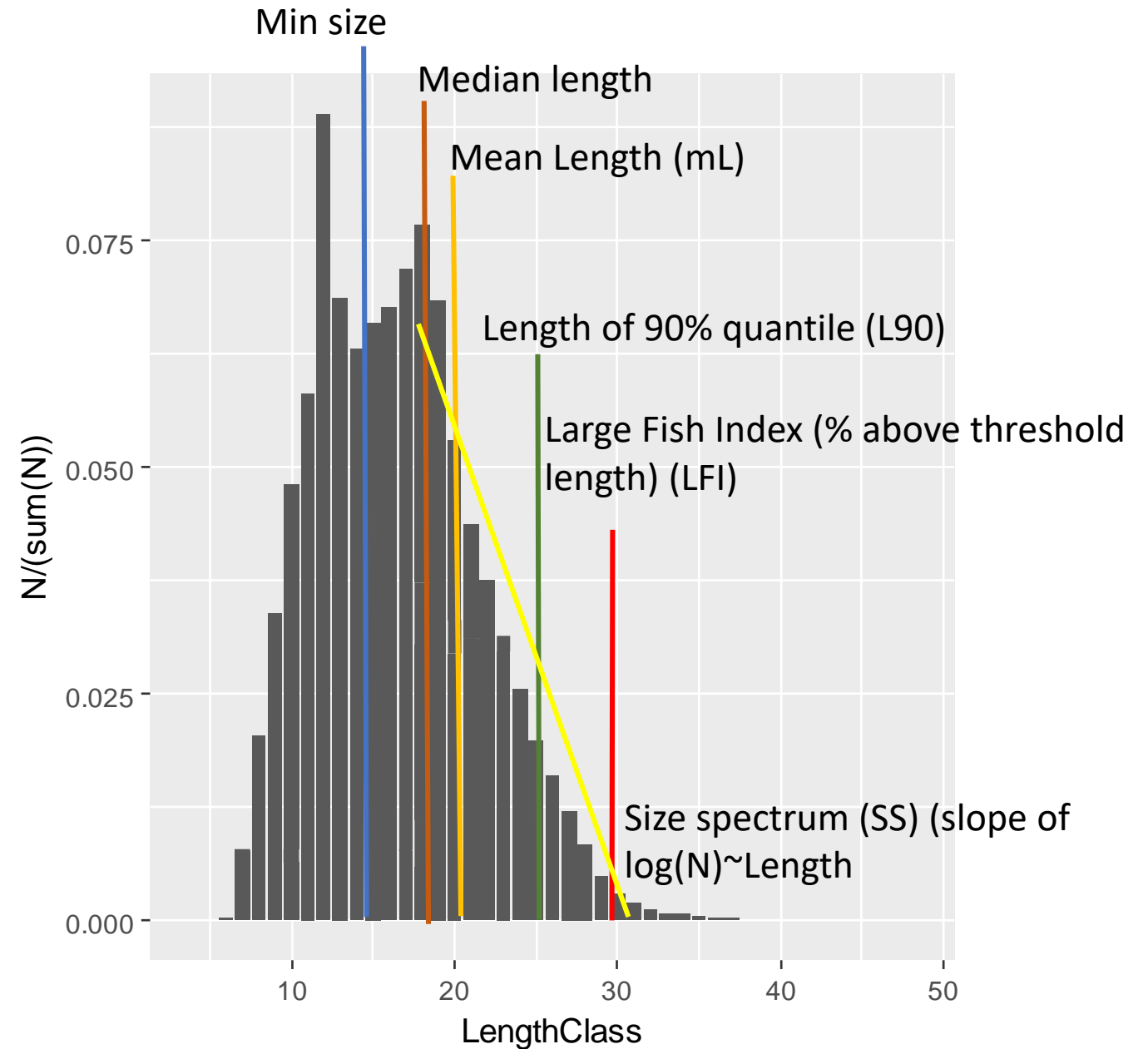


L90 as indicator of size structure for next assessment cycle

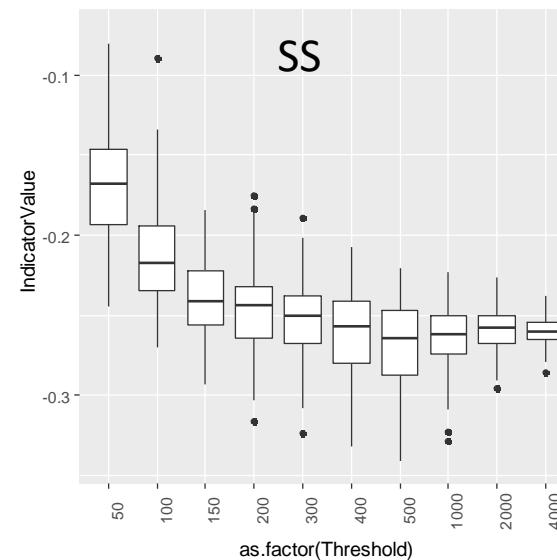
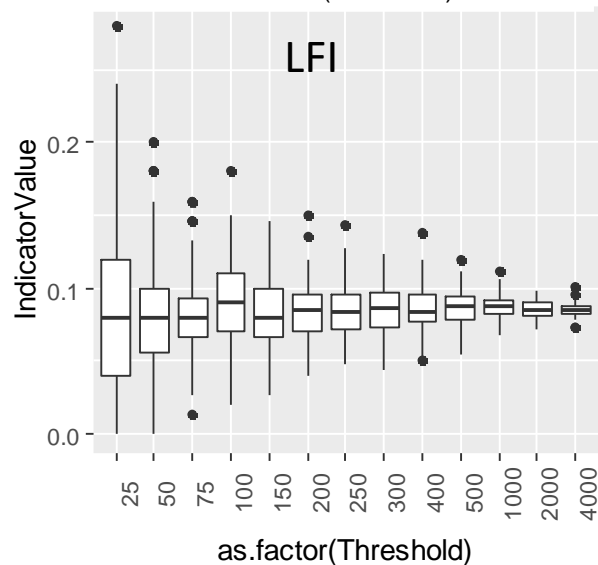
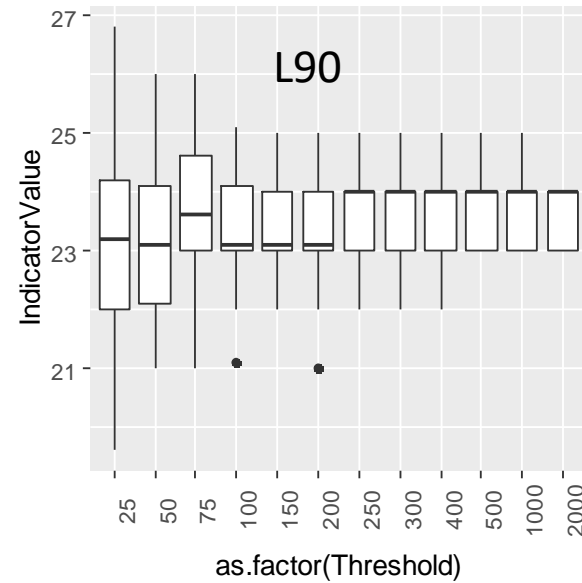
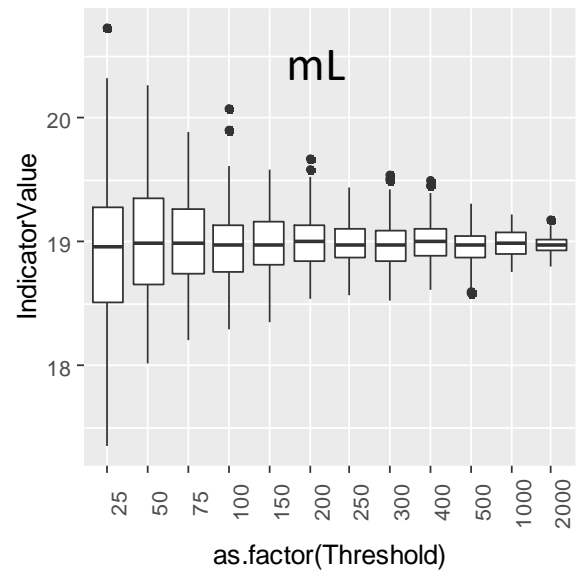
J. Olsson, Ö. Östman, R. Naddafi

