

Sole VIIe

Sven Kupschus CEFAS

Where we were

Figure 3.1.11

Sole in Division VIIe (Western Channel)

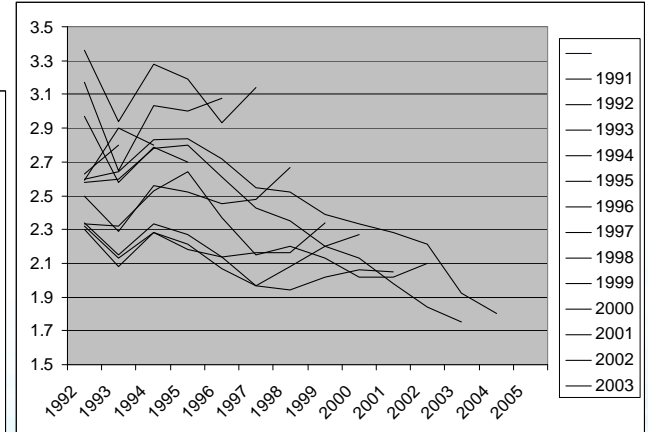
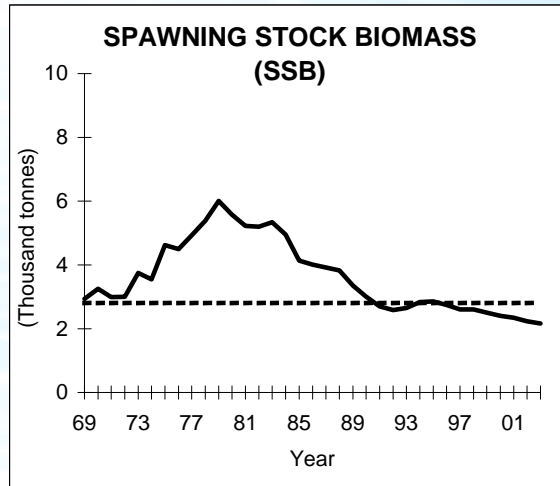
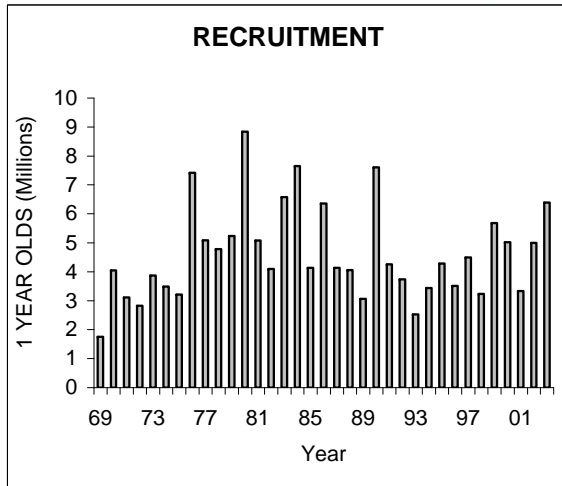
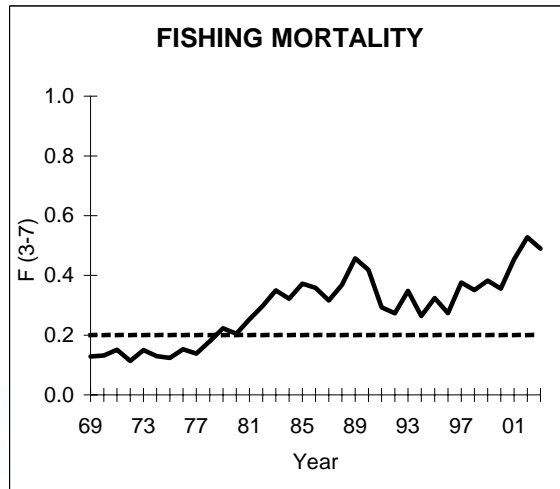
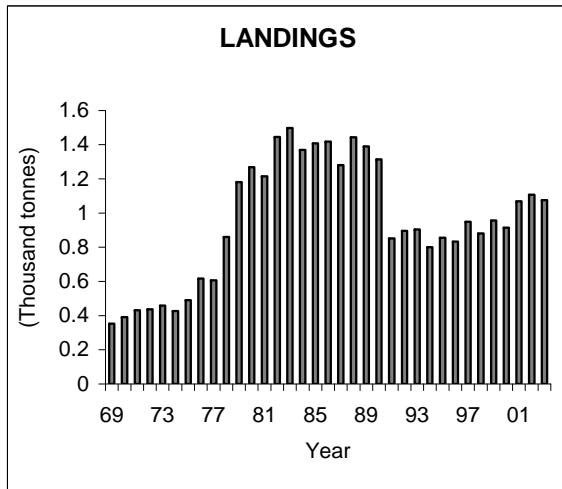
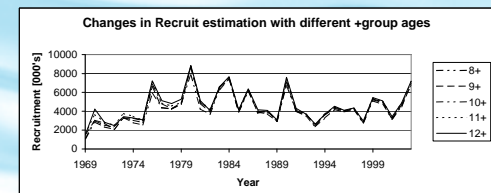
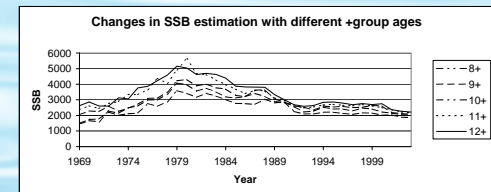
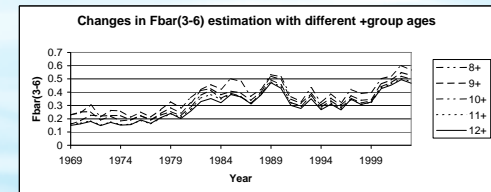


Figure 3.1.7 Variability of estimates in Fbar, SSB and Recruitment with changes in the minimum plus-group age



What are we trying to achieve?

- Management (regulation / implementation)
- Only stock with a management plan!
- F -long-term = 0.27, unmanageable by precautionary approach
- Get there in stepped reductions in F held for 3-years.
- Implemented by TAC with nominal effort control to try to enforce TAC.

The proposed recovery plan

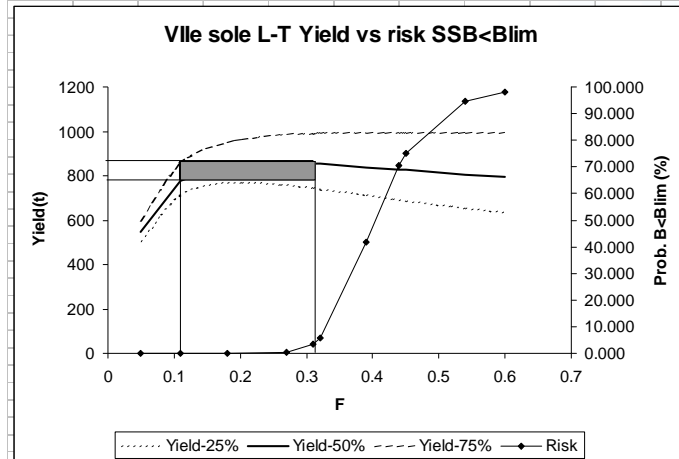
The target

Vlle sole - CS5 results following WG, prior to Review Group meeting.

