SEDAR 22 Gulf of Mexico Yellowedge Grouper and Tilefish

Guidelines for submitting written public comment

The intent of public comment is to allow interested parties the opportunity to address the draft reports of a SEDAR stock assessment before the report and assessment go to the Review Panel. Comments received will be reviewed by the appointed assessment panel and responded to as appropriate. The assessment panel reserves the right to make changes to the draft report in response to comments received. **These documents are a draft documents. Content and formatting may change between this draft and the version that will be released to the Review Panel on February 1st, 2011.**

The comment period will be open from 23 November 2010, to 14 December 2010. All comments must be in writing and submitted via US mail, fax, or by email to the appropriate address indicated below; comments sent by US mail must be postmarked by December 14, 2010. Comments will not be accepted by phone. Any comments received after **December 14, 2010** will not be forwarded to the panel. Please clearly indicate that you are commenting on the "SEDAR 22 Assessment reports" in your correspondence. Please indicate which species you are commenting on: yellowedge grouper or tilefish.

Comments for the SEDAR 22 Gulf of Mexico Yellowedge Grouper and Tilefish stock assessments may be submitted to the following:
Email: Sedar22comments@safmc.net Fax: (843) 769-4520

Address:
SEDAR 22 AW Comments -
4055 Faber Place Dr., Suite 201
North Charleston, SC 29405

When preparing comments for submission please keep the following guidelines in mind:

1. **Relevancy**. Please keep your comments concise and relevant to the assessment documents presented for comment.

   a) Target specific issues,

   b) Include data and facts with references,

   c) Propose specific ideas or suggestions for solving any problems you identify,

   d) Please comment on the assessment decisions and inputs that lead to the results, not on the results of the assessment.

2. **No personal or slanderous remarks**. Please be respectful and avoid personal attacks.

3. Comments should be directed to 'SEDAR 22 Assessment Panel' not to individual panel members.

4. You may submit comments anonymously.

5. All comments are considered public documents in compliance with open meeting and public record laws. All public documents will be available to the general public.

SEDAR

Southeast Data, Assessment, and Review

SEDAR 22
Pre-Review Stock Assessment Report

Gulf of Mexico Tilefish

November 2010

SEDAR
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

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SECTION I: Introduction

SEDAR
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

1. SEDAR PROCESS DESCRIPTION

SouthEast Data, Assessment, and Review (**SEDAR**) is a cooperative Fishery Management Council process initiated in 2002 to improve the quality and reliability of fishery stock assessments in the South Atlantic, Gulf of Mexico, and US Caribbean. SEDAR seeks improvements in the scientific quality of stock assessments and the relevance of information available to address fishery management issues. SEDAR emphasizes constituent and stakeholder participation in assessment development, transparency in the assessment process, and a rigorous and independent scientific review of completed stock assessments.

SEDAR is managed by the Caribbean, Gulf of Mexico, and South Atlantic Regional Fishery Management Councils in coordination with NOAA Fisheries and the Atlantic and Gulf States Marine Fisheries Commissions. Oversight is provided by a Steering Committee composed of NOAA Fisheries representatives: Southeast Fisheries Science Center Director and the Southeast Regional Administrator; Regional Council representatives: Executive Directors and Chairs of the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils; and Interstate Commission representatives: Executive Directors of the Atlantic States and Gulf States Marine Fisheries Commissions.

SEDAR is organized around two workshops and a series of webinars. First is the Data Workshop, during which fisheries, monitoring, and life history data are reviewed and compiled. The second stage is the Assessment Process, which is conducted via a series of webinars, during which assessment models are developed and population parameters are estimated using the information provided from the Data Workshop. Third and final is the Review Workshop, during which independent experts review the input data, assessment methods, and assessment products. The completed assessment, including the reports of all 3 workshops and all supporting documentation, is then forwarded to the Council SSC for certification as 'appropriate for management' and development of specific management recommendations.

SEDAR workshops are public meetings organized by SEDAR staff and the lead Council. Workshop participants are drawn from state and federal agencies, non-government organizations, Council members, Council advisors, and the fishing industry with a goal of including a broad range of disciplines and perspectives. All participants are expected to contribute to the process by preparing working papers, contributing, providing assessment analyses, and completing the workshop report.

SEDAR Review Workshop Panels consist of a chair, 3 reviewers appointed by the Center for Independent Experts (CIE), and three reviewers appointed from the SSC of the Council having jurisdiction over the stocks being assessed. The Review Workshop Chair is appointed by the Council from their SSC. Participating councils may appoint additional representatives of their SSC, Advisory, and other panels as observers.

2. MANAGEMENT OVERVIEW

2.1 *FISHERY MANAGEMENT PLAN AND AMENDMENTS*

The following summary describes only those management actions that likely affect tilefish fisheries and harvest

Original GMFMC FMP

The Fishery Management Plan (FMP) for the reef fish fishery of the Gulf of Mexico was implemented in November 8, 1984. This plan is for the management of reef fish resources under authority of the Gulf of Mexico Fishery Management Council Management Council. The plan considers reef fish resources throughout its range from Florida through Texas. The area which will be regulated by the federal government under this plan is confined to the waters of the fishery conservation zone (FCZ). The FCZ estimated area is 6.82×10^5 km ^{2} (263,525 square miles) and of that 12.4% of it is estimated as part of the continental shelf that is encompassed within the FCZ. Tilefish species of the genus *Caulolatilus*, plus the great northern tilefish (also known as golden tilefish or simply tilefish) (*Lopholatilus chamaeleonticeps*), were listed in the original Reef Fish FMP in 1981 as "Species included in the Fishery but Not in the Management Unit". Species on this list were included in the FMP for purposes of data collection. They were considered to be species that were not normally targeted, but were taken incidentally to the directed fishery. One additional tilefish species found in the Gulf of Mexico, the sand tilefish (*Malacanthus plumieri*) was not listed. This species is generally considered to be a shallow-water species inhabiting sand and rubble bottoms near reefs and grass beds (FishBase[1]), but it has also been reported to occur in Pulley Ridge in depths of 196 feet or deeper (USGS[2]).

The four objectives of the FMP were: (1) to rebuild the declining reef fish stocks wherever they occur within the fishery, (2) establish a fishery reporting system for monitoring the reef fish fishery, (3) conserve reef fish habitats and increase reef fish habitats in appropriate areas and to provide protection for juveniles while protecting existing new habitats, (4) to minimize conflicts between user groupers of the resource and conflicts for space.

[1] http://fishbase.org
[2] http://coastal.er.usgs.gov/pulley-ridge/

Amendment 1 (EA/RIR/IRFA), implemented in 1990, added the tilefish (*Lopholatilus chamaeleonticeps*) and the tilefish of the genus *Caulolatilus* to the management unit, listing the four *Caulolatilus* species by name: goldface tilefish, blackline tilefish, anchor tilefish, and blueline tilefish. This meant that tilefish (other than sand tilefish) were now subject to permit requirements and other requirements of the Reef Fish FMP. However, no tilefish specific management measures were implemented.

Amendment 12, including EA, RIR and IRFA, implemented in January 1997, established a recreational aggregate bag limit of 20 reef fish for reef fish species not otherwise subject to a bag limit, including tilefish.

Measures in the original FMP that would have affected permits and gear specifications for fish traps along with a limit on the number of fish traps allowed per vessel, establishment of a stressed area within which the use of fish traps, roller trawls, and powerheads for the taking of reef fish was prohibited, and a prohibition on the use of poison or explosives for taking reef fish.

GMFMC FMP Amendments affecting tilefish

Description of Action	FMP/Amendment	Effective Date
Following species were placed in the Fishery Management Plan: *Caulolatilus spp.*, plus the great northern tilefish (also known as golden tilefish or simply tilefish) (*Lopholatilus chamaeleonticeps*)	Original FMP	1981
Following species were added: goldenface tilefish, *Caulolatilus chrysops*, blackline tilefish, *Caulolatilus cyanops*, anchor tilefish, *Caulolatilus intermedius*, and blueline, *Caulolatilus microps*), (1)Established 20-50 fathom buoy/longline gear boundary (2) Established a commercial reef fish vessel permit (3) Established fish trap permits, 100 traps per person (4) Established fishing season January 1-December 31 (5)Established a framework for setting total allowable catch	Amendment 1 (GMFMC 1990)	2/21/90
Set a three-year moratorium on issuance of new commercial reef fish permits	Amendment 4 (GMFMC 1992)	5/8/92
Established reef fish dealer permitting and record	Amendment 7	2/7/94

keeping requirements, allowed transfer of fish trap permits, and endorsements between immediate family members during the fish trap moratorium, and allowed transfer of other reef fish permits or endorsements in the event of death or disability of the person who was the qualifier for the permit or endorsement.	(GMFMC 1994)	
(1) Limit sale of Gulf reef fish by permitted vessels to permitted reef fish dealers,(2) require that permitted reef fish dealers purchase reef fish caught in Gulf federal waters only from permitted vessels, (3) allow transfer of reef fish permits and fish trap endorsements in the event of death of disability, (4) implement a new reef fish permit moratorium for no more than 5 years or until 12/31/00, (5) allow permit transfers to other persons with vessels by vessel owners (not operators) who qualified for their reef fish permit, and (6) allow a onetime transfer of existing fish trap endorsements to permitted reef fish vessels whose owners have landed reef fish from fish traps in federal waters, as reported on logbooks received by the science and research director of NMFS from 11/20/92 through 2/6/94.	Amendment 11 (GMFMC 1996)	1/1/96
Established 20 reef fish aggregate bag limit	Amendment 12 (GMFMC 1995)	1997
Ten year phase-out for the fish trap fishery in the EEZ; allowed transfer of fish trap endorsements for the first two years and thereafter only upon death or disability of the endorsement holder, to another vessel owned by the same entity, or to any of the 56 individuals who were fishing traps after 11/19/92 and were excluded by the moratorium; and prohibited the use of fish traps west of Cape San Blas, Florida.	Amendment 14 (GMFMC 1997)	4/24/97
Prohibit harvest of reef fish from traps other than permitted reef fish traps.	Amendment 15 (GMFMC 1998)	1/29/98
Prohibits the possession of reef fish exhibiting the condition of trap rash on board any vessel in the Gulf EEZ and that does not have a valid fish trap endorsement and requires fish trap owners or operators to provide trip initiation and termination reports and to comply with a vessel/gear inspection requirement.	Amendment 16A (GMFMC 2000)	1/10/00
Extended the commercial reef fish permit moratorium	Amendment 17	8/2/00

until December 31, 2005	(GMFMC 2000)	
1) Prohibits vessels from retaining reef fish caught under recreational bag/possession limits when commercial quantities of Gulf reef fish are aboard, (2) adjusts maximum crew size on charter vessels that also have a commercial reef fish permit, and (3) prohibits the use of reef fish for bait except for sand or dwarf sand perch.	Amendment 18A (GMFMC 2007)	5/6/07
Establish 3-year moratorium on issuance of charter and headboat permits for-hire reef fish	Amendment 20 (GMFMC 2001)	7/1/03
Continues the Steamboat Lumps and Madison-Swanson reserves for an additional six years, until June 2010.	Amendment 21 (GMFMC 2003)	6/3/04
Implemented specific bycatch reporting methodologies for logbooks and a mandatory commercial and for-hire (charter vessel/headboat) observer program for the reef fish fishery.	Amendment 22 (GMFMC 2004)	7/5/05
Replaced the commercial reef fish permit moratorium with a permanent limited access system	Amendment 24 (GMFMC 2005)	8/17/05
Replaced reef fish for-hire moratorium with limited access system	Amendment 25 (GMFMC 2005)	6/15/06
Requires the use of non-stainless steel circle hooks when using natural baits to fish for Gulf reef fish and the use of venting tools and dehooking devices when participating in the commercial or recreational reef fish fisheries.	Amendment 27 (GMFMC 2007)	6/1/08
Reduced aggregate bag limit from 5 to 4 fish	Amendment 30B (GMFMC 2008)	4/16/09
Established grouper and tilefish IFQ system	Amendment 29 (GMFMC 2009)	1/1/10

2.2. Secretarial Amendments

Secretarial Amendment 1, implemented July 15, 2004, established a commercial quota of 0.44 mp gutted weight, for all tilefish's in the management unit combined. This quota was equal to the average annual tilefish harvest during 1996-2000. It was implemented as a pro-active measure to prevent an uncontrolled increase in Gulf tilefish harvest as a result of a reduction in the deep-water grouper quota and increased restrictions on the overfished Atlantic tilefish fishery.

2.3. Control Date Notices

Notice of Control Date 11/1/89 54 FR 46755:

-Anyone entering the commercial reef fish fishery in the Gulf of Mexico after 11/1/89 may be assured of future access to the reef fish resource of a management regime is developed and implemented that limits the number of participants in the fishery.

Notice of Control Date 11/18/98 63 FR 64031:

-The Council considered whether there was a need to impose additional management measures limiting entry into the recreational-for-hire (i.e., charter vessel and headboat) fisheries for reef fish in the EEZ of the Gulf of Mexico and if needed what management measures should be imposed. Possible measures include the establishment of a limited entry program to control participation or effort in the recreational-for-hire fisheries for reef fish in the EEZ. In Amendment 20 to the Reef Fish FMP, a qualifying date of March 29, 2001 was adopted.

Notice of Control Date 7/12/00 65 FR 42978:

-The Council considered whether there was a need to limit participation by gear type in the commercial reef fish fisheries in the Gulf EEZ and if so what management measures should be imposed. Possible measures include modifications to the existing limited entry program to control fishery participation or effort, based on gear type, such as a requirement for gear endorsement on the commercial reef fish vessel permit for the appropriate gear. Gear types that may be included are longlines, buoy gear, handlines, rod-and-reel, bandit gear, spear fishing gear, and powerheads used with spears.

Notice of Control Date 10/15/04 69 FR 67106:

-The Council is considered the establishment of an IFQ to control participation or effort in the commercial grouper fishery of the Gulf of Mexico. The control data above would determine eligibility of catch histories in the commercial grouper fishery.

2.4. Management Program Specifications

Table 2.4.1. General Management Information

Species	tilefish, *Lopholatilus chamaeleonticeps*, goldenface tilefish, *Caulolatilus chrysops* blackline tilefish, *Caulolatilus cyanops* anchor tilefish, *Caulolatilus intermedius*, and

	blueline, *Caulolatilus microps*
Management Unit	Gulf of Mexico
Management Unit Definition	All waters within the Gulf of Mexico Fishery Management Council boundaries. Defined as the economic zone (EEZ), 200 miles from state boundary line.
Management Entity	Gulf of Mexico Fishery Management Council
Management Contacts SERO / Council	/ Carrie Simmons
Current stock exploitation status	Not yet determined
Current stock biomass status	Not yet determined

Table 2.4.2. Specific Management Criteria

Criteria	Gulf of Mexico – Current		Gulf of Mexico - Alternative	
	Definition	Value	Definition	Value
MSST	undefined*	To Be Determined (TBD)	MSST = [(1-M) or 0.5 whichever is greater]*B_{MSY}	SEDAR 22
MFMT	F30%SPR	TBD	F_{MSY}	SEDAR 22
MSY	undefined**	TBD	Yield at F_{MSY}	SEDAR 22
F_{MSY}	no proxy defined	TBD	F_{MSY}	SEDAR 22
OY	undefined**	TBD	Yield at F_{OY}	SEDAR 22
F_{OY}	undefined***	TBD	F_{OY} =65%, 75%, 85% F_{MSY}	SEDAR 22
M	--	TBD	Instantaneous natural mortality	SEDAR 22
Probability value for evaluating status	50% Fcurr> MFMT = overfishing		Annual yield @ F_{MFMT}	

*The Generic SFA Amendment (1999) states that MSST will be implemented by framework amendment for each stock as estimates of B_{MSY} and MSST are developed by NMFS, the Reef

Fish Stock Assessment Panel, and Council. Thus, MSST is undefined until established following a stock assessment in which B_{MSY} or a proxy is determined. However, the Council has generally adopted (1-M)*SSB_{MSY} as the MSST for stocks with stock assessments.

**Proposed SPR based proxies of MSY and OY in the Generic SFA Amendment were rejected by NMFS on the basis that such proxies must be biomass based.

*** The Council has typically used 75% of F_{MSY} (or F_{MSY} proxy) as its definition of F_{OY}. However, no generic definition of F_{OY} has been set, and it is therefore undefined for stocks without prior assessments.

Yields (MSY and OY) are in terms of pounds landed under prevailing selectivity's and after estimating and accounting for discards in the stock assessment.

NOTE: "Proposed" columns are for indicating any definitions that may exist in FMPs or amendments that are currently under development and should therefore be evaluated in the current assessment. "Current" is those definitions in place now. Please clarify whether landings parameters are 'landings' or 'catch' (Landings + Discard). If 'landings', please indicate how discards are addressed.

Stock Rebuilding Information

The current stock biomass is unknown; therefore, no rebuilding plan is required at this time.

Table 2.4.4. Stock projection information.

Requested Information	Value
First Year of Management	2013
Projection Criteria during interim years should be based on (e.g., exploitation or harvest)	Fixed exploitation at F_{OY} or Frebuilding as appropriate.
Projection criteria values for interim years should be determined from (e.g., terminal year, avg of X years)	Average of previous 3 years

First year of Management: Earliest year in which management changes resulting from this assessment are expected to become effective

interim years: those between the terminal assessment year and the first year that any management could realistically become effective.

Projection Criteria: The parameter which should be used to determine population removals, typically either an exploitation rate or an average landings value or a pre-specified landings target.

Table 2.4.5. Quota Calculation Details

There is currently a commercial quota = 0.44 mp gutted weight.

Current Quota Value	Commercial = 0.44 mp GW
Next Scheduled Quota Change	None at this time
Annual or averaged quota ?	Annual
If averaged, number of years to average	
Does the quota include bycatch/discard?	Bycatch/discards incorporated into assessment

How is the quota calculated - conditioned upon exploitation or average landings?

The commercial quota of 0.44 mp gutted weight is calculated on an annual basis. The commercial fishery has closed the quota as early as April or as late as November.

Does the quota include bycatch/discard estimates? If so, what is the source of the bycatch/discard values? What are the bycatch/discard allowances?

Discard mortality estimates are to be estimated and incorporated into the assessment in order to estimate quotas and allocations in terms of landed catches that take into account discard mortality. Appropriate values for current levels of discards and discard mortality rates are to be determined and calculated as part of the Data and Assessment workshops using available data, research, and observations (both observer and anecdotal) to determine values that represent the best available scientific information.

There is only a 20 aggregate bag limit for the recreational sector. Species included in the 20 reef fish aggregate are: all tilefish (tilefish, *Lopholatilus chamaeleonticeps*, goldenface tilefish, *Caulolatilus chrysops*, blackline tilefish, *Caulolatilus cyanops*, anchor tilefish, *Caulolatilus intermedius*, and blueline, *Caulolatilus microps*), Almaco Jack, and gray triggerfish.

Are there additional details of which the analysts should be aware to properly determine quotas for this stock?

There are numerous species of tilefish in the fishery management plan.

2.5. Management and Regulatory Timeline

The following tables provide a timeline of Federal management actions by fishery.

Table 2.5.1. Annual Commercial Tilefish Regulatory Summary

Year	Fishing Year	Size Limit	Possession Limit
1983	Calendar Year	None	--
1984	Calendar Year	None	--
1985	Calendar Year	None	--
1986	Calendar Year	None	--
1987	Calendar Year	None	--
1988	Calendar Year	None	--
1989	Calendar Year	None	--
1990	Calendar Year	None	--
1991	Calendar Year	None	--
1992	Calendar Year	None	--
1993	Calendar Year	None	--
1994	Calendar Year	None	--
1995	Calendar Year	None	--
1996	Calendar Year	None	--
1997	Calendar Year	None	--
1998	Calendar Year	None	"
1999	Calendar Year	None	"
2000	Calendar Year	None	
2001	Calendar Year	None	"
2002	Calendar Year	None	"
2003	Calendar Year	None	"
2004	Calendar Year	None	Quota* of 0.44 mp gutted weight, for all tilefishes in the management unit combined
2005	Calendar Year	None	Commercial fishery closed on November 21, 2005
2006	Calendar Year	None	Commercial fishery closed on July 22, 2006
2007	Calendar Year	None	Commercial fishery closed on April 18, 2007
2008	Calendar Year	None	Commercial fishery closed May 10, 2008 The quota was not met so the fishery re-opened for tilefish November 1 through November 11
2009	Calendar Year	None	Commercial fishery closed May 15, 2009

* This quota was equal to the average annual tilefish harvest during 1996-2000. It was implemented as a pro-active measure to prevent an uncontrolled increase in Gulf tilefish harvest as a result of a reduction in the deep-water grouper quota and increased restrictions on the overfished Atlantic tilefish fishery.

Table 2.5.2. Annual Recreational Tilefish Regulatory Summary

Year	Fishing Year	Size Limit	Bag Limit
1983[1]	Calendar Year	None	--
1984[1]	Calendar Year	None	--
1985[2]	Calendar Year	None	--
1986	Calendar Year	None	--
1987	Calendar Year	None	--
1988	Calendar Year	None	--
1989	Calendar Year	None	--
1990[3]	Calendar Year	None	--
1991	Calendar Year	None	--
1992	Calendar Year	None	--
1993	Calendar Year	None	--
1994	Calendar Year	None	--
1995	Calendar Year	None	--
1996	Calendar Year	None	--
1997	Calendar Year	None	Established 20 reef fish aggregate bag limit
1998	Calendar Year	None	"
1999	Calendar Year	None	"
2000	Calendar Year	None	"
2001	Calendar Year	None	"
2002	Calendar Year	None	"
2003	Calendar Year	None	"
2004	Calendar Year	None	"
2005	Calendar Year	None	"
2006	Calendar Year	None	"
2007	Calendar Year	None	"
2008	Calendar Year	None	"
2009	Calendar Year	None	"

[1] Included in the 20 reef fish aggregate are: all tilefish (tilefish, *Lopholatilus chamaeleonticeps*, goldenface tilefish, *Caulolatilus chrysops*, blackline tilefish, *Caulolatilus cyanops*, anchor tilefish, *Caulolatilus intermedius*, and blueline, *Caulolatilus microps*), Almaco Jack, and gray triggerfish

2.6 State Regulatory History

Florida:

Alabama:

February 24, 1997- Established a 20 fish aggregate bag limit for all reef fish species for which there is no other bag limit

There are no regulations for commercial fishing for these species.

*Alabama Marine Resources is proposing regulations this year to the Conservation Advisory Board that will close Alabama waters at any time adjacent federal waters are closed to the taking of a specific reef fish species. These would include both the recreational fisheries and the commercial fisheries. We hope to have these regulations in place by May 2010.

Mississippi:

Historically Mississippi has followed the regulations set forth by the Gulf Council; however, we have not changed our regulations to reflect the regulations put into effect by the council on July 29, 2009. We are still currently at a twenty fish aggregate for the tilefish for the recreational sector.

Louisiana:

For Louisiana the only significant differences for these two species between federal and state management occurred in 2009, when modifications to include IFQ rules were not adopted, and rules on having charter vessels comply with more restrictive rules were also not adopted.

Texas: There are no matching rules in Texas waters, but enforce federal rules under Joint Enforcement Agreements.

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GMFMC (Gulf of Mexico Fishery Management Council). 2007. Amendment 27 to the Reef Fish FMP and Amendment 14 to the Shrimp FMP to end overfishing and rebuild the red snapper stock. Gulf of Mexico Fishery Management Council, 2203 North Lois Avenue, Suite 1100, Tampa, Florida 33607. 490 pp.

GMFMC (Gulf of Mexico Fishery Management Council). 2008. Amendment 30B to the Reef Fish FMP: Gag – End Overfishing and Set Management Thresholds and Targets, Red Grouper – Set Optimum Yield TAC and Management Measures, Time/Area Closures, and Federal Regulatory Compliance. Gulf of Mexico Fishery Management Council, 2203 North Lois Avenue, Suite 1100, Tampa, Florida 33607. 462 pp.

GMFMC (Gulf of Mexico Fishery Management Council). 2009. Amendment 29 to the reef fish fishery management plan. Effort Management in the Commercial Grouper and Tilefish Fisheries. Gulf of Mexico Fishery Management Council, Tampa, Florida 33607. 300 pp.

3. ASSESSMENT HISTORY AND REVIEW

Tilefish and blueline tilefish have not been formally assessed prior to SEDAR 22.

4. REGIONAL MAPS

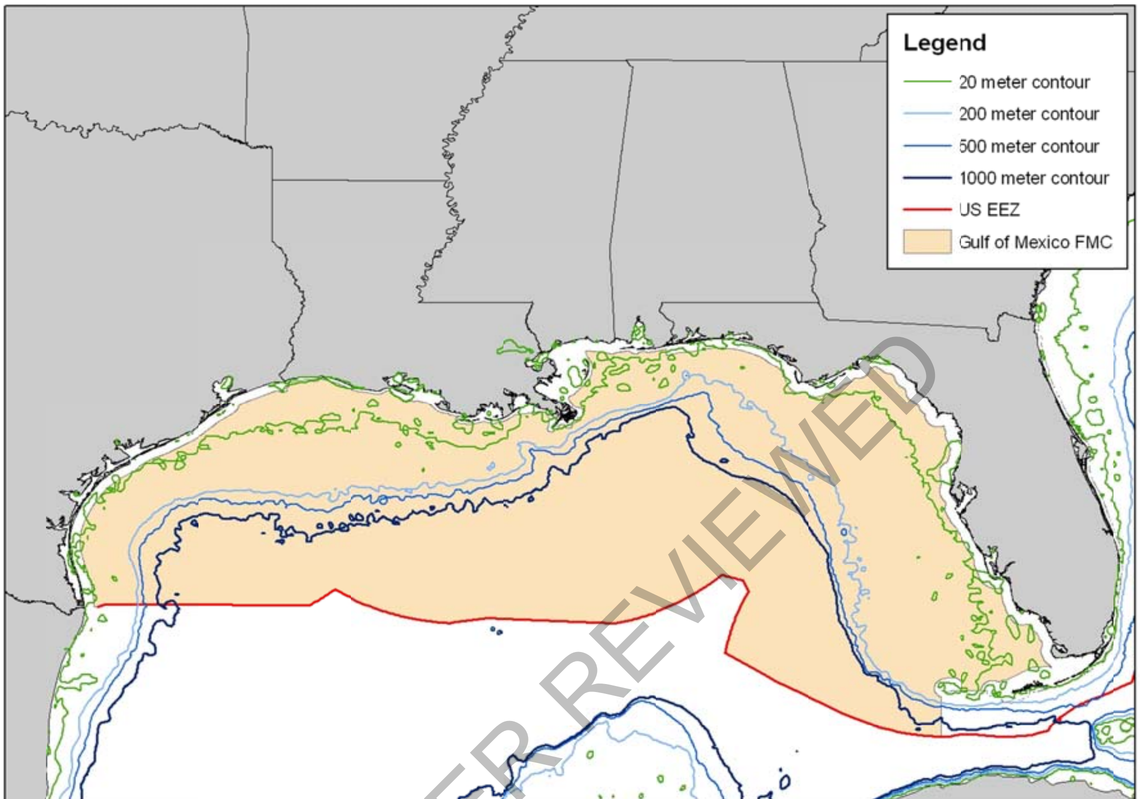

Figure 4.1. Gulf of Mexico management region including Council and EEZ Boundaries

5. **ASSESSMENT SUMMARY**

The Summary Report provides a broad but concise view of the salient aspects of the stock assessment. It recapitulates: (a) the information available to and prepared by the Data Workshop; (b) the application of those data, development and execution of one or more assessment models, and identification of the most reliable model configuration as the base run by the Assessment Process (AP); and (c) the findings and advice determined during the Review Workshop.

TO BE COMPLETED FOLLOWING THE REVIEW WORKSHOP

Stock Status and Determination Criteria

Table 1. Summary of stock status determination criteria.

Criteria	Recommended Values from SEDAR 22	
	Definition	Value
M (Instantaneous natural mortality; per year)	Average of Lorenzen M (if used)	
F_{2009} (per year)	Apical Fishing mortality in 2009	
$F_{current}$ (per year)	Geometric mean of the directed fishing mortality rates in 2007 - 2009	
F_{MSY} (per year)	F_{MSY}	
B_{MSY} (metric tons)	Biomass at MSY	
SSB_{2009} (metric tons)	Spawning stock biomass in 2009	
SSB_{MSY} (metric tons)	SSB_{MSY}	
MSST (metric tons)	(1-M)*SSB $_{MSY}$	
MFMT (per year)	F_{MSY}	
MSY (1000 pounds)	Yield at MSY	
OY (1000 pounds)	Yield at F_{OY}	OY (65% $F_{MSY)}$= OY (75% $F_{MSY)}$= OY (85% F_{MSY}=

F_{OY} (per year)	F_{OY} = 65%,75%, 85% F_{MSY}	65% F_{MSY}= 75% F_{MSY}= 85% F_{MSY}=
Biomass Status	SSB_{2009}/MSST	
Exploitation Status	$F_{current}/F_{MSY}$	

***All weights are whole weight

Stock Identification and Management Unit

Species Distribution:

Stock Life History - summary of life history characteristics of the stock under assessment

Assessment Methods

Assessment Data

Release Mortality

Catch Trends

Fishing Mortality Trends

Stock Abundance and Biomass Trends - summary of abundance, biomass, and recruitment over time

Projections - results of model runs conducted to estimate stock conditions under various potential future levels of fishing mortality

Scientific Uncertainty

Significant Assessment Modifications

Sources of Information

Tables

- Table 1: Summary of stock status and determination criteria (above)
- Table 2: Summary of life history parameters by age
- Table 3: Catch and discards by fishery sector
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- Table 5: Stock abundance and biomass
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Figures

- Figure 1: Landings by fishery sector
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- Figure 8: Stock Status and Control Rule
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SEDAR

Southeast Data, Assessment, and Review

SEDAR 22

Gulf of Mexico Tilefish

SECTION II: Data Workshop Report

SEDAR
4055 Faber Place Drive, Suite 201
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Table of Contents

1. INTRODUCTION

1.1. *WORKSHOP TIME AND PLACE*

The SEDAR 22 Data Workshop was held March 15 - 19, 2010 in Tampa, Florida.

1.2. *TERMS OF REFERNCE*

1. Characterize stock structure and develop unit stock definitions for the tilefish complex. Provide maps of species and stock distribution.

2. Review, discuss and tabulate available life history information (e.g., age, growth, natural mortality, reproductive characteristics); provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable. Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling.

3. Provide measures of population abundance that are appropriate for stock assessment. Consider and discuss all available and relevant fishery dependent and independent data sources. Document all programs evaluated, addressing program objectives, methods, coverage, sampling intensity, and other relevant characteristics. Provide maps of survey coverage. Develop CPUE and index values by appropriate strata (e.g., age, size, area, and fishery); provide measures of precision and accuracy. Evaluate the degree to which available indices adequately represent fishery and population conditions. Recommend which data sources are considered adequate and reliable for use in assessment modeling.

4. Characterize commercial and recreational catch, including both landings and discard, in pounds and number. Provide estimates of discard mortality rates by fishery and other strata as appropriate or feasible. Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector. Provide length and age distributions if feasible. Provide maps of fishery effort and harvest.

5. Provide recommendations regarding the feasibility of conducting a benchmark assessment for each species in the tilefish complex. If the data are deemed insufficient for a benchmark assessment, provide guidance on the type of management advice that can be provided with that data (see SEDAR Caribbean Data Evaluation Workshop report).

6. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.

7. Develop a spreadsheet of assessment model input data that reflects the decisions and recommendations of the Data Workshop. Review and approve the contents of the input spreadsheet by June 1.

8. Prepare the Data Workshop report providing complete documentation of workshop actions and decisions (Section II. of the SEDAR assessment report). Develop a list of tasks to be completed following the workshop.

1.3. *LIST OF PARTICIPANTS*

Workshop Panel

Adam Pollack .... NMFS Pascagoula
Bob Spaeth .... GMFMC AP
Brad Kenyon .... GMFMC AP
Brian Linton .... NMFS Miami
Charlie Bergmann .... NMFS Pascagoula
Debbie Fable .... NMFS Panama City
Elbert Whorton .... GMFMC SSC
Gary Fitzhugh .... NMFS Panama City
Harry Blanchet .... GMFMC SSC/LADWLF
Hope Lyon .... NMFS Panama City
John Quinlan .... NMFS Miami
John Walter .... NMFS Miami
Kevin McCarthy .... NMFS Miami
Linda Lombardi .... NMFS Panama City
Martin Fisher .... GMFMC AP
Melissa Cook .... NMFS Panama City
Neil Baertlein .... NMFS Miami
Refik Orhun .... NMFS Miami
Richard Fulford .... GMFMC SSC/Univ of S. MS
Steve Turner .... NMFS Miami
Walter Ingram .... NMFS Pascagoula

CIE Reviewer

Yong Chen .... Univ. of Maine

Council Representation

Bob Shipp .... GMFMC

Observers

Greg Abrams ....

Staff

Carrie Simmons .... GMFMC Staff
Julie Neer .... SEDAR
Tina O'Hern .... GMFMC Staff
Patrick Gilles.. NMFS Miami

1.4. *LIST OF DATA WORKSHOP WORKING PAPERS AND REFERNCE DOCUMENTS*

Document #	Title	Authors	Working Group
Documents Prepared for the Data Workshop			
SEDAR22-DW-01	Golden tilefish (*Lopholatilus chamaeleonticeps*) age, growth, and reproduction from the northeastern Gulf of Mexico: 1985,1997-2009	Linda Lombardi, Gary Fitzhugh, Hope Lyon	Life History
SEDAR22-DW-02	Commercial longline vessel standardized catch rates of yellowedge grouper in the Gulf of Mexico	Neil Baertlein and Kevin McCarthy	Indices
SEDAR22-DW-03	Golden tilefish and blueline tilefish standardized catch rates from commercial longline vessels in the Gulf of Mexico	Kevin McCarthy	Indices
SEDAR22-DW-04	Discards of yellowedge grouper, golden tilefish, and blueline tilefish from commercial fishing vessels in the Gulf of Mexico	Kevin McCarthy	Catch Statistics
SEDAR22-DW-05	Explorations of habitat associations of yellowedge grouper and golden tilefish	John F Walter, Melissa Cook, Brian Linton, Linda Lombardi, and John A. Quinlan	Life History
SEDAR22-DW-06	Abundance Indices of subadult Yellowedge Grouper, *Epinephelus*	Adam G. Pollack and G. Walter	Indices

	flavolimbatus, Collected in Summer and Fall Groundfish Surveys in the northern Gulf of Mexico	Ingram, Jr.	
SEDAR22-DW-07	Abundance Indices of Yellowedge Grouper and Golden Tilefish Collected in NMFS Bottom Longline Surveys in the northern Gulf of Mexico	G. Walter Ingram, Jr. and Adam G. Pollack	Indices
SEDAR22-DW-08	Yellowedge grouper (Epinephelus flavolimbatus) age, growth and reproduction from the northern Gulf of Mexico	Melissa Cook and Michael Hendon	Life History
SEDAR22-DW-09	Observed Length frequency distributions and otolith sampling issues for yellowedge groupers caught in the Gulf of Mexico from 1984 to 2009.	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-10	Observed Length frequency distributions and otolith sampling issues for tile fish caught in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-11	Length frequency distributions for blue line tile fish caught in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-12	Estimation of species misidentification in the commercial landing data of tile fish in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Catch Statistics
SEDAR22-DW-13	Estimation of species misidentification in the commercial landing data of yellowedge groupers in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Catch Statistics
SEDAR22-DW-14	Evidence of hermaphroditism in Golden Tilefish (*Lopholatilus chamaeleonticeps*) in the Gulf of Mexico	Hope Lyon	Life History
SEDAR22-DW-15	Recreational Survey Data for Yellowedge Grouper, Tilefish (golden), and Blueline Tilefish in	Vivian M. Matter	Catch Statistics

	the Gulf of Mexico		
SEDAR22-DW-16	Estimated Recreational Catch in Weight: Method for Filling in Missing Weight Estimates from the Recreational Surveys	Vivian M. Matter	Catch Statistics
SEDAR22-DW-17	Commercial Landings of Yellowedge Grouper, Golden Tilefish, and Blueline Tilefish from the Gulf of Mexico region	Refik Orhun	Catch Statistics
	Reference Documents		
SEDAR22-RD01	Lead-radium dating of golden tilefish (*Lopholatilus chamaeleonticeps*)	Allen Andrew	
SEDAR22-RD02	Status of the yellowedge grouper fishery in the Gulf of Mexico	Shannon L. Cass-Calay and Melissa Bahnick	
SEDAR22-RD03	Yellowedge grouper (*Epinephelus flavolimbatus*) and golden tilefish (*Lopholatilus chamaeleonticeps*) distributions, habitat preferences and available biological samples	Melissa Cook and Linda Lombardi-Carlson	
SEDAR22-RD04	Validation of yellowedge grouper, *Epinephelus flavolimbatus*, age using nuclear bomb-produced radiocarbon	Melissa Cook & Gary R. Fitzhugh & James S. Franks	
SEDAR22-RD05	Population dynamics structure, and per –recruit analyses of yellowedge grouper, *Epinephelus flavolimbatus* from the northern Gulf of Mexico	Melissa Cook	
SEDAR22-RD06	Reproduction of yellowedge grouper *Epinephelus flavolimbatus*, from the eastern Gulf of Mexico	Bullock, L. H., M. F. Godcharles and R. E. Crabtree	
SEDAR22-RD07	Burrow utilization by yellowedge grouper, *Epinephelus flavolimbatus*, in the northwestern Gulf of Mexico	Jones, R. S., E. J. Gutherz, W. R. Nelson and G. C. Matlock	

SEDAR22-RD08	Age and growth of the yellowedge grouper, *Epinephelus flavolimbatus*, and the yellowmouth grouper, *Mycteroperca interstitialis*, off Trinidad and Tobago	Manickchand-Heileman, S. C. and D. A. T. Phillip
SEDAR22-RD09	A descriptive survey of the bottom longline fishery in the Gulf of Mexico	Prytherch, H. F.

2. LIFE HISTORY

2.1. *OVERVIEW*

2.1.1 Group membership

Gary Fitzhugh	SEFSC, Panama City, WG leader and editor
Linda Lombardi	SEFSC, Panama City, Data provider
Hope Lyon	SEFSC, Panama City, Data provider
Melissa Cook	SEFSC, Panama City
Harry Blanchet	LDWF, GMFMC SSC
Brian Linton	SEFSC, Miami
Carrie Simmons	GMFMC, Staff lead

2.1.2. Issues discussed in the Life History Working Group

Issues discussed in the Life History Working Group (WG) for Gulf of Mexico tilefish, *Lopholatilus chamaeleonticeps,* included stock definition, movements, distributions, age sampling and age determinations, growth, potential for discards, mortality and reproduction. Of these, expanded plenary discussions with the Data Workshop Panel (DW) focused more on particular key issues: 1) the ability to make age determinations from otolith sections, 2) the adequacy of sampling for parameters such as age and sex ratio, 3) the applications/estimations of natural mortality (M) relevant to the assessment model choices, 4) the data sets and parameters, such as the growth coefficients, that informed estimates of M, 5) the evidence suggesting tilefish may be protogynous, and 6) uncertainty about specific reproductive inputs to the model including onset of maturity and the form of reproductive potential.

2.2. *REVIEW 0F WORKING PAPERS*

Working papers were reviewed that were pertinent to the WG. A central paper was S22-DW-01 which presented the age, growth and reproduction results for Gulf of Mexico tilefish. Working document S22-DW-05 presented Gulf habitat associations of tilefish and yellowedge grouper. Also reviewed was S22-DW-14 which presented histological evidence of hermaphrodism, and S22-DW-10 which presented comparisons of length data collected by the Trip Interview Program and reported with hard part collection by port agents.

2.3. *STOCK DEFINITION AND DESCRIPTION*

Tilefish (*Lopholatilus chamaeleonticeps*) have fairly distinct sediment (habitat), depth, and temperature preferences (Nelson and Carpenter 1968, Able et al. 1982, Katz et al. 1983, S22-DW-05). These results together with tagging results suggest adult movements are minimal (Katz et al. 1983, Grimes 1983).

The stock structure of tilefish, *Lopholatilus chamaeleonticeps,* was examined from the U.S. east coast including mid-Atlantic, south Atlantic and the Gulf of Mexico (Katz et al. 1983). Methods included eye, liver, muscle electrophoresis and morphology (e.g., gill raker number). The Mid-Atlantic group broke out distinctly. The south Atlantic and Gulf of Mexico stocks exhibited clinal variation indicating evidence for gene flow from Gulf of Mexico to south Atlantic. However Katz et al. 1983 concluded that wide geographic separation may necessitate management as separate south Atlantic and Gulf of Mexico stocks.

Given the evidence of limited movements (more below) and limited possibility of adult exchange between the Gulf of Mexico and other regions, the WG recommends treatment of tilefish harvested from the Gulf of Mexico as a distinct stock.

2.4. *NATURAL MORTALITY*

The WG reviewed estimates of total and natural mortality (M) from catch curves and various equations (Table 1). The panel developed a table of estimated M values as informative priors for the assessment (Table 2).

The base model to be used for analysis of the species considered under SEDAR 22 will be Stock Synthesis V3 (Methot 2010). This model has the capacity to accept a distribution of informative priors, and estimate M within the model. That capacity reduces some of the need to specify a single estimate for M. However, other analytic methods that are intended to be run in the assessment process do require a specified value of M, or have difficulty in resolving M in some circumstances. Therefore, providing a good estimate of M for those cases will help evaluate the relative performance of the various models.

Several data sources were utilized in order to develop the estimates of M presented. Average water temperatures were obtained from NMFS bottom longline cruise data where the species of interest was collected. Age at maturity was derived from either available literature on the species (Palmer et al. 2004) or from data reports developed for this SEDAR (S22-DW-01). Values for k, L_{inf} and t_{max} were obtained from fish aged using thin sectioned sagittal otoliths. The otoliths for golden tilefish were aged by the same readers, using the same methods. Details of that aging process and methods of validation of otolith aging for each species are presented in S22-DW-01.

Disappearance rates were obtained through catch curve analysis, using data from different datasets, or from subsets of the data (S22-DW-01). Since protogyny may also be present in tilefish, one subset of the data was to consider females only, through those ages between full recruitment to longline gear and significant transition to males. Another case considered was to use all sexed fish, regardless of sex. Thirdly, all aged fish were considered (sex was often unreported). This last case increases the sample size significantly. In each case, the t_{max} associated with that dataset or subset was utilized for calculation of M.

The true value of Z should be considered as an upper limit of M, since with no fishing Z=M. Under fished conditions, Z=M+F, so some value of M below Z is reasonable. However negative estimates of M are not, since this would only be possible if there were contributions to the stock from some additional area. Catch curve analyses conducted here showed negative slopes (positive M), so negative values for M are discounted.

One of the caveats that should be mentioned here is that the species being assessed in this SEDAR are outer continental shelf / shelf break / continental slope species, while most of the published literature considers species that occur in more coastal zones. This may be pertinent to many aspects of the life history, since these deeper waters may be more constant in temperature and salinity than the coastal waters, and those factors may contribute to development of successful life history strategies.

Ninety-eight estimates of M were derived using different functions and sets of data (Table 2 and Figure 1). These tilefish M values include estimates that are higher than current estimates of Z from catch curve calculations. We suggest that these unrealistic high estimates be discounted in development of any prior distributions of F (Figure 1). Therefore, a triangular distribution with a peak around 0.1125 (center of the bin containing the most estimates), falling to 0 at 0.0375 and at 0.235 (centers of the bins on either end of the plausible zone) could be recommended (Figure 1).

During previous SEDAR workshops, it has been discussed that it is unlikely that there is a constant natural mortality rate across all sizes and ages and thus a age-variable approach has been advocated (e.g., SEDARs 4,10, 12,15A and 19). A method for estimating mortality rates by age was developed by Lorenzen 1996. Based upon WG recommendations, Lorenzen estimates were computed for ages 0+ based upon $Hoenig_{fish}$ estimates of M for records where sexes were distinguished and data combined, females only, and all available records regardless of whether sex was noted (Table 2 and Figure 2).

2.5. *DISCARD MORTALITY*

The Life History Working Group noted that there was no tilefish information available regarding discard mortality. However, given the depths fished and common information regarding the condition of captured fish, the assumption is that discard mortality is equal to 100%.

2.6. *AGE*

A total of 4841 otoliths were collected from fishery dependent and independent sampling (1985, 1997-2009; S22-DW-01). Tilefish otoliths were obtained primarily from Florida's federal waters (68%) with 20% collected in Texas' waters (Figure 3a). The source was primarily the commercial fishery (92% of otoliths sampled; Figure 3b). Sectioned otoliths are difficult to interpret and previous validation methods were inconclusive in determining the timing of band depositions. Andrews (2009) determined good agreement between radiometric age and estimated age from growth zone counts for female and unknown age groups but there remain questions about interpretation for the oldest male ages. Given the difficulty in determining accurate age estimates, an ageing workshop was conducted among several federal and state agencies (NOAA Fisheries

Service Panama City, FL; NOAA Fisheries Service Beaufort, NC; South Carolina Department of Natural Resources, Charleston, SC). Each agency provided thin sectioned sagittal otoliths to create a reference collection. Indices of precision were calculated from the reference collection (n = 289) with an overall average percent error of 11%, with percent agreement of 5% increasing to 77% ± 3 years (S22-DW-01).

Length and associated age data reflected a large size range (274-1123 mm TL, mean 653 ± 2 mm se) and age range (2-40 years, mean 10 ± 0.06). A majority of the fish was 400-899 mm in length (94%; Figure 4a) and age 5-18 (95%; Figure 4b). Sexually dimorphic differences in length and age were apparent reflecting slow growing female and faster growing male tilefish at older age classes (Figure 4c).

Commercial longline results revealed similarly sized and aged fish each year; annual mean lengths of 606-687 mm TL, with an overall mean size of 654 ± 2 (se) mm TL (range = 274-1145 mm S22-DW-01). Tilefish collected by the commercial sectors reached an average age of 10 ± 0.1 yrs (range = 2-40 yrs). Some regional differences in demographics were noted; i.e., larger and older tilefish were sampled from the western Gulf in early years of the age record (S22-DW-01). Based upon aggregated data, recruitment to the long line fishery occurs by age 8 (S22-DW-01).

2.7. *GROWTH*

Tilefish ages and total lengths from the entire time series (1997-2009) were fit to a von Bertalanfy growth function (VBGF). For all data: L_∞ = 830 mm, k = 0.13, t_o = -2.14 (S22-DW-01). VBGF fits and size-at-age contrasts were also made by sex (S22-DW-01). Males grew faster at each age class compared and the VBGF predicted males grow faster and obtain a larger asymptotic size (male: L_∞ = 767 mm, k = 0.15, t_o = -1.46; female: L_∞ = 613 mm, k = 0.13, t_o = -4.56; Figure 5). The panel noted data distribution issues that typically affect VBGF fits. In particular, the low number of samples of very young fish resulted in unrealistic fits of t_o. It was discussed that an iterative fitting process, allowing for sample size weighting by sex and region would be conducted within the assessment (e.g., by Stock Synthesis 3 model) and would correct this effect. However, the panel provided unconstrained estimates of VBGF as well as VGBF fits constrained to t_o = zero, needed to complete mortality equations and develop “prior values” to enter into the model (Table 2).

2.8. *REPRODUCTION*

Female tilefish from the Gulf of Mexico exhibited a spawning season extending from January to June with peak development in April (S22-DW-01). This was largely in agreement with Atlantic studies in terms of peak spawning time (spring-to-summer) but an extended season is possible (perhaps 9 months or longer). Immature females were rare among available Gulf samples (n = 4) and ranged in size 301-414 mm TL and age 4-6. Mature females ranged in size from 351 to 780 mm TL and age 3-27 (S22-DW-01). Based on logistic regression, size and age at 50% maturity for females in the Gulf were 344 mm TL and age 2, respectively (Figure 6a and 6b). The panel noted that fit of the logistic maturity function may be constrained by the lack of small (and young) tilefish and may not have adequate resolution concerning the onset of maturity. Interestingly, the rarity of immature female tilefish was also noted during the S. Atlantic assessment (Palmer et al. 2004). In the Atlantic analysis, four immature female tilefish were measured at a maximum length of 540 mm TL and maximum age of 6. From the Gulf data set presented here, it was noted that age-6 was also the earliest age of spawning. Female golden tilefish from the south Atlantic were determined to reach maturity at 582 mm TL in 1996-1998, a decrease of 150 mm in the size at maturity compared to fish collected in 1980-1987 (Palmer et al. 2004). Thus the panel recommended that given the uncertainty, a range of values for onset of maturity be explored within the assessment (recommendations below).

During SEDAR4 (US south Atlantic), reproductive information was reviewed including histological assessment of gonads. Although there were 15 males with previtellogenic oocytes (no transitional fish or ovotestes) it was concluded tilefish were to be considered gonochorists (Palmer et al. 2004). However, the histological findings from the Gulf of Mexico gonads reveal the possibility of sex change; particularly directed towards protogyny. While transitional fish were not detected among Gulf samples, 62% (n = 330) of males and 11% (n = 39) of females exhibited gonadal tissue of the opposite sex (S22-DW-01, S22-DW-14). Other evidence for protogyny is the larger size-at-age among males and the apparent increasing proportion of males with age (S22-DW-1). Assuming protogyny occurs, logistic regression determined the size at transition at 564 mm TL (Figure 7a). It was noted that males and females were present in each age class and age at transition was calculated to be greater than 50% at each age class examined which is quite unlike other instances of protogyny reviewed during prior SEDAR assessments (Figure 7b).

The panel noted the uncertainty about sex transition was partly due to the uncertainty about sex ratio. During a directed Cooperative Research Project (Summers, 08CRP009) conducted in 2008-2009, sex ratio was observed to be seasonally dynamic (Figure 8). The pattern was noted to be of great interest in that males dominated the samples during the spawning season (March-September) while females dominated in months outside of the spawning season (November-January). The panel discussed the value of monthly samples for the seasonal contrast, however, only single trips were observed each month and thus relatively low sample sizes were obtained to draw inference. There could be several possible explanations for the sex ratio pattern such as spatial segregation of sizes and or/sexes or changes in behavior among the sexes related to spawning period. While intriguing, it was never-the-less concluded that more investigation would better inform sex ratios and the likelihood of protogyny (see research recommendations below).

Based upon histologically sexed tilefish, 331 females were available to estimate average somatic weight at age (S22-DW-01, Figure 9). These data (extrapolated to spawning stock biomass, SBB) may be selected as the proxy for fecundity similar to the decision in SEDAR 4. However, the average gonad weight of hydrated females at age suggests that reproductive output is non-proportional to somatic weight with older individuals being much more productive (Figure 9). Since spawning females were not detected until age 6 yet 50% maturity at age is predicted at age 2, there may be an overestimate of the reproductive contribution of the youngest mature fish relative to older ages if an SSB approach is used (total SSB or female SSB). The panel developed a gonad-weight at age function as another possible proxy for fecundity to examine the possible non-proportional effect (Figure 10). The panel recommends that three forms of reproductive potential for the assessment be explored in sensitivity runs (see recommendations below).

2.9. *MOVEMENTS AND MIGRATIONS*

Grimes (1983) conducted an experimental tagging study using detachable leaders from bottom longline gear. Of 384 tags deployed, 7 tags were returned. Fish were at liberty for 115 to 557 days. Only 1 of the 7 tagged fish was reported as moving from its original site (1.9 km west of tagging site).

2.10. *MERISTICS AND CONVERSIONS FACTORS*

Conversions for length and weight were presented to the data workshop (Table 3). Measurements have been reported in terms of total length (TL), fork length (FL), whole weight (W. Wt.) and gutted weight (G. Wt.).

2.11. *COMMENTS ON ADEQUACY OF DATA FOR ASSESSMENT ANALYSES*

Aging: Difficulties determining ages from otolith sections were discussed. Validation studies of otolith increment (annual) periodicity and longevity were conducted and progress was noted over earlier studies. But there was less aging precision than observed in some SEDARs for shallow water species. The WG and DW panel noted that these are reasonable results given the deeper water depth and generally slow growth of species with similar habitat affiliations and life history. More work is recommended to clarify the potential bias in otolith-estimated ages (underestimated age) of large males based upon radiometric age.

Biological sampling: The DW panel noted that age sampling levels from recent years were in general informative for assessment purposes. But there were sample size concerns (S22-DW-10); the WG recommends minimum otolith sampling levels (i.e., >= 500 per year per major strata) based upon GulfFIN guidelines. An increase in otolith sampling level is particularly needed for the western Gulf. The WG recommends expanded data collection of secondary sex characters in commercial fish (observer, port agent programs) to improve information on sex ratio. Given sexually dimorphic growth rates, identification of sex is important when lengths and hardparts (for aging) are collected.

Reproduction Parameters: If benchmark values are sensitive to the form of reproductive potential, the DW panel recommends that increased data needs should be amplified as a priority by the assessment and review panels. In particular the DW panel recommends directed studies for better estimation of onset of maturity, batch fecundity by age, spawning frequency by age, and spawning duration by age. The panel noted in general the mating system of tilefish needs to be better studied.

Age of Maturity: The DW panel noted small number of immature tilefish and thus low contrast for fitting maturity by age/size. The recommendation is to consider sensitivity analysis of maturity by age (e.g., 50% age at maturity ranging from age 2 to age 6).

Spawning Stock Biomass: The DW panel recommends model sensitivity runs of SSB-total, SSB-female, and the female gonad weight proxy. Lacking better resolution about reproductive potential, and given the possibility for protogyny and uncertainty about sex ratio, the DW panel recommends further consultation, if desired, with the life history group and panel members during the sensitivity runs, particularly regarding the possible choice of SSB-total as the preferred form of reproductive potential following Brooks et al. 2008.

Natural Mortality: The DW panel recommend model sensitivity runs using M as an age-fixed value and as an age-variable value (Lorenzen M). As in earlier SEDARs, the panel believes an age-variable approach is more realistic and thus the preferred approach.

2.12. *ITEMIZED LIST OF TASKS FOR COMPLETION FOLLOWING WORKSHOP*

Complete age composition for use in auxiliary model runs (VPA, SRA), taking into account the low age sample sizes available in earlier years (late 80s-90s).

Confrmation of the form of the Lorenzen function preferred for the base model (Stock Synthesis V3).

2.13. *LITERATURE CITED*

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2.14. *TABLES*

Table 1. Equations for estimating natural mortality (M). Parameter definitions: k = von Bertalanffy growth coefficient, tmax = maximum aged fish, Amat = age at 50% maturity, Linf = von Bertalanffy asymptotic length, T = average water (^oC) temperature within species habitat, Wage = weight at age vector, S = survivorship to tmax. Equations provided in Microsoft Excel notation. Note that the "Rule of thumb" used here pertains to equation 7 in Hewitt and Hoenig (2005).

Method	Parameters	Citation	Equation
Alverson & Carney	k, tmax	Quinn & Deriso (1999)	M = 3*k/[exp(0.38*tmax*k)-1]
Beverton & Holt	k, Amat	Beverton and Holt (1956)	M = 3*k/[exp(Amat*k)-1])
Hoenig_{fish}	tmax	Hoenig (1983; for fish)	M=exp(1.46 - 1.01*ln(tmax))
$\text{Hoenig}_{all\ taxa}$	tmax	Hoenig(1983; all taxa)	M=exp(1.44-0.982*ln(tmax))
Pauly I	Linf, k, T	Pauly (1980)	M=exp[-0.0152+0.6543*ln(k)-0.279*ln(Linf)+0.4634*ln(T)]
Pauly Method II	Linf, k, T	Pauly and Binohlan (1996)	M=exp[-0.1464+0.6543*ln(k)-0.279*ln(Linf)+0.4634*ln(T)]
Ralston I	k	Ralston (1987)	M=0.0189 + 2.06*k
Ralston (geometric mean)	k	Ralston (1987)	M=-0.0666+2.52*k
Ralston Method II	k	Pauly and Binohlan (1996)	M=-0.1778+3.1687*k
Lorenzen			
Age-Specific	Wage	Lorenzen (1996; ocean)	M=3.69*W^(-0.305)
Jensen	k	Jensen (1996)	M = 1.5*K
Alagaraja	tmax, S	Alagaraja (1984)	M=-(lnS)/tmax
Rule of thumb	tmax	Hewitt and Hoenig (2005)	M = 2.996/tmax

Table 2. Estimates of natural morality (M) using multiple regressions (see Table 1), values shaded are greater than total mortality (Z = 0.25). Data sets include data collected in the Gulf of Mexico (1997-2009). Fixed refers to the von Bertalanffy t_o parameters set at zero. The notation "*" indicates the age 2.2 at maturity obtained through logistic regression

Data Source	Observed Max Age (years)	Number of Fish Aged	von Bertalanffy Linf (mm)	von Bertalanffy k	Water Temp. (°C)	$Age_{.50Maturity}$	Alverson & Carney	Beverton & Holt	$Hoenig_{fish}$	$Hoenig_{all\ taxa}$	Pauly I	Pauly Method II	Ralston I	Ralston (geometric mean)	Ralston Method II	Jensen	Rule of thumb	Alagaraja 0.01	Alagaraja 0.02	Alagaraja 0.05
2000-2009 Females*	27	341	613.34	0.13	13	2.2	0.135	1.171	0.154	0.166	0.276	0.242	0.297	0.273	0.250	0.202	0.111	0.171	0.145	0.111
000-2009 Females*, fixed	27	341	569.85	0.28	13	2.2	0.050	0.986	0.154	0.166	0.455	0.399	0.596	0.640	0.711	0.421	0.111	0.171	0.145	0.111
2000-2009 Combined*	33	875	766.57	0.15	13	2.2	0.078	1.146	0.126	0.136	0.283	0.248	0.336	0.321	0.310	0.231	0.091	0.140	0.119	0.091
2000-2009 Combined*, fixed	33	875	738.54	0.20	13	2.2	0.053	1.084	0.126	0.136	0.341	0.299	0.434	0.441	0.460	0.302	0.091	0.140	0.119	0.091
1997-2009 all data*	40	4647	830.00	0.13	13	2.2	0.063	1.178	0.104	0.113	0.248	0.217	0.287	0.261	0.234	0.195	0.075	0.115	0.098	0.075
1997-2009 all data - age 6 at maturity	40	4647	830.00	0.13	13	6	0.063	0.330	0.104	0.113	0.248	0.217	0.287	0.261	0.234	0.195	0.075	0.115	0.098	0.075
1997-2009 all data*, fixed	40	4647	782.35	0.20	13	2.2	0.031	1.087	0.104	0.113	0.333	0.292	0.428	0.434	0.451	0.298	0.075	0.115	0.098	0.075

Table 3. Meristic regressions for golden tilefish from the Gulf of Mexico (1997-2009).

Conversion and Units	Equation	n	r^2 values	Data Ranges
FL (mm) to TL (mm)	TL = 1.07 * FL – 5.50	677	0.98	TL (mm): 301 – 1109
				FL (mm): 290 – 1040
TL (mm) to W. Wt (kg)	W. Wt = 6.27×10^{-09} * ($TL^{\wedge 3.08}$)	701	0.94	TL (mm): 301 – 1109
				W. Wt (kg): 0.26 – 14.00
FL (mm) to W. Wt (kg)	W. Wt = 4.65×10^{-09} * ($FL^{\wedge 3.15}$)	740	0.95	FL (mm): 280 – 1040
				W. Wt (kg): 0.20 – 14.00
FL (mm) to G. Wt (kg)	G. Wt = 1.51×10^{-09} * ($FL^{\wedge 3.15}$)	1885	0.97	FL (mm): 290 – 1055
				G. Wt (kg): 0.23 – 17.04

2.15. *FIGURES*

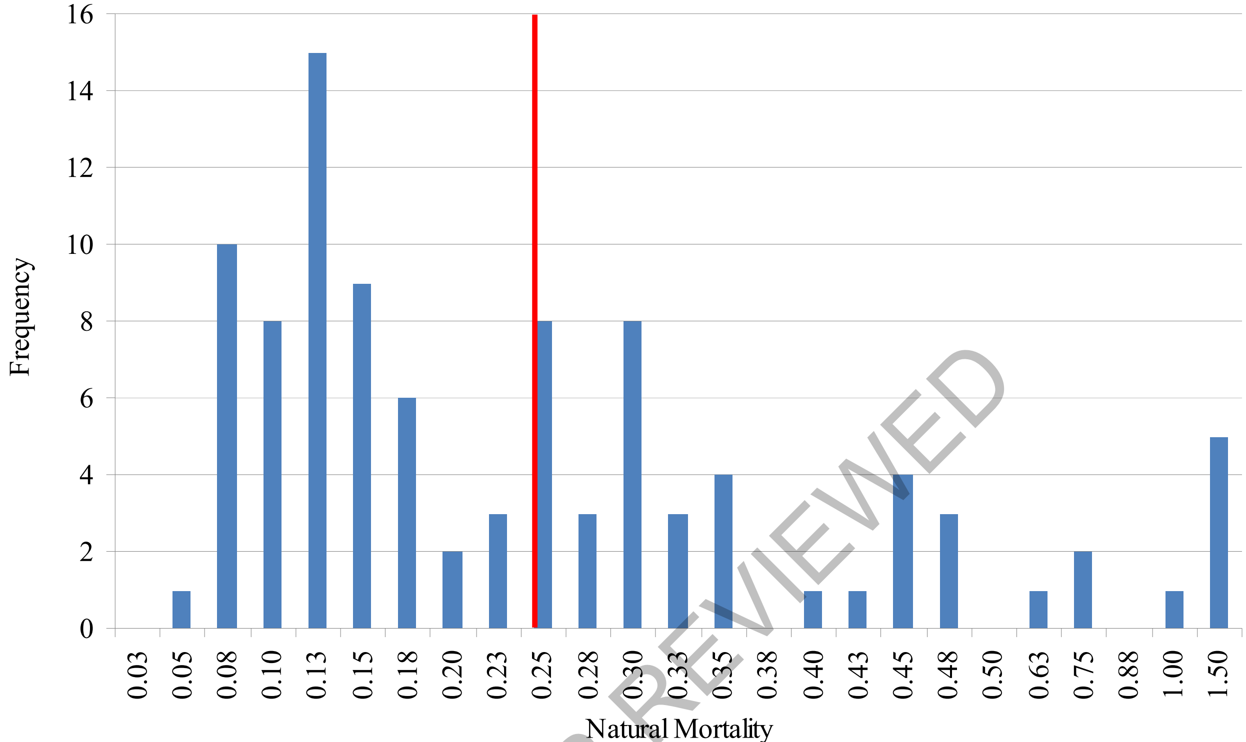


Figure 1. Distribution of natural mortality estimates (M) derived from permutations of available data sets and mortality equations (Table 2). Estimates of M considered as plausible were those where M<= Z (from catch curve analyses). Each bin value represents maximum value. Red line indicates upper bound for M, based on Z approximately = 0.25 (estimates 0.26 - 0.29; S22-DW-01).

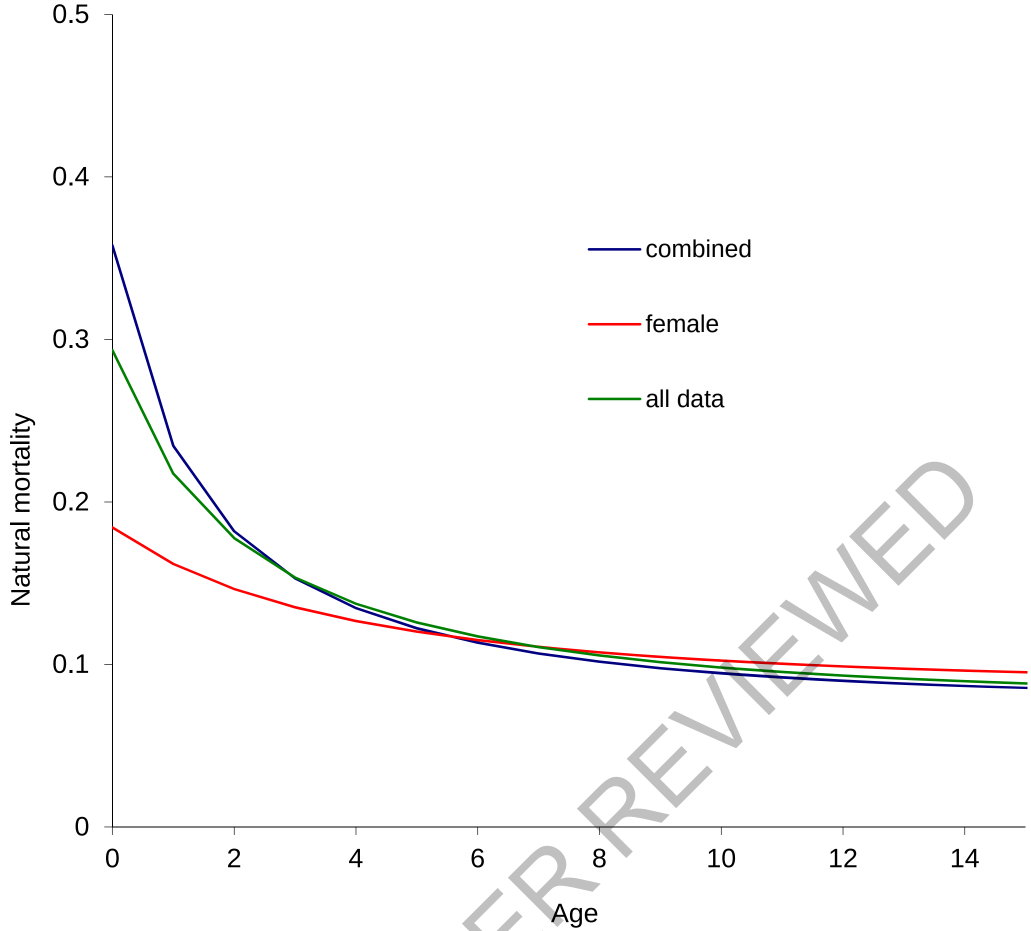
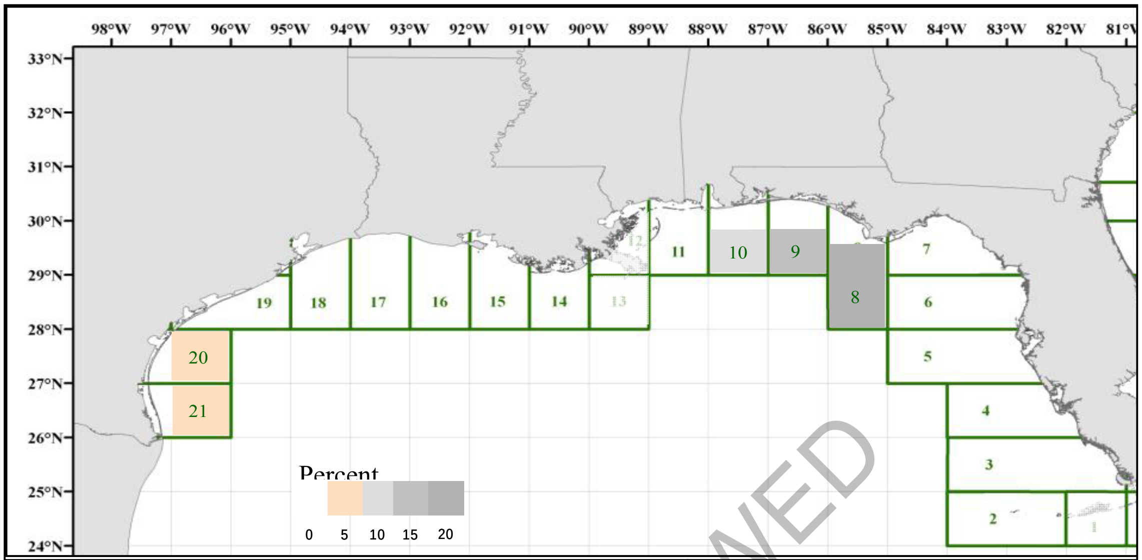


Figure 2. Lorenzen M projections based upon inputs of fixed values of $Hoenig_{fish}$ M for records where sexes were distinguished and data combined, females only, and all available records regardless of whether sex was noted (See Tables 1 and 2).

a. Gulf of Mexico



b. frequency of occurrence

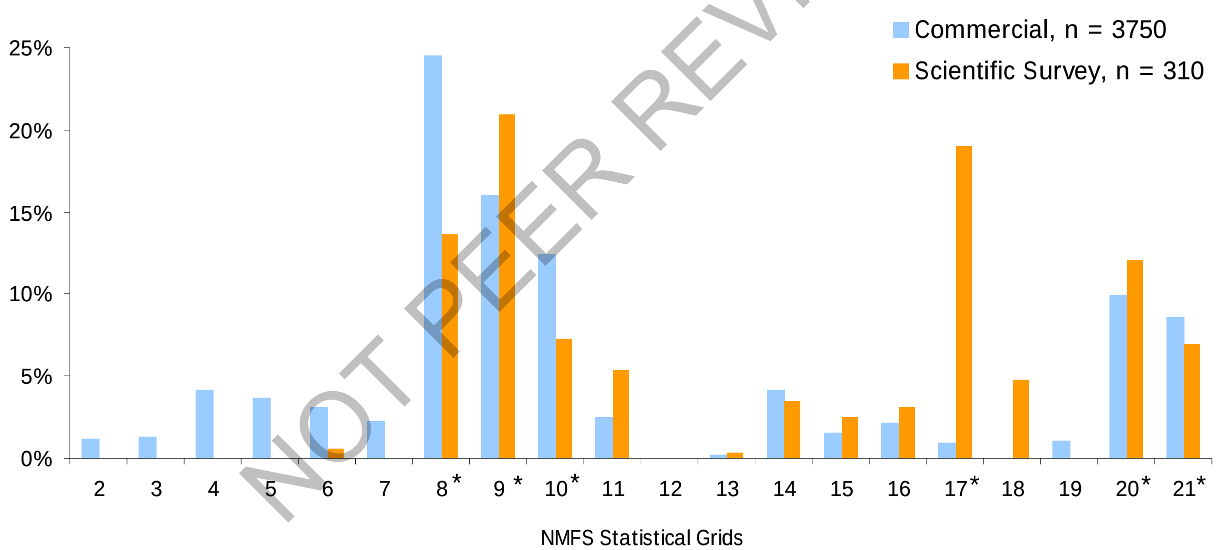
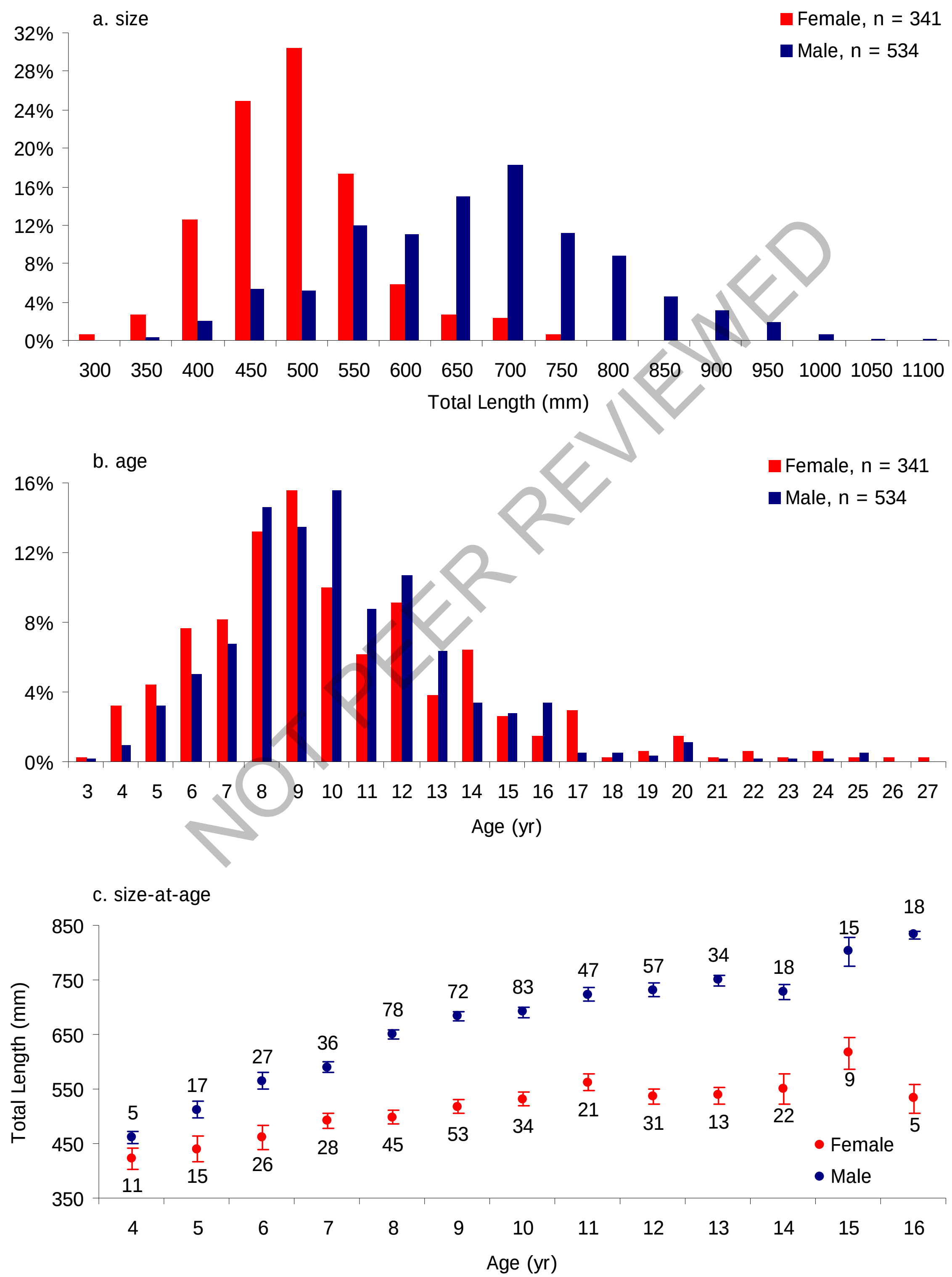


Figure 3. Description of the capture locations of golden tilefish from the Gulf of Mexico as reported through dockside interview for the commercial longline fishery and through reported latitude and longitude of scientific longline surveys: (a) map of the Gulf of Mexico displaying the NMFS Statistical Grids, shaded areas represent the percentage of commercial longline fish caught; (b) frequency of occurrence by source and NMFS Statistical Grid.

Figure 4. Sex-specific description of (a) size, (b) age, and (c) size-at-age ($n \geq 5$; mean ± se) of golden tilefish from the Gulf of Mexico (2000-2009). Sample sizes above and below error bars by sex, respectively.



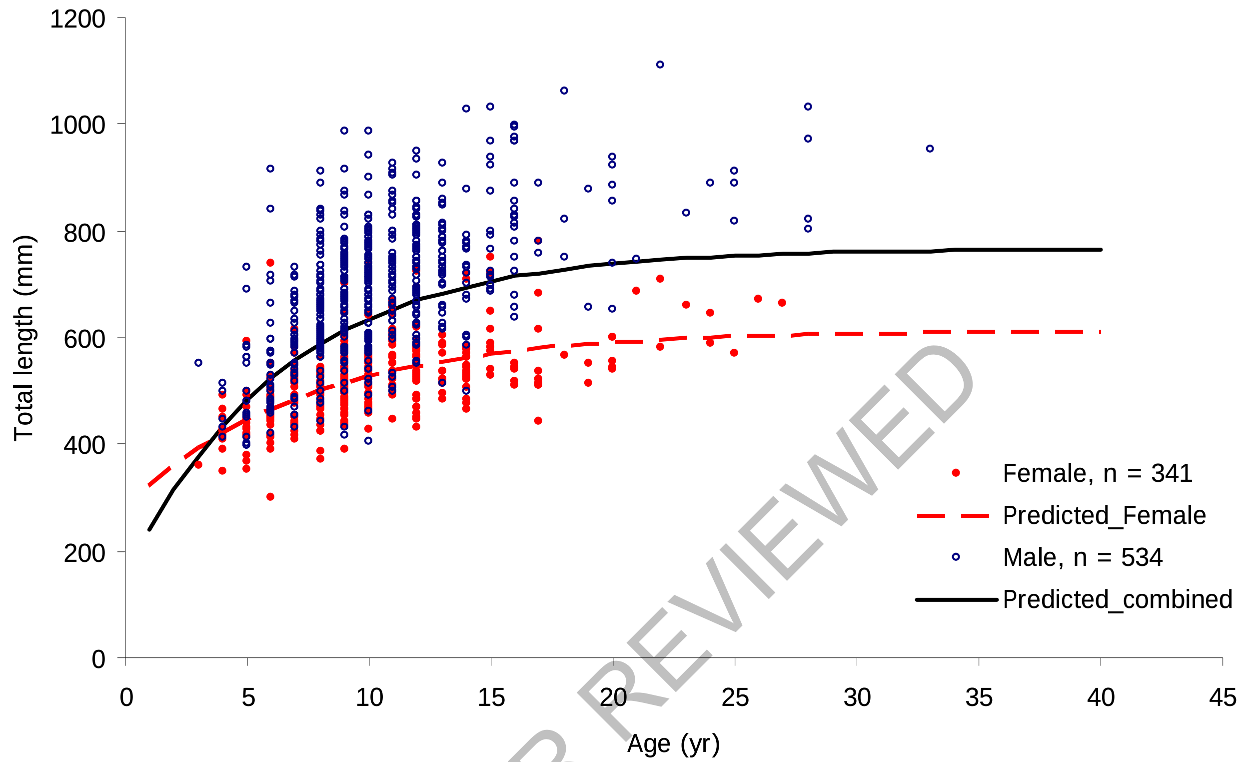
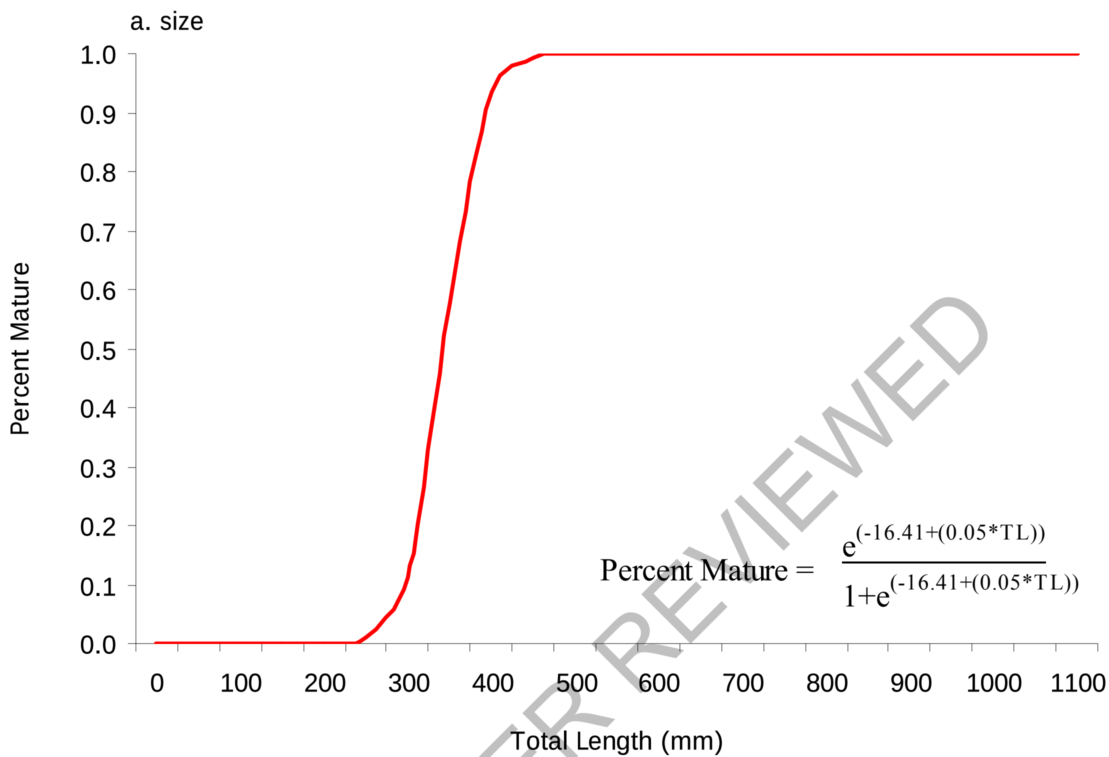


Figure 5. Results of von Bertalanffy growth model for sex-specific data fit to observed total length and ages for golden tilefish collected 2000-2009 from the Gulf of Mexico.

Figure 6. Logistic regressions for (a) size (344 mm) and (b) age (2 yr) at maturity for female golden tilefish from the Gulf of Mexico.



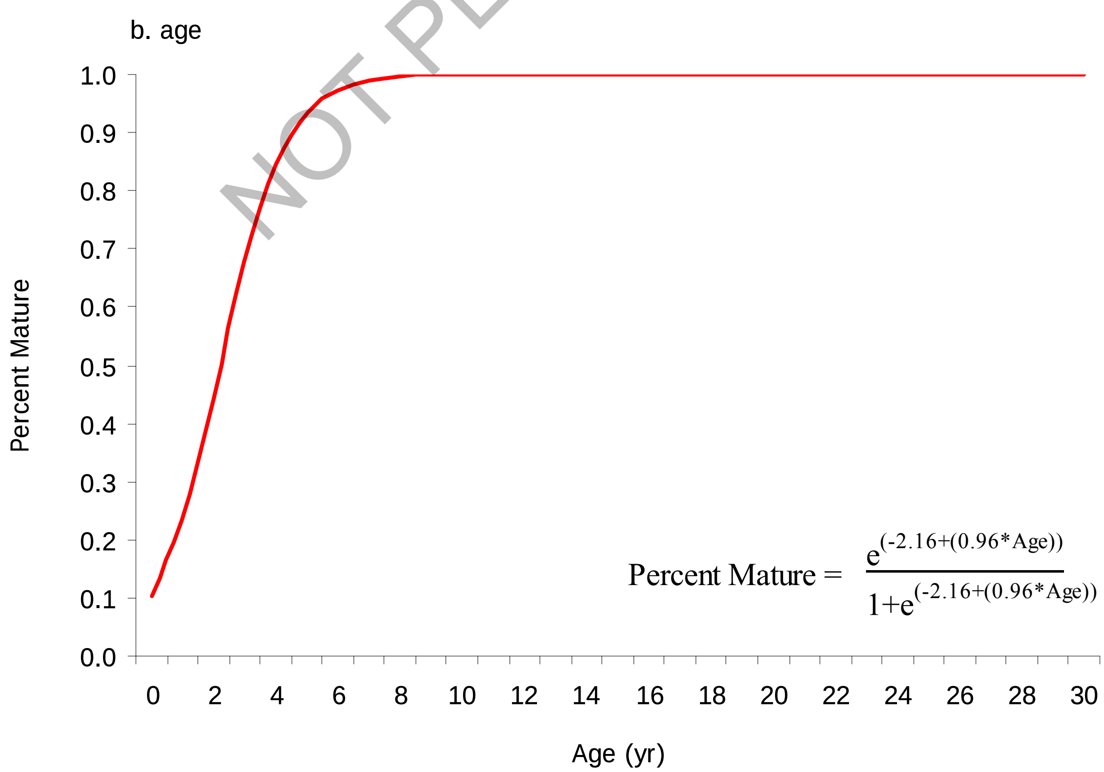
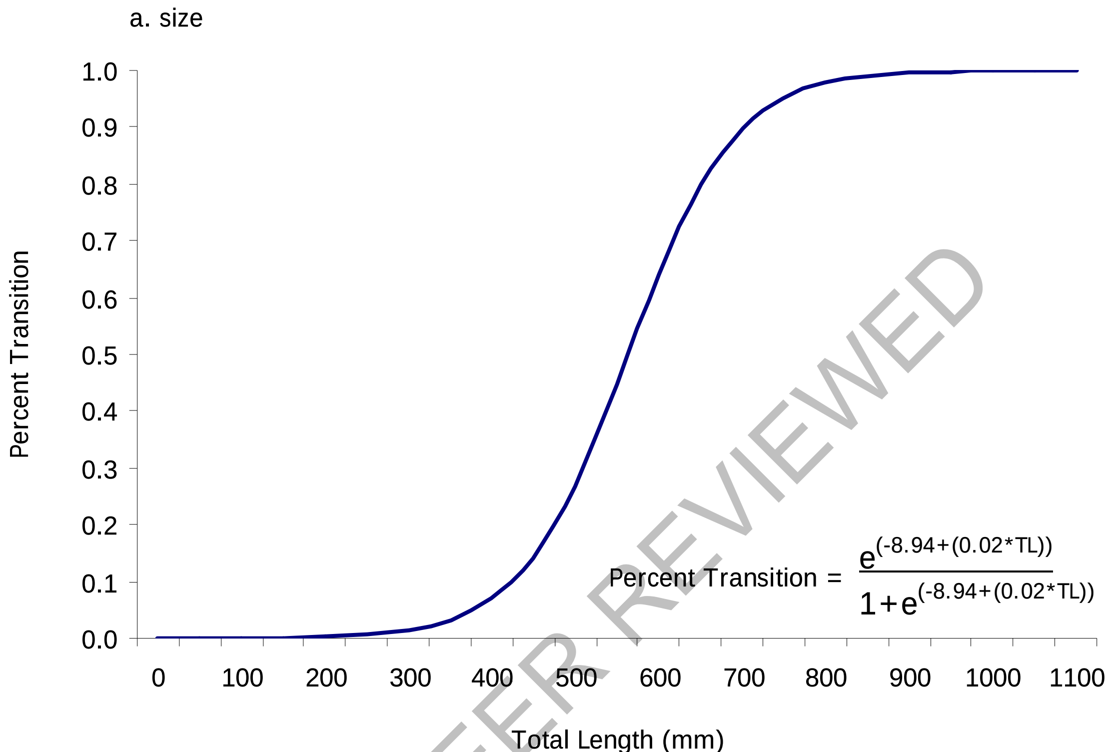


Figure 7. Logistic regressions for (a) size (564 mm) and (b) age (-yr) at transition for golden tilefish from the Gulf of Mexico, assuming protogyny (transition from female to male) occurs.



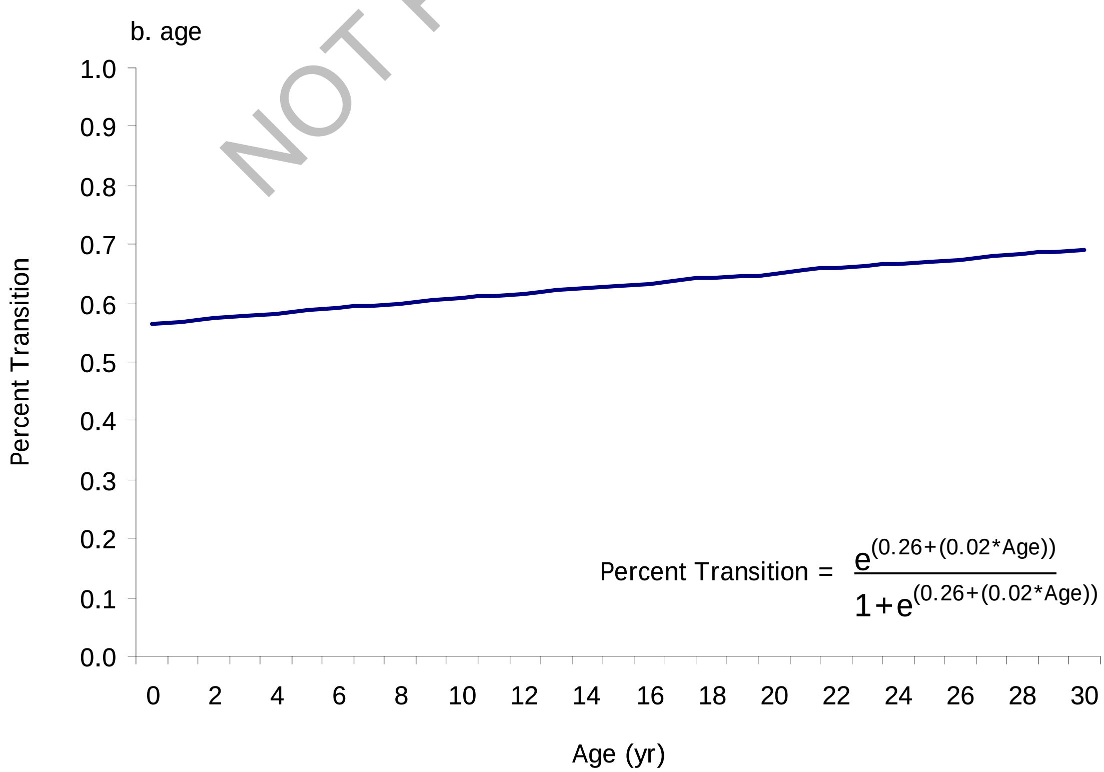


Figure 8. Golden tilefish from the Gulf of Mexico sex ratio determined from 2008-2009 directed Cooperative Research Project.