SLU

Sizer based indicators



Perch precision

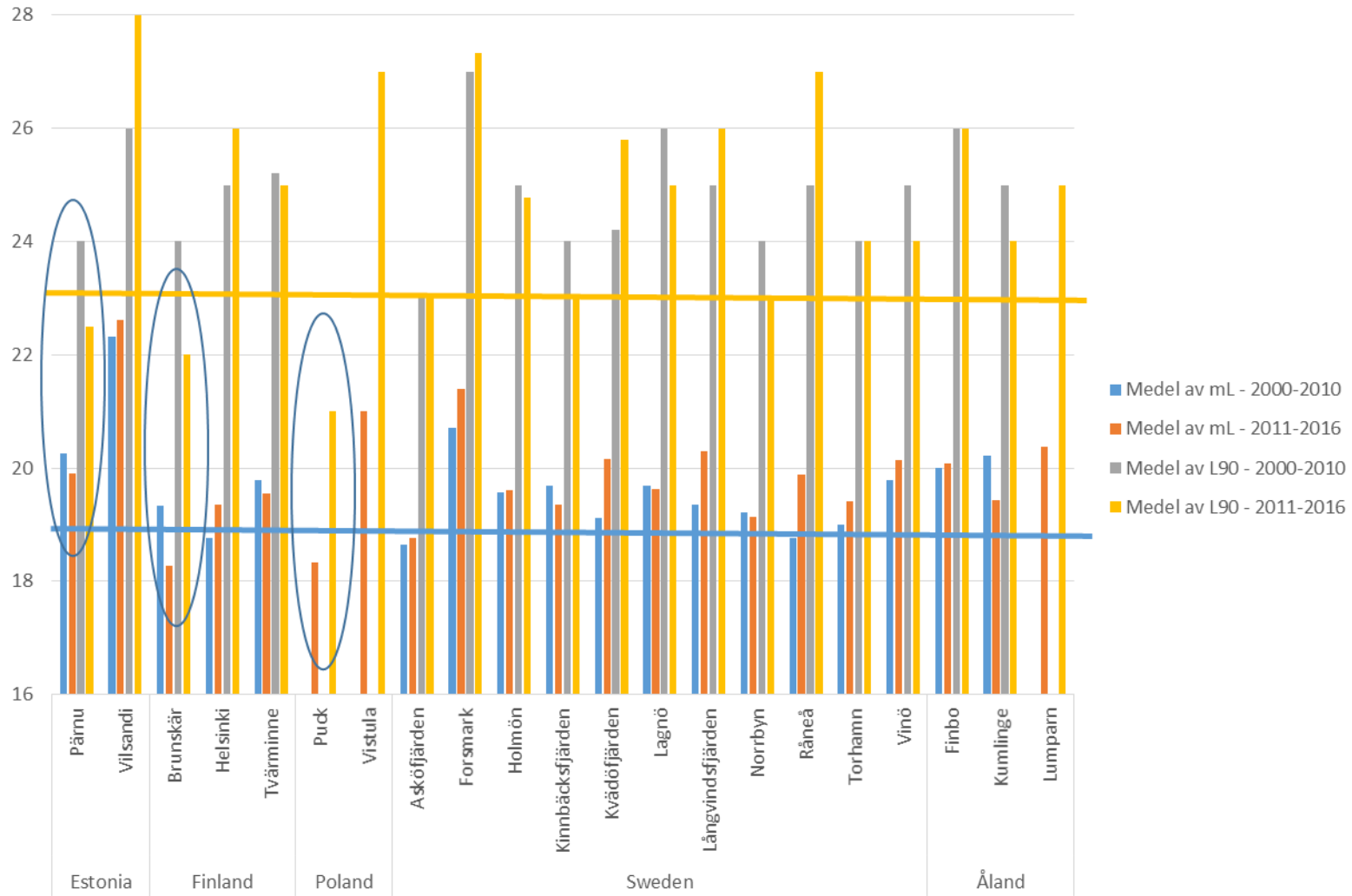


mL, L90 & LFI good precision at 150 perch, for size spectra > 500 needed (not a major problem as sample size for perch is large).

Perch

Most sites within
L90 22-27 cm

mL 18-22 cm



- What drives variation in L90?
 - Fishing pressure, nutrients, disturbances, natural predation?
- Can we identify generic boundary levels?
 - To be applied across the Baltic Sea
- Flounder?



L90 *not* lower in (few) eutrophicated or “disturbed” areas

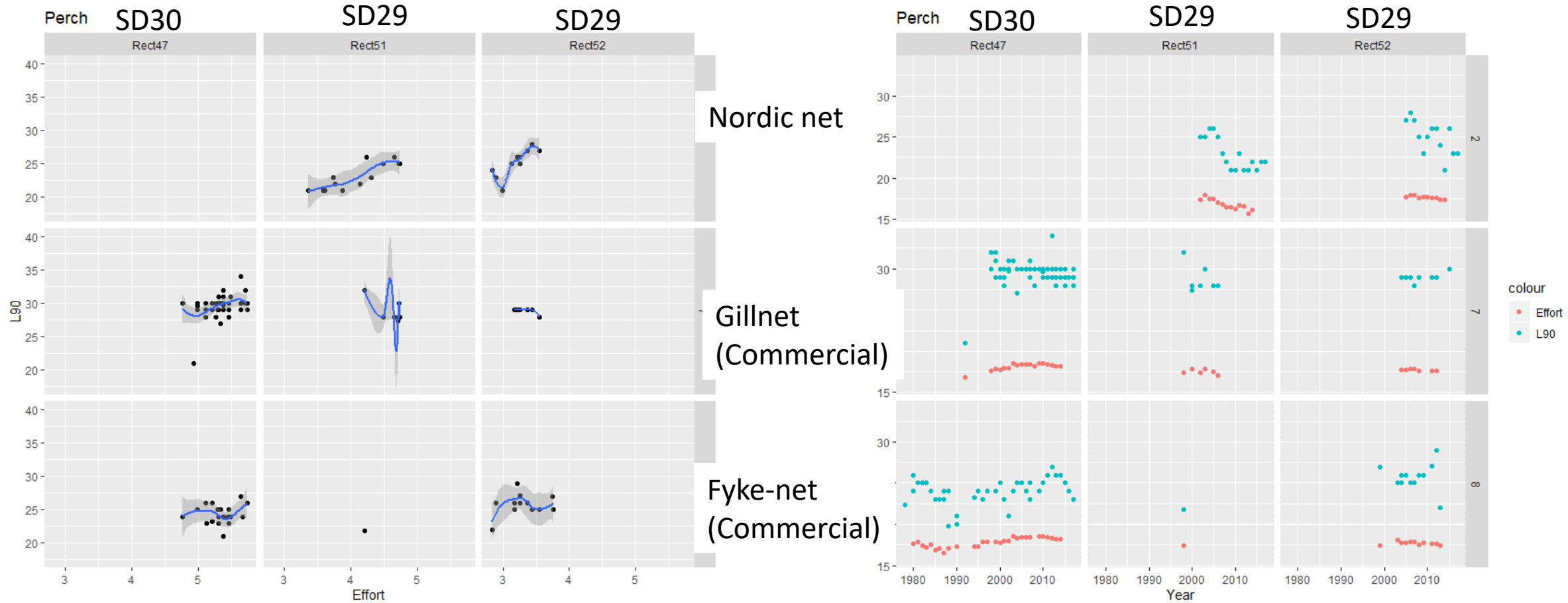
Habitat	Perch _{L90}	Large Fish _{L90}
No-take (N = 5)	30.1 ± 1.2	55.2 ± 19.0
MPA (N = 6)	26.6 ± 1.5	47.6 ± 4.1
REF (N = 22)	25.4 ± 2.1	45.0 ± 8.7
EUT (N = 4)	26.0 ± 2.5	50.0 ± 15.8
DIST (N = 7)	27.3 ± 2.0	48.0 ± 9.5



