Review of Sea Scallop Survey Methodologies

Terms of Reference #5 and #7

Overview/Relation to Management

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Scallop PDT Chair

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New England
Fishery Management Council

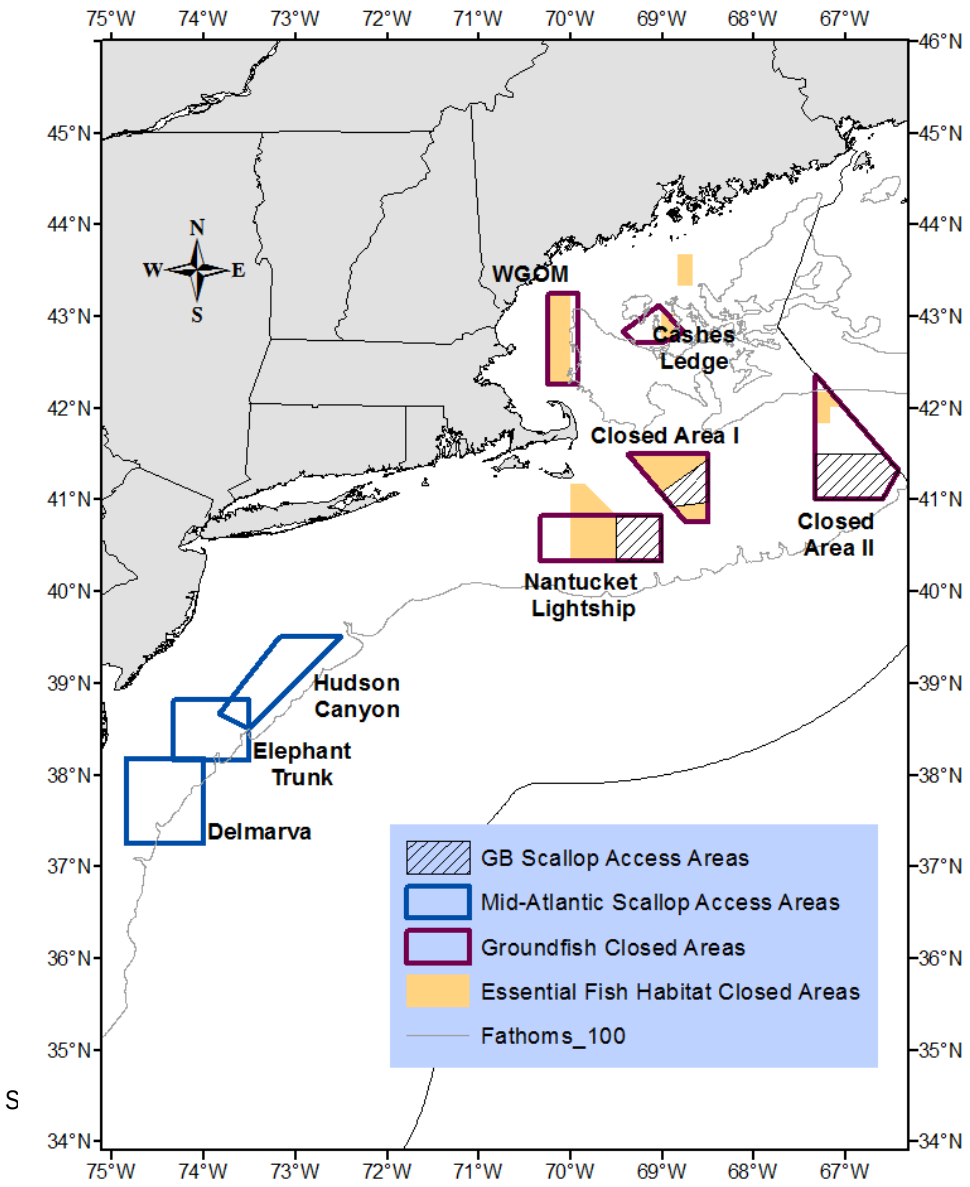
Background

- Eight regional Councils charged with developing fishery management plans; each makes recommendations to NOAA
- The New England Fishery Management Council (NEFMC) is responsible for seven overall plans including the Sea Scallop Fishery Management Plan (FMP)
- Major management milestones
  - 1982 – FMP Implemented
  - 1994 – Limited entry with gear, crew and effort limits (Days-At-Sea (DAS))
  - 2004 – Area rotation system fully implemented
  - 2011 – Annual catch limits with accountability measures