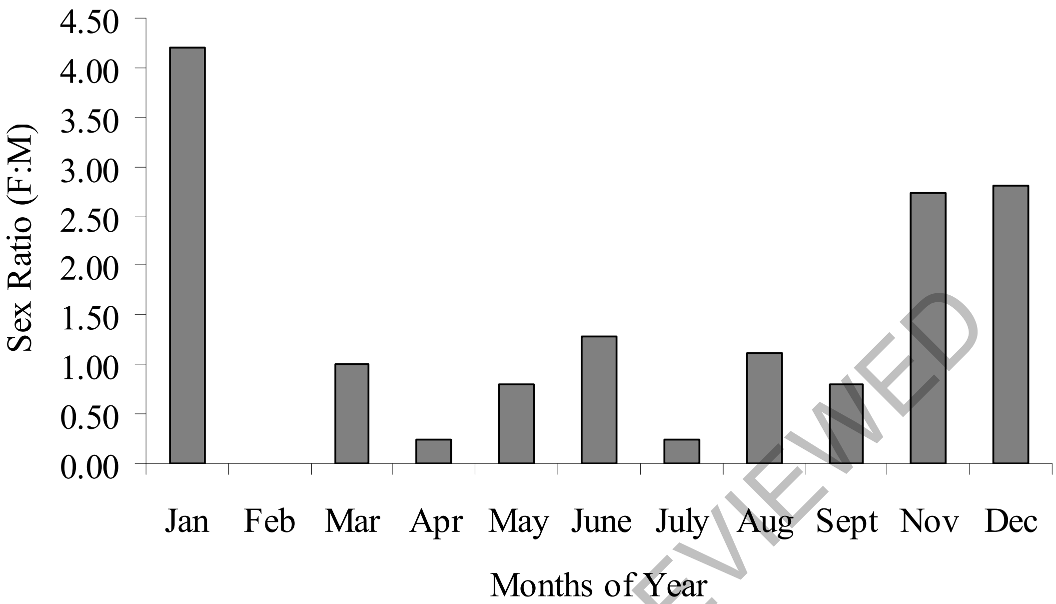


Figure 9. Comparison of mean ± se female somatic weight (whole weight minus gutted weight, n = 341, primary vertical axis), and mean ovary weights of spawning (hydrated, n= 44) and active (vitellogenic, n= 19) females by age.

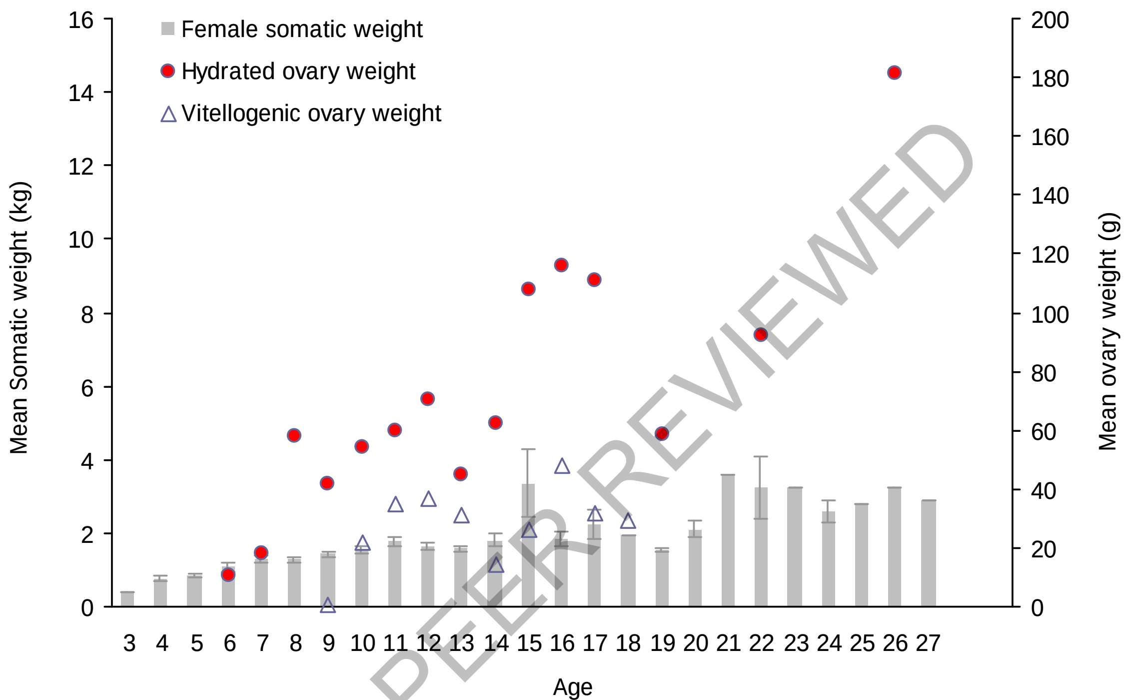
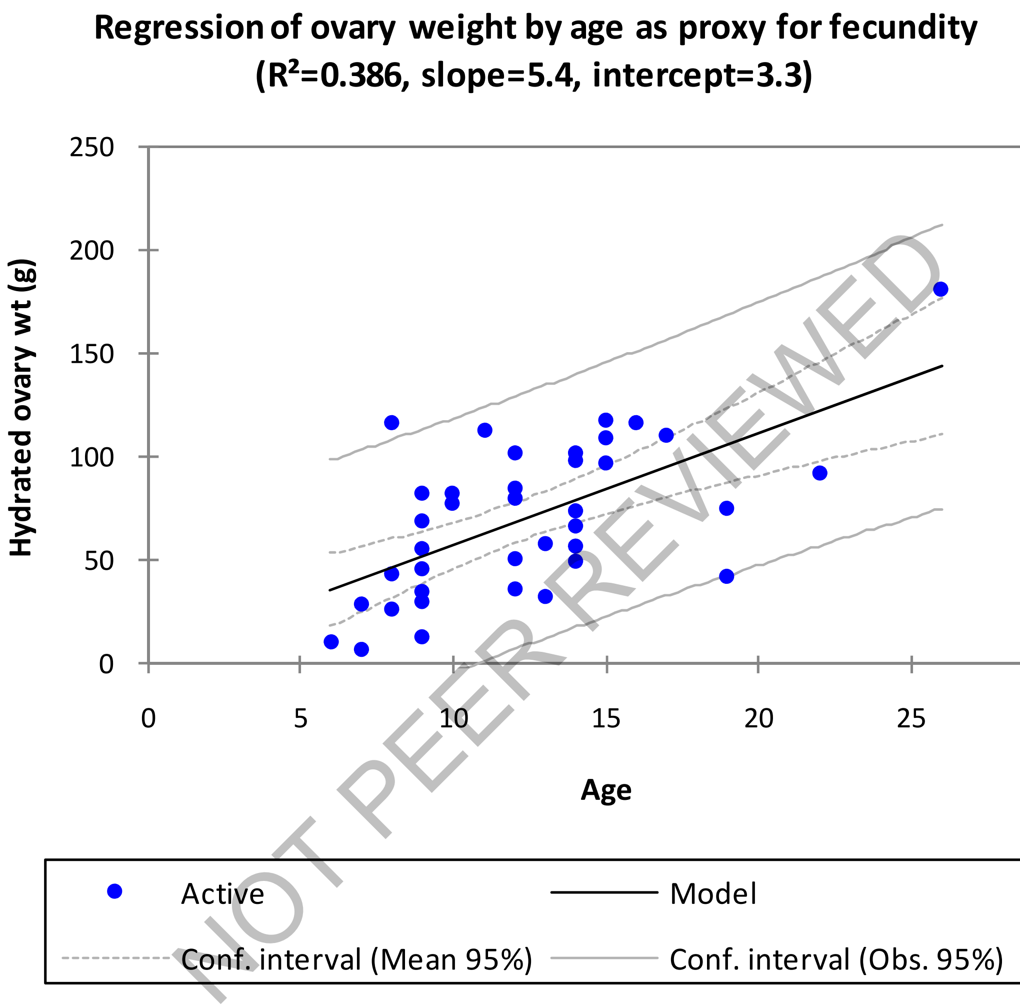


Figure 10. Proxy for fecundity based upon ovary weights of tilefish females in spawning condition.



3. COMMERCIAL STATISTICS

3.1. *OVERVIEW*

The deepwater grouper-complex consists of eight species of fishes from 3 families of fishes, groupers (5 species), tilefishes (2 species) and a snapper species. The primary three species of importance and considered in the SEDAR 22 data workshop for stock assessment are the yellowedge grouper *Epinephelus flavolimbatus*; tilefish (often imprecisely called golden tilefish) *Lopholatilus chamaeleonticeps;* and blueline tilefish *Caulolatilus microps*. The other five secondary species also in the deep water grouper complex are warsaw grouper *Epinephelus nigritus*; snowy grouper *Epinephelus niveatus*; misty grouper, *Epinephelus mystacinus;* speckled hind *Epinephelus drummondhayi*; and queen snapper *Etelis oculatus*. These five secondary species were not considered in the data workshop, although commercial landings were presented.

3.1.1. Group Membership

Refik Orhun (Group Leader).. NMFS-Miami
Steve Turner... NMFS-Miami
Kevin McCarthy.. NMFS-Miami
John Quinlan .... NMFS-Miami
Bob Spaeth ....Commercial Fisheries
Martin Fisher..Commercial Fisheries
Brad Kenyon ....Recreational Fisheries
Linda Lombardi .... NMFS-Panama City
Gary Fitzhugh .... NMFS-Panama City
Debbie Fable ....NMFS-Pascagoula
Charlie Bergmann ....NMFS-Pascagoula
Melissa Cook ....NMFS-Pascagoula
Richard Fulford... SSC - Univ. of Mississippi
Harry Blanchet ....Louisiana Sea Grant
Yong Chen……………...... ....CIE Reviewer - Univ. of Maine

3.1.2. Issues

Commercial landings of (golden) tilefish and to some degree blueline tilefish were explored to address a variety of issues. Some are evident from the list of working papers presented and discussed. Other issues included the historical onset and composition of the deep water grouper complex long line (LL) and vertical line (VL = hand and bandit or electric line) fisheries and separation of blueline from golden tilefish:

(1) Commercial landings

(2) Discards

(3) Length Frequency Distribution of samples by gear

   a. Mis-identification or mislabeling of blueline tilefish as (golden) tilefish in the most of the Southeastern Gulf fishing area, statistical areas or shrimp grids 1-5 from 1980-1991

(4) Composition of the deep water fisheries landings for golden tilefish 1980 to 1990 prior to recording of blueline tilefish landings in the Southeastern Gulf, i.e. statareas 1-5, and comparison of landings of both species 1992-1996 in the statarea, after blueline tilefish were properly identified and recorded

3.2. *REVIEW OF WORKING PAPERS* (Author and Presenter)

All SEDAR 22 Data Workshop (DW) working papers relevant to the commercial fisheries group were presented, reviewed, and discussed during the data workshop. The recommendations resulting from the discussion will be presented in each the relevant chapter, e.g. size distribution of landings samples by gear, misidentification, discards, effort, etc. Below is the list of the papers reviewed in the group

SEDAR **-22 DW-17:** Commercial Landings of Yellowedge Grouper, Golden Tilefish, and Blueline Tilefish from the Gulf of Mexico region (Refik Orhun)

SEDAR **-22-DW-15:** Recreational Survey Data for Yellowedge Grouper, Tilefish (Golden), and Blueline Tilefish in the Gulf of Mexico (Vivian Matter, Author; Richard Fulford, Presenter)

SEDAR **-22-DW-04:** Discards of Yellowedge Grouper, Golden Tilefish, and Blueline Tilefish from commercial fishing vessels in the Gulf of Mexico (Kevin McCarthy)

SEDAR**-22-DW-10:** Observed Length frequency distributions and otolith sampling issues for tile fish caught in the Gulf of Mexico from 1984 to 2009 (Ching-Ping Chih, author; John Quinlan, presenter)

SEDAR**-22-DW-11:** Length frequency distributions for blue line tile fish caught in the Gulf of Mexico from 1984 to 2009 (Ching-Ping Chih, author; John Quinlan, presenter)

SEDAR**-22-DW-12:** Estimation of species misidentification in the commercial landing data of tile fish in the Gulf of Mexico from 1984 to 2009 (Ching-Ping Chih, author; John Quinlan, presenter)

3.3. *COMMERCIAL LANDINGS*

3.3.1. Historical Catch Area

Prytherch (1983) divided the fishing grounds of the bottom longline fishery into three regions; Southern Gulf (SE), Northeastern Gulf (NE) and Western Gulf (W) (Figure 3.1). On the basis of similar landings species composition we propose a similar stratification of the 21 Gulf of Mexico ‘shrimp grid’ or ‘**statareas**’ extending from statistical area 1 at the Southeastern edge of the Gulf of Mexico in Monroe county, North of the US 1 Line, to the West to statistical area 21 ending at the Texas US/Mexican Border (Figure 3.2) into three fishing regions. This classification differs from Prytherch only in that the Western Gulf region includes statistical areas 13-21 and the Northeastern Gulf encompasses stat areas 6-12. These regions also generally reflect similarities in the species composition of bottom longline trips from each of the three areas. These spatial classifications will be used in the assessment modeling as well. The general goal of these classifications is to partition the assessment into areas which have received fairly similar levels of overall fishing mortality over time, while maintaining enough aggregation of the data so that there are few missing cells for age composition, CPUE or landings.

3.3.2. Discussion of Methods to Calculate Landings of Golden and Blueline Tilefish

For the development of the historical landings record prior to 1986, commercial fishermen and dealers who had fished during that period from the mid-70’s onward, Bob Spaeth, Martin Fisher, Gregg Abrams and others were asked to recollect the early fishery on yellowedge grouper and deepwater-complex fishery, e.g. snowy grouper, speckled hind, tilefish and blueline tilefish. Several fish houses were contacted by phone during the working group sessions and their comments were incorporated in the discussion and recommendations of the group.

In response to the anecdotal observations that most of the tilefish catch in statistical grids south of statistical grid-6 were blueline tilefish (also known as grey tilefish), we calculated the ratio of the number of golden to blueline captured in scientific bottom long line surveys and fishing trips with observers aboard on a set by set basis:

$$Ratio = \frac{No.Golden}{(No.Golden + No.Blueline)}$$

The results of this analysis are shown in Figure 3.3. Tilefish captured in areas 3, 4, and 5 were mostly blueline (grey) tilefish with a few sets capturing both species, and one with only golden tilefish.

Blueline tilefish were not reported in the commercial landings prior to 1992. Commercial fisherman reported that blueline were caught prior 1992 and landings recorded as golden tilefish in statistical fishing areas 1-5 in 1965-1991 would likely have included a lot of blueline tilefish. .

Accordingly golden tilefish and blueline tilefish landings were analyzed together for the period of 1992-1996, when both species were classified and reported separately. The proportions of the 1992-1996 combined landings were calculated for each species and gear. Those proportions could then be used to partition the 1965-1991 of golden tilefish landings. The combined analysis was done separately for each gear to maintain a higher level of accuracy than would have been achieved if the analysis had used combined gears.

The results of the analysis of landings by species and gear are shown in Table 3.1 and Figure 3.4. The following percentages were calculated by gear and species from 1992 to 1996:

- 27 % of vertical line landings from 1992-1996 in statareas 1-5 were reported as golden tilefish
  73% of vertical line landings from 1992-1996 in statareas 1-5 were reported as blueline tilefish
- 41% of long line landings from 1992-1996 in statareas 1-5 were reported as golden tilefish
- 59% of long line landings from 1992-1996 in statareas 1-5 were reported as blueline tilefish

These percentages by species and gear were multiplied by the reported landings of golden tilefish in statistical areas 1-5 from 1965 to 1991 to adjust for the fraction of landings which were actually blueline tilefish as recommended by the SEDAR 22 data workshop landings group.

In contrast to the treatment of the yellowedge landings (where three regions were used), the working group decided to divide the golden tilefish landings into two regions and to use only one region for blueline tilefish. The golden tilefish landings were separated into an East (stat areas 1-12) and West (stat areas 13-21); it was noted that golden tilefish landings were quite low in stat areas 1-5. For blueline tilefish only one region was used because they are only infrequently caught west of statistical area 12.

Updated commercial landings of Gulf of Mexico golden tilefish from 1965-2009 were compiled by gear type based on recommendations by the SEDAR 22 data workshop, see above and Table 3.2 and Figure 3.5.). Updated commercial landings of Gulf of Mexico blueline tilefish from 1965-2009 were compiled by gear type based on recommendations by the SEDAR 22 data workshop, see above and Table 3.3and Figure 3.6.

3.3.3 Mis-Identification

The working group reviewed two documents on mis-identification of yellowedge grouper and golden tilefish. Members of the group had extensive discussions both during the workshop and after on ways of calculating quantities of mis-identified fish eventually concluding that with adequate sample size the two proposed methods yielded identical results.

The group also concluded that in the years when sample sizes were adequate, the amounts of the total landings of yellowedge and golden tilefish which had been classified as other species (bony fish, unclassified grouper, …) was sufficiently low compared to the calculated total landings of yellowedge and golden tilefish, that it could be neglected.

Mis-identification Sampling and Calculation

The misidentification and improper allocation of fishes into (other species recorded as yellowedge) and out of (yellowedge recorded as other species) the yellowedge grouper landings estimates is discussed in SEDAR 22- DW-13. (Note: The same issue holds for tilefish as described in SEDAR 22 – DW 12.) The Data Workshop requested a secondary analysis of yellowedge misidentified as general grouper, bony fishes, and black grouper. The focus of this analysis was to examine the occurrence of misidentified yellowedge in those three landings categories. Rather than base this estimate on the number of yellowedge sampled as described in SEDAR 22 – DW 13, the Workshop recommended basing the calculations on the number of the general grouper, bony fishes, and black grouper sampled. This issue was thoroughly reviewed algebraically and through an examination of sampling protocols.

Algebraically, the DW-13 method simplifies to consideration of the reported landings and sampling data. The sampling data is used to generate estimates of the proportion of yellowedge grouper reported by dealers as some other species (bony fish, for instance). The sampling data also provides the total number of yellowedge grouper identified by the port agents. Note that these estimates are based on sampling of individual trips and the reports submitted by dealers. The ratio of these two estimates multiplied by the reported landings returns the number or weight of yellowedge grouper that must be added to the reported landings to estimate the true landings. If sample sizes are adequate, this method does correctly estimate the misidentified landings.

An examination of TIP sampling protocols indicates that implementing the methods suggested by the Data Workshop would greatly increase the uncertainties in the estimation of a misidentification rate. This is because dealers often categorize landings such as bony fish or unclassified grouper after TIP agents have already done their dock-site sampling. As a result, it is not feasible to conduct random sampling of fish that belong to bony fish or unclassified grouper landings. Consequently, estimation of species compositions for bony fish or unclassified grouper can be biased. Also, sampling for the dominant misidentification categories (bony fish, unclassified grouper, and black grouper) is inconsistent and of low intensity especially in the early years of the sampling program. Low intensity sampling in combination with low misidentification rates, can create biases which will exacerbate uncertainty issues.

Recommendation: Although the method suggested by the Data Workshop is mathematically valid, and perhaps conceptually cleaner, the sampling protocols of the TIP program were not structured to allow accurate estimation of misidentification rates by this method. The method suggested by the Data Workshop introduces an additional source of uncertainty because the exact landing categories often cannot be determined at the time of dock site sampling, and because the low sampling intensity common to general categories such as bony fish or unclassified grouper can result in biased estimates of misidentified landings for a target species.

Further, review of the methods specified in SEDAR 22 – DW 12 and SEDAR 22 – DW 13 indicates that, when sampling intensity is sufficient, they produce fully adequate, unbiased estimates of the number of fish misidentified and true landings. Given this, no change in the approach taken in documents SEDAR 22 – DW 12 and SEDAR 22 – DW 13 is recommended.

3.2. *COMMERCIAL DISCARDS*

Data from the SEFSC coastal fisheries self-reported logbook program were used to calculate the number of golden and blueline tilefish discarded during the period January 1, 1990 through December 31, 2009.A detailed description of the available data and methods used for calculating discards are available in SEDAR22-DW-04.

Too few trips reported golden or blueline tilefish discards for any reliable discard calculation to be completed for those species (Table 3.4).Those data could not be provided when categorized by year and deep-water grouper season (open or closed) due to confidentiality restrictions. Only yellowedge grouper discards were calculated, although the available discard reports were very limited for that species, as well.

The number of trips reporting yellowedge grouper and tilefish discards in the Gulf of Mexico was low. This was particularly true of the tilefish species and the deep-water grouper open season yellowedge grouper data. Given that the observed discard observations were so few, the discard rate of yellowedge grouper may be poorly characterized. Even with the limited available data, it does appear likely that the majority of yellowedge grouper discards occur during closed seasons and that yellowedge grouper discards are likely to be few. An additional concern associated with these data is the high percentage of trips that report “no discards”. Vessels selected to report discards must submit discard logbooks or report no discards to remain in permit compliance. The percentage of logline trips reporting no discards for a trip has ranged from 20 to 42 percent. Such high rates of “no discards” reports seem unlikely, suggesting that discards have been underreported in general. The calculated discards provided here should be used with caution, given the limitations and uncertainties of the available data.

3.3. *COMMERCIAL EFFORT*

Total effort reported to the coastal logbook program from the commercial golden tilefish, blueline tilefish, and yellowedge grouper fisheries is provided in Table 3.5. Effort of all trips reporting landings of one pound or more of those species was summed by year. Effort totals are provided for logline and vertical line (hand line and electric reel/bandit rig) vessels only. Very few landings of golden tilefish, blueline tilefish, or yellowedge grouper were reported from vessels fishing other gears. Total yearly logline and vertical line effort in the Gulf of Mexico is provided in Table 3.6 for comparison.

3.4. *BIOLOGICAL SAMPLING: SIZE COMPOSITION BY GEAR TYPE*

3.4.1. Tilefish Length Composition Data from Trip Intercept Program

Length measurements for individual golden tilefish sampled in the Trip Intercept Program were examined to see if the length distributions from the handline and longline fisheries differed. Figure 3.7. shows the length frequency distributions for these two golden tilefish fisheries. Handline length frequency distributions were near normal and shifted toward larger individuals in comparison to longline samples. Longline length frequency distributions were left skewed (smaller fish predominated). To test whether or not the two fisheries were producing the same length frequency distributions, a quantile-quantile plot was produced (Figure 3.8.). This plot indicates that the two distributions differ from one another primarily in the tails of the distributions. The distribution-free two-sample Kolmogorov-Smirnov analysis was used to test whether or not the two data sets were drawn from the same distribution. This test indicated that the longline and handline length measurements were not drawn from the same distribution (p-value << 0.05). Recommendations: Handline and longline fisheries for tilefish do not produce identical length frequency distributions. This can arise through differences in selectivity or through an interaction between the locations of the fisheries and the spatial distribution of the population of golden tilefish. Given these observations, handline and longline fisheries should be treated as different fleets in the assessment.

3.5. *COMPARISION BETWEEN TIP AND AGE AND GROWTH LENGTH FREQUENCIES*

Two SEDAR 22 Data Workshop reports (S22-DW-09 and S22-DW–10) indicated that there were differences between the length frequencies derived from the length and otolith samples from the Trip Interview Program. The Data Workshop recommended a review of the issue. Subsequent review indicates that the length frequencies distributions of the two sample types are different in some years, particularly in the early years of the sampling programs (Figure 3.9). The length frequency distributions of the two sample types are reasonably similar in the more recent years of the sampling period. It is recommended that the assessment team adjust (reweight) the data used for determining the catch-at-age and growth relationships in the assessment model on a year-by-year basis. This will ensure that proper corrections are made when required, and that all the data will be handled in a consistent manner.

3.6. *COMMENTS ON ADEQUACY OF DATA FOR ASSESSMENT ANALYSES*

The commercial landings working group considered the landings of golden tilefish in statistical areas south of statistical area 5 to be mostly blueline tilefish and only some proportion golden tilefish. This update of landings reduces golden tilefish landings and increases blueline tilefish landings according to the landings working group's recommendation. The years especially affected are 1965-1990. Previous estimates of blueline tilefish landings began in 1991, now with this update, blueline landings begin in 1965. Although from fishermen reports it seems certain that mostly blueline tilefish are caught in statistical areas 1-5, there is an uncertainty regarding if there are also some catches of golden tilefish. This may be happening to certain extent in statistical area 1 and with boats from other areas that fish deeper waters for Golden Tilefish instead of Yellowedge grouper that is said to be distributed somewhat shallower and associated with a different bottom sediment type.

Golden tilefish and blueline tilefish are the primary species managed within the Gulf of Mexico tilefish quota. The golden tilefish fishery is considered to be relatively distinct from the yellowedge fishery while the blueline tilefish is a major by-catch of the yellowedge grouper fishery, where fishermen report about 3,000 lbs. of blueline tilefish are caught for every 10,000 lbs. of yellowedge grouper. Additionally the price of blueline tilefish is less than half of the price of golden tilefish. Due to these differences between the fisheries and in the markets for golden tilefish and blueline tilefish, fishermen expressed a sincere interest in a separation of quotas for golden and blueline tilefish in the Gulf of Mexico.

Decision: To determine the amount of Blueline tilefish in statistical areas 1-5 from 1980 to 1991, Blueline to Golden Tilefish proportions were analyzed in the years 1991-1995 and used to calculate blueline tilefish landings in 198-1991.

3.7. *LITERATURE*

Prytherch, H.F. (1983). A descriptive survey of the bottom long line fishery in the Gulf of Mexico. NOAA Technical Memorandum NMFS-SEFSC-122. 33p.

3.8. ***TABLES***

Table 3.1. Analysis of golden and blueline tilefish commercial landings 1992-1996 in the Southeastern Gulf of Mexico, statistical fishing areas (statareas) 1-5 by gear (in lbs whole wt). These calculated proportions were applied back to golden tilefish landings from 1965-1991 from statareas 1-5 and separated into golden and blueline tile landings according to the analysis shown in below and in Figure 3.4.

	Golden Tilefish			Blueline Tilefish		
YEAR	HandLine+	LongLine	Grand Total	HandLine+	LongLine	Grand Total
1992	54%	18%	21%	46%	82%	79%
1993	44%	40%	41%	56%	60%	59%
1994	14%	57%	52%	86%	43%	48%
1995	15%	39%	36%	85%	61%	64%
1996	5%	42%	35%	95%	58%	65%
Grand Total	27%	41%	39%	73%	59%	61%

Table 3.2. Calculated commercial landings of Gulf of Mexico golden tilefish from 1965-2009 (in lbs whole wt) by gear type based on recommendations by the SEDAR 22 data workshop.

YEAR	VL East	LL East	VL West	LL West	Gulf Total
1965	6,973	-			6,973
1966	2,003	-			2,003
1967	1,077	-			1,077
1968	1,474	-			1,474
1969	314	-			314
1970	-	-			-
1971	3,288	-			3,288
1972	1,104	-			1,104
1973	3,995	-			3,995
1974	4,205	-			4,205
1975	14,823	-			14,823
1976	24,635	-			24,635
1977	36,400	-			36,400
1978	*	0	*	0	24,221
1979	29,329	5,721	0	1,185	36,235
1980	19,223	6,900	0	1,805	27,927
1981	129,643	*	0	*	247,495
1982	60,935	*	0	*	302,040
1983	*	138,546	*	79,731	233,062
1984	*	*	*	102,759	302,015
1985	10,005	*	*	164,477	278,577
1986	*	*	9,837	126,478	332,638
1987	*	*	19,848	269,525	537,044
1988	*	*	47,304	555,682	950,182
1989	40,768	102,741	63,536	247,572	454,617
1990	*	*	*	160,521	355,819
1991	18,473	*	*	51,793	214,229
1992	13,413	*	14,761	*	212,259
1993	15,630	*	*	110,300	284,485
1994	12,560	*	*	107,548	388,386
1995	*	*	*	298,051	473,682
1996	1,453	120,964	2,957	85,196	210,570
1997	*	287,849	*	*	337,262
1998	*	224,529	*	*	297,147
1999	*	219,320	4,396	*	374,412
2000	4,239	269,764	5,523	199,911	479,437
2001	16,033	337,594	295	130,394	484,317
2002	9,669	246,741	1,591	282,939	540,939
2003	3,457	235,683	2,171	159,164	400,475
2004	3,070	283,647	*	*	467,286
2005	4,024	342,227	4,285	238,446	588,982
2006	5,858	247,364	*	*	311,215
2007	1,042	291,486	2,073	24,156	318,758
2008	136	290,043	327	58,086	348,591
2009	1,336	351,098	80	58,308	410,823

* Confidential data are blanked out

Table 3.3. Calculated commercial landings of blueline tilefish from 1980-2009 (in lbs whole wt) from the eastern Gulf of Mexico, statistical fishing areas 1-12 by gear type based on recommendations by the SEDAR 22 data workshop.

YEAR	VL East	LL East	VL West	LL West	Gulf Total
1965	18,927	-			18,927
1966	5,437	-			5,437
1967	2,923	-			2,923
1968	4,000	-			4,000
1969	853	-			853
1970	-	-			-
1971	8,924	-			8,924
1972	2,996	-			2,996
1973	8,057	-			8,057
1974	10,961	-			10,961
1975	23,677	-			23,677
1976	28,665	-			28,665
1977	26,833	-			26,833
1978	17,301	-			17,301
1979	32,208	8,228			40,436
1980	13,529	1,783	-	-	15,313
1981	*	*	-	-	146,632
1982	*	*	-	-	36,468
1983	16,570	5,412	-	-	21,982
1984	*	*	-	-	18,073
1985	*	*	-	-	23,069
1986	*	*	-	-	36,382
1987	*	*	-	-	84,116
1988	*	*	-	-	89,413
1989	48,025	6,336	-	-	54,361
1990	*	*	-	-	81,169
1991	*	*	-	-	105,454
1992	18,699	117,835	1,516	1,209	139,260
1993	24,394	68,560	*	227	94,470
1994	*	*	*	81	132,837
1995	16,090	71,596	60	242	87,988
1996	*	47,632	*	100	63,882
1997	18,610	169,428	*	*	188,402
1998	17,149	98,691	*	*	116,083
1999	14,532	70,750	*	*	85,423
2000	6,567	104,874	709	215	112,365
2001	16,342	83,959	2,633	17	102,952
2002	14,092	59,834	*	*	74,997
2003	10,642	91,264	*	*	102,036
2004	15,327	123,054	*	*	138,471
2005	15,129	86,851	*	-	101,991
2006	15,816	128,945	*	-	144,834
2007	14,029	124,674	43	*	138,765
2008	9,427	175,784	118	*	185,351
2009	12,348	105,201	*	*	117,591

Table 3.4. Tilefish reported trips and discards, all years (2002-2009) all areas in the Gulf of Mexico. Number of discards per trip differed between open and closed seasons, however so few vessels reported tilefish discards that those data cannot be presented if stratified by open/closed season due to confidentiality restrictions.

Species	Gear	Total trips reporting discards	Total discards reported
Blueline Tilefish	Vertical lines	3	68
	Logline	13	3,498
Golden tilefish	Vertical lines	3	981
	Logline	11	3,509

Table 3.5. Reported golden tilefish, blueline tilefish, and yellowedge grouper total commercial fishing effort by year and gear fished in the Gulf of Mexico. Effort is defined as: logline – hooks fished and vertical line – hook hours fished. No trips reported blueline tilefish landings prior to 1993.

Year	Golden Tilefish		Blueline Tilefish		Yellowedge Grouper	
	Logline	Vertical line	Logline	Vertical line	Long line	Vertical line
1990	20,650	1,040			791,035	99,370
1991	108,500	5,400			2,522,020	441,027
1992	1,075,000	64,866			2,098,220	482,698
1993	2,594,250	135,590	2,005,250	567,496	4,571,870	956,650
1994	6,932,075	162,965	4,693,875	898,625	9,424,561	1,307,637
1995	6,236,350	123,126	3,490,965	969,045	9,089,235	1,277,702
1996	4,110,850	116,560	1,517,430	852,144	6,006,520	1,103,339
1997	5,888,940	542,766	4,538,250	1,242,228	10,807,900	2,050,354
1998	4,916,652	237,388	3,943,072	1,027,750	8,833,422	1,726,876
1999	5,673,450	430,605	3,006,200	843,317	10,646,450	1,898,750
2000	7,456,880	259,038	4,576,300	1,313,126	11,349,830	2,022,895
2001	5,922,225	164,764	3,551,050	1,028,506	9,779,535	1,918,324
2002	4,629,702	265,156	2,278,300	867,862	6,907,956	2,235,470
2003	6,613,000	312,199	3,536,280	771,210	11,584,630	2,177,766
2004	5,711,598	354,598	3,059,200	524,475	8,210,618	1,215,133
2005	4,583,876	285,094	1,903,716	417,132	6,177,386	945,872
2006	3,504,900	81,999	2,748,150	407,758	6,688,896	650,908
2007	3,339,650	191,992	2,076,950	347,626	6,977,050	784,539
2008	3,484,770	204,106	2,253,800	308,538	5,175,470	554,300
2009	2,866,200	173,140	1,854,650	299,472	5,202,350	804,327

Table 3.6. . Total effort by year in the Gulf of Mexico reported to the coastal logbook program. Effort is defined as: logline – hooks fished and vertical line – hook hours fished.

Year	Long line	Vertical line
1990	2,860,561	523,538
1991	7,540,045	1,672,538
1992	6,534,972	1,854,139
1993	20,672,475	3,647,862
1994	25,182,372	4,264,703
1995	23,207,479	5,120,010
1996	19,824,375	4,578,622
1997	29,199,055	7,011,492
1998	27,203,196	6,717,985
1999	33,491,739	7,658,254
2000	28,375,357	7,396,677
2001	27,302,818	7,388,187
2002	22,980,633	7,606,856
2003	28,149,288	7,865,746
2004	26,832,283	6,536,835
2005	21,676,581	5,587,754
2006	24,766,701	5,262,599
2007	19,868,725	5,745,021
2008	17,834,960	5,008,894
2009	9,294,394	5,839,076

3.9. ***FIGURES***

Figure 3.1. Historical Major Long line Fishing Grounds (Prytherch 1982).

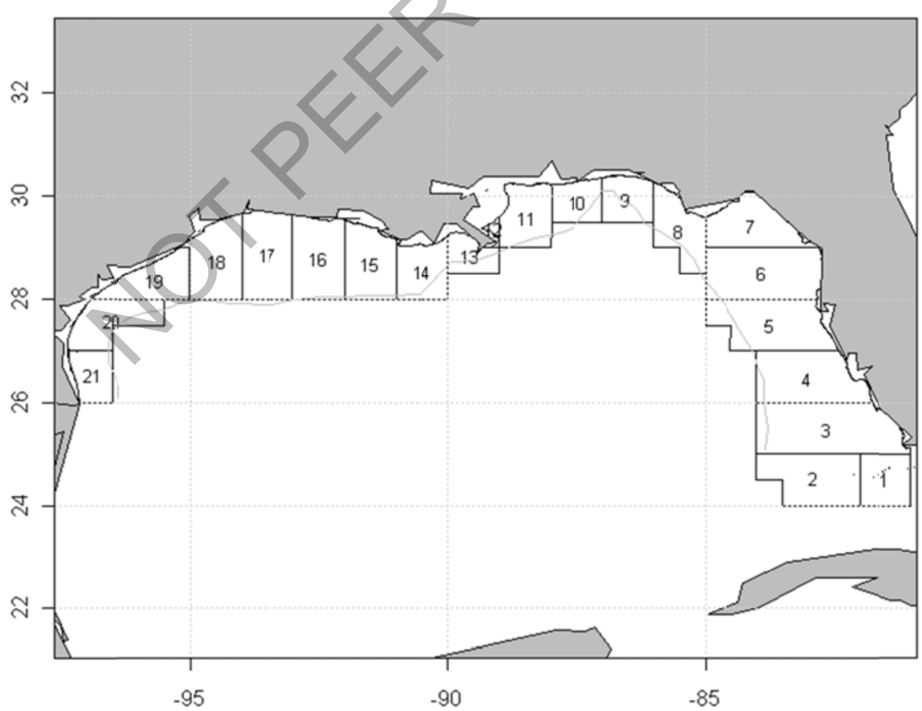


Figure 3.2. Statistical fishing or 'statareas' 1-21 in the Gulf of Mexico ranging from about Key West, FL in the Southeast to the Texas US/Mexican border in the Western Gulf.

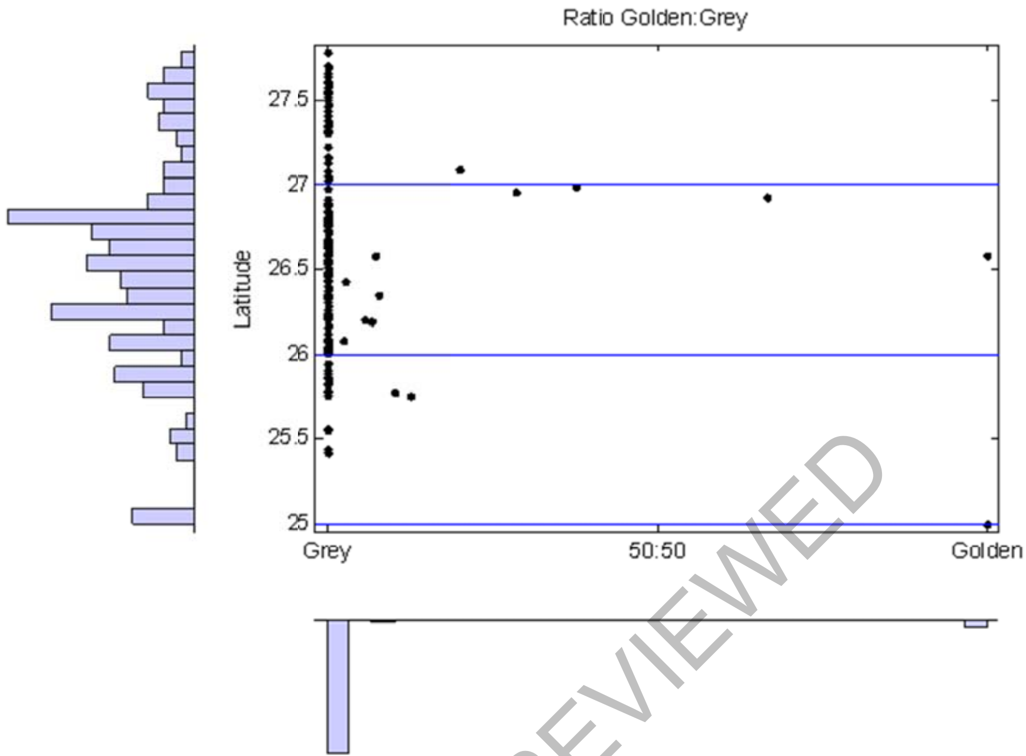


Figure 3.3. Ratio of golden tilefish to blueline (grey) tilefish. The main panel shows the distribution of the calculated ratio of golden: blueline tilefish by latitude for all scientific or observed long line sets along the West Florida Shelf. The histogram on the left shows the distribution of sets by latitude. The histogram on the bottom shows the distribution of the calculated ratio. Numbers along the right hand side indicate statistical grids. Horizontal blue lines demark the boundaries between statistical grids. The vast majority of scientific or observed long line sets in statistical grids3, 4, and 5 captured blueline (grey) tilefish. Those in statistical grid 2 captured only golden tilefish. Note that due to confidentiality, all observations in grid-2 were plotted as along latitude 25 degrees.

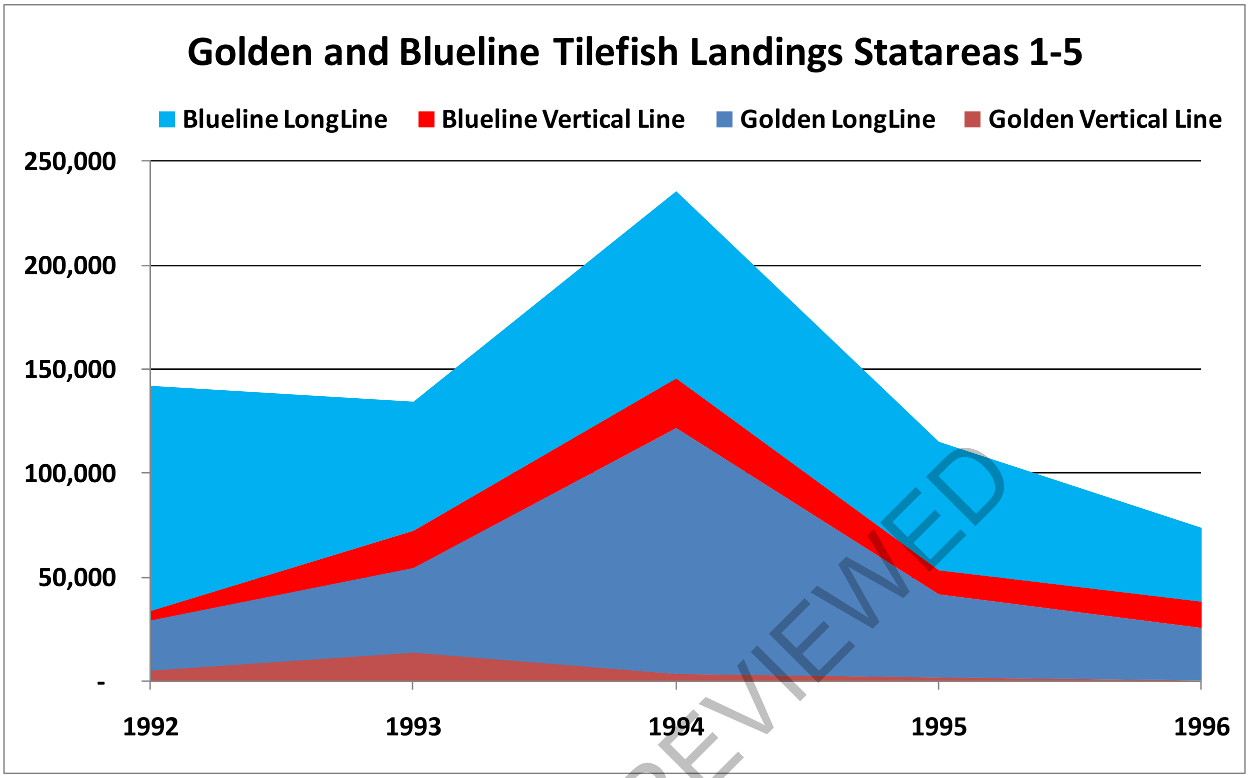


Figure 3.4. Golden and Blueline tilefish commercial landings for the Southeastern Gulf, statistical fishing areas 1-5, by gear from 1992-1996. Corresponding data are in Table 3.3.8

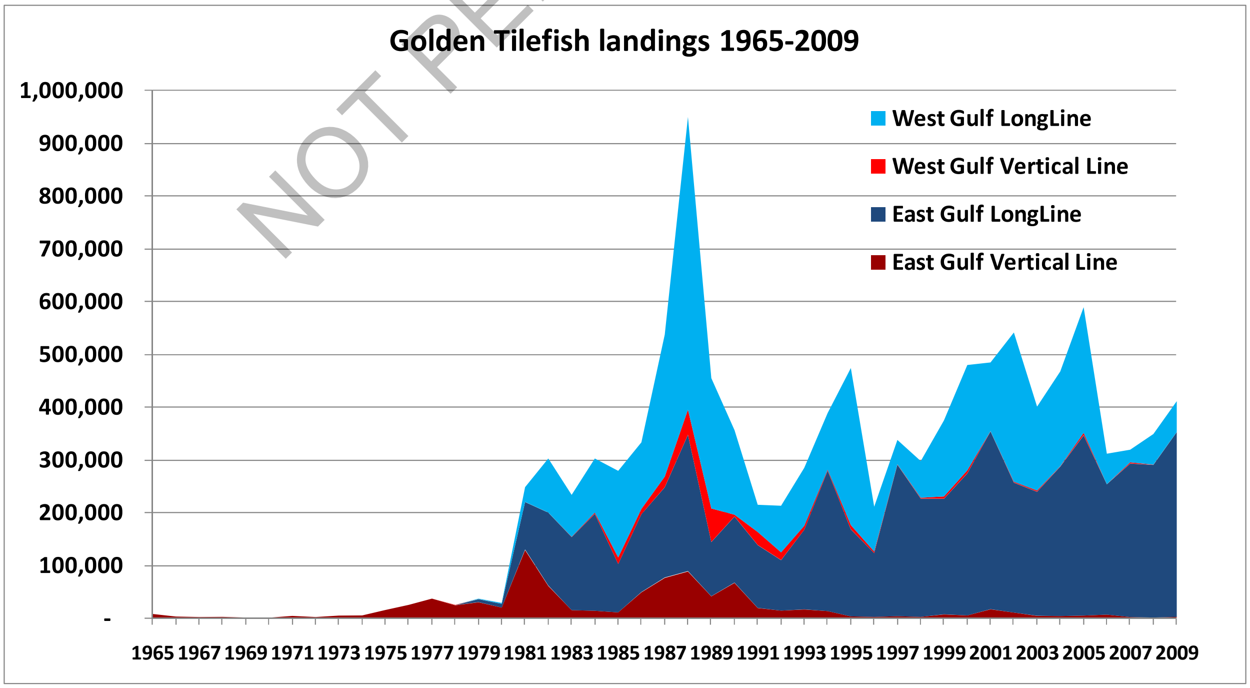


Figure 3.5. Calculated commercial landings of golden tilefish from the Gulf of Mexico management region gear type from 1967-2009.

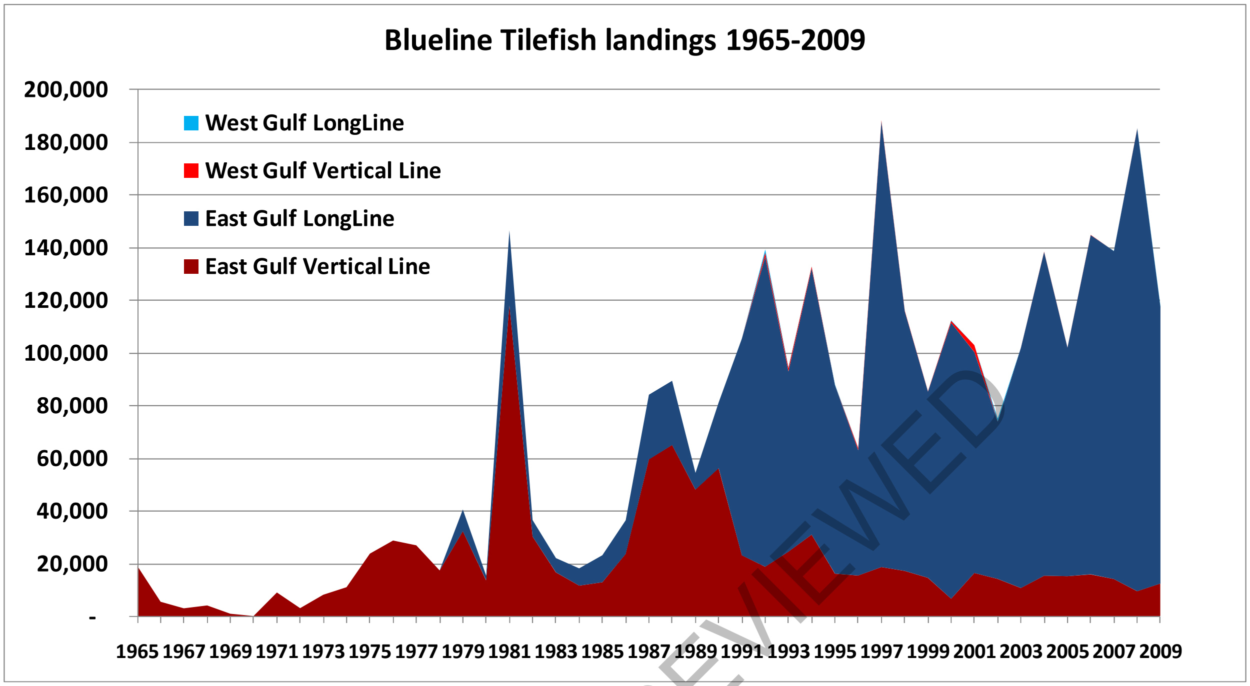


Figure 3.6. Updated calculated commercial landings of blueline tilefish from the Eastern Gulf of Mexico statistical fishing areas 1-12by gear 1980-2009.

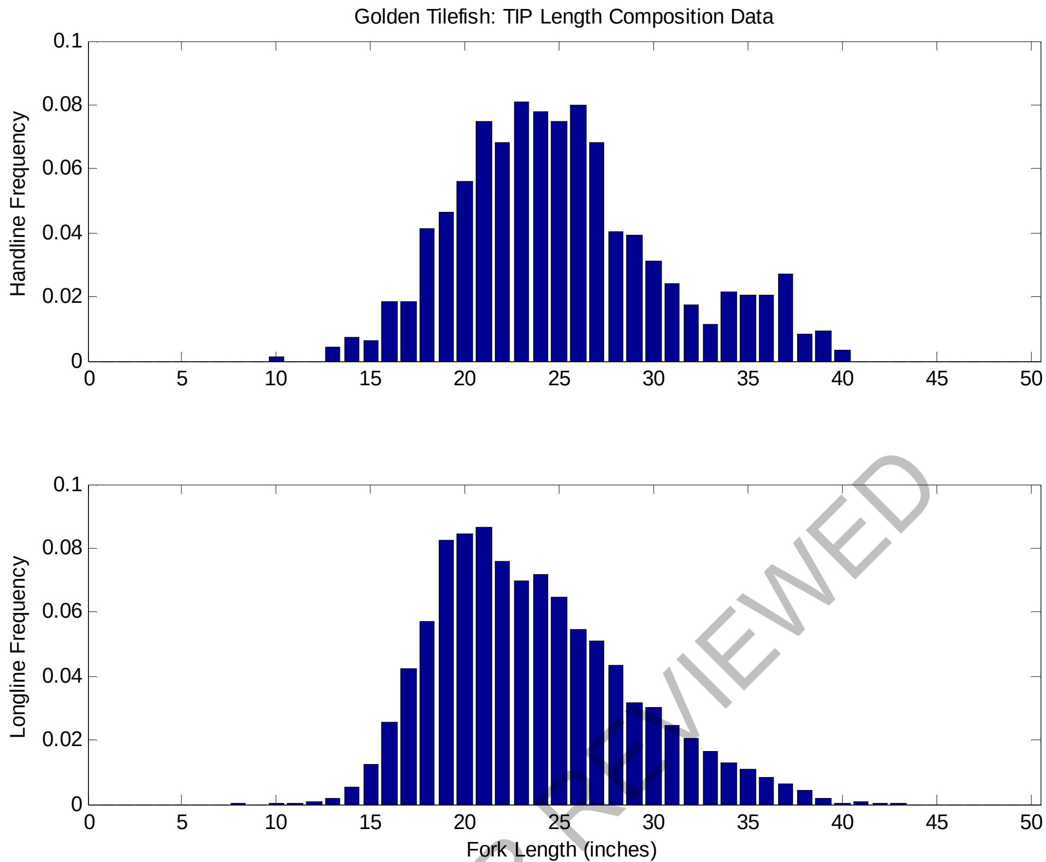


Figure 3.7. Length frequency distributions for the Golden Tilefish handline (top panel) and longline (bottom panel) Trip Intercept Program data. There were 1,007 length observations from the handline fishery and 15,767 observations from the longline fishery.

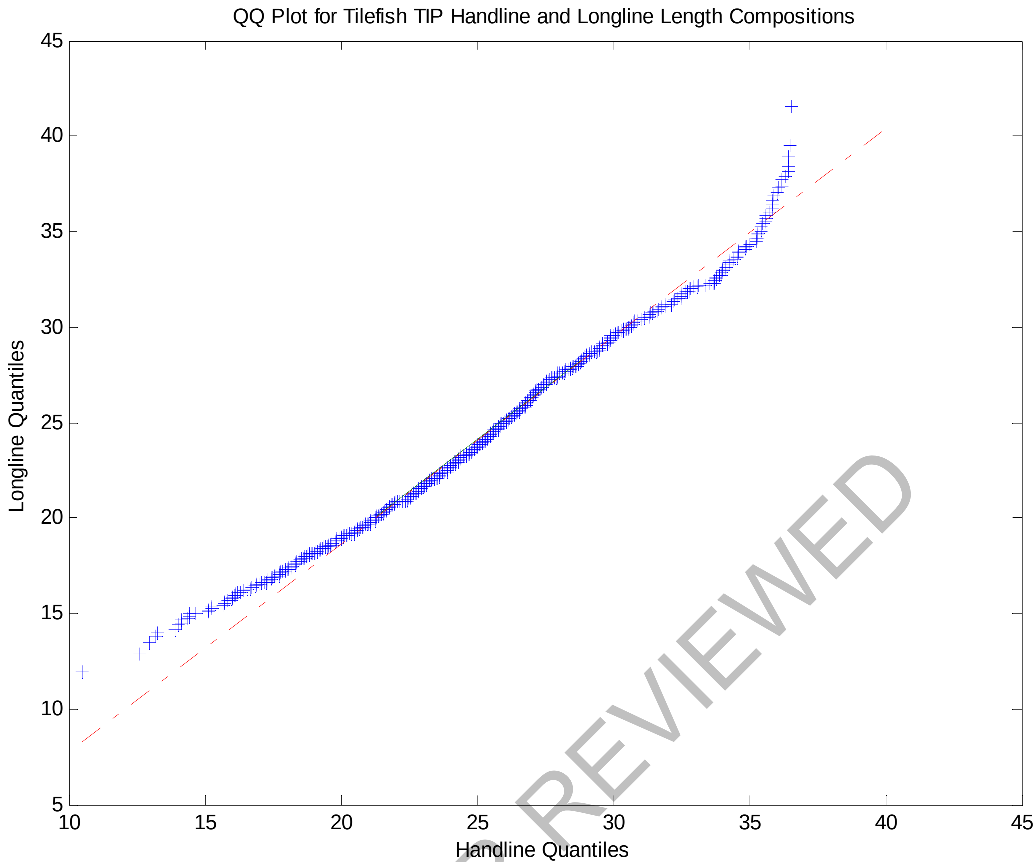


Figure 3.8. Quantile-Quantile plot for the golden tilefish handline and long line length data measured by the Trip Intercept Program. This plot demonstrates deviations between the handline and longline length frequency distributions. Data drawn from identical distributions would fall on the red dotted line.

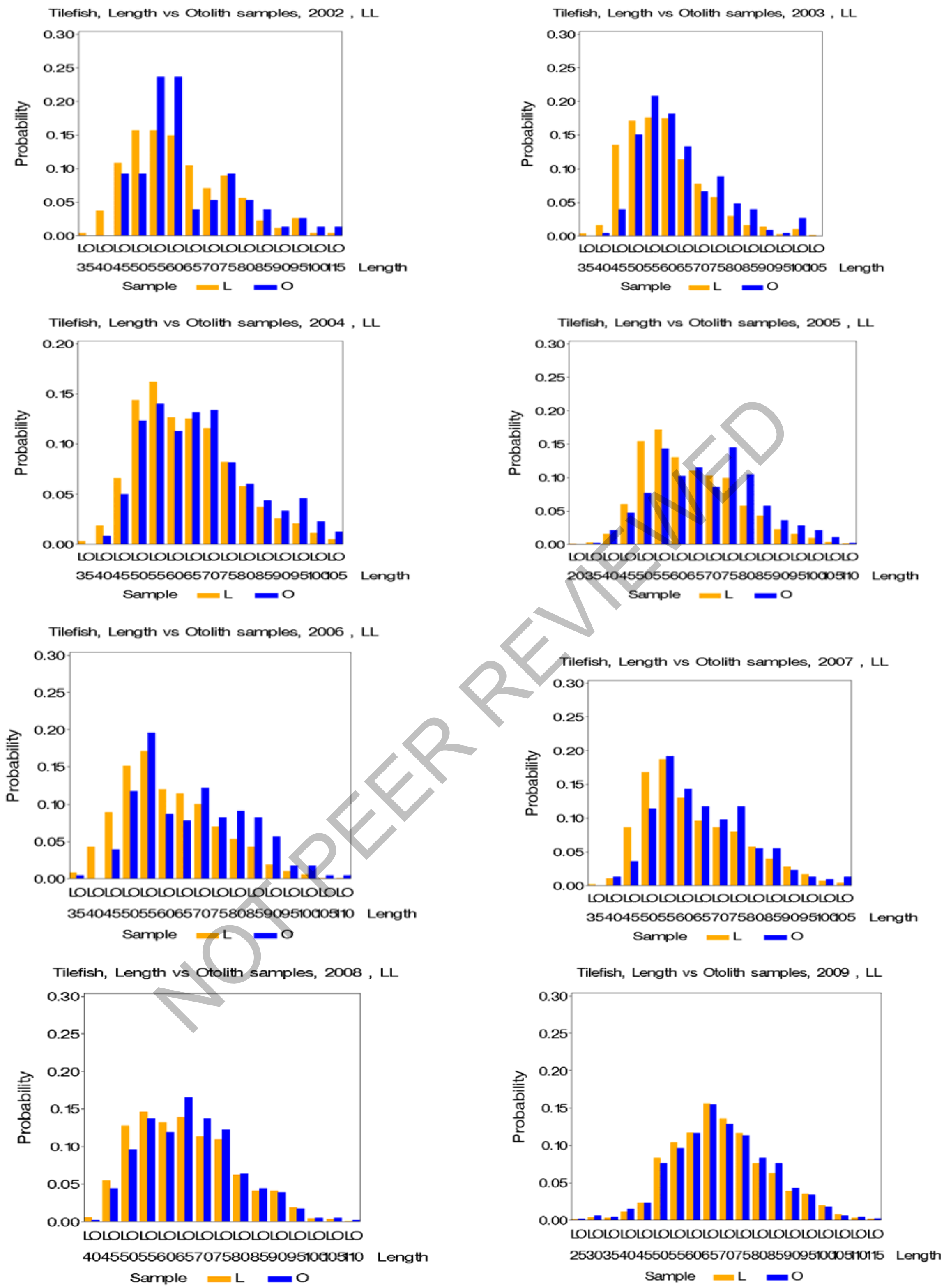


Figure 3.9. Comparisons of tilefish length frequency distributions derived from TIP length and otolith samples from 1986 to 2009. Orange bars indicate data derived from length samples, blue bars indicate data derived from otolith samples. Lengths (x-axis) are given in centimeters.

4. RECREATIONAL STATISTICS

4.1. *OVERVIEW*

4.1.1. Group membership:

Refik Orhun (Group Leader).. NMFS-Miami
Steve Turner.. NMFS-Miami
Kevin McCarthy... NMFS-Miami
John Quinlan .... NMFS-Miami
Bob Spaeth .... Commercial Fisheries
Martin Fisher.. Commercial Fisheries
Brad Kenyon .... Recreational Fisheries
Linda Lombardi .... NMFS-Panama City
Gary Fitzhugh .... NMFS-Panama City
Debbie Fable .... NMFS-Pascagoula
Charlie Bergmann .... NMFS-Pascagoula
Melissa Cook .... NMFS-Pascagoula
Richard Fulford.. SSC - Univ. of Mississippi
Harry Blanchet .... Louisiana Sea Grant
Yong Chen……………...... ....CIE Reviewer - Univ. of Maine

4.1.2. ISSSUES:

The recreational landings for tilefish in the Gulf of Mexico are small in comparison to landings in the commercial sector and for this reason the recreational and commercial landing s groups were merged.The primary issue with estimates of recreational landings of tilefish are the validity of data for several years in which landings were abnormally high. This will be addressed below.

4.2. *REVIEW OF WORKING PAPERS*

Two working papers were provided to the working group (DW-15 and 16).The first summarized estimates of recreational landings since 1982 based on three surveys: The MRFSS survey, the NMFS Headboat survey (HBT), and the Texas Parks and Wildlife Department recreational harvest survey. Data were given as number of fish landed per year estimated for each region or sector. The second working paper summarized an approach for filling in missing weight data when it was not provided as a part of the catch estimates.

4.3. *RECREATIONAL LANDINGS*

Recreational landings of were sporadic and low as reported in the three recreational surveys; typically less than 1,000 lbs in all years except 1981 and 1987.The data as originally presented in DW-15 reported landings of over 49,000 fish in 1981 and over 4,000 fish in 1987.It was the consensus of the data workshop panel, particularly members from the fishing community that estimates for these years were overestimates most likely due to misallocation of catch from the Atlantic side of Florida that was landed in Monroe Co. The group recommended that the recreational catch data be recalculated after all intercept and effort data for Monroe Co., Fl was removed. Recreational landings in number of fish and weight in numbers of fish are shown in Tables 4.1.

4.4. *RECREATIONAL DISCARDS*

Recreational discards were reported only for the MRFSS survey and were given by year in DW-15. It was the consensus of the Data workshop panel that these data be recalculated as described in section 4.3. There were no recreational discards for golden tilefish from 1987 to 2008 as shown in Table 4.1 (last two columns on the left).

4.5. *BIOLOGICAL SAMPLING*

Due to very low amount of recreational landings and its accordingly very low impact on the stock assessment process, biological sampling was not considered in the data workshop.

4.6. *RECREATIONAL CATCH-AT-AGE DATA*

Due to very low amount of recreational landings and its accordingly very low impact on the stock assessment process, sampling of recreational catch-at-age/length was not considered in the data workshop.

4.7. *RECREATIONAL EFFORT*

Estimates of recreational effort were not provided to the working group but they were included in the conversion of recreational survey data to total catch. No recommendations were made by the working group regarding the estimation of recreational effort for Golden Tilefish.

4.8. *COMMENTS ON ADEQUACY OF DATA FOR ASSESSMENT ANALYSES*

Members of the working group expressed concern regarding the validity of the estimates for 1982 and 1987. The overall reliability of the recreational data is not known as the nature of the effort calculation was not described. The consensus of the group was that recreational landings for Tilefish are small in comparison to commercial landings and should not therefore overly influence the assessment. For this reason, summary estimates of landings across years are being considered for generating a final estimate of total landings for the assessment model.

4.9. *TABLES*

Table 4.1. Recreational landings and discards of Golden Tilefish from 1982 to 2009 collected by two data sampling survey sources, Headboat and MRFSS. Landings exclude Monroe County and are in numbers of fish and lbs gutted weight.

Year	Headboat (#)	MRFSS (#)	Headboat (lb)	MRFSS (lb)	Discards Headboat (#)	Discards MRFSS (#)
1987		118		326		0
1990		678		3,946		0
1992	1		3			
1995	1		2			
1998	1		6			
2001	5		1			
2005		519		4,701		0
2008		64		76		0

5. MEASURES OF POPULATION ABUNDANCE

5.1. *OVERVIEW*

Several indices of abundance were considered for use in the assessment model. The possible indices came from fishery independent and dependent data sources. The DW recommended the use of one fishery independent indices (NOAA Fisheries bottom longline survey) and one fishery dependent indices (commercial logbook data).

5.1.1. Group Membership

Membership of this DW working group included Neil Baertlein, Walter Ingram (leader), Kevin McCarthy, Adam Pollack, John Walter and Elbert Whorton, with assistance from Melissa Cook and Linda Lombardi-Carlson.

5.2. ***REVIEW OF WORKING PAPERS***

The working group reviewed a two working papers and reference documents describing index construction, including:

SEDAR22-DW-03 (Commercial logbook)
SEDAR22-DW-07 (NOAA Fisheries bottom longline)

Several improvements to analyses were identified. In some cases these modifications are described in appendices to original working documents; otherwise, they are reported here. We refer the reader to the original working documents for further details on exploratory data analysis, technical analysis, and diagnostics.

5.3. ***FISHERY INDEPENDENT INDICES***

5.3.1 NOAA Fisheries Bottom Longline Survey (SEDAR22-DW-07)

5.3.1.1 General Description

The Southeast Fisheries Science Center (SEFSC) Mississippi Laboratories has conducted standardized bottom longline surveys in the Gulf of Mexico, Caribbean, and Western North Atlantic since 1995. The objective of these surveys is to provide fisheries independent data for stock assessment purposes for as many species as possible. These surveys are conducted annually in U.S. waters of the Gulf of Mexico (GOM) and/or the Atlantic Ocean, and they provide an important source of fisheries independent information on large coastal sharks, snappers and groupers from the GOM and Atlantic.

5.3.1.2 Analysis Methods & Issues Discussed at the DW

For the SEDAR 22, we used the time series of data between 2000 and 2009 to develop abundance indices for golden tilefish. Due to the effects of Hurricane Katrina on the distribution of effort, the 2005 survey was dropped. Only data from stations within the depth range of capture for golden tilefish (i.e. 125 – 365 m) were used in development of annual indices for this species. Standardized indices of abundance, based on CPUE (number of golden tilefish per 100 hook hours) were constructed using a delta lognormal modeling approach (Lo *et al.* 1992). Initially, three factors were considered for inclusion in the binomial and lognormal submodels: water depth, survey area (three demarcations in the GOM: Eastern Gulf (east of 88^o west longitude); Central Gulf (between 88^o and 93^o west longitude); and Western Gulf (west of 93^o west longitude) and year. A backward selection procedure was used to determine which variables were to be included into each submodel based on type 3 analyses with a level of significance for inclusion of $\alpha = 0.05$. If year was not significant then it was forced into each submodel in order to estimate least-squares means for each year. The findings of this initial model run are described in SEDAR22-DW-07.

During the workshop I was asked to incorporate sediment data into the delta-lognormal model. This data is summarized by Rester (2009). The variables included for testing, along with those listed above, were the amounts of mud, clay, and carbonate in core samples taken nearest to the station location and the linear critical sheer stress and sorting factor of the sediment in said core sample. Modeling methods were conducted as described above. The findings of this second model run are described in Addendum 1 of SEDAR22-DW-07.

Finally, during the data workshop, I was also asked by the stock assessment scientist to develop indices for three areas of the Gulf. These areas were based on the NMFS shrimp statistical zones, employed in many fishery independent survey designs: southwest Florida (SWFLA), zones 2-5; northwest Florida (NWFLA), zones 6-11; and the western Gulf (WEST), zones 13-21. This area variable and a variable denoting the interaction of this area and year were forced into the models developed for each species in Addendum 1 of SEDAR22-DW-07. Table 5.8.1 and Figure 5.9.1 summarize these area-specific abundance indices.

5.3.1.4 Sampling Intensity

The positions of all stations, within the depth range golden tilefish were collected (i.e. 125 – 365 m), and positions of stations where golden tilefish were captured were plotted for all survey years combined (Figure 5.9.2). Survey coverage area varied during the time series due to weather or mechanical problems. For annual maps of survey coverage, see SEDAR22-DW-07.

5.3.1.5 Size/Age Data

Length data was collected on specimens throughout the time series whenever possible. Golden tilefish range from 300 to 1250 mm total length, with an average total length of 707 mm.

5.3.1.6 Catch Rates and Measures of Precision

Catch rates (CPUE) are presented as number of golden tilefish per 100 hook hours and have been standardized as aforementioned in Analysis Methods. Measures of precision are presented as coefficients of variation (CV). The standardized and nominal CPUE as well as the CV are presented in Table 5.8.1.

5.3.1.7 Comments on Adequacy for Assessment

The workshop group recommends using this index for the assessment.

5.4. ***FISHERY DEPENDENT INDICES***

5.4.1 Commercial Logbook (Longline) (SEDAR22-DW-03)

5.4.1.1 General Description & Issues Discussed at the DW

Self-reported commercial bottom longline logbook catch per unit effort (CPUE) data were used to construct separate standardized abundance indices for golden and blueline tilefish. Golden tilefish data were sufficient to construct an index of abundance including the years 1992-2009. Data for constructing a blueline tilefish index were available for the years 1993-2009. Methods and results of those analyses are described in SEDAR22-DW-03.

5.4.1.2 Analysis Methods

Golden and blueline tilefish trips were identified separately using a data subsetting technique (modified from Stephens and MacCall, 2004) intended to restrict the data set to trips with fishing effort in tilefish habitat. For each species, targeted trips were identified independently for the eastern Gulf of Mexico (statistical areas 2-7) and the western Gulf (statistical areas 8-21). This east-west partitioning approximately matched the demarcation line at Cape San Blas where longline gear is restricted to 20 fathoms or greater depths (east) and 50 fathoms or greater depths (west). Prior to identifying targeted trips, data from areas 1 and 12 were excluded from the analyses of both species, due to small sample sizes from those areas. Data from areas 18-21 were excluded from the blueline tilefish analysis, also due to small sample size. Figure 5.9.3A-D provides species-specific regression coefficients. The magnitude of the coefficients indicates the predictive impact of each species.

The delta lognormal model approach (Lo et al. 1992) was used to construct standardized indices of abundance. Parameterization of each model was accomplished using a GLM procedure (GENMOD; Version 8.02 of the SAS System for Windows © 2000. SAS Institute Inc., Cary, NC, USA). Eight factors (year, season, area fished, longline length, days at sea, number of crew, distance between hooks) were considered as possible influences on longline proportion of trips that landed tilefish and on the catch rate of tilefish. Longline catch rate was calculated as weight of tilefish per hook fished. An additional factor, number of hooks fished, was examined for its affect on the proportion of positive trips. Factor categories are defined in SEDAR22-DW-03. For each GLM analysis of proportion positive trips, a type-3 model was fit, a binomial error distribution was assumed, and the logit link was selected. The response variable was proportion successful trips. During the analysis of catch rates on successful trips, a type-3 model assuming lognormal error distribution was examined. The linking function selected was “normal”, and the response variable was log(CPUE). All 2-way interactions among significant main effects were examined. Higher order interaction terms were not examined. YEAR*FACTOR interaction terms were included in the model as random effects.

The final delta-lognormal model was fit using a SAS macro, GLIMMIX (Russ Wolfinger, SAS Institute). To facilitate visual comparison, a relative standardized index and relative nominal CPUE series were calculated by dividing each value in the series by the mean value of the series.

5.4.1.3 Results & Discussion

The final models for the binomial on proportion positive trips (PPT) and the lognormal on CPUE of successful trips for each species were:

Golden tilefish:

PPT = Subregion + Days at Sea + Year

LOG(CPUE) = Subregion + Days at Sea + Year + Subregion*Year + Days at Sea*Year + Subregion*Days at Sea

In the proportion positive analysis, Year was included in the final model although it did not meet the inclusion criteria. No two-way interactions involving Year were tested for inclusion in the final binomial portion of the model.

Blueline tilefish:

PPT = Subregion + Year

LOG(CPUE) = Subregion + Distance Between Hooks + Year + Distance Between Hooks*Year

In the proportion positive analysis, Year was included in the model even though it did not meet the inclusion criteria. The two-way interaction Subregion*Year was not tested for inclusion in the final binomial portion of the model.

Relative nominal CPUE, number of trips, proportion positive trips, and relative abundance indices are provided in Tables 5.8.2 and 5.8.3 for the golden tilefish and blueline tilefish models. The delta-lognormal abundance indices developed for each species, with 95% confidence intervals, are shown in Figures 5.9.4 and 5.9.5.

Golden tilefish standardized catch rates for longline vessels had no clear trend over much of the time series. CPUE increased through 1994, but no trend was apparent from 1994 through 2002. CPUE decreased in 2003 then generally increased from 2003 to 2009. Coefficients of variation (CV) were in the range 0.33-0.37 except for the first two years of the series when CVs were slightly larger. Those higher initial CVs may have been due to smaller sample sizes (i.e. sampling error) during the period of 20 percent reporting in Florida.

Blueline tilefish CPUE increased during the first three years of the time series (1993-1995) with no apparent trend from 1995-2003. Yearly standardized CPUE increased from 2003 to 2008, but decreased again in 2009. Uncertainty in CPUE was much greater for blueline tilefish than was found for golden tilefish. Smaller sample size cannot fully explain the greater within year blueline tilefish CPUE variability, although sample size may play a role. Given the large confidence intervals around the blueline tilefish index, little may be concluded regarding trends in CPUE. There may be no trend in mean yearly CPUE over the time series or, alternatively, any actual trend in blueline tilefish CPUE over time cannot be detected from the available data.

5.4.1.4 Comments on Adequacy for Assessment

The workshop group recommends using the golden tilefish index for the assessment. However, due to high variability, the group does not recommend the blueline tilefish index for assessment purposes, except for a possible sensitivity run.

5.5. *CONSENSUS RECOMMENDATIONS AND SURVEY EVALUATIONS*

The workshop group recommends using the golden tilefish indices described above as inputs into the assessment model. However, due to high variability, the blueline tilefish index should not be used for assessment purposes, except for a possible sensitivity run in the assessment model. Figure 5.9.6 illustrates linear coverage of specific abundance indices along the coast of the Gulf of Mexico.

5.6. *ITEMIZED LIST OF TASKS FOR COMPLETION FOLLOWING WORKSHOP*

The group was tasked with developing an extended time series for golden tilefish, which included data from historic exploratory fishing surveys conducted by NMFS, the current NOAA Fisheries bottom longline (SEDAR22-DW-07), and current observer data from the commercial bottom longline fishery. This will be submitted as a document for the upcoming Assessment Workshop.

For the fisheries dependent bottom longline index the assessment scientists requested the construction of three separate indices for golden tilefish, and blueline tilefish for three regions in the Gulf of Mexico (areas 2-5, 6-11, & 13-21).

The results of these tasks will be submitted as documents for the upcoming Assessment Workshop.

5.7. ***LITERATURE CITED***

Lo, N.C., L.D. Jackson, J.L. Squire. 1992. Indices of relative abundance from fish spotter data based on delta-lognormal models. Can. J. Fish. Aquat. Sci. 49: 2515-2526.

Rester, J. 2009. Distribution of bottom habitat information in the Gulf of Mexico. Gulf States Marine Fisheries Commission NA05NMF4331073.

Stephens, A. and A. McCall. 2004. A multispecies approach to subsetting logbook data for purposes of estimating CPUE. Fisheries Research 70:299-310.

5.8. ***TABLES***

Table 5.8.1. Area-specific abundance indices and summaries of Type 3 tests for model inclusion.

Table 5.8.1.a: *Type 3 Tests of Fixed Effects for the Binomial Submodel for Golden Tilefish*

Effect	*Num DF*	*Den DF*	*Chi-Square*	*F Value*	*Pr > ChiSq*	*Pr > F*
YEAR	8	221	12.07	1.51	0.1480	0.1552
Area	2	221	0.80	0.40	0.6707	0.6712
sta_dpth	1	221	32.99	32.99	<.0001	<.0001
Clay	1	221	1.80	1.80	0.1793	0.1807
Sorting	1	221	1.10	1.10	0.2944	0.2955
*YEAR*Area*	7	221	6.97	1.00	0.4318	0.4350

Table 5.8.1.b *Type 3 Tests of Fixed Effects for the Lognormal Submodel for Golden Tilefish*

Effect	*Num DF*	*Den DF*	*F Value*	*Pr > F*
YEAR	8	78	1.40	0.2087
Area	2	78	1.02	0.3658
sta_dpth	1	78	5.48	0.0218
*YEAR*Area*	7	78	0.90	0.5110

Table 5.8.1.c: *Abundance Indices and Variability*

Survey Year	*Area*	*Nominal Frequency*	*N*	*Index*	*Scaled Index*	*CV*	*LCL*	*UCL*
2000	NWFLA	0.00000	4	0.00000	0.00000	.	.	.
2001	NWFLA	0.28571	21	0.36233	0.27630	0.71024	0.07696	0.99193
2002	NWFLA	0.40000	10	1.15490	0.88070	0.58965	0.29537	2.62601
2003	NWFLA	0.29412	17	0.60755	0.46330	0.76620	0.11900	1.80374
2004	NWFLA	0.41667	11	1.62034	1.23564	0.57235	0.42612	3.58307
2006	NWFLA	0.66667	6	1.77768	1.35562	0.47528	0.54973	3.34292
2007	NWFLA	0.53846	13	2.35840	1.79847	0.47926	0.72435	4.46539
2008	NWFLA	0.80000	5	1.47560	1.12527	0.58283	0.38154	3.31868
2009	NWFLA	0.50000	10	1.61015	1.22787	0.57008	0.42500	3.54744
2001	SWFLA	0.00000	7	0.00000	0.00000	.	.	.
2003	SWFLA	0.00000	17	0.00000	0.00000	.	.	.
2004	SWFLA	0.00000	17	0.00000	0.00000	.	.	.
2006	SWFLA	0.00000	12	0.00000	0.00000	.	.	.
2007	SWFLA	0.00000	14	0.00000	0.00000	.	.	.
2008	SWFLA	0.00000	3	0.00000	0.00000	.	.	.
2009	SWFLA	0.09091	11	0.29951	0.22840	1.20561	0.03434	1.51905
2000	WEST	0.21053	19	0.18039	0.13756	0.86394	0.03090	0.61244
2001	WEST	0.47368	19	0.87397	0.66647	0.46705	0.27412	1.62037
2002	WEST	0.27586	29	1.27283	0.97064	0.53226	0.35748	2.63547
2003	WEST	0.40000	10	0.75335	0.57449	0.62844	0.18120	1.82137
2004	WEST	0.33333	18	0.82481	0.62899	0.67514	0.18465	2.14260
2006	WEST	0.46154	13	1.49065	1.13674	0.55433	0.40369	3.20092
2007	WEST	0.54545	11	2.87709	2.19401	0.47416	0.89142	5.40000
2008	WEST	0.66667	9	1.63184	1.24441	0.55130	0.44413	3.48676
2009	WEST	0.50000	14	2.43270	1.85513	0.44300	0.79560	4.32566

Table 5.8.2. Longline relative nominal CPUE, number of trips, proportion positive trips, and standardized abundance index for golden tilefish (1992-2009) in the Gulf of Mexico.

YEAR	Relative Nominal CPUE	Trips	Proportion Successful Trips	Standardized Index	Lower 95% CI (Index)	Upper 95% CI (Index)	CV (Index)
1992	0.696285	72	0.638889	0.511599	0.1763	1.484593	0.572795
1993	0.576969	103	0.699029	0.784492	0.342475	1.796997	0.432865
1994	1.350587	195	0.815385	1.137181	0.595081	2.173119	0.332482
1995	1.037016	229	0.820961	1.109442	0.576145	2.136373	0.336618
1996	0.924305	146	0.863014	0.881585	0.432639	1.7964	0.367483
1997	1.275656	228	0.767544	0.981243	0.492683	1.954276	0.354954
1998	1.295589	209	0.76555	1.145312	0.581097	2.257352	0.349257
1999	1.206708	236	0.758475	1.224067	0.63577	2.356736	0.336534
2000	1.04836	294	0.782313	0.829545	0.424442	1.621294	0.344678
2001	1.108935	255	0.815686	1.019424	0.526665	1.97322	0.339424
2002	0.97124	251	0.812749	0.900457	0.457502	1.772284	0.348499
2003	1.103007	277	0.823105	0.58315	0.286881	1.185383	0.366142
2004	0.537684	163	0.760736	0.71944	0.349189	1.482272	0.37356
2005	0.676155	158	0.727848	0.911633	0.444968	1.867719	0.370463
2006	0.85811	161	0.689441	1.078831	0.5349	2.175879	0.361849
2007	1.279	128	0.859375	1.642863	0.841468	3.207487	0.344104
2008	0.823009	154	0.701299	1.030535	0.493889	2.150288	0.380554
2009	1.231386	125	0.728	1.5092	0.746835	3.049782	0.362911

Table 5.8.3. Longline relative nominal CPUE, number of trips, proportion positive trips, and relative abundance index for tilefish (1993-2009) in the Gulf of Mexico.

Year	Relative Nominal CPUE	Trips	Proportion Successful Trips	Standardized Index	Lower 95% CI (Index)	Upper 95% CI (Index)	CV (Index)
1993	0.498682	51	0.490196	0.437784	0.026067	7.35235	2.512461
1994	0.345656	106	0.603774	0.619062	0.065784	5.825683	1.585217
1995	1.542235	94	0.606383	0.803995	0.095155	6.793211	1.456823
1996	0.935702	46	0.478261	0.505964	0.030113	8.501312	2.513407
1997	0.936111	127	0.677165	0.978834	0.146929	6.520939	1.207218
1998	0.825907	97	0.731959	1.100601	0.165933	7.300052	1.202992
1999	0.636485	84	0.595238	0.51631	0.040921	6.514403	1.996501
2000	1.09752	114	0.675439	1.409594	0.259333	7.661797	1.02337
2001	0.569687	126	0.595238	0.472304	0.039849	5.597843	1.900127
2002	0.87944	85	0.6	0.914954	0.108287	7.730744	1.456823
2003	0.769957	128	0.640625	0.541005	0.055665	5.258001	1.625787
2004	0.969509	119	0.647059	0.849812	0.107124	6.741535	1.386385
2005	1.179599	92	0.641304	1.091026	0.136287	8.734088	1.396333
2006	1.373769	119	0.731092	1.451889	0.272369	7.739445	1.006974
2007	1.63564	74	0.72973	1.864569	0.356819	9.743356	0.990414
2008	1.641751	102	0.823529	2.280721	0.568797	9.145065	0.787104
2009	1.16235	89	0.741573	1.161576	0.185036	7.29185	1.150989

5.9. *FIGURES*

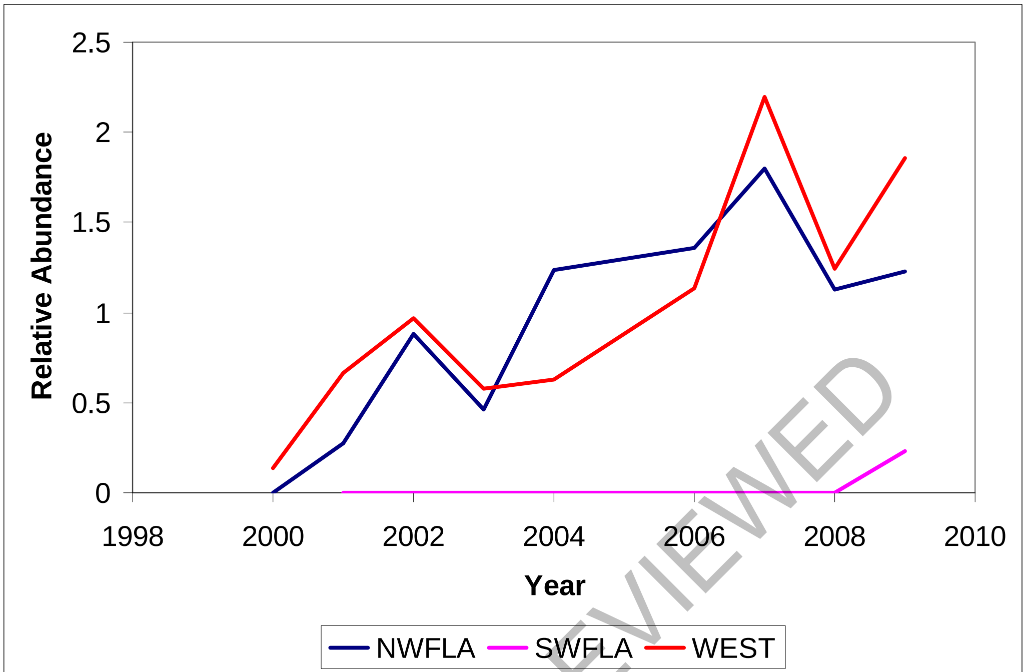


Figure 5.9.1. Area-specific abundance indices for yellowedge grouper

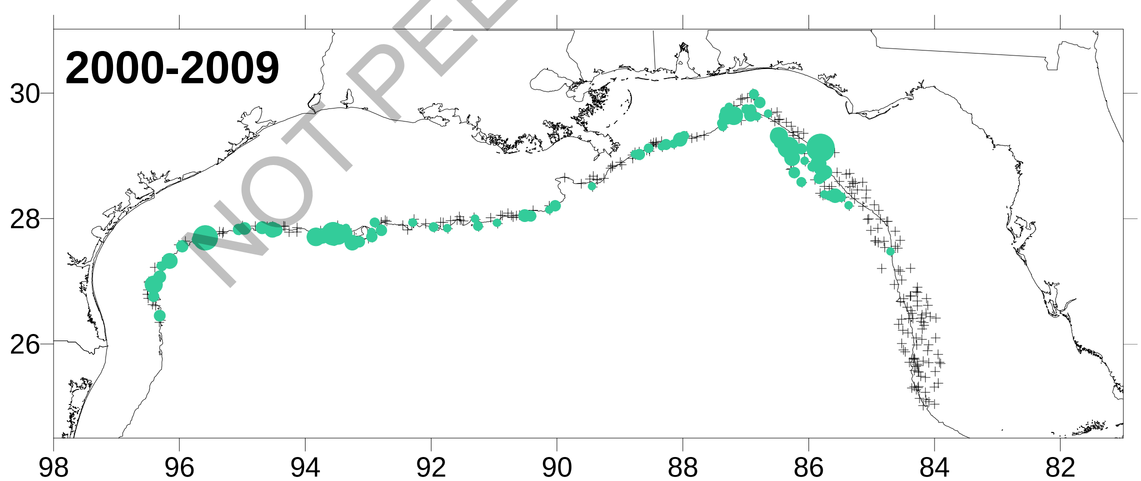
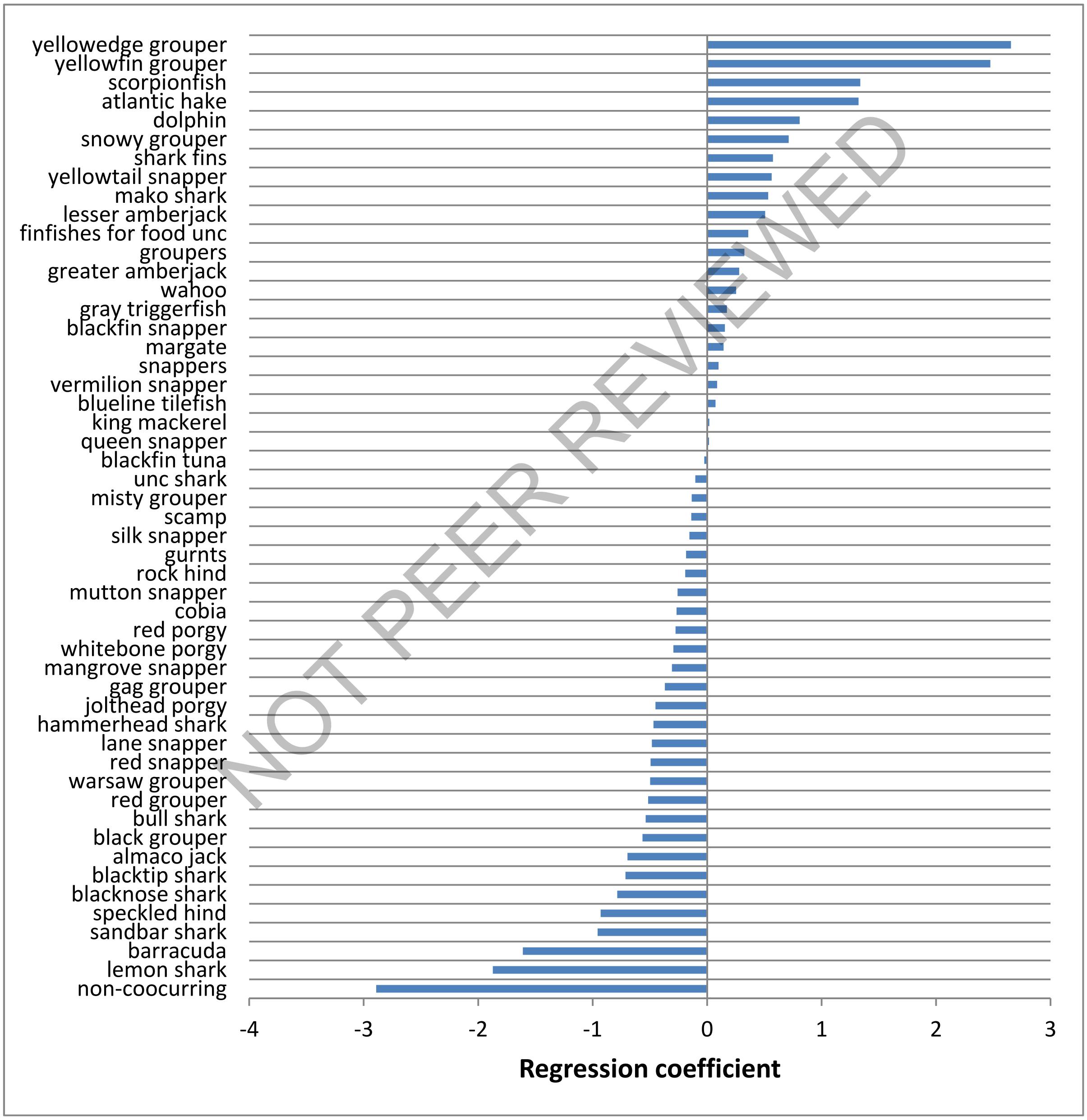
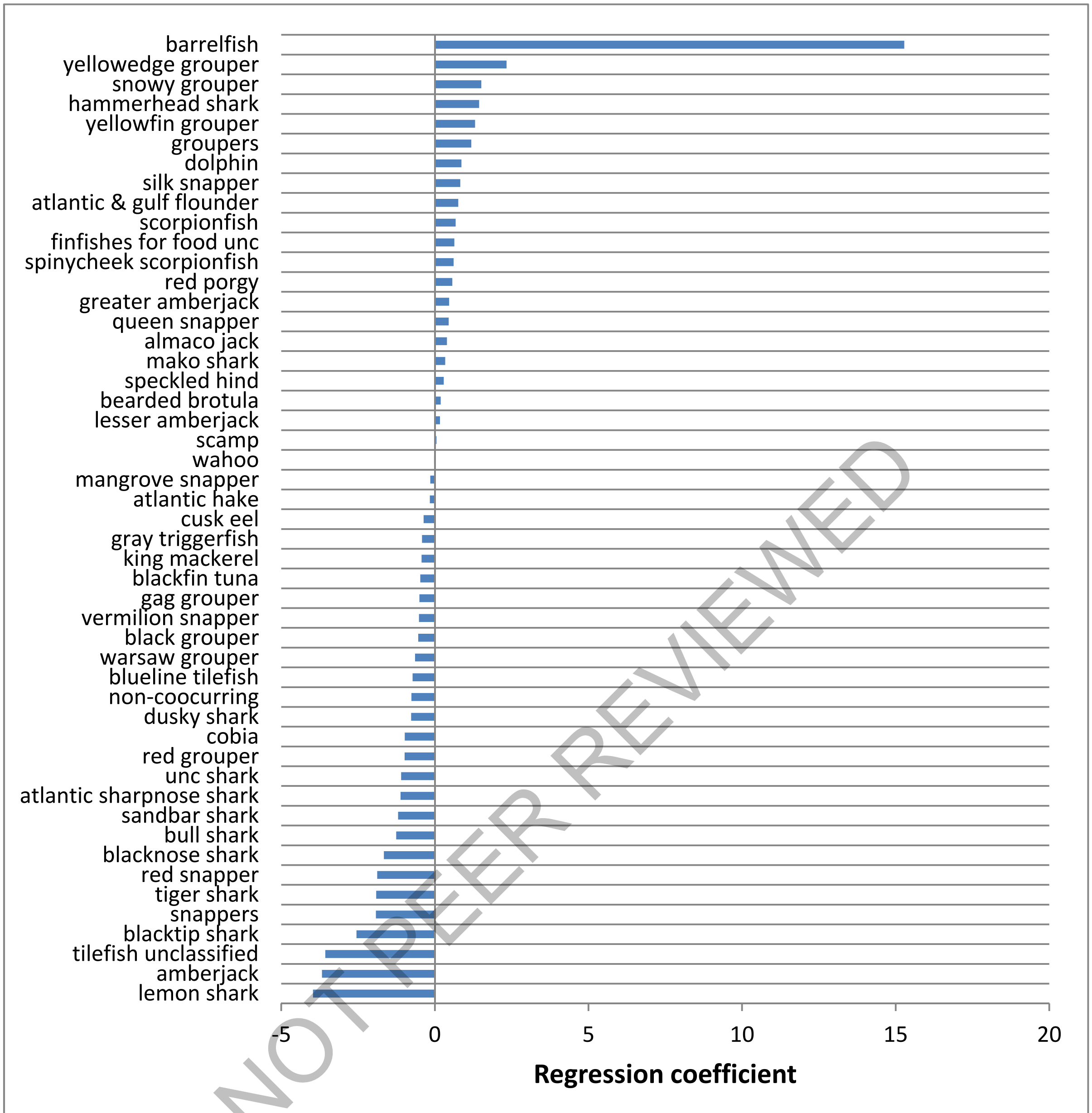


Figure 5.9.2. Survey effort included in analyses and CPUE of golden tilefish from 2000 through 2009 in the Gulf of Mexico. Crosses indicate effort with no catch. The size of green circles is linearly related to positive CPUE (range: 0.7 – 14.5 golden tilefish per 100 hook hours).