L90 of perch and “large fish” higher in no-take area than in reference area

	Gear	Perch _{L90}	LF _{L90}
NTZ : Licknevarp 2005, 2013	Nordic net	31 cm	56 cm (Pike)
REF: Kvädö 2005, 2013		25 cm	45 cm
Lännåker 2013-2015	Nordic net	30 cm	51 cm (Pikeperch)
REF: 2009-2011		29 cm	42 cm
Lännåker 2013-2015	Trapnet	27 cm	78 cm (Pikeperch)
REF: 2009-2011)		24 cm	76 cm)
Storjungfrun 2013-2015	Nordic net	NA	44 cm (Whitefish)
REF: 2010-2012			29 cm
Kalvhararna 2013-2015	Nordic	29 cm	40 cm (Whitefish)
REF: 2010-2012		28 cm	37 cm

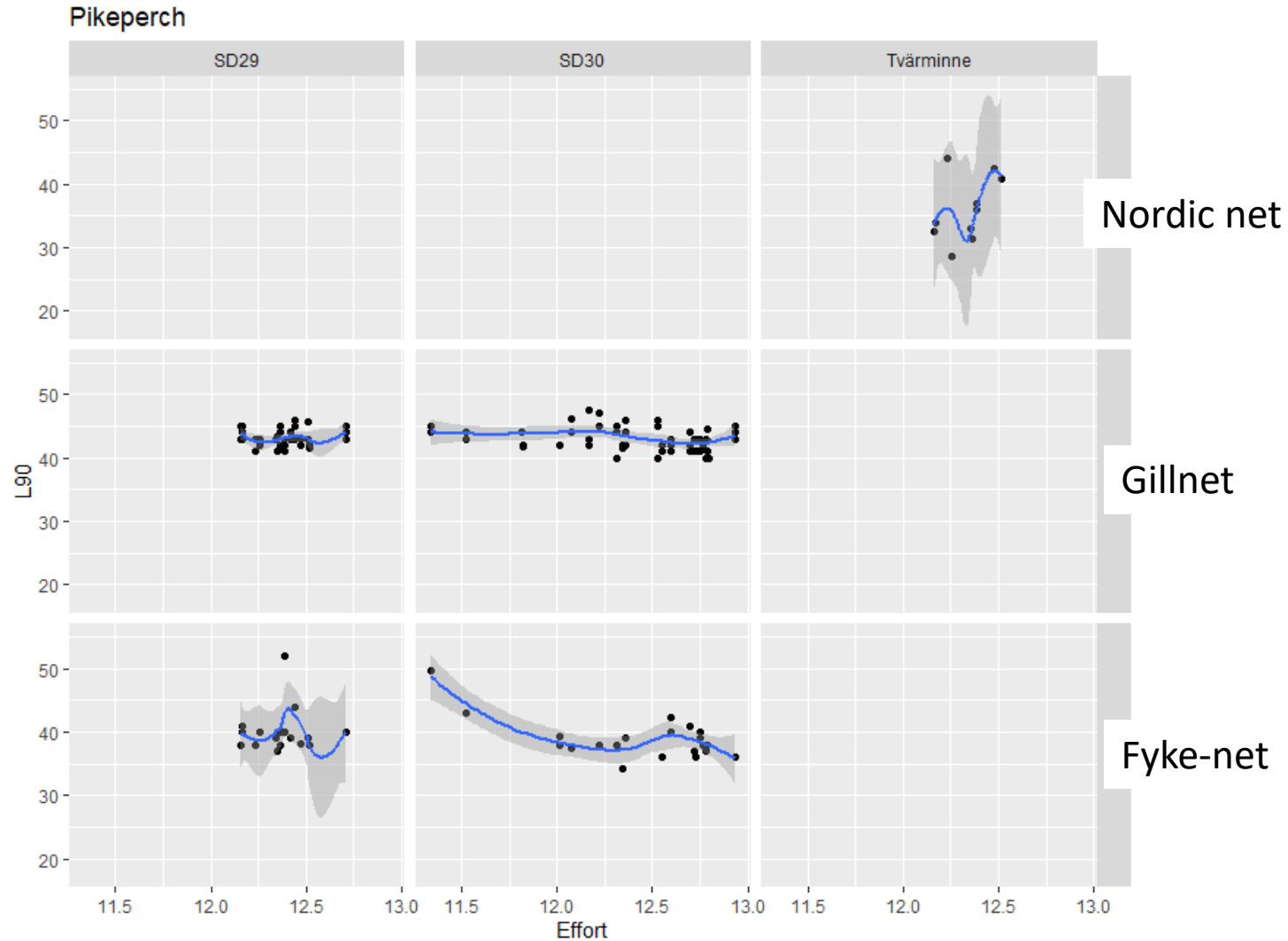
L90 of perch increases with fishing effort- both have declined over time