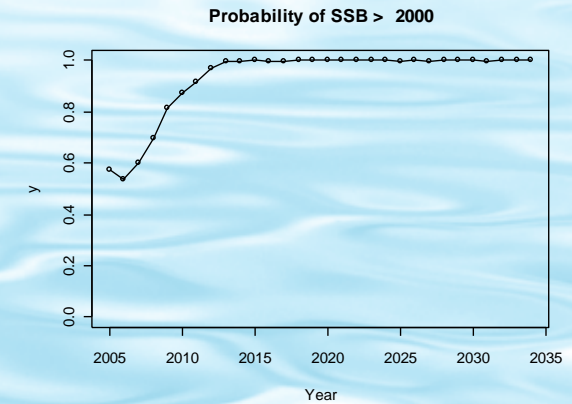
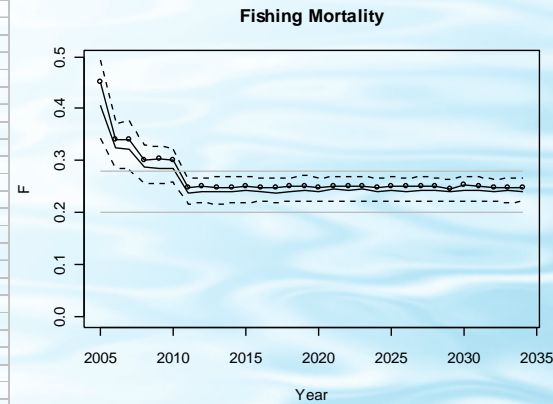
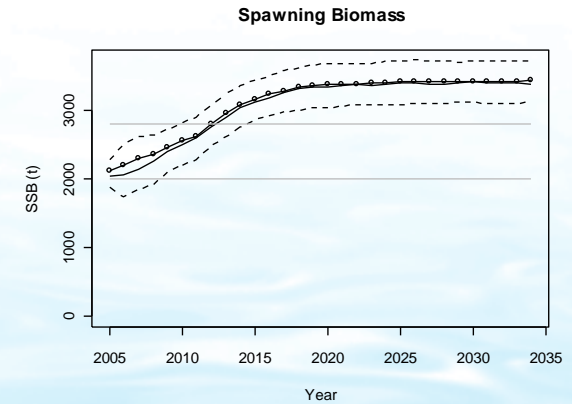
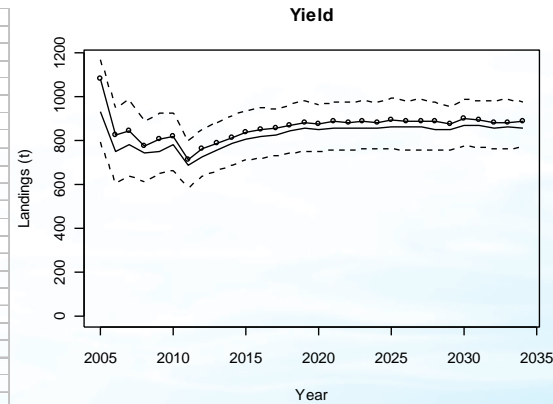
Results for different values of target F, assuming Fsq in 2005, and target F 2006 onwards.

Run	Target F	F value	Yield: mean 2025-2034			Prob. (B<Blim,%) at equilibrium		
			Yield-25%	Yield-50%	Yield-75%	Risk	F-reduction	Loss in yield
7		0.05	504	548	596	0.000	0.89	0.64
3	F0.1	0.11	712	778	854	0.000	0.76	0.90
4	Flow	0.18	770	853	952	0.000	0.60	0.99
2	Fmax	0.27	759	862	987	0.220	0.40	1.00
11		0.31	745	857	990	3.450	0.31	0.99
8		0.32	742	855	993	5.730	0.29	0.99
5	Fhigh	0.39	713	839	995	41.940	0.13	0.97
9		0.44	691	827	994	70.560	0.02	0.96
1	Fsq	0.45	687	825	994	75.040	0.00	0.96
10		0.54	653	806	992	94.600	-0.20	0.93
6		0.6	633	796	993	98.080	-0.33	0.92

Boxed scenarios represent possible target fishing mortalities.



the way

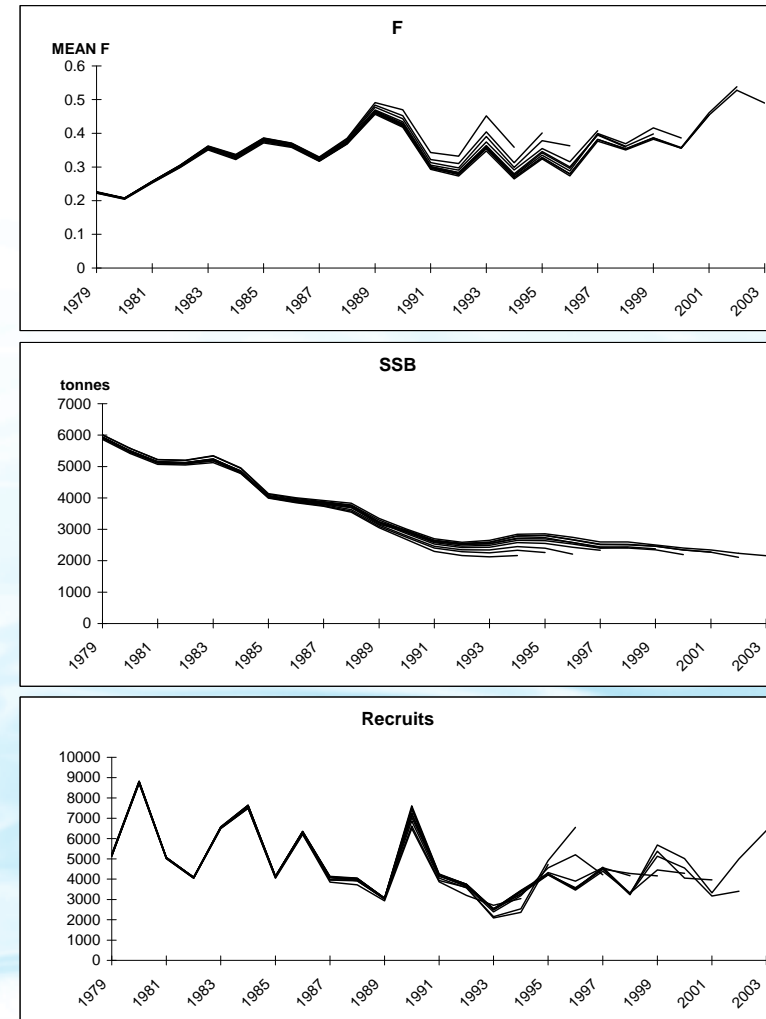
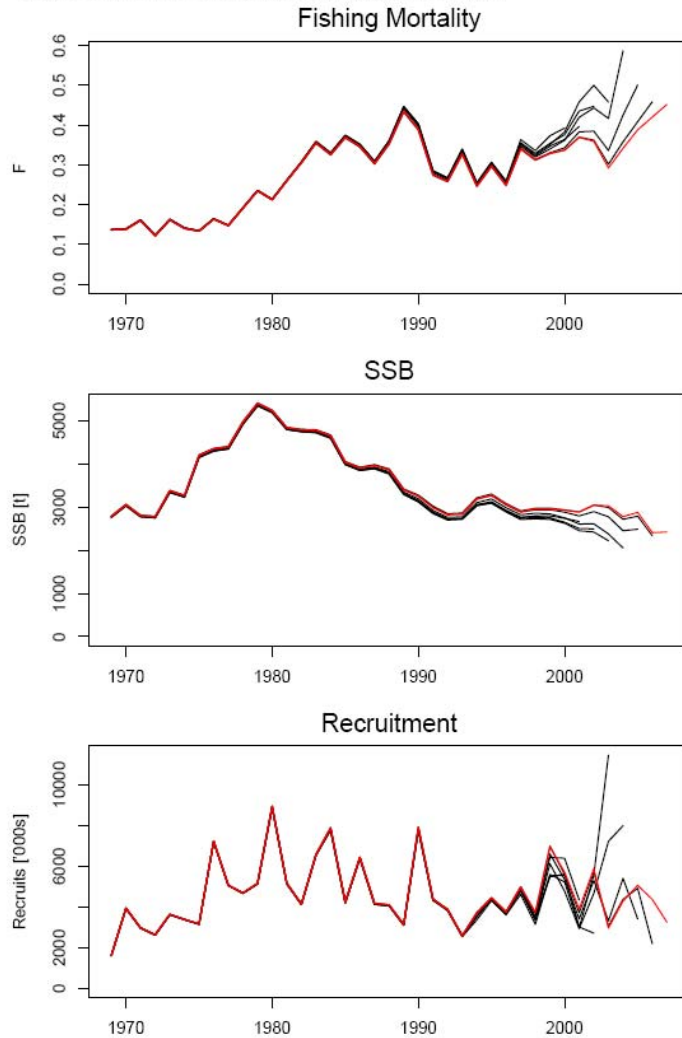