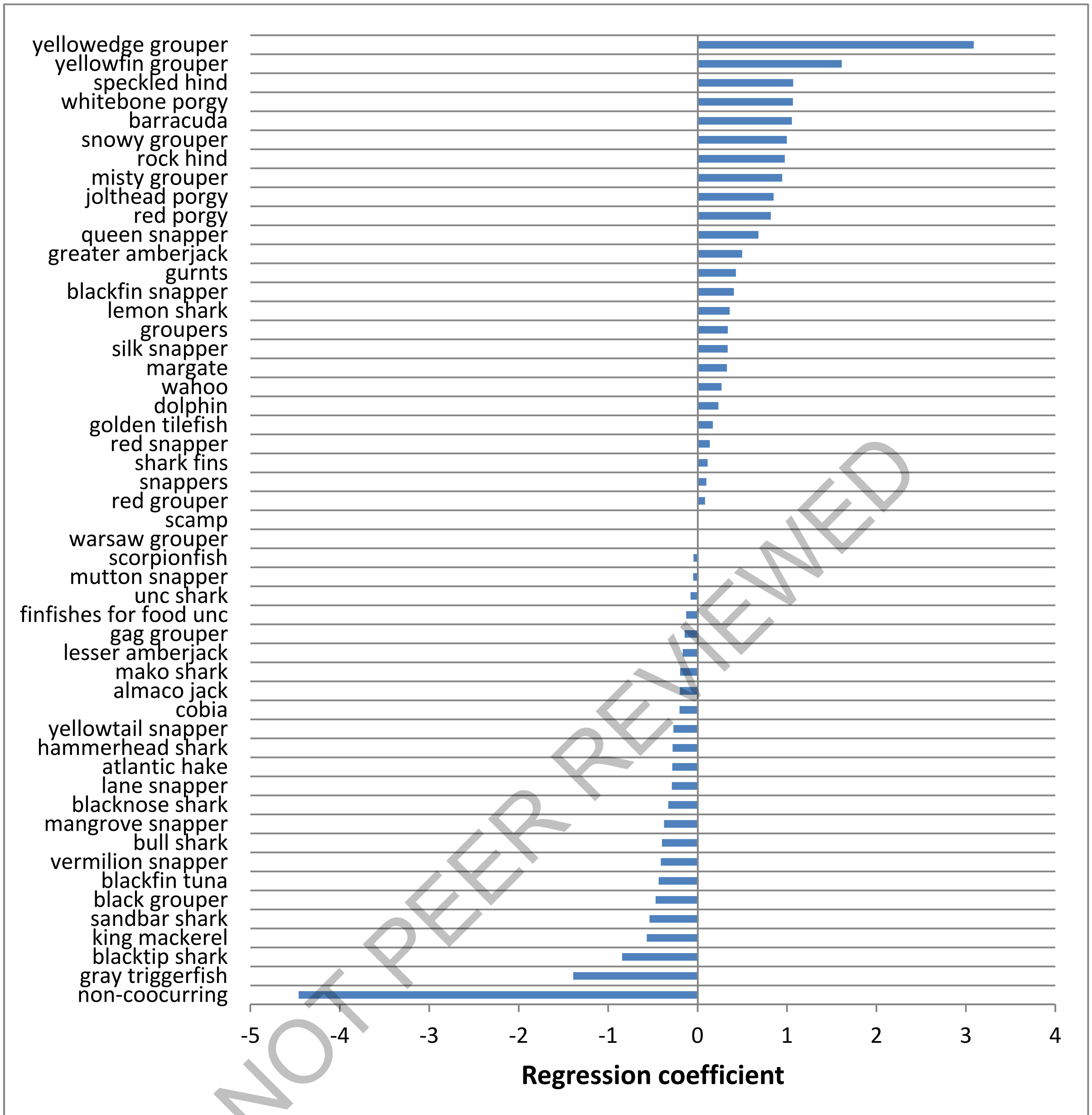
Figure 5.9.3. Regression coefficients from the Stephens & MacCall analyses. Positive coefficients signify species that had positive associations with the target species. The magnitude of the coefficients indicates the predictive impact of each species. The value for "non-coocurring" is the regression intercept and denotes the probability a trip was fishing in the target species' habitat, but did not report any of the listed species. Species included were reported on at least one percent of longline trips in the eastern or western Gulf of Mexico.



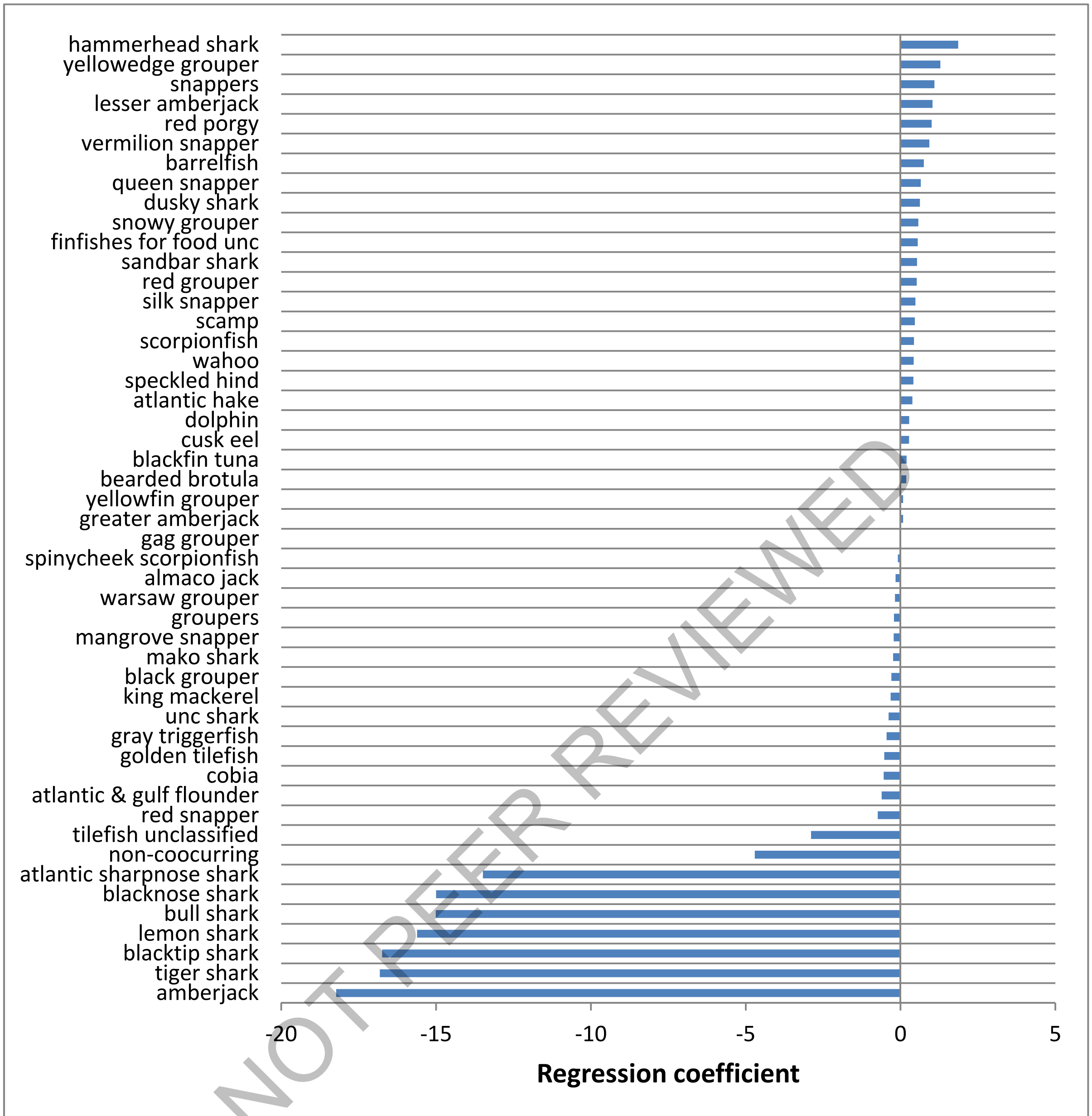
5.9.3A. Golden tilefish eastern Gulf of Mexico longline



5.9.3B. Golden tilefish western Gulf of Mexico longline



5.9.3C. Blueline tilefish eastern Gulf of Mexico longline



5.9.3D. Blueline tilefish western Gulf of Mexico longline

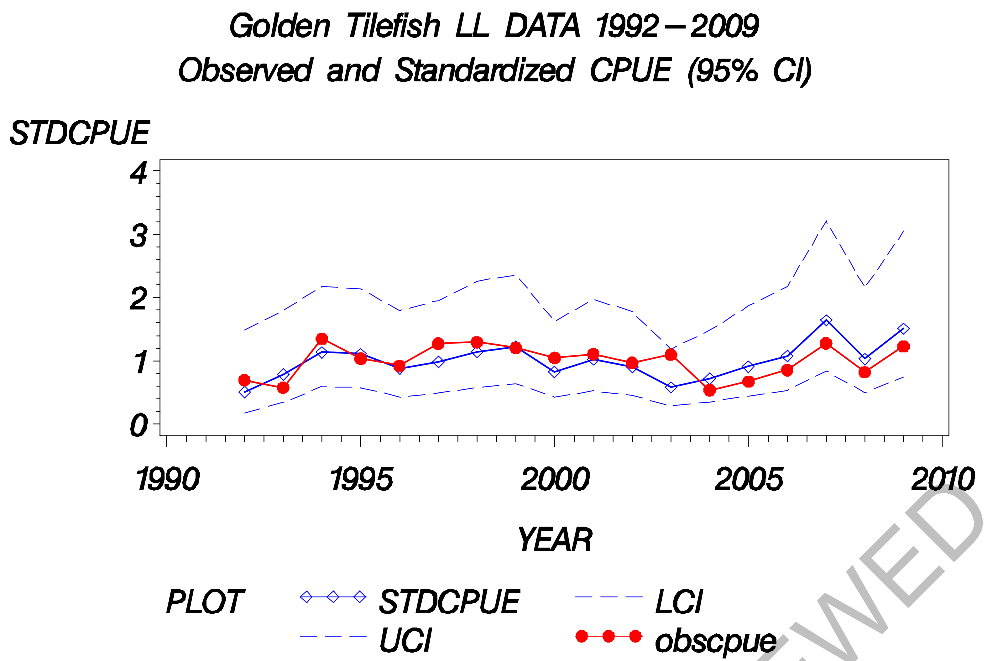


Figure 5.9.4. Golden tilefish nominal CPUE (solid circles), standardized CPUE (open diamonds) and upper and lower 95% confidence limits of the standardized CPUE estimates (dashed lines) for vessels fishing longline gear in the Gulf of Mexico.

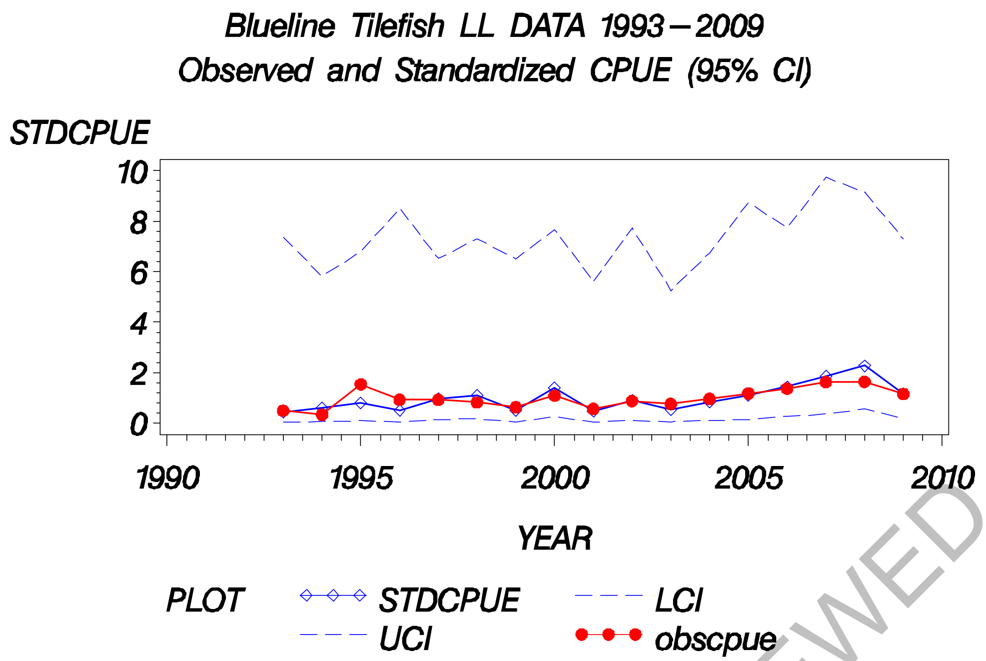


Figure 5.9.5. Blueline tilefish nominal CPUE (solid circles), standardized CPUE (open diamonds) and upper and lower 95% confidence limits of the standardized CPUE estimates (dashed lines) for vessels fishing longline gear in the Gulf of Mexico.

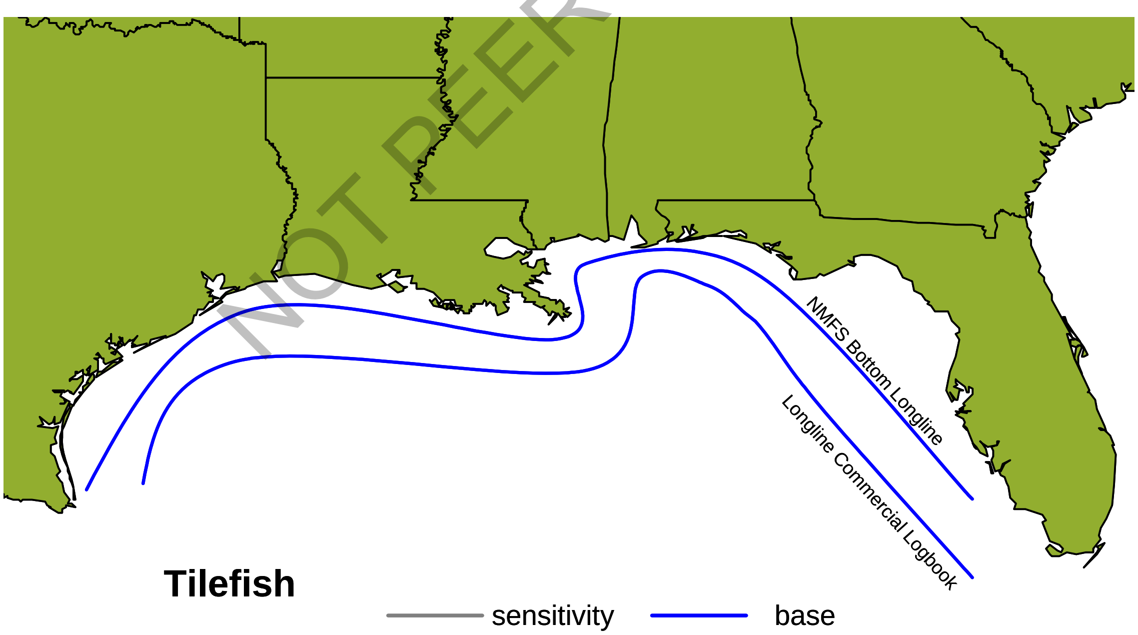


Figure 5.9.6. Linear coverage of specific abundance indices along the coast of the Gulf of Mexico.

6. ANALYTIC APPROACH

6.1. *SUGGESTED ANALYTIC APPROACH GIVEN THE DATA*

Stock Synthesis III (SSIII, Methot 2000) will be the first assessment modeling approach for both yellowedge grouper (YEG) and tilefish. SSIII is an integrated statistical catch-at-age model which is widely used for stock assessments in the United States and throughout the world. SSIII takes relatively unprocessed input data and incorporates many of the important processes (mortality, selectivity, growth, etc) that operate in conjunction to produce observed catch, size and age composition and CPUE indices. In addition, SSIII can incorporate time series of environmental data. Because many of these inputs are correlated, the concept behind SSIII is that they should be modeled together, which helps to ensure that uncertainties in the input data are properly accounted for in the assessment. SSIII has the ability to incorporate an early, data poor time period for which only catch data are available and a more recent, data-rich time period for which indices and length and age observations are available. Such a situation exists for both YEG and tilefish, however both fisheries are rather short (~40 years) and for YEG we have the benefit of substantial age composition data from fairly early in the fishery. However, in either case, there is evidence of substantial landings prior to the routine collection of age composition data from throughout the spatial distribution of the stock.

As a second assessment modeling approach, stochastic stock reduction analysis (SRA, Walters et al. 2005) will also be applied to both species. SRA is a less data-intensive method which can help to determine how large the stock needed to be to have produced the time series of observed landings. This will provide a necessary check on the SSIII results and may be very useful in determining stock status relative to the initial population size. SRA has been applied to several other Gulf of Mexico species including gag and red grouper and red snapper.

For both species, there are sources of uncertainty which will have to be incorporated within the modeling framework or through sensitivity analyses. Uncertainties in assigned ages created by aging error, changing growth rates and unknown M can be incorporated within the SSIII framework. Given the complex reproductive biology of YEG and tilefish, the most effective proxy for spawning stock biomass is another source of uncertainty and will have to be considered in some manner as well. Unfortunately, the greatest uncertainties in either of these two assessments are in the actual landings levels themselves, because of a lack of historical identification of groupers and tilefishes to species. Very few modeling approaches can deal with large uncertainties in total catch, so these may have to be considered through sensitivity runs with both SRA and SS3.

6.2. *REFERENCES*

Walters, C. J., S. J.D. Martell, and J. Korman 2006. A stochastic approach to stock reduction analysis. Can. J. Fish. Aquat. Sci. 63: 212–223.

Methot, R.D. 2000. Technical description of the stock synthesis assessment program. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-43, 4

APPENDIX 1: INDICES WORKSHEETS

Evaluation of Abundance Indices of Blueline Tilefish: Commercial Logbook (Longline) (SEDAR22-DW-02)

DESCRIPTION OF THE DATA SOURCE

1. Fishery Independent Indices

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe the survey design (e.g. fixed sampling sites, random stratified sampling), location, seasons/months and years of sampling.	✓			
B. Describe sampling methodology (e.g. gear, vessel, soak time etc.)	✓			
C. Describe any changes in sampling methodology (e.g. gear, vessel, sample design etc.)	✓			
D. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).	✓			
E. What species or species assemblages are targeted by this survey (e.g. red snapper, reef fish, pelagic).	✓			
F. Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.	✓			

2. Fishery Dependent Indices

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe the data source and type of fishery (e.g. commercial handline, commercial longline, recreational hook and line etc.).				✓
B. Describe any changes to reporting requirements, variables reported, etc.	✓			
C. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).				✓
D Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.		✓		

METHODS

1. Data Reduction and Exclusions

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe any data exclusions (e.g. gears, fishing modes, sampling areas etc.). Report the number of records removed and justify removal.				✓
B. Describe data reduction techniques (if any) used to address targeting (e.g. Stephens and MacCall, 2004; gear configuration, species assemblage etc).				✓
C. Discuss procedures used to identify outliers. How many were identified? Were they excluded?				✓

Working Group Comments:

No minimum size regulation, but size/age range unknown.

	Not Applicable	Absent	Incomplete	Complete
2. Management Regulations (for FD Indices)				
A. Provide (or cite) history of management regulations (e.g. bag limits, size limits, trip limits, closures etc.).				✓
B. Describe the effects (if any) of management regulations on CPUE		✓		
C. Discuss methods used (if any) to minimize the effects of management measures on the CPUE series.		✓		

Working Group Comments:

Data from closed seasons were excluded. There is no minimum size or tilefish trip limits in the regulations.

3. Describe Analysis Dataset (after exclusions and other treatments)

	Not Applicable	Absent	Incomplete	Complete
A. Provide tables and/or figures of number of observations by factors (including year, area, etc.) and interaction terms.		✓		
B. Include tables and/or figures of number of positive observations by factors and interaction terms.		✓		
C. Include tables and/or figures of the proportion positive observations by factors and interaction terms.		✓		
D. Include tables and/or figures of average (unstandardized) CPUE by factors and interaction terms.		✓		
E. Include annual maps of locations of survey sites (or fishing trips) and associated catch rates ***OR*** supply the raw data needed to construct these maps (Observation, Year, Latitude, Longitude (or statistical grid, area), Catch, Effort).		✓		
F. Describe the effort variable and the units. If more than one effort variable is present in the dataset, justify selection.				✓
G. What are the units of catch (e.g. numbers or biomass, whole weight, gutted weight, kilograms, pounds).				✓

Number of observations by factors and interaction terms were examined, but were not included in the document due to confidentiality concerns.

4. Model Standardization

	Not Applicable	Absent	Incomplete	Complete
A. Describe model structure (e.g. delta-lognormal)				✓
B. Describe construction of GLM components (e.g. forward selection from null etc.)				✓
C. Describe inclusion criteria for factors and interactions terms.				✓
D. Were YEAR*FACTOR interactions included in the model? If so, how (e.g. fixed effect, random effect)? Were random effects tested for significance using a likelihood ratio test?				✓
E. Provide a table summarizing the construction of the GLM components.				✓
F. Summarize model statistics of the mixed model formulation(s) (e.g. log likelihood, AIC, BIC etc.)				✓
G. Report convergence statistics.		✓		

MODEL DIAGNOSTICS

Comment: Other model structures are possible and acceptable. Please provide appropriate diagnostics to the CPUE indices working group.

Item	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:
1. Binomial Component					
A. Include plots of the chi-square residuals by factor.				✓	
B. Include plots of predicted and observed proportion of positive trips by year and factor (e.g. year*area)		✓			
C. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).		✓			
2. Lognormal/Gamma Component					
A. Include histogram of log(CPUE) or a histogram of the residuals of the model on CPUE. Overlay the expected distribution.				✓	
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.		✓			
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.				✓	
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.		✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.		✓			
F. Include plots of the residuals by factor				✓	
3. Poisson Component					
A. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).	✓				
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.	✓				
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.	✓				
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓				
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓				*The feasibility of this diagnostic is still under review.*
4. Zero-inflated model					
A. Include ROC curve to quantify goodness of fit.	✓				
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).	✓				
C. Include QQ-plot (e.g. Student dev. residuals vs. theoretical quantiles), Overlay expected distribution.	✓				

MODEL DIAGNOSTICS (CONT.)

	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:

D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓			

MODEL RESULTS

A. Tables of Nominal CPUE, Standardized CPUE, Observations, Positive Observations, Proportion Positive Observations and Coefficients of Variation (CVs). Other statistics may also be appropriate to report				✓
B. Figure of Nominal and Standardized Indices with measure of variance (i.e. CVs).				✓

IF MULTIPLE MODEL STRUCTURES WERE CONSIDERED:

(***Note: this is always recommended but required when model diagnostics are poor***.)

1. Plot of resulting indices and estimates of variance	✓			
2. Table of model statistics (e.g. AIC criteria)	✓			

	Date Received	Workshop Recommendation	Revision Deadline ***	Author and Rapporteur Signatures
First Submission	3/17/10	Reject/reevaluate with revsions	5/10/10	
Revision				

The revision deadline is negotiated by the author, the SEDAR coordinator and the CPUE rapporteur. The author ***DOES NOT*** *commit to any* ***LEGAL OBLIGATION*** *by agreeing to submit a manuscript before this deadline. The maximum penalty for failure to submit a revised document prior to the submission deadline is rejection of the CPUE series.*

Justification of Working Group Recommendation

Working group recommendations:
-Following the workshop, it was recommended by the assessment biologists and indices work group that separate indices be created for Gulf of Mexico areas 2-5, 6-11, and 13-21. Results of these analyses will be disseminated in a working paper prior to the assessment workshop/webinar.

Evaluation of Abundance Indices of Golden Tilefish: Commercial Logbook (Longline) (SEDAR22-DW-02)

DESCRIPTION OF THE DATA SOURCE

1. Fishery Independent Indices

	Not Applicable	Absent	Incomplete	Complete
A. Describe the survey design (e.g. fixed sampling sites, random stratified sampling), location, seasons/months and years of sampling.	✓			
B. Describe sampling methodology (e.g. gear, vessel, soak time etc.)	✓			
C. Describe any changes in sampling methodology (e.g. gear, vessel, sample design etc.)	✓			
D. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).	✓			
E. What species or species assemblages are targeted by this survey (e.g. red snapper, reef fish, pelagic).	✓			
F. Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.	✓			

2. Fishery Dependent Indices

	Not Applicable	Absent	Incomplete	Complete
A. Describe the data source and type of fishery (e.g. commercial handline, commercial longline, recreational hook and line etc.).				✓
B. Describe any changes to reporting requirements, variables reported, etc.	✓			
C. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).				✓
D Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.		✓		

METHODS

1. Data Reduction and Exclusions

	Not Applicable	Absent	Incomplete	Complete
A. Describe any data exclusions (e.g. gears, fishing modes, sampling areas etc.). Report the number of records removed and justify removal.				✓
B. Describe data reduction techniques (if any) used to address targeting (e.g. Stephens and MacCall, 2004; gear configuration, species assemblage etc).				✓
C. Discuss procedures used to identify outliers. How many were identified? Were they excluded?				✓

Working Group Comments:

No minimum size regulation, but size/age range unknown.

Working Group Comments:

Data from closed seasons were excluded. There is no minimum size or tilefish trip limits in the regulations.

Number of observations by factors and interaction terms were examined, but were not included in the document due to confidentiality concerns.

2. Management Regulations (for FD Indices)

Item	Not Applicable	Absent	Incomplete	Complete
A. Provide (or cite) history of management regulations (e.g. bag limits, size limits, trip limits, closures etc.).				✓
B. Describe the effects (if any) of management regulations on CPUE		✓		
C. Discuss methods used (if any) to minimize the effects of management measures on the CPUE series.		✓		

3. Describe Analysis Dataset (after exclusions and other treatments)

Item	Not Applicable	Absent	Incomplete	Complete
A. Provide tables and/or figures of number of observations by factors (including year, area, etc.) and interaction terms.		✓		
B. Include tables and/or figures of number of positive observations by factors and interaction terms.		✓		
C. Include tables and/or figures of the proportion positive observations by factors and interaction terms.		✓		
D. Include tables and/or figures of average (unstandardized) CPUE by factors and interaction terms.		✓		
E. Include annual maps of locations of survey sites (or fishing trips) and associated catch rates ***OR*** supply the raw data needed to construct these maps (Observation, Year, Latitude, Longitude (or statistical grid, area), Catch, Effort).		✓		
F. Describe the effort variable and the units. If more than one effort variable is present in the dataset, justify selection.				✓
G. What are the units of catch (e.g. numbers or biomass, whole weight, gutted weight, kilograms, pounds).				✓

4. Model Standardization

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe model structure (e.g. delta-lognormal)				✓
B. Describe construction of GLM components (e.g. forward selection from null etc.)				✓
C. Describe inclusion criteria for factors and interactions terms.				✓
D. Were YEAR*FACTOR interactions included in the model? If so, how (e.g. fixed effect, random effect)? Were random effects tested for significance using a likelihood ratio test?				✓
E. Provide a table summarizing the construction of the GLM components.				✓
F. Summarize model statistics of the mixed model formulation(s) (e.g. log likelihood, AIC, BIC etc.)				✓
G. Report convergence statistics.		✓		

MODEL DIAGNOSTICS

Comment: Other model structures are possible and acceptable. Please provide appropriate diagnostics to the CPUE indices working group.

1. Binomial Component

Item	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:
A. Include plots of the chi-square residuals by factor.				✓	
B. Include plots of predicted and observed proportion of positive trips by year and factor (e.g. year*area)		✓			
C. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).		✓			

2. Lognormal/Gamma Component

Item	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:
A. Include histogram of log(CPUE) or a histogram of the residuals of the model on CPUE. Overlay the expected distribution.				✓	
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.		✓			
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.				✓	
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.		✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.		✓			
F. Include plots of the residuals by factor				✓	

3. Poisson Component

Item	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:
A. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).	✓				
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.	✓				
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.	✓				
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓				
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓				***The feasibility of this diagnostic is still under review.***

4. Zero-inflated model

Item	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:
A. Include ROC curve to quantify goodness of fit.	✓				
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).	✓				
C. Include QQ-plot (e.g. Student dev. residuals vs. theoretical quantiles), Overlay expected distribution.	✓				

MODEL DIAGNOSTICS (CONT.)

	Not Applicable	Absent	Incomplete	Complete	Working Group Comments:

D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓			

MODEL RESULTS

A. Tables of Nominal CPUE, Standardized CPUE, Observations, Positive Observations, Proportion Positive Observations and Coefficients of Variation (CVs). Other statistics may also be appropriate to report				✓
B. Figure of Nominal and Standardized Indices with measure of variance (i.e. CVs).				✓

IF MULTIPLE MODEL STRUCTURES WERE CONSIDERED:

(***Note: this is always recommended but required when model diagnostics are poor***.)

1. Plot of resulting indices and estimates of variance	✓			
2. Table of model statistics (e.g. AIC criteria)	✓			

	Date Received	*Workshop Recommendation*	*Revision Deadline* ***	*Author and Rapporteur Signatures*
First Submission	3/17/10	Accept with revisions	5/10/10	
Revision				

*The revision deadline is negotiated by the author, the SEDAR coordinator and the CPUE rapporteur. The author **DOES NOT** commit to any **LEGAL OBLIGATION** by agreeing to submit a manuscript before this deadline. The maximum penalty for failure to submit a revised document prior to the submission deadline is rejection of the CPUE series.*

Justification of Working Group Recommendation

Working group recommendations:
-Following the workshop, it was recommended by the assessment biologists and indices work group that separate indices be created for Gulf of Mexico areas 2-5, 6-11, and 13-21. Results of these analyses will be disseminated in a working paper prior to the assessment workshop/webinar.

Evaluation of Abundance Indices Golden Tilefish:
NOAA Fisheries Bottom Longline Survey (SEDAR22-DW-07)

Working Group Comments:

DESCRIPTION OF THE DATA SOURCE

1. Fishery Independent Indices

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe the survey design (e.g. fixed sampling sites, random stratified sampling), location, seasons/months and years of sampling.				✓
B. Describe sampling methodology (e.g. gear, vessel, soak time etc.)				✓
C. Describe any changes in sampling methodology (e.g. gear, vessel, sample design etc.)				✓
D. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).				✓
E. What species or species assemblages are targeted by this survey (e.g. red snapper, reef fish, pelagic).				✓
F. Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.				✓

2. Fishery Dependent Indices

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe the data source and type of fishery (e.g. commercial handline, commercial longline, recreational hook and line etc.).	✓			
B. Describe any changes to reporting requirements, variables reported, etc.	✓			
C. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).	✓			
D Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.	✓			

METHODS

1. Data Reduction and Exclusions

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe any data exclusions (e.g. gears, fishing modes, sampling areas etc.). Report the number of records removed and justify removal.				✓
B. Describe data reduction techniques (if any) used to address targeting (e.g. Stephens and MacCall, 2004; gear configuration, species assemblage etc).				✓
C. Discuss procedures used to identify outliers. How many were identified? Were they excluded?		✓		

Working Group Comments:

2. Management Regulations (for FD Indices)

Item	Not Applicable	Absent	Incomplete	Complete
A. Provide (or cite) history of management regulations (e.g. bag limits, size limits, trip limits, closures etc.).	✓			
B. Describe the effects (if any) of management regulations on CPUE	✓			
C. Discuss methods used (if any) to minimize the effects of management measures on the CPUE series.	✓			

3. Describe Analysis Dataset (after exclusions and other treatments)

Item	Not Applicable	Absent	Incomplete	Complete
A. Provide tables and/or figures of number of observations by factors (including year, area, etc.) and interaction terms.		✓		
B. Include tables and/or figures of number of positive observations by factors and interaction terms.		✓		
C. Include tables and/or figures of the proportion positive observations by factors and interaction terms.		✓		
D. Include tables and/or figures of average (unstandardized) CPUE by factors and interaction terms.				✓
E. Include annual maps of locations of survey sites (or fishing trips) and associated catch rates ***OR*** supply the raw data needed to construct these maps (Observation, Year, Latitude, Longitude (or statistical grid, area), Catch, Effort).				✓
F. Describe the effort variable and the units. If more than one effort variable is present in the dataset, justify selection.				✓
G. What are the units of catch (e.g. numbers or biomass, whole weight, gutted weight, kilograms, pounds).				✓

4. Model Standardization

Item	Not Applicable	Absent	Incomplete	Complete
A. Describe model structure (e.g. delta-lognormal)				✓
B. Describe construction of GLM components (e.g. forward selection from null etc.)				✓
C. Describe inclusion criteria for factors and interactions terms.			✓	
D. Were YEAR*FACTOR interactions included in the model? If so, how (e.g. fixed effect, random effect)? Were random effects tested for significance using a likelihood ratio test?		✓		
E. Provide a table summarizing the construction of the GLM components.				✓
F. Summarize model statistics of the mixed model formulation(s) (e.g. log likelihood, AIC, BIC etc.)				✓
G. Report convergence statistics.		✓		

MODEL DIAGNOSTICS

Comment: Other model structures are possible and acceptable. Please provide appropriate diagnostics to the CPUE indices working group.

1. Binomial Component

Item	Not Applicable	Absent	Incomplete	Complete
A. Include plots of the chi-square residuals by factor.		✓		
B. Include plots of predicted and observed proportion of positive trips by year and factor (e.g. year*area)		✓		
C. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).				✓

2. Lognormal/Gamma Component

Item	Not Applicable	Absent	Incomplete	Complete
A. Include histogram of log(CPUE) or a histogram of the residuals of the model on CPUE. Overlay the expected distribution.				✓
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.				✓
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.				✓
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.		✓		
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.		✓		
F. Include plots of the residuals by factor			✓	

3. Poisson Component

Item	Not Applicable	Absent	Incomplete	Complete
A. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).	✓			
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor.	✓			
C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.	✓			
D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓			

4. Zero-inflated model

Item	Not Applicable	Absent	Incomplete	Complete
A. Include ROC curve to quantify goodness of fit.	✓			
B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).	✓			
C. Include QQ-plot (e.g. Student dev. residuals vs. theoretical quantiles), Overlay expected distribution.	✓			

Working Group Comments:

The feasibility of this diagnostic is still under review.

MODEL DIAGNOSTICS (CONT.)

Not Applicable	Absent	Incomplete	Complete

Working Group Comments:

D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.	✓			
E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.	✓			

MODEL RESULTS

A. Tables of Nominal CPUE, Standardized CPUE, Observations, Positive Observations, Proportion Positive Observations and Coefficients of Variation (CVs). Other statistics may also be appropriate to report				✓
B. Figure of Nominal and Standardized Indices with measure of variance (i.e. CVs).			✓	

IF MULTIPLE MODEL STRUCTURES WERE CONSIDERED:

(***Note: this is always recommended but required when model diagnostics are poor***.)

1. Plot of resulting indices and estimates of variance	✓			
2. Table of model statistics (e.g. AIC criteria)	✓			

	Date Received	*Workshop Recommendation*	*Revision Deadline* ***	*Author and Rapporteur Signatures*
First Submission	3/15/10	Accept with revisions		
Revision	4/12/10 (Addendum)	Accept		

*The revision deadline is negotiated by the author, the SEDAR coordinator and the CPUE rapporteur. The author **DOES NOT** commit to any **LEGAL OBLIGATION** by agreeing to submit a manuscript before this deadline. The maximum penalty for failure to submit a revised document prior to the submission deadline is rejection of the CPUE series.*

Justification of Working Group Recommendation

Revisions described in Section 1.3.2.2

SEDAR

Southeast Data, Assessment, and Review

SEDAR 22

Gulf of Mexico Tilefish

SECTION III: Assessment Process Report

November 2010

SEDAR
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

Table of Contents

1. WORKSHOP PROCEEDINGS

1.1. INTRODUCTION

1.1.1 Workshop time and Place

The SEDAR 22 Assessment Process was held via a series of webinars between May and November 2010.

1.1.2 Terms of Reference

1. Review any changes in data following the data workshop and any analyses suggested by the data workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.
2. Develop population assessment models that are compatible with available data and recommend which model and configuration is deemed most reliable or useful for providing advice. Document all input data, assumptions, and equations.
3. Provide estimates of stock population parameters (fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, etc); include appropriate and representative measures of precision for parameter estimates.
4. Characterize uncertainty in the assessment and estimated values, considering components such as input data, modeling approach, and model configuration. Provide appropriate measures of model performance, reliability, and 'goodness of fit'.
5. Provide yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations, including figures and tables of complete parameters.
6. Provide estimates for SFA criteria consistent with applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and National Standards. This may include: evaluating existing SFA benchmarks, estimating alternative SFA benchmarks; and recommending proxy values. **In addition, specify OFL, and recommend a range of ABC for review by the SSC in compliance with ACL guidelines.**
7. Provide declarations of stock status relative to SFA benchmarks.
8. Perform a probabilistic analysis of proposed reference points and provide the probability of overfishing at various harvest or exploitation levels.
9. Project future stock conditions (biomass, abundance, and exploitation) and develop rebuilding schedules if warranted; include estimated generation time. Stock projections shall be developed in accordance with the following:
   A) If stock is overfished:
      F=0, F=current, F=Fmsy, Ftarget (OY),
      F=Frebuild (max that rebuild in allowed time)
   B) If stock is overfishing
      F=Fcurrent, F=Fmsy, F= Ftarget (OY)
   C) If stock is neither overfished nor overfishing
      F=Fcurrent, F=Fmsy, F=Ftarget (OY)

10. Evaluate the results of past management actions and, if appropriate, probable impacts of current management actions with emphasis on determining progress toward stated management goals.
11. Provide recommendations for future research and data collection (field and assessment); be as specific as practicable in describing sampling design and sampling intensity and emphasize items which will improve future assessment capabilities and reliability.
12. Prepare an accessible, documented, labeled, and formatted spreadsheet containing all model parameter estimates and all relevant population information resulting from model estimates and any projection and simulation exercises. Include all data included in assessment report tables and all data that support assessment workshop figures.
13. Complete the Assessment Workshop Report (Section III of the SEDAR Stock Assessment Report).

1.1.3. List of Participants

SEDAR 22 ASSESSMENT WEBINARS ATTENDANCE REPORT

x = present

First	Last	Web1 13-May	Web2 1-Jul	Web3 21-Jul	Web4 12-Aug	Web4 cont 13-Aug	Web5 23-Aug	Web6 1-Sep	Web7 4-Oct	Web8 3-Nov
PANELISTS										
Brian	Linton	x	x	x	x	x	x	x	x	x
John	Walter	x	x	x	x	x	x	x	x	x
John	Quinlan	x		x	x		x		x	
Linda	Lombardi	x	x	x	x	x	x	x	x	x
Harry	Blanchet	x	x	x	x		x	x	x	
Shannon	Cass-Calay		x	x	x	x	x	x	x	x
Richard	Fulford		x	x	x	x	x			x
Joe	Powers									
Will	Patterson	x	x	x				x	x	
Robert	Allman	x	x	x			x	x		
Irby	Basco									
Bob	Spaeth									
Martin	Fischer									
TJ	Tate									
Neil	Baertein									
COUNCIL REPRESENTATION										
Bob	Shipp				x		x			x
STAFF										
Julie	Neer	x	x	x	x	x	x	x	x	x
Carrie	Simmons		x	x	x	x	x	x	x	
John	Froeschke	x								

Kari	Fenske				x					
John	Carmichael				x					
OBSERVERS										
Clay	Porch	x					x	x		
Nancy	Cummings	x	x	x				x		
Nick	Farmer				x	x	x	x	x	x
Rich	Malinowski							X		
Todd	Gedamke		x							

1.1.4. List of Assessment Process Working and Reference Papers

Documents Prepared for the Assessment Workshop		
SEDAR22-AW-01	United States Commercial Longline Vessel Standardized Catch Rates of Golden and Blueline Tilefish in the Gulf of Mexico, 1992-2009: Revised	Kevin McCarthy
SEDAR22-AW-02	United States Commercial Longline Vessel Standardized Catch Rates of Yellowedge Grouper (*Epinephelus flavolimbatus*) for Three Regions in the Gulf of Mexico, 1991-2009	Neil Baertlein and Kevin McCarthy
Reference Documents		
SEDAR22-RD10	Comparison of Two Techniques for Estimating Tilefish, Yellowedge Grouper, and Other Deepwater Fish Populations	Matlock, Gary C., Walter R. Nelson, Robert S. Jones, Albert W. Green, Terry J. Cody, Elmer Gutherz, and Jeff Doerzbacher
SEDAR22-RD11	Deep-water sinkholes and biotherms of South Florida and the Pourtales Terrace – Habitat and Fauna	John K. Reed, Shirley A. Pomponi, Doug Weaver, Charles K. Paull, and Amy E. Wright
SEDAR22-RD12	Tilefishes of the genus *Caulolatilus* construct burrows in the sea floor	K.W. Able, D.C. Twichell, C.B. Grimes, and R.S. Jones
SEDAR22-RD13	Spawning Locations for Atlantic Reef Fishes off the Southeastern U.S.	GEORGE R. SEDBERRY, O. PASHUK, D.M. WYANSKI, J.A. STEPHEN, and P. WEINBACH

SEDAR22-RD14	Trends in tilefish distribution and relative abundance off South Carolina and Georgia	Charles A. Barnes and Bruce W. Stender
SEDAR22-RD15	Age, growth, and reproductive biology of blueline tilefish along the Southeastern coast of the United States, 1982-1999	Patrick J. Harris, David M. Wyanski, and Paulette T. Powers Mikell
SEDAR22-RD16	Temporal and spatial variation in habitat characteristics of tilefish (Lopholatilus chamaeleonticeps) off the east coast of Florida	Kenneth W. Able, Churchill B. Grimes, Robert S. Jones and David C. Twichell
SEDAR22-RD17	The Complex Life History of Tilefish *Lopholatilus chamaeleonticeps* and Vulnerability to Exploitation	Churchill B. Grimes and Stephen C. Turner
SEDAR22-RD18	The fishery for tilefish, *Lopholatilus chamaeleonticeps*, off South Carolina and Georgia	Bob Low, Glenn Ulrich, and Frank Blum
SEDAR22-RD19	Tilefish off South Carolina and Georgia	R.A. Low, Jr., G.F. Ulrich, and F. Blum
SEDAR22-RD20	Spawner-recruit relationships of demersal marine fishes: Prior distribution of steepness for possible use in SEDAR stock assessments	SEDAR 24−AW−06 - Sustainable Fisheries Branch

1.2. PANEL RECOMMENDATIONS AND COMMENT

1.2.1. Term of Reference 1

Review any changes in data following the data workshop and any analyses suggested by the data workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.

All changes to the data following the data workshop are reviewed in Section 2. The two primary changes include 1) segregating the data into eastern and western Gulf of Mexico regions, and 2) making the age composition data conditional on length.

1.2.2. Term of Reference 2

Develop population assessment models that are compatible with available data and recommend which model and configuration is deemed most reliable or useful for providing advice. Document all input data, assumptions, and equations.

Two stock assessment models were used for this assessment: 1) stochastic stock reduction analysis (SRA), and 2) stock synthesis (SS). These models and their configurations are described more fully in Sections 3.1.1 and 3.2.1, respectively. Stock synthesis was considered the primary assessment model, since SRA is designed to give only rough estimates of stock trends and status.

1.2.3. Term of Reference 3

Provide estimates of stock population parameters (fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, etc); include appropriate and representative measures of precision for parameter estimates.

Estimates of assessment model parameters and their associated standard errors are reported in Section 3.1.2 for SRA and Section 3.2.2 for SS.

1.2.4. Term of Reference 4

Characterize uncertainty in the assessment and estimated values, considering components such as input data, modeling approach, and model configuration. Provide appropriate measures of model performance, reliability, and 'goodness of fit'.

Uncertainty in the assessment and estimated values is characterized in Section 3.1.2 for SRA and Section 3.2.2 for SS.

1.2.5. Term of Reference 5

Provide yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations, including figures and tables of complete parameters.

Yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations are provided in Section 3.1.2 for SRA and Section 3.2.2 for SS.

1.2.6. Term of Reference 6

Provide estimates for SFA criteria consistent with applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and National Standards. This may include: evaluating existing SFA benchmarks, estimating alternative SFA benchmarks; and *recommending proxy values. In addition, specify OFL, and recommend a range of ABC for review by the SSC in compliance with ACL guidelines.*

Estimates of SFA criteria from SS are provided in Section 3.2.2. For reasons explained in Section 3.2.2, OFL yield streams and recommended ABCs were not produced for this assessment.

1.2.7. Term of Reference 7

Provide declarations of stock status relative to SFA benchmarks.

Stock status relative to SFA benchmarks from SS is reported in Section 3.2.2.

1.2.8. Term of Reference 8

Perform a probabilistic analysis of proposed reference points and provide the probability of overfishing at various harvest or exploitation levels.

For reasons explained in Section 3.2.2, the probability of overfishing at various harvest levels was not estimated for this assessment.

1.2.9. Term of Reference 9

Project future stock conditions (biomass, abundance, and exploitation) and develop rebuilding schedules if warranted; include estimated generation time.

For reasons explained in Section 3.2.2, future stock conditions were not projected for this assessment.

1.2.10. Term of Reference 10

Evaluate the results of past management actions and, if appropriate, probable impacts of current management actions with emphasis on determining progress toward stated management goals.

1.2.11. Term of Reference 11

Provide recommendations for future research and data collection (field and assessment); be as specific as practicable in describing sampling design and sampling intensity and emphasize items which will improve future assessment capabilities and reliability.

2. DATA REVIEW AND UPDATE

2.1. LANDINGS

2.1.1. Commercial Landings

Commercial landings data used in the assessment are presented in Table 2.1 and Figure 2.1. Final commercial landings were computed following the data workshop (DW), but a full description of the landings and how they were calculated is given in the SEDAR 22 Data Workshop Report.

Prytherch (1983) identified three fishing grounds in the Gulf of Mexico. The regions consisted of the southeastern Gulf (statistical grids 1-5), northeastern Gulf (statistical grids 6-12), and western Gulf (statistical grids 13-21). Initially, commercial landings were stratified by these three regions to more accurately capture spatial differences in fishing pressure on tilefish across the Gulf. Due to the reclassification of a large proportion of tilefish landings from statistical grids 3-5 as blueline tilefish landings (see SEDAR 22 Data Workshop Report), commercial tilefish landings from the southeastern Gulf were small relative to landings from the northeastern and western regions. Therefore, the assessment panel (AP) decided to combine landings from the southeastern and northeastern regions into a single eastern Gulf region (statistical grids 1-12).

In the end, commercial landings were stratified by gear type (hand line and long line) and region (eastern and western Gulf of Mexico). This stratification resulted in four commercial fisheries (hand line east, hand line west, long line east, and long line west) that were included in the assessment.

2.1.2. Recreational Landings

The recreational landings data used in the assessment are presented in Table 2.2. Following the DW, recreational landings were stratified by region based on state. The eastern Gulf region included landings from Florida, Alabama, and Missouri. The western Gulf region included landings from Louisiana and Texas. Recreational landings were small compared to commercial landings (i.e., only 9,060 lbs from 1987-2009). Therefore, the AP decided to combine recreational landings with commercial hand line landings.

2.2. DISCARDS

2.2.1. Commercial Discards

Commercial discards data used in the assessment are presented in Table 2.3. Few commercial trips reported any discards of tilefish (i.e., only 3 hand line trips and 11 long line trips from 2002-2009. Therefore, the AP decided to combine commercial discards with commercial landings. Based on the DW recommendation, discard mortality was assumed to be 100%. Discard numbers were converted to weight using the average weight of a tilefish (5.8 whole lbs) from Trip Interview Program (TIP) age and growth data. Commercial discards were separated into eastern and western Gulf regions by reported statistical grids.

2.3. LENGTH COMPOSITION

Length composition data used in the assessment are presented in Figures 2.2-2.7 and Appendix A. Lengths are in units of total length in centimeters. Following the DW, length compositions were computed as numbers at length using length data from TIP. Length data were aggregated into 2 cm length bins. Length bins ranged from 20 cm to 114 cm, where the bin size represents the minimum size of the bin (e.g., the 20 cm length bin contains fish greater than or equal to 20 cm and less than 22 cm). Length data were stratified by fishery/survey (commercial hand line, commercial long line, and NMFS bottom long line survey), region (eastern and western Gulf), and gender (female, male, and unknown). Length composition sample sizes were capped at a maximum effective sample size of 200 fish to prevent the length composition data from driving the model fitting process due to large sample sizes.

2.4. AGE COMPOSITION

Age composition data used in the assessment are presented in Figures 2.8-2.13 and Appendix B. Following the DW, age compositions were computed as numbers at age using age data from TIP. Initially, a plus group of age 20 was used for the age data, but preliminary assessment model runs revealed that a significant portion of the spawning biomass was part of the plus group. Therefore, the AP decided to increase the plus group to age 30 to better model the dynamics of the spawning population.

It was observed at the DW that the length frequency distributions of the TIP age samples differed from the length frequency distributions of the TIP length samples, particularly in earlier years when age sample sizes were smaller (see SEDAR 22 Data Workshop Report). As a result, the DW recommended that the age compositions be reweighted by the length samples, so that the length frequency distributions of the age and length samples more closely matched each other. The AP decided to pursue an alternative approach to dealing with these discrepancies in length frequency distributions. Instead of reweighting the age compositions, the age compositions were made conditional on length. In other words, a separate age composition was specified for each 2 cm length bin containing fish whose ages had been estimated. Using these conditional age compositions has the advantage of linking age data directly to length data. As a result, the length frequency distributions of the age samples are explicitly defined as a subset of the overall length frequency distributions of the length samples, and differences between the two length distributions can be accounted for by the assessment model.

Age data were stratified by fishery/survey (commercial hand line, commercial long line, and NMFS bottom long line survey), region (eastern and western Gulf), and gender (female, male, and unknown). Age composition sample sizes were capped at a maximum effective sample size of 100 fish to prevent the age composition data driving the model fitting process due to large sample sizes.

An age estimation error matrix was developed following the DW to account for errors in the estimation of ages for tilefish (Table 2.4). The matrix includes mean coded ages and their associated standard deviations. The standard deviations came from an analysis of tilefish ages estimated by two independent readers (S22-DW-01). A simple power function:

$$\sigma_{pred} = 1.1746\sigma_{obs}^{\ 0.3318},$$

was used to smooth the observed standard deviations from the age precision analysis.

2.5. INDICES

The standardized indices of relative abundance used in the assessment are presented in Figure 2.14 and Table 2.5. The DW recommended the use of two indices: a fishery-dependent commercial long line index and a fishery-independent NMFS bottom long line survey index (see SEDAR 22 Data Workshop Report). The coefficients of variation (CV) associated with the standardized indices were converted to log-scale standard errors by:

$$\log(SE) = \sqrt{\log_e\left(1 + CV^2\right)},$$

for input into the Stock Synthesis assessment model.

Prytherch (1983) identified three fishing grounds in the Gulf of Mexico. The regions consisted of the southeastern Gulf (statistical grids 1-5), northeastern Gulf (statistical grids 6-12), and western Gulf (statistical grids 13-21). Following the DW, region-specific indices were developed for the commercial long line index (S22-AW-01) and NMFS bottom long line survey index (Addendum 2 to S22-DW-07) to more accurately track spatial differences in tilefish abundance across the Gulf. Both the commercial long line index and NMFS bottom long line survey index from the southeastern region had small sample sizes and high variances compared to the indices from the northeastern and western regions. Therefore, the AP decided to combine the southeastern and northeastern regions into a single eastern Gulf region (statistical grids 1-12), and use the commercial long line index and NMFS bottom long line survey index from the northeastern region to represent abundance in the eastern region.

2.6. LIFE HISTORY

Life history data used in the assessment included natural mortality, growth, sex ratio, maturity, fecundity, and sex transition rates. Stock Synthesis uses the life history quantities as initial parameter values, rather than as data inputs. Therefore, the life history data are described in the Parameters Estimated section (3.2.1.4) of the report.

2.7. REFERENCES

Prytherch, H.F. (1983). A descriptive survey of the bottom long line fishery in the Gulf of Mexico. NOAA Technical Memorandum NMFS-SEFSC-122. 33p.

2.8. TABLES

Table 2.1. Commercial landings in whole pounds for Gulf of Mexico tilefish. Landings are separated into four fisheries: commercial hand line east (CM HL E), commercial hand line west (CM HL W), commercial long line east (CM LL E), and commercial long line west (CM LL W).

Year	CM HL E	CM HL W	CM LL E	CM LL W
1965	6,973	0	0	0
1966	2,003	0	0	0
1967	1,077	0	0	0
1968	1,474	0	0	0
1969	314	0	0	0
1971	3,288	0	0	0
1972	1,104	0	0	0
1973	3,995	0	0	0
1974	4,205	0	0	0
1975	14,823	0	0	0
1976	24,635	0	0	0
1977	36,400	0	0	0
1978	23,621	600	0	0
1979	29,329	0	5,721	1,185
1980	19,223	0	6,900	1,805
1981	129,643	0	89,943	27,909
1982	60,935	0	138,612	102,493
1983	14,260	525	138,546	79,731
1984	13,129	2,108	184,019	102,759
1985	10,005	12,299	91,796	164,477
1986	48,625	9,837	147,698	126,478
1987	76,298	19,848	171,373	269,525
1988	88,587	47,304	258,610	555,682
1989	40,768	63,536	102,741	247,572
1990	66,697	3,386	125,215	160,521
1991	18,473	24,649	119,314	51,793
1992	13,413	14,761	95,856	88,229
1993	15,630	7,297	151,258	110,300
1994	12,560	1,640	266,637	107,548
1995	2,335	8,026	165,270	298,051
1996	1,453	2,957	120,964	85,196
1997	2,600	579	287,849	46,234
1998	1,354	1,617	224,529	69,647
1999	6,237	4,396	219,320	144,458

2000	4,239	5,523	269,764	199,911
2001	16,033	295	337,594	130,394
2002	9,669	1,591	246,741	282,939
2003	3,457	2,171	235,683	159,164
2004	3,070	628	283,647	179,941
2005	4,024	4,285	342,227	238,446
2006	5,858	196	247,364	57,796
2007	1,042	2,073	291,486	24,156
2008	136	327	290,043	58,086
2009	1,336	80	351,098	58,308

Table 2.2. Recreational landings in whole pounds for Gulf of Mexico tilefish. Landings are separated into eastern (Rec E) and western (Rec W) Gulf of Mexico regions.

Year	Rec E	Rec W
1987	326	0
1988	0	0
1989	0	0
1990	3,946	0
1991	0	0
1992	0	3
1993	0	0
1994	0	0
1995	2	0
1996	0	0
1997	0	0
1998	0	6
1999	0	0
2000	0	0
2001	0	1
2002	0	0
2003	0	0
2004	0	0
2005	4,701	0
2006	0	0
2007	0	0
2008	0	76
2009	0	0

Table 2.3. Commercial discards in numbers for Gulf of Mexico tilefish. Discards are separated by gear type: commercial hand line (CM HL) and commercial long line (CM LL). Due to confidentiality restrictions, discard numbers are combined across all years.

Year	CM HL	CM LL
2002		
2003		
2004		
2005	981	3,509
2006		
2007		
2008		
2009		

Table 2.4. Age estimation error matrix for Gulf of Mexico tilefish.

Mean Age`	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
SD of Age`	0.01	0.27	0.96	1.37	1.65	1.88	2.06	2.21	2.35	2.46	2.57	2.66	2.75	2.83	2.9	2.97
Mean Age`	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	
SD of Age`	3.04	3.1	3.16	3.21	3.26	3.31	3.36	3.4	3.44	3.48	3.52	3.56	3.6	3.63	3.67	

Table 2.5. Standardized indices of relative abundance and associated log-scale standard errors for Gulf of Mexico tilefish. The indices are from the commercial long line east (CM LL E), commercial long line west (CM LL W), NMFS bottom long line survey east (NMFS BLL E), and NMFS bottom long line survey west (NMFS BLL W).

	CM LL E		CM LL W		NMFS BLL E		NMFS BLL W	
Year	Std CPUE	log SE	Std CPUE	log SE	Std CPUE	log SE	Std CPUE	log SE
1992	0.3887	0.50	0.3516	0.35	-	-	-	-
1993	0.4976	0.48	0.4825	0.27	-	-	-	-
1994	0.9339	0.38	0.5812	0.24	-	-	-	-
1995	1.0734	0.38	0.8402	0.20	-	-	-	-
1996	0.6793	0.38	1.5196	0.24	-	-	-	-
1997	0.8870	0.36	1.3002	0.28	-	-	-	-
1998	1.9493	0.37	0.6337	0.29	-	-	-	-
1999	1.8209	0.37	0.9104	0.21	-	-	-	-
2000	0.8802	0.37	0.8896	0.23	-	-	0.1376	0.75
2001	0.6851	0.37	1.0779	0.25	0.2763	0.64	0.6665	0.44
2002	0.7215	0.36	1.6720	0.25	0.8807	0.55	0.9706	0.50
2003	0.5691	0.35	0.6342	0.23	0.4633	0.68	0.5745	0.58
2004	0.6519	0.37	1.0384	0.32	1.2356	0.53	0.6290	0.61
2005	0.7694	0.38	2.0646	0.31	-	-	-	-
2006	1.2016	0.39	0.6881	0.37	1.3556	0.45	1.1367	0.52
2007	1.3385	0.37	1.4041	0.57	1.7985	0.45	2.1940	0.45
2008	1.5484	0.39	0.9117	0.34	1.1253	0.54	1.2444	0.52
2009	1.4041	0.39	-	-	1.2279	0.53	1.8551	0.42

2.9. FIGURES

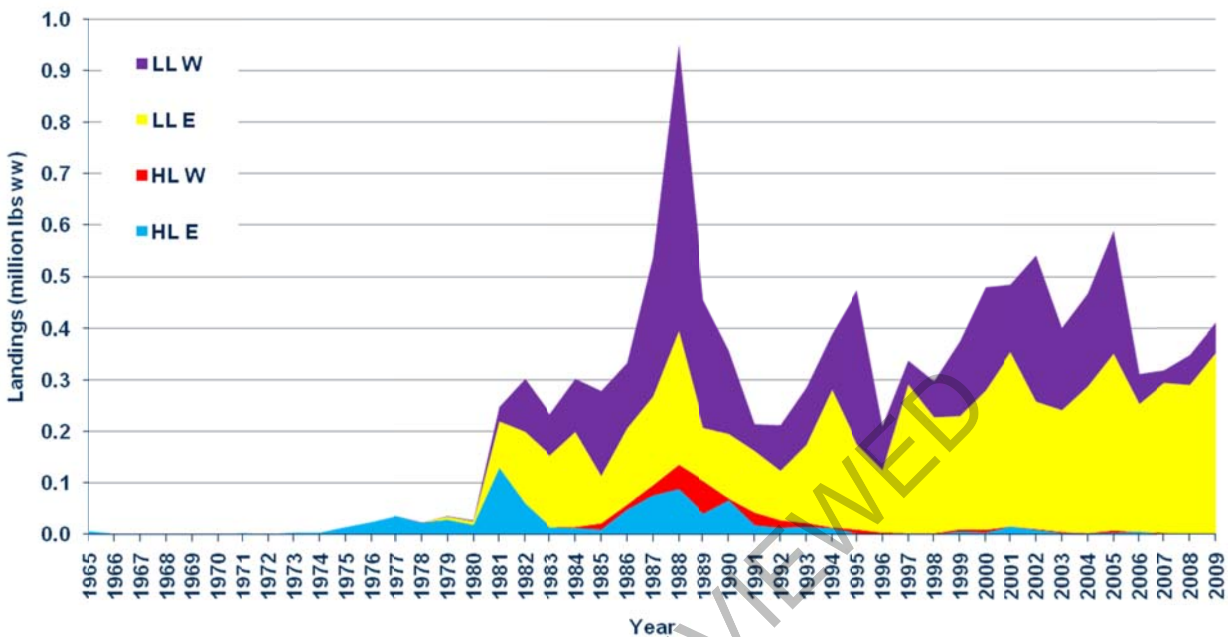


Figure 2.1. Commercial landings in whole pounds for Gulf of Mexico tilefish. Landings are separated into four fisheries: hand line east (HL E), hand line west (HL W), long line east (LL E), and long line west (LL W).

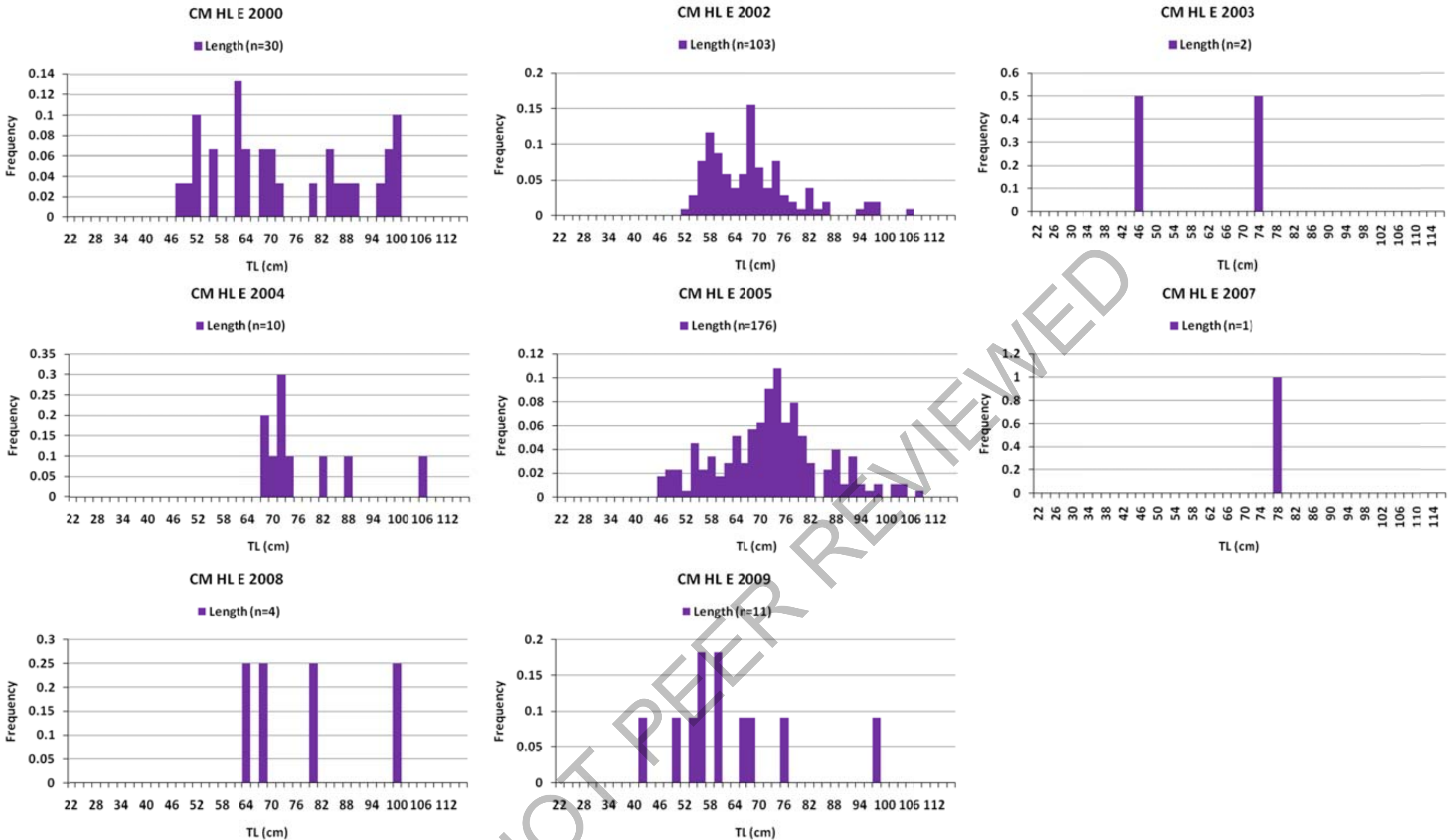


Figure 2.2. Numbers at length for tilefish in the commercial hand line fishery of the eastern Gulf of Mexico (CM HL E). All genders are combined.

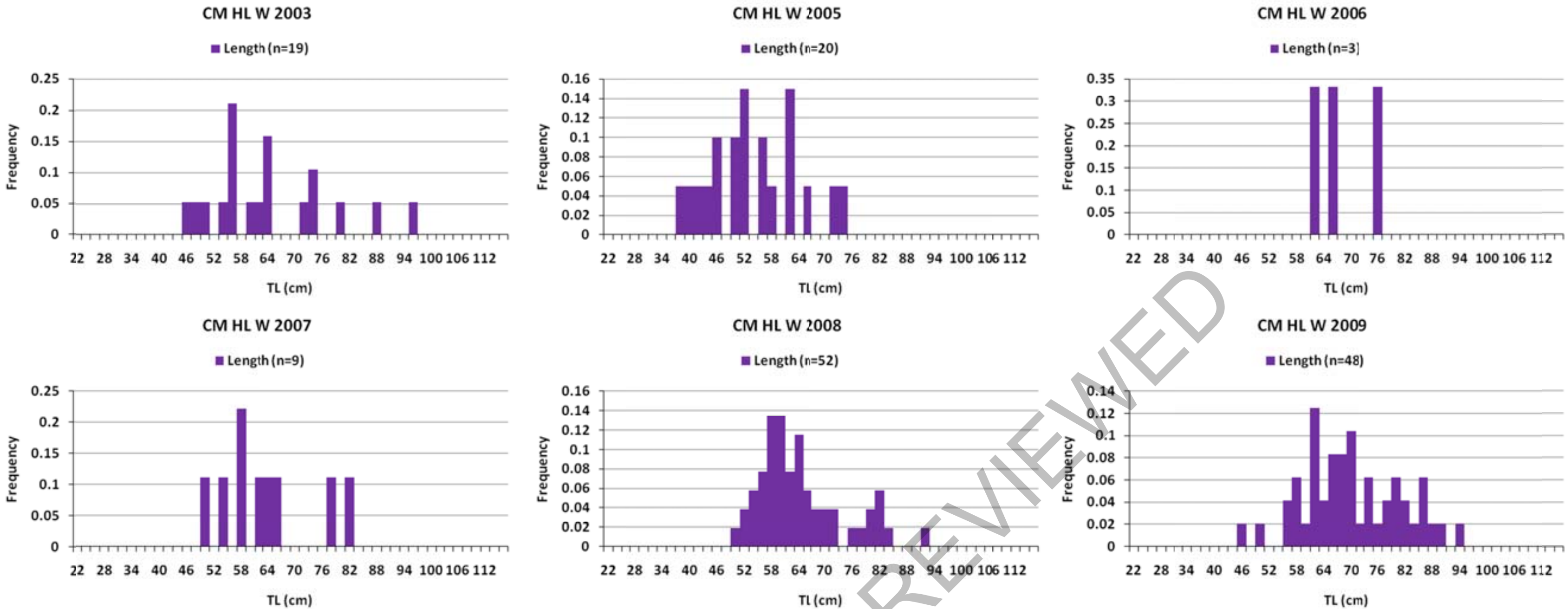


Figure 2.3. Numbers at length for tilefish in the commercial hand line fishery of the western Gulf of Mexico (CM HL W). All genders are combined.

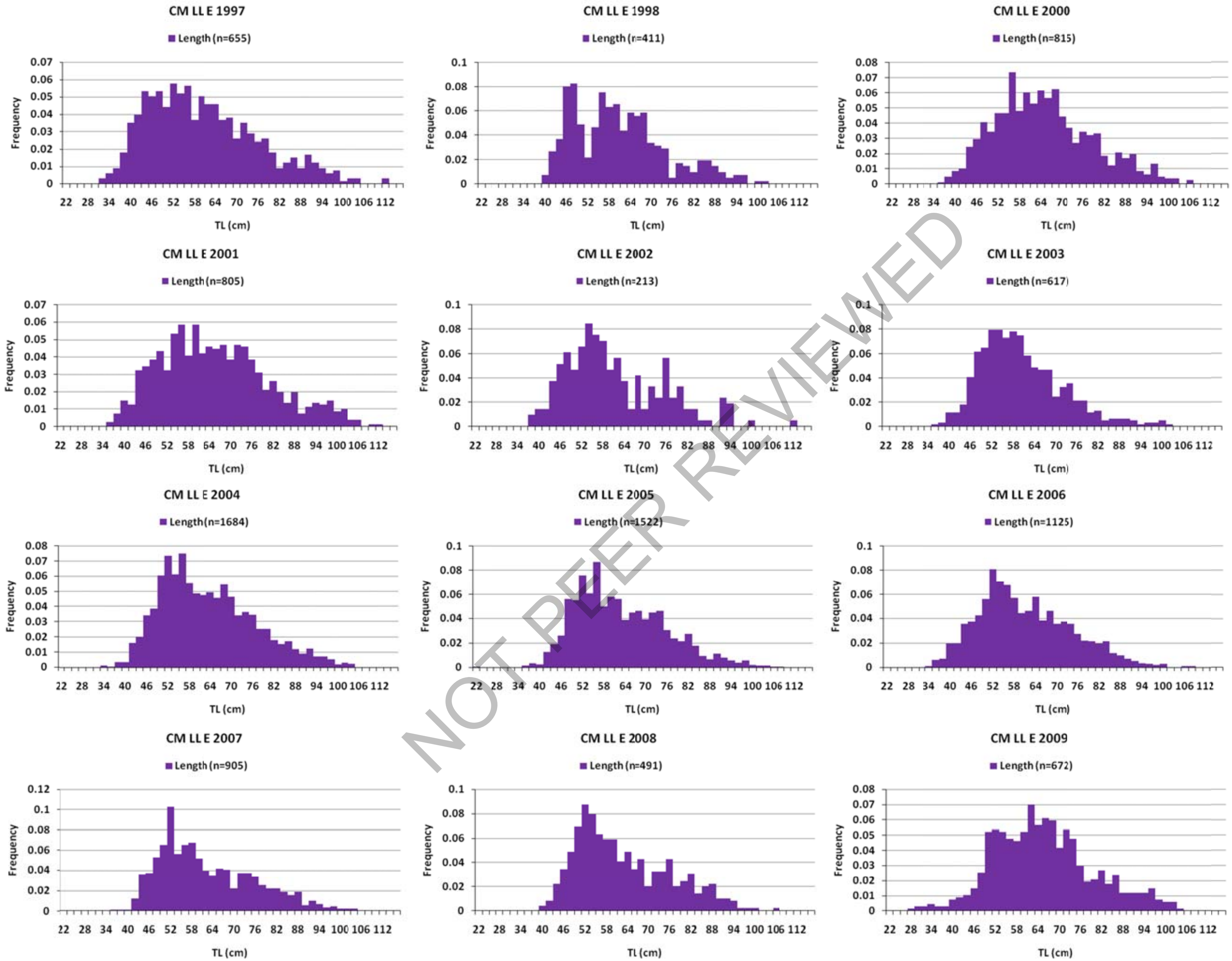

CM LL E 1997
Length (n=655)
CM LL E 1998
Length (n=411)
CM LL E 2000
Length (n=815)
CM LL E 2001
Length (n=805)
CM LL E 2002
Length (n=213)
CM LL E 2003
Length (n=617)
CM LL E 2004
Length(n=1684)
CM LL E 2005
Length (n=1522)
CM LL E 2006
Length (n=1125)
CM LL E 2007
Length (n=905)
CM LL E 2008
Length (n=491)
CM LL E 2009
Length (n=672)
Frequency
TL (cm)

Figure 2.4. Numbers at length for tilefish in the commercial long line fishery of the eastern Gulf of Mexico (CM LL E). All genders are combined.

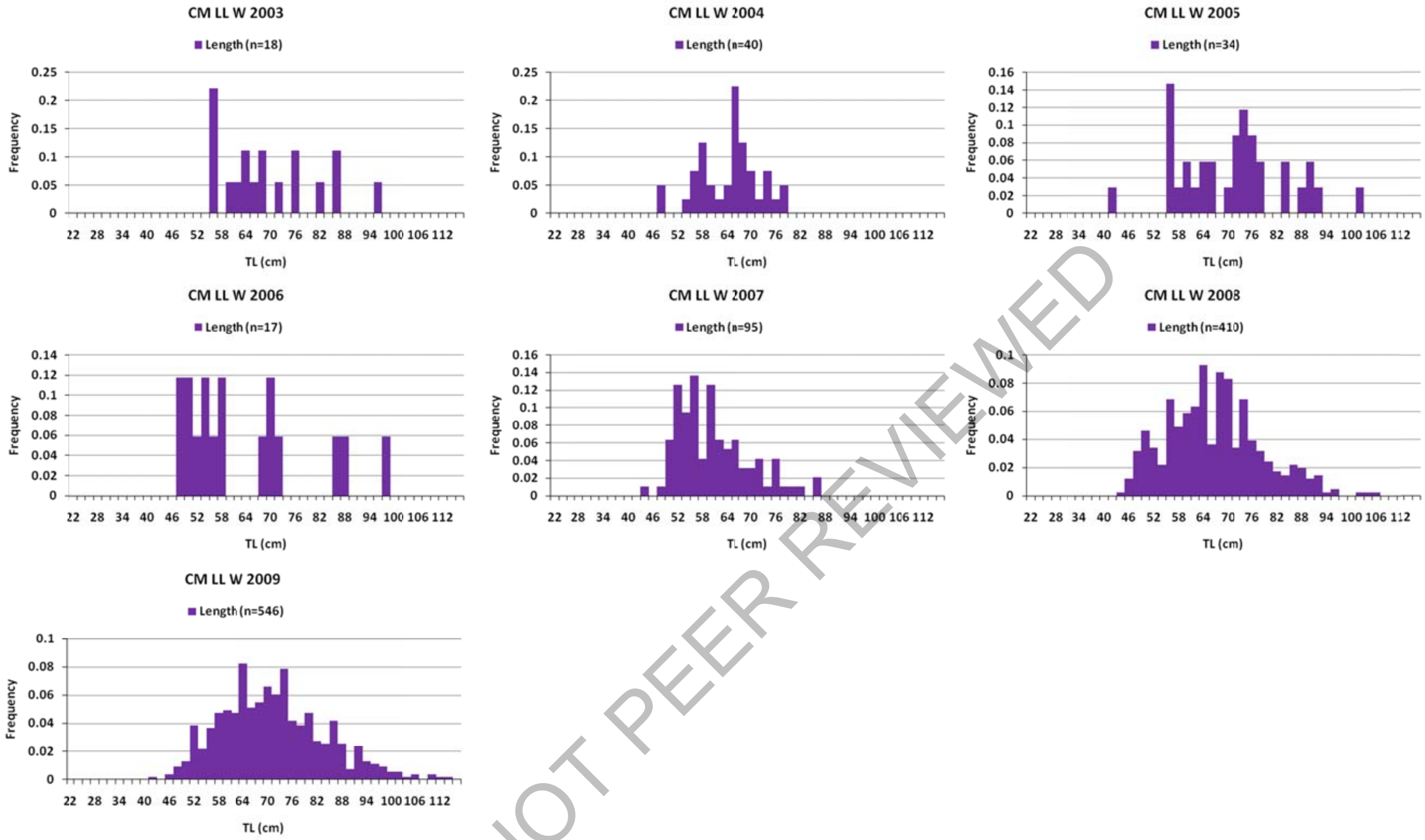


Figure 2.5. Numbers at length for tilefish in the commercial long line fishery of the western Gulf of Mexico (CM LLW). All genders are combined.

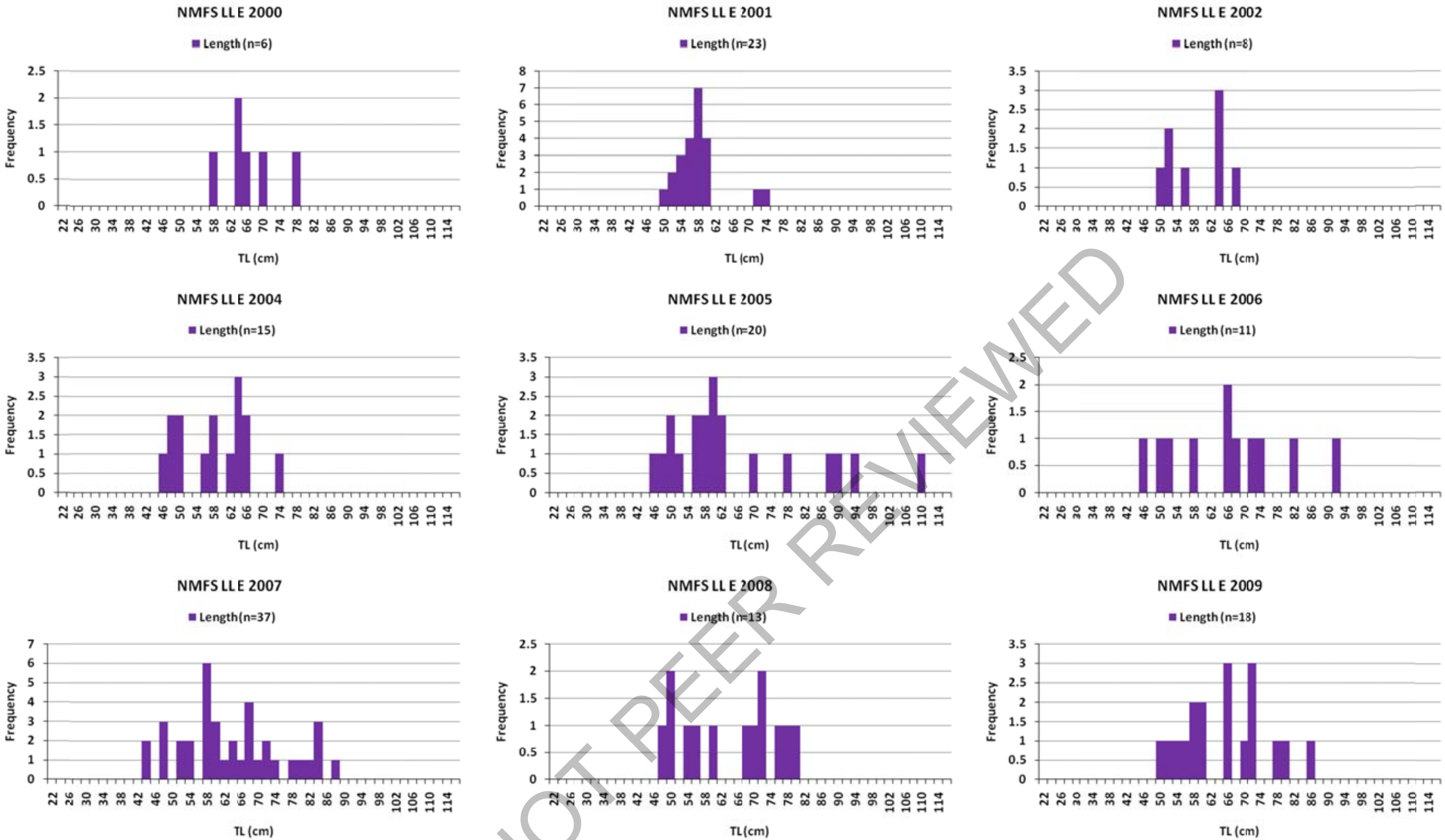


Figure 2.6. Numbers at length for tilefish in the NMFS bottom long line survey of the eastern Gulf of Mexico (NMFS LL E). All genders are combined.

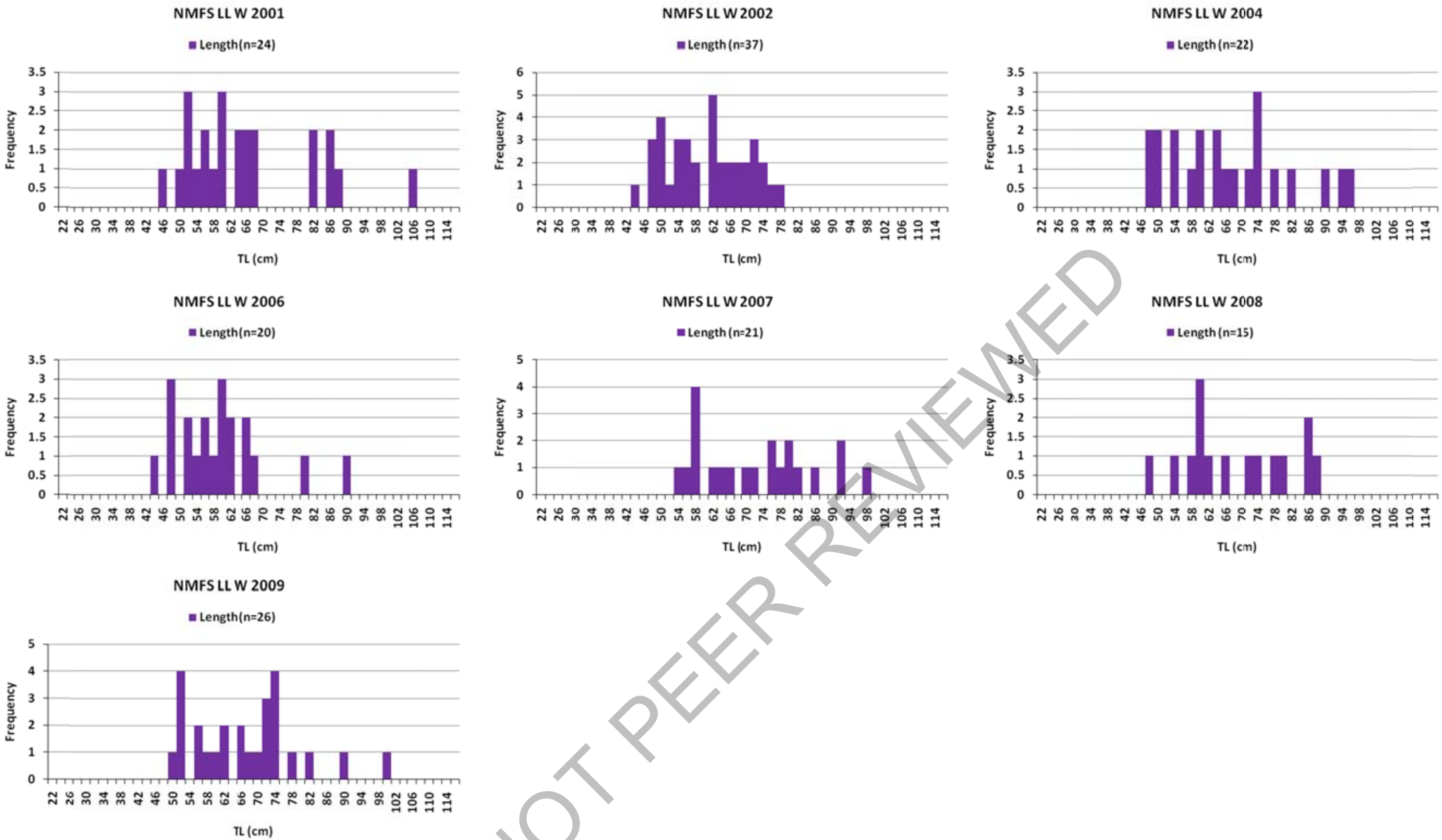


Figure 2.7. Numbers at length for tilefish in the NMFS bottom long line survey of the western Gulf of Mexico (NMFS LL W). All genders are combined.

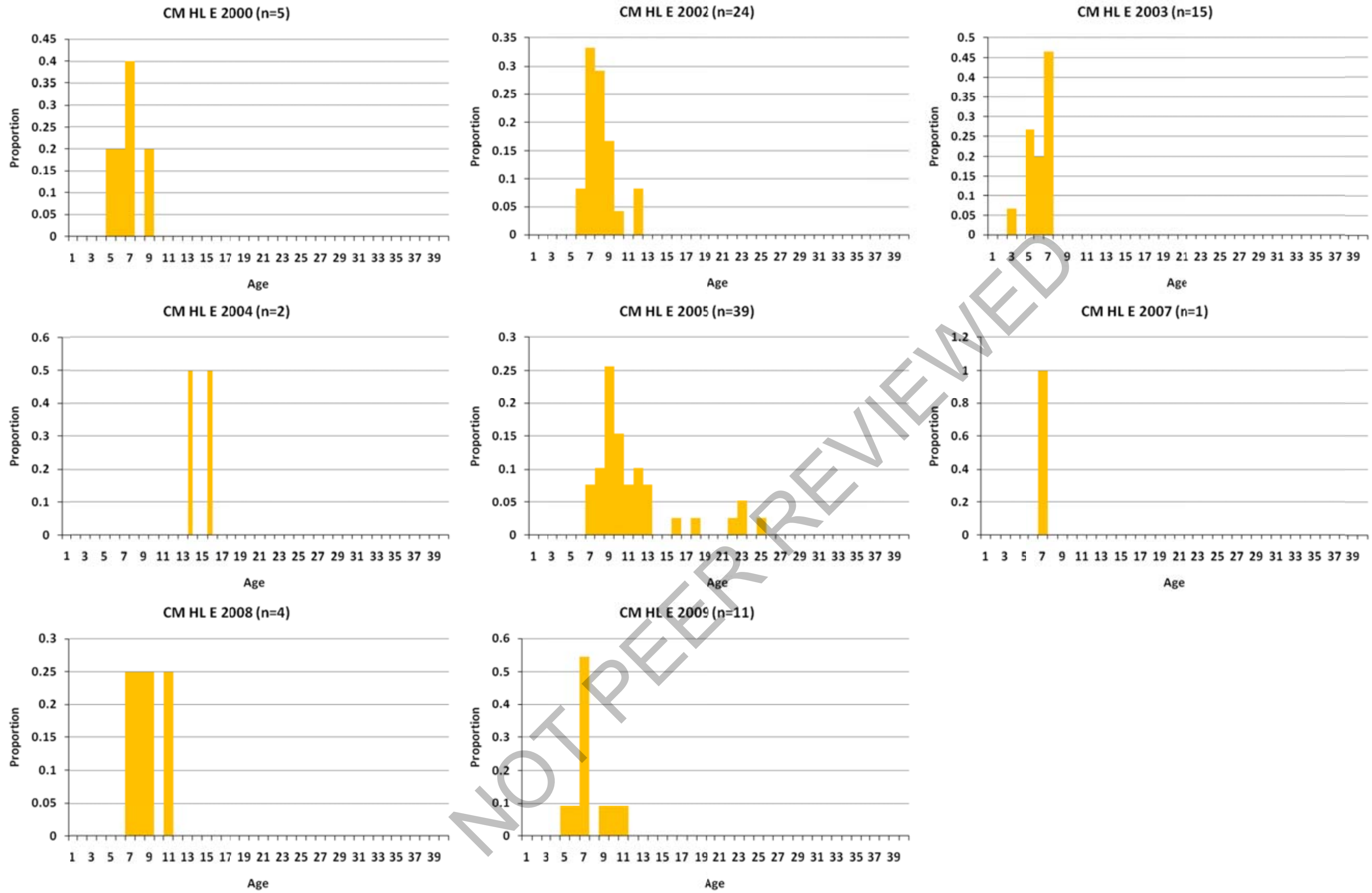


Figure 2.8. Proportions at age for tilefish in the commercial hand line fishery of the eastern Gulf of Mexico (CM HL E). All genders and lengths are combined.