Evolution of Area Rotation

- 1994 - large areas closed to fishing on GB
- By late 1990s scallop fishery in major decline
- 1999 –scallop fishery access
- Council develops large-scale area rotation program

- Current program
  - Areas surveyed annually
  - Beds of small scallops closed for 2-3 years
  - Vessels allowed controlled access to reduce bycatch and mortality



Additional Surveys Needed Under Area Rotation

- Scallop Research Set-Aside Program (RSA) began in 2000
- Initially 2% of projected catch set-aside to fund scallop specific research, now a set amount = 570 mt annually (1.25 mil lbs.)
- Research priorities set by Council and competitive grant program selects awards that are allocated in lbs. of scallops
- About 50% of funds typically spent on surveys – recently about $5million annually
- RSA Management Review Panel provides input to NMFS about priority areas to survey each year

General Timeline of Scallop Surveys and Management Process

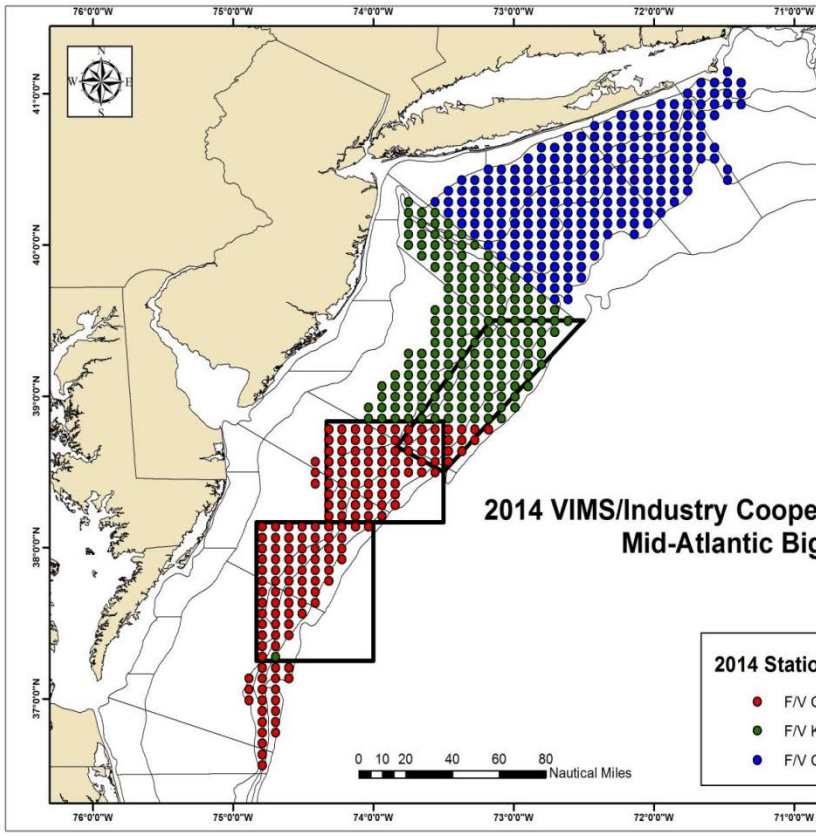
- Surveys generally conducted in the late Spring – Summer
- Early August is target deadline for survey results to Scallop Plan Development Team(PDT)
- In recent years all survey results have been timely; no extensions, combined estimates ready in late August
- Federal survey seems to have less flexibility, which can in some cases cause timing issues, but process has not been delayed
- Early fall - PDT presents updated catch limits to Science and Statistical Committee (SSC) and Council
- Late Fall – Council makes final recommendation for fishery specifications based on PDT, industry, and public input

