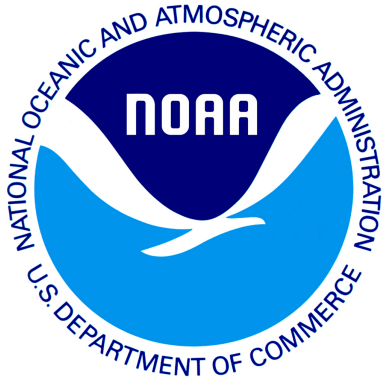

Southern New England Mid-Atlantic Winter Flounder

2015 Assessment Update Report

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts

Compiled September 2015

This assessment of the Southern New England Mid-Atlantic Winter Flounder (Pseudopleuronectes americanus) stock is an operational update of the existing 2011 benchmark ASAP assessment (NEFSC 2011). Based on the previous assessment the stock was overfished, but overfishing was not ocurring. This assessment updates commercial fishery catch data, recreational fishery catch data, and research survey indices of abundance, and the analytical ASAP assessment models and reference points through 2014. Additionally, stock projections have been updated through 2018

State of Stock: Based on this updated assessment, the Southern New England Mid-Atlantic Winter Flounder (*Pseudopleuronectes americanus*) stock is overfished but overfishing is not occurring (Figures 1-2). Spawning stock biomass (SSB) in 2014 was estimated to be 6,151 (mt) which is 23% of the biomass target (26,928 mt), and 46% of the biomass threshold for an overfished stock ($SSB_{Threshold}$ = 13464 (mt); Figure 1). The 2014 fully selected fishing mortality was estimated to be 0.16 which is 49% of the overfishing threshold (F_{MSY} = 0.325; Figure 2).

Table 1: Catch and status table for Southern New England Mid-Atlantic Winter Flounder. All weights are in (mt) recruitment is in (000s) and F_{Full} is the fishing mortality on fully selected ages (ages 4 and 5). Model results are from the current updated ASAP assessment.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
					Data					
Recreational discards	14	16	5	3	9	8	18	2	4	1
Recreational landings	124	136	116	73	87	28	65	31	7	30
Commercial discards	105	151	118	109	165	153	298	483	206	64
Commercial landings	1,320	1,720	1,628	1,113	271	174	150	134	857	658
Catch for Assessment	1,563	2,023	1,867	1,298	532	363	531	650	1,074	753
					Model Results					
Spawning Stock Biomass	5,021	5,517	6,338	5,552	5,038	5,806	6,946	7,116	7,077	6,151
F_{Full}	0.35	0.41	0.36	0.28	0.11	0.07	0.09	0.11	0.19	0.16
Recruits $age1$	13,244	7,368	6,212	9,422	7,416	7,070	5,365	5,281	2,633	4,906

Table 2: Comparison of reference points estimated in an earlier assessment and from the current assessment update. F_{MSY} was generated assuming a Beverton-Holt S-R relationship and an SSB_{MSY} proxy was used for the overfished threshold and was based on long-term stochastic projections. Recruitment estimates are median values of the time-series. 90% CI are shown in parentheses.

	2011	Current
F_{MSY}	0.290	0.325
SSB_{MSY} (mt)	43,661	26,928 (18,488 - 39,847)
MSY (mt)	11,728	7,831 (5,237 - 11,930)
Median recruits (age 1) (000s)	19,256	16,448
Overfishing	No	No
Overfished	Yes	Yes

Projections: Short term projections of biomass were derived by sampling from a cumulative distribution function of recruitment estimates assuming a Beverton-Holt stock recruitment relationship. The annual fishery selectivity, maturity ogive, and mean weights at age used in projection are the most recent 5 year averages; The model exhibited minor retrospective pattern in F and SSB so no retrospective adjustments were applied in the projections.

Table 3: Short term projections of total fishery catch and spawning stock biomass for Southern New England Mid-Atlantic Winter Flounder based on a harvest scenario of fishing at F_{MSY} between 2016 and 2018. Catch in 2015 was assumed to be 717 (mt), a value provided by GARFO (Dan Caless pers. comm.). 90% CI are shown next to SSB estimates.