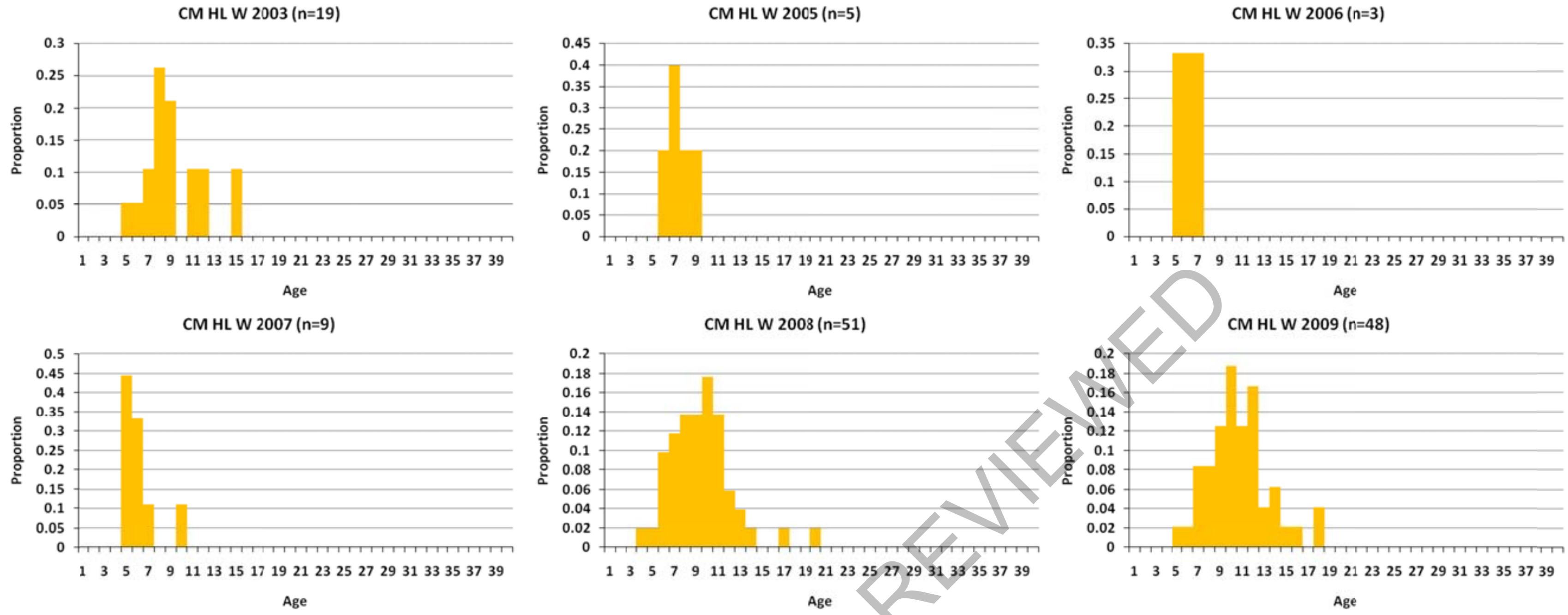


Figure 2.9. Proportions at age for tilefish in the commercial hand line fishery of the western Gulf of Mexico (CM HL W). All genders and lengths are combined.

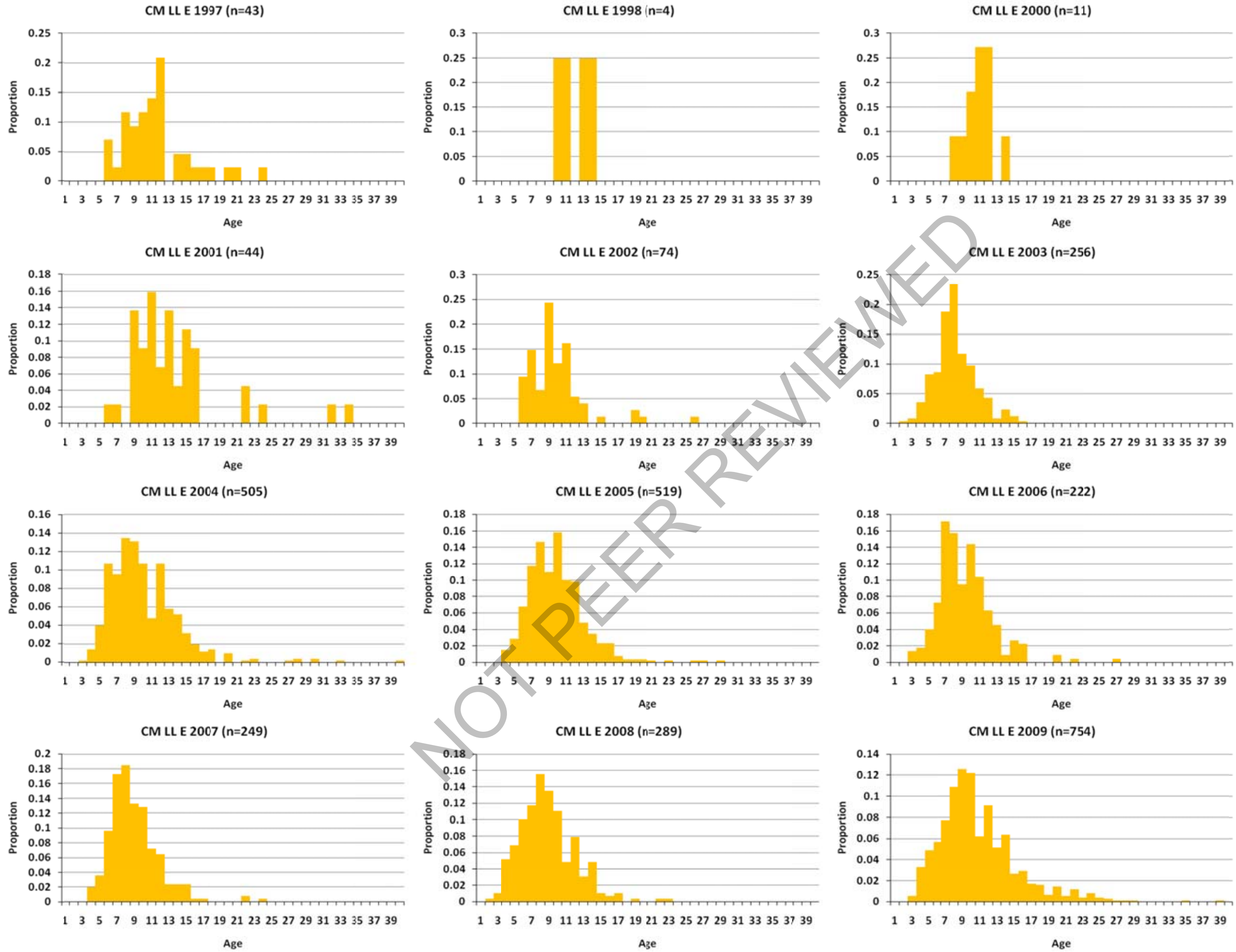

CM LL E 1997 (n=43)
CM LL E 1998 (n=4)
CM LL E 2000 (n=11)
CM LL E 2001 (n=44)
CM LL E 2002 (n=74)
CM LL E 2003 (n=256)
CM LL E 2004 (n=505)
CM LL E 2005 (n=519)
CM LL E 2006 (n=222)
CM LL E 2007 (n=249)
CM LL E 2008 (n=289)
CM LL E 2009 (n=754)
Proportion
Age

Figure 2.10. Proportions at age for tilefish in the commercial long line fishery of the eastern Gulf of Mexico (CM LL E). All genders and lengths are combined.

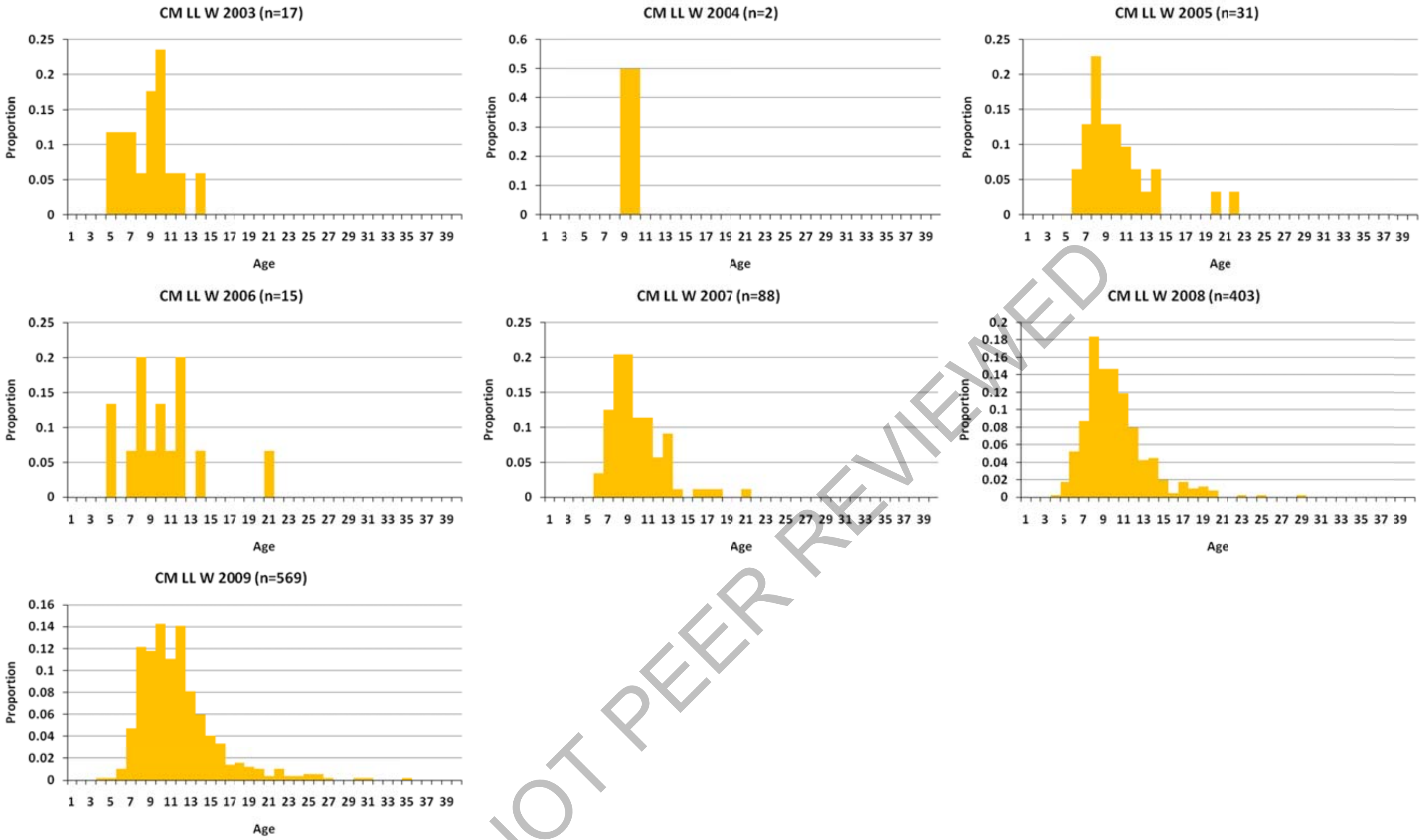


Figure 2.11. Proportions at age for tilefish in the commercial long line fishery of the western Gulf of Mexico (CM LL W). All genders and lengths are combined.

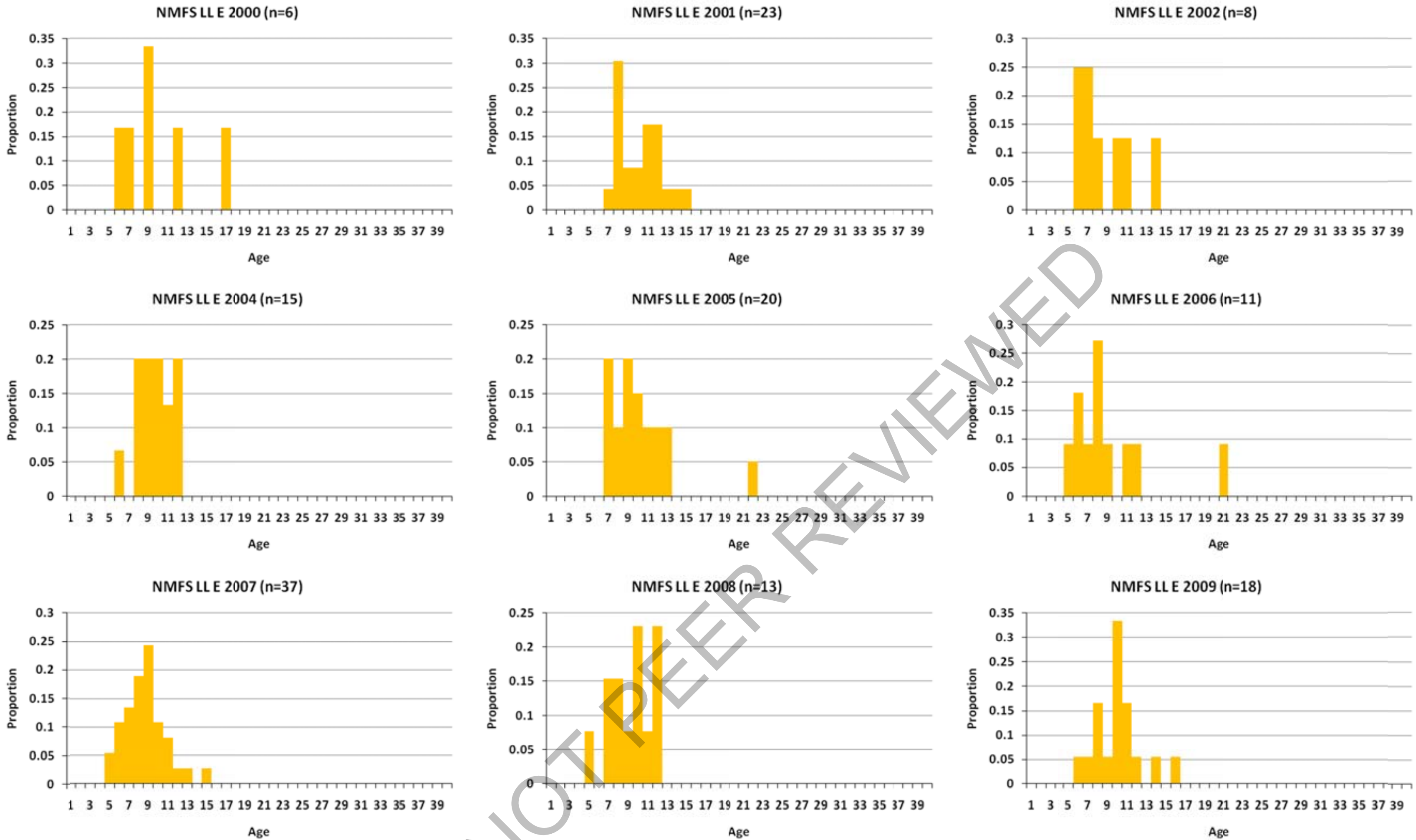


Figure 2.12. Proportions at age for tilefish in the NMFS bottom long line survey of the eastern Gulf of Mexico (NMFS LL E). All genders and lengths are combined.

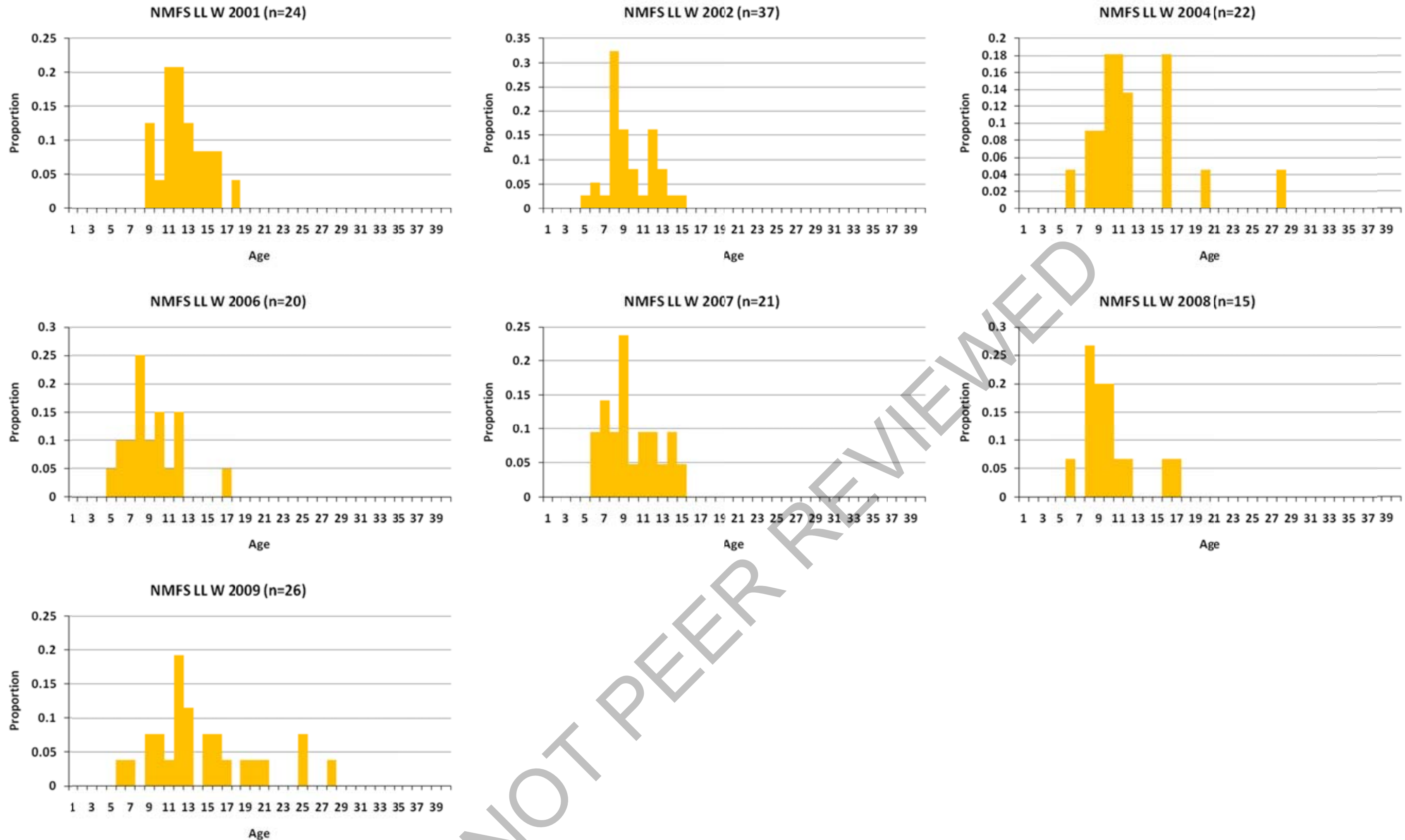


Figure 2.13. Proportions at age for tilefish in the NMFS bottom long line survey of the western Gulf of Mexico (NMFS LL W). All genders and lengths are combined.

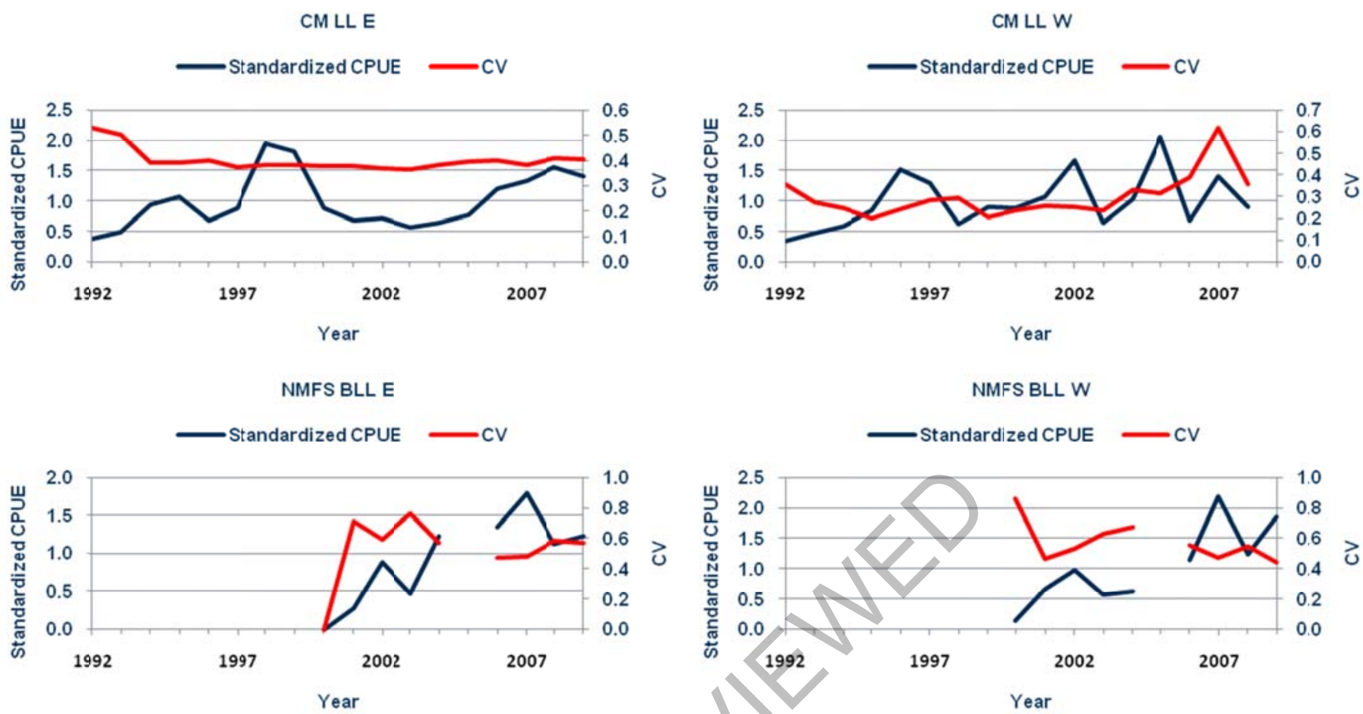


Figure 2.14. Standardized indices of relative abundance and associated coefficients of variation for Gulf of Mexico tilefish. The indices are from the commercial long line east (CM LL E), commercial long line west (CM LL W), NMFS bottom long line survey east (NMFS BLL E), and NMFS bottom long line survey west (NMFS BLL W).

3. STOCK ASSESSMENT MODELS AND RESULTS

3.1. MODEL 1: STOCHASTIC STOCK REDUCTION ANALYSIS

3.1.1. Model 1 Methods

3.1.1.1.Overview

Stochastic stock reduction analysis (SRA) was applied to golden tilefish (*Lopholatilus chamaeleonticeps*) from the Gulf of Mexico. Stochastic SRA (Walters et al. 2006) is a deterministic age structured population model with Beverton-Holt stock-recruitment function that estimates forward in time. SRA uses maximum sustainable yield (MSY) and exploitation at MSY (Umsy) as leading parameters, and given these parameters the model simulates changes in biomass by subtracting estimates of morality and adding recruits. A single trajectory of biomass over time is produced, as well as, estimates of MSY, Umsy, Ucurrent, Goodyear's Compensation

Ratio (recK), and stock status. SRA is a less data-intensive method which can help to determine how large the stock needed to be to have produced the time series of observed landings. SRA should not be a replacement for more computational complex assessment models (such as stock synthesis, referred to as SS) but used more as a tool to make possible conclusions of stock status based on historical catches and recent abundances. SRA has been applied to several Gulf of Mexico species including red snapper (*Lutjanus campechanus*, SEDAR 2005), gag (*Mycteroperca microlepis*, SEDAR 2006a), and red grouper *(Epinephelus morio*, SEDAR 2006b).

3.1.1.2. Data Sources

Stochastic SRA inputs were obtained through SEDAR 22 Data Workshop documents:

Document Reference	Parameter(s)
S22_tilefish_DW_Final.pdf, Chapter 2 Life History	Growth parameters Natural mortality Length at Maturity Weight at 100 cm
S22_tilefish_DW_Final.pdf, Chapter 3 Commercial Statistics	Catch histories
S22_tilefish_DW_Final.pdf, Chapter 5 Measures of Population Abundance	Indices of Abundance

3.1.1.3. Model Configuration and Equations

Stochastic SRA (Walters et al. 2006) is an age structured population model with Beverton-Holt stock-recruitment function that simulates biomass forward in time from the start of the fishery, with exploitation rates calculated each year from observed catch divided by modeled vulnerable population (sum of vulnerabilities at age multiplied by modeled numbers at age). In Stochastic SRA, recruitment is assumed to have had lognormally distributed annual anomalies (with variance estimated from VPA estimates of recent recruitment variability), and to account for the effects of these a very large number of simulation runs is made with anomaly sequences chosen from normal prior distributions (with or without autocorrelation). The resulting sample of possible historical stock trajectories is re-sampled using Markov Chain Monte Claro integration (MCMC). Summing frequencies of occurrence of different values of leading population parameter values over this sample amounts to solving the full state space estimation problem for the leading parameters (i.e. find marginal probability distribution for the leading population parameters integrated over the probability distribution of historical state trajectories implied by recruitment process errors and by the likelihood of observed population trend indices).

The stochastic SRA is parameterized by taking Umsy (annual exploitation rate producing MSY at equilibrium) and MSY as leading parameters, then calculating the Beverton-Holt stock-recruit parameters from these parameters and from per-recruit fished and unfished eggs and vulnerable biomasses. Under this parameterization, we effectively assume a uniform Bayes prior for Umsy and MSY, rather than a uniform prior for the stock-recruitment parameters. This is an age-structured version of the stock-recruitment parameterization in terms of policy parameters suggested by Schnute and Kronlund (1996).

Natural mortality rate was treated as age-independent, and was sampled for each simulation trial from a uniform prior distribution with M ranging from 0.12-0.16.

Vulnerabilities at age were provided from SS from logistic functions of age selectivities given size selectivities and size-at-age data (SS, Asel2). Fecundity was assumed to be proportional to the differences between age-specific body weight and weight at maturity calculated from inputed parameters.

SRA provides probability distributions of leading parameters (Umsy, MSY) and other population parameters (vulnerable biomass, catch, exploitation), as well as the probability of the population being overfished or undergoing overfishing based on a 40/10 rule. Each of these parameters is reported with a level of uncertainty determined through MCMC resampling.

3.1.1.4. Uncertainty and Measures of Precision

Stochastic SRA uses a Monte Carlo approach, as well as Bayesian and likelihood approaches for estimating leading parameters.

3.1.1.5. Benchmark / Reference points methods

Stochastic SRA estimates benchmark for probability of overfished as the ratio of Biomass current/Biomass MSY less than 40% and the benchmark for probability of overfishing as the ratio of Exploitation current/Exploitation MSY greater than 1.

3.1.1.6. Projection methods

Stock status is projected with an exploitation rate of 0.2. This exploitation rate is roughly double the estimated exploitation rate at MSY and was used only as a placeholder rather than a meaningful projection of future fishing mortality. Stochastic SRA obtains probability distributions for future stock status using Markov Chain Monte Carlo methods.

3.1.2 Model I Results

Stochastic SRA model was applied to golden tilefish life history parameters (Table 3.1) and catch history (Table 3.2) by region (East and West of Mississippi River) in the Gulf of Mexico. Vulnerabilities at age were provided from SS from logistic functions of age selectivities given size selectivities and size-at-age data (SS, Asel2) and were the same in both regions (Table 3.3). Commercial longline indices by region were used with varying degrees of uncertainty (index standard error) and the default value for recruitment anomalies was used (1.0)(Table 3.4). An increase in the uncertainty (value of 1.0 for all years) in the commercial longline index for all data and east region SRA model runs was necessary to complete a satisfactory number of model iterations (all data, 2.3 x 10^6; east, 2.1 x 10^6). The west region SRA model was manually ceased after several million (4.4 x 10^6) MCMC iterations.

3.1.2.1. Measures of Overall Model Fit

Stochastic SRA does not provide measures of overall model fit.

3.1.2.2. Parameter estimates & associated measures of uncertainty

Stochastic SRA model provided estimates of population parameters such as vulnerable biomass, maximum sustainable yield, exploitation (current and at maximum sustainable yield), and Goodyear's compensation ratio for each MCMC iteration. Summary statistics were calculated for these parameters given combinations of Umsy and MSY that yielded positive Goodyear's compensation ratio (recK) values.

- The eastern region of the Gulf of Mexico yielded a higher carrying capacity of golden tilefish compared to the western region given the historical catches (Figure 3.1, Table 3.5) and the west region was predicted to have the higher historical exploitation (Figure 3.2).
- SRA model estimated maximum sustainable yield (MSY) to be higher in the east region with central tendency of MSY at 135,587 kg compared to only 63,124 kg in the west (Figure 3.3).

- Exploitation at MSY was predicted higher in the western region (0.18 ± 0.04 and 0.30 ± 0.05, east and west respectively) (Figure 3.4).
- The central tendencies of current exploitation (Ucurrent 0.08 ± 0.02 and 0.07 ± 0.02, east and west respectively) were similar between the regions.
- The eastern region has a larger sample distribution of MSY values given a wider distribution of MSY and smaller distribution of Umsy values as the west (Figure 3.5). Given the sample distribution of MSY and Umsy, in the eastern region there is a high probability that recent catches have been at or above MSY and in the western region there is a high probability that recent catches have been at MSY.
- The west was predicted to have a higher Goodyear's compensation ratio (East, recK = 31.01; West, recK = 43.39).

3.1.2.3. Stock Abundance and Recruitment

Stochastic SRA does not provide measures of stock abundance.

Recruitment for golden tilefish from each region was modeled using the default value of 0.5 for the standard deviation of recruitment without autocorrelation. Normally distributed recruitment anomalies were predicted for each region, with both regions having similar recruitment anomalies throughout the time series (Figure 3.6).

3.1.2.4. Stock Biomass (total and spawning stock)

Stochastic SRA does not provide measures of spawning stock biomass. Total egg production was calculated as a proxy for stock biomass.

3.1.2.5. Fishery Selectivity

Stochastic SRA does not provide measures of fishery selectivity.

3.1.2.6. Fishing Mortality

Stochastic SRA does not provide measures of fishing mortality.

3.1.2.7. Stock-Recruitment Parameters

Stochastic SRA does provide measures of Goodyear's Compensation Ratio (recK) which is comparable to the steepness of the stock-recruitment curve. The west was predicted to have a higher Goodyear's compensation ratio (East, recK = 31.01; West, recK = 43.39), these recK values are analogous to steepness values of 89 and 92, respectively.

3.1.2.8. Evaluation of Uncertainty

Stochastic SRA does not provide other evaluations of uncertainty than those presented in 3.1.2.2.

3.1.2.9. Benchmarks / Reference Points / ABC values

The default benchmark for overfishing and overfished status in the SRA program employs the Pacific Fisheries Management Council 40:10 rule and is not directly comparable to the benchmarks employed by the Gulf of Mexico Fisheries Management Council. Furthermore, the benchmark used here is 40% of virgin biomass, rather than and SPR proxy, so the results are not exactly comparable to the SS3 status determination. The probability of overfishing shown in the figures and calculated here comes from the PFMC 40:10 rule whereby F is targeted to be decremented below Fmsy when the stock is less than 40% of B0, and F is targeted at 0 when the stock is less than or equal to 10% of B0. This rule is shown as the diagonal line on Figure 3.7. Under this rule, SRA results predict golden tilefish in the Gulf of Mexico to be experiencing overfishing in the east (prob. overfishing: east 1%, west 0%) and overfished conditions in the west (prob. overfished: east 0%, west 8%) (Figure 3.7).

3.1.2.10. Projections

Stochastic SRA for golden tilefish in both regions estimate catch to be much higher in the historical years. There is a wider area of uncertainty in historical catches in the east given the swath of possibilities (Figure 3.8). The east is estimated to have a larger vulnerable biomass for future catches.

Stochastic SRA projections were at a fishing mortality rate that was extremely high and unsustainable. Thus the projections indicate a stock decline, and are not particularly useful. If SRA was chosen for base model results it would be necessary to project under more realistic fishing mortality rate or TAC conditions.

3.1.3. References

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3.2. MODEL 2: STOCK SYNTHESIS

3.2.1. Model 2 Methods

3.2.1.1. Overview

Stock Synthesis (SS) is an integrated statistical catch-at-age model which is widely used for stock assessments in the United States and throughout the world. SS takes relatively unprocessed input data and incorporates many of the important processes (mortality, selectivity, growth, etc) that operate in conjunction to produce observed catch, size and age composition and CPUE indices. In addition, SS can incorporate time series of environmental data. Because many of these inputs are correlated, the concept behind SS is that they should be modeled together, which helps to ensure that uncertainties in the input data are properly accounted for in the assessment. SS has the ability to incorporate an early, data poor time period for which only catch data are available and a more recent, data-rich time period for which indices and length and age observations are available.

3.2.1.2. Data Sources

The landings, discards, length composition, age composition, and indices of abundance used in SS are described in Section 2.

3.2.1.3. Model Configuration and Equations

The primary assessment model selected for the Gulf of Mexico tilefish assessment was Stock Synthesis (Methot 2010) version 3.10g. Stock Synthesis has been widely used and tested for assessment evaluations, particularly in the US west coast NMFS centers (Methot 2010). Descriptions of SS algorithms and options are available in the SS user's manual (Methot 2010) and at the NOAA Fisheries Toolbox website (http://nft.nefsc.noaa.gov/).

Two regions were specified for tilefish: 1) eastern Gulf and 2) western Gulf. These regions were partitioned to allow SS to account for spatial differences in fishing pressure on tilefish across the Gulf. Since adult tilefish live in burrows, it was assumed that they do not move great distance. Therefore, there was no movement of tilefish specified between regions.

Two growth patterns were specified for tilefish: 1) eastern Gulf and 2) western Gulf; as well as two genders: 1) female and 2) male. The AP decided to include separate growth patterns for the eastern and western Gulf, because there was evidence that growth differed between the two regions (Figures 3.9 and 3.10), with the east having a higher L_{inf} (878 vs. 773 mm TL) and lower K (0.11 vs. 0.17) than the west. Based on these specifications, four growth curves were estimated in SS: 1) eastern females, 2) western females, 3) eastern males, and 4) western males.

A single Beverton-Holt stock-recruitment function was estimated in SS. Stock synthesis is hard-coded to model recruits as age 0 fish. The AP decided to include only females in the spawning stock, because this is the convention in most SEDAR assessments. Maturity was modeled as a logistic function of length. The DW life history group noted a nonlinear relationship between body weight and gonad weight in tilefish (see SEDAR 22 Data Workshop Report). Therefore, fecundity (represented by gonad weight) was modeled as a power function of body weight. Annual deviations from the stock-recruit function were estimated in SS as a vector of deviations forced to sum to one. Stock synthesis assumes a lognormal error structure for recruitment. Therefore, expected recruitments were bias adjusted. Methot (2010) recommends that the full bias adjustment only be applied to data-rich years in the assessment. Therefore, no bias adjustment was applied from 1965 to 1983, when only catch data are available. The bias adjustment then followed a linear ramp from 1984, when the length composition data begins, to full bias adjustment in 1997, when age composition data also becomes available. No bias adjustment is applied to the last three years (2007-2009), because the age composition data contains no information on recruitments for those years. The proportion of female recruits was set at 0.57, based on age-specific sex ratio data provided by the DW life history group (see SEDAR 22 Data Workshop Report). Recruits were distributed between the two regions according to a recruitment distribution parameter estimated in SS.

Natural mortality was specified using a Lorenzen M curve. The AP felt that it was more realistic for tilefish to have age-specific natural mortality than to assume constant natural mortality across ages. For the Lorenzen M curve in SS, a parameter describing the natural mortality at a specified reference age is defined. Natural mortality values for the remaining ages are scaled according to the growth curve. Four Lorenzen M curves were specified for tilefish: 1) eastern females, 2) western females, 3) eastern males, and 4) western males. Natural mortality was assumed to be constant over time.

The DW life history group found there was evidence of protogyny in Gulf of Mexico tilefish (see SEDAR 22 Data Workshop Report). Therefore, the AP decided to use the hermaphroditism option in SS for this assessment. Hermaphroditism in SS is implemented by specifying the rate of transition from female to male as a cumulative normal function of age.

Size based selectivity patterns were specified for each fishery and survey in SS. Double normal functions were used to model selectivity, because of the flexibility this functional form provides. The double normal can model dome-shaped selectivity, but it also can model asymptotic selectivity by holding several of the function's parameters at fixed values. Six selectivity patterns were defined in SS: 1) commercial hand line east, 2) commercial hand line west, 3) commercial long line east, 4) commercial long line west, 5) NMFS bottom long line survey east, and 6) NMFS bottom long line survey west. The AP decided to constrain all six selectivity patterns to be asymptotic, because there was no evidence of dome-shaped selectivity. The fisheries cover the entire range of the stock, so there does not appear to be a cryptic biomass of larger tilefish that are not vulnerable to the gear. In addition, the AP decided to mirror selectivity patterns across regions (e.g., the eastern and western commercial hand line fisheries share the same selectivity pattern). This decision was made because it was felt that gear configuration and fisher behavior was similar across the Gulf for each fishery/survey.

The SS input files are presented in Appendices C-D.

3.2.1.4. Parameters Estimated

A list of all model parameters is presented in Table 3.6. The table includes predicted parameter values and their associated standard errors from SS, initial parameter values, minimum and maximum values a parameter could take, and prior densities assigned to parameters. Parameters designated as fixed were held at their initial values.

The reference age for all four region and gender-specific Lorenzen M curves was set to age 4. There is no accepted methodology for determining what the reference age should be. Age 4 was chosen, because it allowed the Lorenzen M curve produced by SS to most closely match the Lorenzen M curve produced by the DW life history group using all available data, when the same growth curve was assumed for both Lorenzen M curves. Natural mortality at the reference age was assigned an initial value of 0.137 for all four Lorenzen M curves, because this was the value of M at age 4 from the Lorenzen M curve produced by the DW life history group using all available data. The reference M parameter was fixed at its initial value, because the AP believed the reference M parameter could not be well estimated given the available data. Therefore, differences in the region and gender-specific Lorenzen M curves would be due to differences in growth between the regions and genders.

In preliminary model runs, the parameter for length at age 0 was not well estimated, due to a lack of data for tilefish less than 3 years of age. This led to large differences in length at age 0 between the four region and gender-specific growth curves. These differences in growth translated into large differences in natural mortality at age 0, which the AP felt were unrealistic. Therefore, the AP decided to fix the parameter for length at age 0 for all four region and gender-specific growth curves at 1.4 cm, which was the average length at age 0 across regions and genders when the parameter was estimated in SS. The initial values for L_{inf} and K were taken from the region-specific growth curves (Figure 3.10). These two parameters were then estimated in SS for each region and gender-specific growth curve. The CVs for growth of young and old fish for the region and gender-specific growth curves were calculated outside of SS. The CVs for length at age were calculated using all available length and age data. The CV for young fish was calculated as the average CV of the youngest five age classes for which data were available (ages 2-6). The CV for old fish was calculated as the average CV of the oldest fish age classes for which data were available (ages 27-30 and 35). The same CVs were used for all four region and gender-specific growth curves. The CVs were fixed at their initial values, because variance parameters generally are difficult to estimate in an assessment model.

Initial parameter values for the weight-length relationship and maturity schedule were taken from the SEDAR 22 Data Workshop report. The same weight-length relationship was assumed for both males and females. Initial parameter values for the fecundity curve were obtained from the power function mentioned in Section 3.2.1.3. The parameters describing weight-length, maturity, and fecundity were all fixed at their initial values, because no data was available in SS from which to estimate them.

The probability of transition from female to male was modeled as a cumulative normal function of age. The initial values for the transition curve were calculated outside of SS using sex ratio date (i.e., observed proportions of males at age) provided by the DW life history group. An attempt was made to estimate the sex transition parameters in SS, but parameters were poorly estimated due to the sparsity of gender-specific age data. Therefore, the sex transition parameters were fixed at their initial values.

The initial parameter value for virgin recruitment was taken from a study that estimated virgin recruitment of Gulf of Mexico tilefish from habitat data (S22-DW-05). The study estimated virgin recruitment of age 1 fish. Virgin recruitment of age 0 fish was backcalculated assuming a natural mortality of 0.126, which is the average of the natural mortality estimates reported in the SEDAR 22 Data Workshop Report. The initial parameter value for steepness was taken from a meta-analysis of steepness values for demersal marine fish in the South Atlantic and Gulf of Mexico (S24-AW-06). Virgin recruitment and steepness parameters were estimated in SS. Attempts to estimate the recruitment standard deviation parameter in SS resulted in high parameter values (i.e., greater than one), which allowed current total biomass to exceed virgin total biomass. The AP did not believe this result to be realistic, given the history of the fishery for tilefish. Further exploration revealed that recruitment SDs greater than 0.3 led to this situation where current biomass exceeded virgin levels. Therefore, the AP decided to fix the recruitment SD parameter at a value of 0.15, which is halfway between a maximum realistic value of 0.3 and having a recruitment SD of 0 (i.e., annual recruitments coming directly from the stock-recruit curve).

Initial parameter values for the size selectivity patterns were chosen arbitrarily to produce a reasonably shaped asymptotic curve. The same initial values were used for all of the fisheries/surveys. Four of the selectivity parameters were fixed at their initial values to force an asymptotic selectivity pattern. The remaining two selectivity parameters were estimated in SS.

3.2.1.5. Uncertainty and Measures of Precision

Uncertainty in parameter estimates was quantified by computing asymptotic standard errors for each parameter (Table 3.6). Asymptotic standard errors are calculated by inverting the Hessian matrix (i.e., the matrix of second derivatives) after the model fitting process. Asymptotic standard errors provide a minimum estimate of uncertainty in parameter values.

Uncertainty in data inputs and model configuration was examined through the use of sensitivity runs. Twelve alternative runs are included in this report.

Run 1: The central run off of which the sensitivity runs were based. This run used the model configuration and initial parameter values described in Sections 3.2.1.3 and 3.2.1.4.

Run 2: The age-4 natural mortality parameter was fixed at 0.031, which was the minimum value of natural mortality estimates produced by the DW life history group. The AP felt that this minimum natural mortality value was low, even for a longer lived species like tilefish. Therefore, this run was made solely as a model exploration exercise.

Run 3: The age-4 natural mortality parameter was fixed at 0.087, which was the value from Run 1 (0.137) minus 0.5. The AP felt that the minimum natural mortality value from Run 2 was low, even for a longer lived species like tilefish. Therefore, the AP wanted to see a run with a natural mortality value between those of Run 1 and 2.

Run 4: The age-4 natural mortality parameter was fixed at 0.187, which was the value from Run 1 (0.137) plus 0.5. The AP felt that the maximum natural mortality value from Run 5 (see below) was high for a longer lived species like tilefish. Therefore, the AP wanted to see a run with a natural mortality value between those of Run 1 and 5.

Run 5: The age-4 natural mortality parameter was fixed at 0.242, which was the maximum value of natural mortality estimates produced by the DW life history group. The AP felt that this maximum natural mortality value was high for a longer lived species like tilefish. Therefore, this run was made solely as a model exploration exercise.

Run 6: The reference age for natural mortality was specified as age-15, which was near the midpoint of the age range for the assessment. Since there is no accepted method for selecting the reference age for natural mortality, the AP wanted to see runs exploring alternative reference ages.

Run 7: The reference age for natural mortality was specified as age-25, which was near the upper end of the age range for the assessment. Since there is no accepted method for selecting the reference age for natural mortality, the AP wanted to see runs exploring alternative reference ages.

Run8: The recruitment SD parameter was fixed at a value of 0.01, which effectively constrains annual recruitments to follow the stock-recruit relationship. This value was chosen to represent the lower end of the range of possible recruitment SD values.

Run 9: The recruitment SD parameter was fixed at a value of 0.3. Recruitment SD values greater than 0.3 led to estimates of current total biomass which were greater than virgin total biomass. The AP did not feel these results were realistic given the history of a fishery for tilefish. Therefore, this value was chosen to represent the upper end of the range of possible recruitment SD values.

Run 10: The fixed selectivity parameters were freed up to allow SS to estimate dome-shaped selectivity. The AP included this run solely as a model exploration exercise, since there was no evidence of dome-shaped selectivity. The fisheries cover the entire range of the stock, so there does not appear to be a cryptic biomass of larger tilefish that are not vulnerable to the gear.

Run 11: Separate selectivity patterns were estimated by region for each fishery/survey. The AP wished to determine what affect mirroring selectivity across regions had on model results.

Run 12: The fit to the indices was improved by emphasizing the index data and de-emphasizing the length and age composition data. The AP wished to determine how the signal from the index data would affect model results. This run was included solely as a model exploration exercise.

In addition, a retrospective analysis of Run 1 was conducted, in which the model was refit while sequentially dropping the last five years of data. Retrospective analysis is used to look for systematic bias in key model output quantities over time.

3.2.1.6. Benchmark/Reference points methods

Benchmarks and reference points are calculated in SS. The user can select reference points based on MSY, SPR, and spawning biomass. Stock Synthesis calculates SPR as the equilibrium spawning biomass per recruit that would result from a given year's pattern and intensity of Fs. For SPR-based reference points, SS searches for an F that will produce the specified level of spawning biomass per recruit relative to the unfished value. For spawning biomass-based reference points, SS searches for an F that produces the specified level of spawning biomass relative to the unfished value. Both MSY and spawning biomass-based reference points are dependent on the stock-recruit relationship.

The AP decided to use SPR-based reference points for Gulf of Mexico tilefish, due to uncertainty in the estimation of the stock-recruit relationship. In addition, the AP chose to calculate benchmarks based on two alternative SPR reference points. The first reference point was SPR 30%, which is specified as the default value in the Gulf of Mexico Reef Fish Management Plan. The AP also wanted to use a more conservative reference point given the life history of tilefish. Therefore, the second reference point was SPR 40%.

3.2.1.7. Projection methods

For reasons described in the model results section (3.2.2), the AP decided not to run projections for this assessment.

3.2.2. Model 2 Results

3.2.2.1. Measures of Overall Model Fit

Stock Synthesis effectively treats the landings data as being known without error. Therefore, the landings are fit precisely.

The indices of abundance were poorly fit by the model (Figure 3.11). Observed index CPUEs from all four fisheries/surveys showed an increasing trend in abundance. The commercial long line west index was the only index to capture the observed increasing trend. Predicted CPUE for the NMFS bottom long line west showed no trend in abundance. Predicted CPUE for the commercial long line east and NMFS bottom long line survey east showed declining trends in abundance. This poor fit to the indices is caused in part by the high variances associated with the indices. Even the fishery-dependent indices had relatively high variances associated with them, when normally the fishery-independent indices have relatively low variances due to the large sample sizes (relative to the fishery-independent indices) involved. The indices in the east also conflicted with the catch data, which showed catches in the east increasing to record levels (Figure 2.1), while the eastern indices indicated that abundance was increasing at the same time. Another possible cause for the problems with the indices is the fact that bottom temperature was not included as a factor in the GLMs used to standardize the indices. Tilefish are known to survive in a very narrow range to temperatures. Anecdotal information from fishermen suggests that tilefish may only take a hook within a narrow temperature as well. Perhaps inclusion of bottom temperature data as a factor in the GLMs would improve the indices' usefulness in tracking abundance.

The length compositions were not fit particularly well by the model, but there were no real discernable patterns in the residuals (Figures 3.12-3.45). Small sample sizes are probably the cause of the poor fit in most cases. In cases where there were larger sample sizes, primarily in the commercial long line east, the model fit the length compositions reasonably well.

The conditional age compositions were poorly fit by the model (Figure 3.46-3.61), with strong residual patterns in all of the fisheries and surveys. In particular, there appear to be many 10-15 year old fish in the age compositions during the mid 2000s, for which SS is having difficulty accounting. This can be most clearly seen in the commercial long line east age compositions (Figures 3.50-3.52), since the majority of age samples come from this fishery. It is possible this issue is an artifact of where the age samples are coming from, rather than some dynamic within the stock. There is some evidence that the majority of age samples in the east for 10-15 year old tilefish were being collected from statistical grids 2-5 in the early 2000s, and that samples shifted more towards grids 6-10 in the mid to late 2000s, when large numbers of 10-15 year olds begin to appear Figure (3.62). There is additional information that during this same time period there was a shift in which vessels the age samples were coming from. This vessel information cannot be presented here due to confidentiality restrictions.

3.2.2.2. Parameter estimates & associated measures of uncertainty

A list of all model parameters is presented in Table 3.6. The table includes predicted parameter values and their associated standard errors from SS, initial parameter values, minimum and maximum values a parameter could take, and prior densities assigned to parameters. Parameters designated as fixed were held at their initial values.

3.2.2.3. Stock Abundance and Recruitment

Predicted abundance at age is presented in Figure 3.63. Mean age of females follows similar trends in the east and west. Females in both regions have a mean age of 6 years in 1965, decline to a mean age of 2 years in 1997, and increase to a mean age of 4 years in the east and 6 years in the west in 2009. Mean age of males follows similar trends in the east and west during the early years of the assessment. Males have a mean age of 12 years in the east and 11 years in the west in 1965, decline to a mean age of 3 years in the east and 2 years in the west in 1997. Mean age of males in the east increases to 6 years in 2005 before declining to 4 years in 2009. Mean age of males in the west increases to 6 years in 2005 and remains at that level through 2009.

Predicted age-0 recruits are presented in Table 3.7 and Figure 3.64. For both the east and the west, there was an unusual pattern to the annual recruitment deviations. Annual recruitments were all less than the mean recruitment from 1965 to 1982 during the data poor period (i.e., on catch data available). Annual recruitments were all greater than the mean recruitment from 1983 to 2001 during the data rich period (i.e., length and age compositions and indices available). Finally, annual recruitments were all less than the mean recruitment from 2002 to 2009, when data quality begins to decline due to incomplete cohorts at the end of the time series. There was an unusually high recruitment peak in 1997, which was largely responsible for supporting the population through the remainder of the time series. Such reliance on sporadic high recruitment events seems out of keeping with the life history of tilefish. Given that tilefish are a relatively long lived and slow growing species, one would suspect the population would be support by a spawning stock of older individuals producing low but constant numbers of recruits each year. It appears that this unusual recruitment pattern is an artifact of the model's attempt to fit the age composition data described above (Section 3.2.2.1). Stock Synthesis estimates high recruitment events in the 1990s to try and account for the large number of 10-15 year old tilefish that appear in the 2000s.

3.2.2.4. Stock Biomass

Predicted total biomass and spawning biomass are presented in Table 3.7 and Figure 3.65. Total biomass and spawning biomass in the east show steady declines beginning in the early 1980s. Total biomass and spawning biomass in the west decline until 1990, increase from 1996 to 2000, and remain relatively constant from 2000 onward. These trends in total and spawning biomass correspond to what is happening in the fisheries (Figure 2.1). The decline in total and spawning biomass in the east corresponds with increasing catches in the eastern fisheries. The constant, or possibly declining, catches in the west correspond to constant or increasing biomass in the west.

3.2.2.5. Fishery Selectivity

Predicted size selectivity patterns are presented in Figure 3.66. As expected, selectivity patterns for the commercial long line fisheries and NMFS bottom long line surveys are fairly similar. Though, the NMFS bottom long line survey is slightly less selective for fish 30-50 cm, and slightly more selective for fish 50-60 cm compared to the commercial long line fisheries. The commercial hand line fishery is less selective for fish 40-70 cm compared to the commercial long line fisheries and NMFS bottom long line surveys.

3.2.2.6. Fishing Mortality

Predicted fishing mortality rates are presented in Table 3.7 and Figure 3.67. Stock Synthesis does produce region and fishery-specific estimates of instantaneous fishing mortality rates. In a multi-area, multi-fishery model, it is impossible to produce an overall instantaneous fishing mortality rate. Therefore, a proxy must be used to get estimates of Gulfwide fishing mortality. The AP decided to use exploitation rate (catch / total biomass) as a proxy for Gulfwide instantaneous fishing mortality. Fishing mortality was relatively low from 1965-1980. From 1981-2009, fishing mortality has steadily increased, with the highest peak in 1988. The trend in Gulfwide fishing mortality is strongly influenced by the commercial long line fishery in the east, where most of the catch occurs.

3.2.2.7. Stock-Recruitment Parameters

The predicted stock-recruitment relationship is presented in Figure 3.68, while the stock-recruitment parameter values are reported in Table 3.6. Predicted virgin recruitment was lower than the initial value (240,000 vs. 850,000 fish) and predicted steepness was higher than the initial value (0.93 vs. 0.75). The AP felt that the predicted steepness seemed unrealistically high given the life history of tilefish. Part of the difficulty in obtaining a good estimate of steepness is the lack of contrast in spawning biomass. In particular, spawning biomass never drops low enough to capture recruitment dynamics near the origin.

3.2.2.8. Evaluation of Uncertainty

Estimates of asymptotic standard errors for all model parameters are presented in Table 3.6.

Results of the retrospective analysis are presented in Figure 3.69. Three model output quantities were examined in the analysis: 1) total biomass, 2) spawning biomass, and 3) recruitment. There was variability in model results as years of data were dropped from the assessment. Total biomass and spawning biomass in the western Gulf were particularly affected. But, there was no strong systematic bias to that variability

Results of the sensitivity analysis are summarized in Tables 3.8 and 3.9. As expected, decreasing reference natural mortality (Runs 2 and 3) led to a less productive stock that was experiencing greater fishing mortality. As expected, increasing the reference natural mortality (Runs 4 and 5) led to a more productive stock that was experiencing less fishing mortality. Increasing the value of the natural mortality reference age (Runs 6 and 7) effectively increased natural mortality (i.e., natural mortality increased as the reference age increased) as in Runs 4 and 5. The results from Run 6 are in line with a higher natural mortality, but the results of Run 7 are unusual in that the western spawning biomass (virgin and current) is lower, rather than higher, than spawning biomass in Run 1. This unusual result is due to the growth curve estimated for western females in Run 7 by SS (Figure 3.70). Run 7 western females are smaller than Run 1 western females for the ages between when they become mature and when most of them have transitioned to males. This smaller size at age translates to lower numbers at size and lower spawning biomass, even under virgin conditions. The model was very sensitive to the value specified for recruitment SD (Runs 8 and 9). As recruitment SD was increased, SS would estimate more recruitment peaks, and those peaks would be higher. These recruitment peaks had the biggest impact on western biomass (total and spawning). As recruitment SD increased, the western biomass trajectory would go from declining, to stable, to increasing, to the point that current biomass would exceed virgin levels. Well behaved models generally are not sensitive to the recruitment SD. As long as recruitment SD is set at a reasonable level (e.g., around 0.3-0.6), annual recruitments will fluctuate randomly around the mean recruitment. As expected, when selectivity was allowed to be dome-shaped (Run 10), the stock became more productive and impacted less by the fishery due to the biomass of large tilefish that were no longer vulnerable to the fisheries. Estimating region-specific selectivity patterns (Run 11) had little impact on model results. Though selectivity patterns did differ by region, the selectivity pattern for the commercial long line fishery east, which is responsible for the majority of tilefish landings, was very similar between Runs 1 and 11. Improving the fit to the indices (Run 12) had a big impact on model results, particularly for eastern biomass (total and spawning). In all of the other runs, eastern biomass was predicted to be declining. Run 12 is the only run to show an increasing trend in biomass, because SS was forced to fit the increasing abundance trend observed in the eastern indices (Figures 3.71 and 3.72).

3.2.2.9. Benchmarks/Reference Points/ABC Values

Benchmarks for the SPR 30% reference point are presented in Table 3.10. Benchmarks for the SPR 40% reference point are presented in Table 3.11. The AP decided not to select a single base model for benchmark determination due to the uncertainty involved with specifying quantities such as the reference age for natural mortality, the natural mortality value at the reference age, and the value for the recruitment SD. Therefore, the AP selected a subset of the sensitivity runs for use in benchmark calculations. The sensitivity runs designed solely for exploring model performance, rather than those designed to represent possible states of nature, were not used for benchmark calculations (i.e., Runs 2, 5, 10, and 12). In addition, the AP decided to exclude Run 7 from benchmark calculations due to the unusual growth curve estimated for western females, which was not consistent with growth curves estimated in the other model runs. All of the model runs, regardless of the reference point used, agreed that the stock was undergoing overfishing but was not overfished. Yield at SPR 30% ranged from 51-106 mt (whole weight), and yield at SPR 40% ranged from 50-102 mt (whole weight). There are no projected yield streams for OFL and

OYto include in the benchmark tables, due to the AP's decision not to conduct projections for this assessment (see Section 3.2.2.10).

3.2.2.10. Projections

The AP decided that it would not be useful to run projections for the tilefish assessment, given the uncertainties involved in specifying key model quantities and the issues affecting several of the data sources. In particular, there is no objective way to select between recruitment SD values, while the choice of recruitment SD can have a profound influence on the assessment results. Selecting a recruitment SD value, that would be considered reasonable in most other assessments, results in biomass trajectories that are not realistic for a stock that has been fished for several decades (i.e., current biomass greater than virgin levels). The difficulty with selecting a recruitment SD value are caused, at least in part, by the age composition data and the affect they have on the estimation of recruitment (see Sections 3.2.2.1 and 3.2.2.3). In general, tilefish is a data poor species that suffers from small sample sizes that are highly correlated with each other, due to being collected from a small number of trips. Instead, the AP recommends that management advice be based off of multiple sources of information such as the suite of SS runs discussed here, the results from SRA, and the history of tilefish landings in the Gulf of Mexico.

3.2.3. Discussion

Gulf of Mexico tilefish is a data poor species, and suffers many of the problems that make assessments of data poor species so difficult. Data quality is the primary problem with this assessment. This can be seen specifically in the effect of the age composition data on model results. Unless the recruitment SD parameter is used to constrain the model, current biomass estimates will often exceed virgin levels. The age composition data are not the only problematic data source in this assessment. The indices of abundance, particularly in the east, appear track abundance trends that conflict with signal from the landings data. For these reasons, the AP has recommended that management advice not be based solely on this assessment, but should take into account other information like the landings history for tilefish.

3.2.4 References

Methot, R. 2010. User manual for Stock Synthesis: model version 3.10b. Feb 26, 2010. NOAA Fisheries Service, Seattle, WA.

3.3. COMPARISON OF MODELS

Comparison of SRA and SS results suggests that SRA is most similar to SS Run 12, which emphasized the fits to the indices over the fits to the age and length composition data. Direct comparisons of predicted biomass between SRA and SS are not possible, because SRA produces estimates of vulnerable biomass, while SS produces estimates of total biomass. That being said, trends in predicted vulnerable biomass from SRA are similar to trends in predicted total biomass from SS, particularly in the eastern Gulf of Mexico (Figure 3.73). Predicted exploitation rates are nearly identical between SRA and SS through 1993, and trends in exploitation rate are similar from 1994 to 2009 (Figure 3.74). The similarities between SRA and SS Run 12 can be explained by the fact that SRA is fitting the commercial long line indices and does not include length and age composition data, while SS Run 12 emphasizes the fit to the indices over the fit to the length and age composition data. The commercial long line indices have lower log-scale standard errors than the commercial hand line indices. Therefore, population trends in both SS Run 12 and SRA are driven by the fit to the commercial long line indices. Differences between the two model results can be explained by the fact that SS uses data sources that are not included in SRA. In particular, SRA uses landings and indices from the commercial long line fishery, while SS also includes commercial hand line landings, commercial long line and hand line discards, recreational landings, and length and age composition data from all of the fisheries and surveys. These differences in population trends between the two models begin in the mid 90s, which is the same time period where the additional SS data sources come into play.

As explained previously, SRA produces probabilities of overfishing and of being overfished using a 40/10 rule. When the SRA probability of overfishing is recalculated as the proportion of MCMC runs in which U_{2009}/U_{MSY} is greater than 1.0, then the Gulf-wide probability of overfishing is 0.01. The SRA probability of overfishing likely would be higher if SPR 30% or SPR 40% were used in place of MSY for determining benchmarks and reference points, as was done in SS. When the SRA probability of being overfished is recalculated as the proportion of MCMC runs in which E_{2009}/E_0 is less than 0.4, which is roughly analogous to using SPR 40% as was done in SS, then the Gulf-wide probability of being overfished is effectively 0.0. Thus, SRA suggests that the stock is not undergoing overfishing and is not overfished. This status determination agrees with the stock status predicted by SS Run 12 (Table 3.9). SRA is in disagreement over stock status with the SS runs selected for management advice, which all suggest that the stock is undergoing overfishing, but is not overfished (Tables 3.10 and 3.11).

3.4. TABLES

Table 3.1. Life history parameters for golden tilefish from the Gulf of Mexico

Parameter	Definition	All	East	West
# ages	Number of age classes	30	30	30
Bhat 2009	Biomass in the last year	6.0E+06	6.0E+06	6.0E+06
SD Bhat	Standard Deviation Bhat	1.0E+08	1.0E+08	1.0E+08
Uhat 2009	Exploitation for the last year	0.10	0.10	0.10
SD Uhat	Standard Deviation of Uhat	0.02	0.02	0.02
SD rec	Standard Deviation of RecK	0.50	0.50	0.50
Rec rho	Recruitment Residuals	0	0	0
Future Catch	Amount of future landings (catch), kg	N/A	N/A	N/A
Ufuture	Future exploitation	0.2	0.2	0.2
growth von B K	von Bertalanffy growth coefficient	0.14	0.11	0.17
growth Linfinity (cm)	von Bertalanffy asymptotic length	83	88	77
CV length age	Variation of length at age	0.08	0.08	0.08
length maturity (cm)	Length at maturity	34	34	34
wt (kg) at 100 cm	Size (weight) of fish at 100 cm	11	11	11
growth tzero	Size (length, cm) at time zero			
MSY min	Minimum Maximum Sustainable Yield	10,000	10,000	10,000
MSY max	Maximum Maximum Sustainable Yield	500,000	400,000	200,000
Umsy min	Minimum Exploitation at MSY	0.05	0.05	0.05
Umsy max	Maximum Exploitation at MSY	0.50	0.40	0.50
S min	Minimum Survivalship (S-0.2)	0.84	0.84	0.84
S max	Maximum Survivalship (S+0.2)	0.88	0.88	0.88

Table 3.2. Commercial longline catch histories (whole kilograms) for golden tilefish by region (East and West of Mississippi River) in the Gulf of Mexico.

Year	All	East	West
1965	3,163	3,163	0
1966	909	909	0
1967	489	489	0
1968	668	668	0
1969	142	142	0
1971	1,491	1,491	0
1972	501	501	0
1973	1,812	1,812	0
1974	1,908	1,908	0
1975	6,724	6,724	0
1976	11,174	11,174	0
1977	16,511	16,511	0
1978	10,987	10,715	272
1979	16,436	15,899	537
1980	12,668	11,849	819
1981	112,264	99,604	12,659
1982	137,005	90,515	46,491
1983	105,717	69,313	36,404
1984	136,994	89,426	47,568
1985	126,363	46,177	80,186
1986	150,885	89,052	61,832
1987	243,603	112,343	131,260
1988	431,003	157,488	273,514
1989	206,214	65,096	141,119
1990	161,400	87,051	74,348
1991	97,174	62,500	34,674
1992	96,281	49,564	46,717
1993	129,043	75,700	53,342
1994	176,172	126,644	49,528
1995	214,862	76,026	138,836
1996	95,515	55,528	39,986
1997	152,982	131,748	21,234
1998	134,786	102,461	32,325
1999	169,833	102,313	67,520
2000	217,473	124,288	93,185
2001	219,686	160,405	59,281
2002	245,370	116,308	129,063
2003	181,656	108,474	73,182
2004	211,961	130,055	81,906
2005	267,162	157,059	110,103
2006	141,167	114,862	26,306
2007	144,589	132,691	11,898
2008	158,121	131,625	26,496
2009	186,349	159,864	26,485

Table 3.3. Golden tilefish vulnerabilities at age were provided from SS3 from logistic functions of age selectivities given size selectivities and size-at-age data (SS, Asel2). The same age vulnerabilities were used for all data combined and for each region.

Age	Vulnerability	Age	Vulnerability
1	0.0000	16	0.9832
2	0.0060	17	0.9856
3	0.0617	18	0.9873
4	0.2143	19	0.9886
5	0.4130	20	0.9896
6	0.5885	21	0.9903
7	0.7204	22	0.9909
8	0.8128	23	0.9913
9	0.8746	24	0.9917
10	0.9148	25	0.9920
11	0.9405	26	0.9922
12	0.9571	27	0.9924
13	0.9679	28	0.9925
14	0.9750	29	0.9926
15	0.9798	30	0.9928

Table 3.4. Commercial longline indices and coefficient of variation (CV) for golden tilefish. An increase in the uncertainty (value of 1.0 for all years) in the commercial longline index for all data and east region SRA model runs was necessary to complete a satisfactory number of model iterations.

Year	All Index	All CV	East Index	East CV	West Index	West CV
1992	0.5116	0.57	0.3887	0.50	0.3516	0.35
1993	0.7845	0.43	0.4976	0.48	0.4825	0.27
1994	1.1372	0.33	0.9339	0.38	0.5812	0.24
1995	1.1094	0.34	1.0734	0.38	0.8402	0.20
1996	0.8816	0.37	0.6793	0.38	1.5196	0.24
1997	0.9812	0.35	0.8870	0.36	1.3002	0.28
1998	1.1453	0.35	1.9493	0.37	0.6337	0.29
1999	1.2241	0.34	1.8209	0.37	0.9104	0.21
2000	0.8295	0.34	0.8802	0.37	0.8896	0.23
2001	1.0194	0.34	0.6851	0.37	1.0779	0.25
2002	0.9005	0.35	0.7215	0.36	1.6720	0.25
2003	0.5832	0.37	0.5691	0.35	0.6342	0.23
2004	0.7194	0.37	0.6519	0.37	1.0384	0.32
2005	0.9116	0.37	0.7694	0.38	2.0646	0.31
2006	1.0788	0.36	1.2016	0.39	0.6881	0.37
2007	1.6429	0.34	1.3385	0.37	1.4041	0.57
2008	1.0305	0.38	1.5484	0.39	0.9117	0.34
2009	1.5092	0.36	1.4041	0.39	0.3516	0.35

Table 3.5. Vulnerable biomass (whole kilograms) trajectories by region for golden tilefish.

Year	All	East	West
1965	3,410,718	2,271,349	
1966	3,465,730	2,180,495	
1967	3,410,718	2,225,922	
1968	3,410,718	2,225,922	
1969	3,355,707	2,180,495	
1971	3,465,730	2,180,495	
1972	3,465,730	2,180,495	
1973	3,355,707	2,180,495	
1974	3,410,718	2,180,495	
1975	3,355,707	2,135,068	
1976	3,300,695	2,089,641	
1977	3,355,707	2,089,641	
1978	3,300,695	2,089,641	
1979	3,135,660	1,998,787	796,995
1980	3,135,660	1,953,360	816,674
1981	3,135,660	1,953,360	796,995
1982	3,135,660	1,998,787	796,995
1983	3,025,637	1,862,506	777,316
1984	2,805,591	1,771,652	718,280
1985	2,750,579	1,680,798	678,922
1986	2,640,556	1,544,517	639,564
1987	2,420,510	1,499,091	580,527
1988	2,365,498	1,499,091	531,330
1989	2,145,452	1,408,237	432,936
1990	1,815,382	1,317,383	216,468
1991	1,705,359	1,226,529	127,913
1992	1,650,348	1,226,529	108,234
1993	1,705,359	1,271,956	127,913
1994	1,760,371	1,271,956	177,110
1995	1,815,382	1,362,810	216,468
1996	1,870,394	1,408,237	275,504
1997	1,815,382	1,499,091	245,986
1998	1,870,394	1,544,517	275,504
1999	1,760,371	1,499,091	305,023
2000	1,870,394	1,499,091	334,541
2001	1,815,382	1,499,091	354,220
2002	1,815,382	1,453,664	324,702
2003	1,760,371	1,453,664	354,220
2004	1,760,371	1,453,664	314,862
2005	1,815,382	1,499,091	324,702
2006	1,815,382	1,544,517	314,862
2007	1,815,382	1,589,944	265,665
2008	1,925,405	1,680,798	285,344
2009	1,980,417	1,680,798	344,381

Table 3.6. List of SS parameters for Gulf of Mexico tilefish. The list includes predicted parameter values and their associated standard errors from SS, initial parameter values, minimum and maximum values a parameter could take, and prior densities assigned to parameters. Parameters designated as fixed were held at their initial values.

	Predicted					Prior				
Label	Value	SD	Initial	Min	Max	Type	Value	SD	Status	Description
NatM_p_1_Fem_GP_1	_	_	0.137	_	_	_	_	_	Fixed	East female reference M
L_at_Amin_Fem_GP_1	_	_	1.4	_	_	_	_	_	Fixed	East female length at age 0
L_at_Amax_Fem_GP_1	82.0603	1.93313	87.8	60	120	Symmetric Beta	_	5	Estimated	East female Linf
VonBert_K_Fem_GP_1	0.10823	0.00471722	0.109	0.01	0.3	Symmetric Beta	_	0.8	Estimated	East female K
CV_young_Fem_GP_1	_	_	0.16	_	_	_	_	_	Fixed	Young east female growth CV
CV_old_Fem_GP_1	_	_	0.12	_	_	_	_	_	Fixed	Old east female growth CV
NatM_p_1_Fem_GP_2	_	_	0.137	_	_	_	_	_	Fixed	West female reference M
L_at_Amin_Fem_GP_2	_	_	1.4	_	_	_	_	_	Fixed	West female length at age 0
L_at_Amax_Fem_GP_2	65.6036	1.20958	77.3	60	120	Symmetric Beta	_	0.8	Estimated	West female Linf
VonBert_K_Fem_GP_2	0.188231	0.0106731	0.1721	0.01	0.3	Symmetric Beta	_	0.8	Estimated	West female K
CV_young_Fem_GP_2	_	_	0.16	_	_	_	_	_	Fixed	Young west female growth CV
CV_old_Fem_GP_2	_	_	0.12	_	_	_	_	_	Fixed	Old west female growth CV
NatM_p_1_Mal_GP_1	_	_	1.37E-01	_	_	_	_	_	Fixed	East male reference M
L_at_Amin_Mal_GP_1	_	_	1.4	_	_	_	_	_	Fixed	East male length at age 0
L_at_Amax_Mal_GP_1	92.3779	0.735422	87.8	60	120	Symmetric Beta	_	0.8	Estimated	East male Linf
VonBert_K_Mal_GP_1	0.133416	0.0026338	0.109	0.01	0.3	Symmetric Beta	_	0.8	Estimated	East male K
CV_young_Mal_GP_1	_	_	0.16	_	_	_	_	_	Fixed	Young east male growth CV
CV_old_Mal_GP_1	_	_	0.12	_	_	_	_	_	Fixed	Old east male growth CV
NatM_p_1_Mal_GP_2	_	_	1.37E-01	_	_	_	_	_	Fixed	West male reference M
L_at_Amin_Mal_GP_2	_	_	1.4	_	_	_	_	_	Fixed	West male length at age 0
L_at_Amax_Mal_GP_2	86.5538	0.699975	77.3	60	120	Symmetric Beta	_	0.8	Estimated	West male Linf
VonBert_K_Mal_GP_2	0.160307	0.00442129	0.1721	0.01	0.3	Symmetric Beta	_	0.8	Estimated	West male K
CV_young_Mal_GP_2	_	_	0.16	_	_	_	_	_	Fixed	Young west male growth CV
CV_old_Mal_GP_2	_	_	0.12	_	_	_	_	_	Fixed	Old west male growth CV
Wtlen_1_Fem	_	_	7.53E-06	_	_	_	_	_	Fixed	Female weight-length scalar
Wtlen_2_Fem	_	_	3.082	_	_	_	_	_	Fixed	Female weight-length exponent
Mat50%_Fem	_	_	34.4	_	_	_	_	_	Fixed	Maturity inflection point
Mat_slope_Fem	_	_	-0.478	_	_	_	_	_	Fixed	Maturity slope
Eggs_scalar_Fem	_	_	29.87	_	_	_	_	_	Fixed	Fecundity scalar
Eggs_exp_wt_Fem	_	_	1.42	_	_	_	_	_	Fixed	Fecundity exponent
Wtlen_1_Mal	_	_	7.53E-06	_	_	_	_	_	Fixed	Male weight-length scalar
Wtlen_2_Mal	_	_	3.082	_	_	_	_	_	Fixed	Male weight-length exponent
Herm_Infl_age	_	_	47.4945	_	_	_	_	_	Fixed	Sex transition inflection point
Herm_stdev	_	_	20	_	_	_	_	_	Fixed	Sex transition standard deviation
Herm_asymptote	_	_	0.190862	_	_	_	_	_	Fixed	Sex transition asymptote
RecrDist_GP_1	_	_	0	_	_	_	_	_	Fixed	East growth pattern recruit distr
RecrDist_GP_2	_	_	0	_	_	_	_	_	Fixed	West growth pattern recruit distr
RecrDist_Area_1	1.13913	0.0300277	1	-4	4	Uniform	_	_	Estimated	East region recruit distr
RecrDist_Area_2	_	_	1	_	_	_	_	_	Fixed	West region recruit distr
RecrDist_Seas_1	_	_	1	_	_	_	_	_	Fixed	Seasonal recruit distr
CohortGrowDev	_	_	1	_	_	_	_	_	Fixed	Cohort growth deviations
SR_R0	5.48191	0.0211672	6.75	1	10	Normal	6.75	0.4	Estimated	Virgin recruit
SR_steep	0.93439	0.0236374	0.75	0.2	0.99	Symmetric Beta	_	5	Estimated	Steepness
SR_sigmaR	_	_	0.15	_	_	_	_	_	Fixed	Stock -recruit standard deviation
SR_envlink	_	_	0	_	_	_	_	_	Fixed	Stock-recruit environmental link
SR_R1_offset	_	_	0	_	_	_	_	_	Fixed	Stock-recruit offset
SR_autocorr	_	_	0	_	_	_	_	_	Fixed	Stock-recruit autocorrelation
Main_RecrDev_1965	-0.407848	0.13235	_	_	_	_	_	_	Estimated	1965 recruit deviation
Main_RecrDev_1966	-0.411064	0.132159	_	_	_	_	_	_	Estimated	1966 recruit deviation
Main_RecrDev_1967	-0.412649	0.132049	_	_	_	_	_	_	Estimated	1967 recruit deviation

Main_RecrDev_1968	-0.411905	0.132052	_	_	_	_	_	_	Estimated	1968 recruit deviation
Main_RecrDev_1969	-0.408155	0.132201	_	_	_	_	_	_	Estimated	1969 recruit deviation
Main_RecrDev_1970	-0.400568	0.132535	_	_	_	_	_	_	Estimated	1970 recruit deviation
Main_RecrDev_1971	-0.388022	0.133108	_	_	_	_	_	_	Estimated	1971 recruit deviation
Main_RecrDev_1972	-0.369308	0.133984	_	_	_	_	_	_	Estimated	1972 recruit deviation
Main_RecrDev_1973	-0.341097	0.135342	_	_	_	_	_	_	Estimated	1973 recruit deviation
Main_RecrDev_1974	-0.301884	0.13727	_	_	_	_	_	_	Estimated	1974 recruit deviation
Main_RecrDev_1975	-0.250397	0.139854	_	_	_	_	_	_	Estimated	1975 recruit deviation
Main_RecrDev_1976	-0.188564	0.143003	_	_	_	_	_	_	Estimated	1976 recruit deviation
Main_RecrDev_1977	-0.1281	0.146105	_	_	_	_	_	_	Estimated	1977 recruit deviation
Main_RecrDev_1978	-0.0889557	0.148035	_	_	_	_	_	_	Estimated	1978 recruit deviation
Main_RecrDev_1979	-0.089737	0.147642	_	_	_	_	_	_	Estimated	1979 recruit deviation
Main_RecrDev_1980	-0.140869	0.144835	_	_	_	_	_	_	Estimated	1980 recruit deviation
Main_RecrDev_1981	-0.171314	0.143723	_	_	_	_	_	_	Estimated	1981 recruit deviation
Main_RecrDev_1982	-0.122182	0.147157	_	_	_	_	_	_	Estimated	1982 recruit deviation
Main_RecrDev_1983	0.0393318	0.157311	_	_	_	_	_	_	Estimated	1983 recruit deviation
Main_RecrDev_1984	0.292073	0.170231	_	_	_	_	_	_	Estimated	1984 recruit deviation
Main_RecrDev_1985	0.299366	0.171068	_	_	_	_	_	_	Estimated	1985 recruit deviation
Main_RecrDev_1986	0.161165	0.161776	_	_	_	_	_	_	Estimated	1986 recruit deviation
Main_RecrDev_1987	0.181632	0.163554	_	_	_	_	_	_	Estimated	1987 recruit deviation
Main_RecrDev_1988	0.258494	0.168461	_	_	_	_	_	_	Estimated	1988 recruit deviation
Main_RecrDev_1989	0.266986	0.17141	_	_	_	_	_	_	Estimated	1989 recruit deviation
Main_RecrDev_1990	0.277863	0.176604	_	_	_	_	_	_	Estimated	1990 recruit deviation
Main_RecrDev_1991	0.379833	0.195912	_	_	_	_	_	_	Estimated	1991 recruit deviation
Main_RecrDev_1992	0.662179	0.29045	_	_	_	_	_	_	Estimated	1992 recruit deviation
Main_RecrDev_1993	0.888989	0.332272	_	_	_	_	_	_	Estimated	1993 recruit deviation
Main_RecrDev_1994	0.515308	0.247788	_	_	_	_	_	_	Estimated	1994 recruit deviation
Main_RecrDev_1995	0.365263	0.203779	_	_	_	_	_	_	Estimated	1995 recruit deviation
Main_RecrDev_1996	0.356601	0.215994	_	_	_	_	_	_	Estimated	1996 recruit deviation
Main_RecrDev_1997	1.75974	0.122446	_	_	_	_	_	_	Estimated	1997 recruit deviation
Main_RecrDev_1998	0.228781	0.191037	_	_	_	_	_	_	Estimated	1998 recruit deviation
Main_RecrDev_1999	0.313314	0.189459	_	_	_	_	_	_	Estimated	1999 recruit deviation
Main_RecrDev_2000	0.584996	0.187028	_	_	_	_	_	_	Estimated	2000 recruit deviation
Main_RecrDev_2001	0.278179	0.168338	_	_	_	_	_	_	Estimated	2001 recruit deviation
Main_RecrDev_2002	-0.243613	0.135278	_	_	_	_	_	_	Estimated	2002 recruit deviation
Main_RecrDev_2003	-0.575778	0.122165	_	_	_	_	_	_	Estimated	2003 recruit deviation
Main_RecrDev_2004	-0.724587	0.118014	_	_	_	_	_	_	Estimated	2004 recruit deviation
Main_RecrDev_2005	-0.66183	0.121036	_	_	_	_	_	_	Estimated	2005 recruit deviation
Main_RecrDev_2006	-0.391828	0.133871	_	_	_	_	_	_	Estimated	2006 recruit deviation
Main_RecrDev_2007	-0.180409	0.146309	_	_	_	_	_	_	Estimated	2007 recruit deviation
Main_RecrDev_2008	-0.14982	0.148349	_	_	_	_	_	_	Estimated	2008 recruit deviation
Main_RecrDev_2009	-0.149612	0.148366	_	_	_	_	_	_	Estimated	2009 recruit deviation
InitF_1HLE	_	_	0	_	_	_	_	_	Fixed	Hand line east initial F
InitF_2HLW	_	_	0	_	_	_	_	_	Fixed	Hand line west initial F
InitF_3LLE	_	_	0	_	_	_	_	_	Fixed	Long line east initial F
InitF_4LLW	_	_	0	_	_	_	_	_	Fixed	Long line west initial F
SizeSel_1P_1_HLE	71.1341	1.53473	60	20	113	Symmetric Beta	_	0.05	Estimated	HLE size select peak
SizeSel_1P_2_HLE	_	_	3	_	_	_	_	_	Fixed	HLE size select top
SizeSel_1P_3_HLE	5.77046	0.112582	5	-4	12	Symmetric Beta	_	0.05	Estimated	HLE size select ascending width
SizeSel_1P_4_HLE	_	_	2.5	_	_	_	_	_	Fixed	HLE size select descending width
SizeSel_1P_5_HLE	_	_	-15	_	_	_	_	_	Fixed	HLE size select initial
SizeSel_1P_6_HLE	_	_	5	_	_	_	_	_	Fixed	HLE size select final
SizeSel_2P_1_HLW	_	_	0	_	_	_	_	_	Fixed	HLW size select min length
SizeSel_2P_2_HLW	_	_	0	_	_	_	_	_	Fixed	HLW size select max length
SizeSel_3P_1_LLE	58.3103	0.683248	60	20	113	Symmetric Beta	_	0.05	Estimated	LLE size select peak
SizeSel_3P_2_LLE	_	_	3	_	_	_	_	_	Fixed	LLE size select top
SizeSel_3P_3_LLE	5.09259	0.0722288	5	-4	12	Symmetric Beta	_	0.05	Estimated	LLE size select ascending width
SizeSel_3P_4_LLE	_	_	2.5	_	_	_	_	_	Fixed	LLE size select descending width
SizeSel_3P_5_LLE	_	_	-15	_	_	_	_	_	Fixed	LLE size select initial
SizeSel_3P_6_LLE	_	_	5	_	_	_	_	_	Fixed	LLE size select final

SizeSel_4P_1_LLW	_	_	0	_	_	_	_	_	Fixed	LLW size select min length
SizeSel_4P_2_LLW	_	_	0	_	_	_	_	_	Fixed	LLW size select max length
SizeSel_5P_1_NMFSE	52.6511	1.76578	60	20	113	Symmetric Beta	_	0.05	Estimated	NMFSE size select peak
SizeSel_5P_2_NMFSE	_	_	3	_	_	_	_	_	Fixed	NMFSE size select top
SizeSel_5P_3_NMFSE	3.62436	0.434985	5	-4	12	Symmetric Beta	_	0.05	Estimated	NMFSE size select ascending width
SizeSel_5P_4_NMFSE	_	_	2.5	_	_	_	_	_	Fixed	NMFSE size select descending width
SizeSel_5P_5_NMFSE	_	_	-15	_	_	_	_	_	Fixed	NMFSE size select initial
SizeSel_5P_6_NMFSE	_	_	5	_	_	_	_	_	Fixed	NMFSE size select final
SizeSel_6P_1_NMFSW	_	_	0	_	_	_	_	_	Fixed	NMFSW size select min length
SizeSel_6P_2_NMFSW	_	_	0	_	_	_	_	_	Fixed	NMFSW size select max length
AgeSel_1P_1_HLE	_	_	0	_	_	_	_	_	Fixed	HLE age select min age
AgeSel_1P_2_HLE	_	_	30	_	_	_	_	_	Fixed	HLE age select max age
AgeSel_2P_1_HLW	_	_	0	_	_	_	_	_	Fixed	HLW age select min age
AgeSel_2P_2_HLW	_	_	30	_	_	_	_	_	Fixed	HLW age select max age
AgeSel_3P_1_LLE	_	_	0	_	_	_	_	_	Fixed	LLE age select min age
AgeSel_3P_2_LLE	_	_	30	_	_	_	_	_	Fixed	LLE age select max age
AgeSel_4P_1_LLW	_	_	0	_	_	_	_	_	Fixed	LLW age select min age
AgeSel_4P_2_LLW	_	_	30	_	_	_	_	_	Fixed	LLW age select max age
AgeSel_5P_1_NMFSE	_	_	0	_	_	_	_	_	Fixed	NMFSE age select min age
AgeSel_5P_2_NMFSE	_	_	30	_	_	_	_	_	Fixed	NMFSE age select max age
AgeSel_6P_1_NMFSW	_	_	0	_	_	_	_	_	Fixed	NMFSW age select min age
AgeSel_6P_2_NMFSW	_	_	30	_	_	_	_	_	Fixed	NMFSW age select max age

Table 3.7. Predicted total biomass (mt), spawning biomass (gonad wt g), age-0 recruits (thousand fish), and fishing mortality for Gulf of Mexico tilefish.

	East			West			Gulf
Year	Total Biomass	Spawning Biomass	Recruits	Total Biomass	Spawning Biomass	Recruits	F
Virgin	1,989	17,414	128	1,430	11,535	112	0.00
1965	1,989	17,414	85	1,430	11,535	74	9.2E-04
1966	1,984	17,551	85	1,428	11,574	74	2.7E-04
1967	1,980	17,695	85	1,425	11,611	74	1.4E-04
1968	1,975	17,834	85	1,419	11,633	74	2.0E-04
1969	1,968	17,950	85	1,411	11,606	74	4.1E-05
1970	1,959	18,026	86	1,400	11,522	75	0.00
1971	1,947	18,049	87	1,387	11,387	76	4.5E-04
1972	1,932	18,008	89	1,372	11,209	77	1.5E-04
1973	1,916	17,924	91	1,355	11,000	79	5.5E-04
1974	1,897	17,782	95	1,338	10,770	83	5.9E-04
1975	1,877	17,599	100	1,321	10,530	87	2.1E-03
1976	1,852	17,345	106	1,304	10,292	93	3.5E-03
1977	1,822	17,033	113	1,288	10,064	98	5.3E-03
1978	1,788	16,669	117	1,273	9,858	102	3.6E-03
1979	1,762	16,356	117	1,260	9,680	102	5.4E-03
1980	1,731	16,015	111	1,248	9,539	97	4.3E-03
1981	1,708	15,735	108	1,239	9,443	94	0.04
1982	1,601	14,778	113	1,220	9,316	99	0.05
1983	1,507	13,957	133	1,170	9,014	116	0.04
1984	1,439	13,381	171	1,133	8,827	149	0.05
1985	1,354	12,693	172	1,088	8,598	150	0.05
1986	1,318	12,447	150	1,017	8,192	130	0.06
1987	1,246	11,893	152	971	7,975	133	0.11
1988	1,157	11,218	164	863	7,355	143	0.21
1989	1,031	10,228	165	626	5,760	143	0.12
1990	1,002	10,173	166	527	5,227	145	0.11
1991	955	9,978	184	497	5,215	160	0.07
1992	940	10,070	244	511	5,612	212	0.07
1993	942	10,341	306	519	5,915	266	0.09
1994	923	10,382	210	525	6,154	183	0.12
1995	863	9,889	181	543	6,454	157	0.15
1996	858	9,971	179	482	5,868	156	0.07
1997	885	10,381	729	522	6,475	634	0.11
1998	833	10,032	158	577	7,356	137	0.10
1999	827	10,060	172	642	8,099	150	0.12

2000	830	10,097	226	681	8,521	197	0.14
2001	815	9,987	166	696	8,983	145	0.15
2002	766	9,693	99	738	9,877	86	0.16
2003	756	9,995	71	708	9,812	62	0.12
2004	747	10,336	61	717	10,226	53	0.14
2005	708	10,290	65	705	10,328	57	0.19
2006	628	9,628	85	654	9,806	74	0.11
2007	579	9,265	106	671	10,099	93	0.12
2008	501	8,311	110	696	10,368	95	0.13
2009	418	7,068	109	701	10,251	95	0.17

Table 3.8. Summary of results from sensitivity runs for Gulf of Mexico tilefish. Results include virgin recruitment (thousand fish; R0), steepness, virgin total biomass (mt; B0), 2009 total biomass (mt; Bcurrent), virgin spawning biomass (gonad wt g; SSB0), 2009 spawning biomass (gonad wt g; SSBcurrent), and 2009 SPR (SPRcurrent).

				B0		Bcurrent		SSB0		SSBcurrent		
Run	Description	R0	Steepness	East	West	East	West	East	West	East	West	SPRcurrent
1	Central	240	0.93	1,989	1,430	418	701	17,414	11,535	7,068	10,251	0.37
2	Mref=0.03	17	0.92	1,661	1,207	245	402	17,789	4,362	6,912	6,204	0.11
3	Mref=0.09	87	0.94	1,984	1,386	325	582	14,216	9,187	5,734	8,661	0.31
4	Mref=0.19	582	0.92	1,954	1,437	505	797	19,099	12,532	8,234	11,123	0.42
5	Mref=0.24	1,412	0.89	1,922	1,456	620	911	19,876	12,834	9,604	11,808	0.47
6	Mref age=15	377	0.94	1,950	1,384	420	597	16,982	11,569	6,548	8,979	0.36
7	Mref age=25	622	0.93	1,916	1,317	421	503	16,193	4,821	6,211	3,366	0.25
8	sigmaR=0.01	311	0.94	2,320	1,668	435	580	18,778	12,551	5,483	6,919	0.37
9	sigmaR=0.3	166	0.84	1,554	1,126	429	841	14,473	9,012	8,152	12,867	0.37
10	Dome-shaped sel.	430	0.91	6,583	4,966	3,402	3,007	52,180	22,998	32,927	21,175	0.44
11	Region-specific sel.	239	0.93	1,983	1,375	425	668	17,304	9,867	7,084	9,541	0.36
12	Fit CPUE indices	362	0.88	2,844	1,317	2,169	981	30,933	17,656	31,635	17,586	0.66

Table 3.9. Reference points and benchmarks from sensitivity runs for Gulf of Mexico tilefish. Benchmarks are reported for two reference points: 1) SPR 30% and 2) SPR 40%. *Current* refers to 2009 values. *Ref* refers to the reference point, either SPR 30% or SPR 40%. MSST is (1-M)*SSBref with M = 0.13. Fratio is Fcurrent / Fref. SSBratio is SSBcurrent / MSST.

				SPR30%						SPR40%					
Run	Description	Fcurrent	SSBcurrent	Yref	Fref	SSBref	MSST	Fratio	SSBratio	Yref	Fref	SSBref	MSST	Fratio	SSBratio
1	Central	0.17	17,319	81	0.12	8,322	7,241	1.48	2.39	77	0.08	11,269	9,804	2.32	1.77
2	Mref=0.03	0.30	13,116	26	0.03	6,313	5,492	9.22	2.39	27	0.03	8,575	7,460	11.58	1.76
3	Mref=0.09	0.21	14,395	56	0.09	6,766	5,886	2.30	2.45	55	0.06	9,143	7,954	3.67	1.81
4	Mref=0.19	0.15	19,357	102	0.14	8,983	7,815	1.10	2.48	95	0.09	12,218	10,630	1.69	1.82
5	Mref=0.24	0.13	21,412	123	0.15	9,105	7,921	0.83	2.70	115	0.10	12,477	10,855	1.26	1.97
6	Mref age=15	0.19	15,527	87	0.12	8,222	7,153	1.54	2.17	83	0.08	11,126	9,679	2.34	1.60
7	Mref age=25	0.21	9,576	83	0.09	6,037	5,252	2.42	1.82	79	0.06	8,176	7,113	3.35	1.35
8	sigmaR=0.01	0.19	12,402	106	0.14	9,065	7,887	1.40	1.57	102	0.09	12,246	10,654	2.13	1.16
9	sigmaR=0.3	0.15	21,020	51	0.10	6,236	5,426	1.58	3.87	50	0.06	8,701	7,569	2.50	2.78
10	Dome-shaped sel.	0.03	54,102	126	0.04	21,194	18,439	0.77	2.93	117	0.03	28,906	25,148	1.16	2.15
11	Region-specific sel.	0.18	16,625	80	0.12	7,789	6,777	1.48	2.45	76	0.08	10,558	9,186	2.38	1.81
12	Fit CPUE indices	0.06	49,222	156	0.19	13,333	11,600	0.33	4.24	155	0.13	18,370	15,982	0.47	3.08

Table 3.10. Required SFA and MSRA evaluations using SPR 30% reference point for Gulf of Mexico tilefish runs. Biomass units are metric tons, whole weight (SSB, MSST, and MSY).