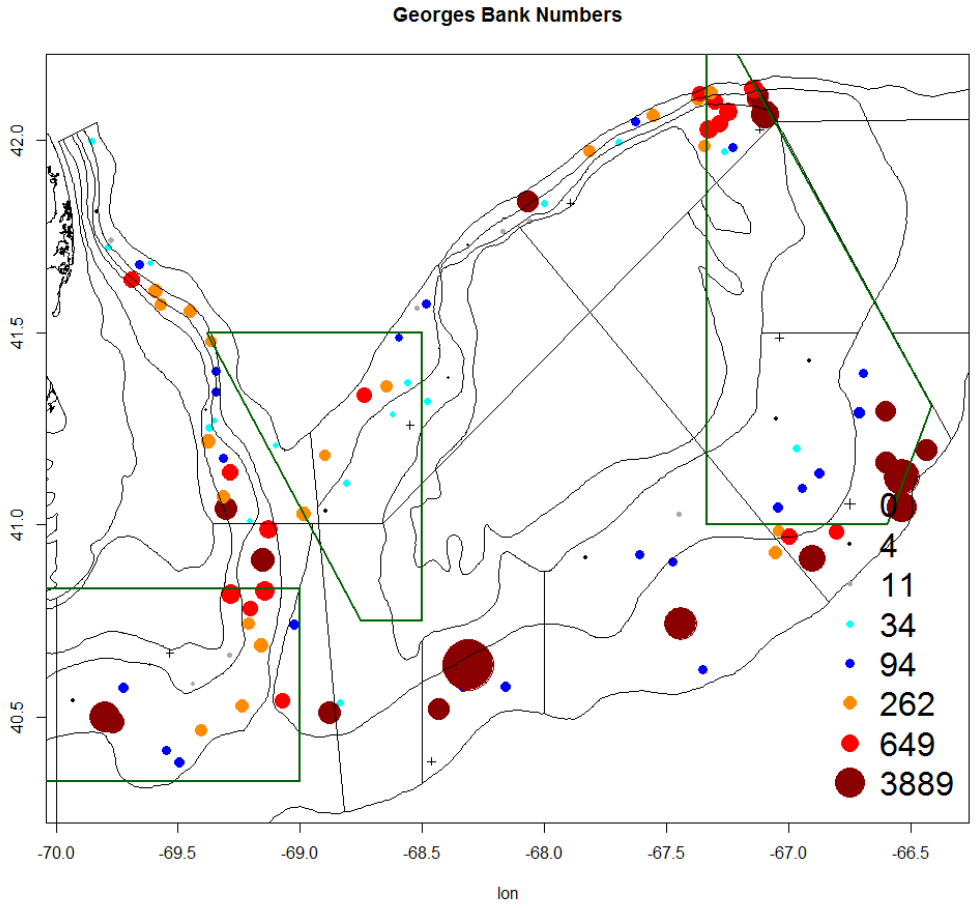
Major Uses of scallop surveys in fisheries management

1. Set fishery specifications – catch limits, DAS, access area allocation
2. Identify new areas with small scallops to protect
3. Other

Examples of Survey Results – 2014 Season

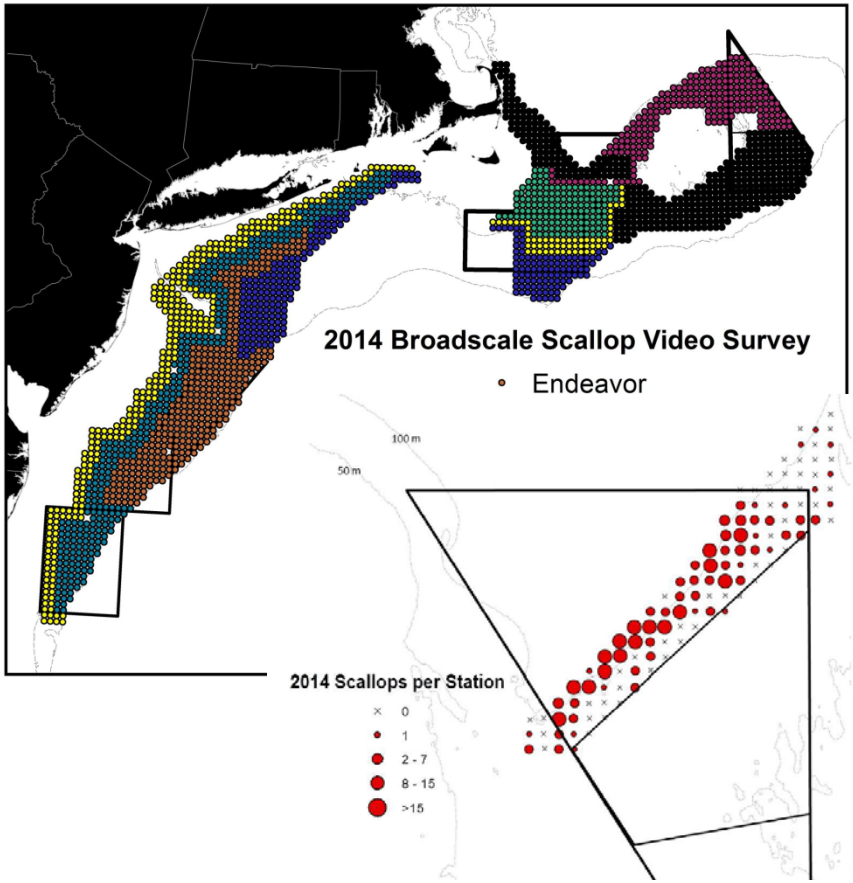
Dredge Surveys – VIMS in Mid-Atlantic and NEFSC on GB