Retrospective pattern

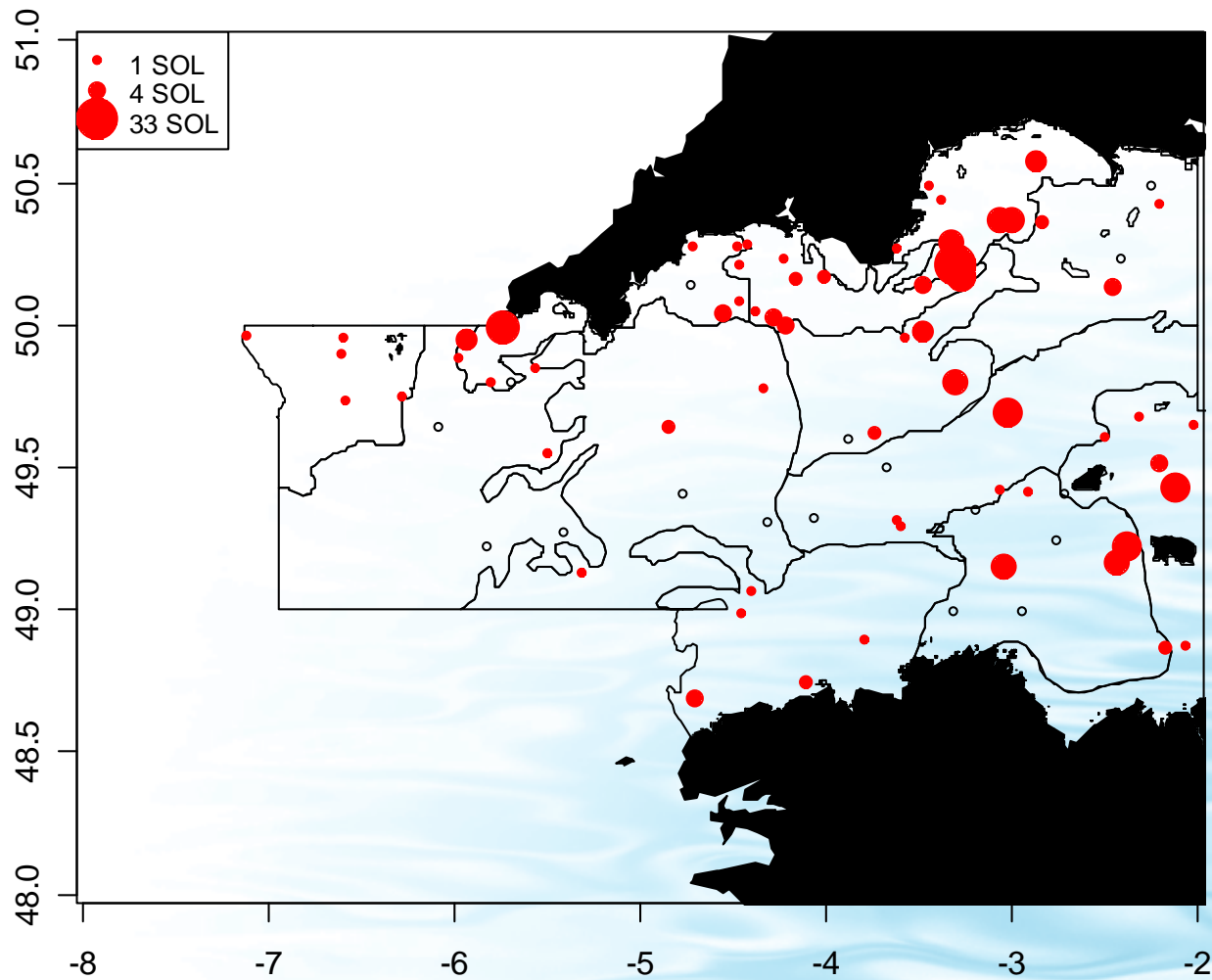
Figure 3.1.9

Vlle sole, Retrospective analysis with 73-88 tune
(Shrinkage SE=1.0) P-shrinkage ON

