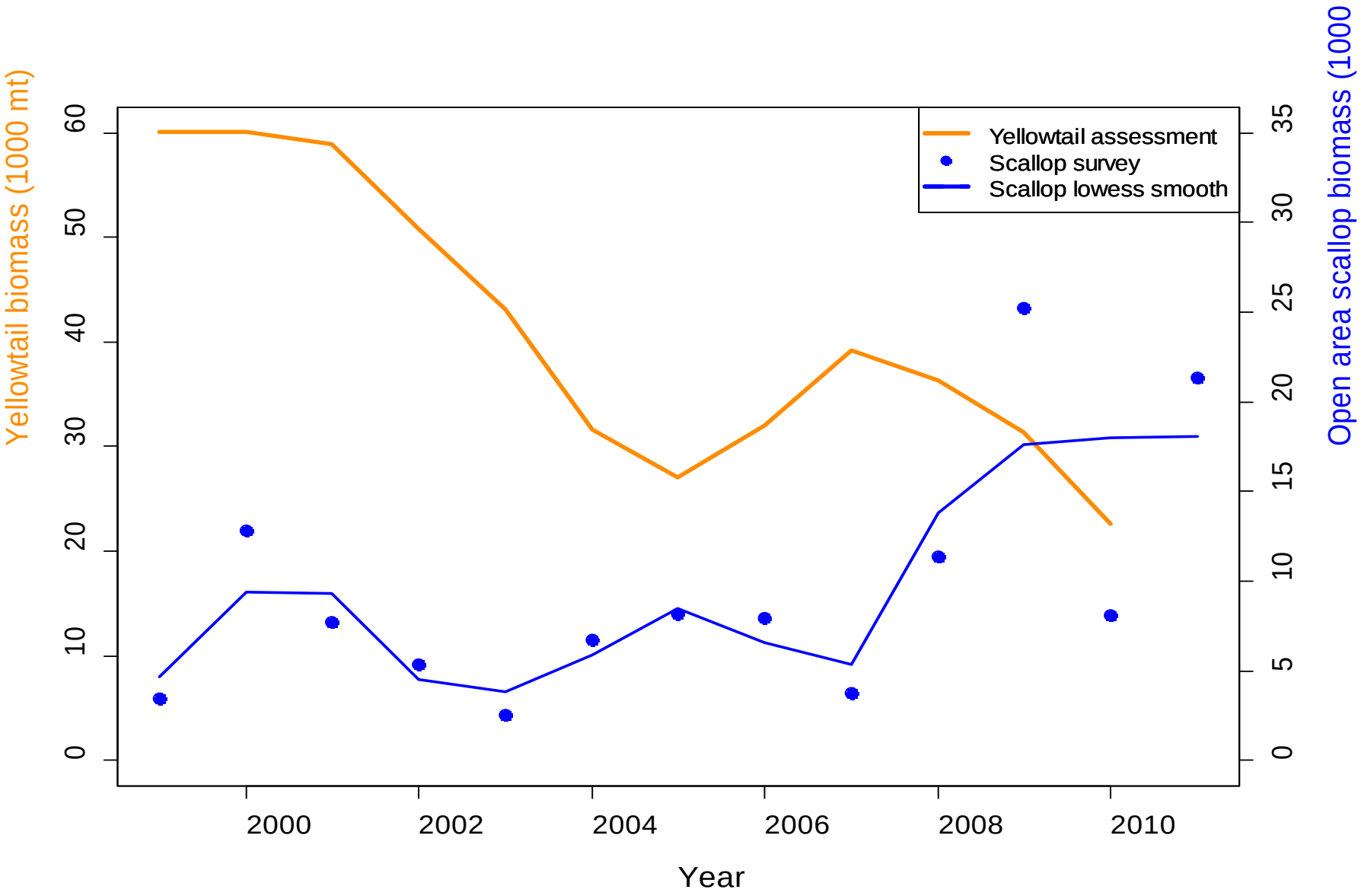
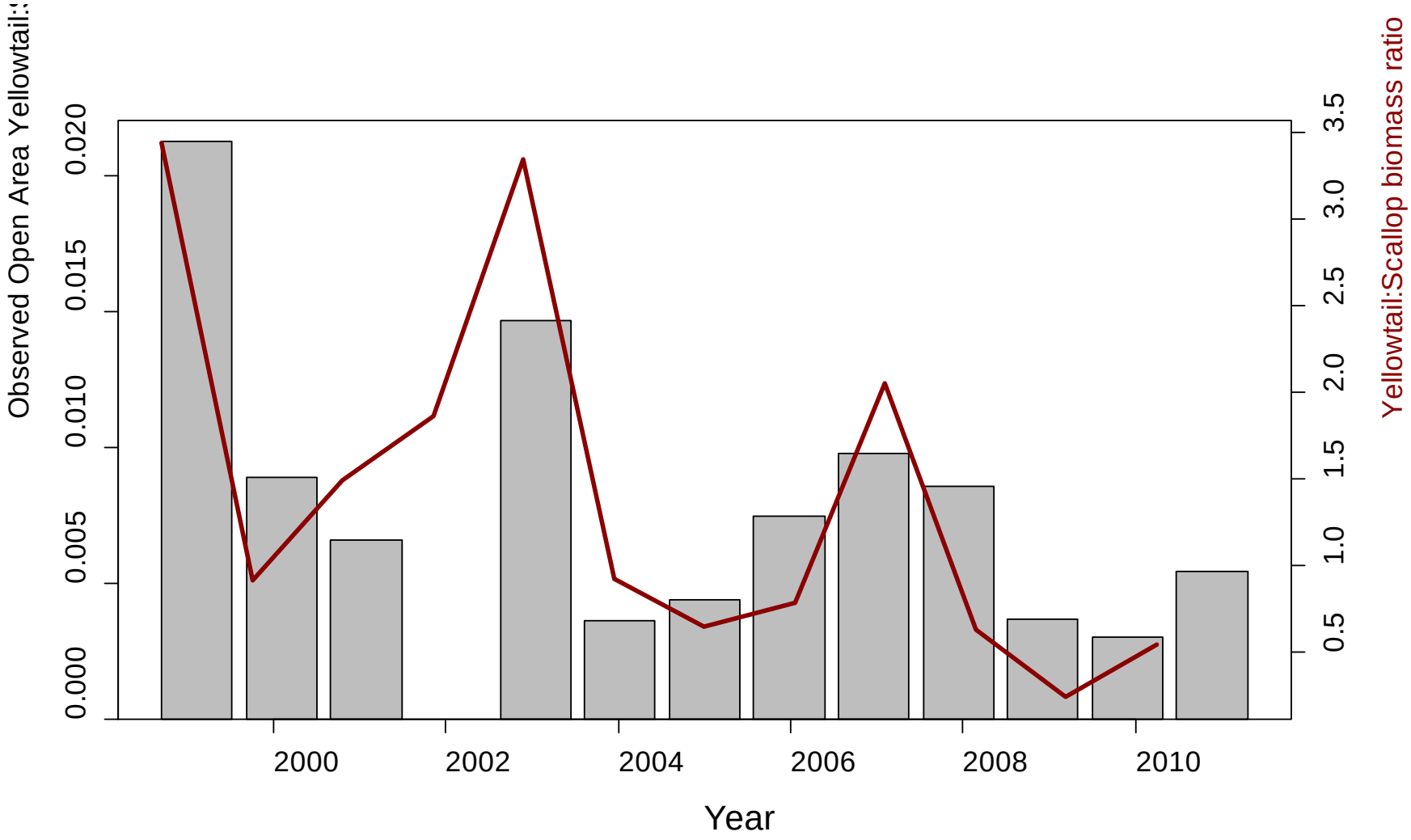
Estimation of 2012 Georges Bank Yellowtail Flounder Bycatch in the Scallop Fishery