Video Surveys – 2014 Season

SMAST – Broadscale GB and MA and CA1 sliver – intensive
Habcam – Both Version 4 (NEFSC) and Version 2 (Habcam Group)



NEFSC V4 – Black
Habcam Grp V2 - Blue

Preliminary Combined Survey Estimates

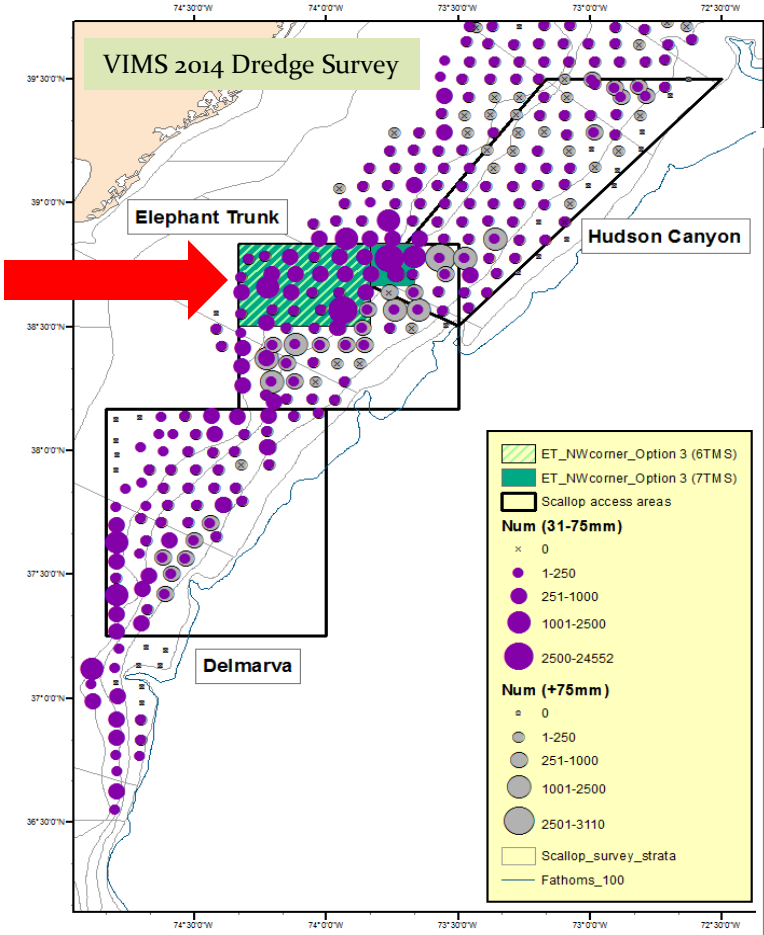
		DREDGE			SMAST		HABCAM			TOTALS	
Area	Bms	SE	Ebms	Bms	SE	Ebms	Bms	SE	Bms	SE	Ebms
Delmarva	4707	778	2080	9626	1093	3935	10598	3665	8310	2253	3488
Elephant Trunk	16392	3426	8067	24799	2909	12938	36154	3469	25782	3278	13147
HCS	5805	1206	3044	7381	1021	3143	18041	5050	10409	3055	4884
Virginia	279	79	3	NS	NS	NS			279	79	3
NYB	6822	1656	4140	3609	495	2119	12756	613	10618	1059	6371
Long Island	11966	816	8438	10269	950	6402	14305	508	12950	780	8643
NYB Ext	1766	332	757	6900	867	4013	*		*		*
Block Island	939	206	535	1372	671	521	*		*		*
Mid-Atlantic Total	**48676**	**4167**	**27064**	**63956**	**3612**	**33071**	**91854**	**20577**	**68348**	**5186**	**36536**
CL-I NA	2163	649	1854	5115	3004	3091	21378	5917	9984	3850	6783
CL-1 Acc	333	59	246	962	375	190	*		*		*
CL-2 NA	8989	3190	7061	5550	2054	4191	7087	524	7209	2211	5579
CL-2 Acc	7848	2462	3642	8197	2570	929	9835	95	8627	2055	2458
NLS-NA	2240	1142	675	5211	4650	677			3726	3386	676
NLS-Acc	1637	327	854	30052	6534	3091	3231	626	11640	3794	1449
GSch	17689	1875	9485	11134	7849	4949	15994	4870	14939	5442	7481
SEP	15434	9833	2862	7026	1359	2476	16038	1223	12833	5775	3050
NEP	7752	9302	3837	5863	1483	2259	4330	394	5982	5443	2678
Georges Bank Total	**64085**	**14311**	**30516**	**79110**	**12246**	**21853**	**77893**	**19008**	**74938**	**11294**	**30154**
TOTALS	**112761**	**14906**	**57580**	**143066**	**12767**	**54924**	**159149**	**28013**	**143286**	**12428**	**66690**
* Included in other areas											