Figure 3.1.14 Sole VIII XSA Retrospective Plots



The biology



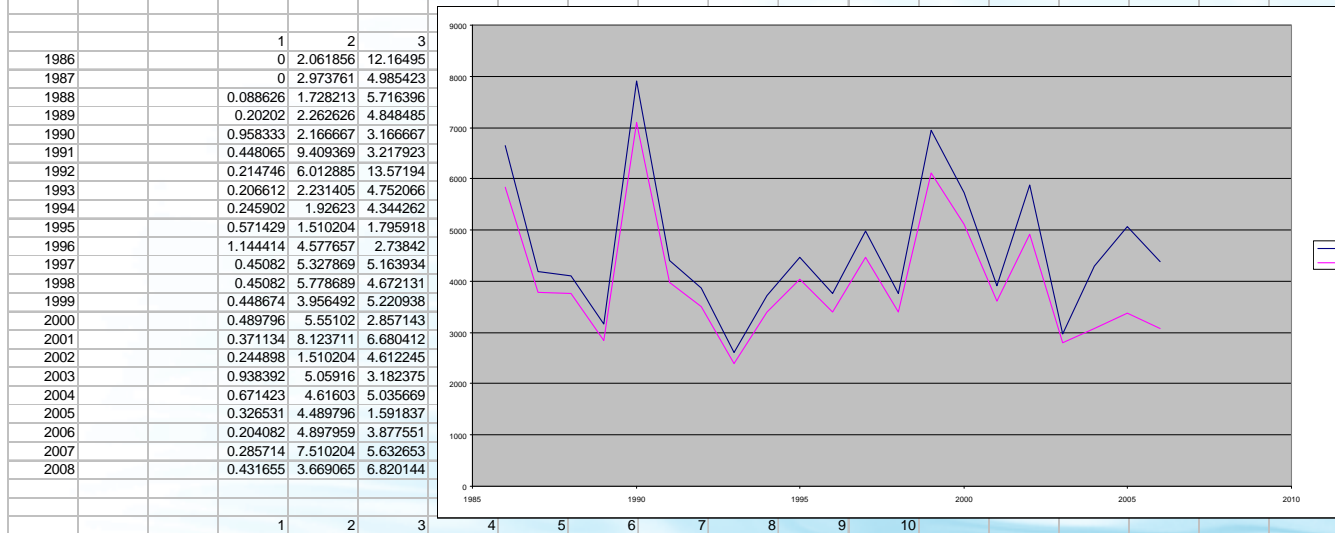
The catch data

Age structure to 40

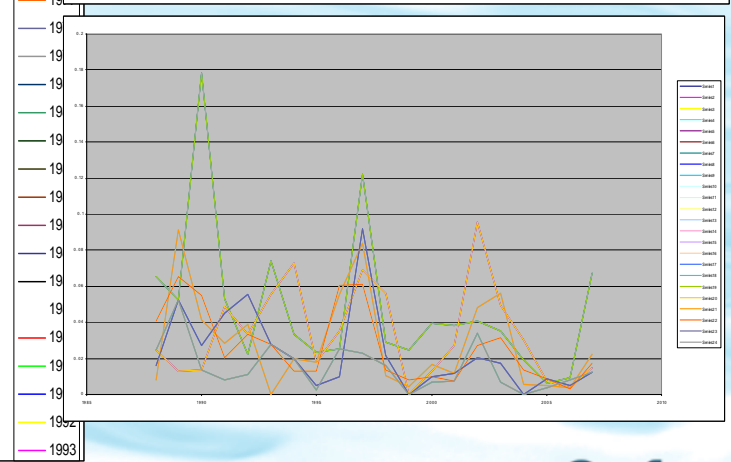
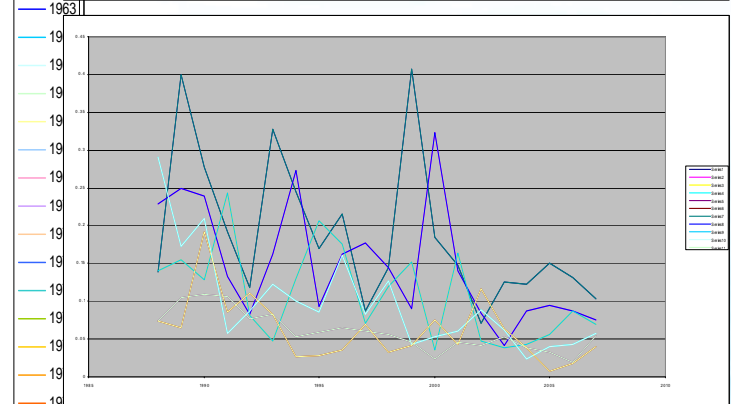
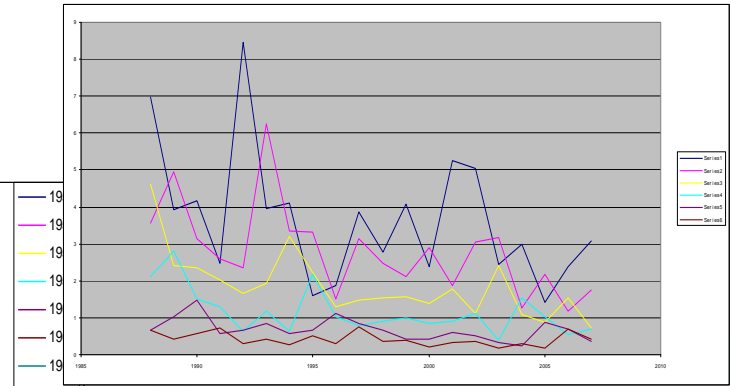
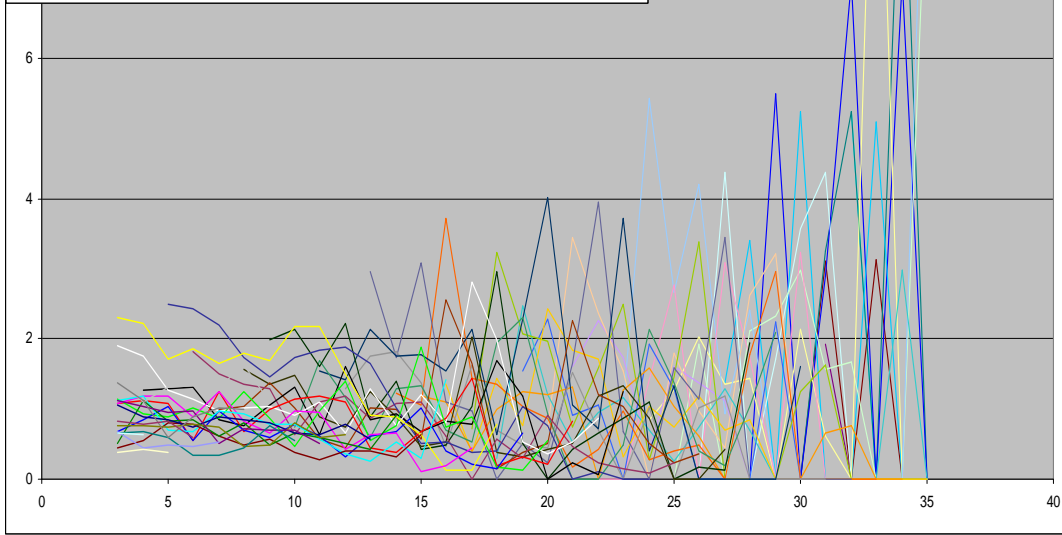
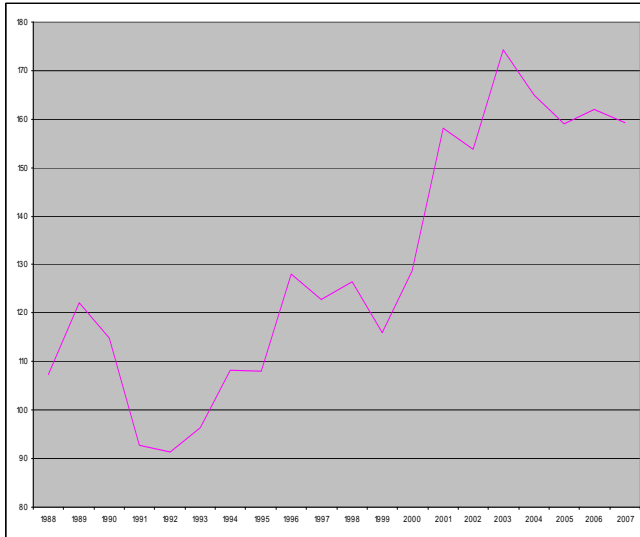
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
1986	0	0	246.3	1817.9	670.9	420.7	521	336.2	83.9	75.4	90	73.9	15.2	22	21.3	17.1	15.2	5.7	1.9	8.5	5.7	0	1.9	0	1.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1987	0	487.3	905.5	1930.5	427.3	203.9	223.9	228.9	47.1	41	32.4	30.3	29.2	8.186047	6.548837	6.548837	3.274419	0	6.548837	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	1.637209	1.637209	3.274419	
1988	0	442.7	1437.9	555.6	727.9	374.2	152.3	161.8	109.2	38.9	49.8	25.7	46.5	13.8	24.69362	22.92799	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383	1.76383
1989	0	390	871.4	1232.6	496.6	304.8	225.3	109.9	106.9	112.9	48.8	30.2	43.8	25.7	20.64673	12.78131	11.79813	6.882243	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335	2.946335
1990	0	341.3	902.1	581.4	552.9	243.8	264.6	142.6	102.6	74.8	84.7	40.8	55.3	34	31.19403	6.238006	9.358209	10.91791	9.358209	15.59701	3.119403	3.119403	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1991	0	459.2	414.8	492.5	269	220	93.1	110.8	68	36.9	30.7	42.8	10.6	20	13.74894	12.22228	9.165857	0	4.502978	4.502978	4.502978	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	1.52766	3.053519	
1992	0	315.6	1433.8	416.9	297	114.8	112.4	61	73.8	25.9	23	15.7	15.4	11.1	4.042553	5.053191	11.11702	3.031915	2.021277	3.031915	3.031915	3.031915	3.031915	1.010638	2.021277	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	1.010638	
1993	0	209.4	703.6	1107.4	350.5	219.3	151.2	78.3	59.7	55.9	30.9	7.9	19.3	15.4	8.25	6.75	5.25	5.25	3.75	1.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75		
1994	0	97.3	656.6	558.3	557.8	112	105.9	49.4	57.4	44.2	50.2	24.2	19.2	9.3	5.182258	3.701613	5.182258	8.143548	8.883871	1.480645	3.701613	0.740323	1.480645	1.480645	2.220968	0.740323	0.740323	1.480645	0.740323	1.480645	0.740323	1.480645	0.740323	1.480645	0.740323	1.480645	0.740323	1.480645	0.740323	1.480645	
1995	0	94.8	308.3	629.3	427.1	411.1	130.7	100.6	61.1	32.7	18.4	39.8	16.7	10.4	7.898624	14.04235	7.898624	9.654118	7.021176	2.632941	5.265882	0.877647	1.755294	0.877647	2.632941	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	0.877647	
1996	0	354.93	444.96	354.07	297.57	224.67	297.04	67.91	61.07	48.96	36.63	35.53	36.91	14.75	7.72	7.076667	13.51	2.573303	3.216667	3.98	1.93	1.286667	0.643333	2.573303	1.93	0	0.643333	1.286667	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	0.643333	