Differences in trends between fishery independent and fish dependent data



Weak decrease in L90 with fishing effort for pikeperch in Finland

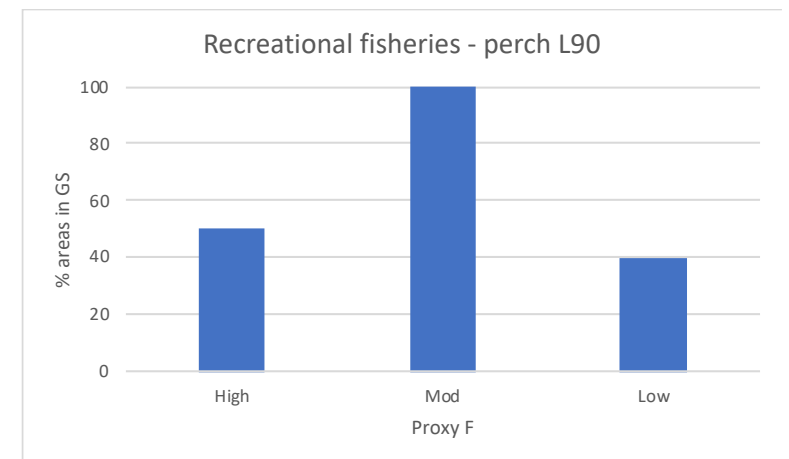
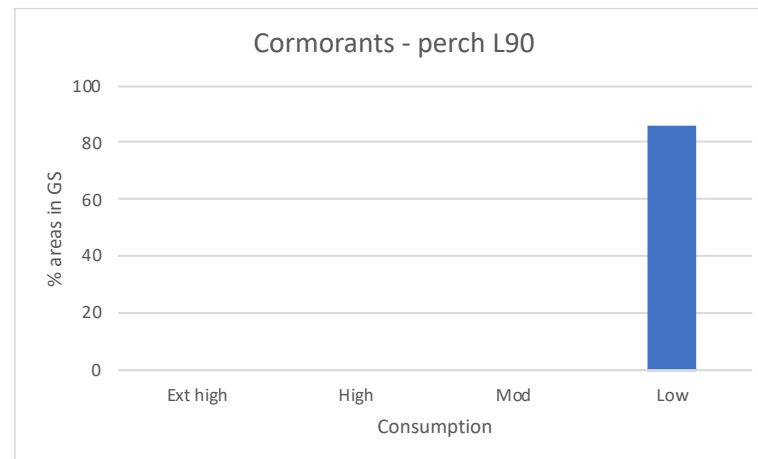
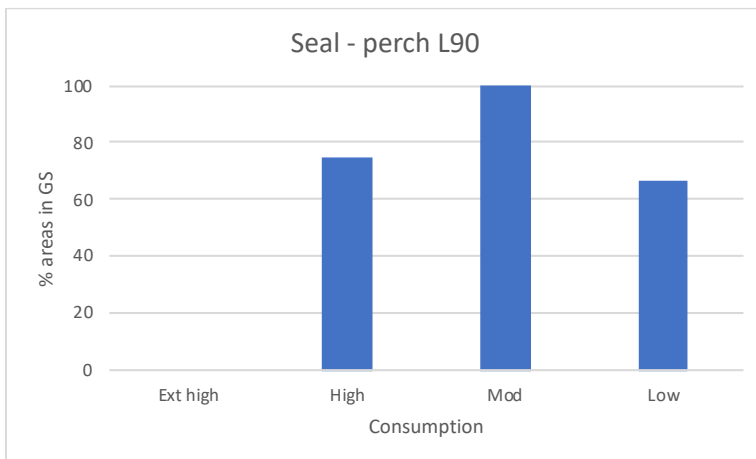




L90 in perch and potential pressures (pseudo-science in action)

Data from 12 areas along the **Swedish east coast** (until 2018)

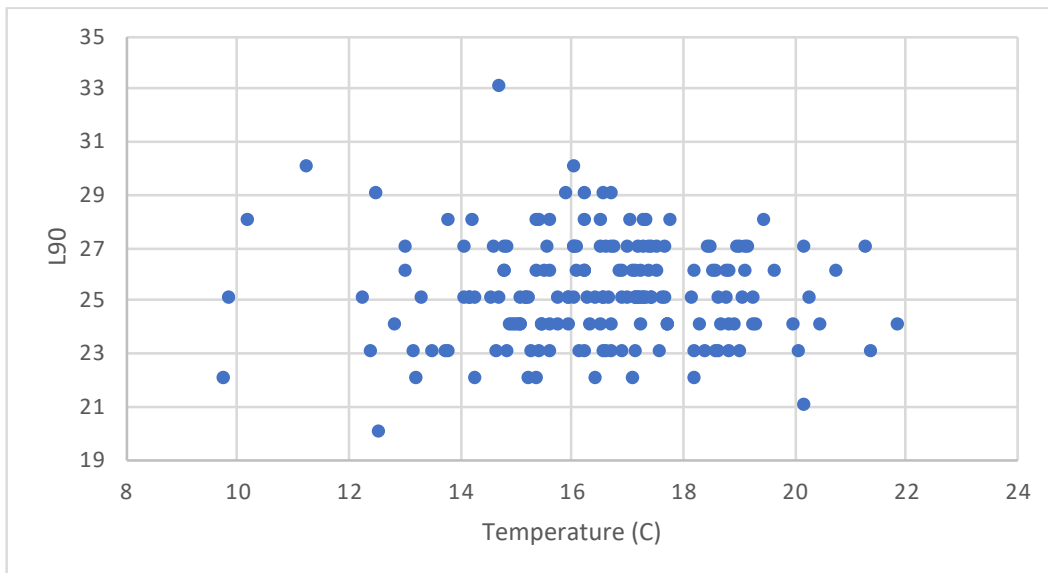
Data for seals, cormorants and recreational fishing pressure until 2012



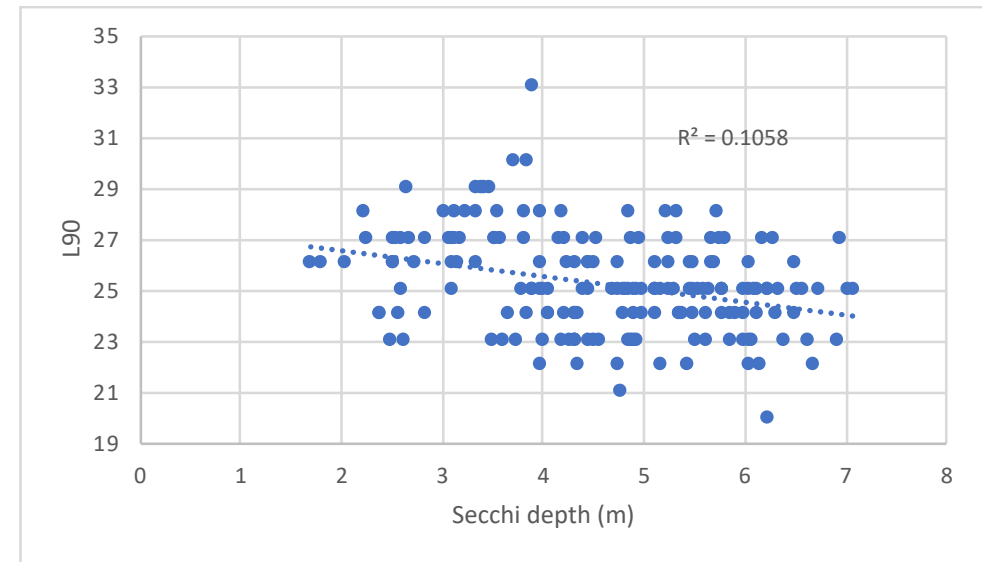
GS = Good status -> no decreasing trend since 2005

L90 in perch and potential pressures

Data from 12 areas along the Swedish east coast (until 2018)