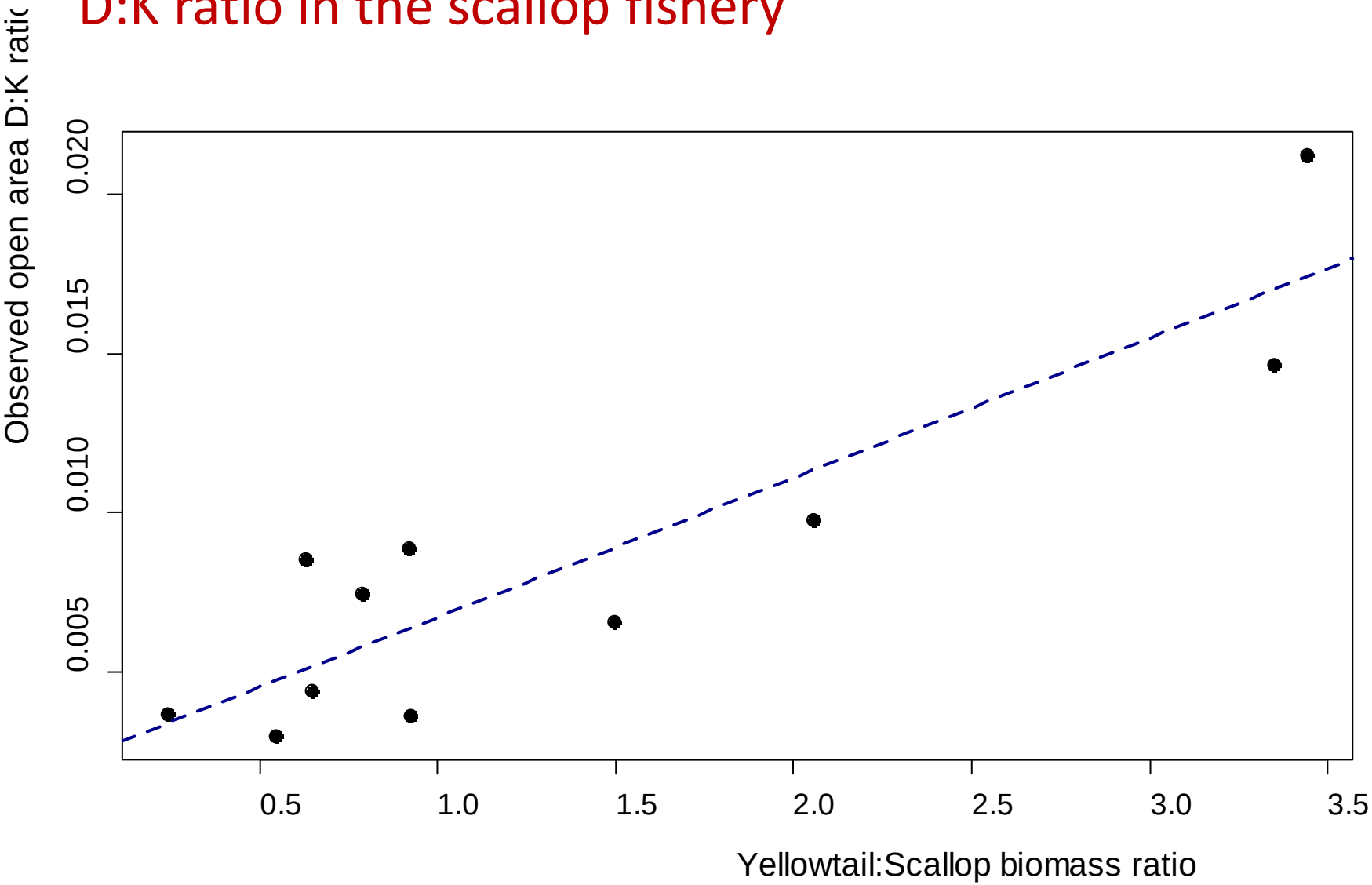
GB yellowtail and open area scallop biomass dynamics