1998	0	265.11	605.81	536.26	336.43	209.21	151.12	79.8	127.33	34.89	34.39	30.64	30.27	12.51	27.96233	14.58904	4.863014	6.078767	3.64726	3.64726	2.431507	0.104178	3.64726	6.078767	1.215753	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1999	0	279.99	914.51	499.76	397.94	255.11	114.41	102.63	54.08	107.45	24.79	41.34	12.26	13.41	13.66933	12.42667	8.698667	3.728	2.485333	3.728	2.485333	1.242667	1.242667	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2000	0	271.14	630.92	838.76	435.6	264.77	130.72	56.1	84.7	63.19	103.23	10.86	19.36	7.5	7.32563	5.11493	14.26917	7.134065	4.07662	3.057465	5.098775	2.03531	1.019155	3.057465	2.03531	1.019155	3.057465	1.019155	3.057465	1.019155	3.057465	1.019155	3.057465	1.019155	3.057465	1.019155	3.057465	1.019155	3.057465	1.019155	
2001	0	145.06	1400.94	531.07	498.87	267.6	177.67	100.45	55.13	42.86	42.34	48.7	18.81	14	19.21587	8.463261	11.83457	13.52522	7.607935	4.22663	1.890652	3.81304	2.535978	2.535978	3.81304	0	0	1.890652	0	0	0	0	0	0	0	0	0	0	0		
2002	0	332.01	1251.21	842.74	386.77	322.16	128.64	105.24	93.73	32.64	18.42	18.57	21.52	17.07	8.097143	4.048571	6.362041	1.156735	2.891837	0	0.578367	1.735102	1.735102	0	0	0	0	0.578367	0	0	0	0	0	0.578367	0	0	0.578367	0	0.578367		
2003	0	598.14	835.28	953.14	644.96	130.39	74.43	49.65	57.9	63.19	13.83	10.33	20.33	11.63	2.388511	1.990426	2.388511	1.59224	2.786596	2.786596	1.194255	0.398085	0.398085	1.59224	0	0	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085	0.398085		
2004	0	397.6	1080.04	448.08	444.69	325.8	164.32	116.16	60.68	54.3	35.21	18.28	15.73	13.51	11.40013	5.947985	2.478289	2.478289	1.962532	2.972947	4.96679	0.495658	0	0.495658	1.488974	0	0	0.495658	2.478289	0	0	0	0	0	0	0	0	0			
2005	0	257.9	468.5	834.3	449.32	365.74	292.88	113.27	79.9	44.74	24.25	21.78	16.19	16.24	7.077053	11.94293	2.653965	3.989482	3.096211	2.21579	2.211579	1.769283	1.769283	0	0.442116	0.442116	0.442116	0.442116	1.328471	0.846332	0.846332	0.846332	0.846332	0.846332	0.846332	0.846332	0.846332	0.846332			
2006	0	510.39	795.04	476.9	610.76	252.21	223.7	185.37	85.03	56.24	30.83	27.46	10.82	7.35	9.15675	5.10975	9.15675	1.702917	2.384083	2.0435	1.362333	2.0435	1.362333	1.362333	0.681167	0.681167	1.702917	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167	0.681167			
2007	0	201.99	848.21	737.49	283.72	344.36	169.72	125.91	105.7	52.01	25.53	19.09	15.42	18.09	7.620246	7.620246	5.805902	8.345984	25.40082	2.177213	1.088607	1.451475	2.902951	2.540082	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738	0.725738			