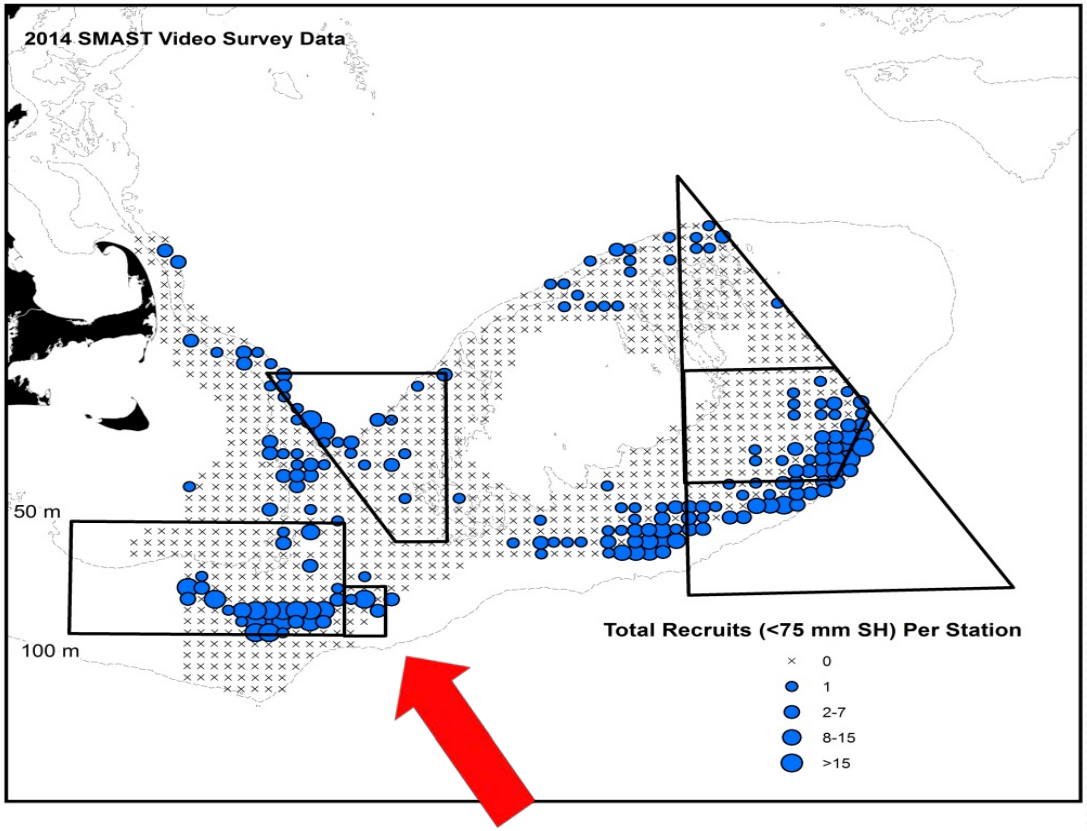
#1 Use: Setting Fishery Allocations

- Biomass estimates incorporated in Scallop Area Management Simulator (SAMS Model)
- Stochastic model that projects scallop abundance and landings by area (1,000 separate runs for 14 years)
- SAMS is a very useful tool for managers
  - Provides spatial estimates of biomass, landings, fishing mortality, area swept, and estimates of flatfish bycatch
  - Alternatives can be compared in both short and long term
- In theory:

  More survey data ➡ more precise estimates ➡ assess potential impacts better ➡ make more informed decisions

#2 Use: Identify new areas to protect





#3 Uses: Other

- Gear performance – size selectivity
- Shell height : meat weight relationships
- Product quality / disease
- Bycatch estimation
- Genetic data
- Substrate and benthos maps – "SASI" Model – Swept Area Seabed Impact model
- Evaluate fishery impacts on environment

Scallop Survey Results used in NEFMC Actions

		Survey Methods				
Action	Fishing Year	NEFSC Dredge	VIMS Dredge	SMAST	NEFSC Habcam	Industry Habcam
Framework 11	1999	(*)		(*)		
Framework 12	2000	*				
Framework 13	2000	*		*		
Frameowrk 14	2001 2002	*	*			
Framework 15	2003	*	*			
Framework 16	2004 2005	*		*		
Framework 18	2006 2007	*	*	*		
Framework 19	2008 2009	*	*	*		
Framework 21	2010	*	*	*		
Framework 22	2011 2012	*	*	*		
Framework 24	2013	*	*	*	*	*
Framework 25	2014	*	*	*	*	*
Framework 26	2015	*	*	*	*	*
Amendment 10	2004	*	*	*		
Amendment 15	2011	*	*	*		
EFH Omnibus A1	1999	*				
EFH Omnibus A2	2016	*	*	*	*	*

(*) The first cooperative survey was a dredge survey on six commercial vessels

Issues to Consider for Terms of Reference #5 and #7

5. Evaluate any proposed methods for integrating and using surveys outside of a stock assessment model for management purposes
   - *Do we need additional surveys to set TACs, or is federal survey sufficient?*
   - *Are there benefits to using multiple survey methods?*
   - *Should additional surveys be used to assess bycatch species?*
   - *Should Scallop FMP develop an overall survey design for area rotation, separate from NEFSC survey used to assess the status of the resource?*

7. Comment on the current and/or any proposals for optimal frequency and combination of survey methods
   - *Open areas vs. Access areas*
   - *Broadscale vs. Intensive*
   - *Timing: Is it necessary to survey before an opening and after fishing?*
   - *Are there constraints for certain survey methods, i.e. season?*
   - *How best survey NGOM: Which method? How frequent?*
   - *Should inshore areas be surveyed differently?*

Scallop Survey Results used in NEFMC Actions

		Survey Methods					
Action	**Fishing Year**	**NEFSC Dredge**	**VIMS Dredge**	**SMAST**	**NEFSC Habcam**	**Industry Habcam**	**Notes**
Framework 11	1999	(*)		(*)			TAC for CA2 intermediate between NMFS dredge and CMAST cooperative dredge estimate
Framework 12	2000	*					Set DAS only
Framework 13	2000	*		*			GB access area allocations
Frameowrk 14	2001 2002	*	*				including access area allocations for HC and VA/NC areas
Framework 15	2003	*	*				VIMS HC survey (2000)
Framework 16	2004 2005	*		*			
Framework 18	2006 2007	*	*	*			
Framework 19	2008 2009	*	*	*			
Framework 21	2010	*	*	*			
Framework 22	2011 2012	*	*	*			Inverse weighted mean of all surveys used for biomass estimates
Framework 24	2013	*	*	*	*	*	Inverse weighted mean of all surveys used for biomass estimates
Framework 25	2014	*	*	*	*	*	Mean of all surveys used for biomass estiamtes
Framework 26	2015	*	*	*	*	*	Mean of all surveys used for biomass estiamtes, data used to ID new area boundaries
Amendment 10	2004	*	*	*			
Amendment 15	2011	*	*	*			
EFH Omnibus A1	1999	*					
EFH Omnibus A2	2016	*	*	*	*	*	SMAST video data used extensively in SASI model and alternaitve development

(*) The first cooperative survey was a dredge survey on six commercial vessels