Criteria	Definition	Run 1	Run 3	Run 4	Run 6	Run 8	Run 9	Run 11
	Mortality Rate Criteria							
$F_{MSY\ or\ proxy}$	$F_{SPR30\%}$	0.12	0.09	0.14	0.12	0.14	0.10	0.12
MFMT	$F_{SPR30\%}$	0.12	0.09	0.14	0.12	0.14	0.10	0.12
F_{OY}	75% of $F_{SPR30\%}$	-	-	-	-	-	-	-
$F_{CURRENT}$	F_{2009}	0.17	0.21	0.15	0.19	0.19	0.15	0.18
$F_{CURRENT}$/MFMT	F_{2009}	1.48	2.30	1.10	1.54	1.40	1.58	1.48
Base M								
	Biomass Criteria							
$SSB_{MSY\ or\ proxy}$	Equilibrium SSB @ $F_{SPR30\%}$	8,322	6,766	8,983	8,222	9,065	6,236	7,789
MSST	(1-M)*$SSB_{SPR30\%}$ M=0.13	7,241	5,886	7,815	7,153	7,887	5,426	6,777
$SSB_{CURRENT}$	SSB_{2009}	17,319	14,395	19,357	15,527	12,402	21,020	16,625
$SSB_{CURRENT}$/MSST	SSB_{2009}	2.39	2.45	2.48	2.17	1.57	3.87	2.45
Equilibrium MSY	Equilibrium Yield @ $F_{SPR30\%}$	81	56	102	87	106	51	80
Equilibrium OY	Equilibrium Yield @ F_{OY}	-	-	-	-	-	-	-
OFL	Annual Yield @ FMFMT							
	OFL 2010	-	-	-	-	-	-	-
	OFL 2011	-	-	-	-	-	-	-
	OFL 2012	-	-	-	-	-	-	-
	OFL 2013	-	-	-	-	-	-	-
	OFL 2014	-	-	-	-	-	-	-
	OFL 2015	-	-	-	-	-	-	-
Annual OY (ACT)	Annual Yield @ F_{OY}							
	OY 2010	-	-	-	-	-	-	-
	OY 2011	-	-	-	-	-	-	-
	OY 2012	-	-	-	-	-	-	-
	OY 2013	-	-	-	-	-	-	-
	OY 2014	-	-	-	-	-	-	-
	OY 2015	-	-	-	-	-	-	-
	Annual Yield (2011) @ 65% FMFMT	-	-	-	-	-	-	-
Alternative ACT:	Annual Yield (2011) @ 75% FMFMT	-	-	-	-	-	-	-
	Annual Yield (2011) @ 85% FMFMT	-	-	-	-	-	-	-
Generation Time								
Rebuild Time	(if B_{2009}<MSST)							
Tmin	@ F=0	-	-	-	-	-	-	-
Midpoint	mid of Tmin, Tmax	-	-	-	-	-	-	-
Tmax	if Tmin>10y, Tmin + 1 Gen	-	-	-	-	-	-	-
ABC	Recommend Range	-	-	-	-	-	-	-

Table 3.11. Required SFA and MSRA evaluations using SPR 40% reference point for Gulf of Mexico tilefish runs. Biomass units are metric tons, whole weight (SSB, MSST, and MSY).

Criteria	Definition	Run 1	Run 3	Run 4	Run 6	Run 8	Run 9	Run 11
	Mortality Rate Criteria							
$F_{MSY\ or\ proxy}$	$F_{SPR40\%}$	0.08	0.06	0.09	0.08	0.09	0.06	0.08
MFMT	$F_{SPR40\%}$	0.08	0.06	0.09	0.08	0.09	0.06	0.08
F_{OY}	75% of $F_{SPR40\%}$	-	-	-	-	-	-	-
$F_{CURRENT}$	F_{2009}	0.17	0.21	0.15	0.19	0.19	0.15	0.18
$F_{CURRENT}$/MFMT	F_{2009}	2.32	3.67	1.69	2.34	2.13	2.50	2.38
Base M								
	Biomass Criteria							
$SSB_{MSY\ or\ proxy}$	Equilibrium SSB @ $F_{SPR40\%}$	11,269	9,143	12,218	11,126	12,246	8,701	10,558
MSST	(1-M)*$SSB_{SPR40\%}$ M=0.13	9,804	7,954	10,630	9,679	10,654	7,569	9,186
$SSB_{CURRENT}$	SSB_{2009}	17,319	14,395	19,357	15,527	12,402	21,020	16,625
$SSB_{CURRENT}$/MSST	SSB_{2009}	1.77	1.81	1.82	1.60	1.16	2.78	1.81
Equilibrium MSY	Equilibrium Yield @ $F_{SPR40\%}$	77	55	95	83	102	50	76
Equilibrium OY	Equilibrium Yield @ F_{OY}	-	-	-	-	-	-	-
OFL	Annual Yield @ FMFMT							
	OFL 2010	-	-	-	-	-	-	-
	OFL 2011	-	-	-	-	-	-	-
	OFL 2012	-	-	-	-	-	-	-
	OFL 2013	-	-	-	-	-	-	-
	OFL 2014	-	-	-	-	-	-	-
	OFL 2015	-	-	-	-	-	-	-
Annual OY (ACT)	Annual Yield @ F_{OY}							
	OY 2010	-	-	-	-	-	-	-
	OY 2011	-	-	-	-	-	-	-
	OY 2012	-	-	-	-	-	-	-
	OY 2013	-	-	-	-	-	-	-
	OY 2014	-	-	-	-	-	-	-
	OY 2015	-	-	-	-	-	-	-
	Annual Yield (2011) @ 65% FMFMT	-	-	-	-	-	-	-
Alternative ACT:	Annual Yield (2011) @ 75% FMFMT	-	-	-	-	-	-	-
	Annual Yield (2011) @ 85% FMFMT	-	-	-	-	-	-	-
Generation Time								
Rebuild Time	(if B_{2009}<MSST)							
Tmin	@ F=0	-	-	-	-	-	-	-
Midpoint	mid of Tmin, Tmax	-	-	-	-	-	-	-
Tmax	if Tmin>10y, Tmin + 1 Gen	-	-	-	-	-	-	-
ABC	Recommend Range	-	-	-	-	-	-	-

3.5. FIGURES

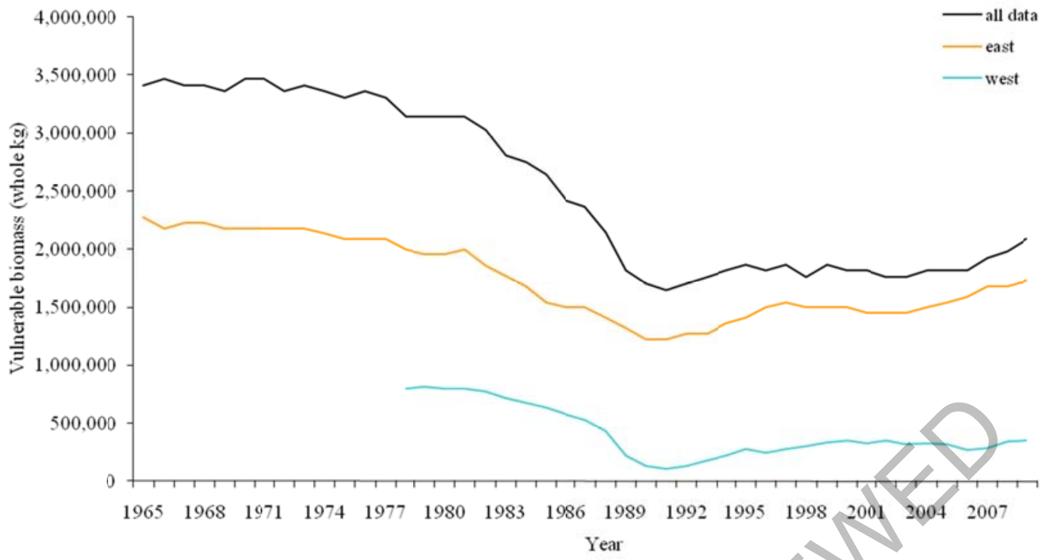


Figure 3.1. Estimates of vulnerable biomass for golden tilefish by region (east and west of the Mississippi River) and all data combined in the Gulf of Mexico for the time period catch histories exist. Note that the 'all data' model is an independent model and not the sum of the East and West biomass.

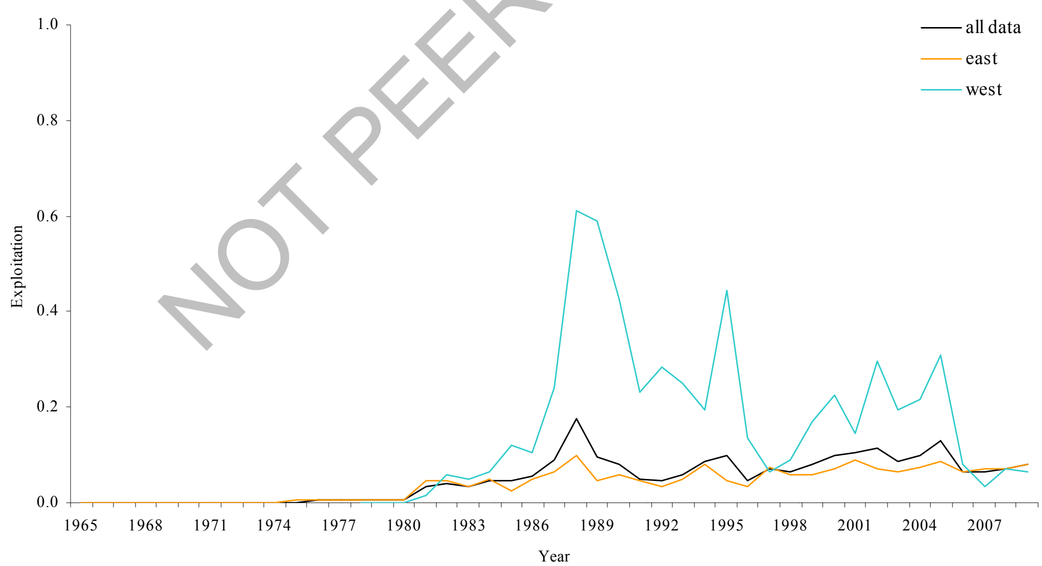
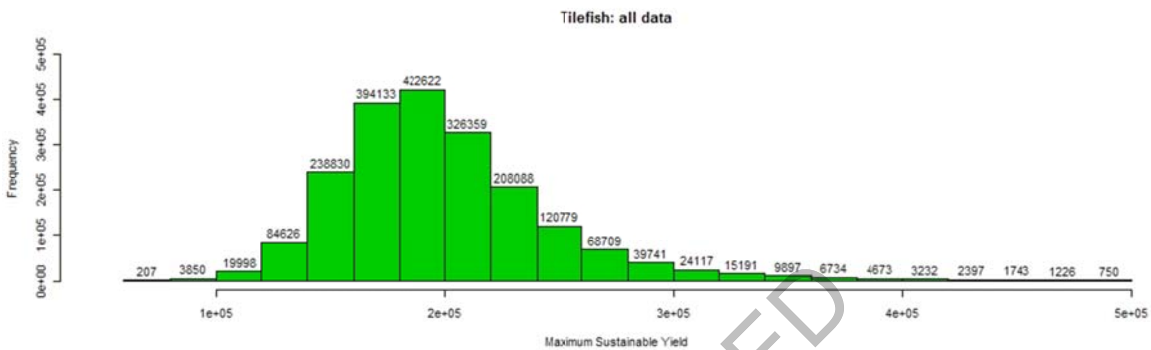


Figure 3.2. Estimates of exploitation for golden tilefish by region (east and west of the Mississippi River) and all data combined in the Gulf of Mexico for the time period catch histories exist.

Figure 3.3. Distribution of maximum sustainable yield values for (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish. Sample sizes per size bin are above each respective column. Note, figure not drawn on the same x-axis or y-axis.

a.



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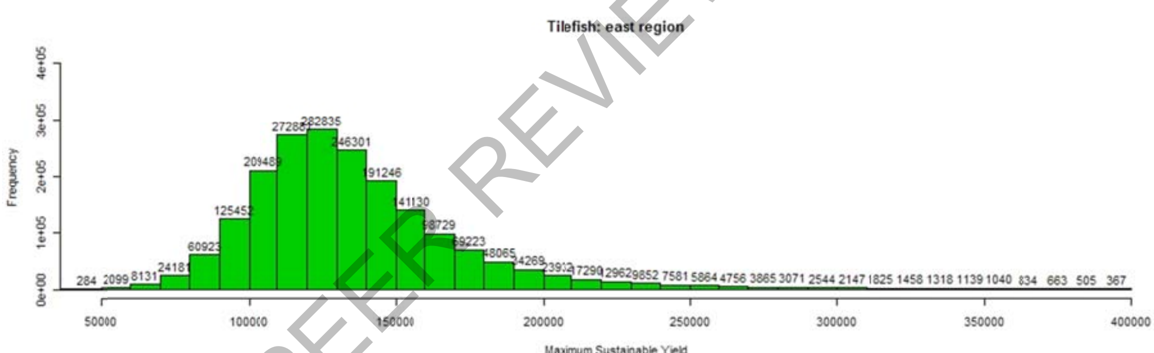


c.

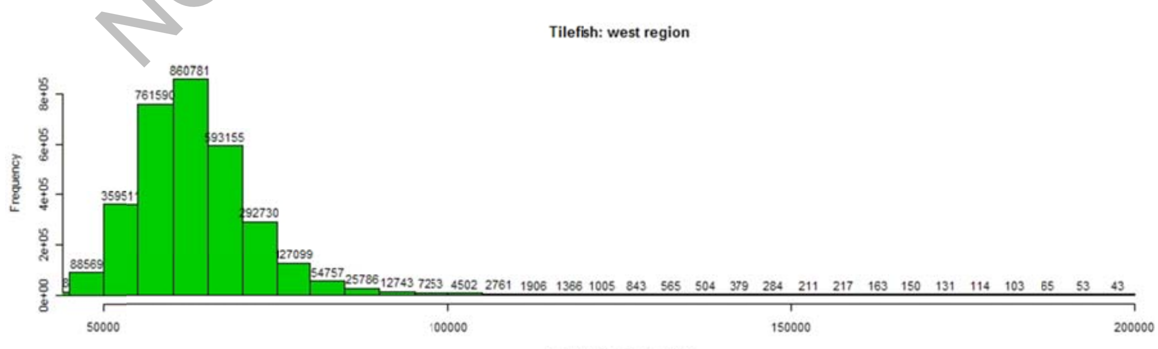
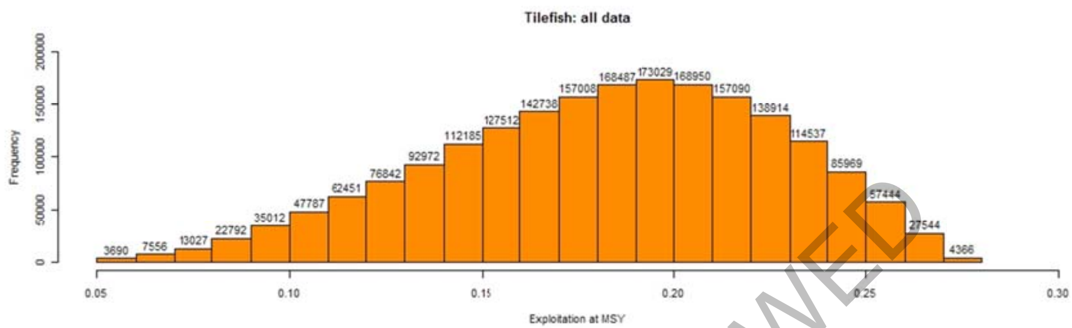


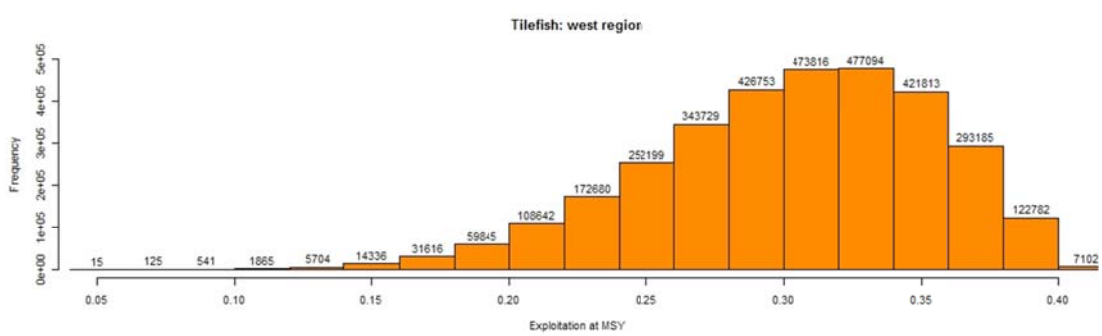
Figure 3.4. Distribution of exploitation at maximum sustainable yield (MSY) values (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish. Sample sizes per size bin are above each respective column. Note, figure (c) not drawn on the same x-axis or y-axis.

a.

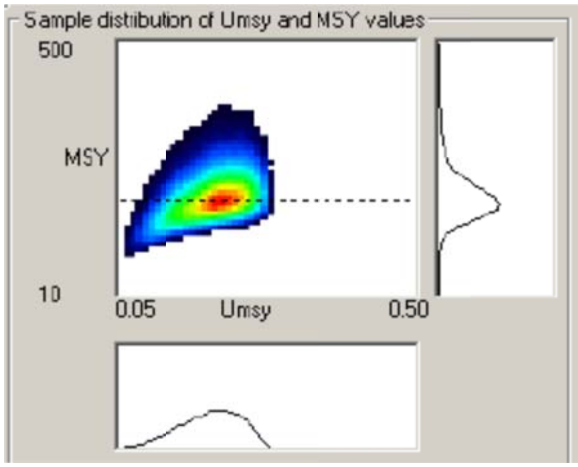


b.

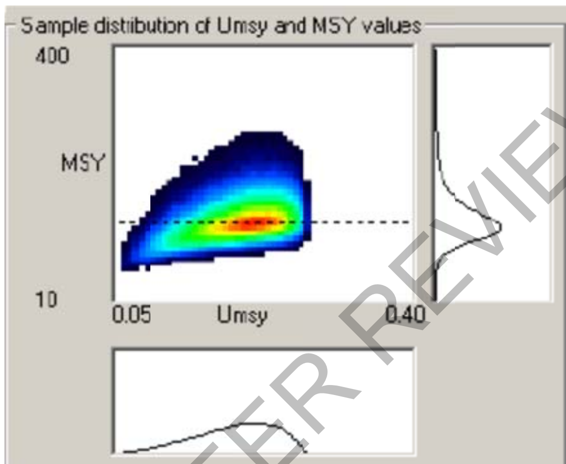
c.



a. All data



b. East Gulf of Mexico



c. West

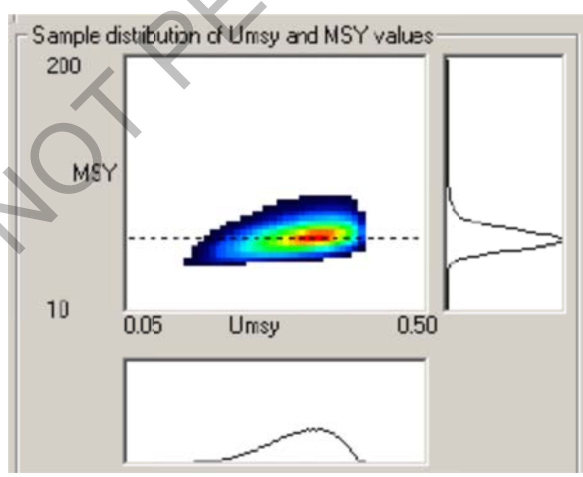
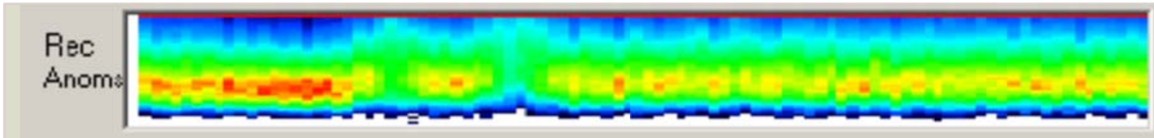


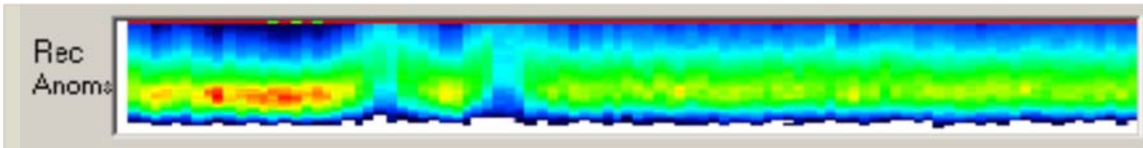
Figure 3.5. Sample distributions of maximum sustainable yield (MSY) given the sample distribution of exploitation at maximum sustainable yield (Umsy) for (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish. Dotted line indicate the average catch for the given time series for either region. Note: range of MSY and Umsy differ for each figure.

a. All data

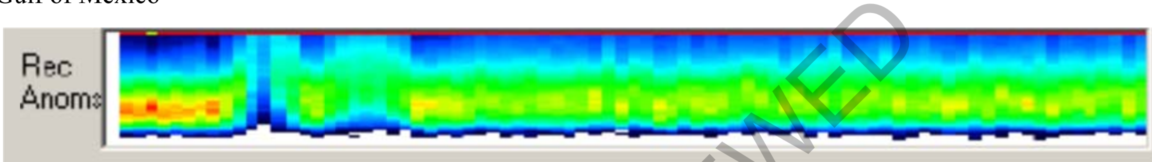
a. All data



b. East Gulf of Mexico



c. West Gulf of Mexico



Note: the time series began in 1965 for the east and in 1978 for the west.

Figure 3. 6. Recruitment anomalies for the historical and future projection time periods for (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish.

a. All data b. East c. West

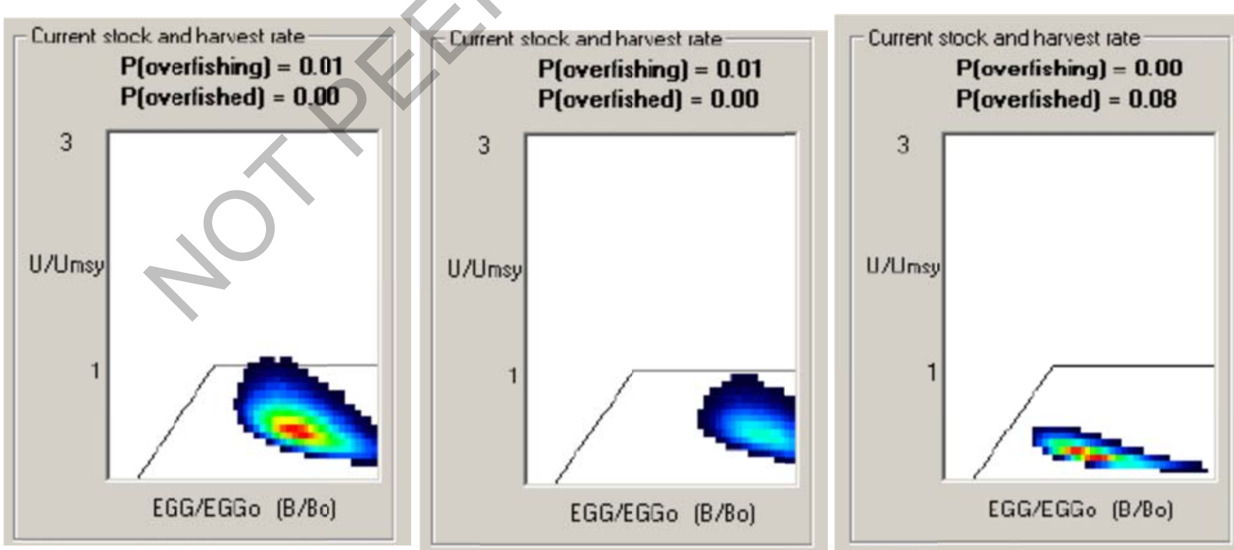
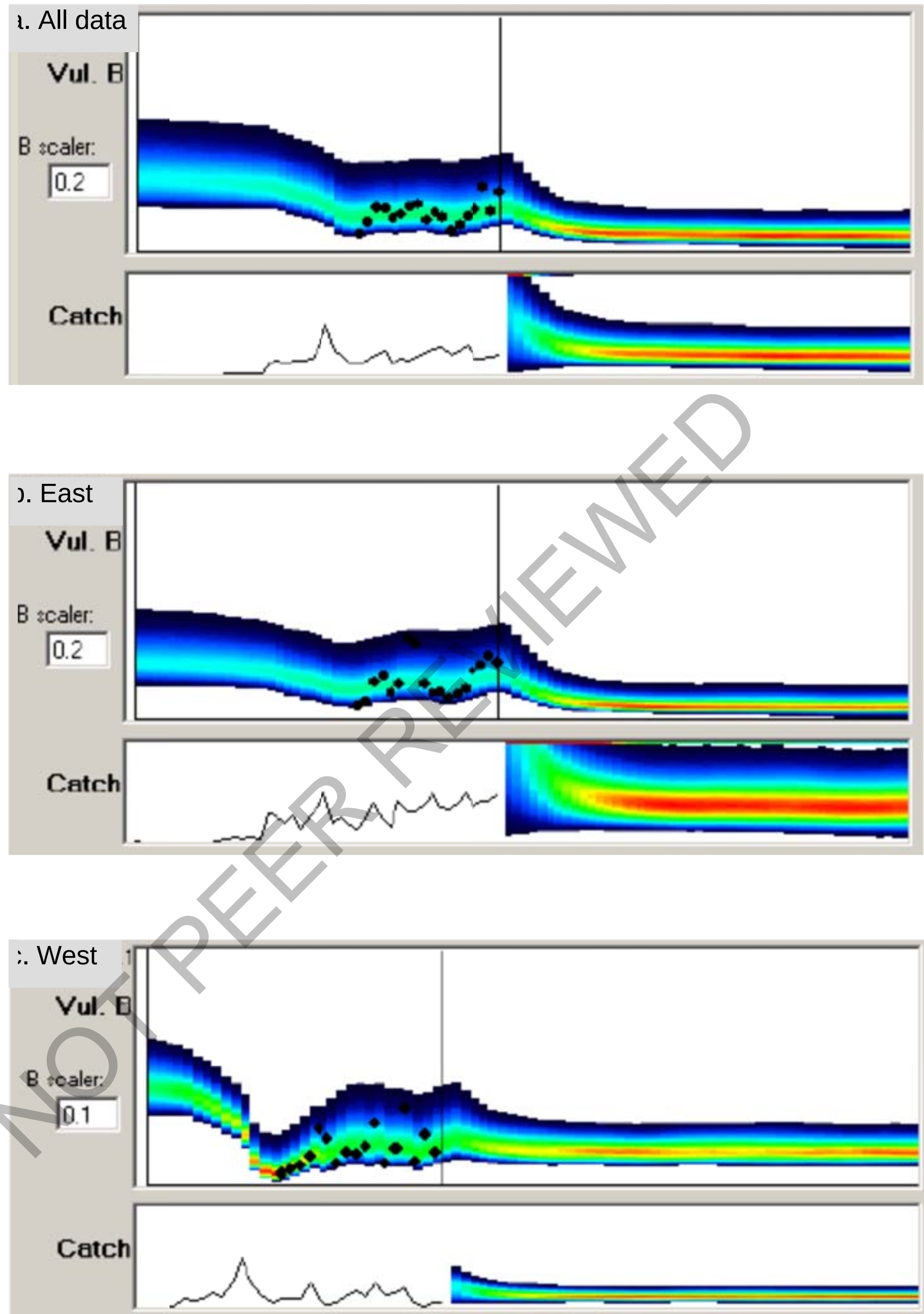


Figure 3.7. Current stock status and harvest rate for golden tilefish for (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish. Note that the probabilities of overfishing and of being overfished are calculated according to the Pacific Fisheries Management Council 40/10 rule and are not the same as the GMFMC rules.



Note: the time series began in 1965 for the east and in 1978 for the west.

Figure 3.8. Future projections of catch at an exploitation rate of 0.2 (approximately double the rate at MSY) and vulnerable biomass for golden tilefish for (a) all data combined, (b) East Gulf of Mexico and (c) West Gulf of Mexico for golden tilefish. The vertical line indicates the last year of data, 2009. Black dots represent the respectively commercial longline index.

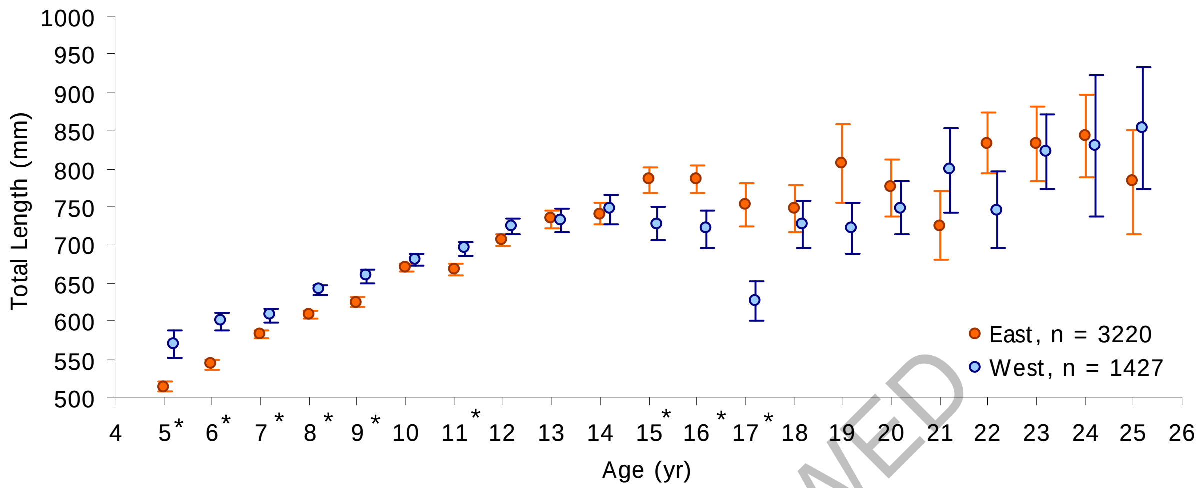


Figure 3.9. Observed mean size at age by region for Gulf of Mexico tilefish. Whiskers represent standard errors.

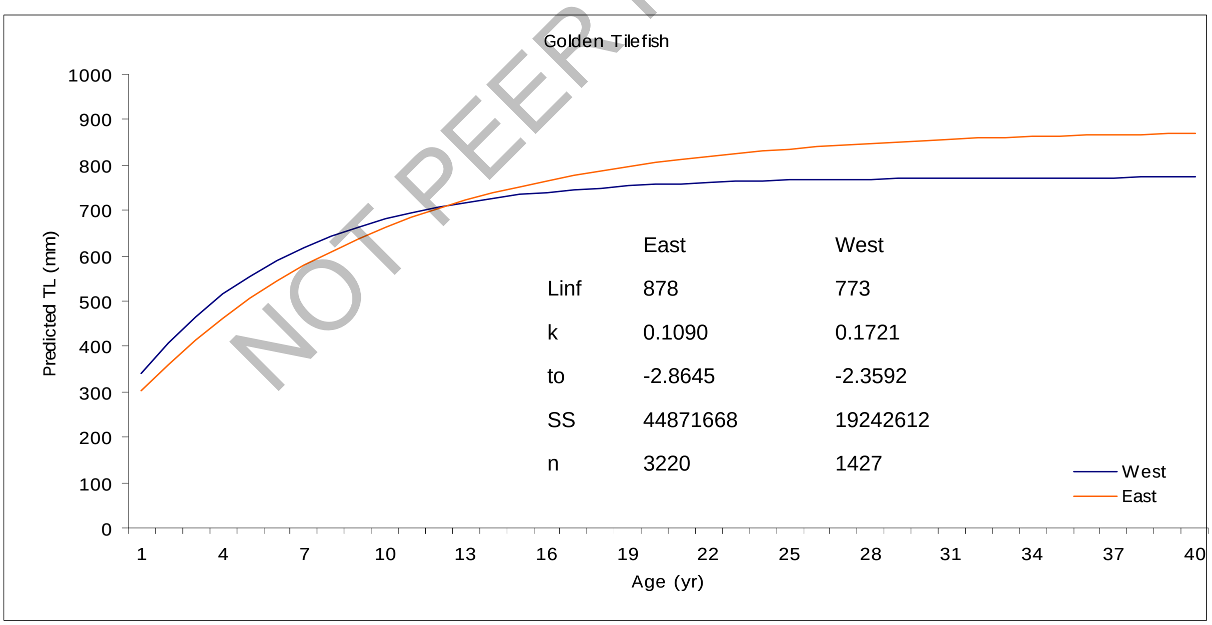


Figure 3.10. Von Bertalanffy growth curves by region for Gulf of Mexico tilefish.

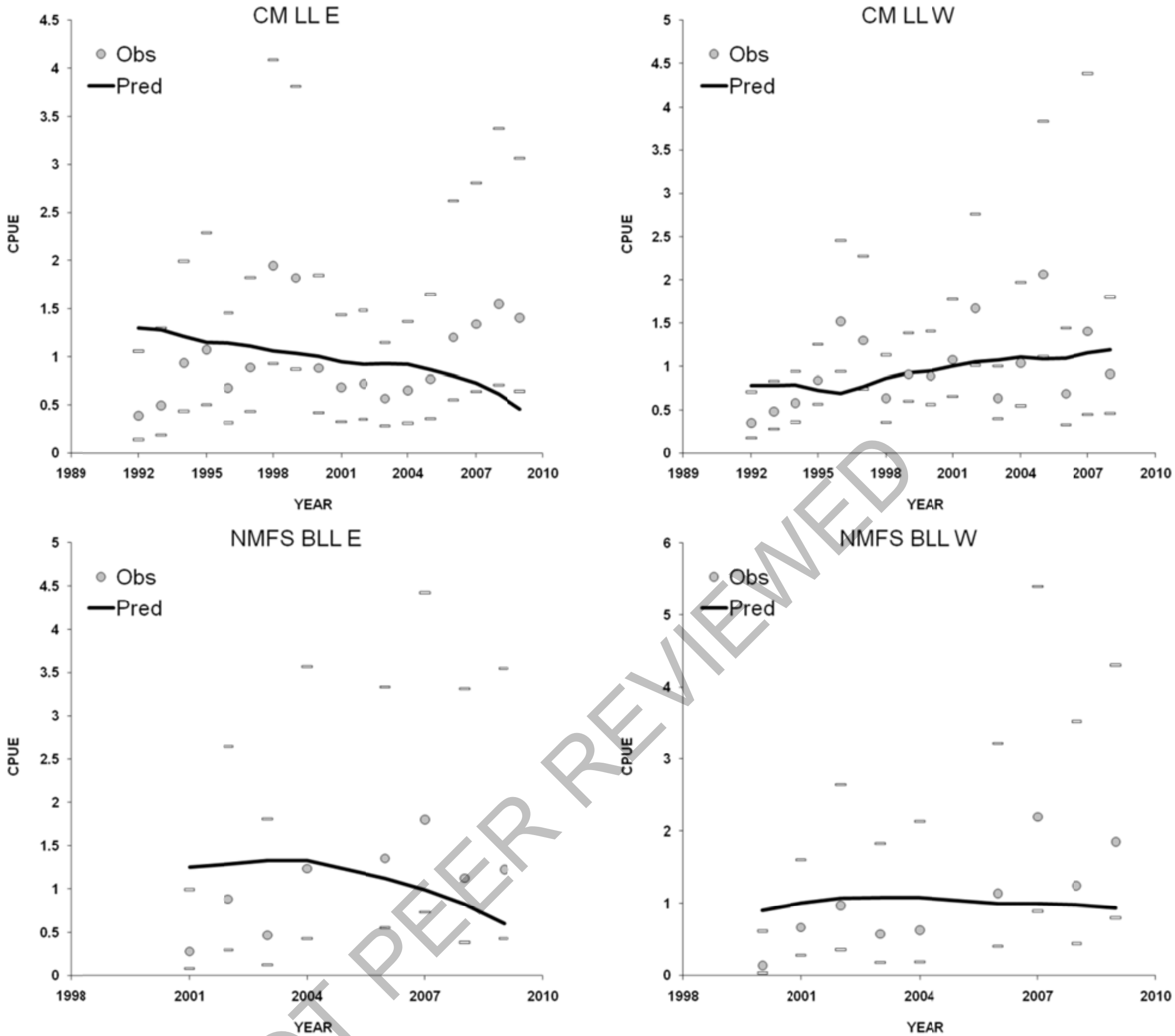


Figure 3.11. Observed and predicted index CPUE for Gulf of Mexico tilefish. Indices include the commercial long line east (CM LL E), commercial long line west (CM LL W), NMFS bottom long line survey east (NMFS BLL E), and NMFS bottom long line west (NMFS BLL W). Error bars represent the observed log-scale standard errors.

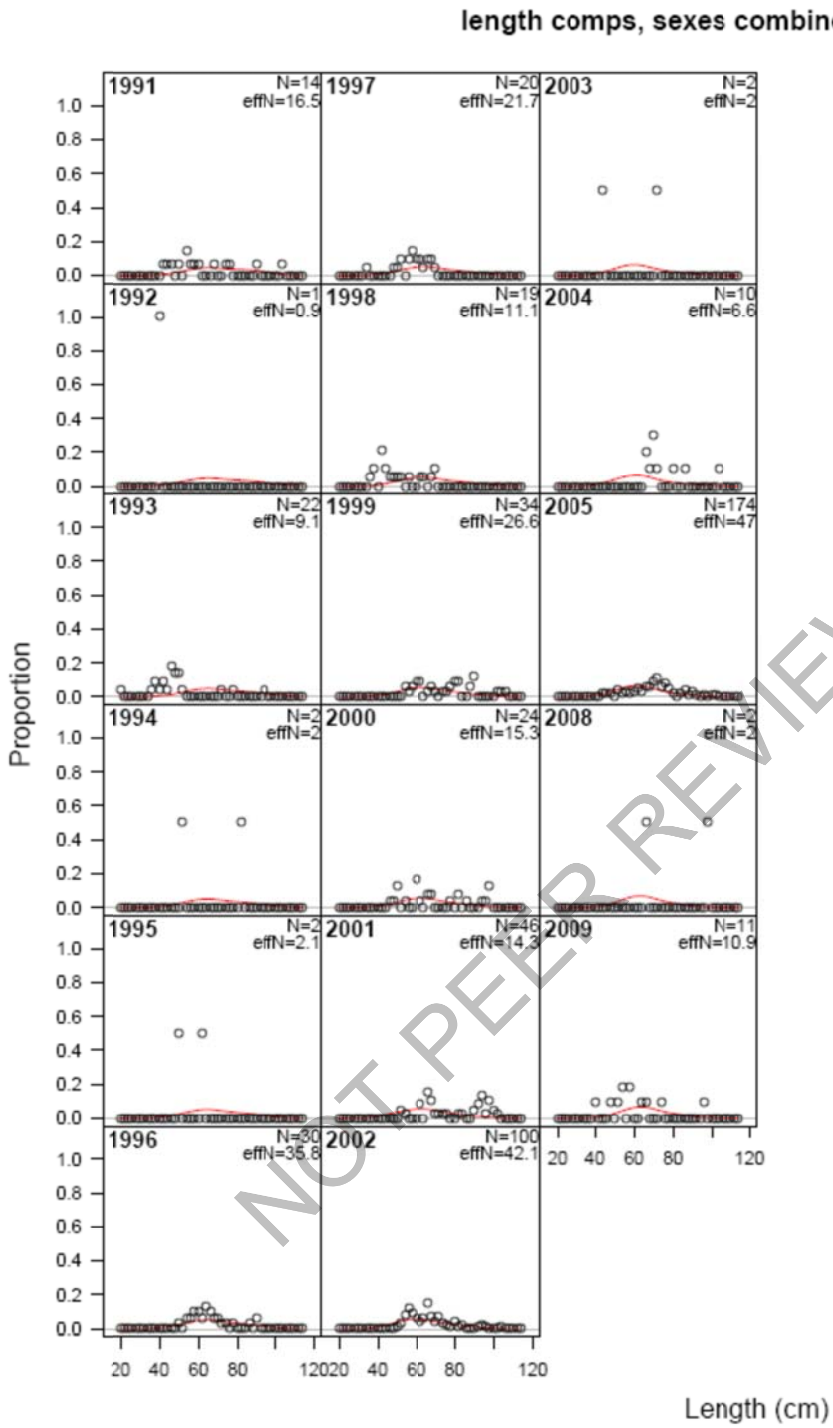


Figure 3.12. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unknown gender in the commercial hand line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

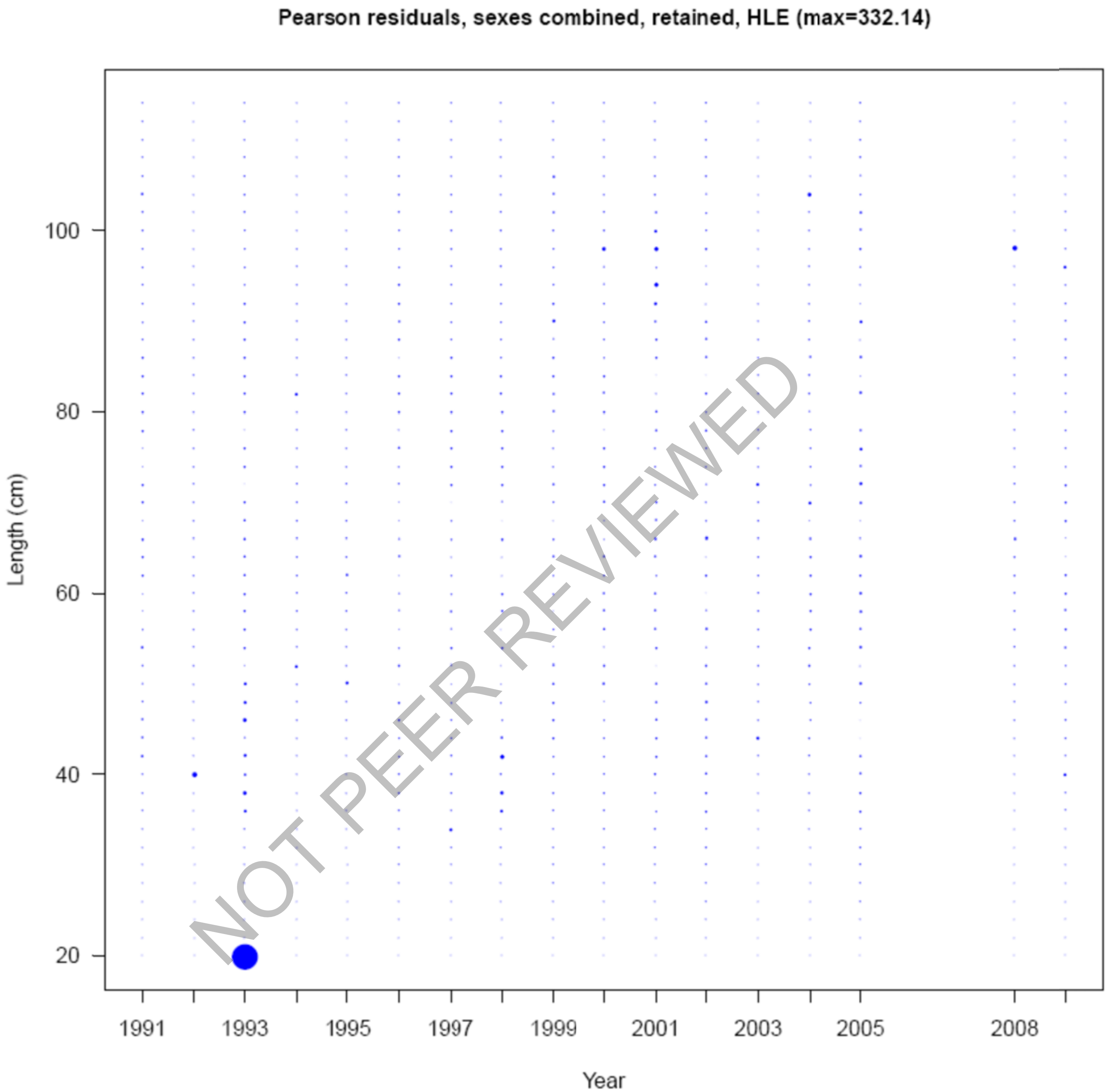


Figure 3.13. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the commercial hand line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

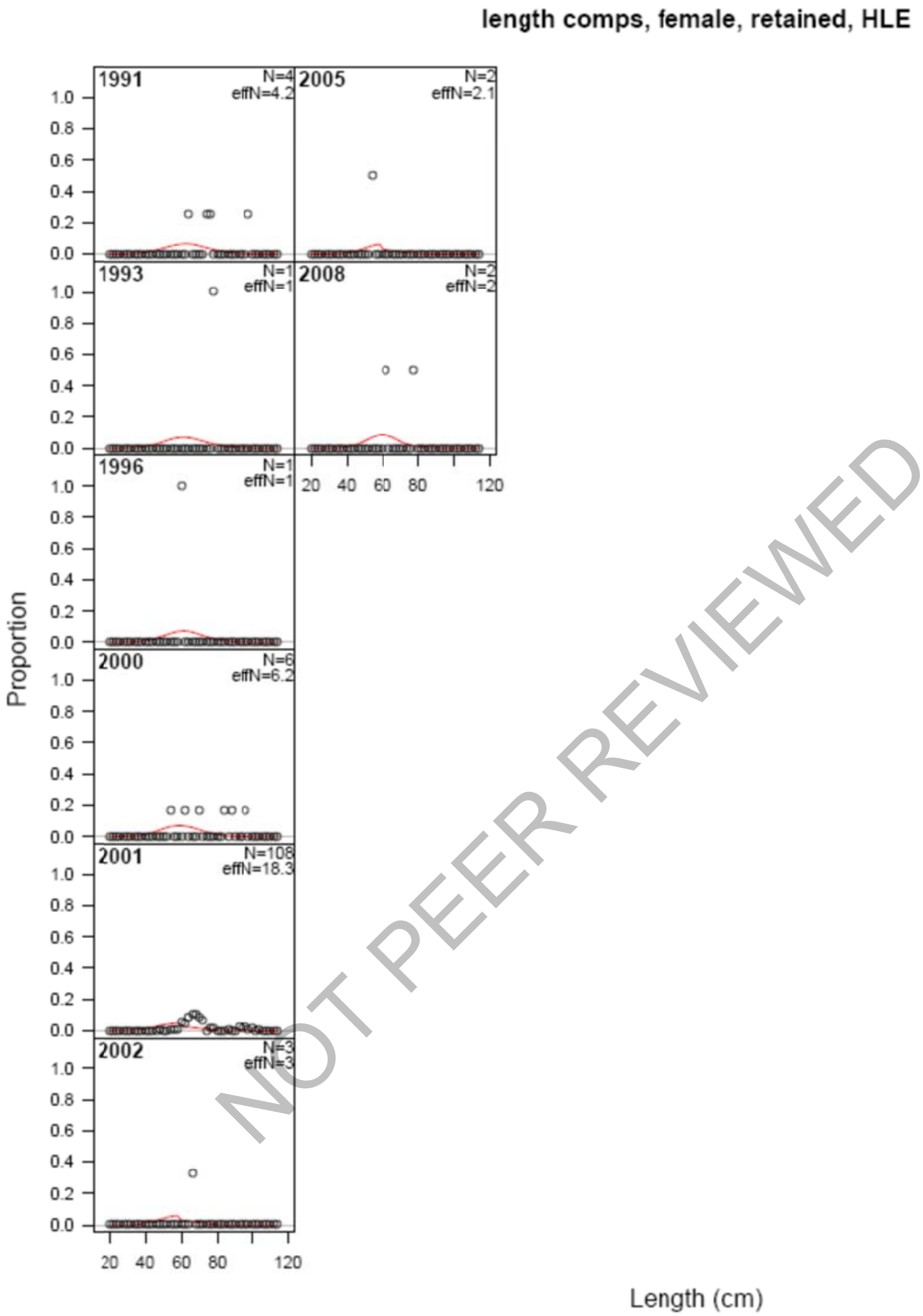


Figure 3.14. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the commercial hand line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

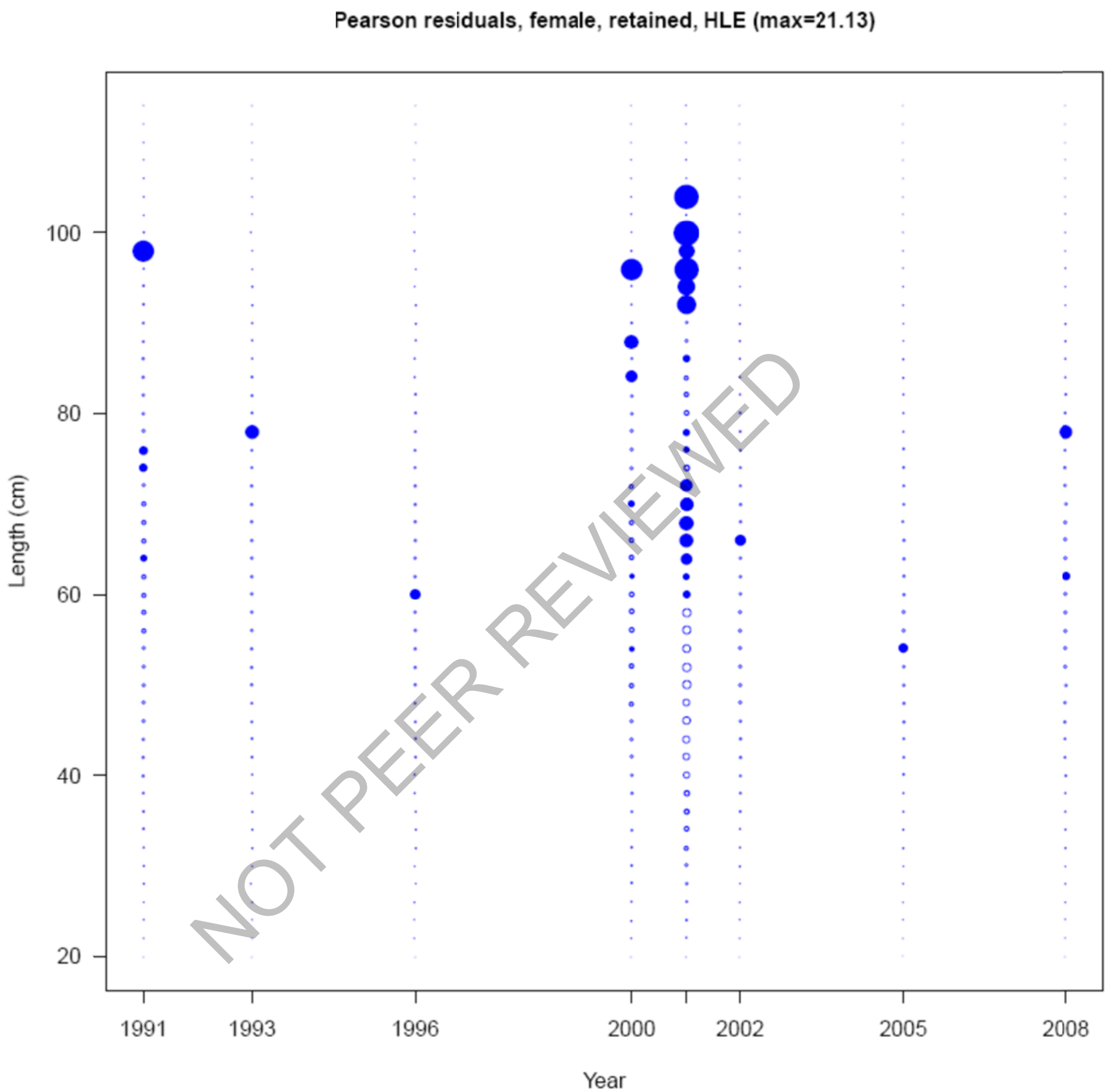


Figure 3.15. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the commercial hand line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

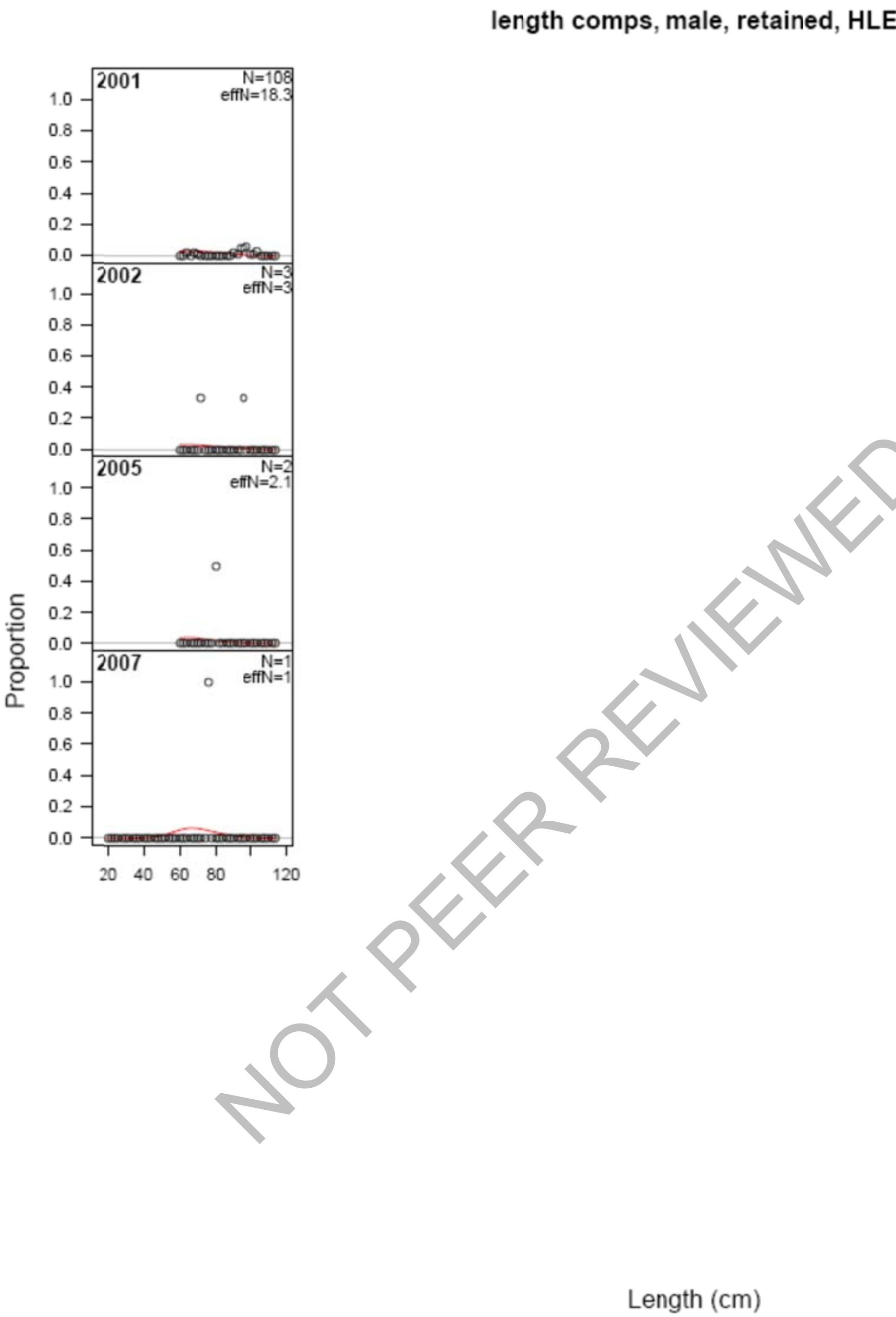


Figure 3.16. Observed (open circles) and predicted (lines) length compositions for male Gulf of Mexico tilefish in the commercial hand line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

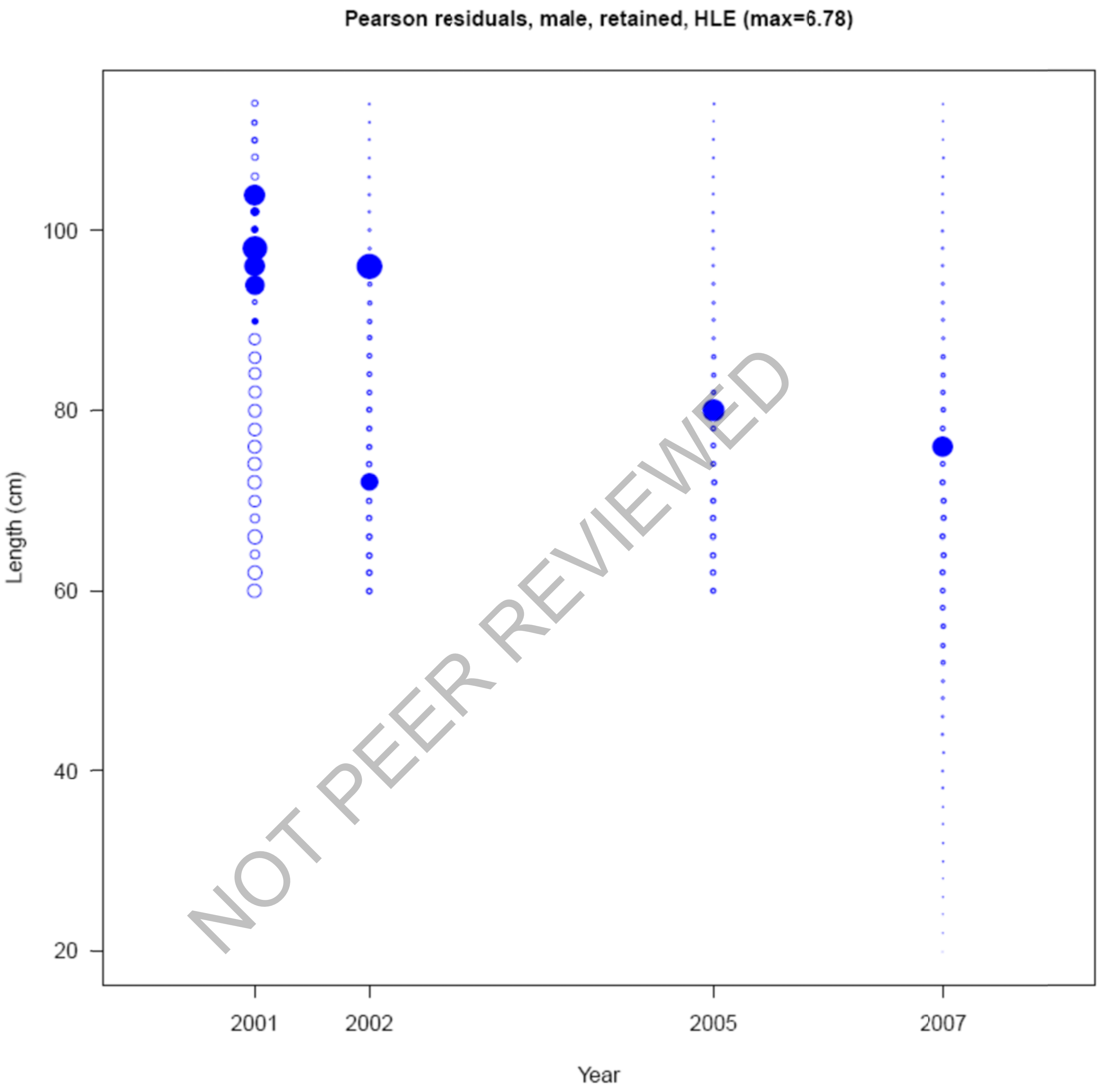


Figure 3.17. Pearson residuals of length composition fits for male Gulf of Mexico tilefish in the commercial hand line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

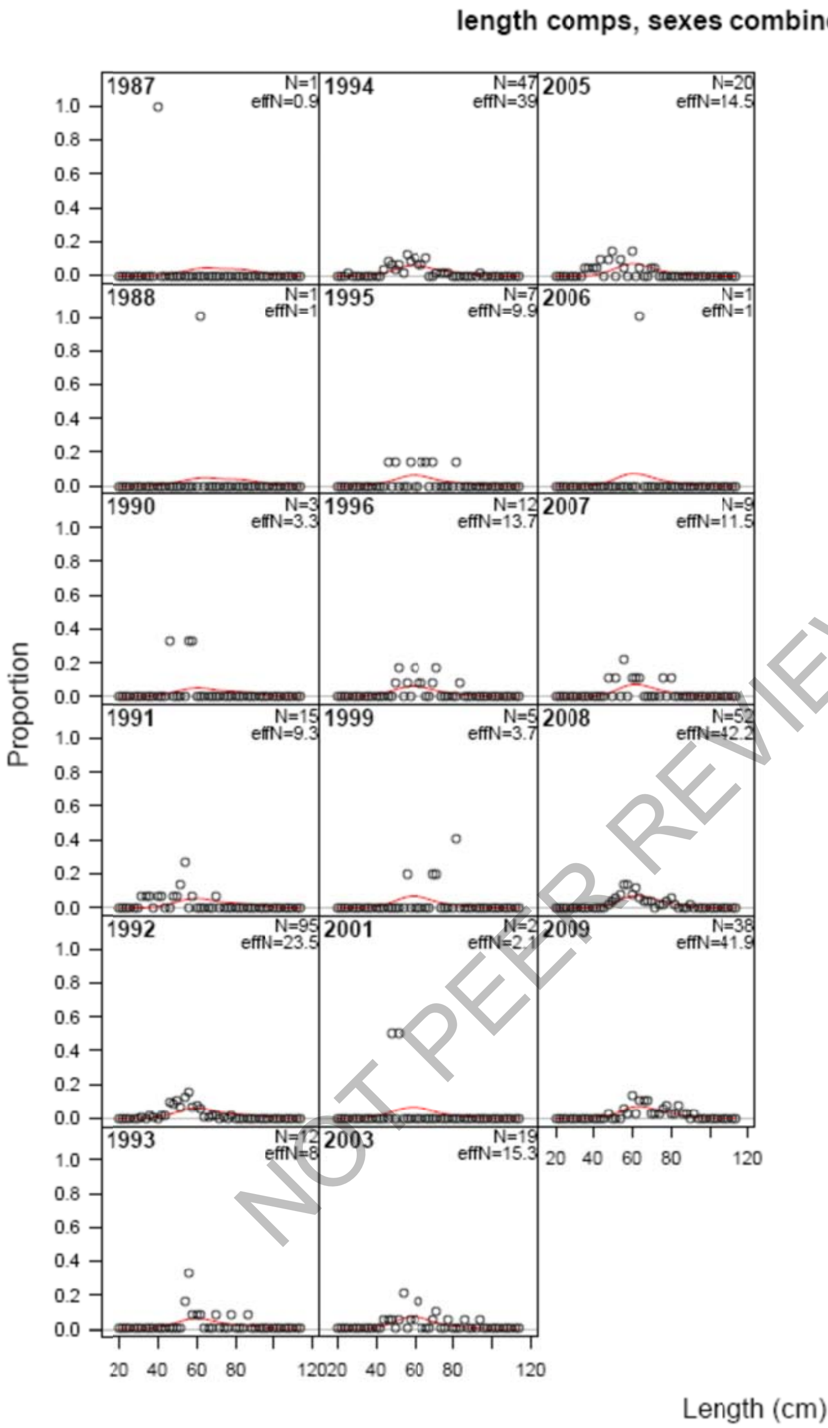


Figure 3.18. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unkown gender in the commercial hand line west fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

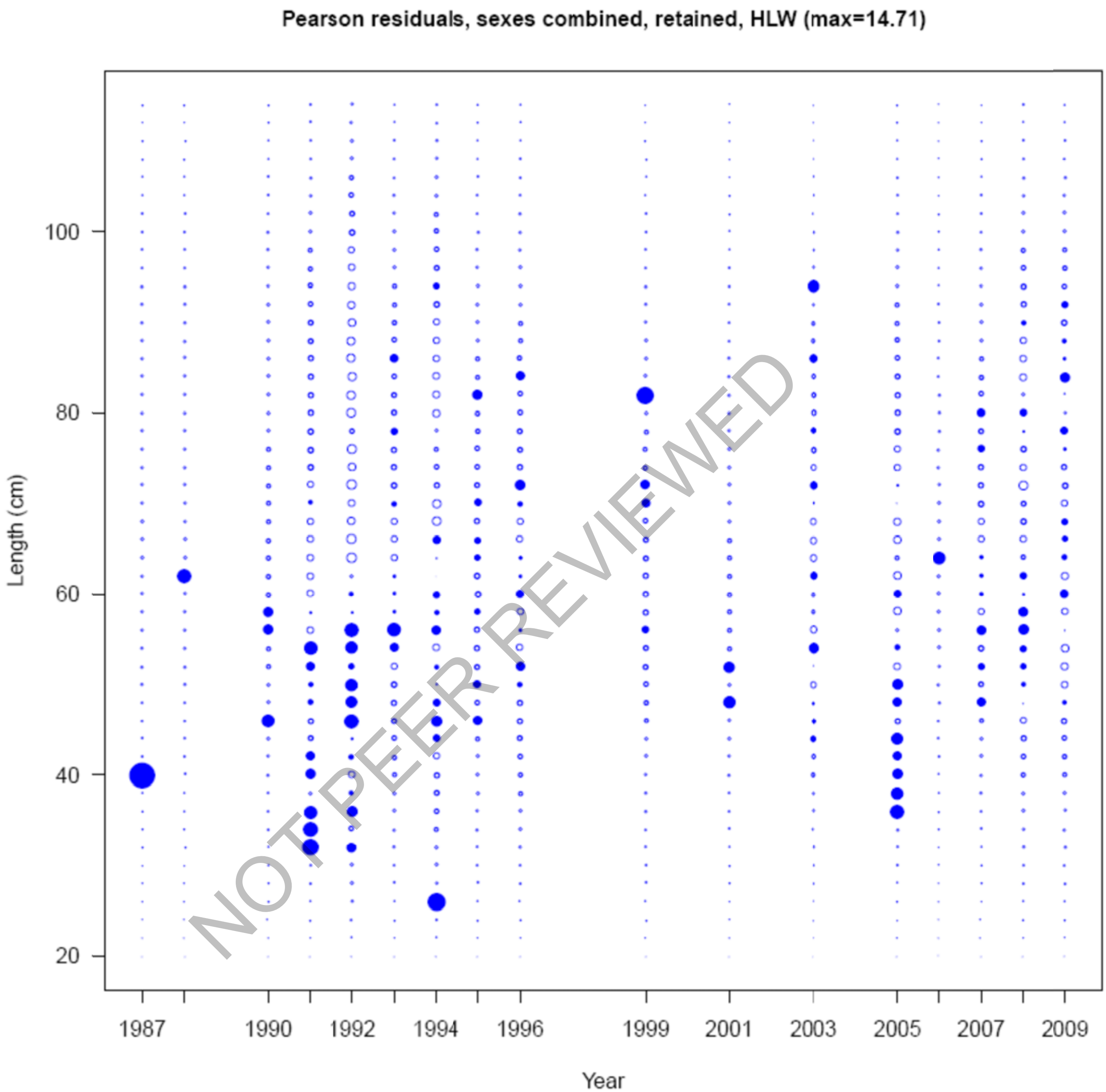


Figure 3.19. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the commercial hand line west fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

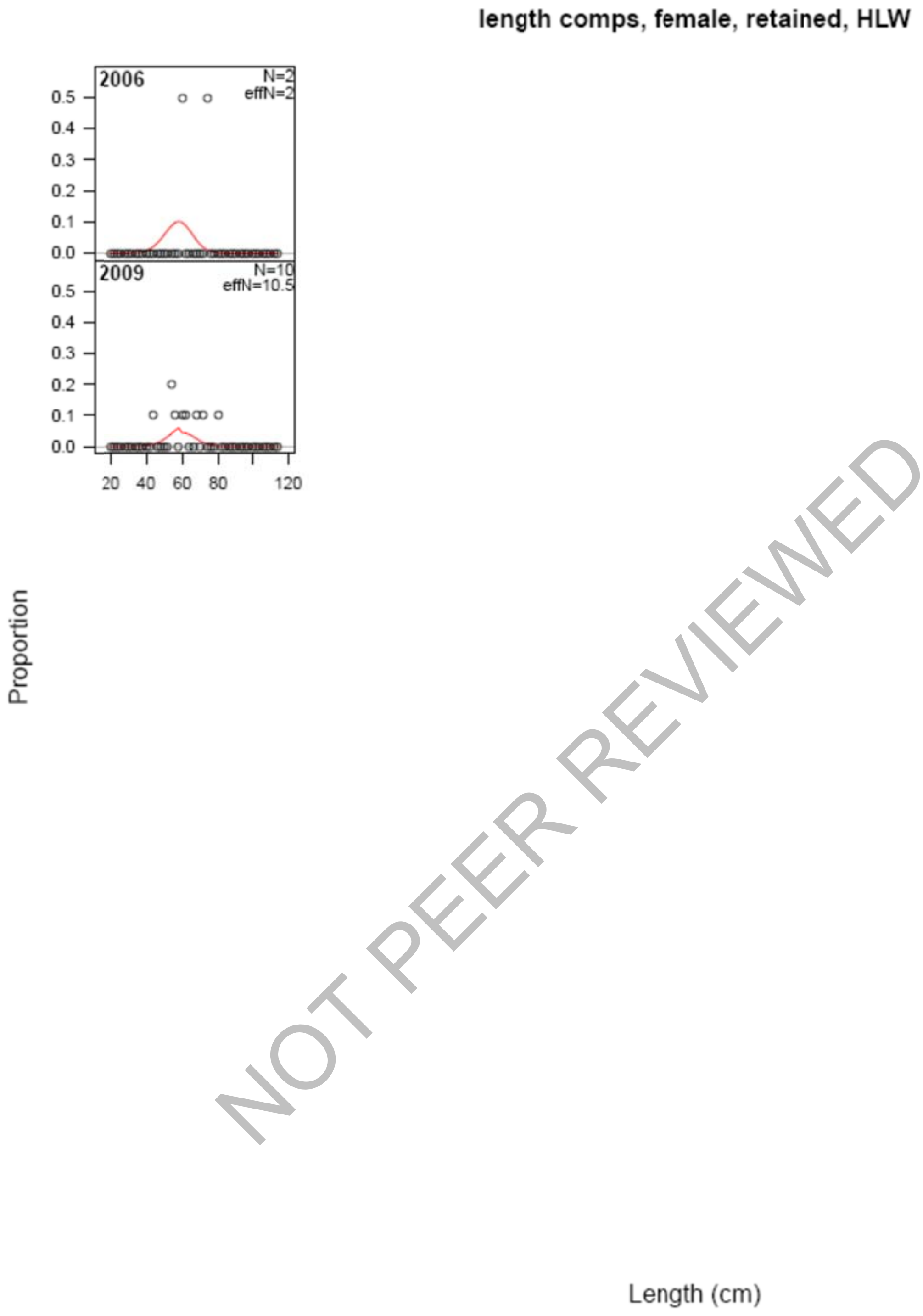


Figure 3.20. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the commercial hand line west fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

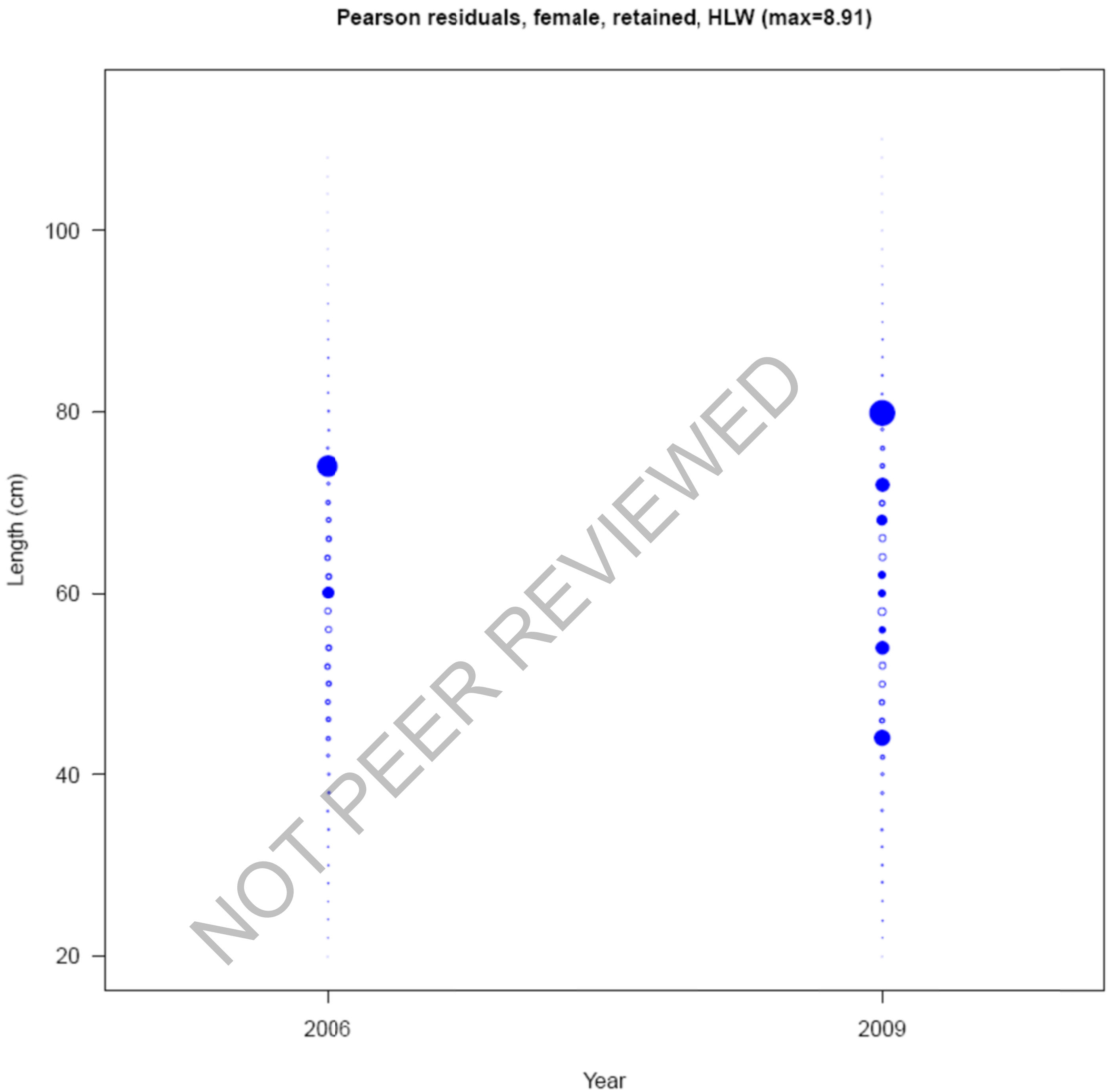


Figure 3.21. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the commercial hand line west fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

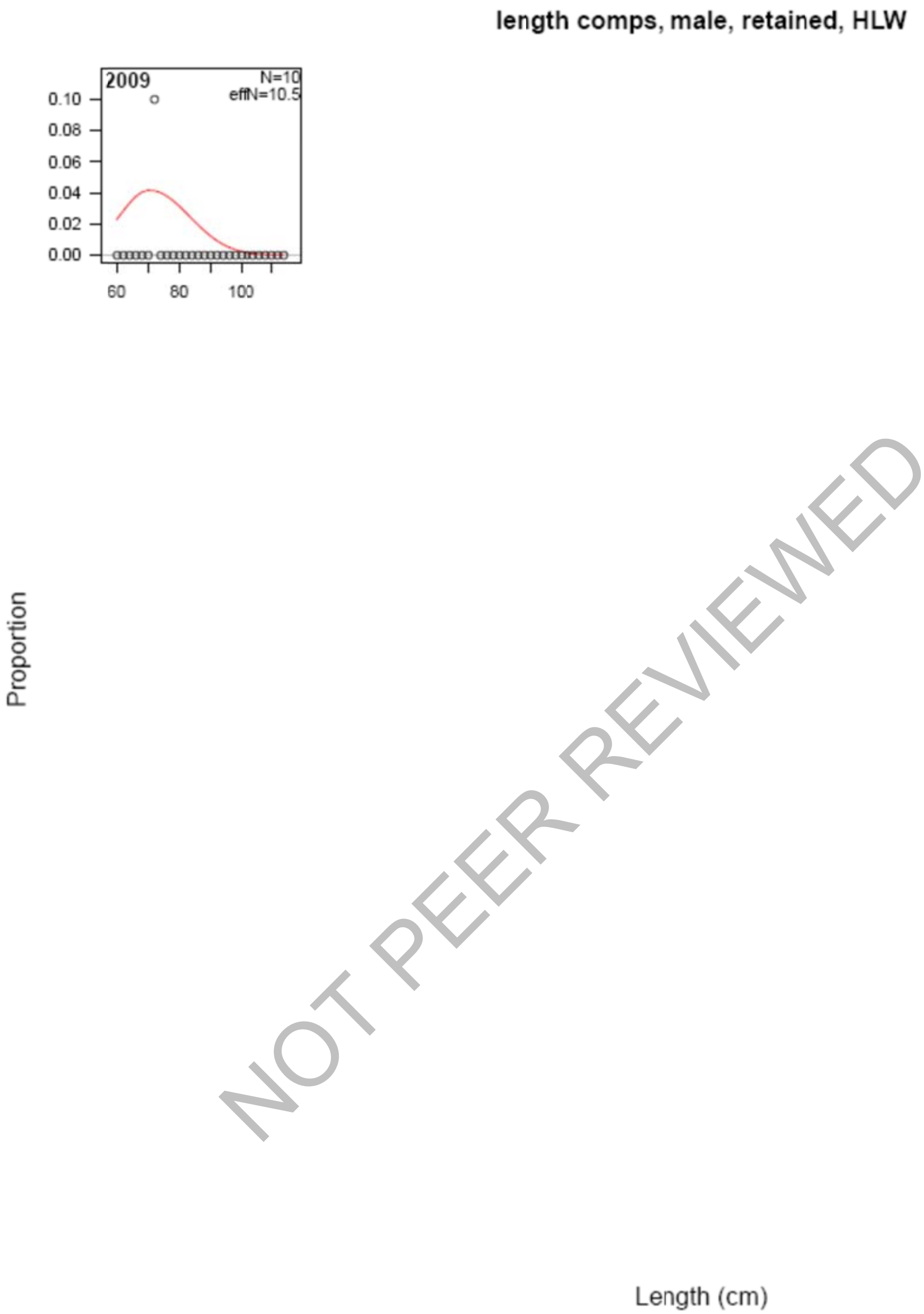


Figure 3.22. Observed (open circles) and predicted (lines) length compositions for male Gulf of Mexico tilefish in the commercial hand line west fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

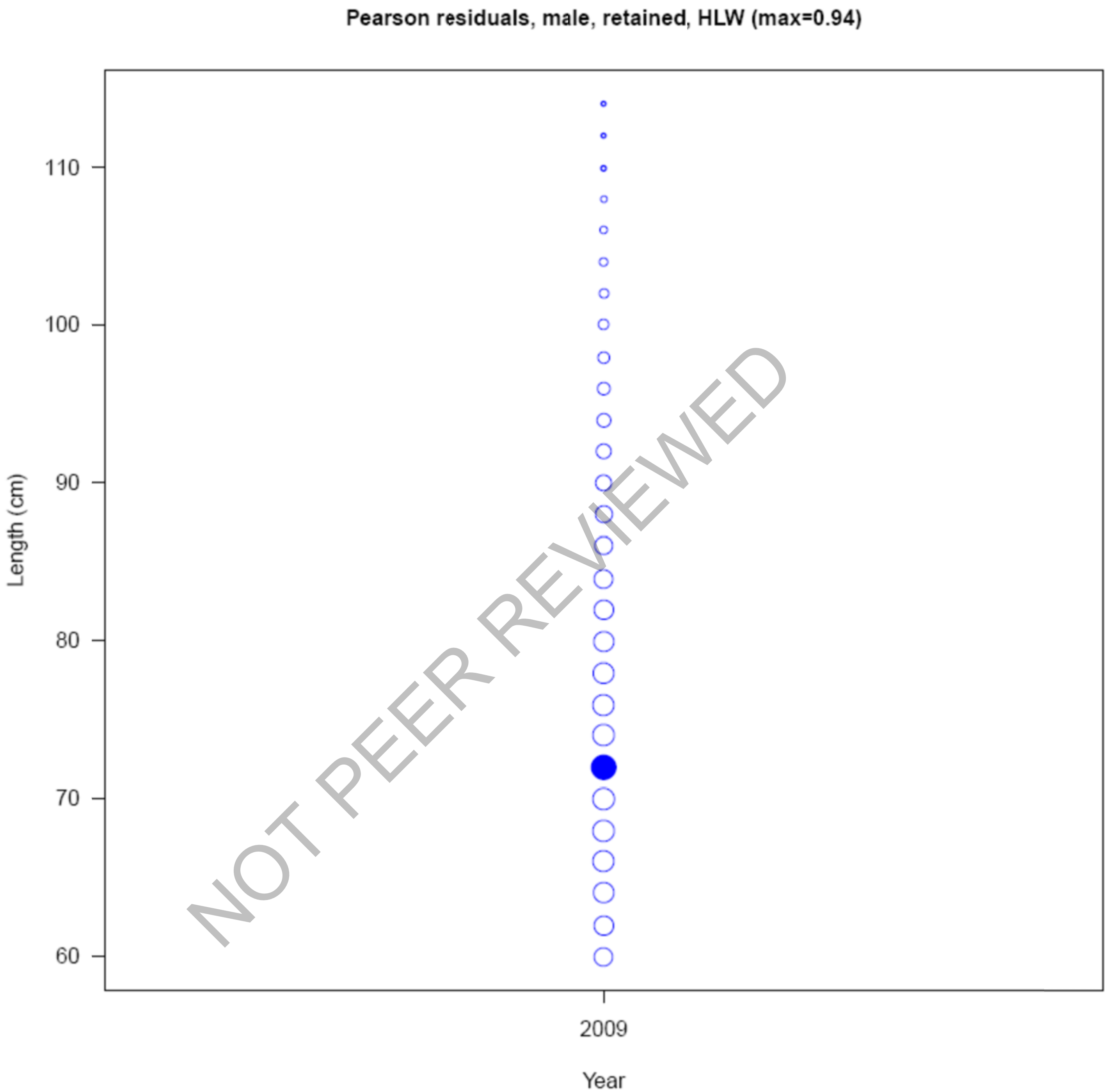


Figure 3.23. Pearson residuals of length composition fits for male Gulf of Mexico tilefish in the commercial hand line west fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

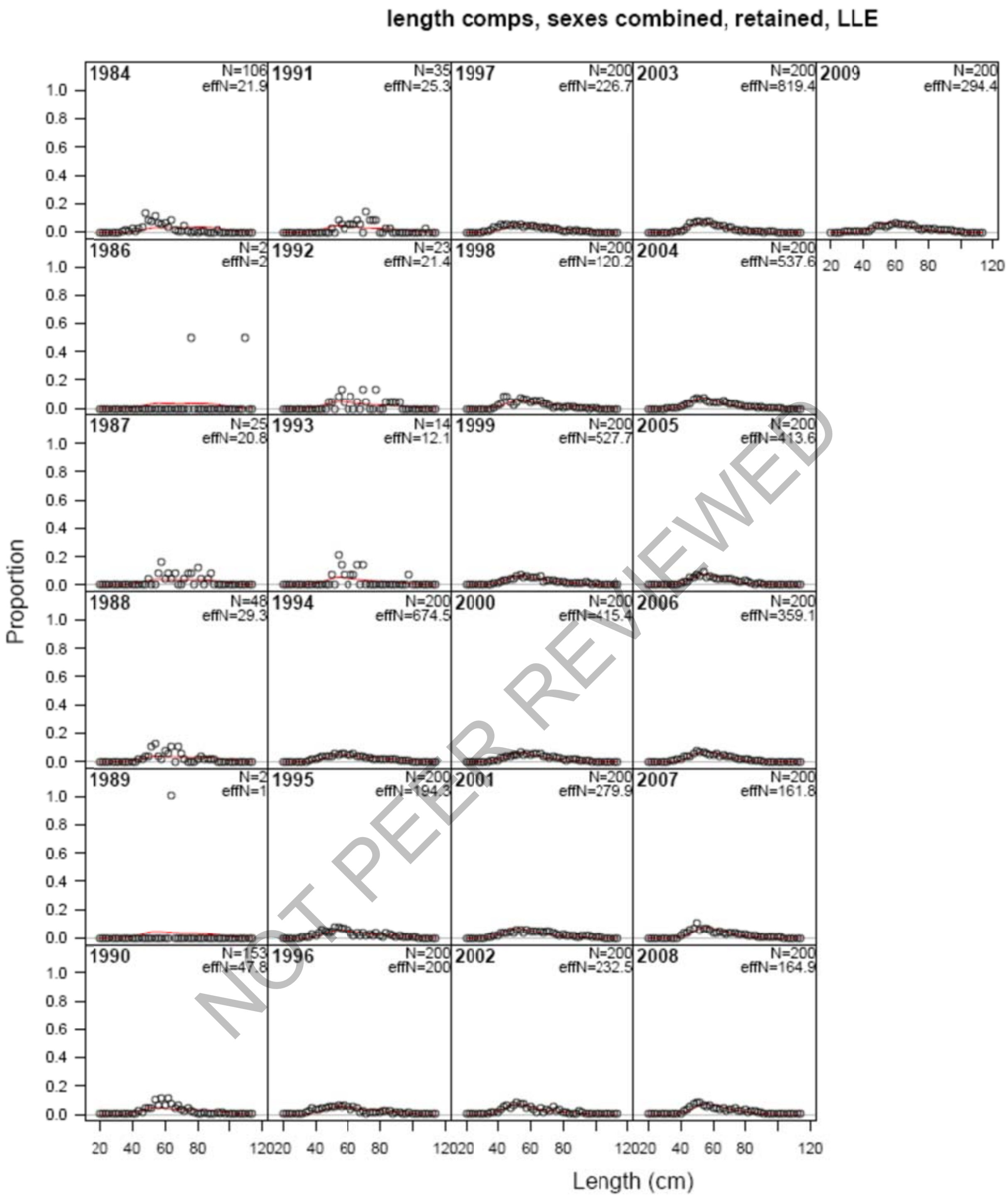


Figure 3.26. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unknown gender in the commercial long line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

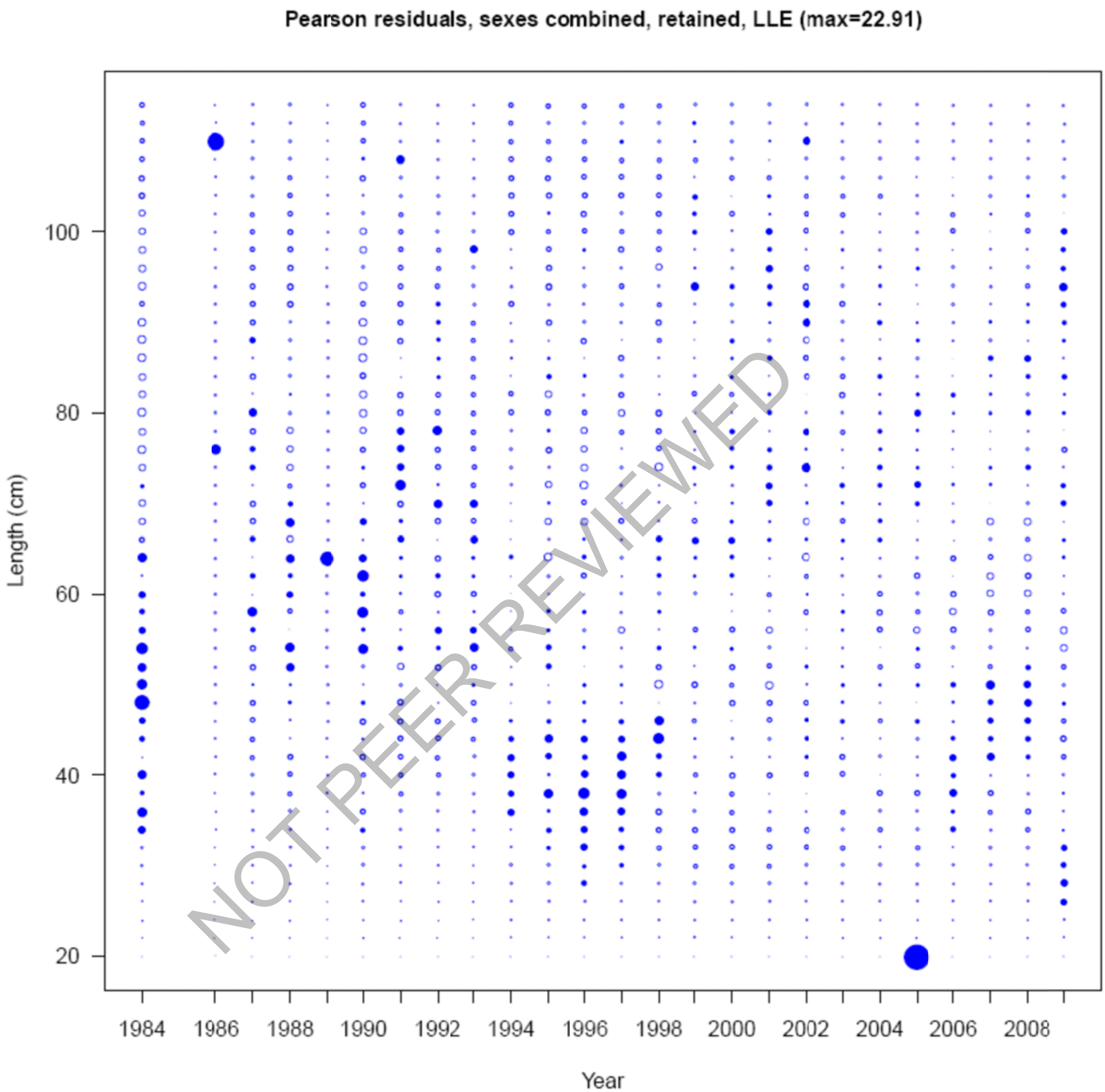


Figure 3.25. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the commercial long line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