Year	Catch (mt)	SSB (mt)	F_{Full}
2015	717	5,439 (4,423 - 6,607)	0.183
2016	1,041	4,732 (3,827 - 5,774)	0.325
2017	973	3,782 (3,057 - 4,645)	0.325
2018	1,515	4,612 (3,267 - 7,339)	0.325

Special Comments:

- What are the most important sources of uncertainty in this stock assessment? Explain, and describe qualitatively how they affect the assessment results (such as estimates of biomass, F, recruitment, and population projections).

  A large source of uncertainty is the estimate of natural mortality based on longevity, which is not well studied in Southern New England Mid-Atlantic Winter Flounder, and assumed constant over time. Natural mortality affects the scale of the biomass and fishing mortality estimates. Natural mortality was adjusted upwards from 0.2 to 0.3 during the last benchmark assessment assuming a max age of 16. However, there is still uncertainty in the true max age of the population and the resulting natural mortality estimate. Other sources of uncertainty include length distribution of the recreational discards. The recreational discards, are a small component of the total catch, but the assessment suffers from very little length information used to characterize the recreational discards (1 to 2 lengths in recent years).

- Does this assessment model have a retrospective pattern? If so, is the pattern minor, or major?

  This assessment has a minor retrospective pattern in both SSB and F with Mohn's rho equal to 0.205 and -0.253, respectively.

- Based on this stock assessment, are population projections well determined or uncertain?

  Population projections for Southern New England Mid-Atlantic Winter Flounder are reasonably well determined. There is uncertainty in the estimates of M. In addition, while the retrospective pattern is considered minor (within the 90% CI of both F and SSB) the rho adjusted terminal value is very close to falling out of the bounds, becoming a major retrospective pattern. This would lead to retrospective adjustments being needed for the projections.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the affect these changes had on the assessment and stock status.

  No changes, other than the incorporation of new data were made to the Southern New England Mid-Atlantic Winter Flounder assessment for this update.

- If the stock status has changed a lot since the previous assessment, explain why this occurred.

  The stock status of Southern New England Mid-Atlantic Winter Flounder has not changed since the previous benchmark in 2011.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.

  The Southern New England Mid-Atlantic Winter Flounder assessment could be improved with additional studies on maximum age, as well additional information of recreational discard lengths. In addition, further investigation into the localized struture/genetics of the stock is warranted. Also, a future shift to ASAP version 4 will provide the ability to model envirionmental factors that may influence both survey catchability and the modeled S-R relationship

- Are there other important issues?

  None.

References:

Smith, A. and S. Jones. 2008. In. Northeast Fisheries Science Center. 2008. Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3^{rd} Groundfish Assessment Review Meeting (GARM III), Northeast Fisheries Science Center, Woods Hole, Massachusetts, August 4-8, 2008. US Dep Commer, NOAA Fisheries, Northeast Fish Sci Cent Ref Doc. 08-15; 884 p + xvii. http://www.nefsc.noaa.gov/publications/crd/crd0815/

Northeast Fisheries Science Center. 2011. 52^{nd} Northeast Regional Stock AssessmentWorkshop (52^{nd} SAW) Assessment Report. US Dept Commer, Northeast Fish SciCent Ref Doc. 11-17; 962 p. Available from: National Marine Fisheries Service, 166Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