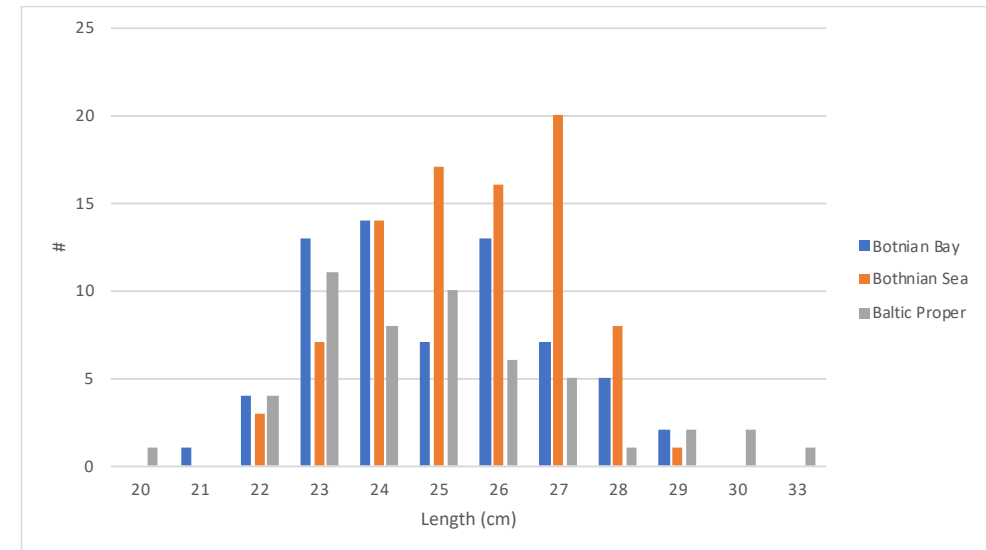
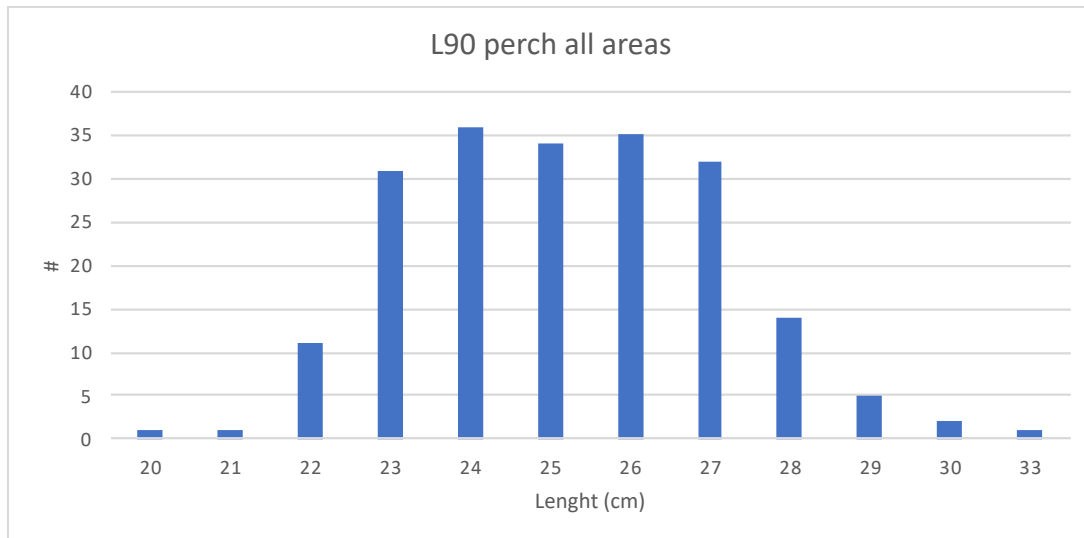


Water temperature during fishing



Secchi depth during fishing

L90 perch in Swedish monitoring areas



12 areas along the Swedish east coast

Range between 20-31 cm

5th percentile = 22 cm

No major difference between basins

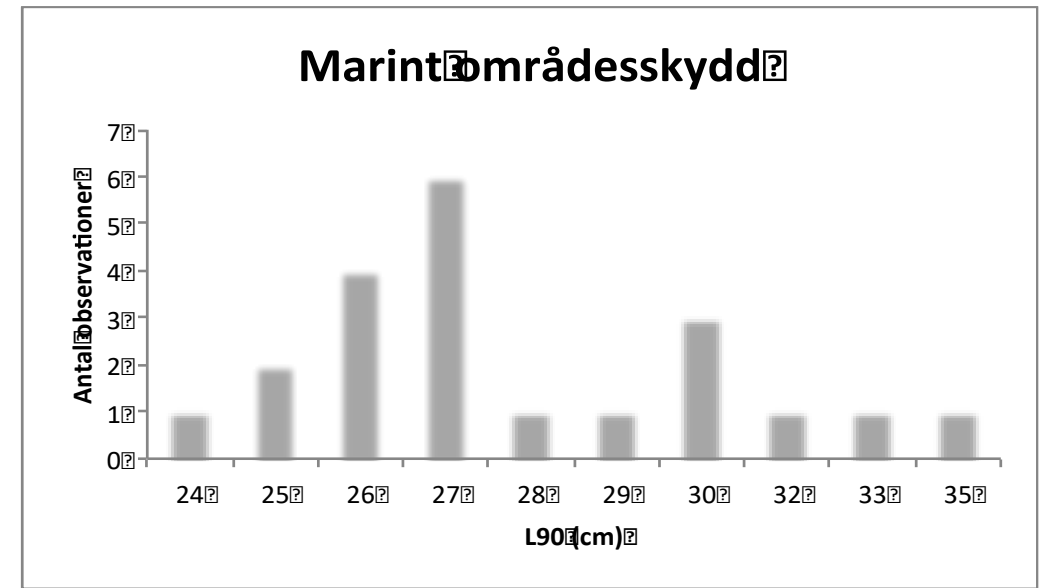
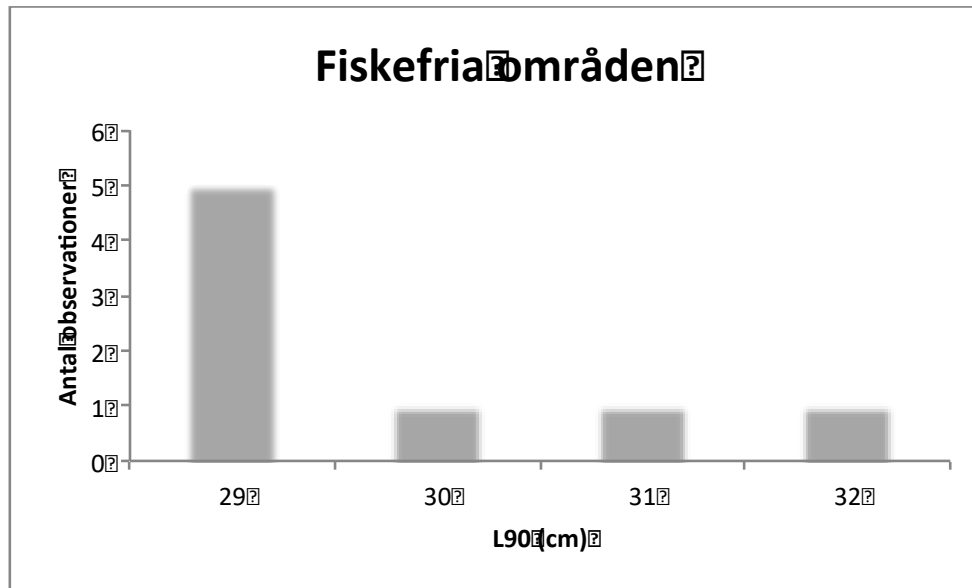
Mean L90 in BB = 24.9; BS = 25.5; BP = 25.0

Largest and smallest fish in BP?