Assessment uses to 12

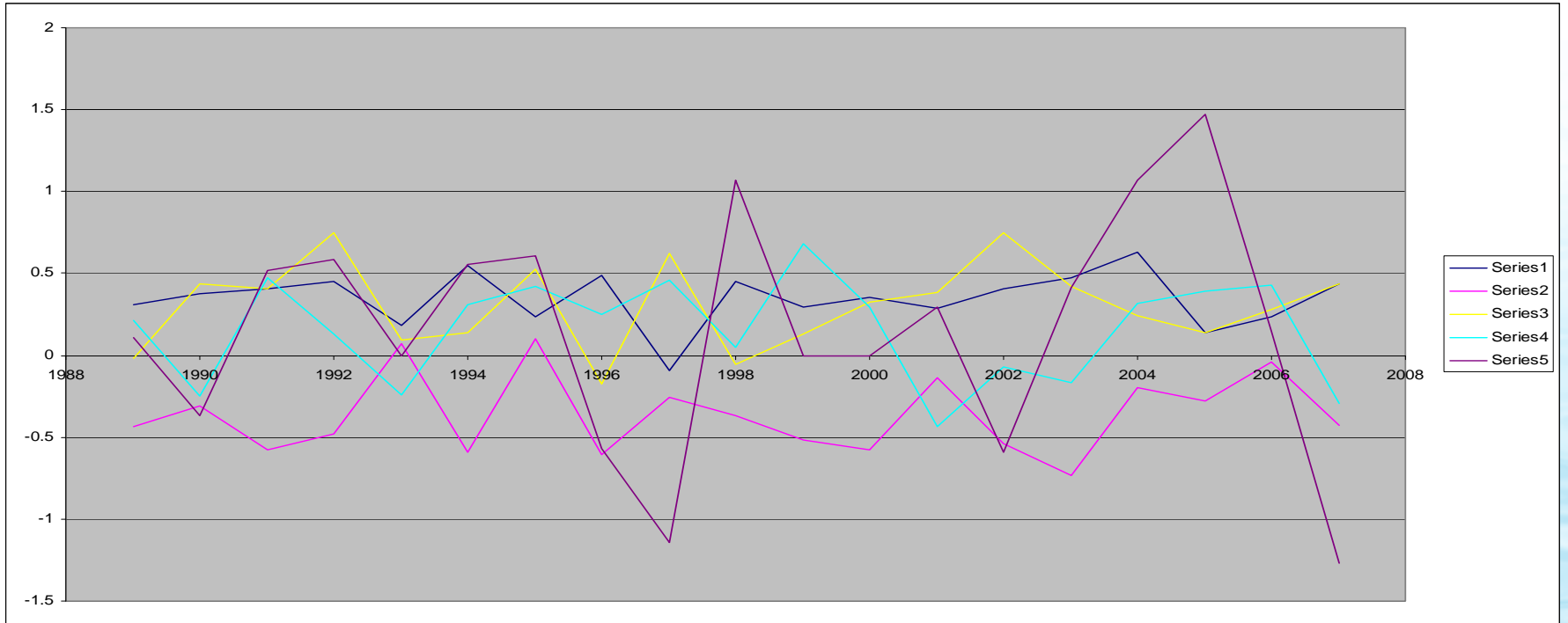
		1	2	3	4	5	6	7	8	9	10								
1986	6649	5838.724	598.1571	2120.353	1202.067	533.1866	427.6445	441.9233	117.7306	102.0431	111.3777	98.78215	20.31785	28.34006	27.43833	22.02795	19.5804	7.342651	
1987	4190	3790.587	1016.974	1075.332	1417.977	573.1362	277.2453	294.8476	298.0541	71.63125	68.11168	54.39869	42.98824	40.26711	38.80526	10.87882	8.70306	2.175765	
1988	4113	3752.945	780.6389	1819.306	770.7765	939.4988	467.9845	202.7793	207.8969	156.4727	56.99302	61.49014	31.73286	62.20056	17.69831	31.66922	29.40713	2.262087	
1989	3154	2852.287	723.3333	1111.455	1449.607	602.7111	641.9937	282.1939	142.3189	136.0281	144.883	59.74286	49.2	53.86897	31.60805	25.3931	15.71954	14.51034	
1990	7917	7090.708	596.0015	1139.495	730.4769	668.8119	306.1529	349.5482	176.9614	121.6706	92.65203	104.2612	50.22263	69.47949	42.71795	39.1925	7.8385	11.75775	
1991	4405	3980.641	1112.259	607.7302	633.2813	384.3795	290.2875	134.2947	170.3838	89.51899	47.98108	42.11264	58.71078	14.45455	27.27273	18.74855	16.66538	12.49903	
1992	3876	3499.632	678.3586	1935.129	551.8191	397.3378	182.729	160.8483	91.19802	119.3556	41.13529	30.2327	20.63711	21.34595	15.38571	5.603385	7.004231	15.40931	
1993	2601	2384.811	531.5538	981.7028	1439.953	435.9878	285.7545	199.6615	113.1	81.17482	91.05723	41.93571	10.72143	25.18415	20.09512	10.76524	8.807927	6.85061	
1994	3723	3398.453	318.4364	905.3121	750.1557	782.7194	168.5657	151.1564	84.18873	82.57544	58.73947	76.90213	37.07234	26.97328	13.06518	7.280338	5.200242	7.280338	
1995	4461	4036.458	410.8	486.5081	792.3311	553.8359	568.6096	170.1864	131.5538	87.21111	51.27955	28.67933	62.03464	22.3229	13.90168	10.55836	18.77042	10.55836	
1996	3771	3389.721	729.86	703.4995	492.2637	403.0913	318.7811	368.7965	94.54137	81.63229	67.36602	50.09691	52.69544	50.33169	20.67369	10.8204	9.918701	18.9357	
1997	4982	4478.012	529.1659	1101.949	899.5045	408.296	252.9879	250.0818	253.5623	62.57476	35.27321	52.59273	23.51143	25.23141	19.46349	19.16712	11.50027	0	
1998	3767	3401.651	679.3444	848.134	717.4289	447.0978	259.5009	201.4933	117.9818	186.2791	48.25782	45.17056	40.24502	39.94093	16.50681	36.89598	19.25008	6.416692	
1999	6943	6120.742	591.09	1230.949	666.9038	517.8014	327.3791	145.0009	136.3899	82.24667	149.7531	34.07464	56.82315	15.98644	17.48599	17.82415	16.20377	11.34264	
2000	5719	5110.151	860.5748	866.3379	1040.385	541.8439	342.1881	169.008	75.99362	106.3071	82.99878	131.3581	13.81913	25.09184	9.725519	22.46677	7.929449	18.50205	
2001	3912	3606.009	628.5933	1842.482	688.4505	617.4695	331.1629	227.0228	133.6018	67.7745	56.67204	55.32773	63.63865	23.90756	17.79404	19.33941	10.74412	15.04176	
2002	5885	4908.364	651.2504	1617.061	1139.479	485.9418	393.1204	168.3615	136.8436	114.3754	40.00795	28.06398	28.29251	27.51443	21.77373	10.35261	5.176307	8.134197	
2003	2970	2797.622	1072.854	1065.385	1180.078	842.8005	196.9155	121.2413	77.23333	78.95455	74.49411	18.39436	14.36436	27.26857	15.59928	3.203702	2.669752	3.203702	
2004	4300	3071.805	632.8663	1427.32	597.44	586.311	648.9382	210.2194	149.1472	80.31754	67.94322	40.90741	21.23793	20.32942	17.46029	14.7335	7.687045	3.202936	
2005	5067	3371.669	616.0944	639.4854	1057.973	541.018	455.3822	366.6533	141.7298	100.5995	57.52286	33.03623	29.6713	20.36268	20.42557	8.901035	15.0205	3.337888	
2006	4380	3075.249	921.9948	1064.545	585.5333	744.993	302.7531	277.474	229.8232	101.3819	68.54635	38.85865	34.61104	13.39007	9.095843	11.38001	6.32223	11.38001	
2007		3389.856	566.99	1152.228	907.811	346.9093	421.732	195.6315	158.4449	132.4595	60.42586	32.97315	24.6556	18.8315	22.09221	9.306141	9.306141	7.090393	
Surv			3381.826	2500.37	1289.437	474.2304	582.0137	173.4919	252.5313	206.807	57.53044	59.15821	44.23542	25.56117	29.98714	12.6318	12.6318	9.624232	



Tuning Data Beam

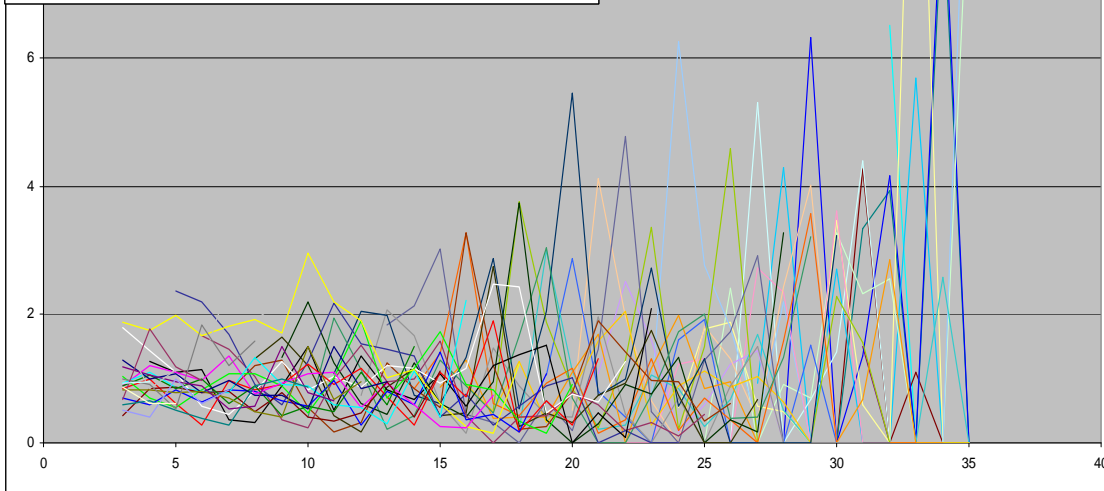
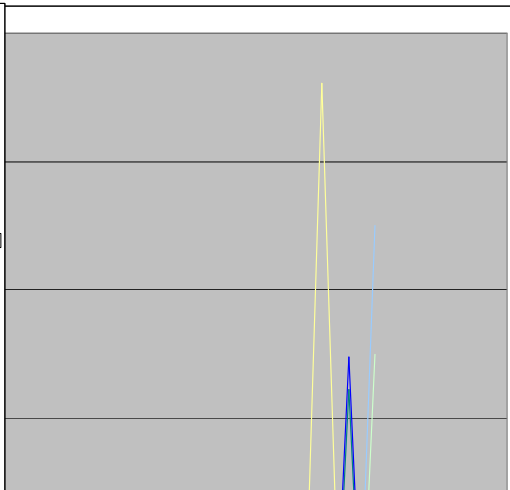
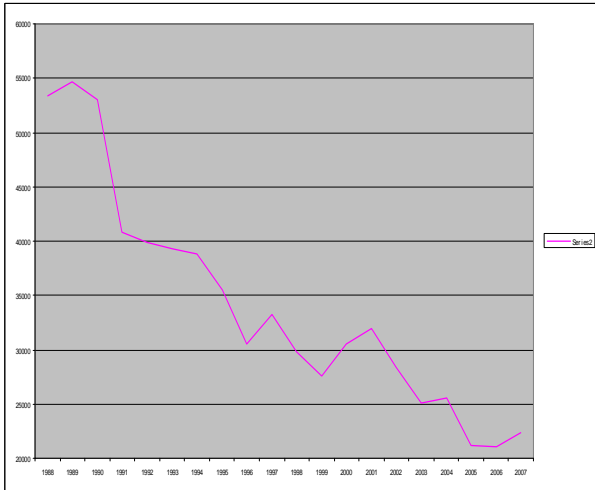


