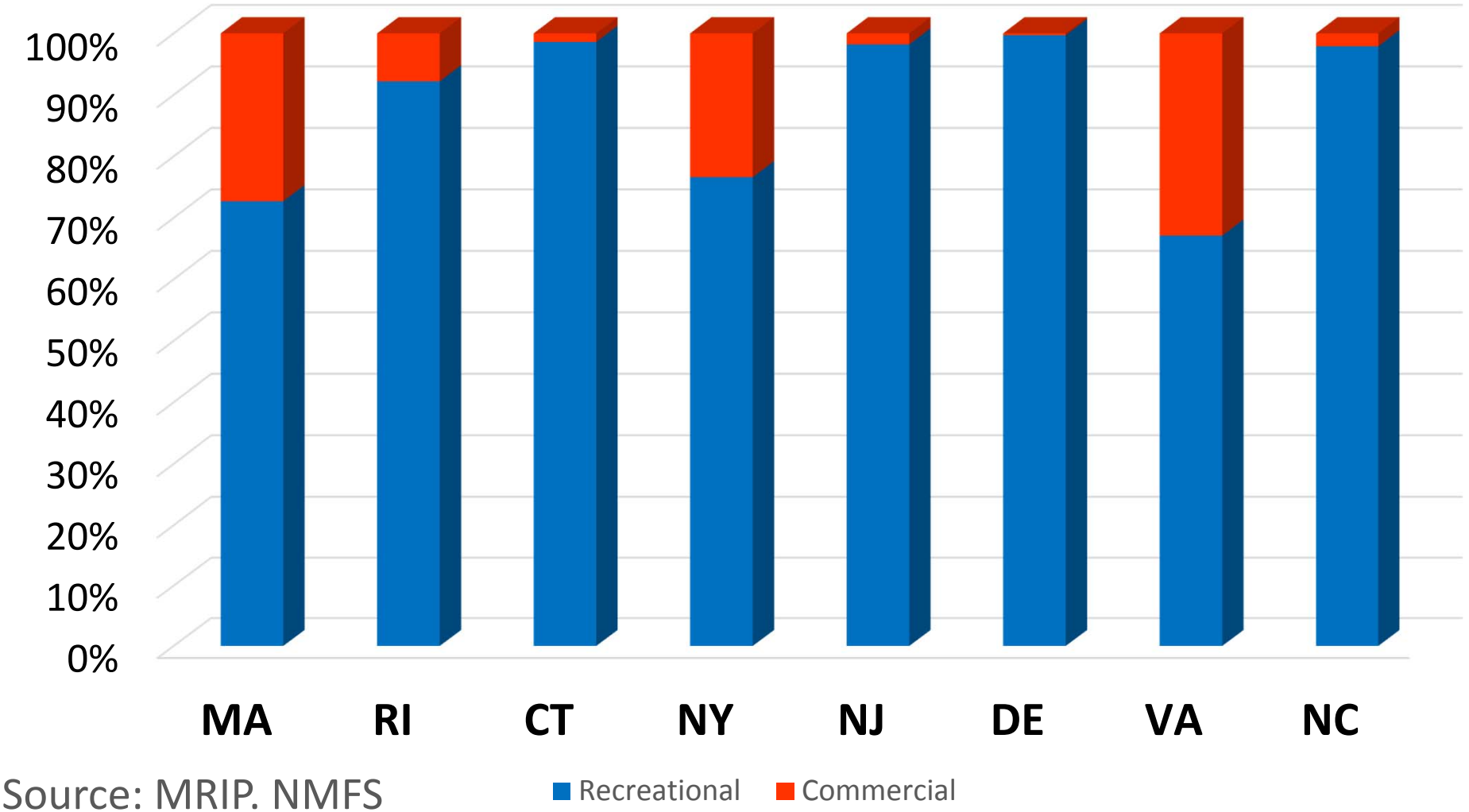
Commercial Fishery



Source: ACCSP , NMFS

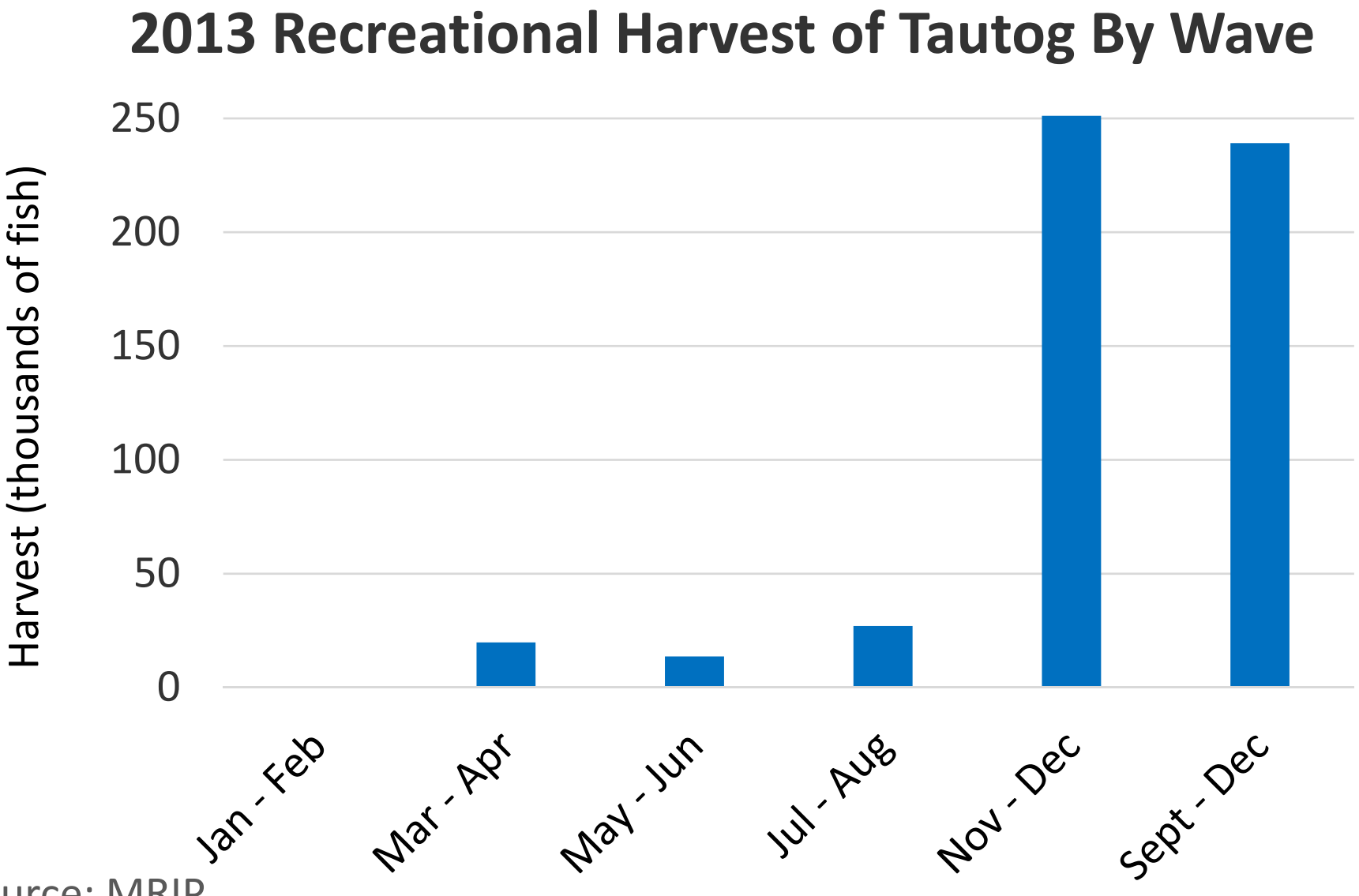
Status of the Fishery

Proportion of Recreational to Commercial Landings



Source: MRIP. NMFS

Status of the Fishery



Source: MRIP

Status of Management

1996: FMP

1997: Addendum I

1999: Addendum II

2002: Addendum III

2007: Addenda IV and V

2011: Addendum VI

- Set $F_{target} = 0.15$
- Required a coastwide 39% reduction

Management Measures

- **Commercial and Recreational**
  - ☑ 14” minimum size limit
  - ☑ Biodegradable fasteners on fish traps/pots
  - ☑ Monitoring and data collection
  - ☑ Possession limits
  - ☑ Seasonal closures

✓ **Plan Review Team finds that all states had management programs consistent with the FMP.**

Biological Sampling

- Plan-specific requirements:
  All states must collect 200 opercula for ageing.
  - **MA, RI, CT, NJ, DE, and VA collected 200+ samples. NY collected 195.**
  - **MD collected 165 from charter boat captains.**

✓ **PRT finds that all states met, or tried to meet, biological sampling requirements of FMP.**

Request for *De minimis* Status

- **Amendment 1**
  - **Criteria: commercial landings is less than 1% of coastwide landings or 10,000 pounds, whichever is greater.**
- **DE** and **NC** requests *de minimis* status

☑ **PDT recommends granting *de minimis* status**

- **DE commercial landings = 2,302 lbs**
- **NC commercial landings = 205 lbs**