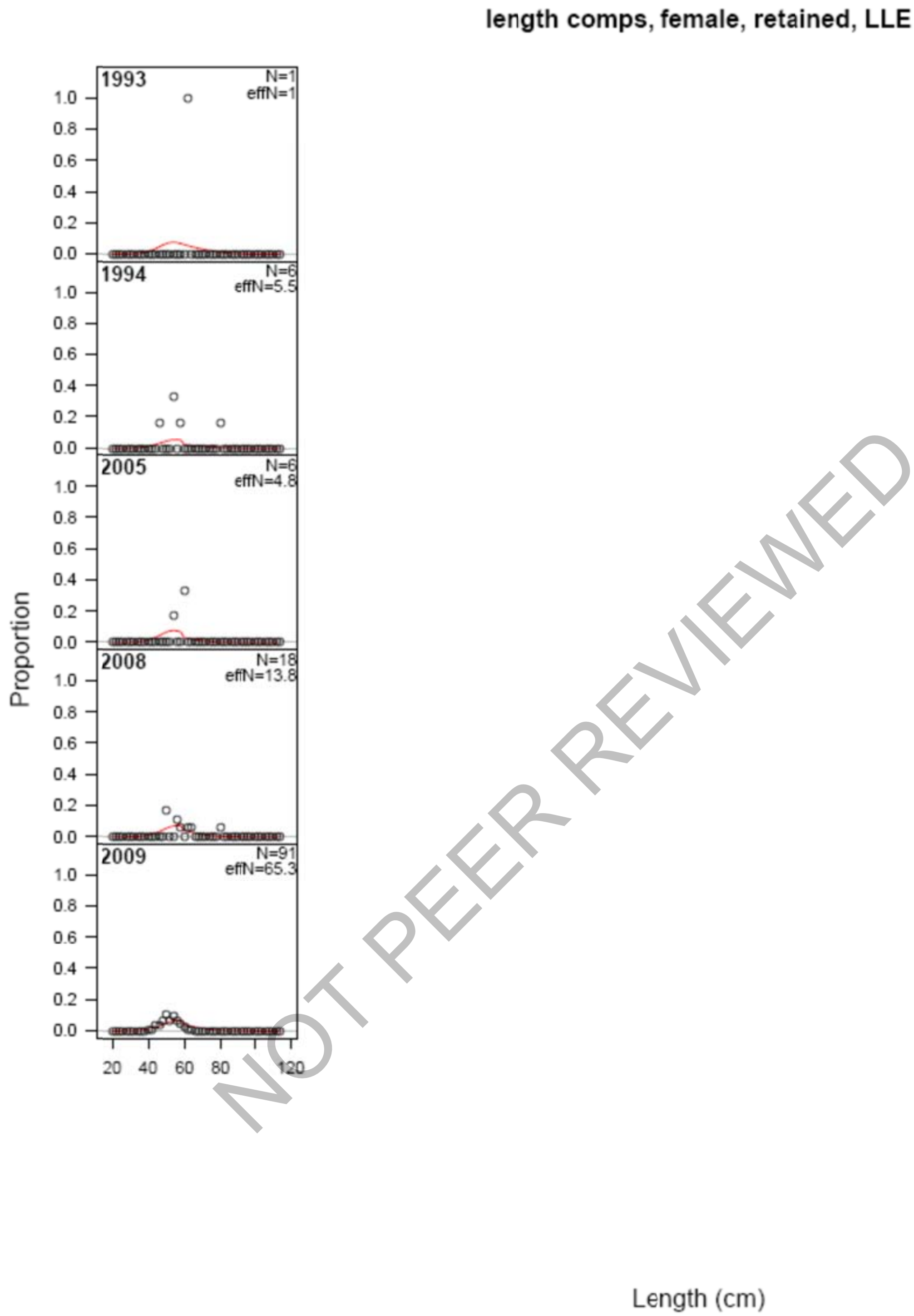


Figure 3.26. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the commercial long line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

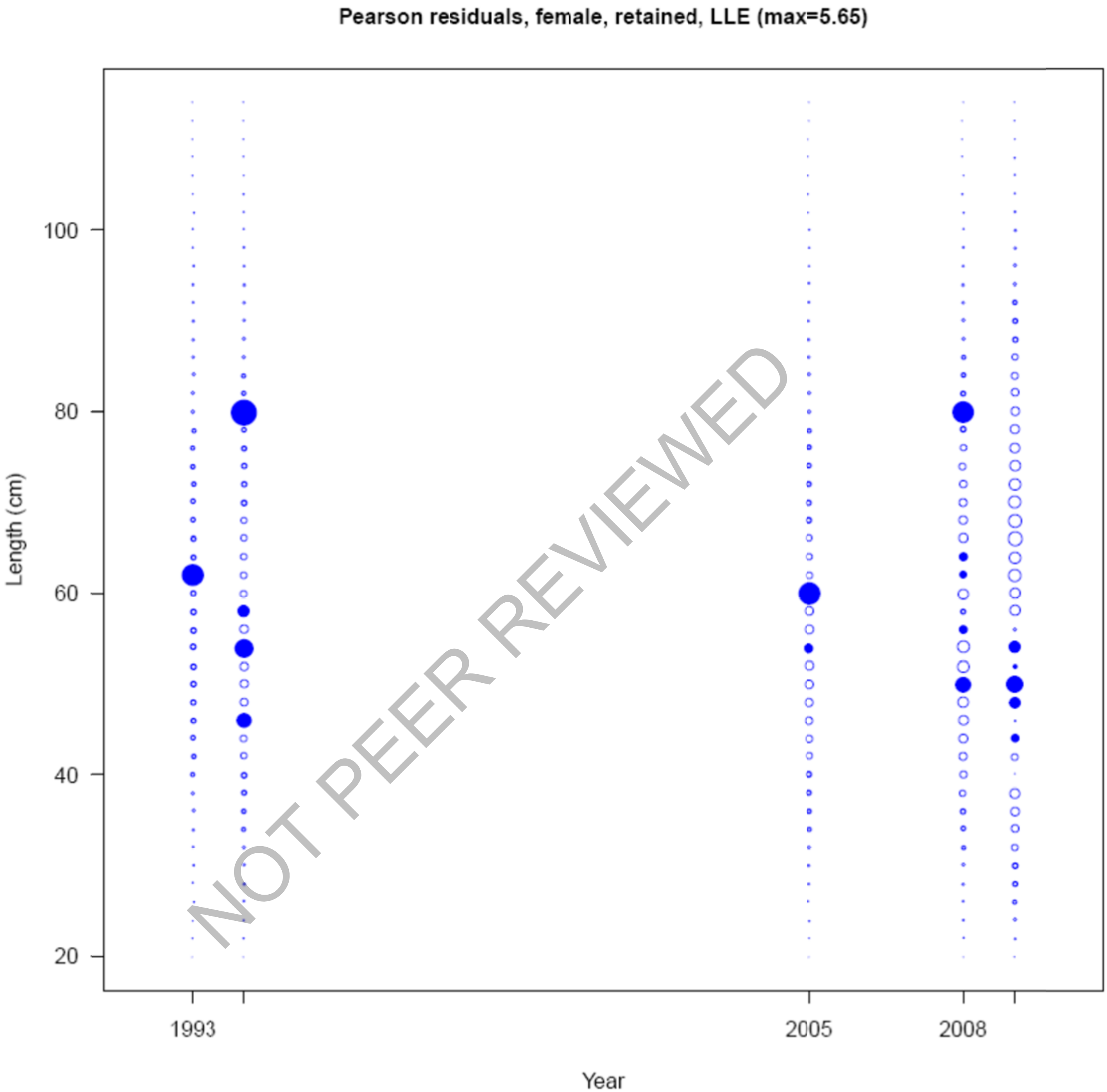


Figure 3.27. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the commercial long line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

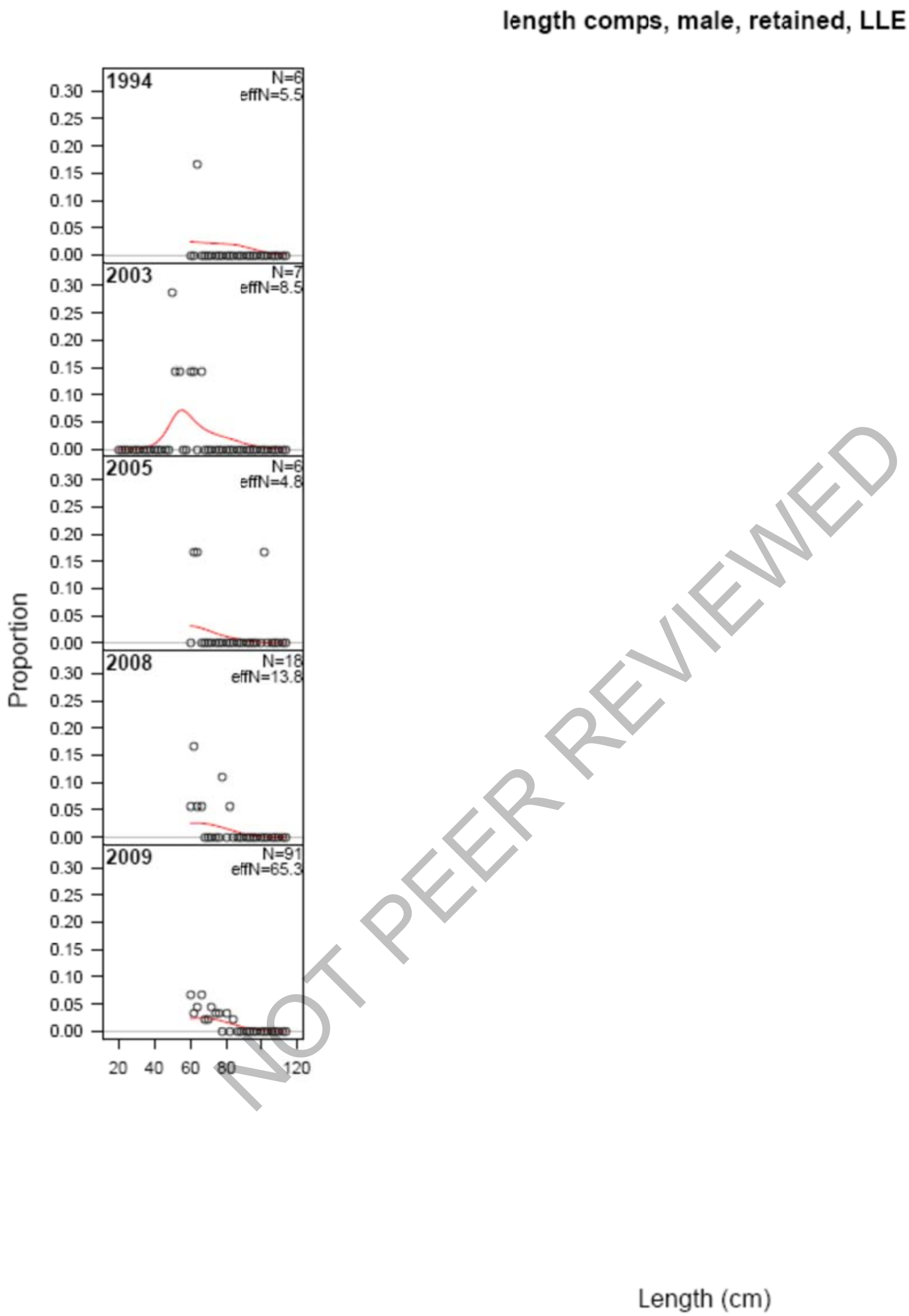


Figure 3.28. Observed (open circles) and predicted (lines) length compositions for male Gulf of Mexico tilefish in the commercial long line east fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

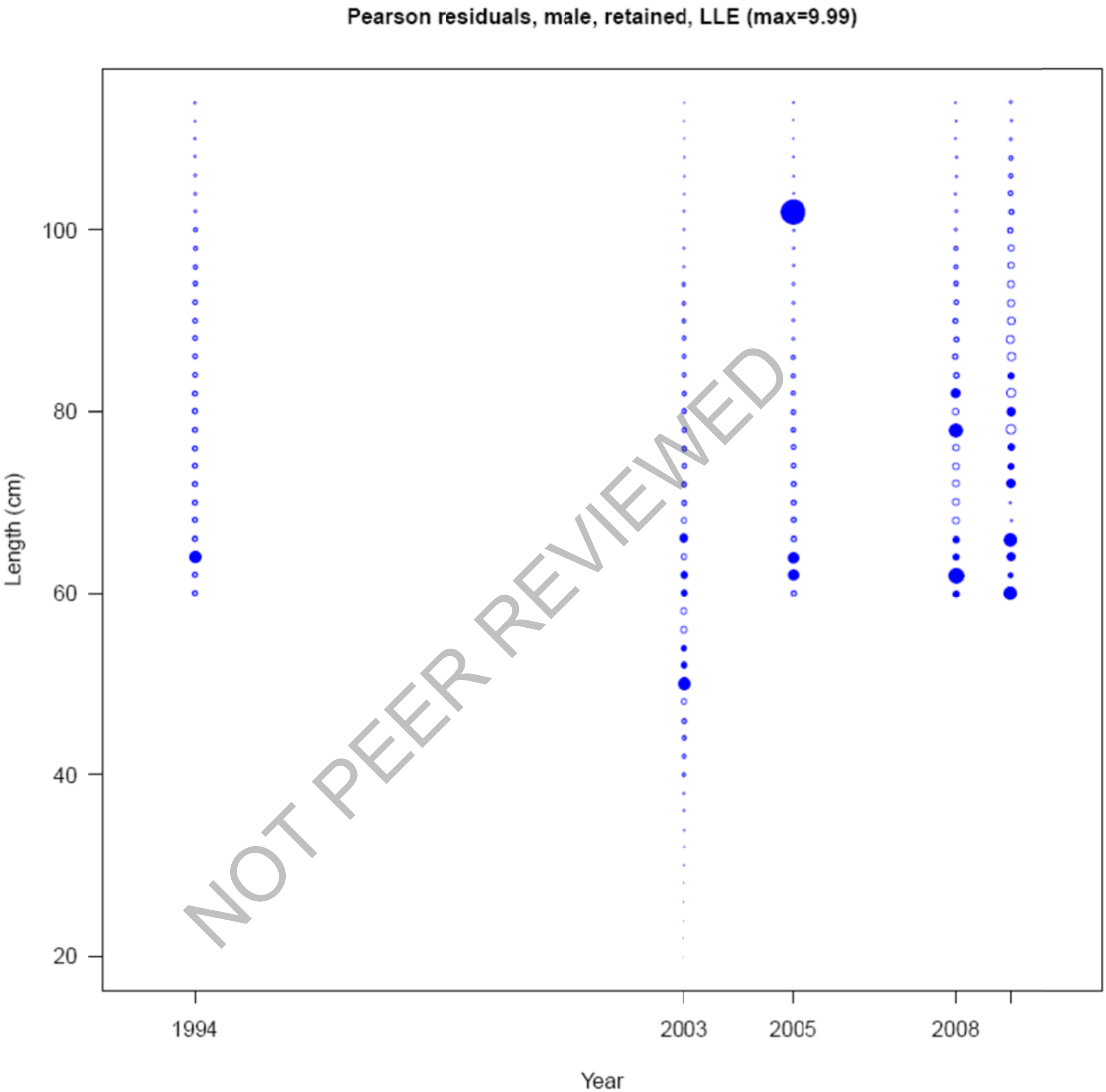


Figure 3.29. Pearson residuals of length composition fits for male Gulf of Mexico tilefish in the commercial long line east fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

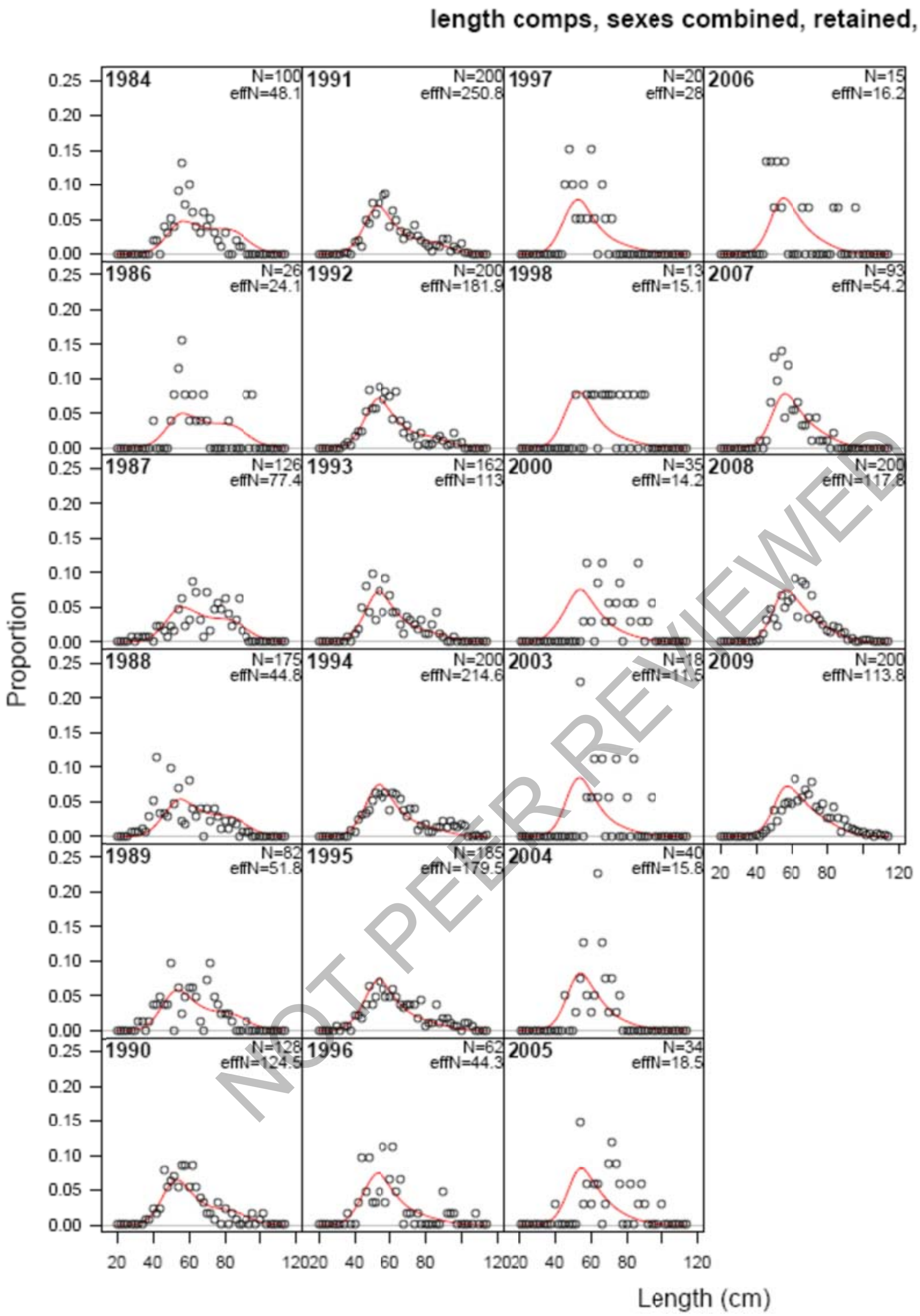


Figure 3.30. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unknown gender in the commercial long line west fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

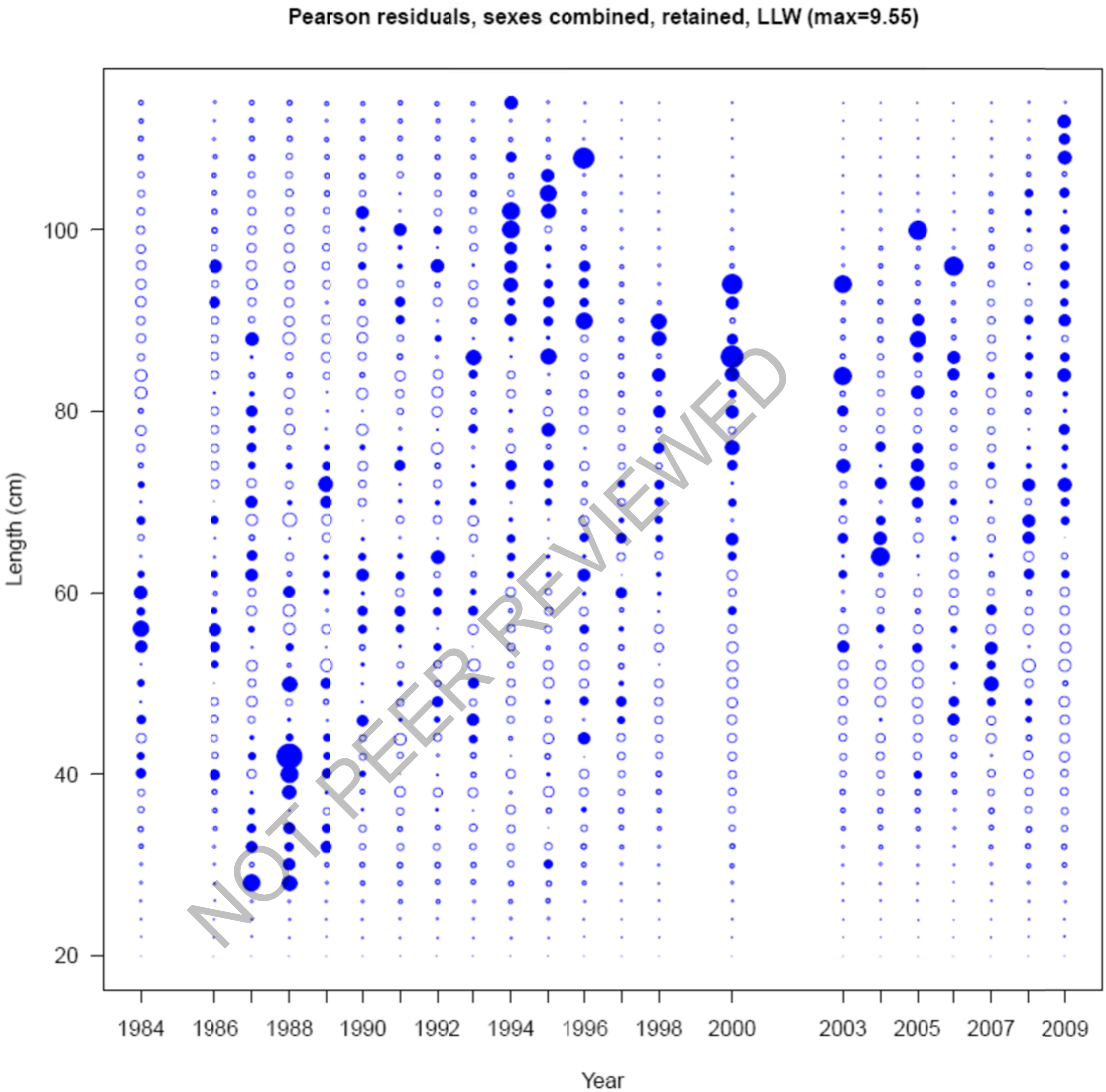


Figure 3.31. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the commercial long line west fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

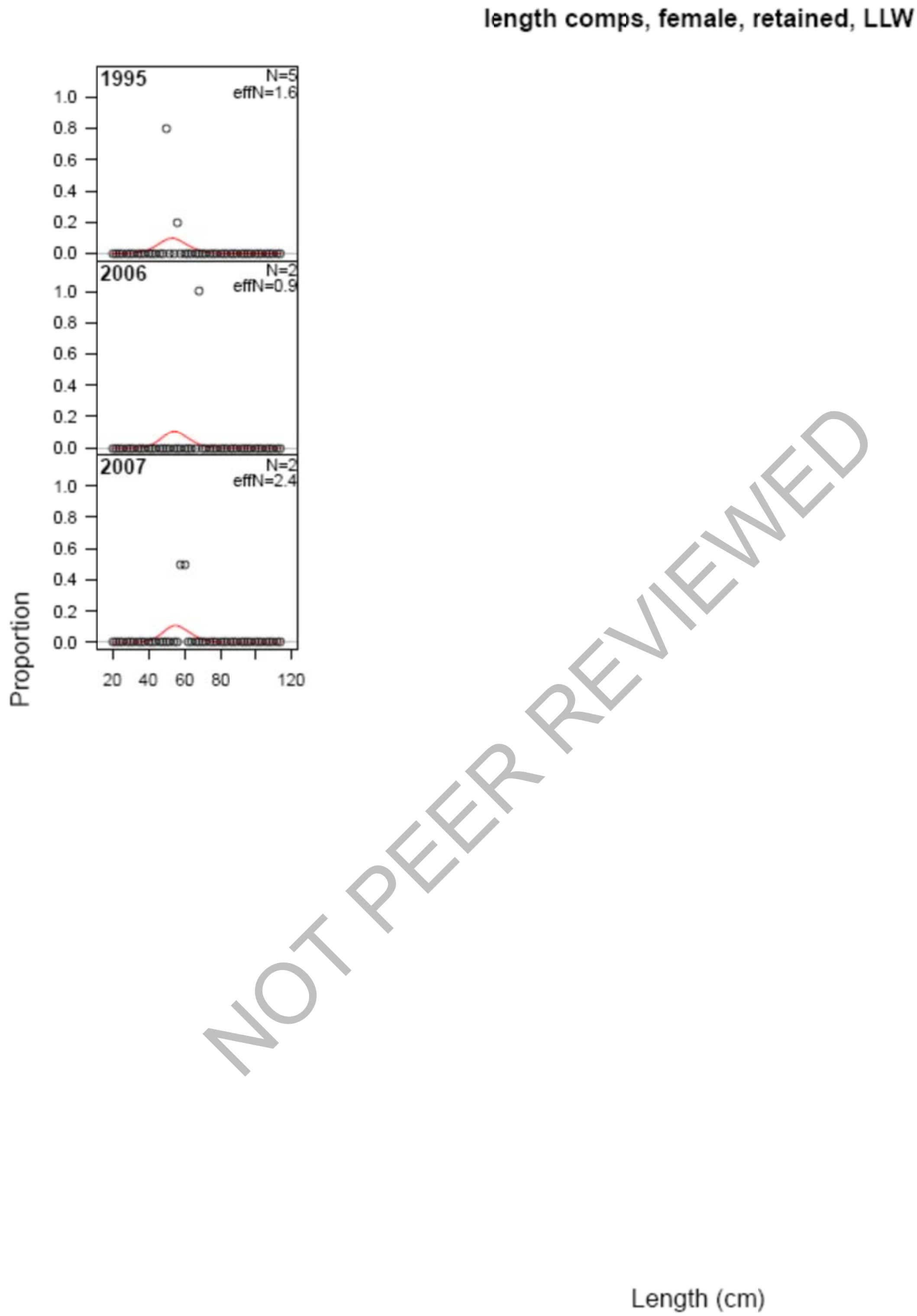


Figure 3.32. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the commercial long line west fishery. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

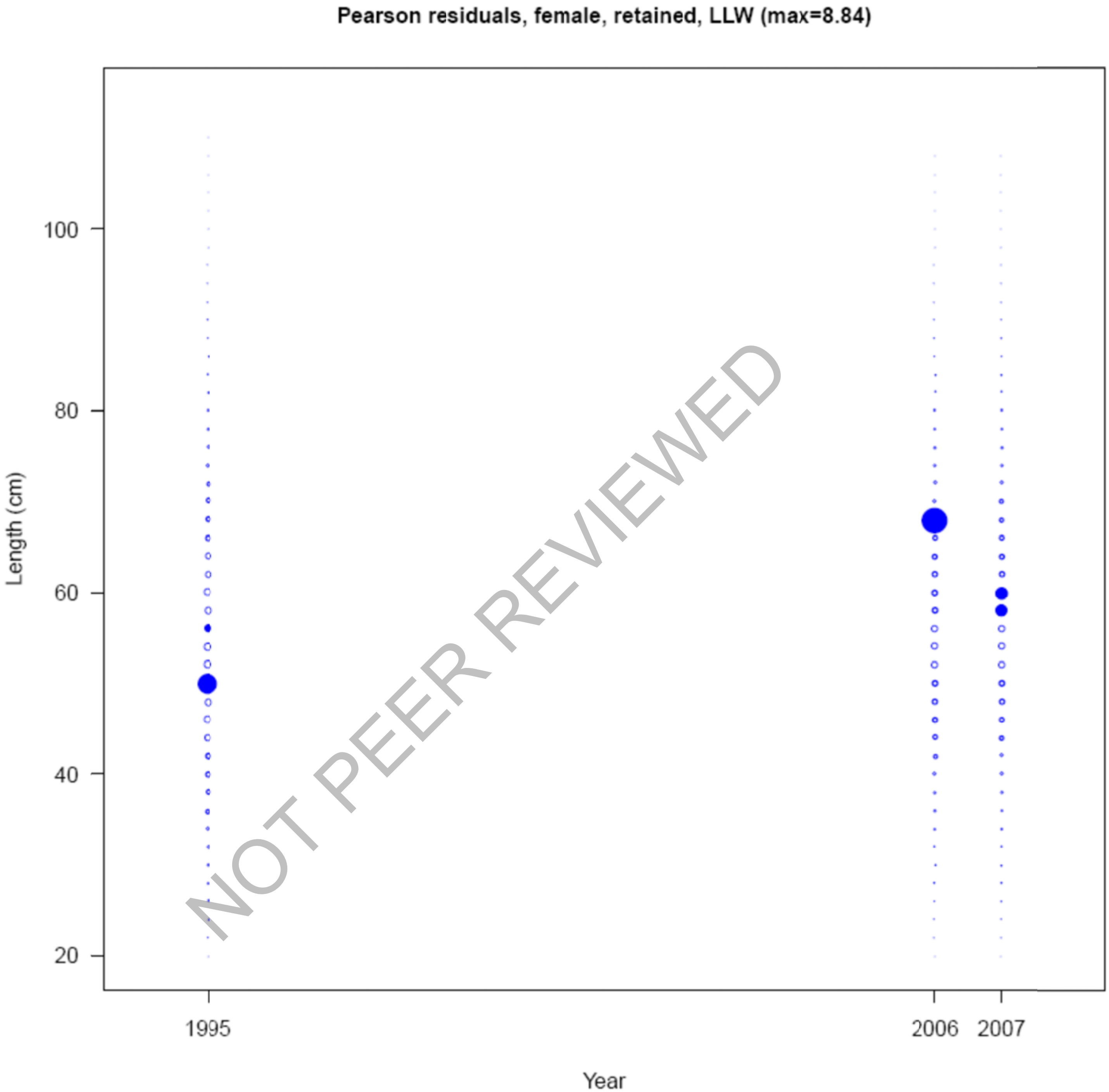


Figure 3.33. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the commercial long line west fishery. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

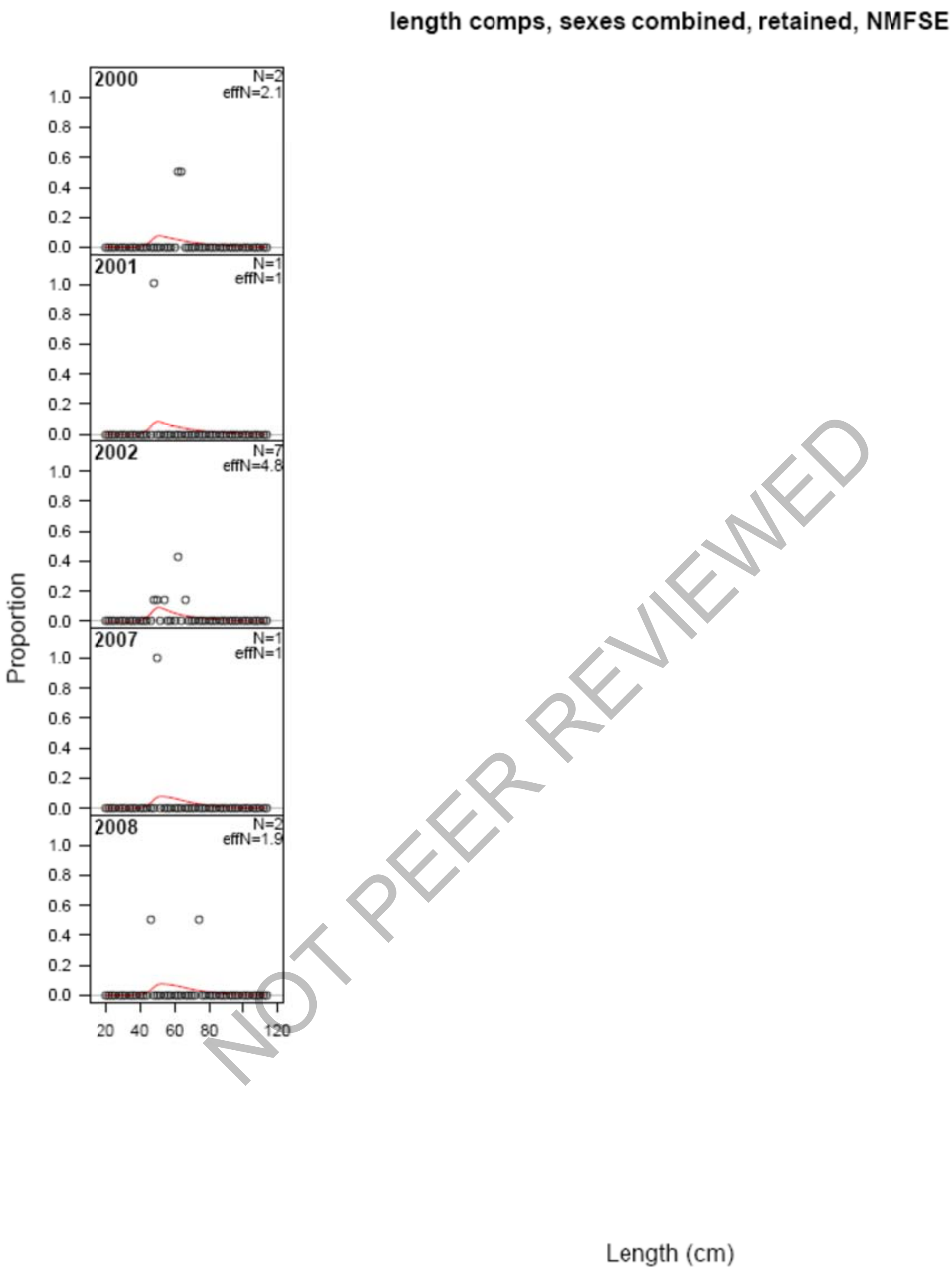


Figure 3.34. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unknown gender in the NMFS bottom long line survey east. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

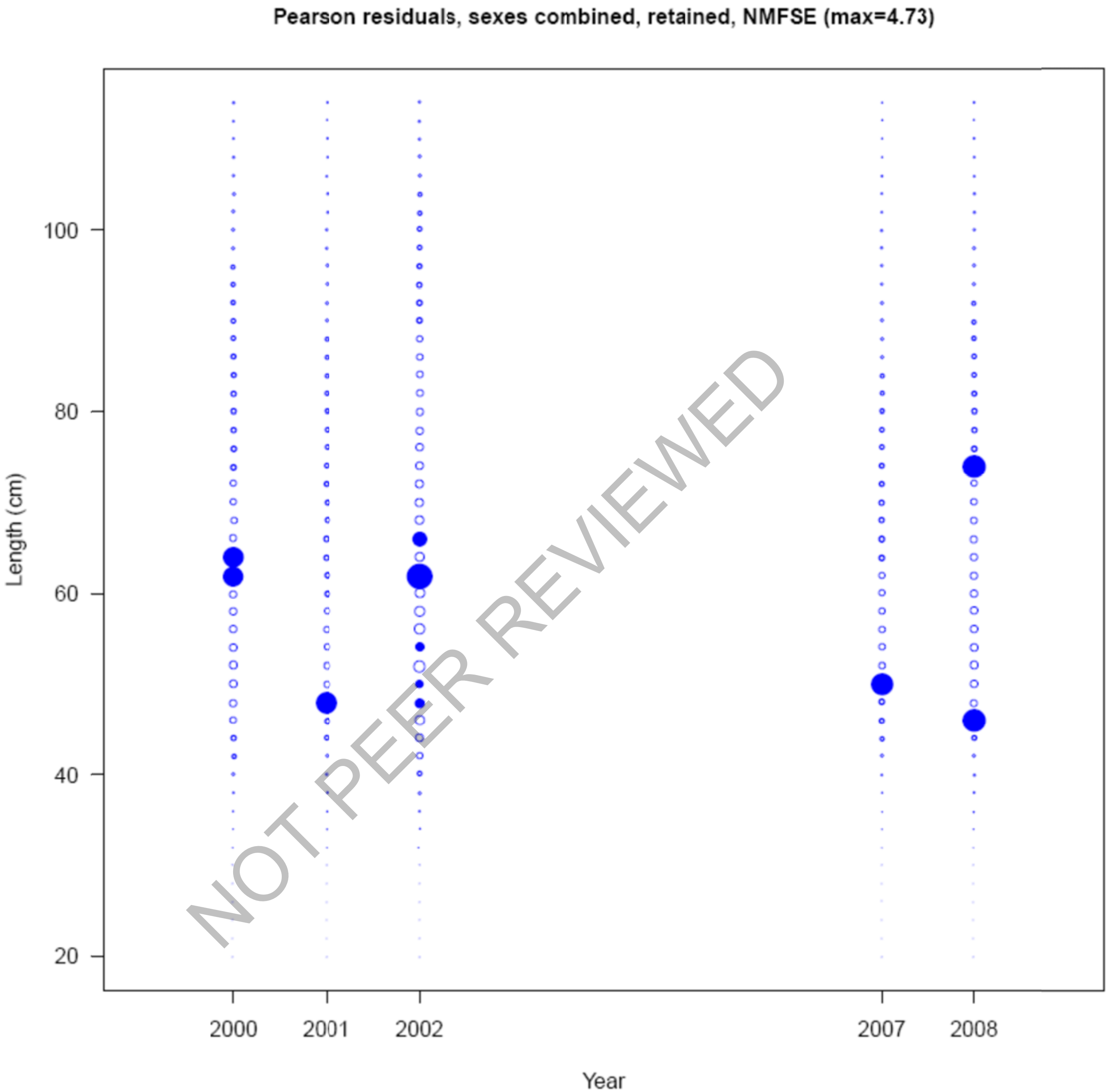


Figure 3.35. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

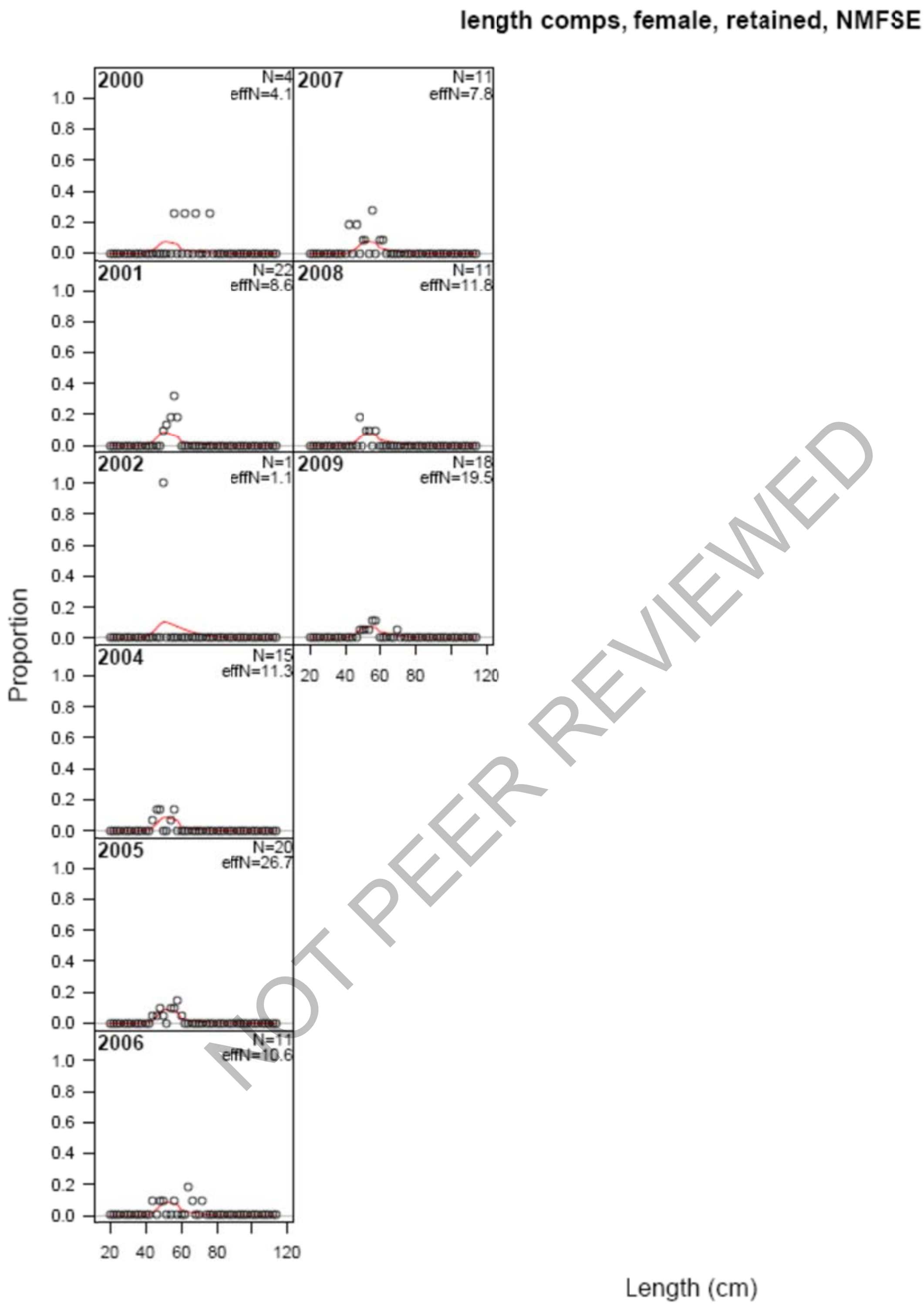


Figure 3.36. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the NMFS bottom long line survey east. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

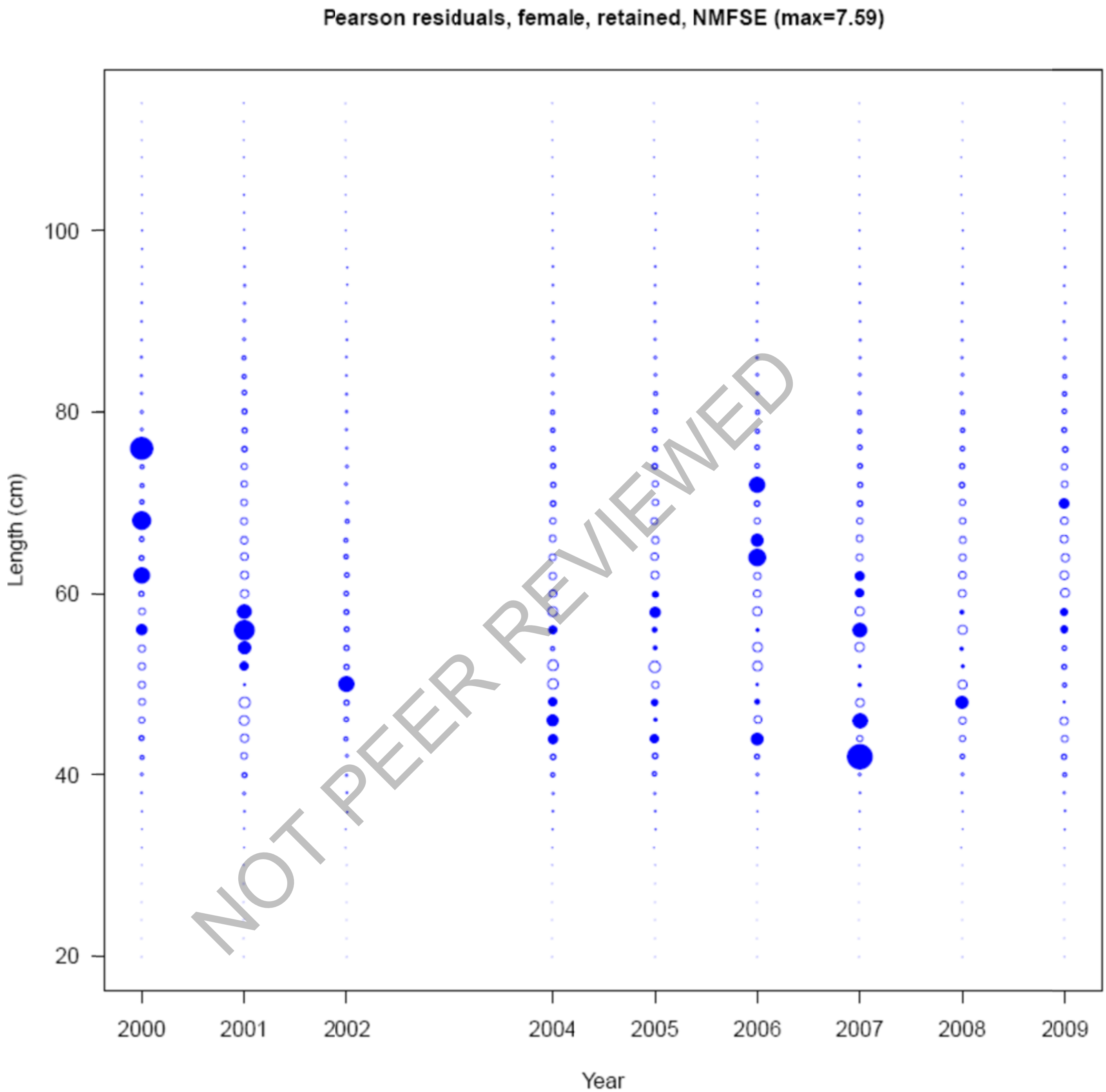


Figure 3.37. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

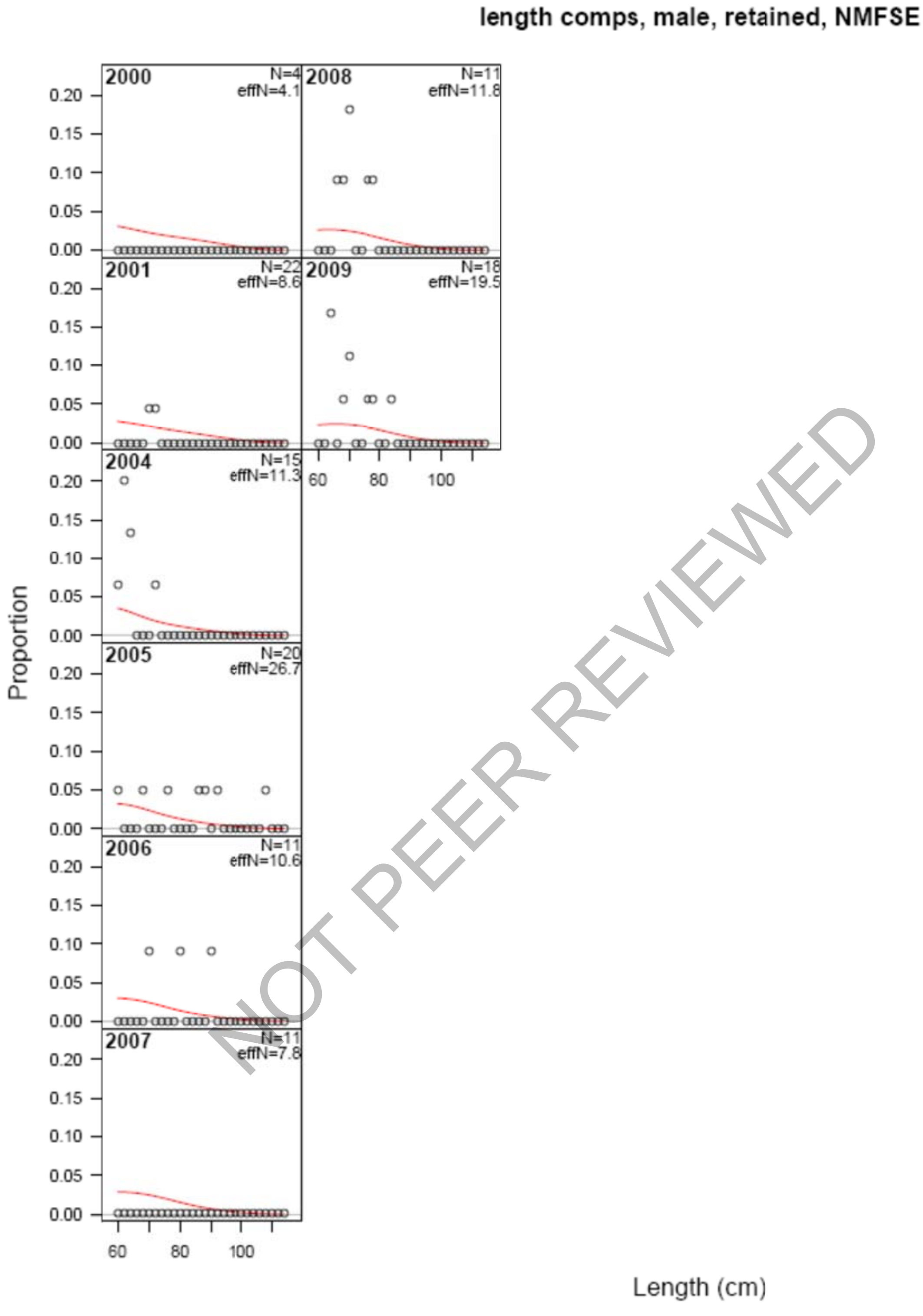


Figure 3.38. Observed (open circles) and predicted (lines) length compositions for male Gulf of Mexico tilefish in the NMFS bottom long line survey east. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

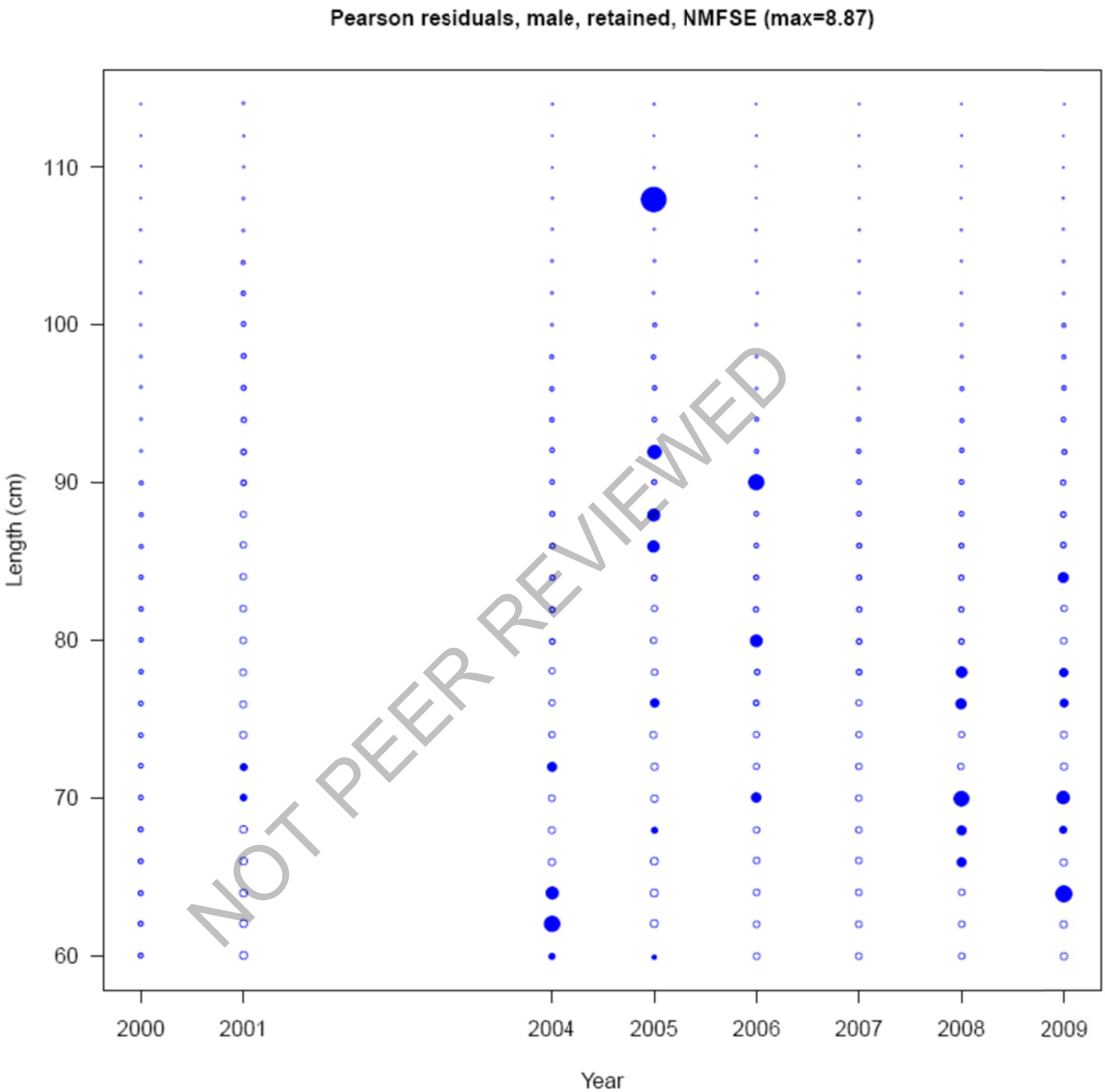


Figure 3.39. Pearson residuals of length composition fits for male Gulf of Mexico tilefish in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

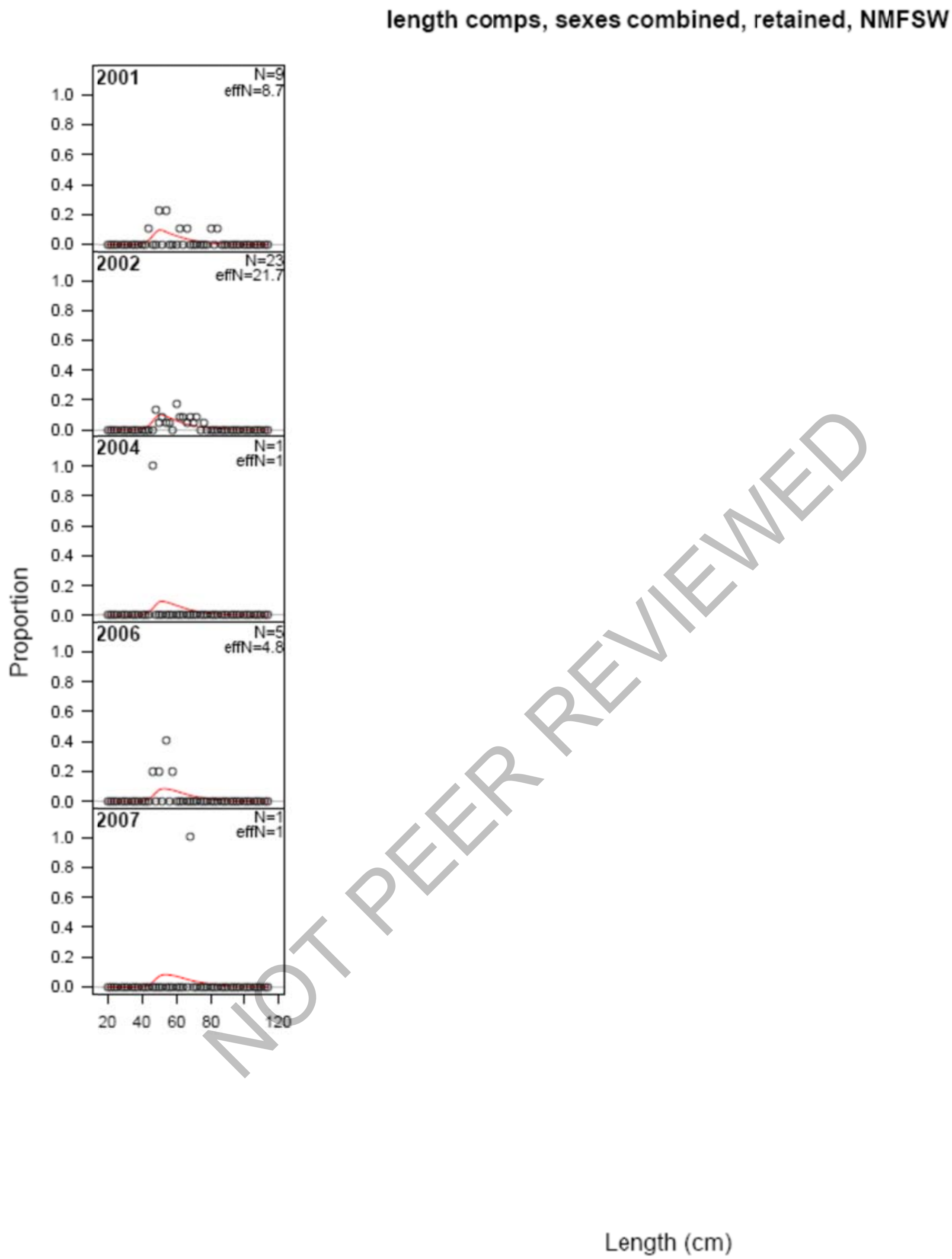


Figure 3.40. Observed (open circles) and predicted (lines) length compositions for Gulf of Mexico tilefish of unknown gender in the NMFS bottom long line survey west. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

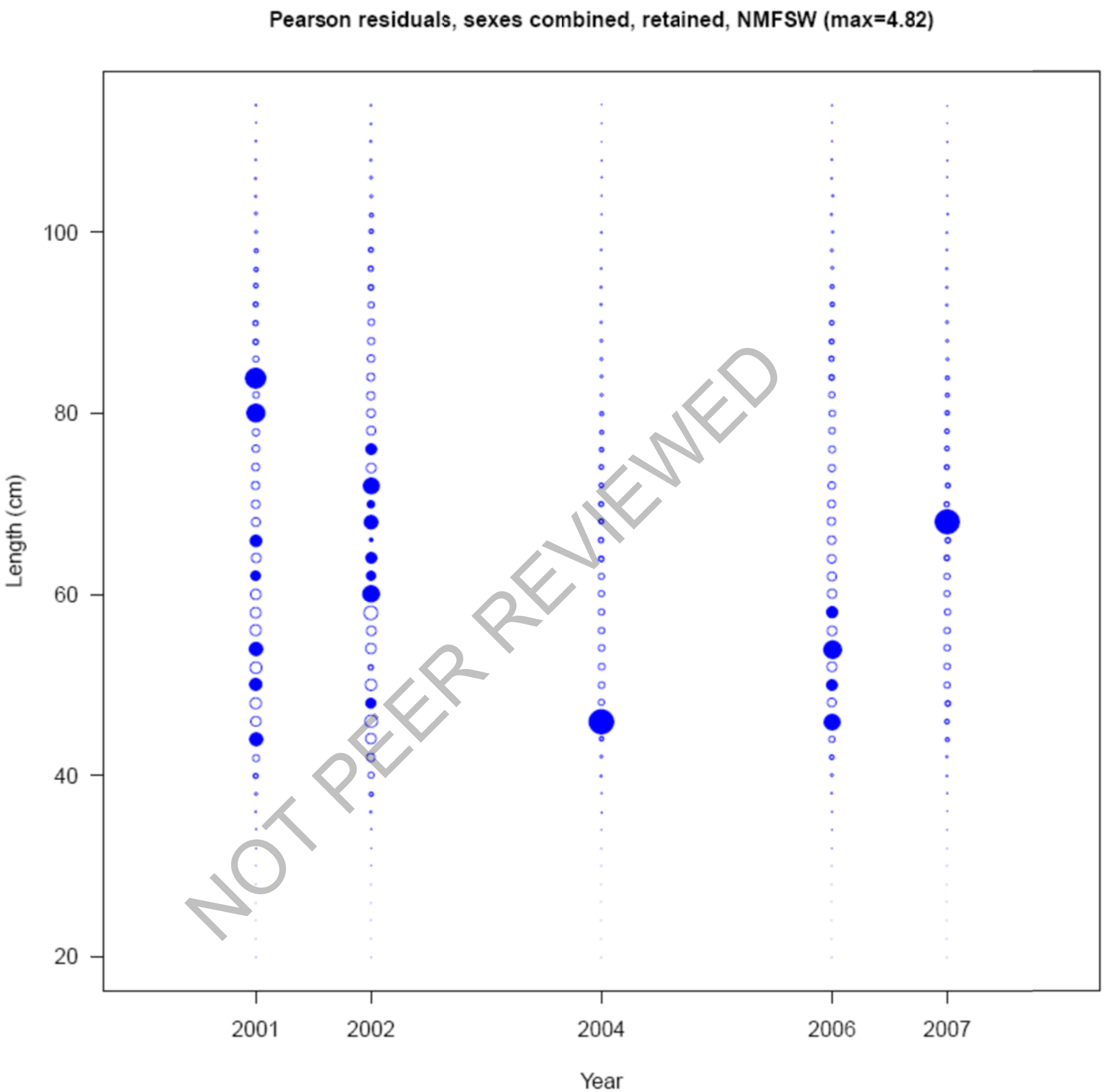


Figure 3.41. Pearson residuals of length composition fits for Gulf of Mexico tilefish of unknown gender in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

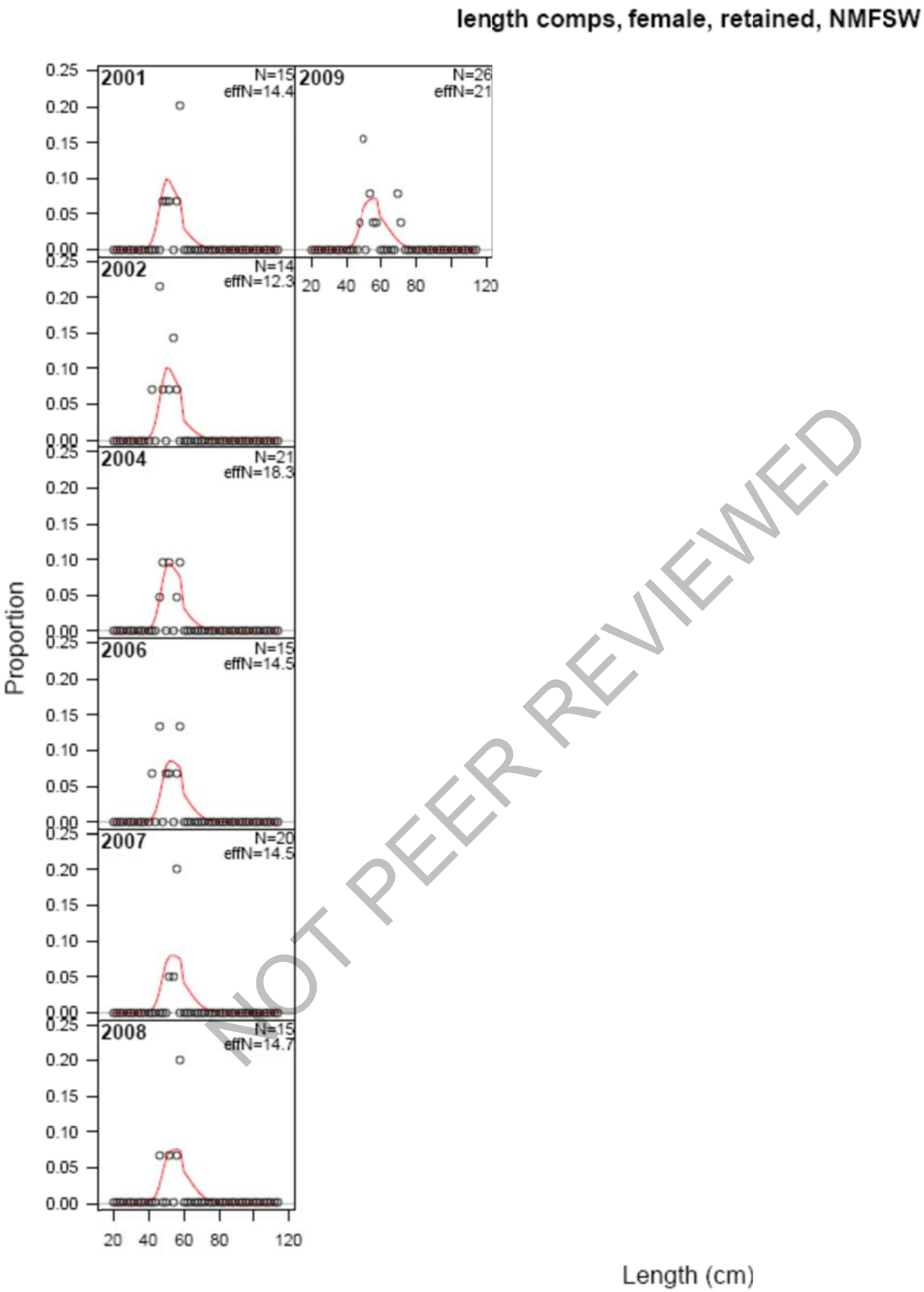


Figure 3.42. Observed (open circles) and predicted (lines) length compositions for female Gulf of Mexico tilefish in the NMFS bottom long line survey west. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

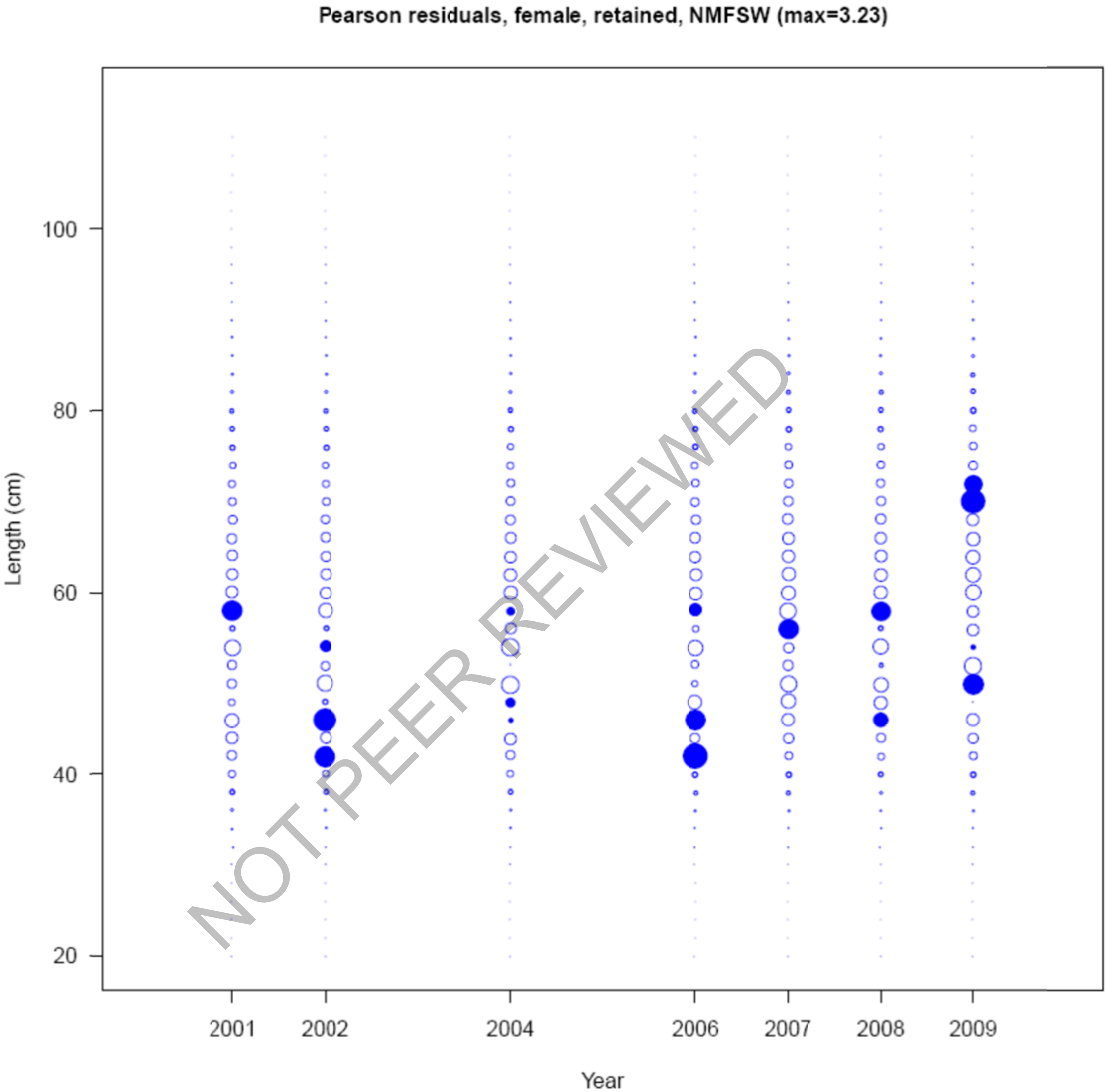


Figure 3.43. Pearson residuals of length composition fits for female Gulf of Mexico tilefish in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

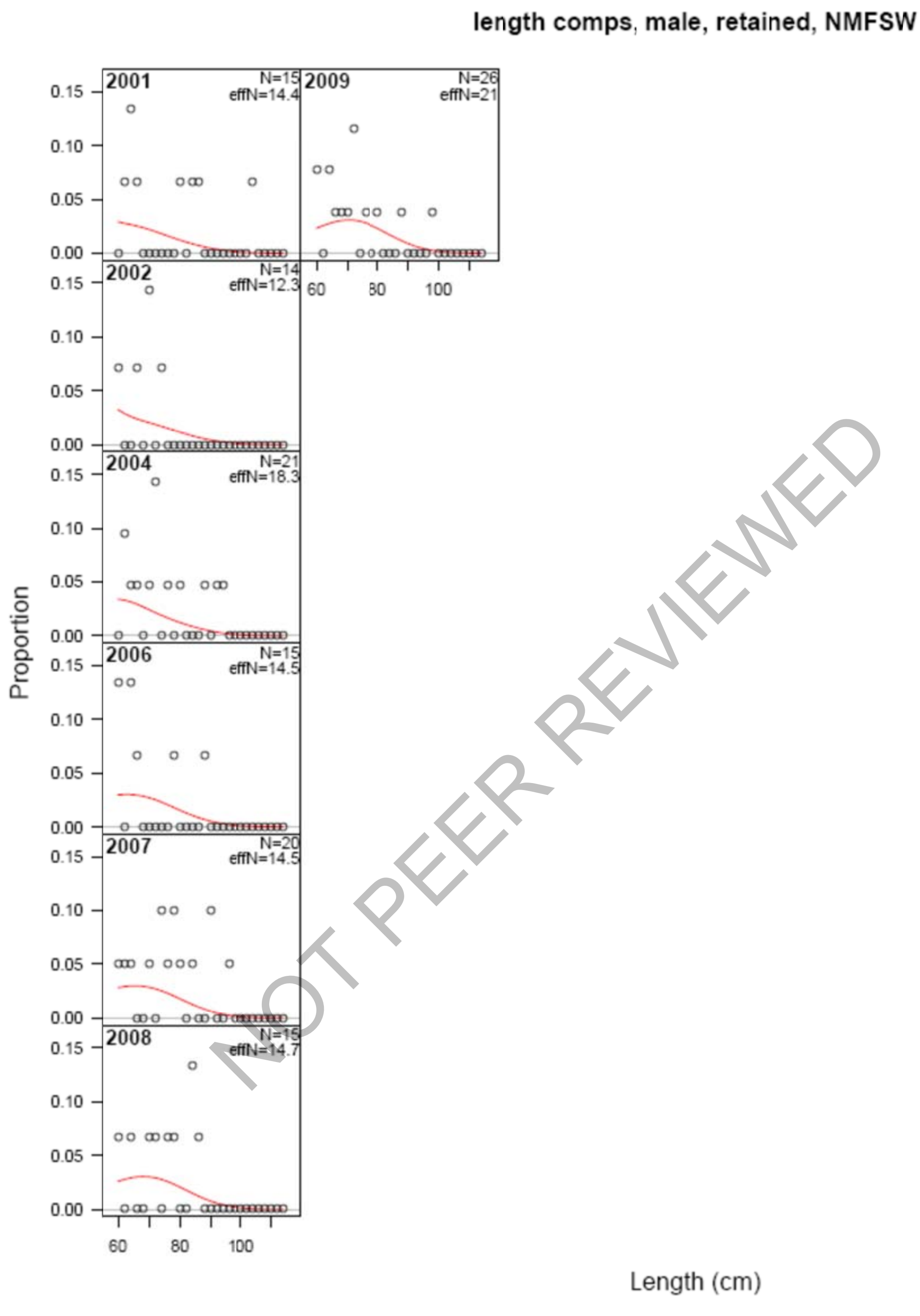


Figure 3.44. Observed (open circles) and predicted (lines) length compositions for male Gulf of Mexico tilefish in the NMFS bottom long line survey west. Observed (N) sample sizes and effective sample sizes (effN) estimated by SS are also reported. Observed sample sizes were capped at a maximum of 200 fish.

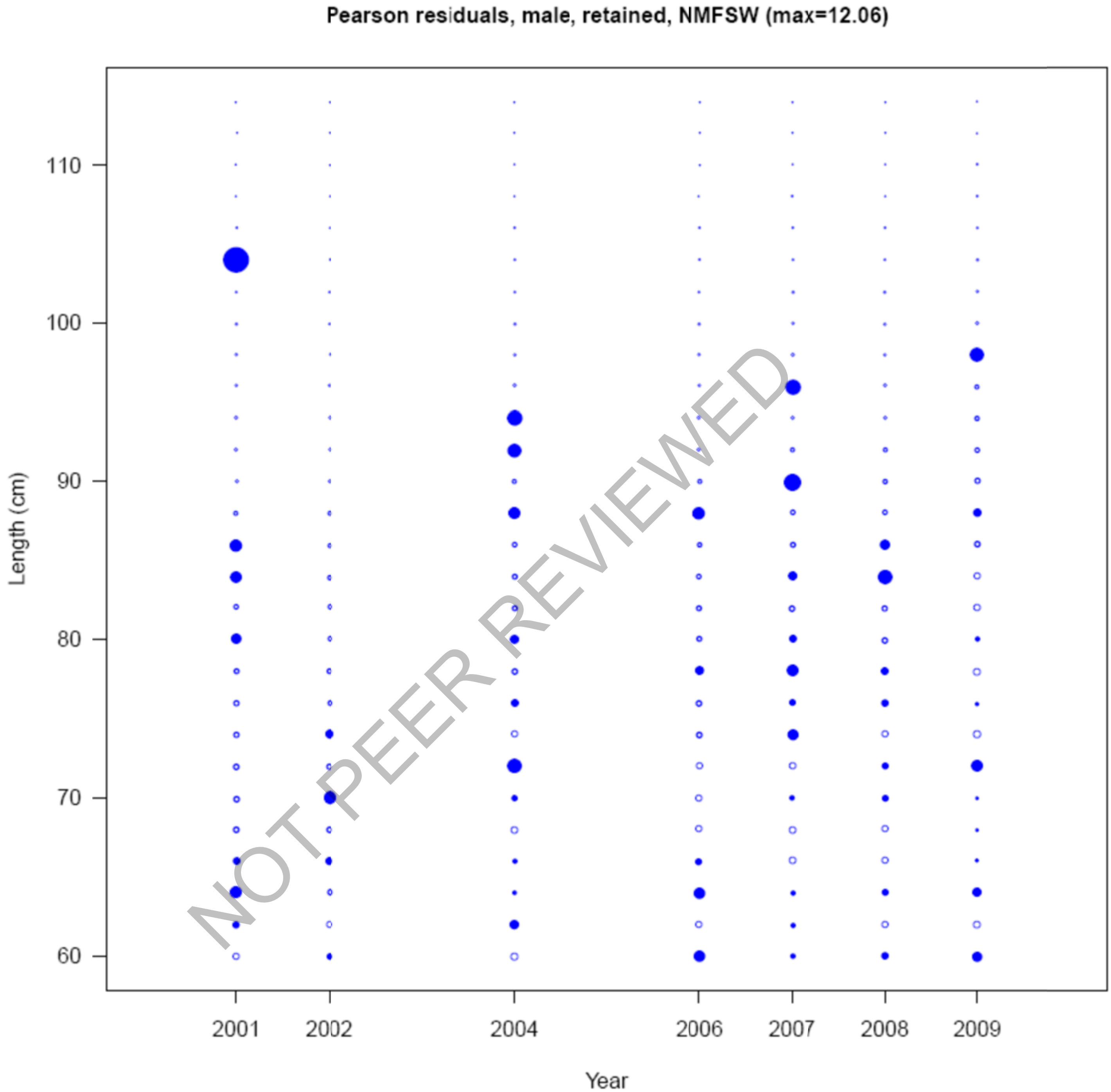


Figure 3.45. Pearson residuals of length composition fits for male Gulf of Mexico tilefish in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

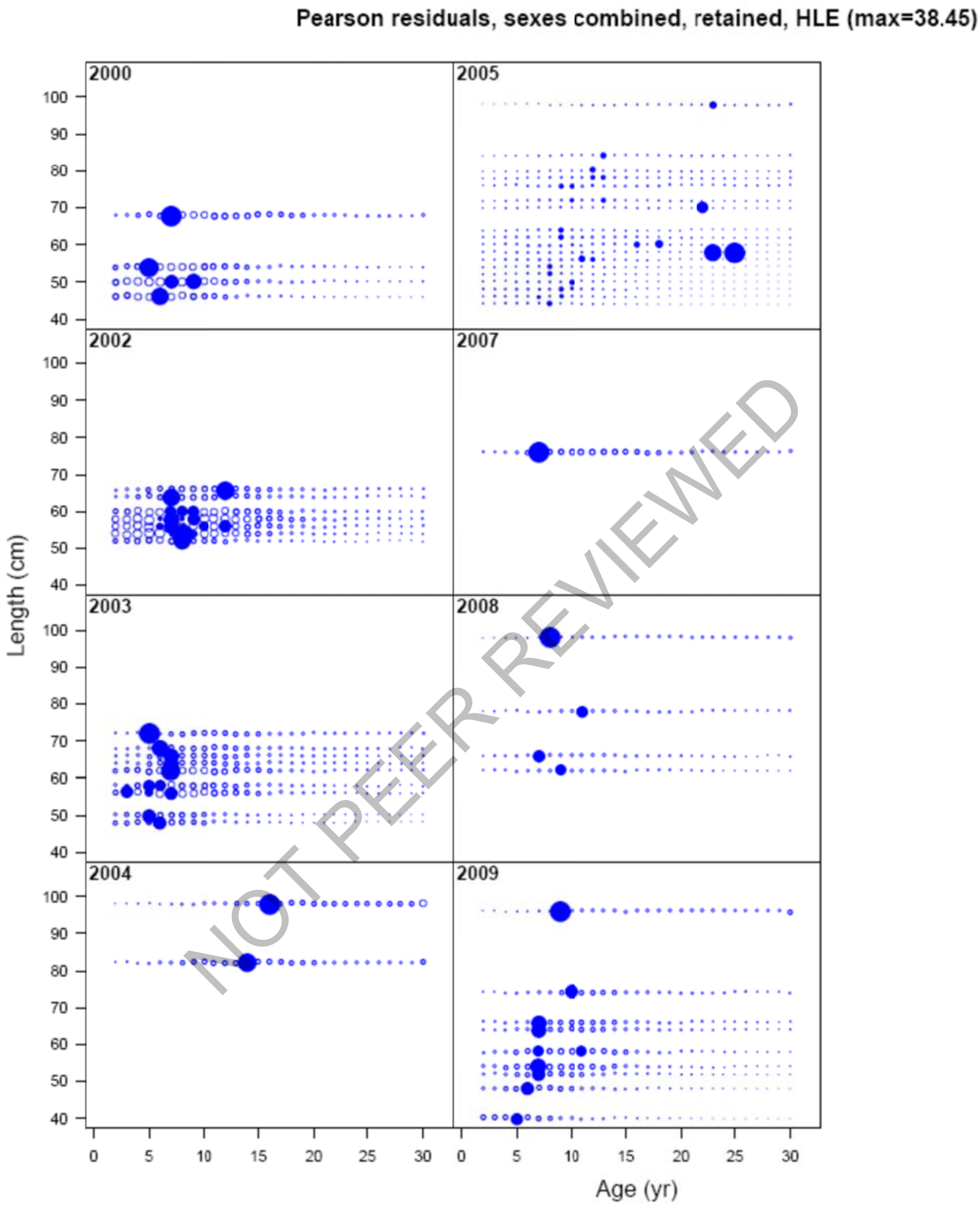


Figure 3.46. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the commercial hand line fishery east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

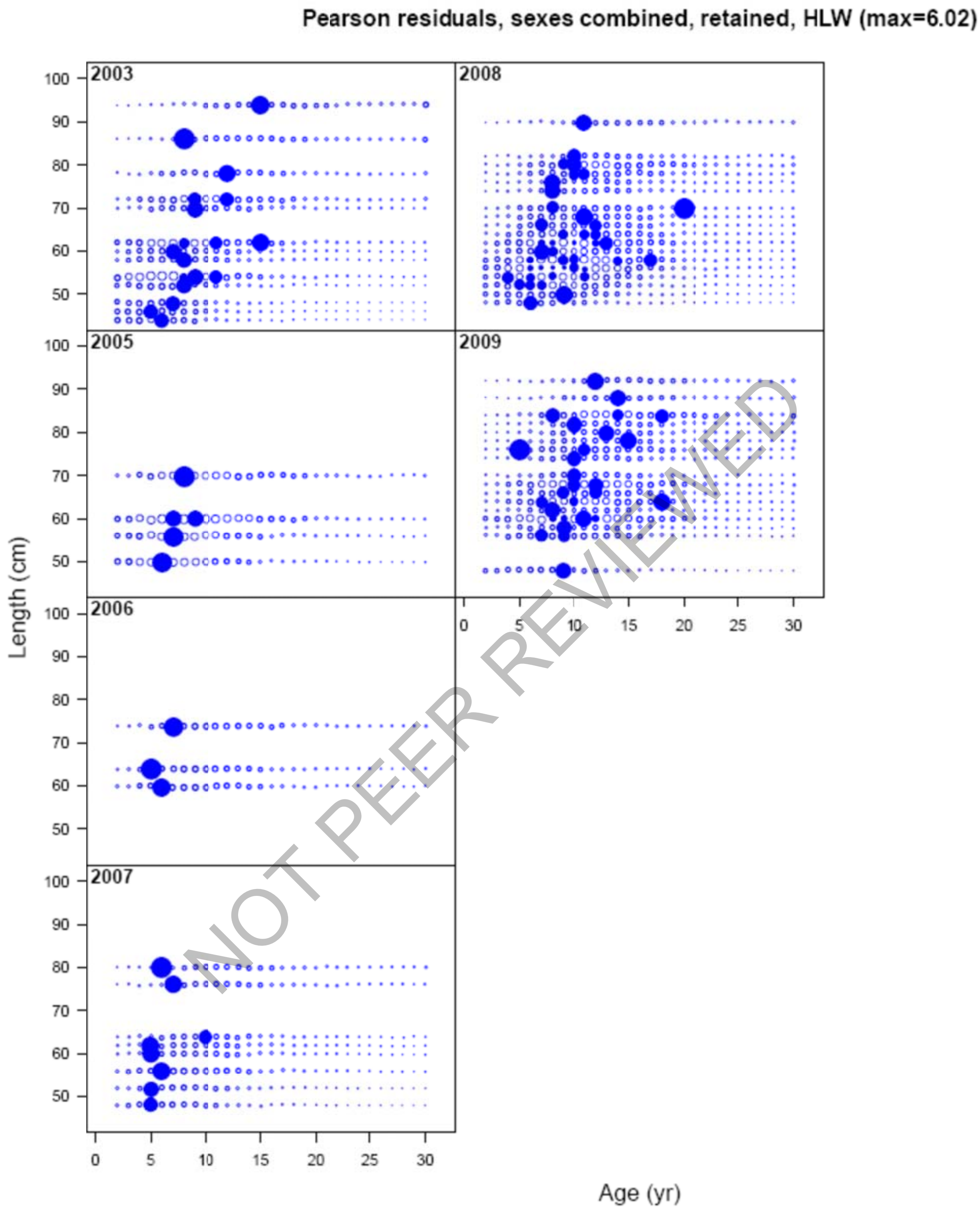


Figure 3.47. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the commercial hand line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

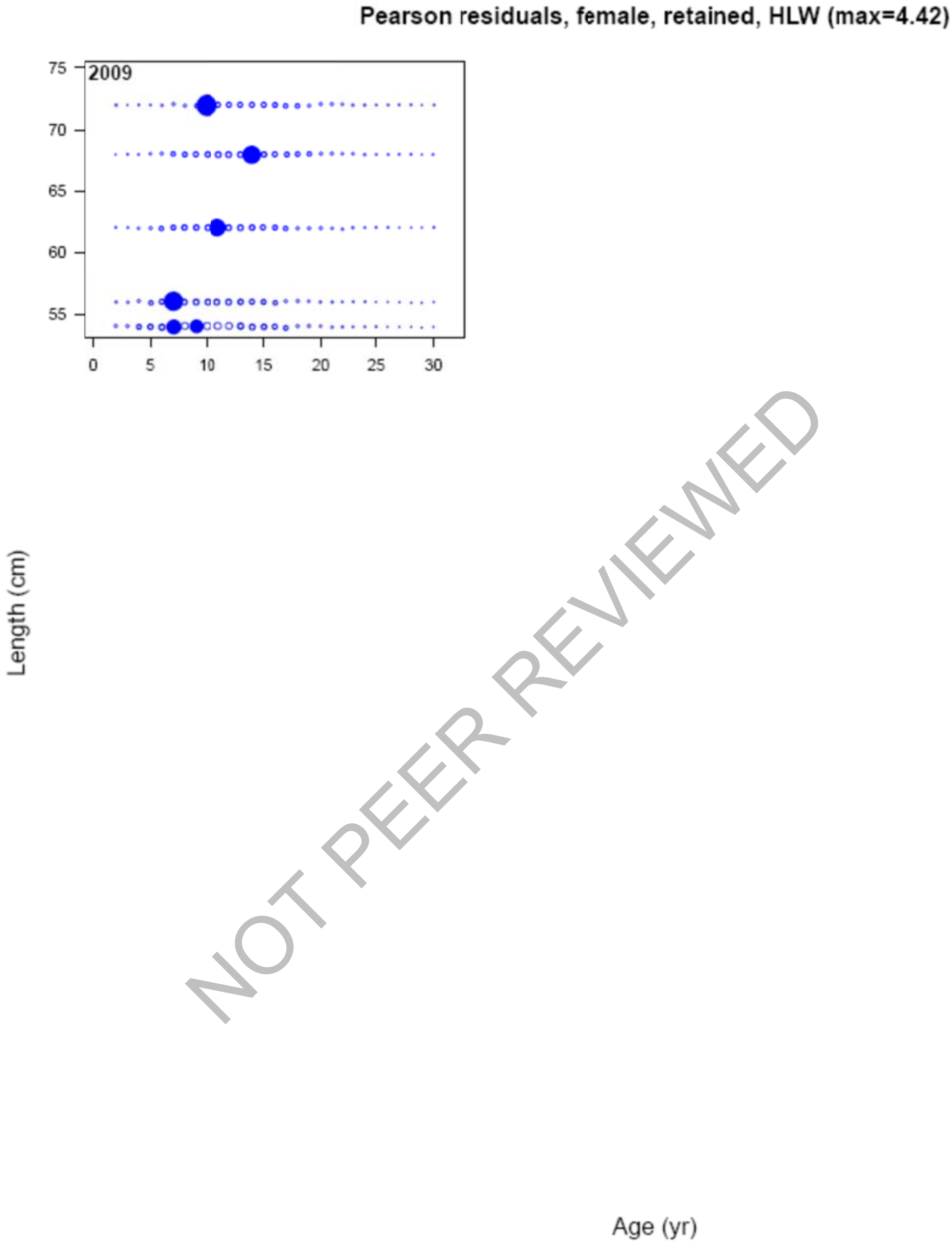


Figure 3.48. Pearson residuals of conditional age composition fits for female Gulf of Mexico tilefish in the commercial hand line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