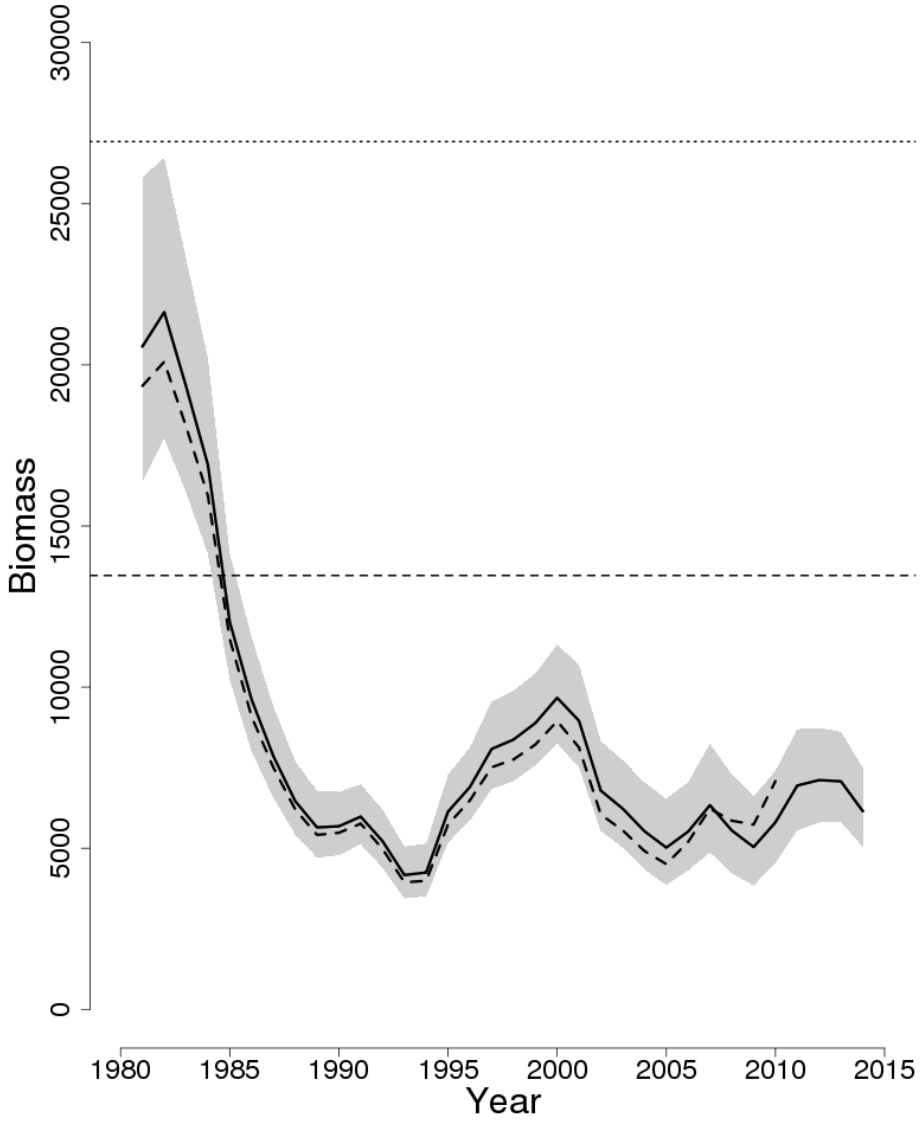

Figure 1: Trends in spawning stock biomass of Southern New England Mid-Atlantic Winter Flounder between 1981 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ ($\frac{1}{2}$ SSB_{MSY} *proxy*; horizontal dashed line) as well as SSB_{Target} (SSB_{MSY} *proxy*; horizontal dotted line) based on the 2015 assessment. The approximate 90% lognormal confidence intervals are shown.