Tuning Data Beam F

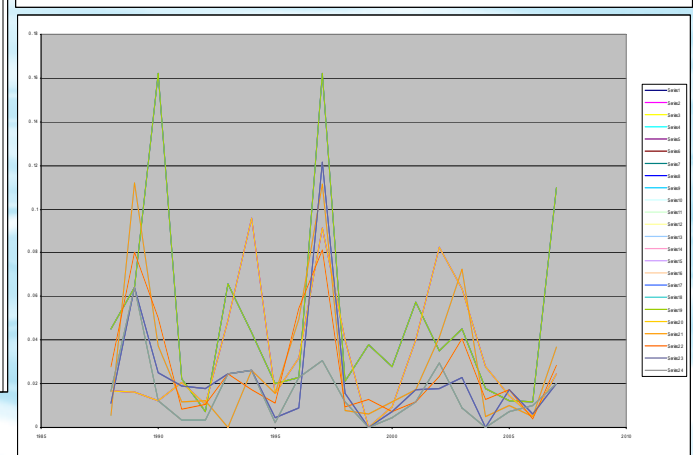
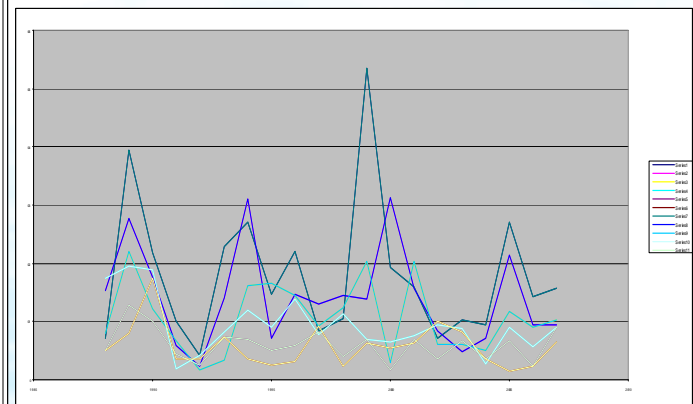
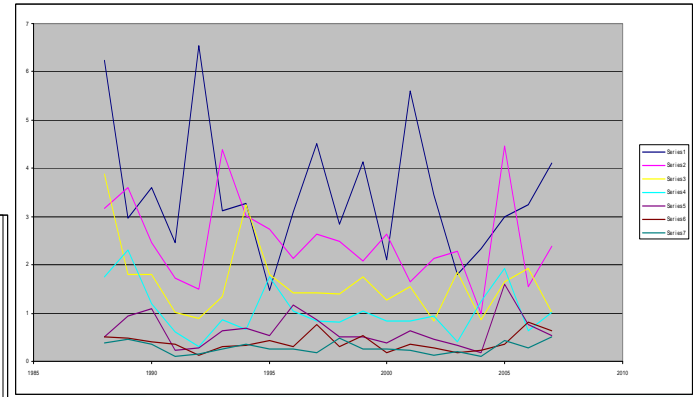