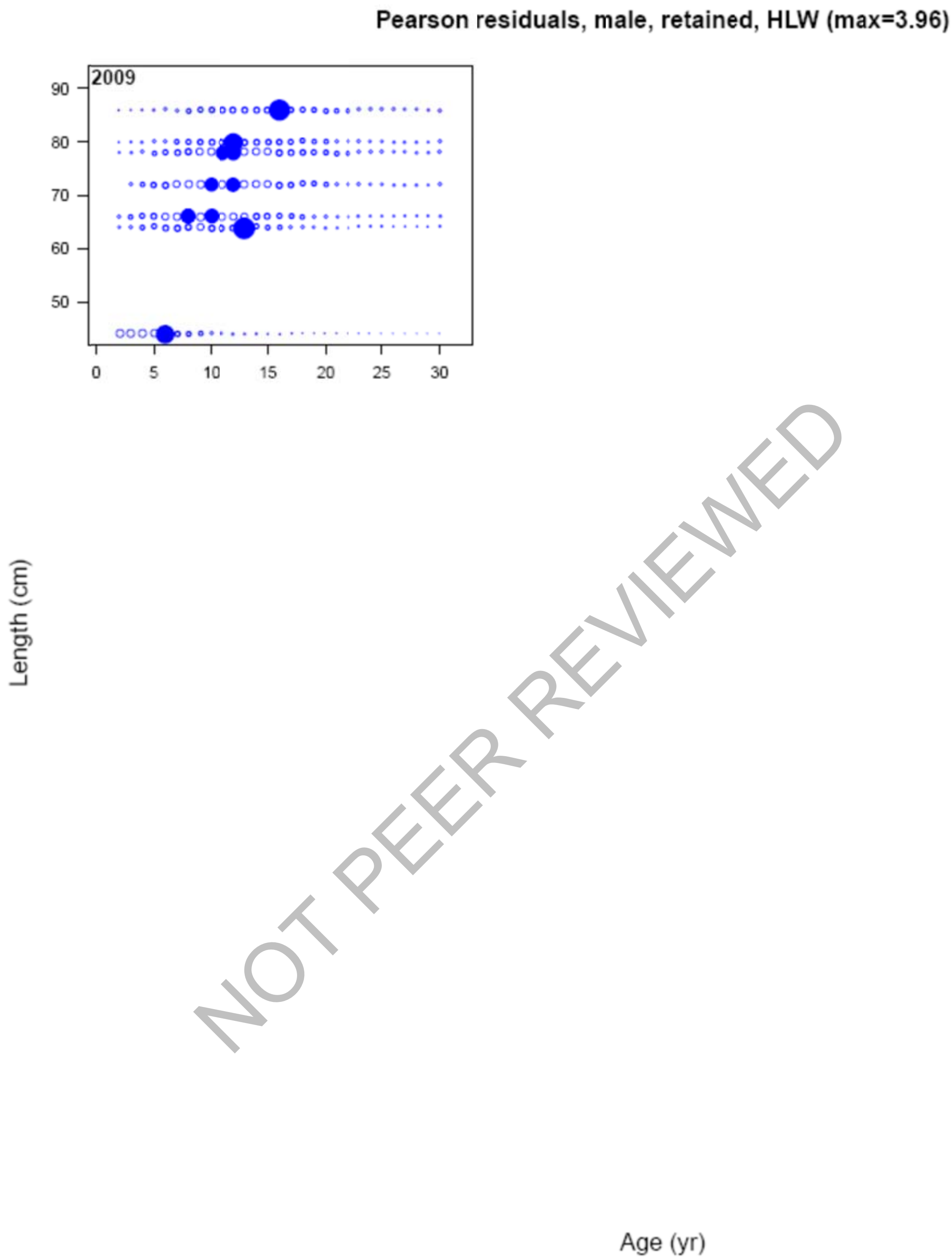


Figure 3.49. Pearson residuals of conditional age composition fits for male Gulf of Mexico tilefish in the commercial hand line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

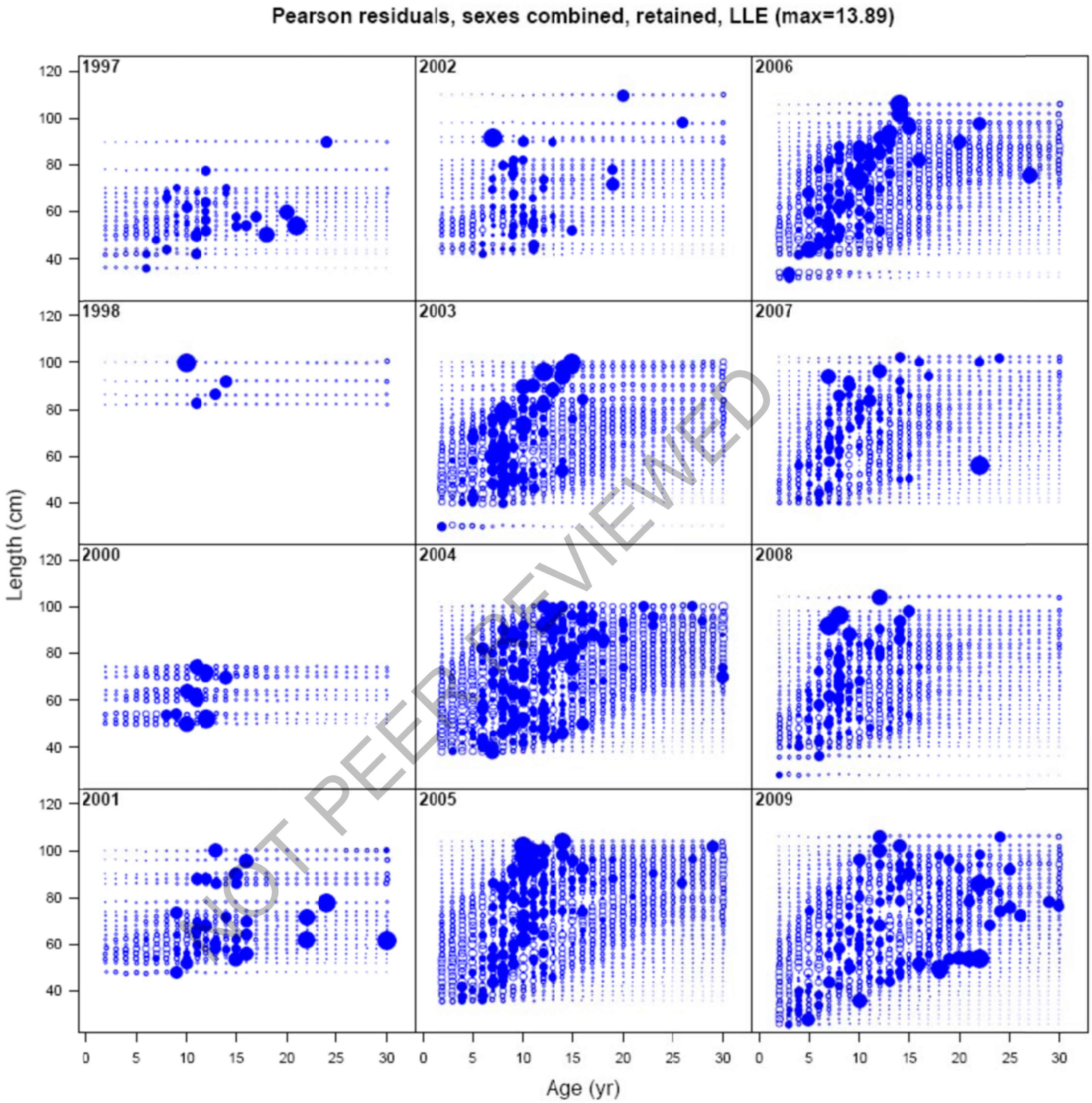


Figure 3.50. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the commercial long line fishery east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

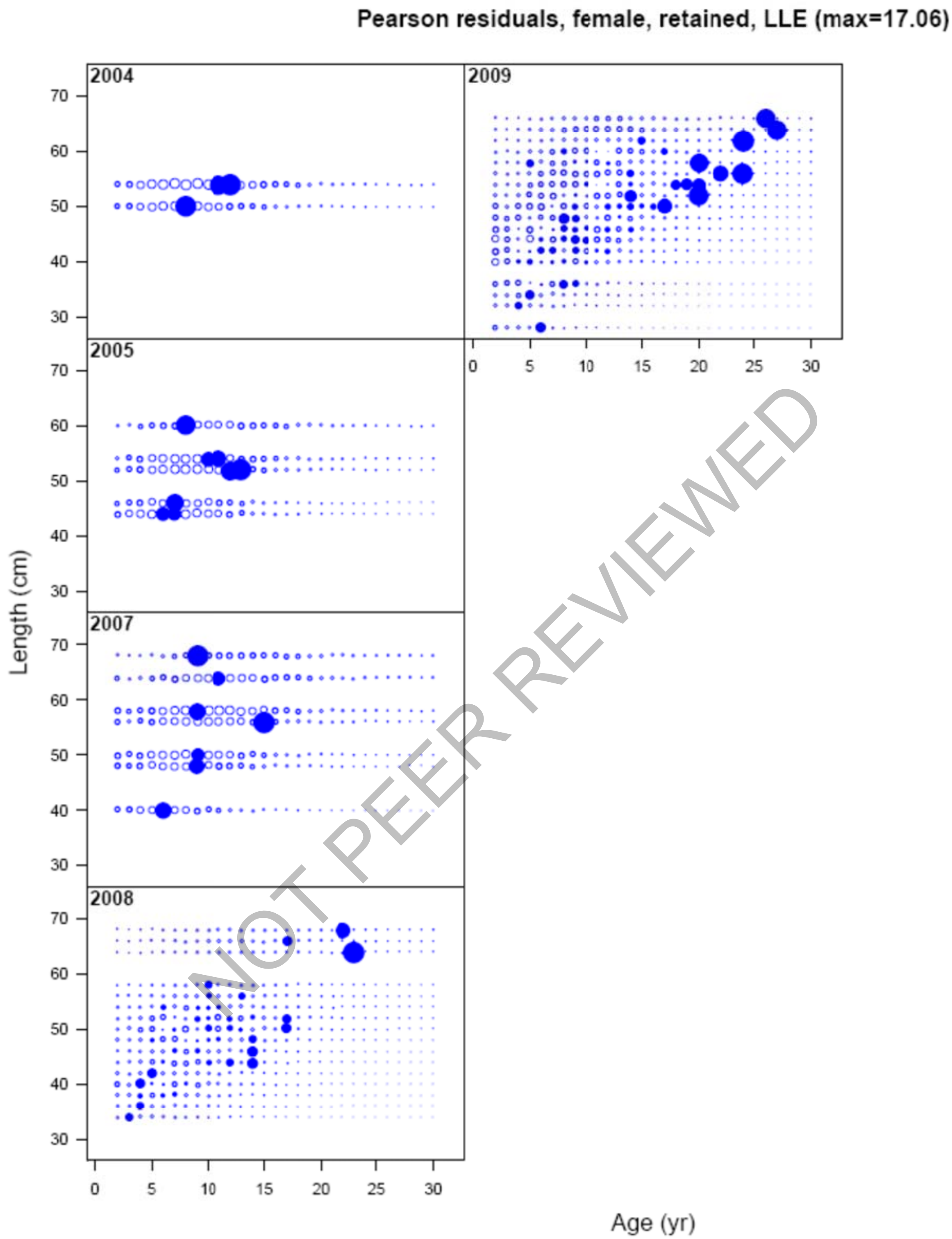


Figure 3.51. Pearson residuals of conditional age composition fits for female Gulf of Mexico tilefish in the commercial long line fishery east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

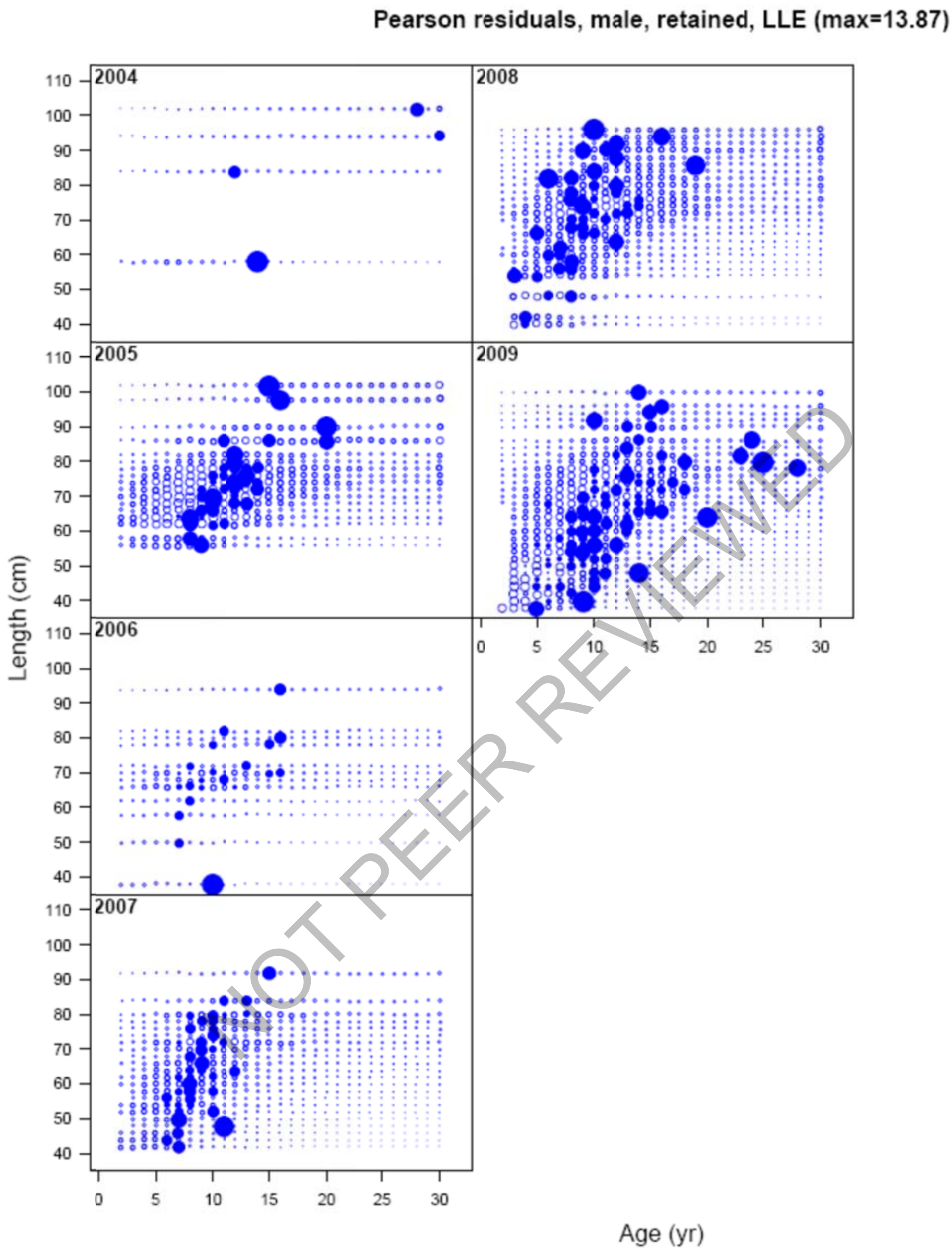


Figure 3.52. Pearson residuals of conditional age composition fits for male Gulf of Mexico tilefish in the commercial long line fishery east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

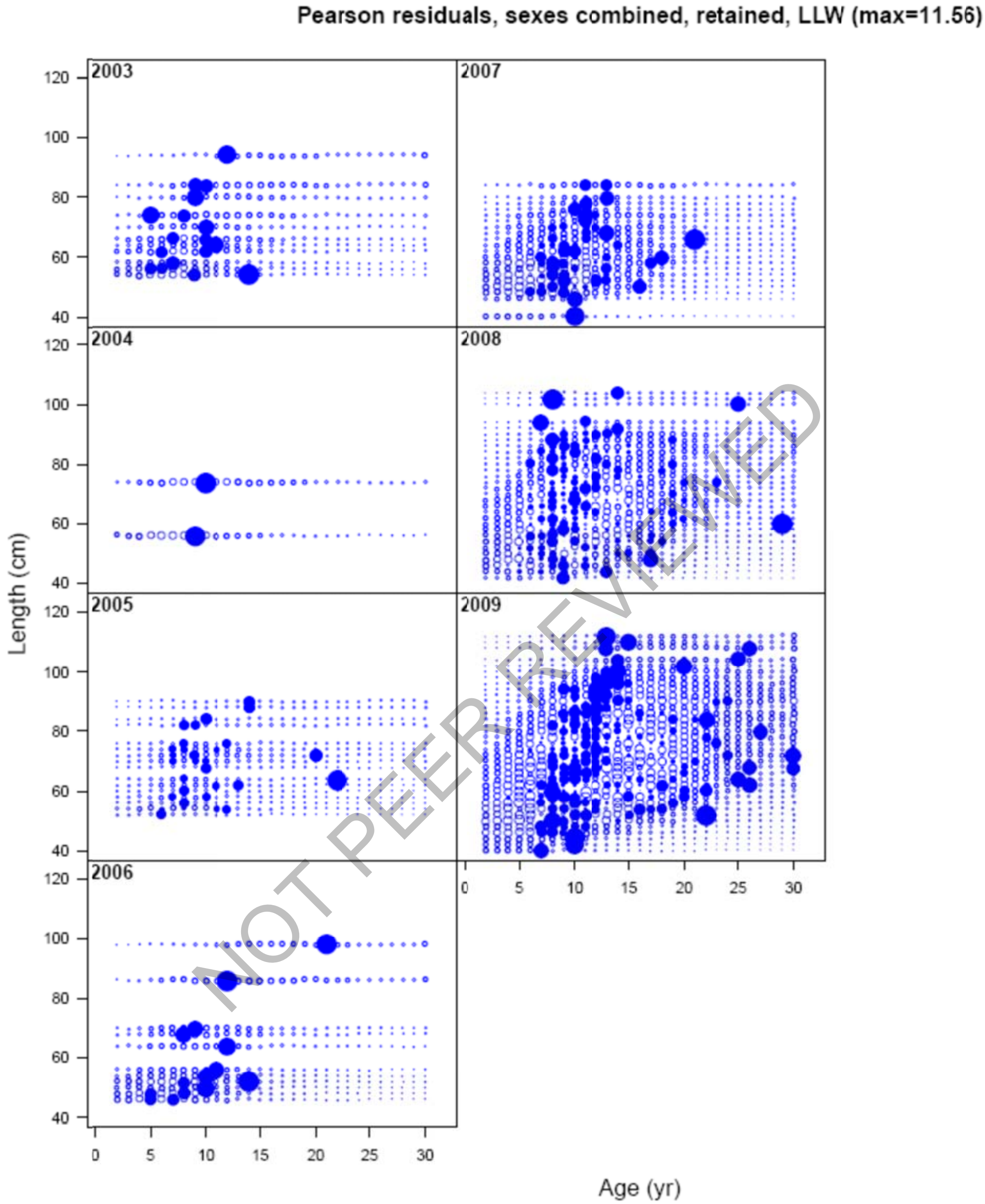


Figure 3.53. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the commercial long line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

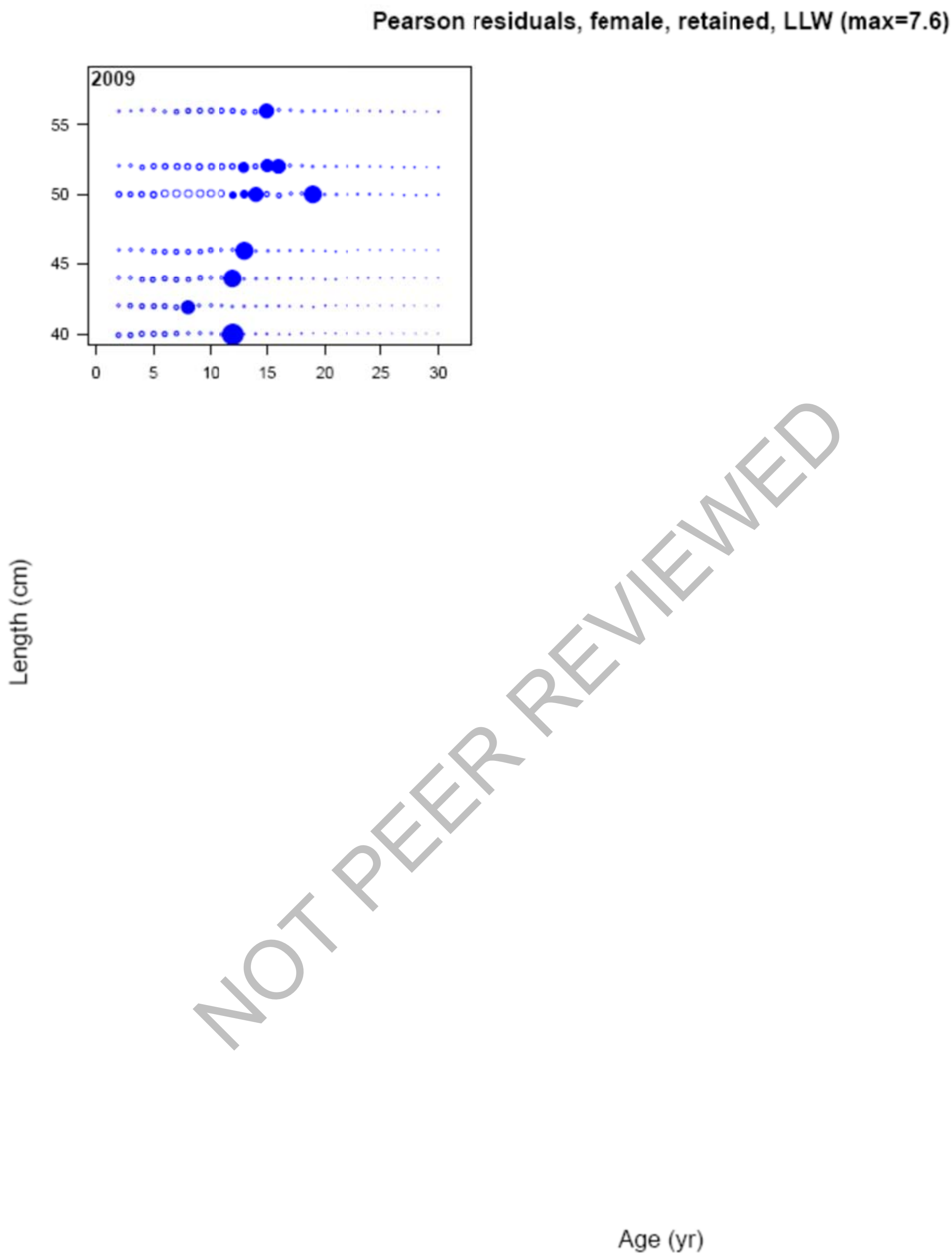


Figure 3.54. Pearson residuals of conditional age composition fits for female Gulf of Mexico tilefish in the commercial long line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

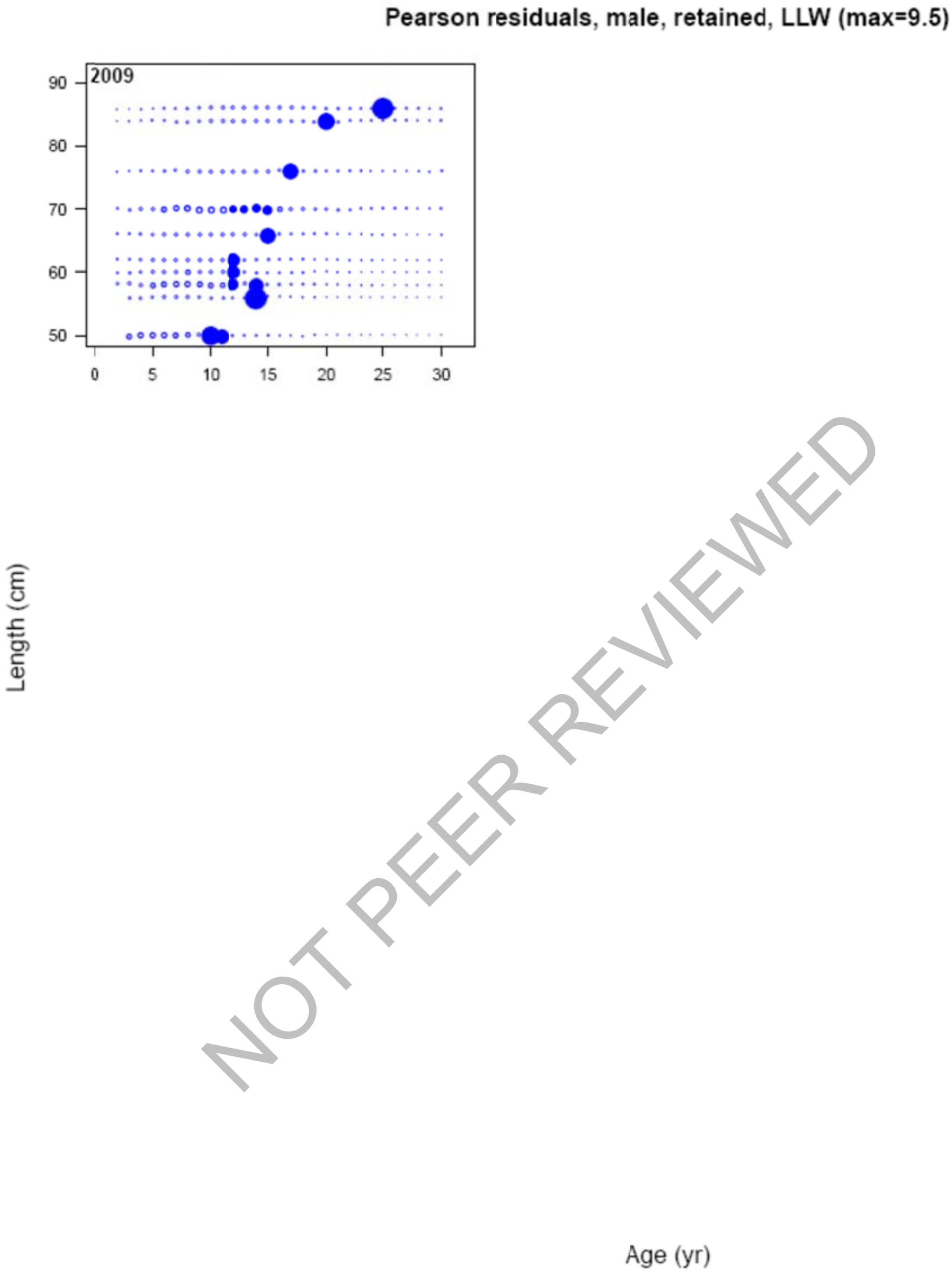


Figure 3.55. Pearson residuals of conditional age composition fits for male Gulf of Mexico tilefish in the commercial long line fishery west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

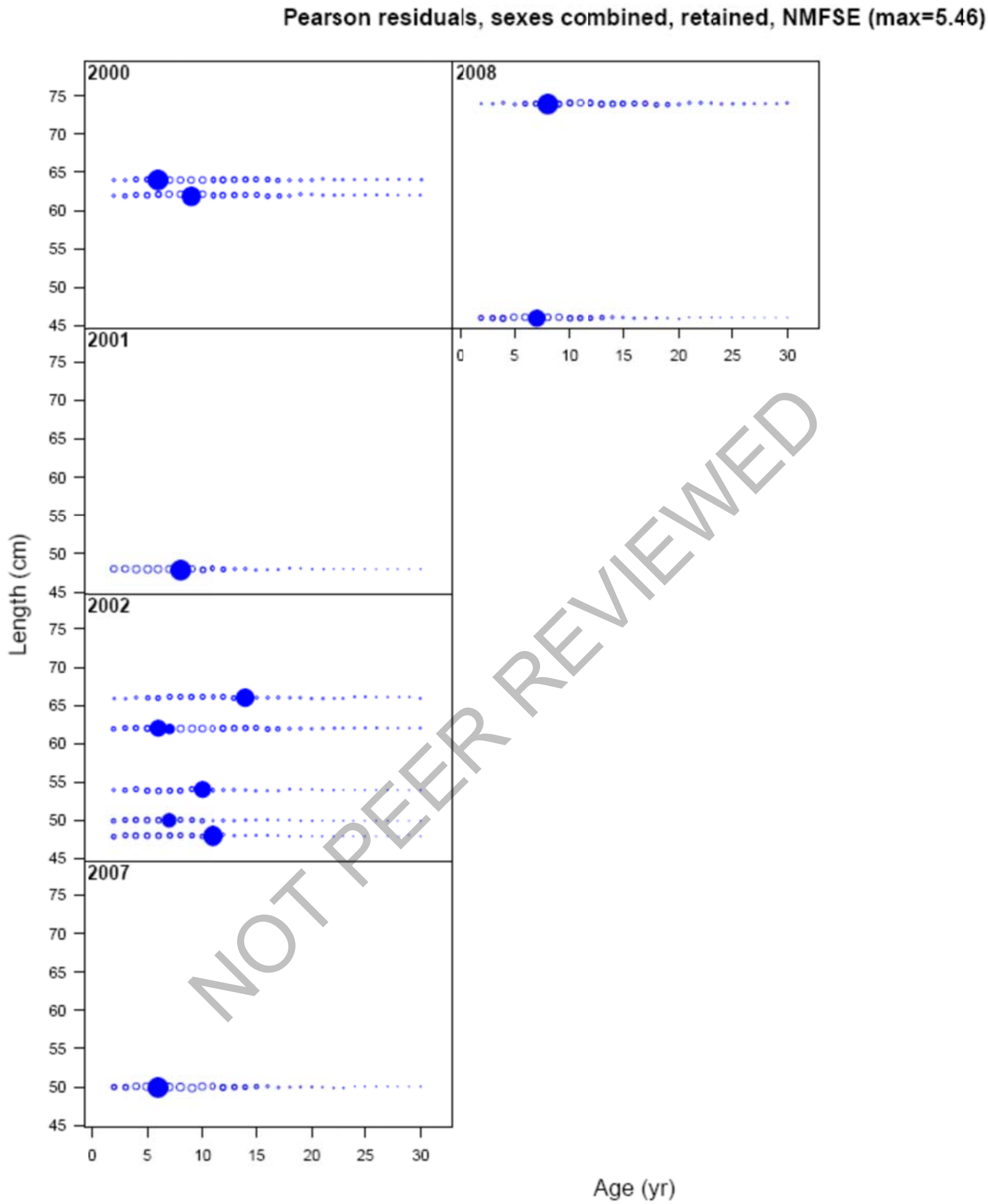


Figure 3.56. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

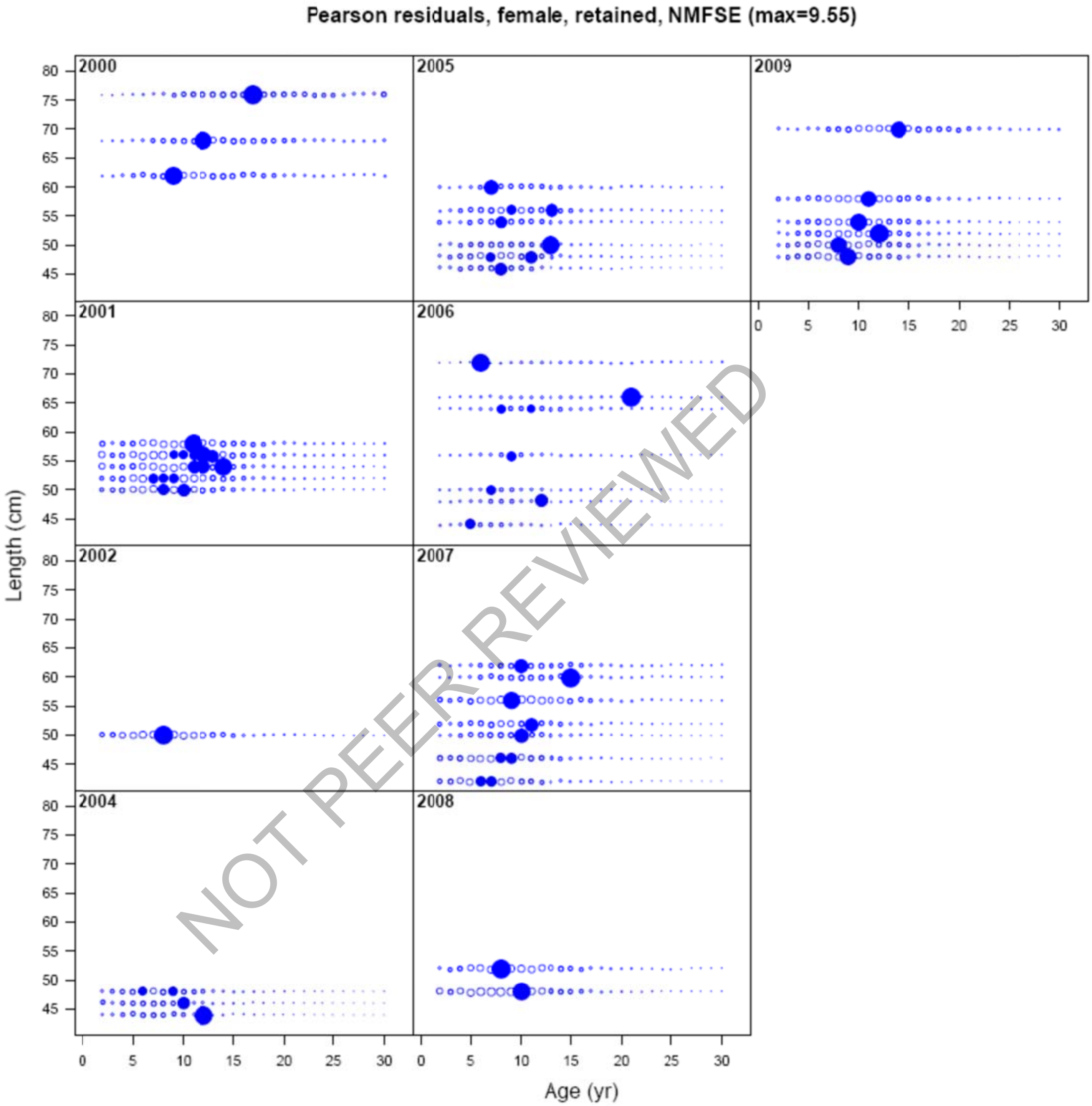


Figure 3.57. Pearson residuals of conditional age composition fits for female Gulf of Mexico tilefish in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

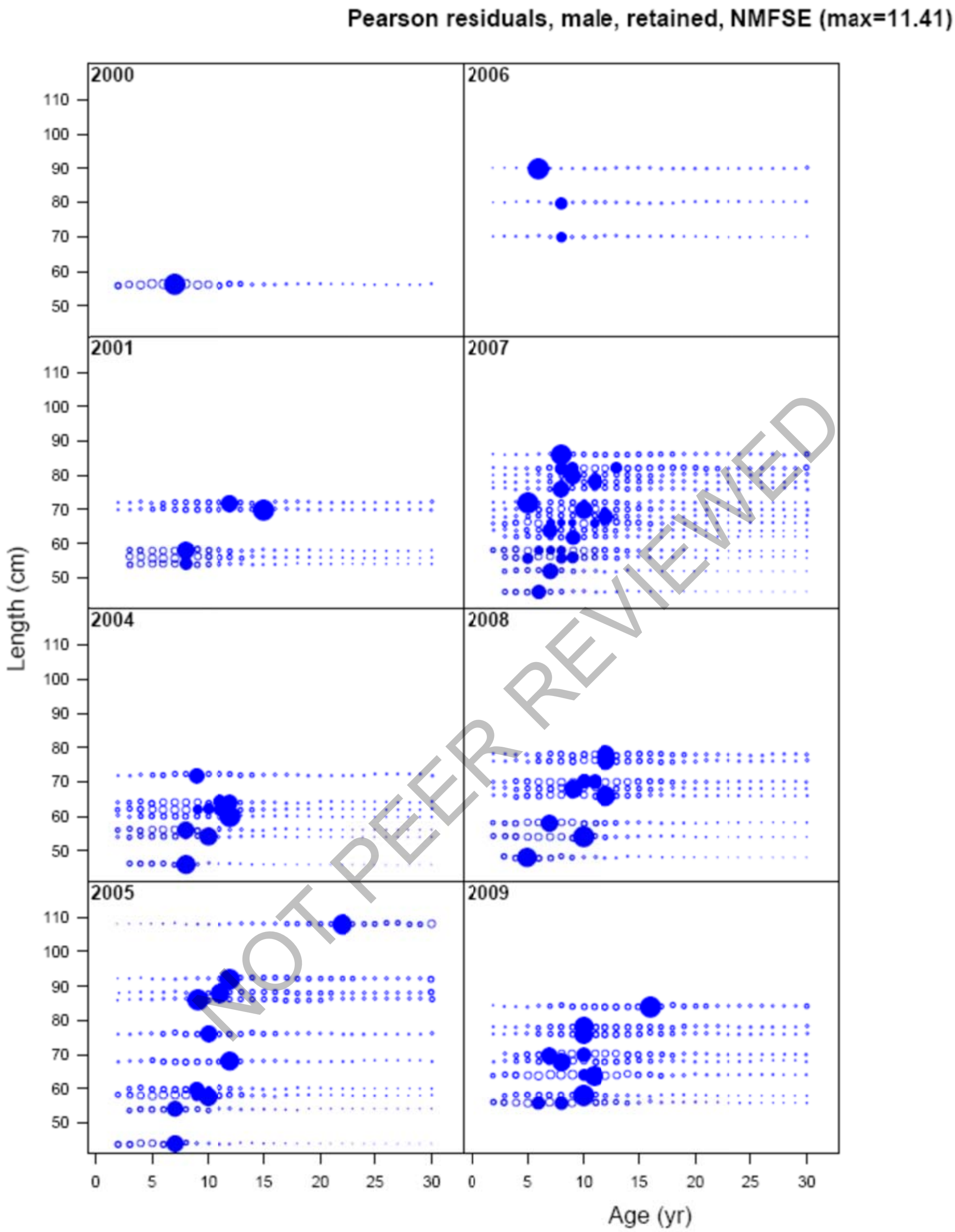


Figure 3.58. Pearson residuals of conditional age composition fits for male Gulf of Mexico tilefish in the NMFS bottom long line survey east. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

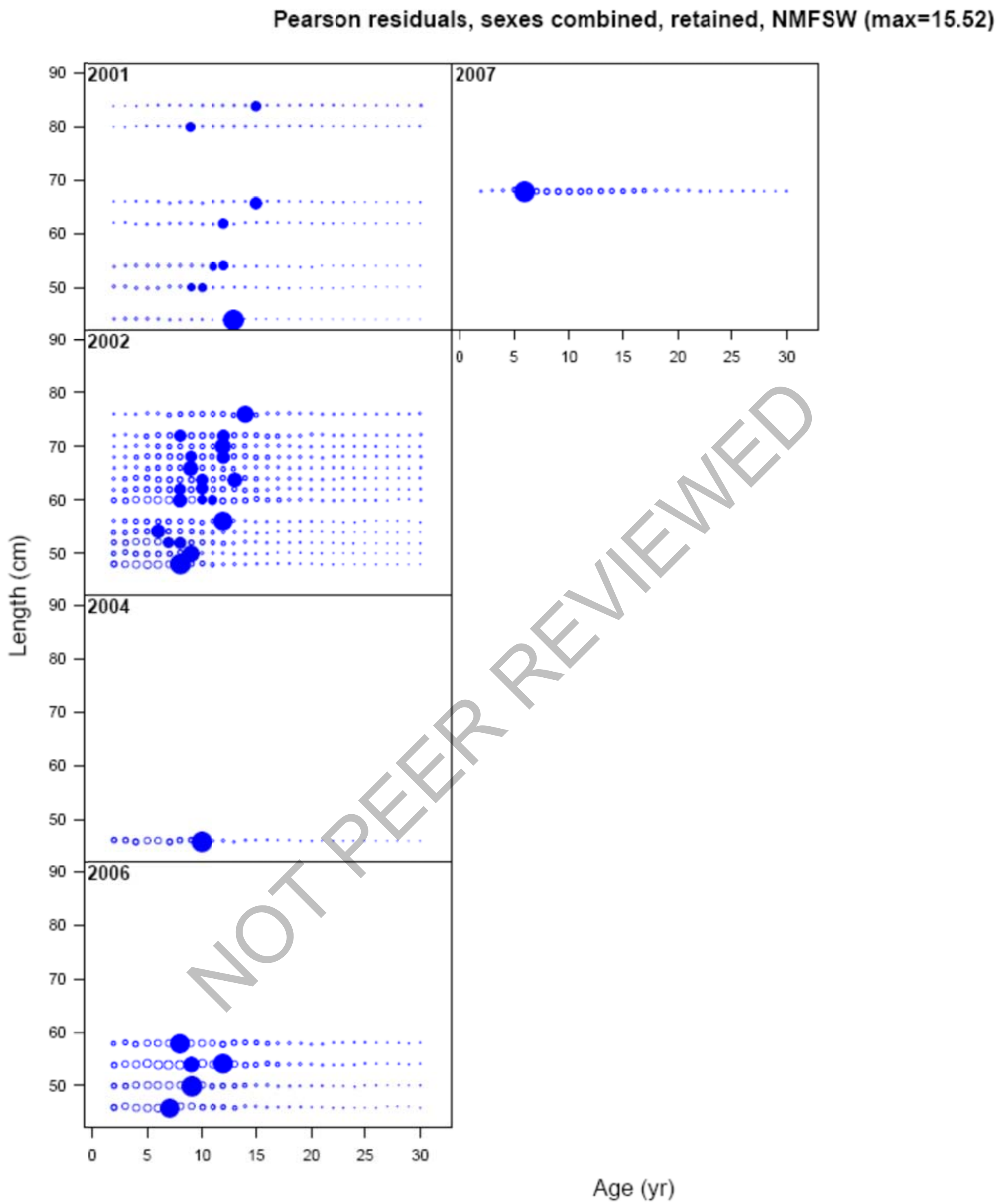


Figure 3.59. Pearson residuals of conditional age composition fits for unknown gender Gulf of Mexico tilefish in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

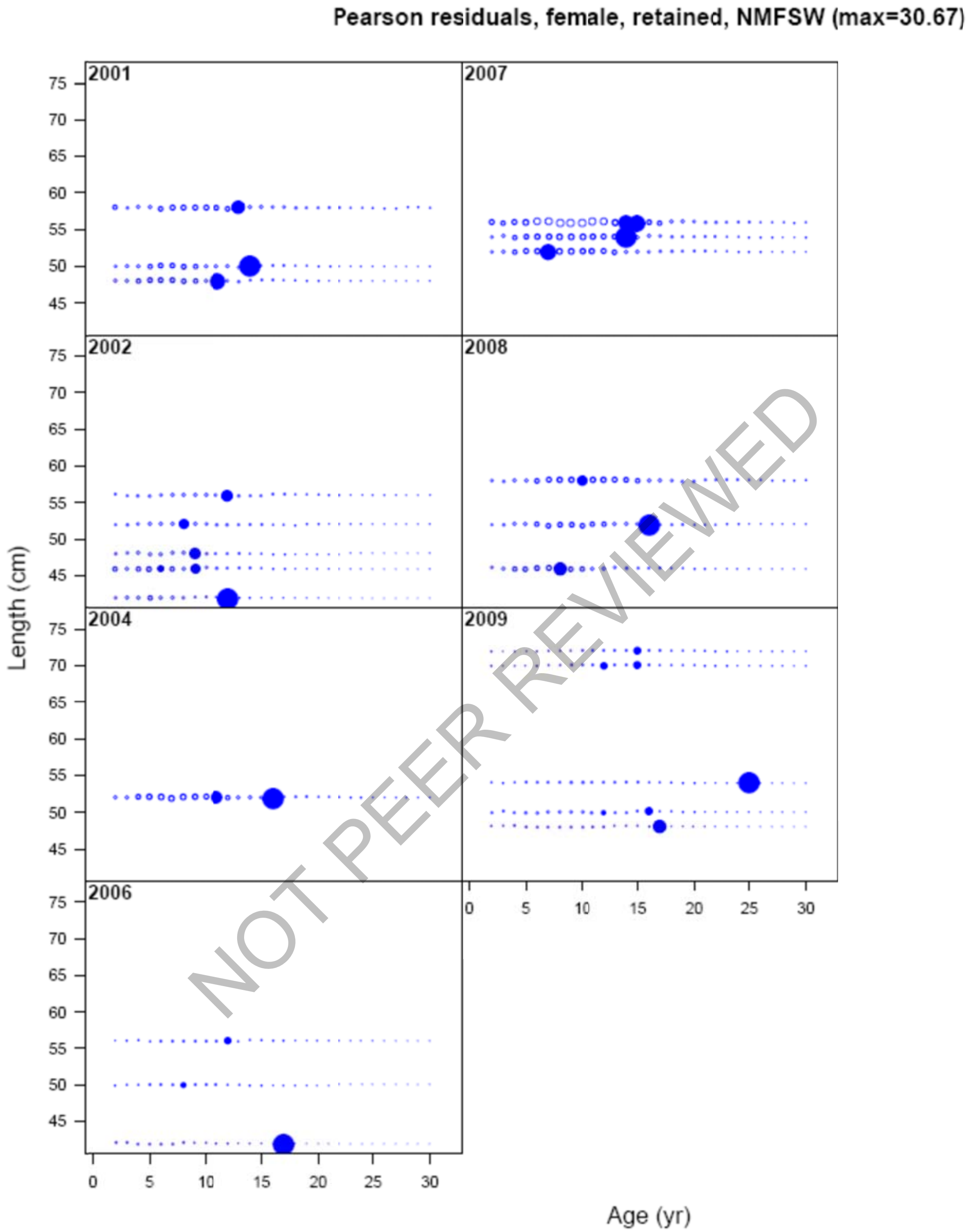


Figure 3.60. Pearson residuals of conditional age composition fits for female Gulf of Mexico tilefish in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

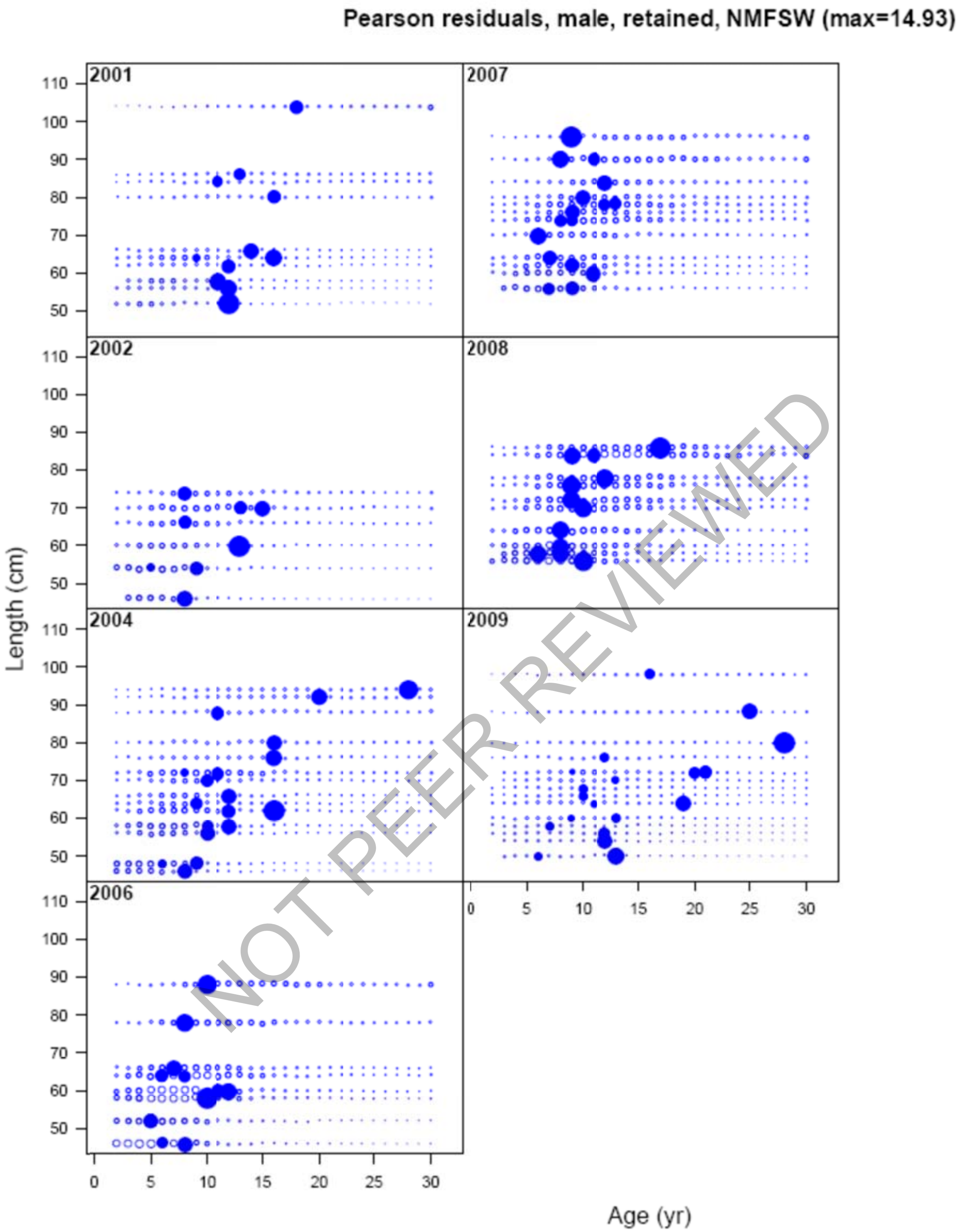


Figure 3.61. Pearson residuals of conditional age composition fits for male Gulf of Mexico tilefish in the NMFS bottom long line survey west. Solid circles are positive residuals (i.e., observed greater than predicted) and open circles are negative residuals (i.e., predicted greater than observed).

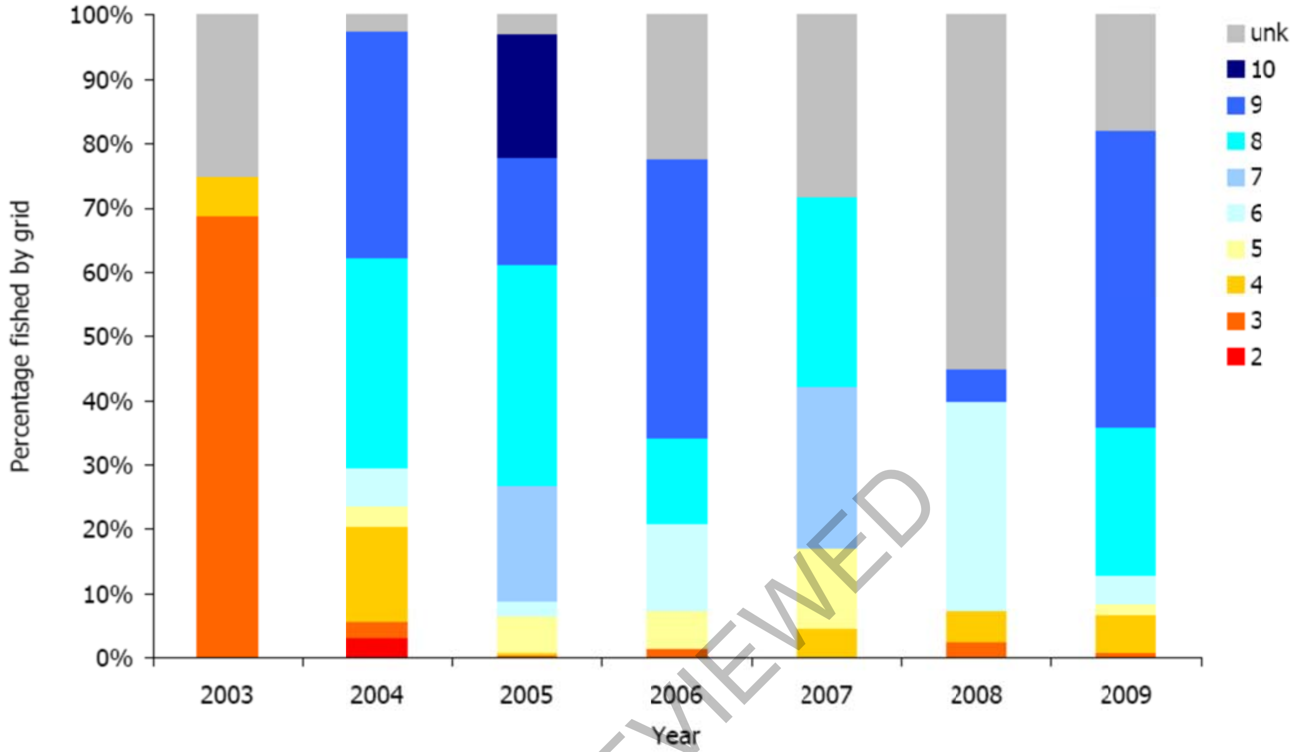


Figure 3.62. Distribution of age 10-15 year old tilefish by statistical grid for the eastern Gulf of Mexico, 2003-2009.

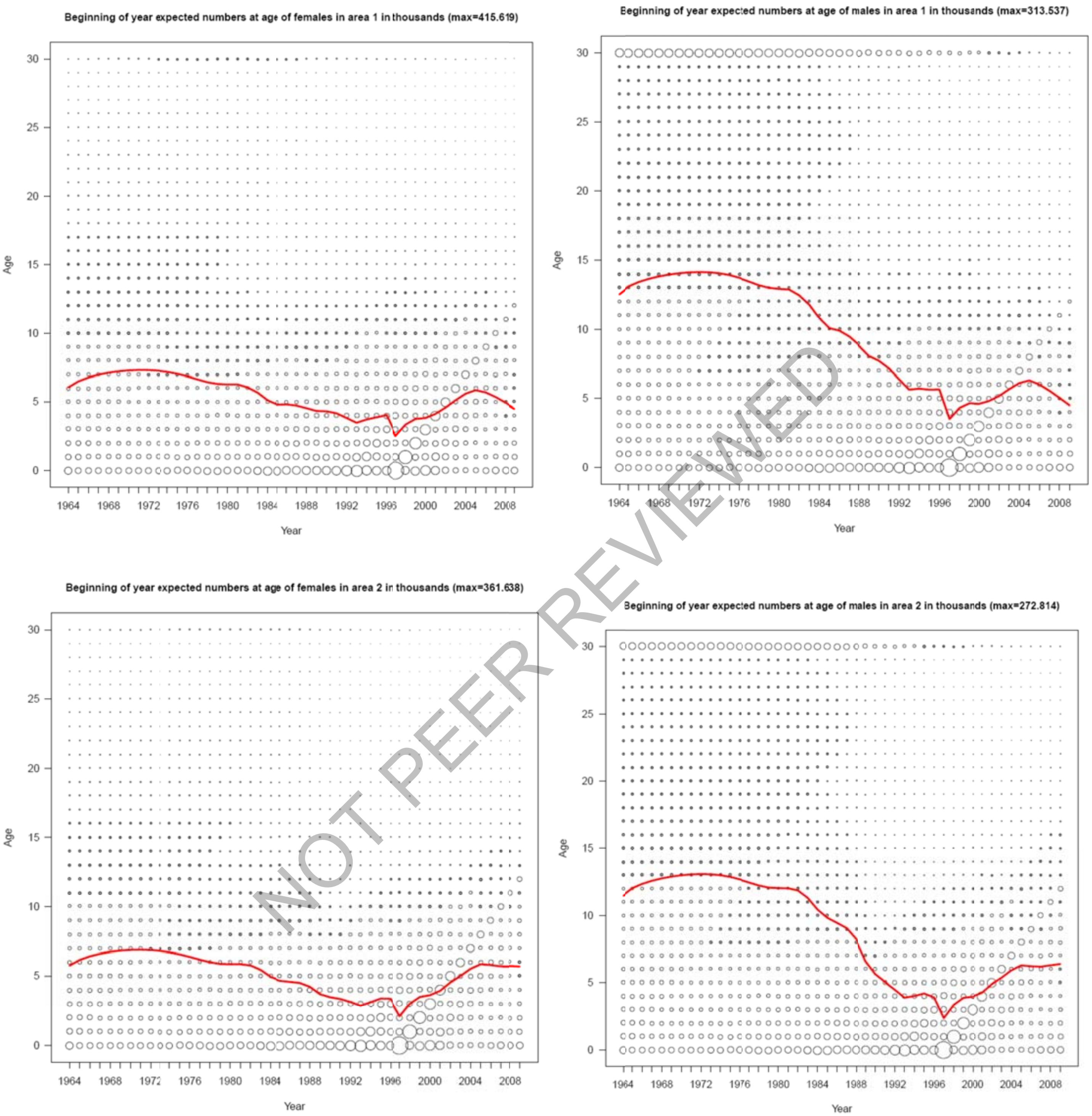
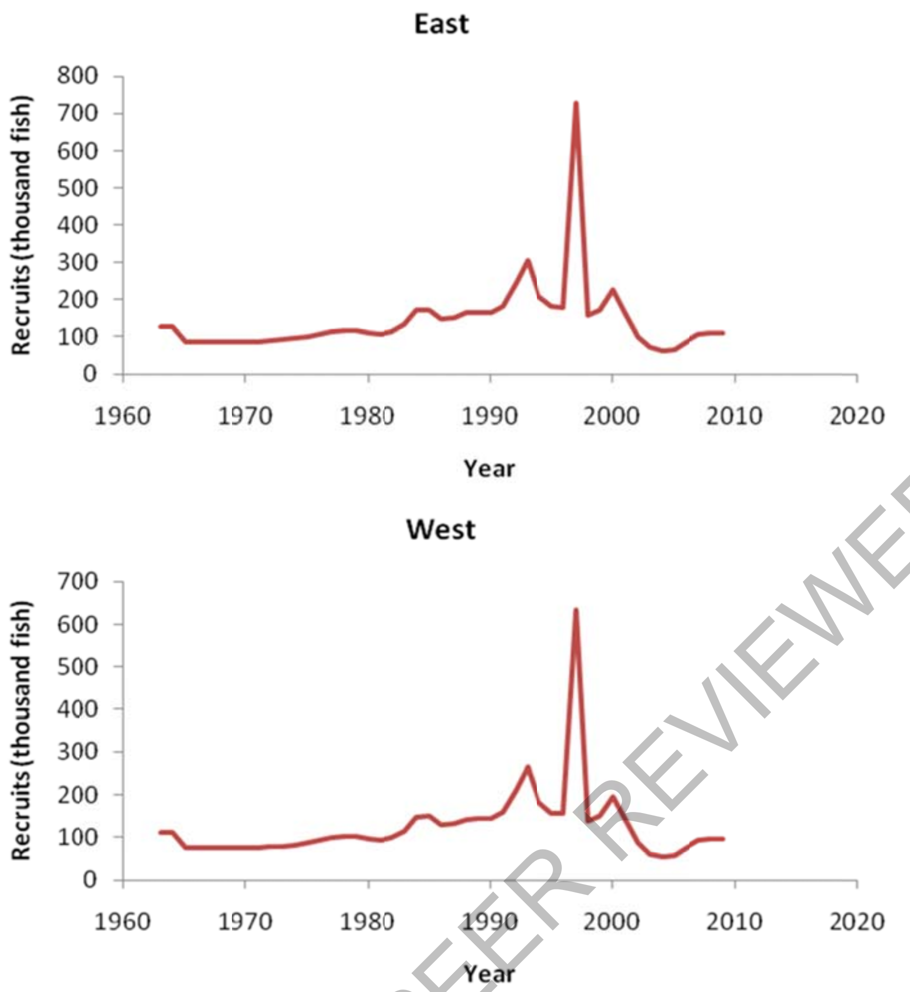


Figure 3.63. Predicted abundance at age (circles) and mean age (line) for females (left column) and males (right column), eastern (top row) and western (bottom row) Gulf. Abundances reported as thousand fish.



3.64. Predicted age-0 recruits in thousand fish for Gulf of Mexico tilefish.

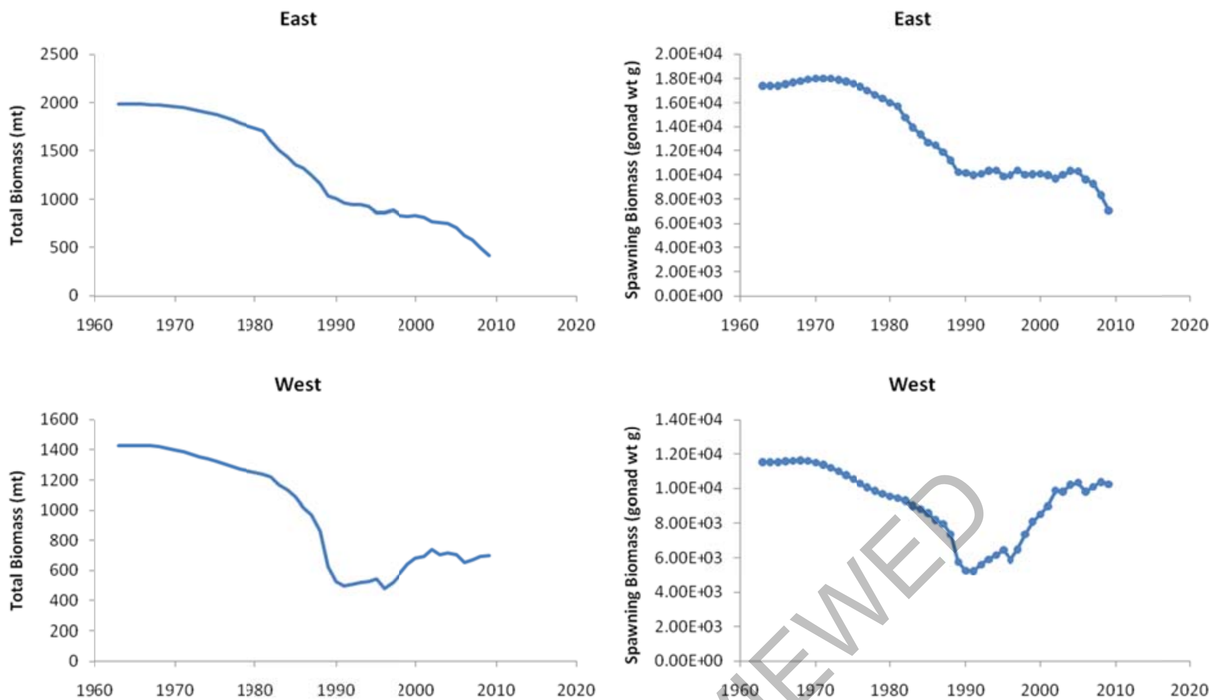


Figure 3.65. Predicted total biomass (mt) and spawning biomass (gonad wt g) by region for Gulf of Mexico tilefish.

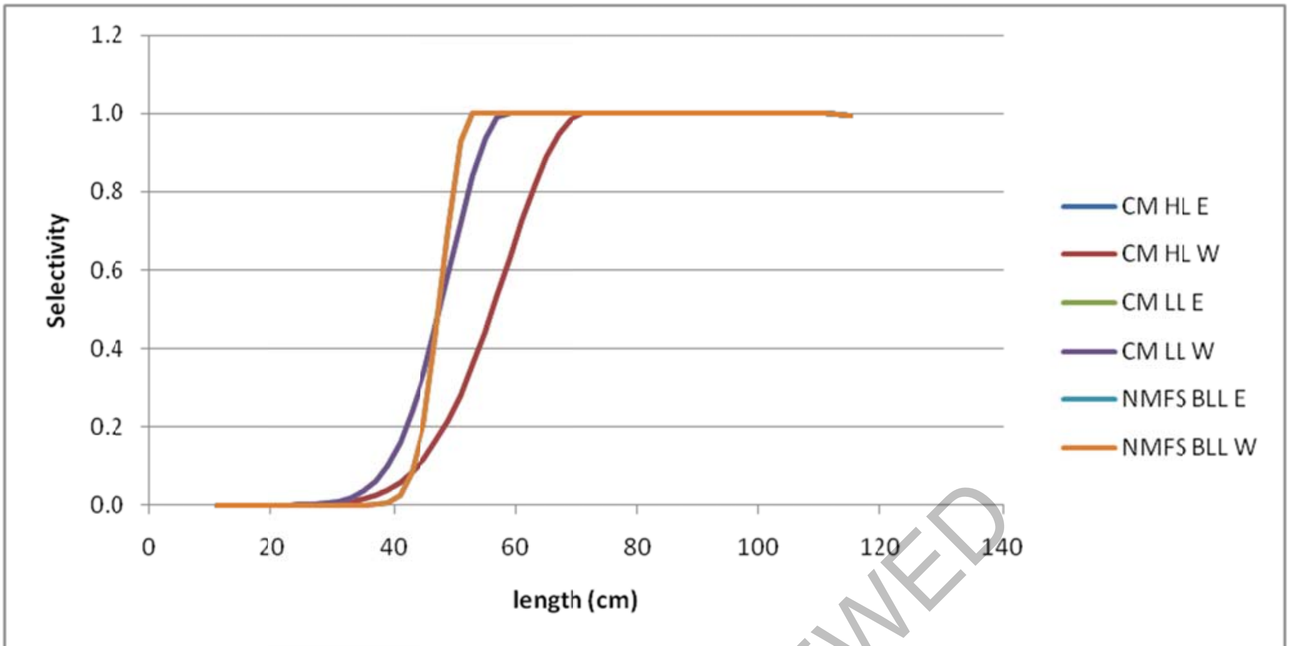


Figure 3.66. Predicted size selectivity for Gulf of Mexico tilefish. Fisheries/Surveys include the commercial hand line east (CM HL E), commercial hand line west (CM HL W), commercial long line east (CM LL E), commercial long line west (CM LL W), NMFS bottom long line survey east (NMFS BLL E), and NMFS bottom long line survey west (NMFS BLL W).

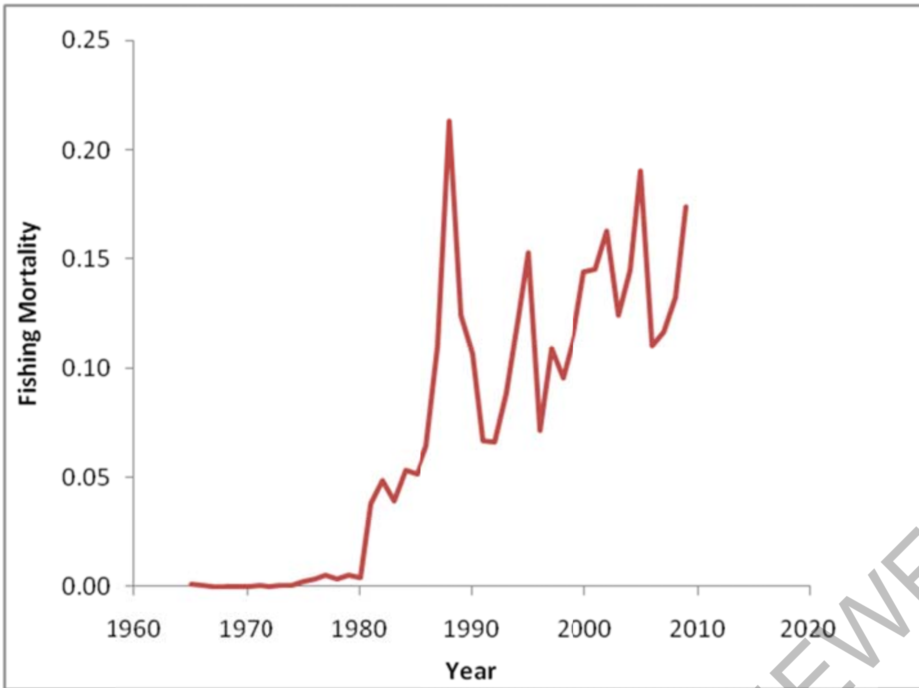


Figure 3.67. Predicted Gulfwide fishing mortality for Gulf of Mexico tilefish.

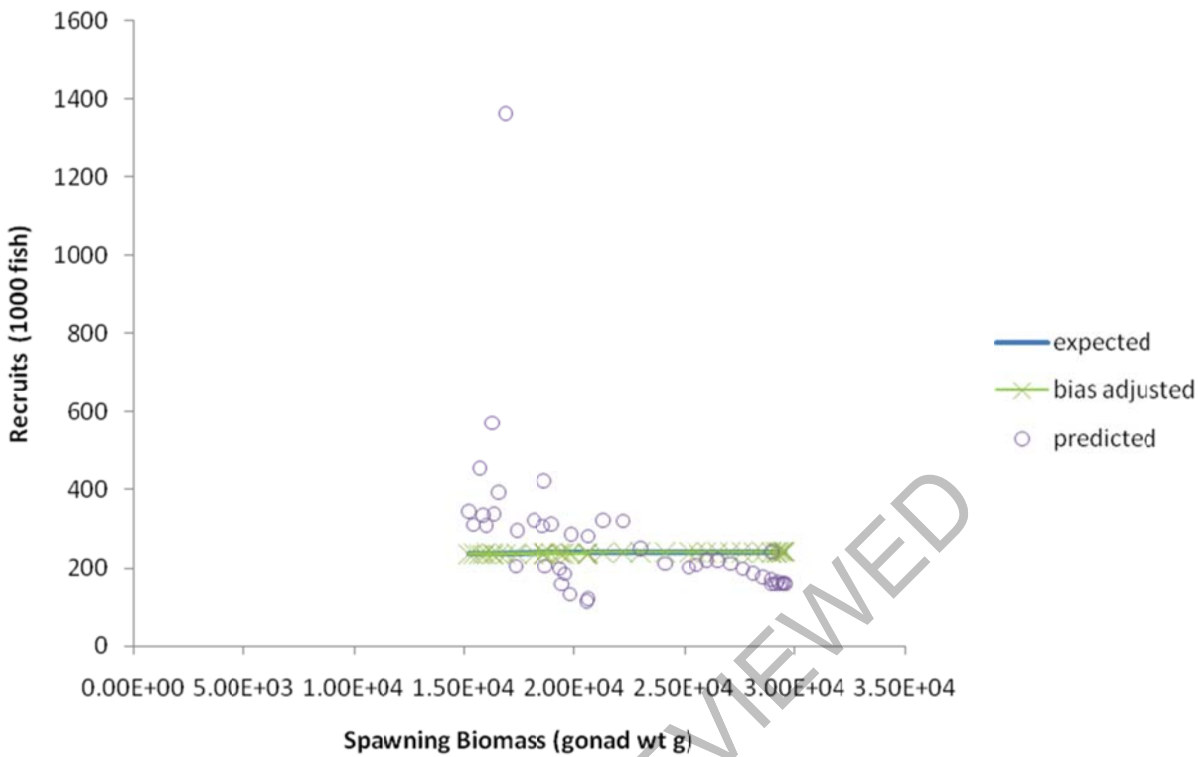


Figure 3.68. Predicted stock-recruitment relationship for Gulf of Mexico tilefish. Plotted are predicted annual recruitments from SS (circles), expected recruitment from the stock-recrit relationship (line), and bias adjusted recruitment from the stock-recruit relationship (line with X).

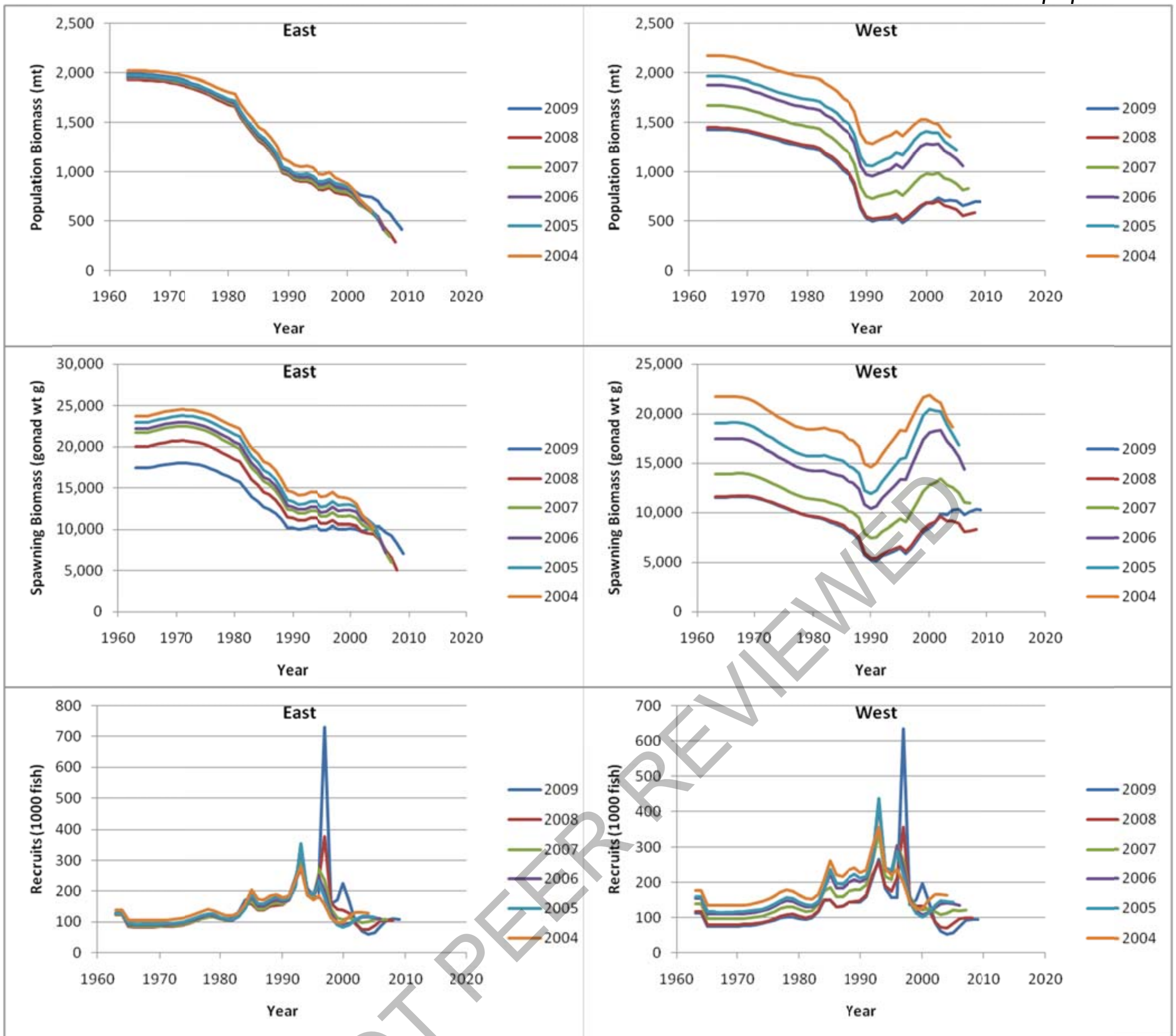


Table 3.69. Retrospective analysis for Gulf of Mexico tilefish with last five years of data sequentially dropped from the model. Model quantities examined include total biomass (top row), spawning biomass (middle row), and recruiment (bottom row).

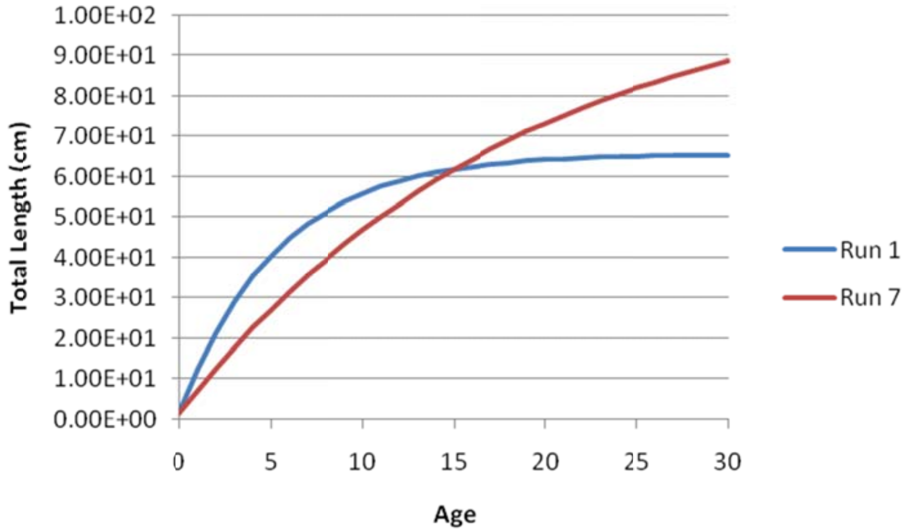


Figure 3.70. Predicted growth curves for western female tilefish from Run 1 (central) and Run 7 (Mref age = 25).

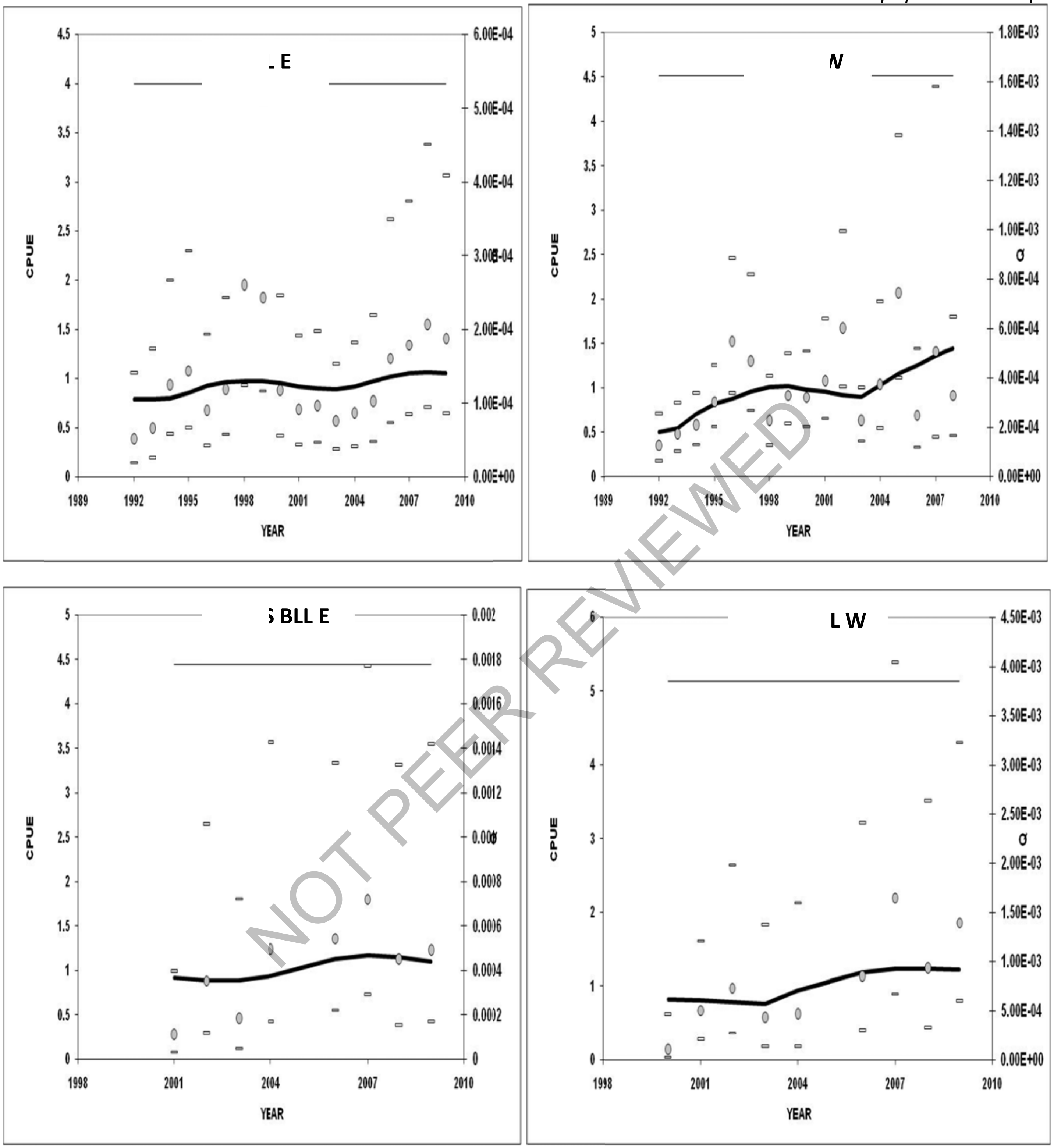


Figure 3.71. Observed and predicted index CPUE from Run 12 for Gulf of Mexico tilefish. Indices include the commercial long line east (CM LL E), commercial long line west (CM LL W), NMFS bottom long line survey east (NMFS BLL E), and NMFS bottom long line west (NMFS BLL W). Error bars represent the observed log-scale standard errors.

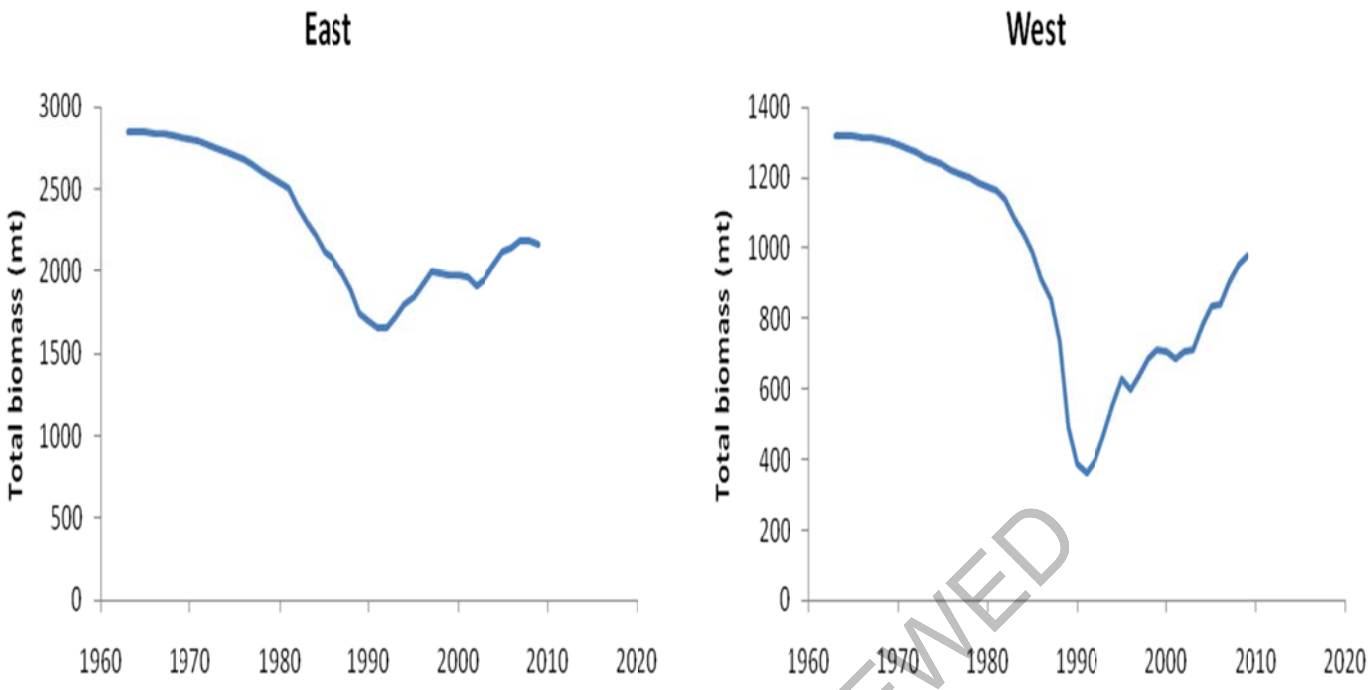


Figure 3.72. Predicted total biomass (mt) by region from Run 12 for Gulf of Mexico tilefish.

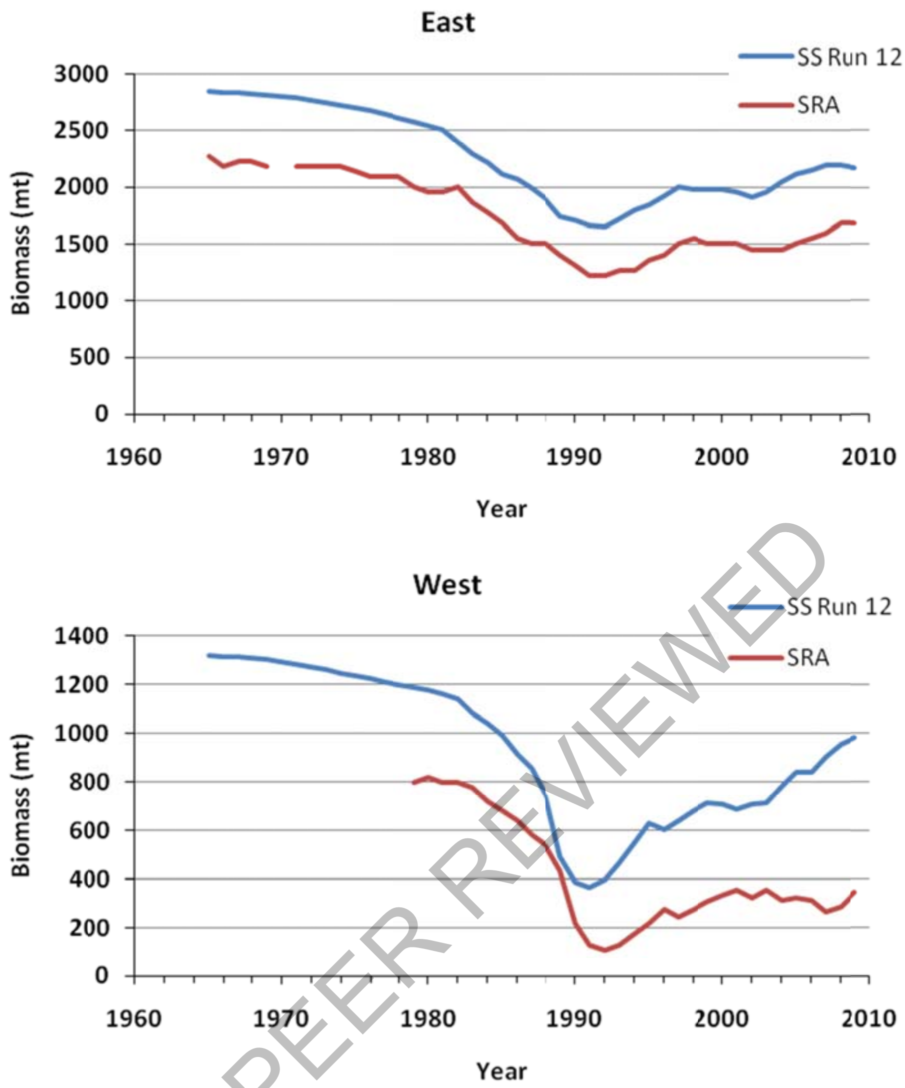


Figure 3.73. Predicted biomass (whole mt) by region from SS Run 12 and SRA for Gulf of Mexico tilefish. Biomass from SS is reported as total biomass. Biomass from SRA is reported as vulnerable biomass.

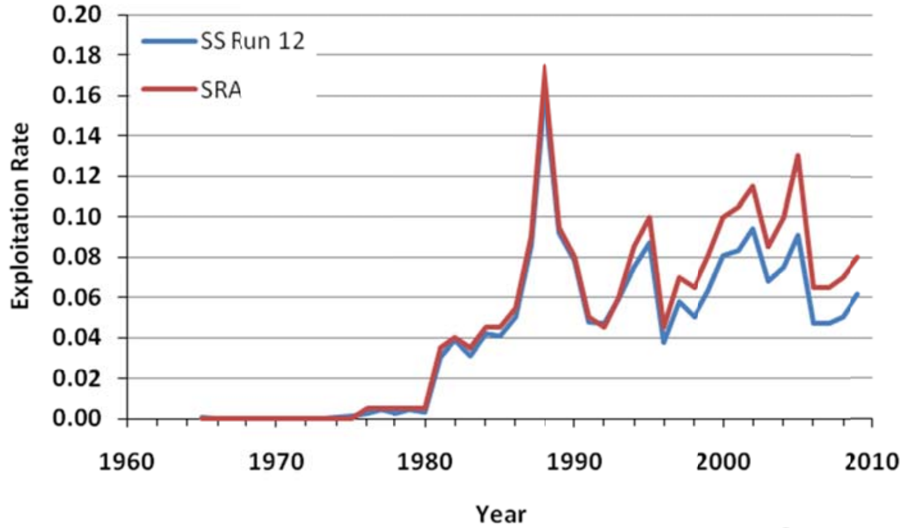


Figure 3.74. Predicted Gulf-wide exploitation rates from SS Run 12 and SRA for Gulf of Mexico tilefish.

3.6. Appendix A. Length Composition Data

Length composition data for Gulf of Mexico tilefish by fishery/survey, region, and gender.