The yellowtail:scallop D:K ratio should be proportional to the ratio of yellowtail to scallop biomass



This relationship is strong (R^2 = 0.79), indicating that the yellowtail:scallop ratio is a good predictor of the D:K ratio in the scallop fishery



Forecasting yellowtail bycatch in the scallop fishery

Step 1: Predicting the D:K ratio

$$\text{Predicted D:K} = \text{Observed D:K} * \frac{\text{Projected YT Bms}}{\text{Observed YT Bms}} * \frac{\text{Obs Scal Expl Bms}}{\text{Proj Scal Expl Bms}}$$

Step 2:

Est. YT bycatch = Predicted D:K * Est. scallop landings

Forecasting yellowtail bycatch in the scallop fishery

Sources of error

Step 1: Predicting the D:K ratio

$$\text{Predicted D:K} = \text{Observed D:K} * \frac{\text{Projected YT Bms}}{\text{Observed YT Bms}} * \frac{\text{Obs Scal Expl Bms}}{\text{Proj Scal Expl Bms}}$$

1. YT projection can be inaccurate
2. Scallop projection can be inaccurate
3. Estimated Observed D:K and relationship between D:K and biomasses not exact

In the past, the projected biomass for GB yellowtail has been much higher than realized, leading to overestimated D:K ratios.

Forecasting yellowtail bycatch in the scallop fishery

Sources of error

Step 2:

Est. YT bycatch = Predicted D:K * Est. Scallop landings

1. Estimated D:K ratio calculated from step 1 may be inaccurate
2. Forecast scallop landings may be inaccurate – this applies mainly to open areas where scallopers can chose to fish in any open area and in any yellowtail stock area

In recent years, only ~10% of open area scallop landings have occurred in the Georges Bank YT stock area, but it can be much higher or lower. Forecasting this percentage is difficult.

Projected change in yellowtail biomass, including error

Three projections done during 2011 TRAC

Split Series

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)									
YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	5.297	6.119	6.571	7.336	8.381	9.322	10.443	11.002	12.369
2012	4.549	5.317	5.819	6.7	7.829	8.935	9.948	10.798	12.134
change	**86%**	**87%**	**89%**	**91%**	**93%**	**96%**	**95%**	**98%**	**98%**

Split Series retro adjusted

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)									
YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	2.402	2.925	3.213	3.689	4.325	4.894	5.566	5.899	6.713
2012	1.39	1.814	2.118	2.645	3.309	3.966	4.562	5.068	5.858
change	**58%**	**62%**	**66%**	**72%**	**77%**	**81%**	**82%**	**86%**	**87%**

Single Series retro adjusted

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)									
YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	5.678	6.52	7.039	7.89	8.901	9.988	11.134	11.792	13.057
2012	4.329	5.199	5.686	6.565	7.577	8.703	9.839	10.495	11.622
change	**76%**	**80%**	**81%**	**83%**	**85%**	**87%**	**88%**	**89%**	**89%**

Current forecast suggests that GB YT will decrease from 2011 to 2012. Projected 2012 SSB is about 85% that of 2011, with a confidence interval of about 62% to 98%.

Forecast change in scallop biomass and D:K

Scallop projections are area specific:

Change in scallop exploitable biomass 2011-2012

	5%	**50%**	**95%**
CL-I access:	0.48	0.49	0.56
CL-II access:	1.04	1.07	1.44
Open	1.19	1.24	1.40

Expected changes in D:K (combined uncertainty from yellowtail and scallop projections)

	Low	Med	High
CL-I access:	1.11	1.73	2.04
CL-II access:	0.43	0.79	0.94
Open	0.44	0.69	0.82

Forecast D:K (yellowtail caught: scallops retained ww)

	2011	Low	Median	High
CL-I access:	0.00004	0.00004	0.00007	0.00008
CL-II access:	0.00356	0.0015	0.0028	0.0033
Open	0.00366	0.0016	0.0025	0.0030

Forecast bycatch (mt, scallop landings in mw)

	ScalLand	Low	Median	High
CL-I access:	2730	1.0	1.5	1.8
CL-II access:	2600	33.2	60.9	72.5
Open (low)	1000	13.4	21.0	30.0
Open (med)	2034	27.3	42.8	50.8
Open (high)	4000	53.6	84.1	100.0

Total projected yellowtail bycatch

Low: 1.0 + 33.2 + 13.4 = 47.6 mt

Median: 1.5 + 60.9 + 42.8 = 105.2 mt

High: 1.8 + 72.5 + 100 = 174.3 mt

Questions?