Spatial Effort Plots

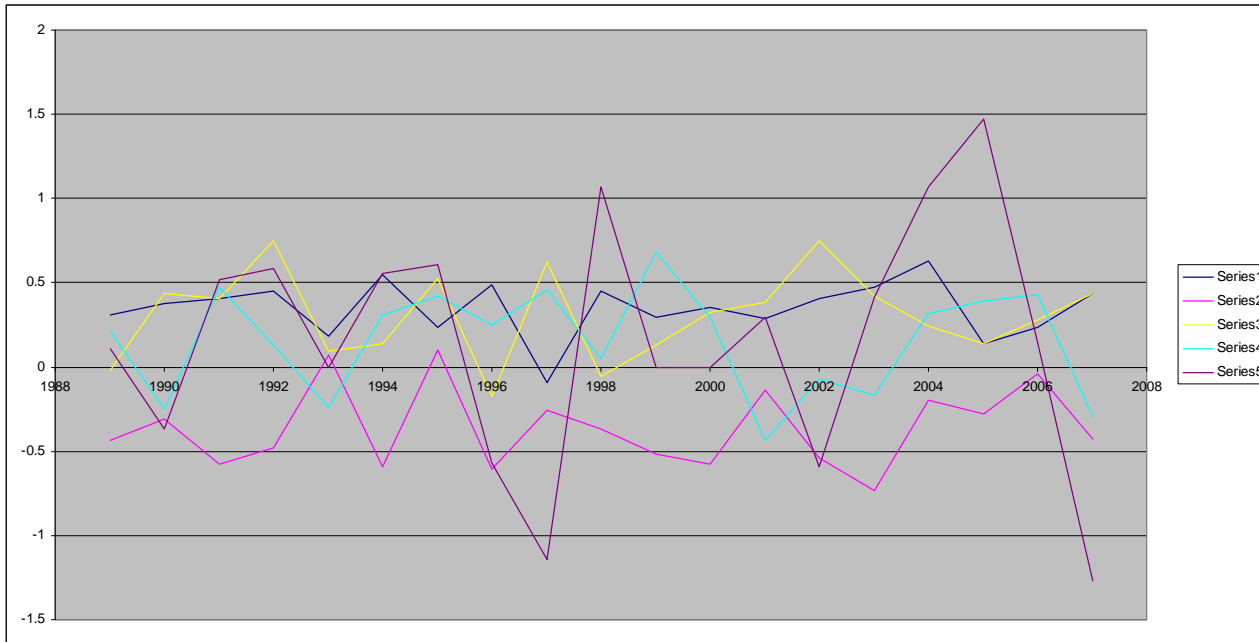
Tuning Data Otter



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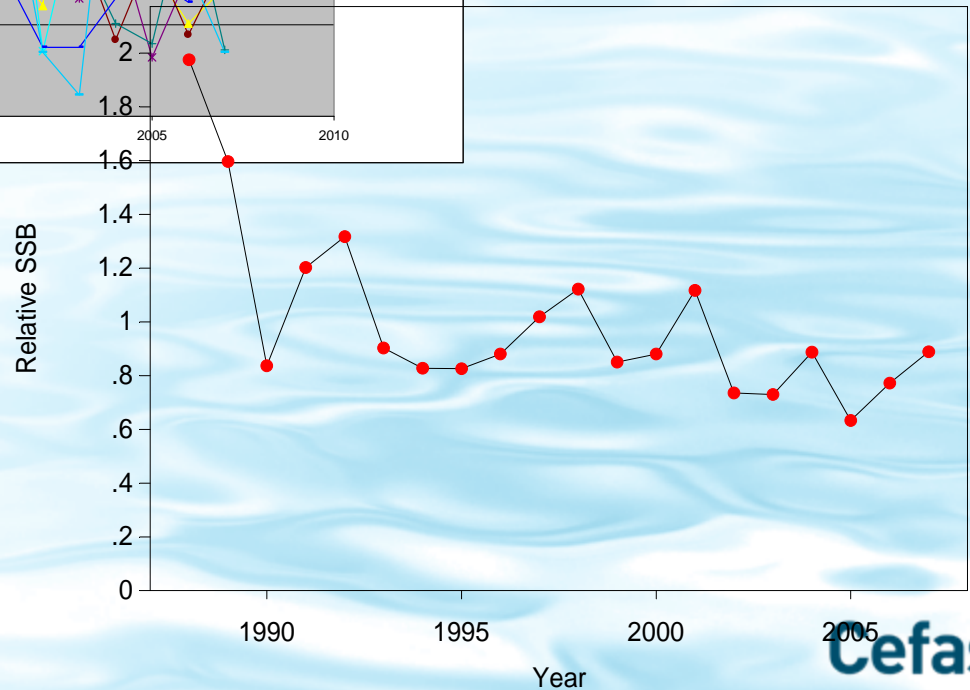
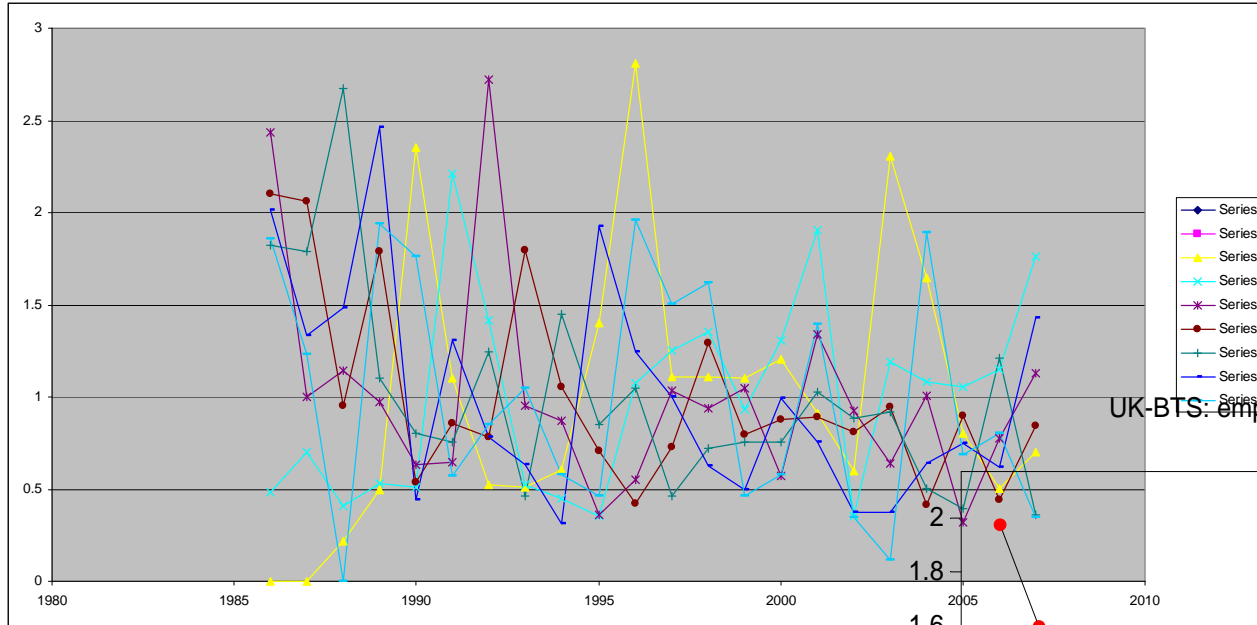


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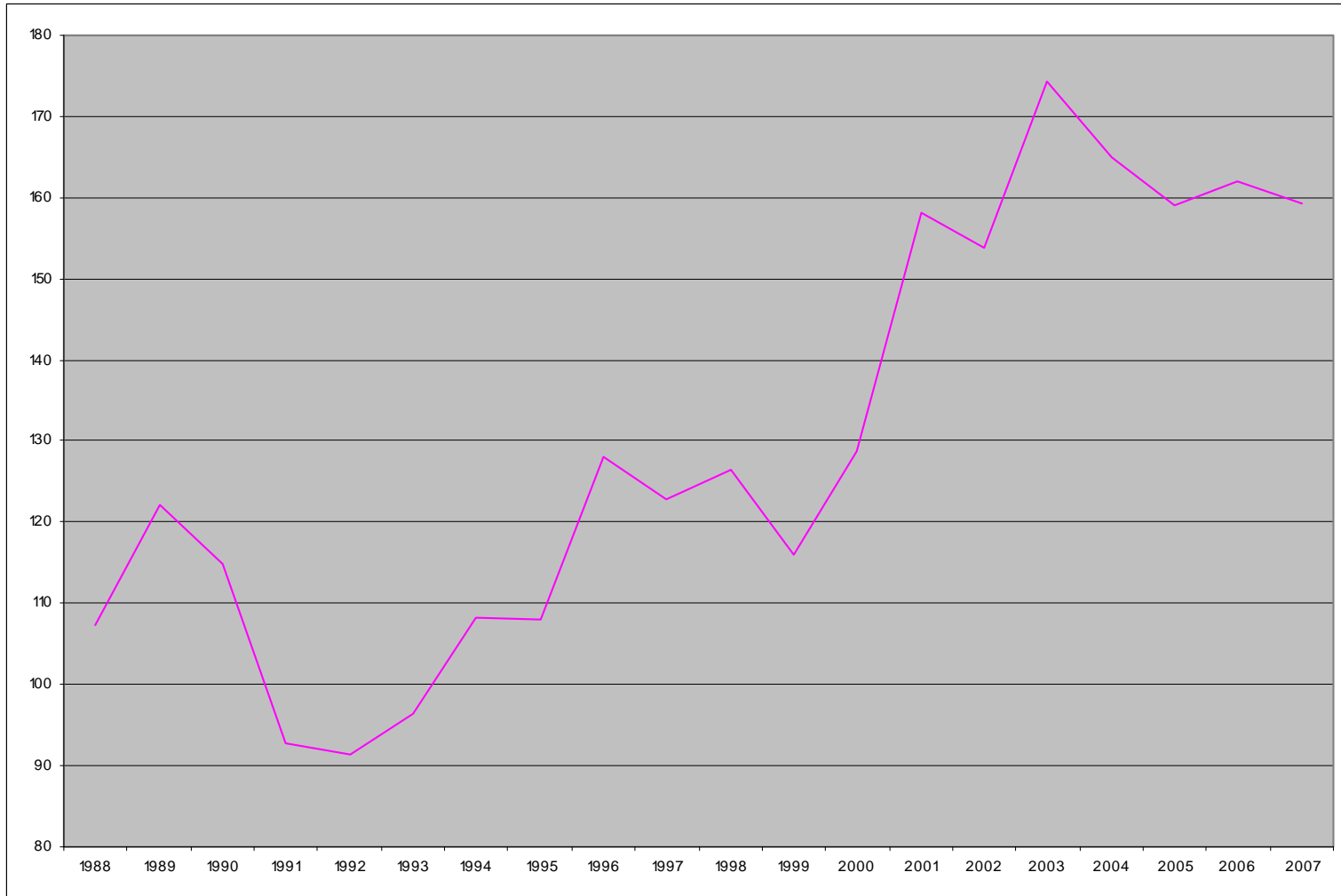


Spatial Effort Plots

Survey Tuning Index



But effort says?!



Other Data / New Data

What to do

- Fix the assessment retrospective, probably needs a new assessment model approach.
- Find a way to apply the management plan sensibly in the absence of an unbiased assessment.

Eco / Biological data

- Don't know spawning recruitment, but not like other sole stocks
- Migration off shore inshore seasonally long shore randomly.
- Long-lived subtropical / temperate
- Lots of anecdotal evidence of changes in the ecosystem, but species composition quite stable.

Survey Species Composition