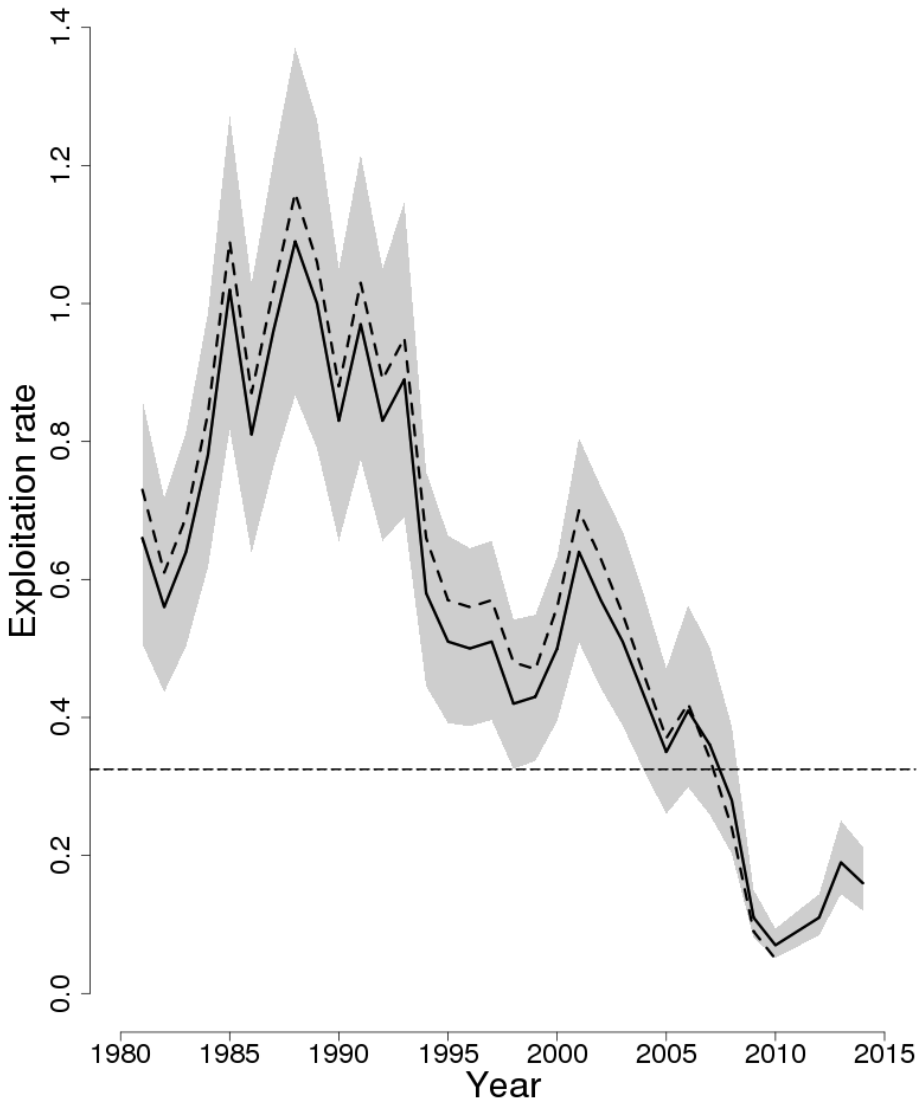

Figure 2: Trends in the fully selected fishing mortality (F_{Full}) of Southern New England Mid-Atlantic Winter Flounder between 1981 and 2014 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ (F_{MSY}=0.325; horizontal dashed line) based on the 2015 assessment. The approximate 90% lognormal confidence intervals are shown.