Potential threshold for GS

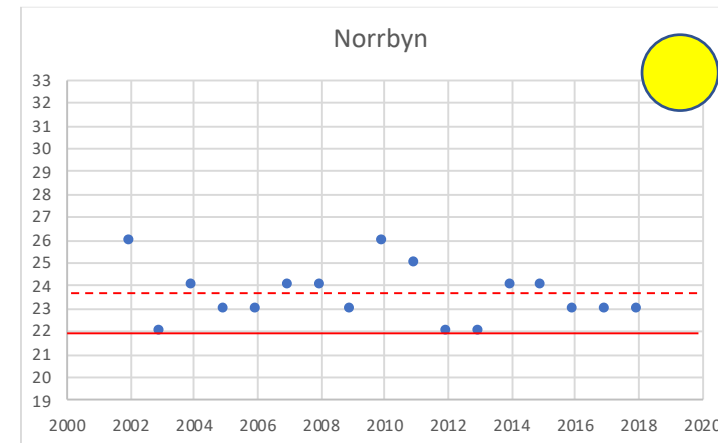
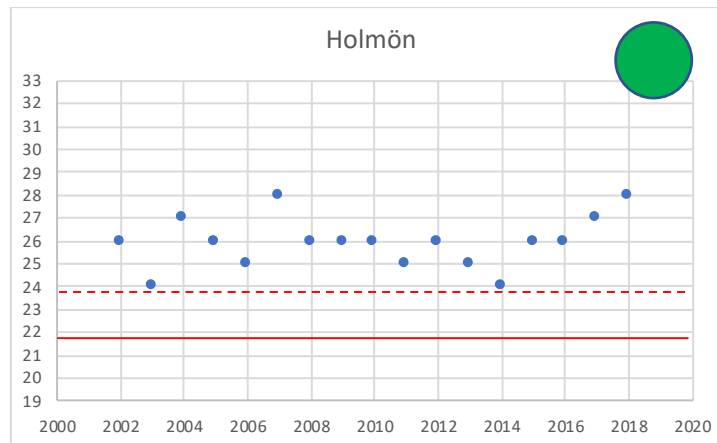
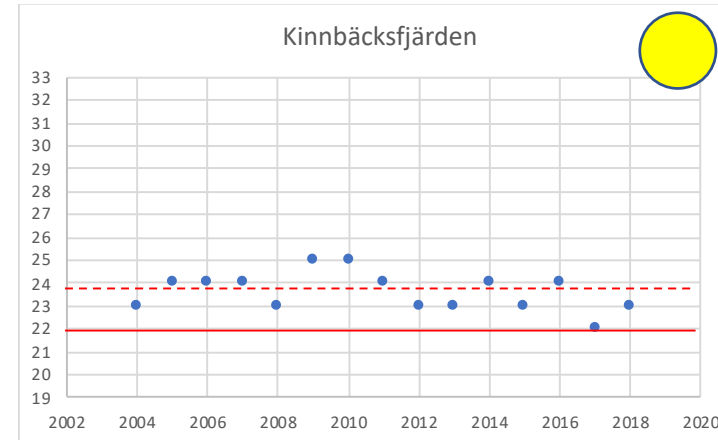
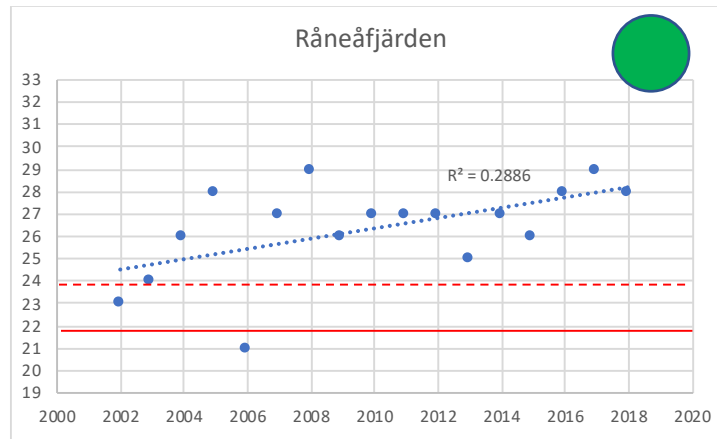
No take areas

MPA (fishing is allowed)

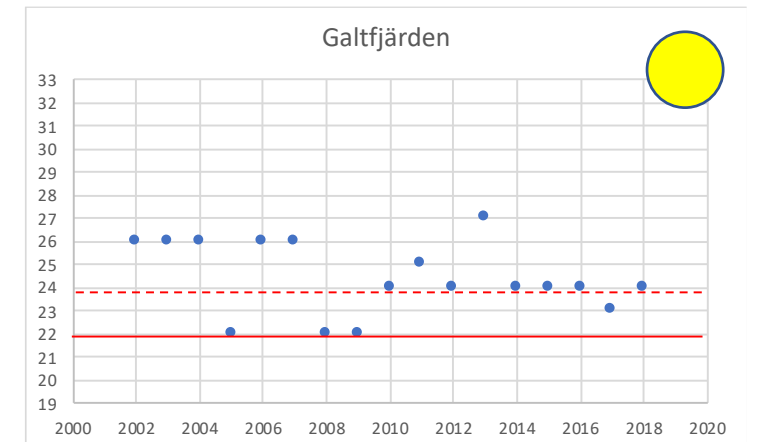
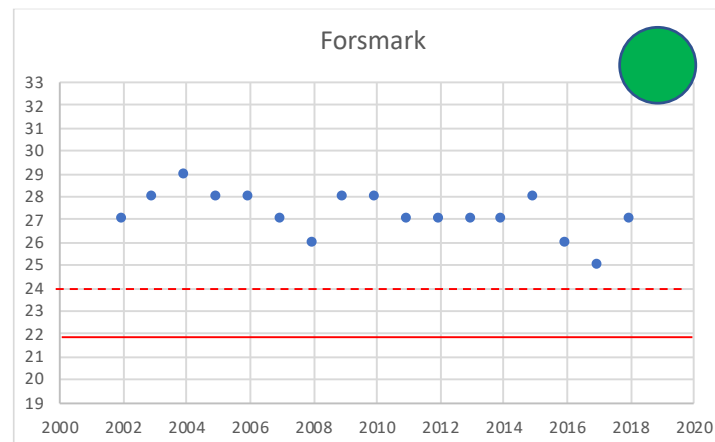
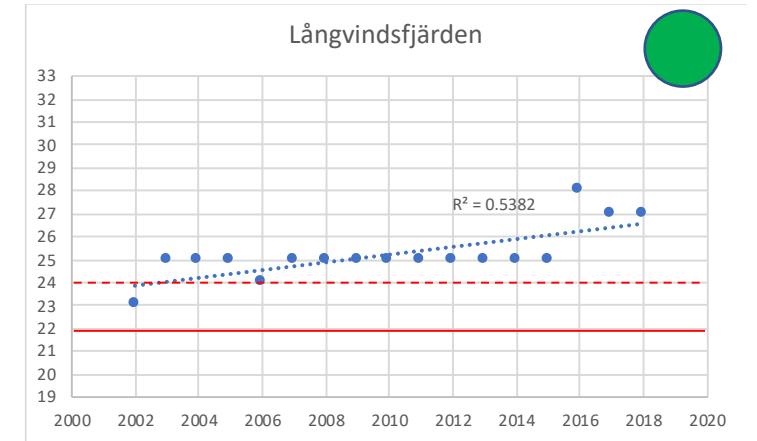
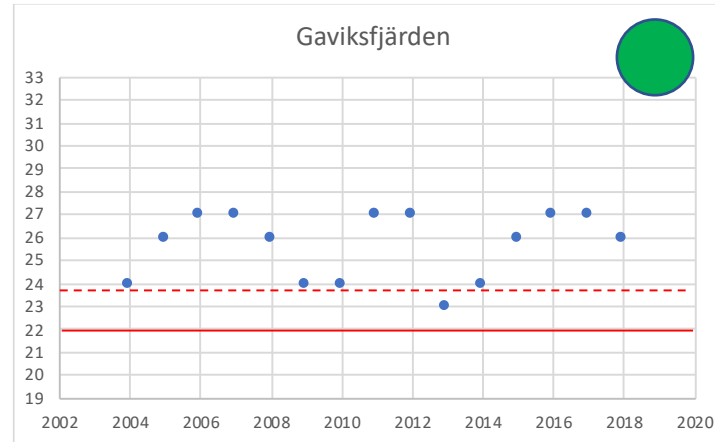
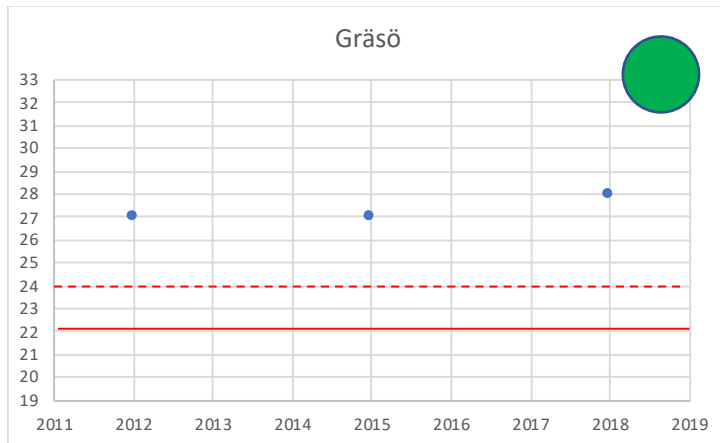