Commercial Hand Line East

		Sample	Length Bin																						
Year	Gender	Size	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66
1991	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1991	Unknown	14	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	2	1	1	1	0	0	0
1992	Unknown	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Unknown	22	1	0	0	0	0	0	0	0	1	2	1	2	1	4	3	3	1	0	0	0	0	0	0	0
1994	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
1995	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
1996	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1996	Unknown	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	3	3	2	4	3
1997	Unknown	20	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	2	0	2	3	2	2	1	2
1998	Unknown	19	0	0	0	0	0	0	0	0	1	2	0	4	2	1	1	1	1	0	1	0	0	1	1	0
1999	Unknown	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	3	3	0	1
2000	Female	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
2000	Unknown	24	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	1	0	0	4	1	0	2
2001	Female	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	6	5	9	11
2001	Male	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0
2001	Unknown	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	4	0	7
2002	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2002	Male	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	8	12	9	6	4	6	15
2003	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2005	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2005	Male	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	174	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4	1	8	3	6	3	5	9	5	10
2007	Male	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2008	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2009	Unknown	11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	2	0	2	0	0	1	1

Commercial Hand Line East (continued)

Year	Gender	Sample Size	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
			Length Bin																							
1991	Female	4	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1991	Unknown	14	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
1992	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Female	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Unknown	22	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1994	Unknown	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	Unknown	30	2	2	1	1	0	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	20	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	Unknown	19	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	Unknown	34	2	1	0	1	1	2	3	3	0	0	2	4	0	0	0	0	0	1	1	1	0	0	0	0
2000	Female	6	0	1	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2000	Unknown	24	2	0	0	0	0	1	0	2	0	1	0	0	0	1	1	3	0	0	0	0	0	0	0	0
2001	Female	78	11	9	7	0	2	2	0	0	0	1	0	0	3	2	3	1	2	0	1	0	0	0	0	0
2001	Male	30	2	1	0	0	0	0	0	0	0	0	0	2	1	5	5	6	1	1	3	0	0	0	0	0
2001	Unknown	46	5	1	1	1	1	0	0	1	1	0	0	2	4	6	1	5	2	1	0	0	0	0	0	0
2002	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2002	Unknown	100	7	4	7	3	2	1	4	1	2	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0
2003	Unknown	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	10	1	3	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2005	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	174	11	16	19	11	14	9	4	0	4	7	2	6	2	1	2	0	2	2	0	1	0	0	0	0
2007	Male	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2009	Unknown	11	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Commercial Hand Line West

Year	Gender	Sample Size	Length Bin 20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66
1987	Unknown	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1990	Unknown	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0
1991	Unknown	15	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	1	2	4	0	1	0	0	0	0
1992	Unknown	95	0	0	0	0	0	0	1	0	2	1	0	2	2	9	8	10	6	12	15	6	7	5	1	1
1993	Unknown	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	1	0	0
1994	Unknown	47	0	0	0	1	0	0	0	0	0	0	0	0	2	4	3	2	3	1	6	4	5	3	3	5
1995	Unknown	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	1	1
1996	Unknown	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	2	1	1	0
1999	Unknown	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2001	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
2003	Unknown	19	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	4	0	1	1	3	0	0
2005	Unknown	20	0	0	0	0	0	0	0	0	1	1	1	1	2	0	2	3	0	2	1	0	3	0	1	0
2006	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
2006	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2007	Unknown	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	1	1	1	0
2008	Unknown	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	7	7	4	6	3	2
2009	Female	9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0	1	1	0	0
2009	Male	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	5	1	4	4

Commercial Hand Line West (continued)

Year	Gender	Sample Size	Length Bin 68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
1987	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	Unknown	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	Unknown	15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	Unknown	95	2	2	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Unknown	12	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	Unknown	47	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1995	Unknown	7	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	Unknown	12	0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	Unknown	5	0	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2001	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	19	0	1	2	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2005	Unknown	20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	9	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	52	2	2	0	1	1	2	3	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	9	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	38	4	1	1	1	2	3	1	1	3	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0

Commercial Long Line East

		Sample											Length Bin													
Year	Gender	Size	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66
1984	Unknown	106	0	0	0	0	0	0	0	1	2	1	3	1	3	4	14	9	8	12	7	6	7	4	9	2
1986	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	Unknown	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	4	1	2	1	2
1988	Unknown	48	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	5	6	2	1	4	3	5	0
1989	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
1990	Unknown	153	0	0	0	0	0	0	0	1	0	1	1	1	4	2	7	6	6	16	9	17	9	17	11	6
1991	Unknown	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	1	2	2	2	3
1992	Unknown	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	3	1	0	2	0	1
1993	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1993	Unknown	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	1	0	1	1	2
1994	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
1994	Male	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
1994	Unknown	740	0	0	0	0	0	0	1	2	10	12	18	25	28	28	30	32	40	34	42	40	37	35	40	30
1995	Unknown	248	0	0	0	0	0	0	1	2	2	7	4	8	13	11	9	12	18	19	16	16	13	10	4	9
1996	Unknown	347	0	0	0	0	1	1	3	4	7	14	11	11	16	15	17	20	19	22	17	22	18	12	19	16
1997	Unknown	655	0	0	0	0	0	2	4	6	12	23	26	35	33	35	29	38	34	37	24	33	30	30	24	25
1998	Unknown	411	0	0	0	0	0	0	0	0	0	3	11	15	33	34	20	9	19	31	26	27	18	24	23	24
1999	Unknown	560	0	0	0	0	0	0	0	0	2	5	6	11	19	18	26	22	34	40	29	33	27	31	29	36
2000	Unknown	815	0	0	0	0	0	0	0	1	4	7	8	20	24	33	28	38	38	60	39	49	43	50	46	51
2001	Unknown	805	0	0	0	0	0	0	0	2	6	12	10	26	28	31	35	26	43	47	33	47	34	37	36	38
2002	Unknown	213	0	0	0	0	0	0	0	0	2	3	3	8	11	13	10	14	18	16	15	10	12	8	3	9
2003	Male	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	1	1	0	1
2003	Unknown	610	0	0	0	0	0	0	0	1	2	7	7	11	25	38	40	47	48	44	48	46	35	29	29	28
2004	Unknown	1684	0	0	0	0	0	0	2	1	6	6	27	34	57	65	102	124	103	126	93	82	80	83	77	92

2005	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0
2005	Male	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2005	Unknown	1516	1	0	0	0	0	0	0	2	5	4	19	29	40	85	84	115	92	131	76	88	83	58	67	70
2006	Unknown	1125	0	0	0	0	0	0	1	7	8	22	22	40	42	48	63	91	79	76	64	50	52	65	43	52
2007	Unknown	905	0	0	0	0	0	0	0	1	1	1	11	33	34	48	59	93	51	59	61	47	36	32	38	37
2008	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2008	Male	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	1	1	3	1	1
2008	Unknown	473	0	0	0	0	0	0	0	0	0	2	4	11	17	24	34	40	39	31	27	28	19	20	15	20
2009	Female	34	0	0	0	0	0	0	0	0	0	0	1	1	3	3	5	6	2	5	3	1	2	1	1	0
2009	Male	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	4	4	3	3	6	3	4	6
2009	Unknown	581	0	0	0	1	2	2	3	2	2	5	5	6	7	14	29	26	29	23	25	31	39	34	36	34

Commercial Long Line East (continued)

		Sample												Length Bin												
Year	Gender	Size	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
1984	Unknown	106	1	1	5	1	0	1	0	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
1986	Unknown	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1987	Unknown	25	0	0	1	2	2	0	3	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	Unknown	48	5	3	1	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1989	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	Unknown	153	9	5	3	6	3	2	1	1	2	0	0	0	2	0	2	0	0	1	1	0	1	0	0	0
1991	Unknown	35	2	0	5	3	3	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1992	Unknown	23	0	3	1	0	0	3	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
1993	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	Unknown	14	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1994	Female	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	Male	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	Unknown	740	29	27	22	20	18	18	13	13	17	18	13	13	6	9	10	7	2	1	0	0	0	0	0	0
1995	Unknown	248	5	10	4	7	4	8	4	2	8	6	5	2	3	1	1	1	1	2	0	0	0	0	0	0
1996	Unknown	347	6	9	3	4	5	4	6	7	9	7	3	4	4	3	3	4	1	0	0	0	0	0	0	0
1997	Unknown	655	17	23	19	16	17	12	6	8	10	6	11	8	6	4	5	1	2	2	0	0	0	2	0	0
1998	Unknown	411	14	13	12	2	7	6	4	8	8	6	4	2	3	3	0	1	1	0	0	0	0	0	0	0
1999	Unknown	560	15	18	19	19	15	14	12	7	8	8	8	6	5	13	5	4	5	4	4	1	0	1	1	0
2000	Unknown	815	36	30	22	28	26	27	15	10	17	14	16	7	5	11	4	3	3	0	2	0	0	0	0	0
2001	Unknown	805	31	38	37	31	25	17	21	16	11	16	6	9	11	10	12	7	8	3	3	0	1	1	0	0
2002	Unknown	213	3	7	5	12	5	7	3	3	1	1	0	5	4	0	0	1	0	0	0	0	0	1	0	0
2003	Male	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	610	15	20	22	13	13	7	8	3	4	4	4	3	1	2	2	3	1	0	0	0	0	0	0	0

2004	Unknown	1684	78	57	61	58	42	42	30	26	29	20	15	21	12	12	9	3	5	4	0	0	0	0	0	0
2005	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2005	Unknown	1516	60	68	70	46	36	33	42	27	14	10	17	12	9	6	9	3	2	1	1	1	0	0	0	0
2006	Unknown	1125	40	42	40	31	25	24	22	24	13	11	8	6	4	3	2	3	0	0	1	1	0	0	0	0
2007	Unknown	905	20	34	34	31	23	20	20	17	14	17	5	9	6	3	4	2	2	2	0	0	0	0	0	0
2008	Female	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	15	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	473	10	16	16	21	10	10	14	6	10	11	5	5	4	1	1	1	0	0	1	0	0	0	0	0
2009	Female	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	57	2	2	4	3	3	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	581	26	34	28	17	10	14	15	12	14	8	8	8	8	10	5	4	4	1	0	0	0	0	0	0

Commercial Long Line West

		Sample	Length Bin																						
Year	Gender	Size	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66
1984	Unknown	100	0	0	0	0	0	0	0	0	0	0	2	2	0	4	3	5	4	9	13	7	10	6	4	3
1986	Unknown	26	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	3	4	2	1	2	1	1
1987	Unknown	126	0	0	0	0	1	0	1	1	1	1	0	3	3	2	1	3	2	6	8	3	4	11	9	4
1988	Unknown	175	0	0	0	0	1	1	1	2	1	5	9	20	6	6	5	17	8	12	4	3	14	7	5	7
1989	Unknown	82	0	0	0	0	0	0	1	1	0	1	3	3	4	3	3	8	0	5	2	4	5	5	4	1
1990	Unknown	128	0	0	0	0	0	0	0	0	1	1	3	2	3	10	7	8	9	7	11	11	7	11	7	5
1991	Unknown	415	0	0	0	0	0	0	0	1	1	0	7	8	4	20	18	30	24	30	35	36	16	26	20	14
1992	Unknown	395	0	0	0	0	0	0	0	1	3	1	7	9	9	21	33	22	22	35	28	32	29	16	32	15
1993	Unknown	162	0	0	0	0	0	0	0	0	1	0	2	3	8	13	7	16	5	12	7	15	11	7	7	4
1994	Unknown	320	0	0	0	0	0	0	0	0	0	3	2	8	10	11	12	16	20	19	18	20	12	20	19	17
1995	Female	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0
1995	Unknown	185	0	0	0	0	0	1	0	1	1	0	4	4	3	7	12	7	9	13	11	9	9	11	9	7
1996	Unknown	62	0	0	0	0	0	0	0	0	1	0	0	2	6	3	6	2	2	3	7	2	4	7	3	4
1997	Unknown	20	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	1	2	1	3	1	0	2
1998	Unknown	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	1
2000	Unknown	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	0	3	4
2003	Unknown	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	1	2	1	2
2004	Unknown	40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	3	5	2	1	2	9	5
2005	Unknown	34	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1	2	1	2	2	0
2006	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	15	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	0	0	0	0	1
2007	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0

2007	Unknown	93	0	0	0	0	0	0	0	0	0	0	0	1	0	1	6	12	9	13	4	11	5	5	6	3
2008	Unknown	410	0	0	0	0	0	0	0	0	0	0	0	1	5	13	19	14	9	28	20	24	26	38	15	36
2009	Unknown	546	0	0	0	0	0	0	0	0	0	0	1	0	2	5	7	21	12	20	26	27	26	45	28	30

Commercial Long Line West (continued)

		Sample	Length Bin																						
Year	Gender	Size	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
1984	Unknown	100	6	4	5	3	2	1	3	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1986	Unknown	26	2	1	0	0	0	0	0	1	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0
1987	Unknown	126	1	9	2	6	7	6	8	5	3	4	8	2	1	0	0	0	0	0	0	0	0	0	0	0
1988	Unknown	175	0	7	4	7	5	2	4	2	4	3	0	1	1	1	0	0	0	0	0	0	0	0	0	0
1989	Unknown	82	0	6	8	4	3	2	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1990	Unknown	128	4	2	2	1	4	0	3	0	2	1	0	0	1	0	2	0	1	2	0	0	0	0	0	0
1991	Unknown	415	9	13	11	17	11	8	6	4	2	5	4	9	9	2	4	3	6	1	1	0	0	0	0	0
1992	Unknown	395	8	13	6	7	1	8	2	1	2	5	7	4	1	2	8	2	3	0	0	0	0	0	0	0
1993	Unknown	162	2	6	5	4	3	5	2	2	4	7	2	1	0	0	1	0	0	0	0	0	0	0	0	0
1994	Unknown	320	12	9	13	13	3	5	6	2	2	4	4	7	4	7	5	4	6	5	0	0	1	0	0	1
1995	Female	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	Unknown	185	6	7	7	7	3	8	1	2	2	7	2	3	3	2	1	1	0	2	2	1	0	0	0	0
1996	Unknown	62	0	1	1	0	1	0	0	0	0	0	0	3	1	1	1	0	0	0	0	0	1	0	0	0
1997	Unknown	20	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	Unknown	13	1	1	1	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	35	1	2	1	2	3	0	2	1	2	4	1	0	1	2	0	0	0	0	0	0	0	0	0	0
2003	Unknown	18	0	1	0	2	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2004	Unknown	40	3	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	34	1	3	4	3	2	0	0	2	0	1	2	1	0	0	0	0	1	0	0	0	0	0	0	0
2006	Female	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	15	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2007	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	93	3	4	1	4	1	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	410	34	14	28	16	13	10	7	6	9	8	5	6	1	2	0	0	1	1	1	0	0	0	0	0
2009	Unknown	546	36	33	43	23	21	26	15	14	23	14	4	13	7	6	5	3	3	1	2	0	2	1	1	0

NMFS Bottom Long Line Survey East

		Sample	Length Bin																						
Year	Gender	Size	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66

2000	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2000	Male	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2000	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2001	Female	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	6	2	0	0	0	0
2001	Male	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0
2001	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2002	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2002	Unknown	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	3	0	1
2004	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0
2004	Male	11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	1	3	2	0
2005	Female	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	2	0	1	0	0	0
2005	Male	12	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	1	0	0	0
2006	Female	8	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	2	1
2006	Male	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	11	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	1	0	3	0	1	1	0	0
2007	Male	25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	3	0	1	1	4
2007	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2008	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
2008	Male	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1
2008	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2009	Female	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0
2009	Male	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	0

NMFS Bottom Long Line Survey East (continued)

		Sample	Length Bin																						
Year	Gender	Size	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
2000	Female	3	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Male	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	12	1	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0

2006	Female	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	3	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	25	1	2	1	0	1	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	9	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	12	1	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NMFS Bottom Long Line Survey West

		Sample	Length Bin																						
Year	Gender	Size	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66
2001	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0
2001	Male	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	2	1
2001	Unknown	9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	2	0	0	0	1	0	1
2002	Female	6	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	1	0	1	0	0	0	0	0
2002	Male	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	1	0	0	1
2002	Unknown	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	2	1	1	0	4	2	2	1
2004	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
2004	Male	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	2	0	2	1	1
2004	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2006	Female	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0
2006	Male	12	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	2	2	0	2	1
2006	Unknown	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	1	0	0	0	0
2007	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0
2007	Male	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	1	0
2007	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0
2008	Male	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0
2009	Female	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0
2009	Male	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	1	2	0	2	1

NMFS Bottom Long Line Survey West (continued)

		Sample	Length Bin																						
Year	Gender	Size	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114
2001	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	12	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2001	Unknown	9	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	8	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	23	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	19	0	1	3	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0
2004	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	12	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	16	0	1	0	2	1	2	1	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
2007	Unknown	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	12	0	1	1	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	7	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	19	1	1	3	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0

3.7. Appendix B. Age Composition Data

Conditional age composition data for Gulf of Mexico tilefish by fishery/survey, region, and gender. Length bins are at 2 cm intervals based on total length. Age 30 is a plus group.

Commercial Hand Line East

		Length	Sample	Age																												
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2000	Unknown	46	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	50	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	54	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	68	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	52	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	54	6	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	56	5	0	0	0	0	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	58	7	0	0	0	0	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	60	3	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	64	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	66	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	48	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	50	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	56	4	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	58	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	62	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	64	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	66	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	68	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	72	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	82	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	44	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	46	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	48	4	0	0	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	52	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	54	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	56	3	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	58	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
2005	Unknown	60	4	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0

2005	Unknown	62	6	0	0	0	0	0	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	64	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	70	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2005	Unknown	72	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	76	5	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	78	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	80	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	84	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2007	Unknown	76	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	62	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	66	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	78	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	98	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	40	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	48	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	52	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	54	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	58	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	64	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	66	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	74	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	96	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Commercial Hand Line West

		Length	Sample	Age																												
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2003	Unknown	44	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	46	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	48	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	52	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	54	4	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	58	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	60	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	62	3	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	70	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	72	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	78	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2003	Unknown	86	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	50	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	56	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	60	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	70	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	60	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	64	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	74	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	48	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	52	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	56	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	60	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	62	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	64	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	76	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	80	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	48	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	50	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	52	3	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	54	4	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	56	7	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	58	7	0	0	0	0	1	0	0	2	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	60	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	62	6	0	0	0	0	0	1	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	64	3	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	66	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	68	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	70	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2008	Unknown	74	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	76	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	78	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	80	3	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	82	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	90	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	48	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	56	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	58	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	60	6	0	0	0	0	0	0	1	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	62	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	64	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

2009	Unknown	66	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	68	4	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	70	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	74	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	76	2	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	80	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	82	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	84	3	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	88	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	92	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	54	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	56	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	62	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	68	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	72	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	44	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	64	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	66	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	72	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	78	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	80	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Commercial Long Line East

		Length	Sample	Age																												
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1997	Unknown	36	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	42	3	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	44	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	48	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	50	5	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	52	4	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	54	4	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1997	Unknown	56	4	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	58	3	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	60	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1997	Unknown	62	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	64	5	0	0	0	0	0	0	1	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1997	Unknown	66	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	68	3	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	70	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	78	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	Unknown	90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1998	Unknown	82	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	Unknown	86	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	Unknown	92	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	Unknown	100	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	52	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	54	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	60	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	62	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	64	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	70	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	72	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	74	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	48	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	52	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	54	3	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	56	4	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	58	8	0	0	0	0	0	0	0	2	1	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	60	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	62	6	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2001	Unknown	64	3	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	66	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	68	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	70	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	72	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2001	Unknown	74	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2001	Unknown	86	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	88	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	96	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	100	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2002	Unknown	42	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	44	5	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	46	2	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	50	5	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	52	8	0	0	0	0	0	1	1	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	54	9	0	0	0	0	1	2	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	56	11	0	0	0	0	2	2	0	0	3	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2002	Unknown	58	5	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	60	3	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	62	3	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	66	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	68	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	70	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	74	4	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	76	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	78	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	80	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	82	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	90	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	92	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2002	Unknown	110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2003	Unknown	30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	40	3	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	42	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	44	6	0	0	1	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	46	23	0	0	0	4	3	4	6	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	48	24	0	1	2	2	2	7	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	50	20	0	0	3	2	3	2	1	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	52	32	0	0	1	2	4	5	8	3	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	54	19	0	0	0	0	2	6	1	3	2	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	56	23	0	0	1	1	3	2	6	5	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	58	15	0	1	0	3	2	4	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	60	14	0	0	0	0	0	7	5	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	62	8	0	0	0	0	0	2	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	64	12	0	0	0	0	1	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	66	6	0	0	0	1	0	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	68	3	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	70	8	0	0	0	1	1	2	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	72	8	0	0	0	0	1	0	1	1	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	74	5	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	76	5	0	0	0	0	0	1	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	78	4	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	80	4	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	82	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	84	3	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	88	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	90	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	94	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	96	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2003	Unknown	98	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	38	3	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	40	5	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	42	6	0	0	1	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	44	21	0	0	1	4	6	2	2	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	46	20	0	0	3	4	1	4	6	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	48	36	0	0	0	4	5	5	7	7	1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	50	30	0	0	0	1	5	4	2	8	4	2	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	52	26	0	0	0	0	6	4	5	3	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	54	32	0	0	2	2	3	3	6	6	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	56	28	0	0	0	1	7	1	5	6	0	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	58	16	0	0	0	0	4	0	5	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	60	26	0	0	0	1	2	4	5	2	5	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	62	19	0	0	0	1	3	1	1	4	6	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	64	24	0	0	0	0	3	2	5	7	1	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	66	31	0	0	0	1	1	5	7	2	3	1	3	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	68	23	0	0	0	0	0	4	4	1	2	3	4	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	70	17	0	0	0	0	1	1	1	3	4	1	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2004	Unknown	72	18	0	0	0	0	0	3	1	4	4	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	74	16	0	0	0	0	0	0	0	2	3	1	3	1	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2004	Unknown	76	14	0	0	0	0	1	0	2	1	3	0	4	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	78	12	0	0	0	0	0	0	0	2	0	0	3	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	80	10	0	0	0	0	0	1	1	1	1	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	82	8	0	0	0	0	1	0	0	0	1	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	84	5	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	86	8	0	0	0	0	0	0	0	0	0	0	0	2	1	0	2	0	2	0	1	0	0	0	0	0	0	0	0	0	0
2004	Unknown	88	7	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1
2004	Unknown	90	11	0	0	0	0	0	0	1	1	0	0	0	3	2	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
2004	Unknown	92	7	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
2004	Unknown	94	8	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	1	0	0	1	0	0	0	0	0	0	0	1	0	0
2004	Unknown	96	5	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
2004	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	100	5	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0
2004	Female	50	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	54	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	58	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	84	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2004	Male	102	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2005	Unknown	36	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	38	4	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	40	6	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	42	4	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2005	Unknown	44	12	0	0	0	0	2	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	46	14	0	0	2	2	1	3	4	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	48	13	0	0	0	3	1	1	5	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	50	21	0	0	0	1	4	6	6	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	52	26	0	0	0	1	2	5	4	7	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	54	35	0	0	0	4	6	10	2	7	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	56	19	0	0	0	0	2	2	6	3	2	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	58	14	0	0	0	1	0	4	2	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	60	26	0	0	0	0	1	4	5	7	4	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	62	18	0	0	0	0	1	2	3	1	8	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	64	26	0	0	0	1	4	2	5	2	5	0	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	66	17	0	0	0	0	1	1	4	2	3	4	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	68	21	0	0	0	0	1	1	2	2	8	4	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	70	23	0	0	0	0	1	4	1	4	6	2	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	72	30	0	0	0	0	1	2	4	1	8	6	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	74	21	0	0	0	0	1	0	2	0	2	1	4	3	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	76	13	0	0	0	0	0	2	2	1	1	2	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	78	20	0	0	0	0	0	1	2	1	5	3	3	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	80	19	0	0	0	0	0	0	3	4	2	2	2	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0
2005	Unknown	82	5	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	84	6	0	0	0	0	0	0	2	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	86	8	0	0	0	0	0	1	0	1	1	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
2005	Unknown	88	5	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	90	8	0	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2005	Unknown	92	5	0	0	0	0	0	0	0	1	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	94	5	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	96	7	0	0	0	0	0	0	0	0	1	0	1	0	0	2	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
2005	Unknown	98	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	100	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	102	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2005	Unknown	104	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	44	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	46	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	52	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	54	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	60	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	56	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	58	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	62	4	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	64	6	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	66	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	68	4	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	70	7	0	0	0	0	0	0	0	2	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	72	4	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2005	Male	74	6	0	0	0	0	0	0	0	0	1	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	76	4	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	78	4	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	80	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	82	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	86	3	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2005	Male	90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2005	Male	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	102	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	32	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	34	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	42	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	44	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	46	9	0	0	1	0	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	48	9	0	0	0	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	50	16	0	0	0	1	3	3	4	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	52	20	0	0	2	1	0	4	6	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	54	13	0	0	0	1	2	5	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	56	8	0	0	0	0	2	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	58	6	0	0	0	0	0	2	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	60	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	62	12	0	0	0	0	2	2	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	64	4	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	66	6	0	0	0	0	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	68	3	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	70	3	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	72	8	0	0	0	0	0	0	2	1	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	74	6	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	76	8	0	0	0	0	0	0	0	2	1	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2006	Unknown	78	9	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	80	7	0	0	0	0	0	1	0	1	1	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	82	5	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	84	7	0	0	0	0	0	0	1	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	86	6	0	0	0	0	0	0	0	0	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	88	7	0	0	0	0	0	0	1	0	2	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2006	Unknown	90	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2006	Unknown	92	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	94	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	96	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	98	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2006	Unknown	102	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	106	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	38	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	50	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2006	Male	58	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	62	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	66	8	0	0	0	0	0	2	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	68	3	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	70	7	0	0	0	0	0	1	1	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	72	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	78	2	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	82	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	40	4	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	42	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	44	4	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	46	6	0	0	1	1	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	48	7	0	0	0	2	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	50	11	0	0	0	1	2	1	2	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	52	7	0	0	0	1	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	54	9	0	0	0	0	2	1	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	56	9	0	0	2	2	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2007	Unknown	58	10	0	0	1	0	1	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	60	10	0	0	0	1	2	1	3	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	62	9	0	0	0	0	2	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	64	7	0	0	0	0	1	3	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	66	9	0	0	0	0	1	3	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	68	7	0	0	0	0	0	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	70	9	0	0	0	0	0	1	2	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	72	12	0	0	0	0	0	0	2	4	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	74	12	0	0	0	0	0	3	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	76	3	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	78	7	0	0	0	0	0	1	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	80	8	0	0	0	0	0	1	1	0	3	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	82	6	0	0	0	0	0	0	1	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	84	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	86	4	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	88	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	90	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	92	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	94	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	96	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2007	Unknown	102	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2007	Female	40	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	48	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	50	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2007	Female	56	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	58	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	64	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	68	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	42	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	44	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	46	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	48	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	50	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	52	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	54	3	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	56	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	58	4	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	60	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	62	3	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	64	3	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	66	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	68	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	70	3	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	72	7	0	0	0	0	0	1	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	74	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	76	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	78	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	80	5	0	0	0	0	0	0	1	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	84	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	92	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	28	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	36	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	40	4	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	42	3	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	44	9	0	0	2	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	46	10	0	0	1	2	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	48	11	0	0	0	2	2	1	1	1	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	50	18	0	0	1	0	3	6	3	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	52	21	0	0	0	4	1	5	2	4	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	54	10	0	0	1	1	1	1	2	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	56	6	0	0	0	1	1	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	58	4	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	60	7	0	0	0	1	1	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	62	9	0	0	0	1	1	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	64	9	0	0	0	1	1	1	0	2	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	66	6	0	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	68	4	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	70	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2008	Unknown	72	4	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	74	6	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	76	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	78	6	0	0	0	0	0	0	2	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	80	5	0	0	0	0	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	82	5	0	0	0	0	0	0	1	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	84	5	0	0	0	0	0	0	0	1	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	86	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	88	3	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	90	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	92	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	94	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	96	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	104	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	34	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	36	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	38	3	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	40	6	0	0	3	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	42	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	44	4	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	46	3	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	48	6	0	0	0	1	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	50	11	0	0	0	0	1	2	0	1	3	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	52	11	0	0	0	0	0	1	1	3	2	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	54	4	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	56	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	58	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2008	Female	66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	68	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2008	Male	40	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	42	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	48	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	54	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	56	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	58	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	60	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	62	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	66	3	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	68	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	70	3	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	72	8	0	0	0	0	0	0	0	1	2	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2008	Male	74	5	0	0	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	76	5	0	0	0	0	0	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	78	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	80	3	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	82	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	84	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2008	Male	88	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	90	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	92	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	96	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	26	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	28	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	30	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	32	4	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	34	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	36	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	38	5	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	40	7	0	0	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	42	7	0	0	1	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	44	7	0	0	1	0	0	4	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	46	19	0	0	2	3	3	3	1	2	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	48	26	0	0	2	0	3	4	5	2	1	2	2	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	50	21	0	0	0	2	0	2	3	7	1	1	1	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	52	26	0	0	0	1	0	3	3	6	4	1	1	1	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	54	19	0	0	0	1	1	1	3	2	1	2	3	0	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0
2009	Unknown	56	18	0	0	0	1	0	4	3	2	3	0	2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	58	27	0	0	0	0	1	3	8	3	6	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	60	27	0	0	0	1	1	2	1	4	6	4	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	62	27	0	0	0	0	1	3	3	4	6	1	4	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	64	20	0	0	0	0	2	3	3	0	4	3	2	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
2009	Unknown	66	20	0	0	0	0	1	2	0	5	2	3	2	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	68	21	0	0	0	0	0	0	4	2	3	2	7	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2009	Unknown	70	21	0	0	0	0	0	1	1	2	4	4	3	0	2	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0
2009	Unknown	72	18	0	0	0	0	0	2	0	3	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
2009	Unknown	74	11	0	0	0	1	0	0	0	1	0	2	1	1	1	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2009	Unknown	76	10	0	0	0	0	0	0	0	2	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2009	Unknown	78	16	0	0	0	0	0	0	0	0	1	0	4	1	4	0	0	1	1	0	0	2	0	0	0	0	0	0	0	1	1
2009	Unknown	80	11	0	0	0	0	0	0	0	0	3	0	1	2	2	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2009	Unknown	82	13	0	0	0	0	0	1	1	1	2	1	2	0	1	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0
2009	Unknown	84	12	0	0	0	0	0	0	1	1	1	0	1	3	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	86	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0	0
2009	Unknown	88	5	0	0	0	0	0	0	0	0	1	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0

2009	Unknown	90	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	92	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
2009	Unknown	94	9	0	0	0	0	0	0	0	0	0	0	2	0	2	2	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0
2009	Unknown	96	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	98	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
2009	Unknown	100	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	102	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	106	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2009	Female	28	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	32	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	34	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	36	5	0	0	0	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	40	12	0	0	2	3	2	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	42	17	0	0	1	2	4	4	1	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	44	21	0	0	1	0	4	1	5	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	46	21	0	0	1	0	2	3	5	4	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	48	19	0	0	0	1	1	1	8	5	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	50	22	0	0	0	0	0	2	1	5	1	1	3	2	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	52	10	0	0	0	0	0	0	1	2	1	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2009	Female	54	8	0	0	0	0	0	0	0	0	2	1	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
2009	Female	56	4	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
2009	Female	58	6	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2009	Female	60	5	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	62	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2009	Female	64	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
2009	Female	66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2009	Male	38	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	40	4	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	42	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	44	8	0	0	0	3	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	46	5	0	0	0	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	48	5	0	0	1	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	50	6	0	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	52	6	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	54	5	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	56	10	0	0	0	1	1	0	2	1	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	58	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	60	9	0	0	0	0	0	0	2	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	62	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	64	12	0	0	0	0	0	0	3	2	4	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2009	Male	66	6	0	0	0	0	0	0	0	2	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	68	6	0	0	0	0	1	0	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	70	7	0	0	0	0	0	0	0	3	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	72	8	0	0	0	0	0	0	0	0	2	0	3	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0

2009	Male	74	5	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	76	7	0	0	0	0	0	0	0	0	1	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	78	8	0	0	0	0	0	0	0	0	2	0	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2009	Male	80	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
2009	Male	82	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2009	Male	84	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	86	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2009	Male	90	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	92	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	96	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	100	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Commercial Long Line West

		Length	Sample															Age														
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2003	Unknown	54	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	56	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	58	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	62	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	64	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	66	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	70	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	74	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	80	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	84	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	Unknown	94	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	56	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	74	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	52	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	54	4	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	56	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	58	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	60	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	62	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	64	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2005	Unknown	68	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	70	3	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	72	4	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

2005	Unknown	74	3	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	76	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	82	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	84	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	88	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Unknown	90	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	46	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	48	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	52	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	54	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	56	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	64	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	68	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	70	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	86	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2007	Unknown	40	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	46	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	48	6	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	50	10	0	0	0	0	0	2	3	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	52	7	0	0	0	0	0	0	1	3	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	54	12	0	0	0	0	1	2	4	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	56	4	0	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	58	11	0	0	0	0	0	2	4	3	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	60	6	0	0	0	0	0	2	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	62	4	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	64	6	0	0	0	0	0	1	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	66	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2007	Unknown	68	3	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	70	4	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	72	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	74	4	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	76	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	78	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	80	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	84	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	42	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	44	4	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	46	13	0	0	1	2	0	1	3	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	48	18	0	0	0	0	1	3	5	3	1	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2008	Unknown	50	14	0	0	0	1	2	3	3	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	52	9	0	0	0	1	2	2	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	54	28	0	0	0	0	1	2	8	3	6	2	0	1	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	56	20	0	0	0	1	4	4	6	2	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	58	24	0	0	0	0	0	2	4	8	5	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	60	25	0	0	0	0	2	2	4	5	4	2	2	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
2008	Unknown	62	36	0	0	0	1	2	5	8	3	5	4	2	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0
2008	Unknown	64	15	0	0	0	0	0	1	1	2	3	2	3	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
2008	Unknown	66	35	0	0	0	0	3	4	6	5	5	8	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	68	34	0	0	0	0	1	2	6	3	10	3	3	3	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2008	Unknown	70	14	0	0	0	0	1	0	3	2	4	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2008	Unknown	72	28	0	0	0	0	1	1	3	3	4	8	6	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	74	16	0	0	0	0	0	0	2	2	3	2	3	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0
2008	Unknown	76	13	0	0	0	0	0	0	1	2	2	1	4	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	78	9	0	0	0	0	0	0	3	2	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	80	7	0	0	0	0	1	0	1	1	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2008	Unknown	82	6	0	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	84	9	0	0	0	0	0	1	1	1	3	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	86	8	0	0	0	0	0	0	1	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	88	5	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2008	Unknown	90	6	0	0	0	0	0	0	0	1	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	92	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	94	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2008	Unknown	102	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	104	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	40	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	42	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	44	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	46	6	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	48	5	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	50	19	0	0	0	0	1	2	8	4	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	52	12	0	0	0	0	0	1	2	1	3	3	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2009	Unknown	54	21	0	0	0	1	0	1	4	4	1	2	3	1	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	56	27	0	0	0	0	0	4	3	3	6	4	4	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2009	Unknown	58	26	0	0	1	0	0	3	5	6	5	0	0	1	0	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0
2009	Unknown	60	28	0	0	0	0	2	1	9	3	3	0	2	1	2	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0
2009	Unknown	62	46	0	0	0	0	0	6	8	5	5	4	2	5	4	1	2	0	3	0	0	0	0	0	0	0	1	0	0	0
2009	Unknown	64	28	0	0	0	0	0	0	4	5	6	4	2	1	0	2	2	0	0	1	0	0	0	0	0	1	0	0	0	0
2009	Unknown	66	29	0	0	0	0	1	0	3	5	6	6	4	2	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2009	Unknown	68	34	0	0	0	0	0	0	5	5	8	3	6	0	1	0	1	1	1	0	1	0	0	0	0	0	1	0	0	1

2009	Unknown	70	33	0	0	0	0	0	1	5	3	5	6	5	5	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
2009	Unknown	72	42	0	0	0	0	1	1	5	6	5	7	6	2	1	3	0	1	1	0	0	0	0	0	1	0	0	0	0	0	2
2009	Unknown	74	23	0	0	0	0	1	0	2	3	3	2	6	3	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	76	20	0	0	0	0	0	1	1	2	2	4	3	2	1	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0
2009	Unknown	78	23	0	0	0	0	0	1	0	2	1	4	4	3	2	2	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0
2009	Unknown	80	15	0	0	0	0	0	0	0	2	2	3	3	0	2	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
2009	Unknown	82	15	0	0	0	0	0	0	2	1	3	2	2	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	84	21	0	0	0	0	0	0	0	2	3	1	5	0	2	0	2	0	0	2	0	1	3	0	0	0	0	0	0	0	0
2009	Unknown	86	14	0	0	0	0	0	0	0	2	3	3	3	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	88	4	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	90	14	0	0	0	0	0	0	0	0	1	1	2	2	3	2	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
2009	Unknown	92	7	0	0	0	0	0	0	0	0	1	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	94	6	0	0	0	0	0	0	0	1	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	96	5	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	98	3	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	100	3	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	102	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2009	Unknown	104	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2009	Unknown	108	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2009	Unknown	110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Unknown	112	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	40	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	42	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	44	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	46	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	50	5	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2009	Female	52	3	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	56	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	50	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	56	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	58	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	60	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	62	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	70	4	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2009	Male	86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

NMFS Bottom Long Line Survey East

		Length	Sample	Age																												
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2000	Unknown	62	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Unknown	64	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Female	62	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Female	68	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Female	76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	Male	56	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	48	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	50	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	52	3	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	54	3	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	56	6	0	0	0	0	0	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	58	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	54	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	56	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	58	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	70	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	72	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	48	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	50	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	54	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	62	3	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	66	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	50	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	44	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	46	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	48	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	54	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	56	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	60	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	62	3	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	64	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	72	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2005	Female	48	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	50	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	54	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	56	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Female	60	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	44	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	54	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	58	3	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	60	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	68	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	76	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	86	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	88	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	92	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	Male	108	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2006	Female	44	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	48	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	50	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	56	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	64	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2006	Female	72	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	70	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	80	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	90	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	50	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	42	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	46	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	50	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	52	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	56	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	60	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	62	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	46	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	52	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	56	3	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	58	3	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	62	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	64	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	66	4	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	68	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2007	Male	70	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	72	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	76	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	78	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	80	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	82	3	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	86	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	46	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Unknown	74	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	48	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	52	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	48	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	54	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	58	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	66	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	68	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	70	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	76	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	78	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	48	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	50	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	52	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	54	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	58	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	70	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	56	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	58	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	64	3	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	68	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	70	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	76	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	78	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NMFS Bottom Long Line Survey West

		Length	Sample															Age														
Year	Gender	Bin	Size	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2001	Unknown	44	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2001	Unknown	50	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	54	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	62	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	66	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	80	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Unknown	84	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	48	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	50	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Female	58	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	52	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	56	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	58	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	62	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	64	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	66	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	84	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	86	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	Male	104	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	48	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	50	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	52	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	54	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	56	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	60	4	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	62	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	64	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	66	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	68	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	70	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	72	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Unknown	76	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	42	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	46	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	48	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	52	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Female	56	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	54	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	60	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	66	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2002	Male	70	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	Male	74	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Unknown	46	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Female	52	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	48	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	56	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	58	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	62	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	64	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	66	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	70	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	72	3	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	76	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	88	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	Male	92	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2004	Male	94	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2006	Unknown	46	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	50	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	54	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Unknown	58	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	42	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	50	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Female	56	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	46	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	52	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	58	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	60	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	64	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	66	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	78	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	Male	88	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Unknown	68	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	52	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	54	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Female	56	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	56	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	60	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	62	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	64	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2007	Male	70	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	74	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	76	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	78	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	80	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	84	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	90	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	Male	96	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	46	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Female	58	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	56	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	58	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	60	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	64	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	70	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	72	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	76	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	78	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	84	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	Male	86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	48	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	50	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	54	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2009	Female	70	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Female	72	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	50	2	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	54	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	56	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	58	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	60	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	64	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2009	Male	66	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	68	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	70	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	72	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
2009	Male	76	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	Male	80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2009	Male	88	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2009	Male	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.8. Appendix C. Starter.SS File

```
#C GOM Tilefish Assessment
Tilefish.dat
Tilefish.ctl
0 # 0=use init values in control file; 1=use ss3.par
0 # run display detail (0,1,2)
1 # detailed age-structured reports in REPORT.SSO (0,1)
0 # write detailed checkup.sso file (0,1)
0 # write parm values to ParmTrace.sso (0=no,1=good,active; 2=good,all; 3=every_iter,all_parms;
4=every,active)
1 # write to cumreport.sso (0=no,1=like&timeseries; 2=add survey fits)
1 # Include prior_like for non-estimated parameters (0,1)
1 # Use Soft Boundaries to aid convergence (0,1) (recommended)
1 # Number of bootstrap datafiles to produce
10 # Turn off estimation for parameters entering after this phase
10 # MCMC burn interval
2 # MCMC thin interval
0 # jitter initial parm value by this fraction
-1 # min yr for sdreport outputs (-1 for styr)
-1 # max yr for sdreport outputs (-1 for endyr; -2 for endyr+Nforecastyrs
1 # N individual STD years
#vector of year values
2009
0.0001 # final convergence criteria (e.g. 1.0e-04)
0 # retrospective year relative to end year (e.g. -4)
0 # min age for calc of summary biomass
1 # Depletion basis: denom is: 0=skip; 1=rel X*B0; 2=rel X*Bmsy; 3=rel X*B_styr
1.0 # Fraction (X) for Depletion denominator (e.g. 0.4)
4 # (1-SPR)_reporting: 0=skip; 1=rel(1-SPR); 2=rel(1-SPR_MSY); 3=rel(1-SPR_Btarget); 4=notrel
1 # F_std reporting: 0=skip; 1=exploit(Bio); 2=exploit(Num); 3=sum(frates)
0 # F_report_basis: 0=raw; 1=rel Fspr; 2=rel Fmsy ; 3=rel Fbtgt
999 # check value for end of file
```

3.9. Appendix D. Forecast.SS File

```
0 # Forecast: 0=none; 1=F(SPR); 2=F(MSY) 3=F(Btgt); 4=F(endyr); 5=Ave F (enter yrs); 6=read Fmult
# -4 # first year for recent ave F for option 5 (not yet implemented)
# -1 # last year for recent ave F for option 5 (not yet implemented)
# 0.74 # F multiplier for option 6 (not yet implemented
2009 # first year to use for averaging selex to use in forecast (e.g. 2004; or use #NAME? to be rel endyr)
2009 # last year to use for averaging selex to use in forecast
1 # Benchmarks: 0=skip; 1=calc F_spr,F_btgt,F_msy
2 # MSY: 1= set to F(SPR); 2=calc F(MSY); 3=set to F(Btgt); 4=set to F(endyr)
0.3 # SPR target (e.g. 0.40)
0.3 # Biomass target (e.g. 0.40)
6 # N forecast years
1 # read 10 advanced options
 0 # Do West Coast gfish rebuilder output (0/1)
 -1 # Rebuilder: first year catch could have been set to zero (Ydecl)(-1 to set to endyear+1)
 2009 # Rebuilder: year for current age structure (Yinit) (-1 to set to endyear+1)
 2 # Control rule method (1=west coast adjust catch; 2=adjust F)
 0 # Control rule Biomass level for constant F (as frac of Bzero, e.g. 0.40)
 0.1 # Control rule Biomass level for no F (as frac of Bzero, e.g. 0.10)
 1 # Control rule fraction of Flimit (e.g. 0.75)
 0 # basis for max forecast catch by seas and area (0=none; 1=deadbio; 2=retainbio; 3=deadnum; 4=retainnum)
 0 # 0= no implementation error; 1=use implementation error in forecast (not coded yet)
 0.1 # stddev of log(realized F/target F) in forecast (not coded yet)
# end of advanced options
# max forecast catch
# rows are seasons, columns are areas
# 1000
1 # fleet allocation (in terms of F) (1=use endyr pattern, no read; 2=read below)
# 0.225768
0 # Number of forecast catch levels to input (rest calc catch from forecast F
# 1 # basis for input forecatch: 1=retained catch; 2=total dead catch
#Year Seas Fleet Catch


999 # verify end of input
```

3.10. Appendix E. Tilefish.DAT File

```
#.dat file for Tilefish SSIII
#_bootstrap file: 1
1965 #_styr
2009 #_endyr
1 #_nseas
12 #_months/season
1 #_spawn_seas
4 #_Nfleet CM_HL_E, CM_HL_W, CM_LL_E, CM_LL_W
2 #_Nsurveys NMFS_E_index, NMFS_W_index
2 #_N_areas
# CM_HL_E, CM_HL_W, CM_LL_E, CM_LL_W, NMFS_E_index, NMFS_W_index
HLE%HLW%LLE%LLW%NMFSE%NMFSW
0.5 0.5 0.5 0.5 0.5 0.5 #_surveytiming_in_season
1 2 1 2 1 2 #_area_assignments_for_each_fishery_and_survey
1 1 1 1    #_units of catch:  2=num
0.01 0.01 0.01 0.01 #_se of log(catch) only used for init_eq_catch and for  2 and 3
2 #_Ngenders
30 #_Nages
0 0 0 0 #_init_equil_catch_for_each_fishery
44 #_N_lines_of_catch_to_read
#_catch_biomass(mt):_columns_are_fisheries,year,season
 3.16 0.00 0.00 0.00 1965 1
 0.91 0.00 0.00 0.00 1966 1
 0.49 0.00 0.00 0.00 1967 1
 0.67 0.00 0.00 0.00 1968 1
 0.14 0.00 0.00 0.00 1969 1
 1.49 0.00 0.00 0.00 1971 1
```

0.50 0.00 0.00 0.00 1972 1
1.81 0.00 0.00 0.00 1973 1
1.91 0.00 0.00 0.00 1974 1
6.72 0.00 0.00 0.00 1975 1
11.17 0.00 0.00 0.00 1976 1
16.51 0.00 0.00 0.00 1977 1
10.71 0.27 0.00 0.00 1978 1
13.30 0.00 2.60 0.54 1979 1
8.72 0.00 3.13 0.82 1980 1
58.81 0.00 40.80 12.66 1981 1
27.64 0.00 62.87 46.49 1982 1
6.47 0.24 62.84 36.17 1983 1
5.95 0.96 83.47 46.61 1984 1
4.54 5.58 41.64 74.61 1985 1
22.06 4.46 66.99 57.37 1986 1
34.76 9.00 77.73 122.25 1987 1
40.18 21.46 117.30 252.05 1988 1
18.49 28.82 46.60 112.30 1989 1
32.04 1.54 56.80 72.81 1990 1
8.38 11.18 54.12 23.49 1991 1
6.08 6.70 43.48 40.02 1992 1
7.09 3.31 68.61 50.03 1993 1
5.70 0.74 120.94 48.78 1994 1
1.06 3.64 74.97 135.19 1995 1
0.66 1.34 54.87 38.64 1996 1
1.18 0.26 130.57 20.97 1997 1
0.61 0.74 101.84 31.59 1998 1
2.83 1.99 99.48 65.53 1999 1
1.92 2.51 122.36 90.68 2000 1

7.27 0.13 153.13 59.15 2001 1
4.39 0.72 111.92 128.34 2002 1
1.57 0.98 106.90 72.20 2003 1
1.39 0.28 128.66 81.62 2004 1
3.96 1.94 155.23 108.16 2005 1
2.66 0.09 112.20 26.22 2006 1
0.48 0.99 133.33 10.96 2007 1
0.06 0.18 131.57 26.92 2008 1
0.61 2.24 164.81 27.27 2009 1

52 #_N_cpue_and_surveyabundance_observations
#_year seas index obs se(log)
1992 1 3 0.388729358 0.50 #CM_LL_E_index
1993 1 3 0.497613432 0.48 #CM_LL_E_index
1994 1 3 0.933917031 0.38 #CM_LL_E_index
1995 1 3 1.073417615 0.38 #CM_LL_E_index
1996 1 3 0.679337972 0.38 #CM_LL_E_index
1997 1 3 0.887044147 0.36 #CM_LL_E_index
1998 1 3 1.949292905 0.37 #CM_LL_E_index
1999 1 3 1.82087748 0.37 #CM_LL_E_index
2000 1 3 0.880234569 0.37 #CM_LL_E_index
2001 1 3 0.685054359 0.37 #CM_LL_E_index
2002 1 3 0.721522232 0.36 #CM_LL_E_index
2003 1 3 0.56912321 0.35 #CM_LL_E_index
2004 1 3 0.651857236 0.37 #CM_LL_E_index
2005 1 3 0.769378104 0.38 #CM_LL_E_index
2006 1 3 1.20161629 0.39 #CM_LL_E_index
2007 1 3 1.338505747 0.37 #CM_LL_E_index
2008 1 3 1.548394986 0.39 #CM_LL_E_index

2009 1 3 1.404083326 0.39 #CM_LL_E_index
1992 1 4 0.351612127 0.35 #CM_LL_W_index
1993 1 4 0.482485199 0.27 #CM_LL_W_index
1994 1 4 0.581232287 0.24 #CM_LL_W_index
1995 1 4 0.840238575 0.20 #CM_LL_W_index
1996 1 4 1.519611989 0.24 #CM_LL_W_index
1997 1 4 1.300153447 0.28 #CM_LL_W_index
1998 1 4 0.633733859 0.29 #CM_LL_W_index
1999 1 4 0.910370964 0.21 #CM_LL_W_index
2000 1 4 0.889629594 0.23 #CM_LL_W_index
2001 1 4 1.077905955 0.25 #CM_LL_W_index
2002 1 4 1.672015693 0.25 #CM_LL_W_index
2003 1 4 0.634179417 0.23 #CM_LL_W_index
2004 1 4 1.038398218 0.32 #CM_LL_W_index
2005 1 4 2.064560373 0.31 #CM_LL_W_index
2006 1 4 0.688100164 0.37 #CM_LL_W_index
2007 1 4 1.404058707 0.57 #CM_LL_W_index
2008 1 4 0.911713432 0.34 #CM_LL_W_index
2001 1 5 0.2763 0.64 #NMFS_E_index
2002 1 5 0.8807 0.55 #NMFS_E_index
2003 1 5 0.4633 0.68 #NMFS_E_index
2004 1 5 1.23564 0.53 #NMFS_E_index
2006 1 5 1.35562 0.45 #NMFS_E_index
2007 1 5 1.79847 0.45 #NMFS_E_index
2008 1 5 1.12527 0.54 #NMFS_E_index
2009 1 5 1.22787 0.53 #NMFS_E_index
2000 1 6 0.13756 0.75 #NMFS_W_index
2001 1 6 0.66647 0.44 #NMFS_W_index
2002 1 6 0.97064 0.50 #NMFS_W_index

2003 1 6 0.57449 0.58 #NMFS_W_index
2004 1 6 0.62899 0.61 #NMFS_W_index
2006 1 6 1.13674 0.52 #NMFS_W_index
2007 1 6 2.19401 0.45 #NMFS_W_index
2008 1 6 1.24441 0.52 #NMFS_W_index
2009 1 6 1.85513 0.42 #NMFS_W_index
1 #_discard_type (1=bio or num; 2=fraction)
0 #_N_discard_obs
0 #_N_meanbodywt_obs

2 # length bin method: 1=use databins; 2=generate from binwidth,min,max below; vector
2 # binwidth for population size comp
10 # minimum size in the population (lower edge of first and size at age 0.00)
114 # maximum size in the population (lower edge of last

-0.0001 #_comp_tail_compression
1.00E-07 #_add_to_comp
20 #_combine males into females at or below this bin number
48 #_N_LengthBins
20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114
127 #_N_Length_obs
#Yr Seas Flt/Svy Gender Part Nsamp datavector(female-male)
1991 1 1 1 2 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1991 1 1 0 2 14 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 0 2 1 1 1 0 0 0 1 0 0 1 1 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1992 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1993 1 1 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1993 1 1 0 2 22 1 0 0 0 0 0 0 0 1 2 1 2 1 4 3 3 1 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1994 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1995 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1996 1 1 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1996 1 1 0 2 30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 2 3 3 2 4 3 2 2 1 1 0 1 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1997 1 1 0 2 20 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 2 0 2 3 2 2 1 2 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1998 1 1 0 2 19 0 0 0 0 0 0 0 0 1 2 0 4 2 1 1 1 1 0 1 0 0 1 1 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1999 1 1 0 2 34 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 2 3 3 0 1 2 1 0 1 1 2 3 3 0 0 2 4 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2000 1 1 1 2 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2000 1 1 0 2 24 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 3 0 1 0 0 4 1 0 2 2 0 0 0 0 1 0 2 0 1 0 0 0 1 1 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2001 1 1 3 2 108 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 6 5 9 11 11 9 7 0 2 2 0 0 0 1 0 0 3 2 3 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 1 0 0 0 0 2 0 2 1 0 0 0 0 0 0 0 0 0 2 1 5 5 6 1 1 3 0 0 0 0 0
2001 1 1 0 2 46 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 0 0 0 4 0 7 5 1 1 1 1 0 0 1 1 0 0 2 4 6 1 5 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 1 3 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0

2002 1 1 0 2 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 3 8 12 9 6 4 6 15 7 4 7 3 2 1 4 1 2 0 0 0 1 2 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2003 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2004 1 1 0 2 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 3 1 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2005 1 1 3 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2005 1 1 0 2 174 0 0 0 0 0 0 0 0 0 0 0 0 3 4 4 1 8 3 6 3 5 9 5 10 11 16 19 11 14 9 4 0 4 7 2 6 2 1 2 0 2 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2007 1 1 2 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2008 1 1 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2008 1 1 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2009 1 1 0 2 11 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 1 2 0 2 0 0 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1987 1 2 0 2 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1988 1 2 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1990 1 2 0 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1991 1 2 0 2 15 0 0 0 0 0 0 1 1 1 0 1 1 0 0 1 1 2 4 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1992 1 2 0 2 95 0 0 0 0 0 0 1 0 2 1 0 2 2 9 8 10 6 12 15 6 7 5 1 1 2 2 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1993 1 2 0 2 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 4 1 1 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1994 1 2 0 2 47 0 0 0 1 0 0 0 0 0 0 0 0 2 4 3 2 3 1 6 4 5 3 3 5 0 0 1 1 1 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1995 1 2 0 2 7 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 1 0 0 1 1 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1996 1 2 0 2 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 0 1 0 2 1 1 0 0 1 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1999 1 2 0 2 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2001 1 2 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2003 1 2 0 2 19 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 4 0 1 1 3 0 0 0 1 2 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 2 0 2 20 0 0 0 0 0 0 0 0 1 1 1 1 2 0 2 3 0 2 1 0 3 0 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 2 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 2 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 2 0 2 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 2 0 1 1 1 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 2 0 2 52 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 3 4 7 7 4 6 3 2 2 2 0 1 1 2 3 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 2 3 2 10 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 2 1 0 1 1 0 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 2 0 2 38 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 2 1 5 1 4 4 4 1 1 1 2 3 1 1 3 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1984 1 3 0 2 106 0 0 0 0 0 0 0 1 2 1 3 1 3 4 14 9 8 12 7 6 7 4 9 2 1 1 5 1 0 1 0 1 1 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1986 1 3 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1987 1 3 0 2 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 2 4 1 2 1 2 0 0 1 2 2 0 3 1 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1988 1 3 0 2 48 0 0 0 0 0 0 0 0 0 0 0 0 1 1 2 2 5 6 2 1 4 3 5 0 5 3 1 0 0 0 1 2 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1989 1 3 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1990 1 3 0 2 153 0 0 0 0 0 0 0 1 0 1 1 1 4 2 7 6 6 16 9 17 9 17 11 6 9 5 3 6 3 2 1 1 2 0 0 0 2 0 2 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1991 1 3 0 2 35 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 2 1 2 2 2 3 2 0 5 3 3 3 0 0 1 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1992 1 3 0 2 23 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 2 3 1 0 2 0 1 0 3 1 0 0 3 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1993 1 3 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1993 1 3 0 2 14 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 3 2 1 0 1 1 2 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1994 1 3 3 2 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1994 1 3 0 2 200 0 0 0 0 0 0 1 2 10 12 18 25 28 28 30 32 40 34 42 40 37 35 40 30 29 27 22 20 18 18 13 13 17 18 13 13 6 9 10 7 2 1 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1995 1 3 0 2 200 0 0 0 0 0 0 1 2 2 7 4 8 13 11 9 12 18 19 16 16 13 10 4 9 5 10 4 7 4 8 4 2 8 6 5 2 3 1 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1996 1 3 0 2 200 0 0 0 0 1 1 3 4 7 14 11 11 16 15 17 20 19 22 17 22 18 12 19 16 6 9 3 4 5 4 6 7 9 7 3 4 4 3 3 4 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1997 1 3 0 2 200 0 0 0 0 0 2 4 6 12 23 26 35 33 35 29 38 34 37 24 33 30 30 24 25 17 23 19 16 17 12 6 8 10 6 11 8 6 4 5 1 2 2 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1998 1 3 0 2 200 0 0 0 0 0 0 0 0 0 3 11 15 33 34 20 9 19 31 26 27 18 24 23 24 14 13 12 2 7 6 4 8 8 6 4 2 3 3 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1999 1 3 0 2 200 0 0 0 0 0 0 0 0 2 5 6 11 19 18 26 22 34 40 29 33 27 31 29 36 15 18 19 19 15 14 12 7 8 8 8 6 5 13 5 4 5 4 4 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2000 1 3 0 2 200 0 0 0 0 0 0 0 1 4 7 8 20 24 33 28 38 38 60 39 49 43 50 46 51 36 30 22 28 26 27 15 10 17 14 16 7 5 11 4 3 3 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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2003 1 3 2 2 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 1 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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1998 1 4 0 2 13 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 1 1 0 1 1 1 1 0 1 0 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2000 1 4 0 2 35 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 4 1 0 3 4 1 2 1 2 3 0 2 1 2 4 1 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2003 1 4 0 2 18 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 0 1 1 2 1 2 0 1 0 2 0 0 1 0 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2005 1 4 0 2 34 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 5 1 2 1 2 2 0 1 3 4 3 2 0 0 2 0 1 2 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2006 1 4 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2006 1 4 0 2 15 0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 1 2 1 2 0 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2007 1 4 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2007 1 4 0 2 93 0 0 0 0 0 0 0 0 0 0 0 1 0 1 6 12 9 13 4 11 5 5 6 3 3 4 1 4 1 1 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2008 1 4 0 2 200 0 0 0 0 0 0 0 0 0 0 0 1 5 13 19 14 9 28 20 24 26 38 15 36 34 14 28 16 13 10 7 6 9 8 5 6 1 2 0 0 1 1 1 0 0 0 0 0 0 0 0 0
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2000 1 5 3 2 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2000 1 5 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2001 1 5 3 2 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 3 3 6 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 2 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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2002 1 5 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2002 1 5 0 2 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 3 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2004 1 5 3 2 15 0 0 0 0 0 0 0 0 0 0 0 0 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 2 0 1 3 2 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2005 1 5 3 2 20 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 1 0 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 3 1 0 0 0 1 0 0 0 1 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 1 0 0 0

2006 1 5 3 2 11 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 0 0 1 0 0 0 2 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0

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2007 1 5 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2008 1 5 3 2 11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 1 0 0 0 1 1 2 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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2009 1 5 3 2 18 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 0 0 3 0 1 2 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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2 0 1 1 1 2 0 2 1 1 1 3 0 1 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0

29 #_N_age_bins
 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
2 #_N_ageerror_definitions

0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5 13.5 14.5 15.5 16.5 17.5 18.5 19.5 20.5 21.5 22.5 23.5 24.5 25.5 26.5 27.5 28.5 29.5 30.5
0.001 0.001
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5 13.5 14.5 15.5 16.5 17.5 18.5 19.5 20.5 21.5 22.5 23.5 24.5 25.5 26.5 27.5 28.5 29.5 30.5
0.01 0.27 0.96 1.37 1.65 1.88 2.06 2.21 2.35 2.46 2.57 2.66 2.75 2.83 2.90 2.97 3.04 3.10 3.16 3.21 3.26 3.31 3.36 3.40 3.44 3.48 3.52 3.56 3.60 3.63 3.67

914 #_N_Agecomp_obs
2 #_Lbin_method: 1=poplenbins; 2=datalenbins; 3=lengths
1 #_combine males into females at or below this bin number
#Year Season Fleet Gender Partition AgeError Def Lbin_Lo Lbn_hi Nsamp 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
2000 1 1 0 2 2 14 14 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2000 1 1 0 2 2 16 16 2 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2000 1 1 0 2 2 18 18 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2000 1 1 0 2 2 25 25 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2002 1 1 0 2 2 18 18 6 0 0 0 0 0 1 4 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2008 1 3 3 2 2 20 20 2 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2008 1 3 3 2 2 24 24 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 3 2 2 25 25 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 21 21 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 22 22 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 26 26 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 27 27 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 28 28 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 29 29 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2008 1 3 2 2 2 30 30 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 31 31 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 32 32 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 33 33 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 34 34 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 35 35 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 36 36 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 37 37 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 38 38 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 3 2 2 2 39 39 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 4 4 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 0 2 2 6 6 2 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 7 7 4 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 8 8 2 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 9 9 2 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 10 10 5 0 0 2 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 11 11 7 0 0 3 2 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 12 12 7 0 0 1 2 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 13 13 7 0 0 1 0 0 4 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 14 14 19 0 0 2 3 3 3 1 2 1 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 15 15 26 0 0 2 0 3 4 5 2 1 2 2 2 2 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 16 16 21 0 0 0 2 0 2 3 7 1 1 1 0 1 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 17 17 26 0 0 0 1 0 3 3 6 4 1 1 1 3 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 18 18 19 0 0 0 1 1 1 3 2 1 2 3 0 0 1 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 19 19 18 0 0 0 1 0 4 3 2 3 0 2 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 20 20 27 0 0 0 0 1 3 8 3 6 2 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 21 21 27 0 0 0 1 1 2 1 4 6 4 5 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 22 22 27 0 0 0 0 1 3 3 4 6 1 4 4 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2009 1 3 0 2 2 23 23 20 0 0 0 0 2 3 3 0 4 3 2 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 24 24 20 0 0 0 0 1 2 0 5 2 3 2 2 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 0 2 2 27 27 18 0 0 0 0 0 2 0 3 3 2 2 1 1 1 1 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 28 28 11 0 0 0 1 0 0 0 1 0 2 1 1 1 1 2 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 29 29 10 0 0 0 0 0 0 0 2 0 1 1 1 1 1 1 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 30 30 16 0 0 0 0 0 0 0 0 1 0 4 1 4 0 0 1 1 0 0 2 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 31 31 11 0 0 0 0 0 0 0 0 3 0 1 2 2 0 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 32 32 13 0 0 0 0 0 1 1 1 2 1 2 0 1 0 0 1 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 33 33 12 0 0 0 0 0 0 1 1 1 0 1 3 2 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 34 34 6 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 0 2 2 38 38 9 0 0 0 0 0 0 0 0 0 0 2 0 2 2 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 0 2 2 40 40 3 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 41 41 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 42 42 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 0 2 2 44 44 2 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 1 2 2 5 5 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 1 2 2 8 8 2 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 1 2 2 9 9 5 0 0 0 1 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 11 11 16 0 0 2 3 2 2 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 12 12 19 0 0 1 2 4 4 1 3 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 13 13 29 0 0 1 0 4 1 5 6 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 2 2 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 14 14 26 0 0 1 0 2 3 5 4 3 0 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2009 1 3 3 2 2 15 15 24 0 0 0 1 1 1 8 5 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 16 16 28 0 0 0 0 0 2 1 5 1 1 3 2 2 1 1 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 2 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 17 17 16 0 0 0 0 0 0 1 2 1 0 0 0 4 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 18 18 13 0 0 0 0 0 0 0 0 2 1 1 0 1 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 19 19 14 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 1 1 0 2 1 3 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 20 20 8 0 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 21 21 14 0 0 0 0 0 0 2 0 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 3 3 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 22 22 4 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 3 2 2 23 23 13 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 3 2 4 1 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 2 2 2 10 10 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 2 2 2 26 26 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 1 2 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 2 2 2 27 27 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 3 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 3 2 2 2 28 28 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 3 2 2 2 31 31 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0
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2009 1 3 2 2 2 34 34 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0
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2003 1 4 0 2 2 22 22 2 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2005 1 4 0 2 2 26 26 3 0 0 0 0 0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 27 27 4 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 28 28 3 0 0 0 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 29 29 2 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 32 32 2 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 33 33 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 35 35 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2005 1 4 0 2 2 36 36 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 14 14 2 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 15 15 2 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 16 16 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2006 1 4 0 2 2 17 17 2 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 18 18 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 19 19 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 23 23 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 25 25 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 26 26 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 34 34 2 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 4 0 2 2 40 40 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 11 11 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 14 14 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 15 15 6 0 0 0 0 2 2 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 16 16 10 0 0 0 0 0 2 3 2 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 17 17 7 0 0 0 0 0 0 1 3 0 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 18 18 12 0 0 0 0 1 2 4 3 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 19 19 4 0 0 0 0 0 0 2 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 20 20 11 0 0 0 0 0 2 4 3 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 21 21 6 0 0 0 0 0 2 1 0 1 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 22 22 4 0 0 0 0 0 0 0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 23 23 6 0 0 0 0 0 1 1 2 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 24 24 3 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 25 25 3 0 0 0 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 26 26 4 0 0 0 0 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 27 27 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 28 28 4 0 0 0 0 0 0 0 0 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 29 29 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 30 30 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 31 31 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 4 0 2 2 33 33 2 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 12 12 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2008 1 4 0 2 2 13 13 4 0 0 0 1 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 14 14 13 0 0 1 2 0 1 3 4 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 15 15 18 0 0 0 0 1 3 5 3 1 2 1 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 16 16 14 0 0 0 1 2 3 3 0 1 1 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 17 17 9 0 0 0 1 2 2 0 1 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 18 18 28 0 0 0 0 1 2 8 3 6 2 0 1 2 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 19 19 20 0 0 0 1 4 4 6 2 0 1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 20 20 24 0 0 0 0 0 2 4 8 5 2 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 21 21 25 0 0 0 0 2 2 4 5 4 2 2 0 2 0 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 22 22 36 0 0 0 1 2 5 8 3 5 4 2 1 1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 23 23 15 0 0 0 0 0 1 1 2 3 2 3 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 24 24 35 0 0 0 0 3 4 6 5 5 8 0 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 25 25 34 0 0 0 0 1 2 6 3 10 3 3 3 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 26 26 14 0 0 0 0 1 0 3 2 4 1 0 1 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 27 27 28 0 0 0 0 1 1 3 3 4 8 6 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 28 28 16 0 0 0 0 0 0 2 2 3 2 3 1 0 1 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 29 29 13 0 0 0 0 0 0 1 2 2 1 4 0 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 30 30 9 0 0 0 0 0 0 3 2 1 0 0 0 2 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 31 31 7 0 0 0 0 1 0 1 1 0 1 0 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 32 32 6 0 0 0 0 0 0 2 1 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 33 33 9 0 0 0 0 0 1 1 1 3 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 34 34 8 0 0 0 0 0 0 1 2 2 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 35 35 5 0 0 0 0 0 0 2 1 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 36 36 6 0 0 0 0 0 0 0 1 0 1 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 37 37 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 38 38 2 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 41 41 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 42 42 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 4 0 2 2 43 43 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2009 1 4 0 2 2 11 11 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 4 0 2 2 12 12 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 4 0 2 2 13 13 2 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 4 0 2 2 40 40 3 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 4 2 2 2 26 26 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 4 2 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 4 2 2 2 33 33 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0
2009 1 4 2 2 2 34 34 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0
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2001 1 5 1 2 2 16 16 2 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2005 1 5 2 2 2 20 20 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2007 1 5 2 2 2 26 26 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2009 1 5 2 2 2 33 33 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2002 1 6 0 2 2 21 21 4 0 0 0 0 0 0 2 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2002 1 6 0 2 2 23 23 2 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 0 2 2 24 24 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2002 1 6 0 2 2 25 25 2 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 0 2 2 26 26 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 0 2 2 27 27 2 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 0 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 1 2 2 12 12 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2002 1 6 1 2 2 17 17 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 1 2 2 19 19 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 2 2 2 18 18 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 2 2 2 21 21 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2002 1 6 2 2 2 24 24 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2004 1 6 2 2 2 19 19 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2004 1 6 2 2 2 22 22 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 23 23 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 24 24 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 26 26 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 27 27 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 31 31 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 35 35 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2004 1 6 2 2 2 37 37 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0

2004 1 6 2 2 2 38 38 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0
2006 1 6 0 2 2 14 14 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 0 2 2 16 16 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 0 2 2 18 18 2 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 0 2 2 20 20 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2006 1 6 1 2 2 16 16 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 1 2 2 19 19 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 14 14 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 17 17 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 20 20 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 21 21 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 23 23 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 24 24 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 30 30 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2006 1 6 2 2 2 35 35 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 0 2 2 25 25 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 1 2 2 17 17 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 1 2 2 18 18 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 3 2 2 19 19 4 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 21 21 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 22 22 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 23 23 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 26 26 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 28 28 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 30 30 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 31 31 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 33 33 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2007 1 6 2 2 2 36 36 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2007 1 6 2 2 2 39 39 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 1 2 2 14 14 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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2008 1 6 3 2 2 20 20 3 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 19 19 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 21 21 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 23 23 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 26 26 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 27 27 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 30 30 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 33 33 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2008 1 6 2 2 2 34 34 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 1 2 2 15 15 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 3 2 2 16 16 4 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 3 2 2 18 18 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 3 2 2 26 26 3 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 3 2 2 27 27 4 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 19 19 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 20 20 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 21 21 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 23 23 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 24 24 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 25 25 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 29 29 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2009 1 6 2 2 2 31 31 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
2009 1 6 2 2 2 35 35 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
2009 1 6 2 2 2 40 40 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 #_N_size@age_obs
1 #_N_environ_variables
0 #_N_environ_obs
0 # N sizefreq methods to read

0 # no tag data

0 # no morphcomp data

999

3.11. Appendix F. Tilefish.CTL File

```
#.ctl file for Tilefish SSIII
2 #_N_Growth_Patterns
1 #_N_Morphs_Within_GrowthPattern
#_Cond 1 #_Morph_between/within_stdev_ratio (no read if N_morphs=1)
#_Cond 1 #vector_Morphdist_(-1_in_first_val_gives_normal_approx)

2 # N recruitment designs goes here if N_GP*nseas*area>1
0 # placeholder for recruitment interaction request
1 1 1 # example recruitment design element for GP=1, seas=1, area=1
2 1 2 # recruitment design element for GP=2, seas=1, area=2

0 # N_movement_definitions goes here if N_areas > 1
1 # first age that moves (real age at begin of season, not integer) also cond on do_migration>0
#_Cond 1 1 1 2 4 10 # example move definition for seas=1, morph=1, source=1 dest=2, age1=4, age2=10

0 #_Nblock_Patterns
# 3 2 #_blocks_per_pattern
# begin and end years of blocks
# 1975 1985 1986 1990 1995 2001
# 1987 1990 1995 2001

0.57 #_fracfemale
2 #_natM_type:_0=1Parm; 1=N_breakpoints;_2=Lorenzen;_3=agespecific;_4=agespec_withseasinterpolate
# 2 #_N_breakpoints
# 4 15 # age(real) at M breakpoints
4 #_ref age for Lorenzen function
1 # GrowthModel: 1=vonBert with L1&L2; 2=Richards with L1&L2; 3=not implemented; 4=not implemented
```

0 #_Growth_Age_for_L1
999 #_Growth_Age_for_L2 (999 to use as Linf)
0 #_SD_add_to_LAA (set to 0.1 for SS2 V1.x compatibility)
0 #_CV_Growth_Pattern: 0 CV=f(LAA); 1 CV=F(A); 2 SD=F(LAA); 3 SD=F(A)
1 #_maturity_option: 1=length logistic; 2=age logistic; 3=read age-maturity matrix by growth_pattern; 4=read age-fecundity
#_placeholder for empirical age-maturity by growth pattern
1 #_First_Mature_Age
3 #_fecundity option:(1)eggs=Wt*(a+b*Wt);(2)eggs=a*L^b;(3)eggs=a*Wt^b
1 #_hermaphroditism
-1 #_season of transition (-1 at end of each season)
0 #_include males in spawning biomass (0=no, 1=yes)
1 #_parameter_offset_approach (1=none, 2= M, G, CV_G as offset from female-GP1, 3=like SS2 V1.x)
2 #_env/block/dev_adjust_method (1=standard; 2=with logistic trans to keep within base parm bounds)

#_growth_parms
#_LO HI INIT PRIOR PR_type SD PHASE env-var use_dev dev_minyr dev_maxyr dev_stddev Block Block_Fxn
0.01 0.3 0.137 0.137 1 5.0 -4 0 0 0 0 0.5 0 0 # NatM_p1_Fem_GP1
0 30 1.4 1.4 1 5.0 -2 0 0 0 0 0.5 0 0 # L_at_Amin_Fem_GP1
60 120 87.8 87.8 1 5.0 2 0 0 0 0 0.5 0 0 # L_at_Amax_Fem_GP1
0.01 0.3 0.1090 0.1090 1 0.8 2 0 0 0 0 0.5 0 0 # VBK_Fem_GP1
COND(Growth_Model=2)_Richards_coefficient_fem
0.05 0.5 0.16 0.16 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_young_Fem_GP1
0.05 0.5 0.12 0.12 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_old_Fem_GP1
0.01 0.3 0.137 0.137 1 5.0 -4 0 0 0 0 0.5 0 0 # NatM_p1_Fem_GP2
0 30 1.4 1.4 1 5.0 -2 0 0 0 0 0.5 0 0 # L_at_Amin_Fem_GP2
60 120 77.3 77.3 1 0.8 2 0 0 0 0 0.5 0 0 # L_at_Amax_Fem_GP2
0.01 0.3 0.1721 0.1721 1 0.8 2 0 0 0 0 0.5 0 0 # VBK_Fem_GP2
COND(Growth_Model=2)_Richards_coefficient_fem
0.05 0.5 0.16 0.16 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_young_Fem_GP2

0.05 0.5 0.12 0.12 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_old_Fem_GP2
0.05 0.25 0.137 0.137 1 5.0 -4 0 0 0 0 0.5 0 0 # NatM_p1_Mal_GP1
0 30 1.4 1.4 1 0.8 -2 0 0 0 0 0.5 0 0 # L_at_Amin_Mal_GP1
60 120 87.8 87.8 1 0.8 2 0 0 0 0 0.5 0 0 # L_at_Amax_Mal_GP1
0.01 0.3 0.1090 0.1090 1 0.8 2 0 0 0 0 0.5 0 0 # VBK_Mal_GP1
COND(Growth_Model=2)_Richards_coefficient_mal
0.05 0.5 0.16 0.16 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_young_Mal_GP1
0.05 0.5 0.12 0.12 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_old_Mal_GP1
0.05 0.25 0.137 0.137 1 5.0 -4 0 0 0 0 0.5 0 0 # NatM_p1_Mal_GP2
0 30 1.4 1.4 1 0.8 -2 0 0 0 0 0.5 0 0 # L_at_Amin_Mal_GP2
60 120 77.3 77.3 1 0.8 2 0 0 0 0 0.5 0 0 # L_at_Amax_Mal_GP2
0.01 0.3 0.1721 0.1721 1 0.8 2 0 0 0 0 0.5 0 0 # VBK_Mal_GP2
COND(Growth_Model=2)_Richards_coefficient_mal
0.05 0.5 0.16 0.16 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_young_Mal_GP2
0.05 0.5 0.12 0.12 -1 0.05 -3 0 0 0 0 0.5 0 0 # CV_old_Mal_GP2
0.000002 0.000009 0.000007526 0.000007526 1 0.2 -2 0 0 0 0 0.5 0 0 # Wtlen_1_Fem
2.5 3.8 3.082 3.082 1 0.2 -3 0 0 0 0 0.5 0 0 # Wtlen_2_Fem
25 50 34.4 34.4 -1 0.8 -3 0 0 0 0 0.5 0 0 # Mat50%_Fem
-0.6 -0.2 -0.478 -0.478 -1 0.8 -3 0 0 0 0 0.5 0 0 # Mat_slope_Fem
0 50 29.87 29.87 1 0.2 -2 0 0 0 0 0.5 0 0 # Fec_1_Fem
0 5 1.42 1.42 1 0.2 -3 0 0 0 0 0.5 0 0 # Fec_2_Fem
0.000002 0.000009 0.000007526 0.000007526 1 0.2 -2 0 0 0 0 0.5 0 0 # Wtlen_1_Mal
2.5 3.8 3.082 3.082 1 0.2 -3 0 0 0 0 0.5 0 0 # Wtlen_2_Mal
1 60 47.49449 47.49449 -1 0 -4 0 0 0 0 0.5 0 0 # herm_inflection_age
0.1 40 20 20 -1 0 -4 0 0 0 0 0.5 0 0 # herm_stdev(in_age)
0 1 0.190861916 0.190861916 -1 0 -4 0 0 0 0 0.5 0 0 # herm_asymptotic_rate
-4 4 0 0 -1 99 -4 0 0 0 0 0 0 0 # RecrDist_GP1
-4 4 0 0 -1 99 -4 0 0 0 0 0 0 0 # RecrDist_GP2
-4 4 1 1 -1 0.01 4 0 0 0 0 0 0 0 # RecrDist_Area1

-4 4 1 1 -1 0.01 -4 0 0 0 0 0 0 0 # RecrDist_Area2
-4 4 1 1 -1 0.01 -4 0 0 0 0 0 0 0 # RecrDist_Seas1
COND(Rec_Dist_Interact=1)_N_patterns*N_areas*N_seasons
1 1 1 1 -1 0 -4 0 0 0 0 0 0 0 # CohortGrowDev
#_Cond 0 #custom_MG-env_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no MG-environ parameters

#_Cond 0 #custom_MG-block_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no MG-block parameters

#_seasonal_effects_on_biology_parms
0 0 0 0 0 0 0 0 0 0 #_femwtlen1,femwtlen2,mat1,mat2,fec1,fec2,Malewtlen1,malewtlen2,L1,K
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no seasonal MG parameters

#_Cond -4 #_MGparm_Dev_Phase

#_Spawner-Recruitment
3 #_SR_function
#_LO HI INIT PRIOR PR_type SD PHASE
1 10 6.75 6.75 0 0.4 1 # SR_log(R0)
0.2 0.99 0.75 0.75 1 5.0 3 # SR_steep
0 2 0.15 0.15 -1 50 -4 # SR_sigmaR
-5 5 0 0 -1 50 -3 # SR_envlink
-5 5 0 0 -1 50 -3 # SR_R1_offset
0 0.5 0 0 -1 50 -2 # SR_autocorr
0 #_SR_env_link
0 #_SR_env_target_0=none;1=devs;_2=R0;_3=steepness

1 #do_recdev: 0=none; 1=devvector; 2=simple deviations

1965 # first year of main recr_devs; early devs can preceed this era
2009 # last year of main recr_devs; forecast devs start in following year
4 #_recdev phase
1 # (0/1) to read 11 advanced options
0 #_recdev_early_start (0=none; neg value makes relative to recdev_start)
-5 #_recdev_early_phase
0 #_forecast_recruitment phase (incl. late recr) (0 value resets to maxphase+1)
1 #_lambda for prior_fore_recr occurring before endyr+1
1983 #_last_early_yr_nobias_adj_in_MPD
1997 #_first_yr_fullbias_adj_in_MPD
2006 #_last_yr_fullbias_adj_in_MPD
2007 #_first_recent_yr_nobias_adj_in_MPD
1
0
-5 #min rec_dev
5 #max rec_dev
0 #_read_recdevs
#_end of advanced SR options

read specified recr devs
#_Yr Input_value

all recruitment deviations
#DisplayOnly -0.28147 # RecrDev_1971
#DisplayOnly 0.358653 # RecrDev_1972
#DisplayOnly -0.0613461 # RecrDev_1973
#DisplayOnly 0.0765681 # RecrDev_1974
#DisplayOnly 0.792201 # RecrDev_1975
#DisplayOnly 0.0675588 # RecrDev_1976

#DisplayOnly 0.278372 # RecrDev_1977
#DisplayOnly -0.272589 # RecrDev_1978
#DisplayOnly -0.327367 # RecrDev_1979
#DisplayOnly 0.485895 # RecrDev_1980
#DisplayOnly 0.497595 # RecrDev_1981
#DisplayOnly -0.587451 # RecrDev_1982
#DisplayOnly -0.732346 # RecrDev_1983
#DisplayOnly -0.645347 # RecrDev_1984
#DisplayOnly 0.602779 # RecrDev_1985
#DisplayOnly 0.0265801 # RecrDev_1986
#DisplayOnly 0.474477 # RecrDev_1987
#DisplayOnly -0.0120026 # RecrDev_1988
#DisplayOnly -0.125787 # RecrDev_1989
#DisplayOnly 0.367247 # RecrDev_1990
#DisplayOnly -0.74953 # RecrDev_1991
#DisplayOnly -0.543472 # RecrDev_1992
#DisplayOnly -0.609505 # RecrDev_1993
#DisplayOnly 0.340329 # RecrDev_1994
#DisplayOnly -0.0701799 # RecrDev_1995
#DisplayOnly -0.159475 # RecrDev_1996
#DisplayOnly 0.44237 # RecrDev_1997
#DisplayOnly 0.1719 # RecrDev_1998
#DisplayOnly -0.419804 # RecrDev_1999
#DisplayOnly 0.302961 # RecrDev_2000
#DisplayOnly 0.312186 # RecrDev_2001
#DisplayOnly 0 # ForeRecr_2002
#DisplayOnly 0 # ForeRecr_2003
#DisplayOnly 0 # ForeRecr_2004
#DisplayOnly 0 # ForeRecr_2005

#DisplayOnly 0 # ForeRecr_2006
#DisplayOnly 0 # ForeRecr_2007
#DisplayOnly 0 # ForeRecr_2008
#DisplayOnly 0 # ForeRecr_2009
#DisplayOnly 0 # ForeRecr_2010
#DisplayOnly 0 # ForeRecr_2011
#DisplayOnly 0 # ForeRecr_2012
#DisplayOnly 0 # ForeRecr_2013

#Fishing Mortality info
0.1 # F ballpark for tuning early phases
2009 # F ballpark year (neg value to disable)
3 # F_Method: 1=Pope; 2=instan. F; 3=hybrid (hybrid is recommended)
4 # max F or harvest rate, depends on F_Method
4
no additional F input needed for Fmethod 1
read overall start F value; overall phase; N detailed inputs to read for Fmethod 2
read N iterations for tuning for Fmethod 3 (recommend 3 to 7)
#Fleet Year Seas F_value se phase (for detailed setup of F_Method=2)

#_initial_F_parms
#_LO HI INIT PRIOR PR_type SD PHASE
0 1 0 0.01 -1 99 -99 # Init_F_CM_HL_E
0 1 0 0.01 -1 99 -99 # Init_F_CM_HL_W
0 1 0 0.01 -1 99 -99 # Init_F_CM_LL_E
0 1 0 0.01 -1 99 -99 # Init_F_CM_LL_W
#_Q_setup

```
# A=do power, B=env-var, C=extra SD, D=devtype(<0=mirror, 0/1=none, 2=cons, 3=rand, 4=randwalk); E=0=num/1=bio,
F=err_type
#_A B C D E F
0 0 0 0 1 0 # CM_HL_E
0 0 0 0 1 0 # CM_HL_W
0 0 0 0 1 0 # CM_LL_E
0 0 0 0 1 0 # CM_LL_W
0 0 0 0 0 0 # NMFS_E_index
0 0 0 0 0 0 # NMFS_W_index
#_Cond 0 #_If q has random component, then 0=read one parm for each fleet with random q; 1=read a parm for each year of index
#_Q_parms(if_any)
# LO HI INIT PRIOR PR_type SD PHASE
#_place holder for catchability parameters
#_size_selex_types
#_Pattern Discard Male Special
24 0 0 0 # CM_HL_E
5 0 0 1 # CM_HL_W
24 0 0 0 # CM_LL_E
5 0 0 3 # CM_LL_W
24 0 0 0 # NMFS_E_index
5 0 0 5 # NMFS_W_index
#_age_selex_types
#_Pattern Discard Male Special
11 0 0 0 # CM_HL_E
11 0 0 1 # CM_HL_W
11 0 0 0 # CM_LL_E
11 0 0 3 # CM_LL_W
11 0 0 0 # NMFS_E_index
11 0 0 5 # NMFS_W_index
```

#_LO HI INIT PRIOR PR_type SD PHASE env-var use_dev dev_minyr dev_maxyr dev_stddev Block Block_Fxn
20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p1
-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p2
-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p3
-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p4
-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p5
-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLE_SizeSel_p6
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p1
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p2
#20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p1
#-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p2
#-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p3
#-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p4
#-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p5
#-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #HLW_SizeSel_p6
20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p1
-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p2
-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p3
-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p4
-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p5
-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLE_SizeSel_p6
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p1
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p2
#20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p1
#-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p2
#-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p3
#-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p4
#-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p5
#-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #CMLLW_SizeSel_p6

20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p1
-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p2
-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p3
-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p4
-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p5
-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSE_index_SizeSel_p6
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p1
-5 5 0 0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p2
#20 113 60 60 1 0.05 3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p1
#-5 3 3.0 3.0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p2
#-4 12 5 5 1 0.05 3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p3
#-2 6 2.5 2.5 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p4
#-15 5 -15 -15 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p5
#-5 5 5.0 5.0 1 0.05 -3 0 0 0 0 0.5 0 0 #NMFSW_index_SizeSel_p6
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #HLE_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #HLE_AgeSel_p2
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #HLW_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #HLW_AgeSel_p2
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #CMLLE_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #CMLLE_AgeSel_p2
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #CMLLW_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #CMLLW_AgeSel_p2
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #NMFSE_index_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #NMFSE_index_AgeSel_p2
0 30 0 5 0 99 -1 0 0 0 0 0.5 0 0 #NMFSW_index_AgeSel_p1
0 30 30 6 0 99 -1 0 0 0 0 0.5 0 0 #NMFSW_index_AgeSel_p2
#_Cond 0 #_custom_sel-env_setup (0/1)
#_Cond -2 2 0 0 -1 99 -2 #_placeholder when no enviro fxns

Tag loss and Tag reporting parameters go next
0 # TG_custom: 0=no read; 1=read if tags exist
#_Cond -6 6 1 1 2 0.01 -4 0 0 0 0 0 0 0 #_placeholder if no parameters

1 #_Variance_adjustments_to_input_values
#_1 2 3 4 5 6
0 0 0 0 0 0 #_add_to_survey_CV
0 0 0 0 0 0 #_add_to_discard_stddev
0 0 0 0 0 0 #_add_to_bodywt_CV
1 1 1 1 1 1 #_mult_by_lencomp_N
1 1 1 1 1 1 #_mult_by_agecomp_N
1 1 1 1 1 1 #_mult_by_size-at-age_N
30 #_DF_for_discard_like
30 #_DF_for_meanbodywt_like

4 #_maxlambdaphase
1 #_sd_offset

4 # number of changes to make to default Lambdas (default value is 1.0)
Like_comp codes: 1=surv; 2=disc; 3=mnwt; 4=length; 5=age; 6=SizeFreq; 7=sizeage; 8=catch;
9=init_equ_catch; 10=recrdev; 11=parm_prior; 12=parm_dev; 13=CrashPen; 14=Morphcomp; 15=Tag-comp; 16=Tag-negbin
#like_comp fleet/survey phase value sizefreq_method
1 3 1 1 1
1 4 1 1 1
1 5 1 1 1
1 6 1 1 1

lambdas (for info only; columns are phases)

0 0 0 0 #_CPUE/survey:_1
1 1 1 1 #_CPUE/survey:_2
1 1 1 1 #_CPUE/survey:_3
1 1 1 1 #_lencomp:_1
1 1 1 1 #_lencomp:_2
0 0 0 0 #_lencomp:_3
1 1 1 1 #_agecomp:_1
1 1 1 1 #_agecomp:_2
0 0 0 0 #_agecomp:_3
1 1 1 1 #_size-age:_1
1 1 1 1 #_size-age:_2
0 0 0 0 #_size-age:_3
1 1 1 1 #_init_equ_catch
1 1 1 1 #_recruitments
1 1 1 1 #_parameter-priors
1 1 1 1 #_parameter-dev-vectors
1 1 1 1 #_crashPenLambda
0 # (0/1) read specs for more stddev reporting
1 1 -1 5 1 5 1 -1 5 # selex type, len/age, year, N selex bins, Growth pattern, N growth ages, area For N-at-age, Year, N bins
-5 16 27 38 46 # vector with selex std bin picks (-1 in first bin to self-generate)
-1 2 14 26 40 # vector with growth std bin picks (-1 in first bin to self-generate)
-1 2 14 26 40 # vector with N-at-age std bin picks (-1 in first bin to self-generate)
999

SEDAR

Southeast Data, Assessment, and Review

SEDAR 22

Gulf of Mexico Tilefish

SECTION IV: Research Recommendations

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1. DATA WORKSHOP RESEARCH RECOMMENDATIONS

1.1 LIFE HISTORY WORKING GROUP

- In addition to the tilefish reproductive data needs (above), the WG recommends examination of the size frequency of commercial catch by month to examine potential inference concerning the sex ratio of the catch.
- Improve information on stock structure/rates of possible exchange between Gulf and Atlantic, including pathways for larval transport.
- Expand the fishery-independent long-line survey to deeper depths. In addition, increase collection of sediment/habitat data to allow post-stratification of survey results. Increased resolution of spatial population structure is important given the spatially divergent landings and demographic differences (east and western Gulf) and given the potential for localized over-exploitation within the larger Gulf of Mexico stock.
- Last, the WG recommends monitoring the possibility of increased discards/highgrading as ITQs (catch shares) is undertaken as a management approach.

Procedural Recommendation:

At points during the SEDAR 22 process, WG and DW panel members noted some confusion about "tilefish" as a species and as a species complex during discussions. Given the lack of clarity about common names for several species and their associated complexes, The WG recommends that scientific names be added to future SEDAR schedules and announcements.

1.2 COMMERCIAL STATISTICS WORKING GROUP

No recommendations were provided.

1.3 RECREATIONAL STATISTICS WORKING GROUP

No recommendations were provided.

1.4 INDICES OF ABUNDANCE WORKING GROUP

In the fishery-independent survey presented above, precision in abundance indices could be improved by increasing the number of samples at least two- to three-fold.

Research recommendations for fishery dependent data:
1.) Expand observer coverage to provide a subsample adequate to construct indices of abundance (Pelagic Longline Observer Progam has 5-8% coverage). Observer data provides finer spacial resolution and a more accurate measure of CPUE. It also provides size frequency and discard information that is currently unavailable in the self-reported dataset. Current observer coverage is inadequate for the construction of indices of abundance.

2.) Self logbook data should be restructured to collect data on a per set basis rather than per trip. This would allow for a more accurate calculation of CPUE. Data subsetting (determining targeting) would be vastly improved with set-based data.

2. ASSESSMENT WORKSHOP RESEARCH RECOMMENDATIONS

No specific research recommendations were provided.

3. REVIEW PANEL RESEARCH RECOMMENDATIONS

(To be added after Review workshop)