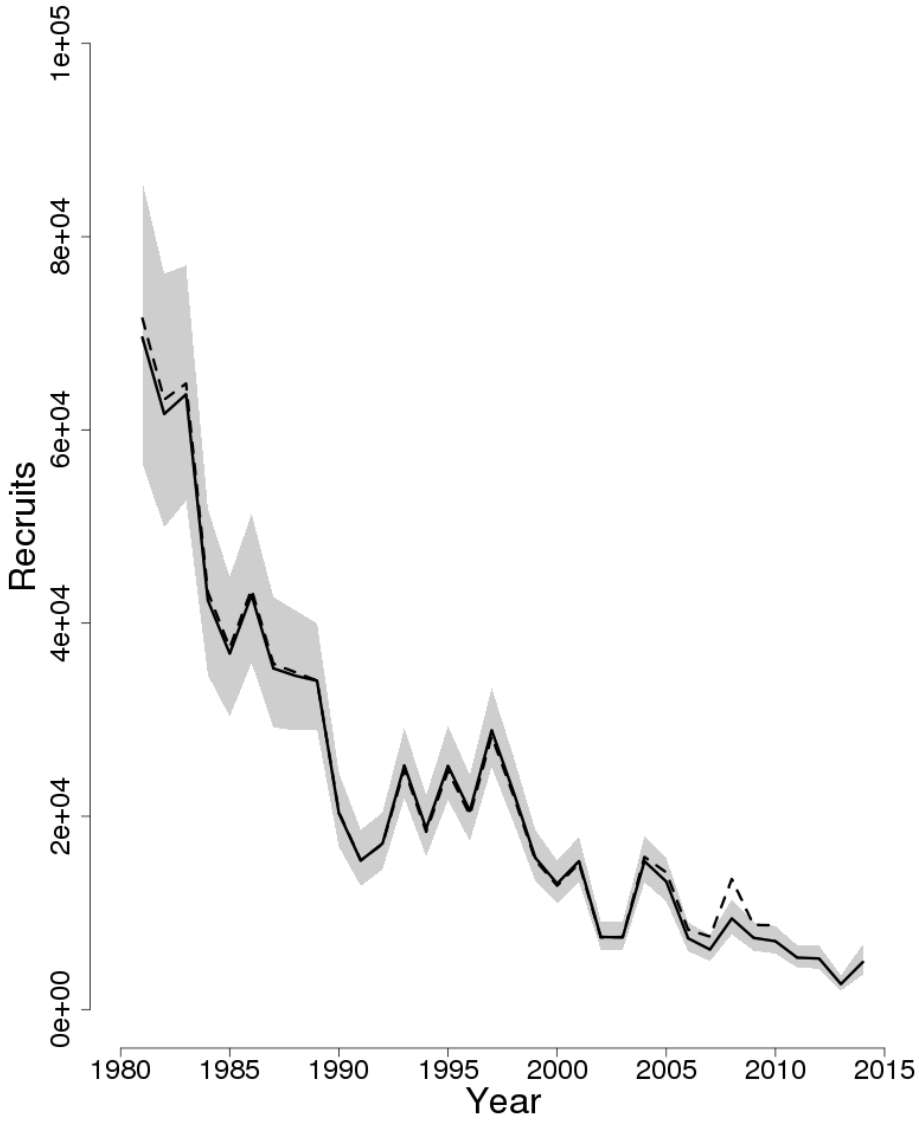

Figure 3: Trends in Recruits (age 1) (000s) of Southern New England Mid-Atlantic Winter Flounder between 1981 and 2014 from the current (solid line) and previous (dashed line) assessment. The approximate 90% lognormal confidence intervals are shown.

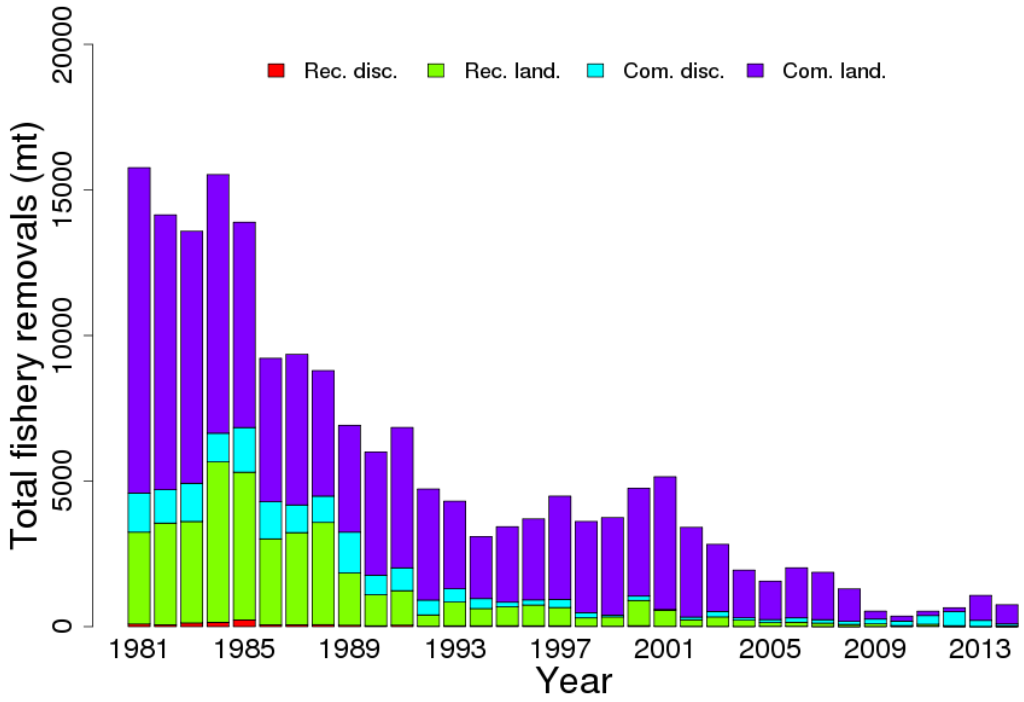

Figure 4: Total catch of Southern New England Mid-Atlantic Winter Flounder between 1981 and 2014 by fleet (commercial, recreational) and disposition (landings and discards).