- (GS) L90 > 24 cm and no trend
- (nGS?) L90 > 22 cm but < 24 cm (or negative trend?)
- (nGS) L90 < 22 cm

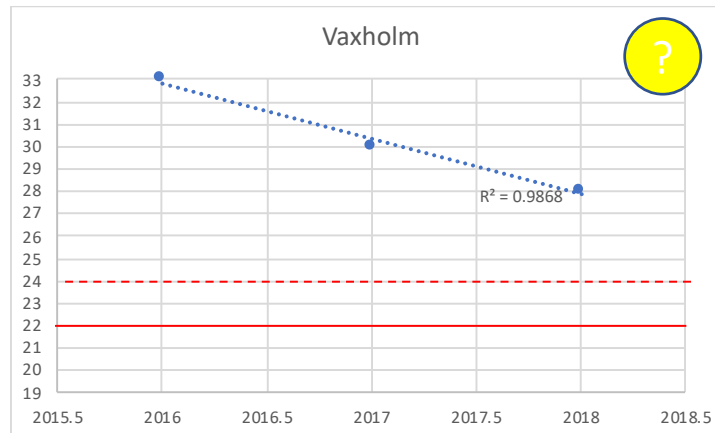
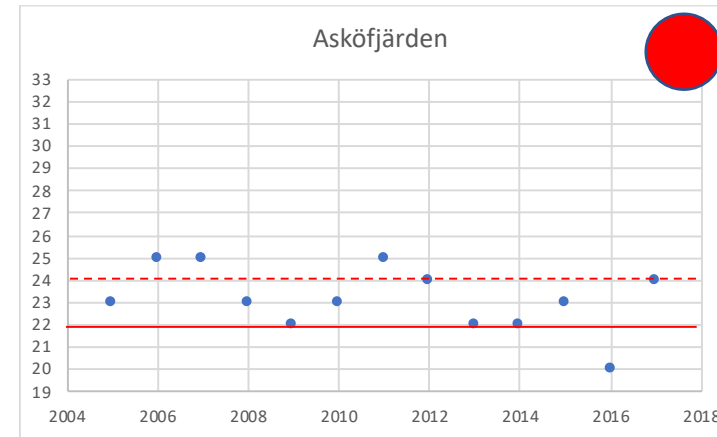
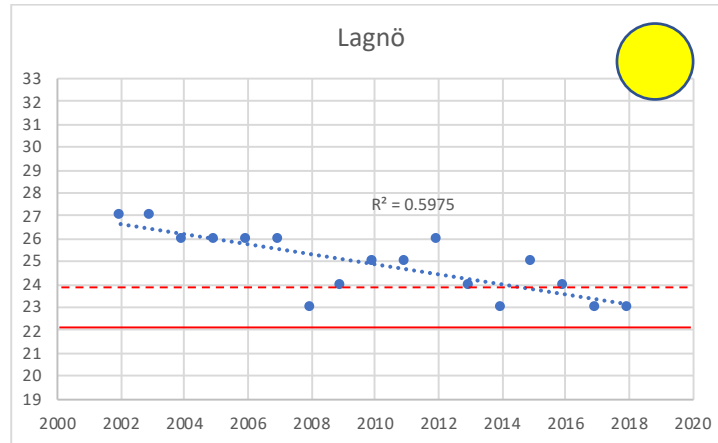
This is how it looks – Bothnian Bay



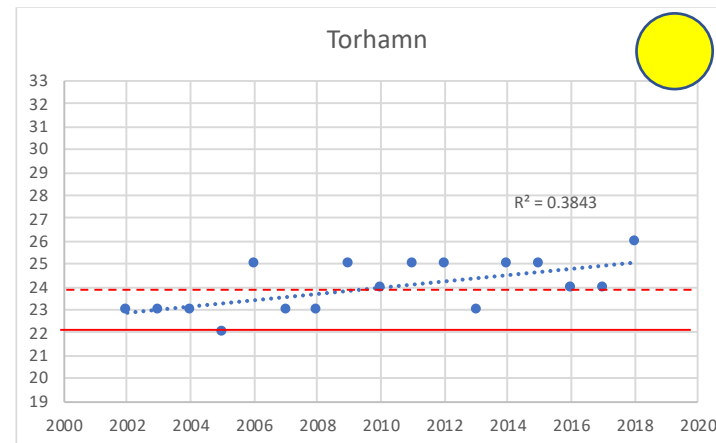
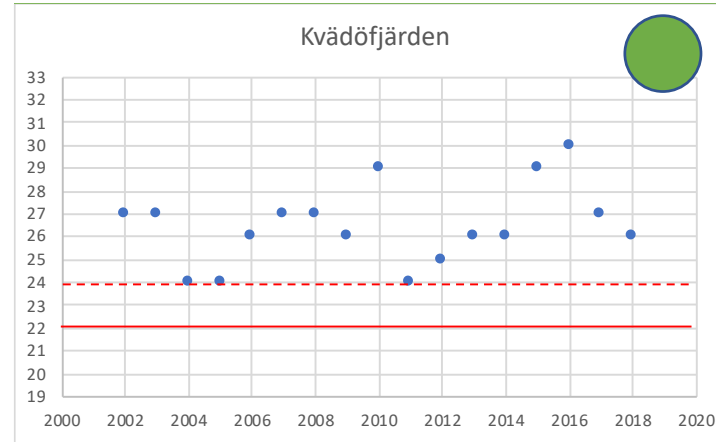
This is how it looks – Bothnian Sea