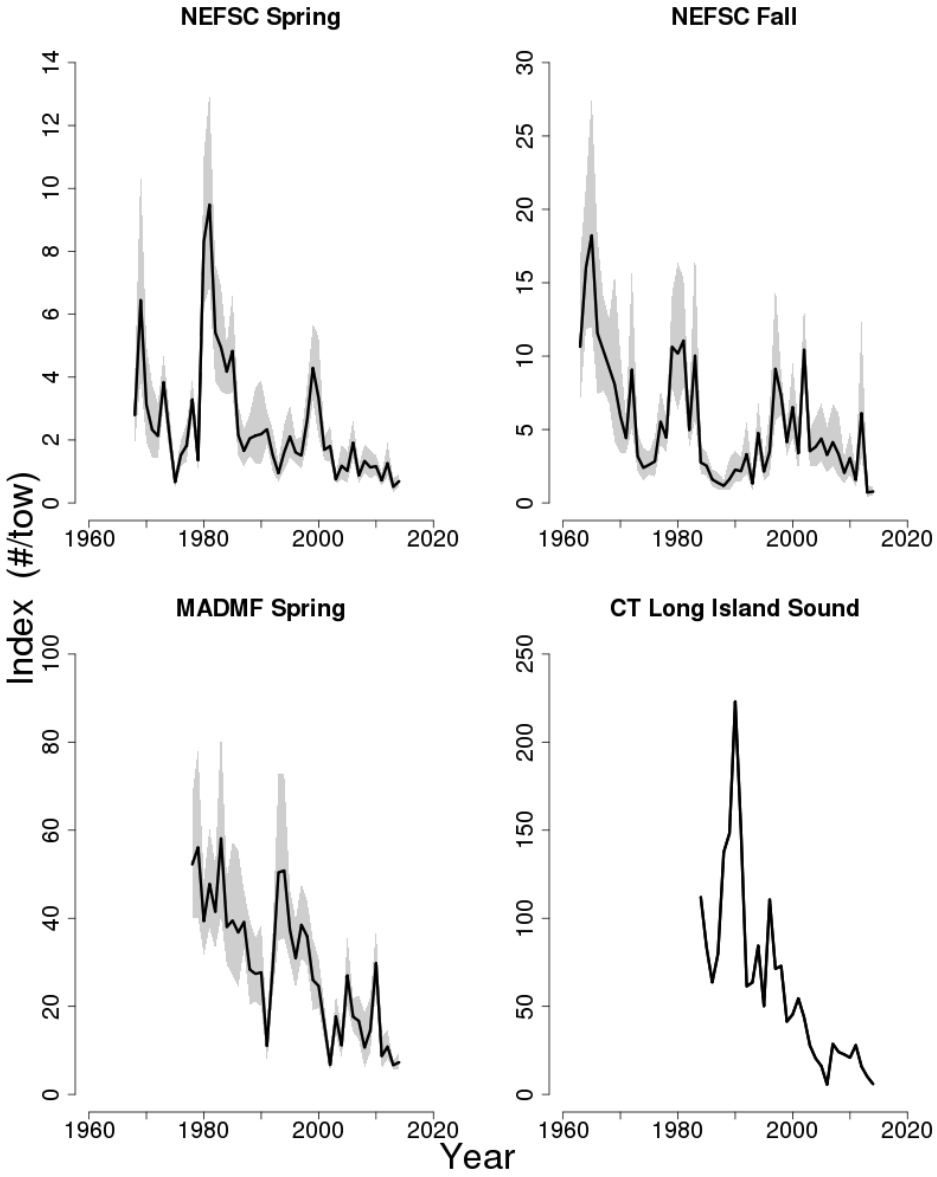

Figure 5: Indices of biomass for the Southern New England Mid-Atlantic Winter Flounder between 1963 and 2014 for the Northeast Fisheries Science Center (NEFSC) spring and fall bottom trawl surveys, the MADMF spring survey, and the CT LISTS survey The approximate 90% lognormal confidence intervals are shown.