This is how it looks – Northern Baltic Proper



This is how it looks – Southern Baltic Proper



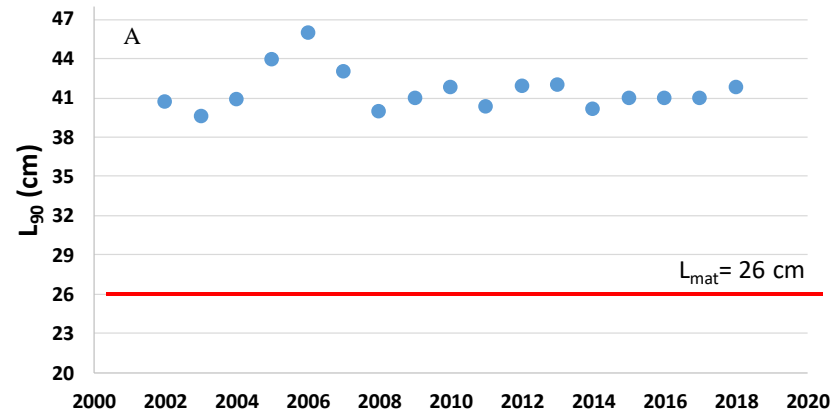
Points for discussion/additional work

- Also an upper threshold for L90?
- L_{mat} as a potential threshold for L90?
- What assessment method and period should be used?

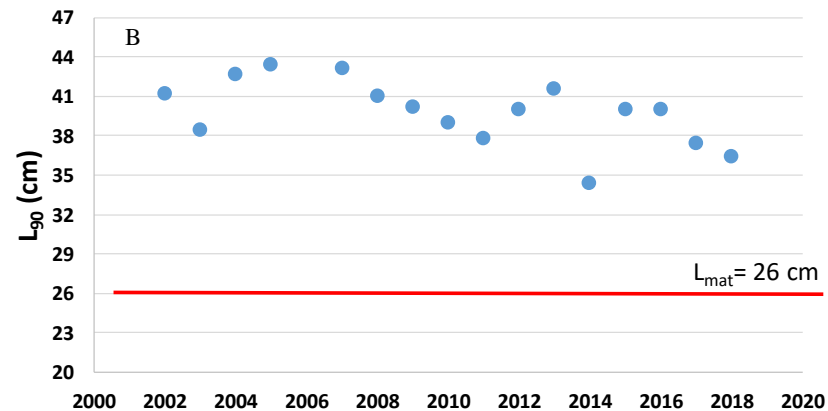
L90 in whitefish and pikeperch (Swedish data)

Whitefish

Kombinerade data från åtta kustområden

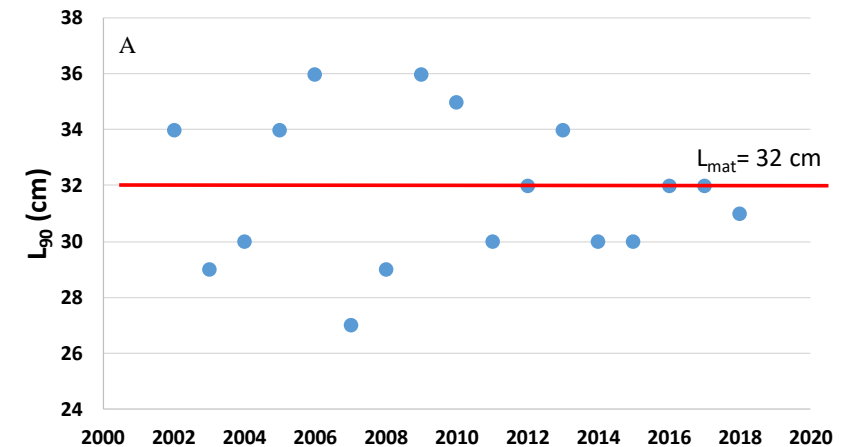


Lagnö

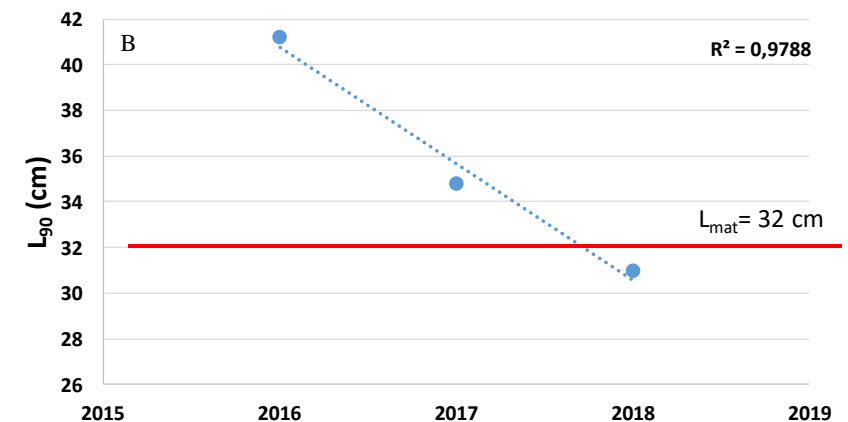


Pikeperch

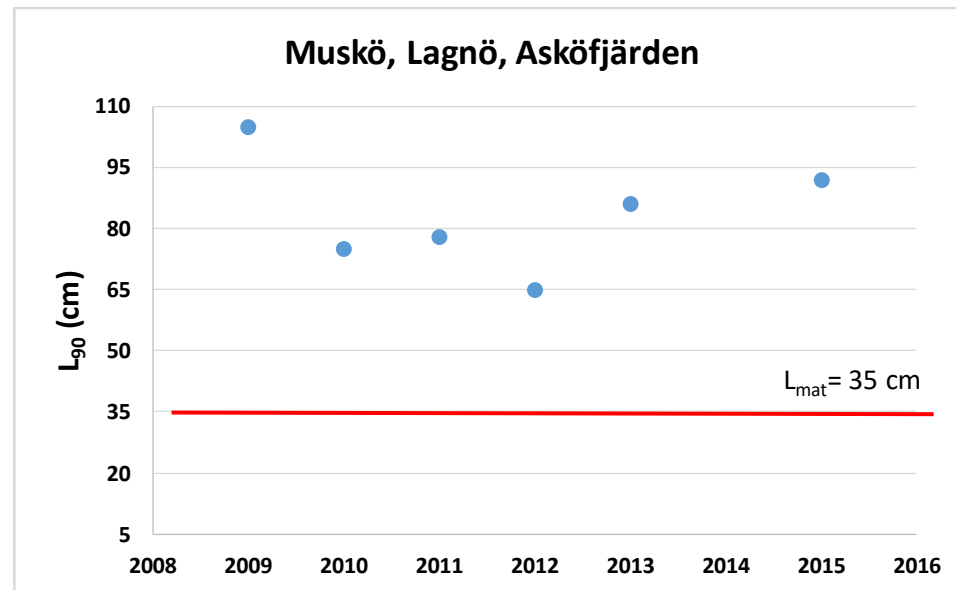
Kombinerade data från åtta kustområden



Vaxholm



L90 in pike (Swedish data)



L90 for flounder? Different ecotypes and gears

