

Size Based Indicators

- a Helcom perspective

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Size based indicators of coastal fish

- Easy to measure for all species
 - Precision & Accuracy
 - Sample sizes needed
- Is it possible to identify 'regional' assessment criteria?
 - Spatial consistency?
 - Temporal consistency?
 - Influence of season and gear?
 - (Relation to other reference points)
- Size based indicators could increase the spatial resolution of assessments for many species

Size based indicators investigated

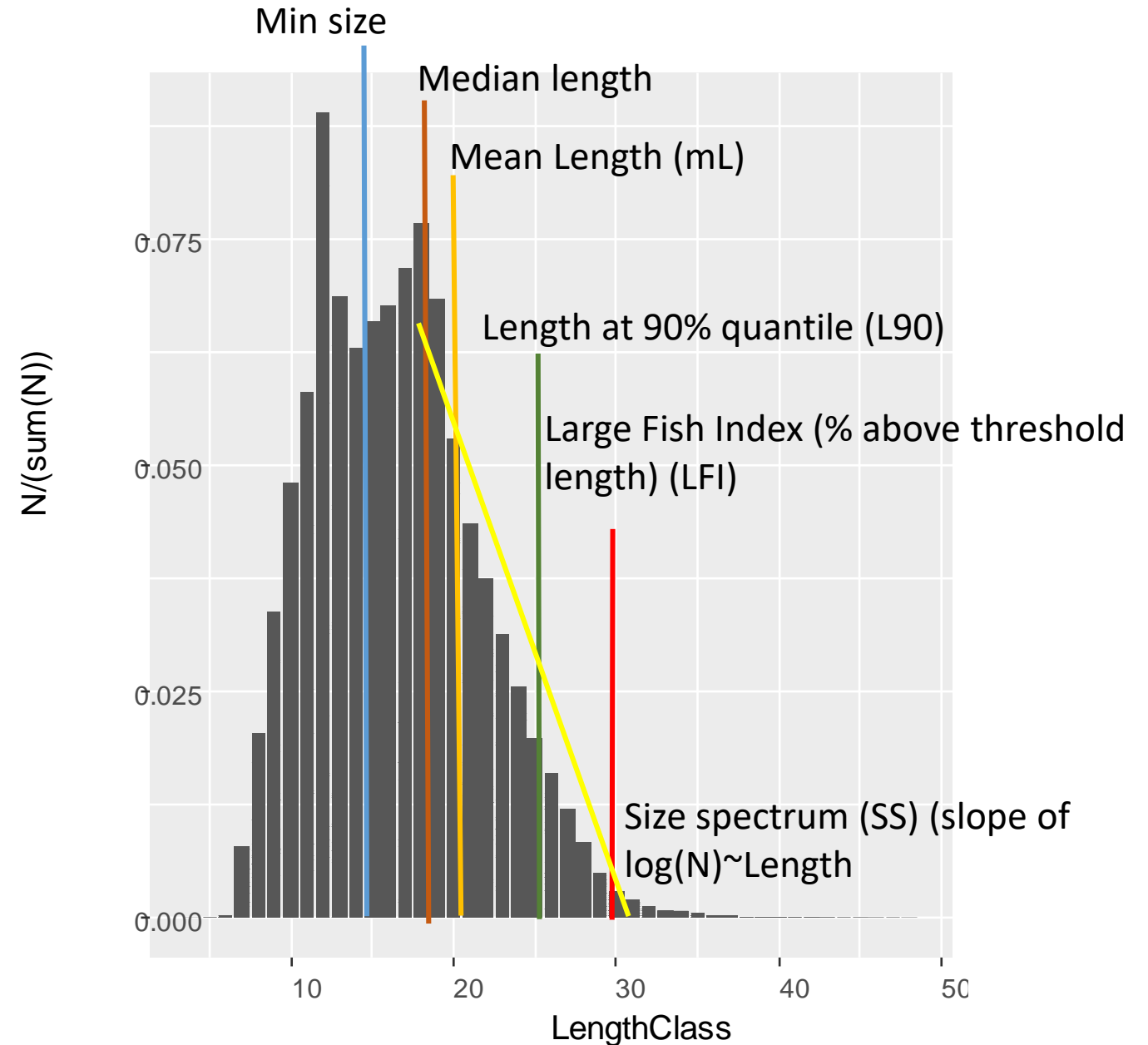
Mean and median length

Length at 90% quantile (L90)

Large Fish Index

Size-spectra

A minimum size threshold to remove influence of recruitment



Data

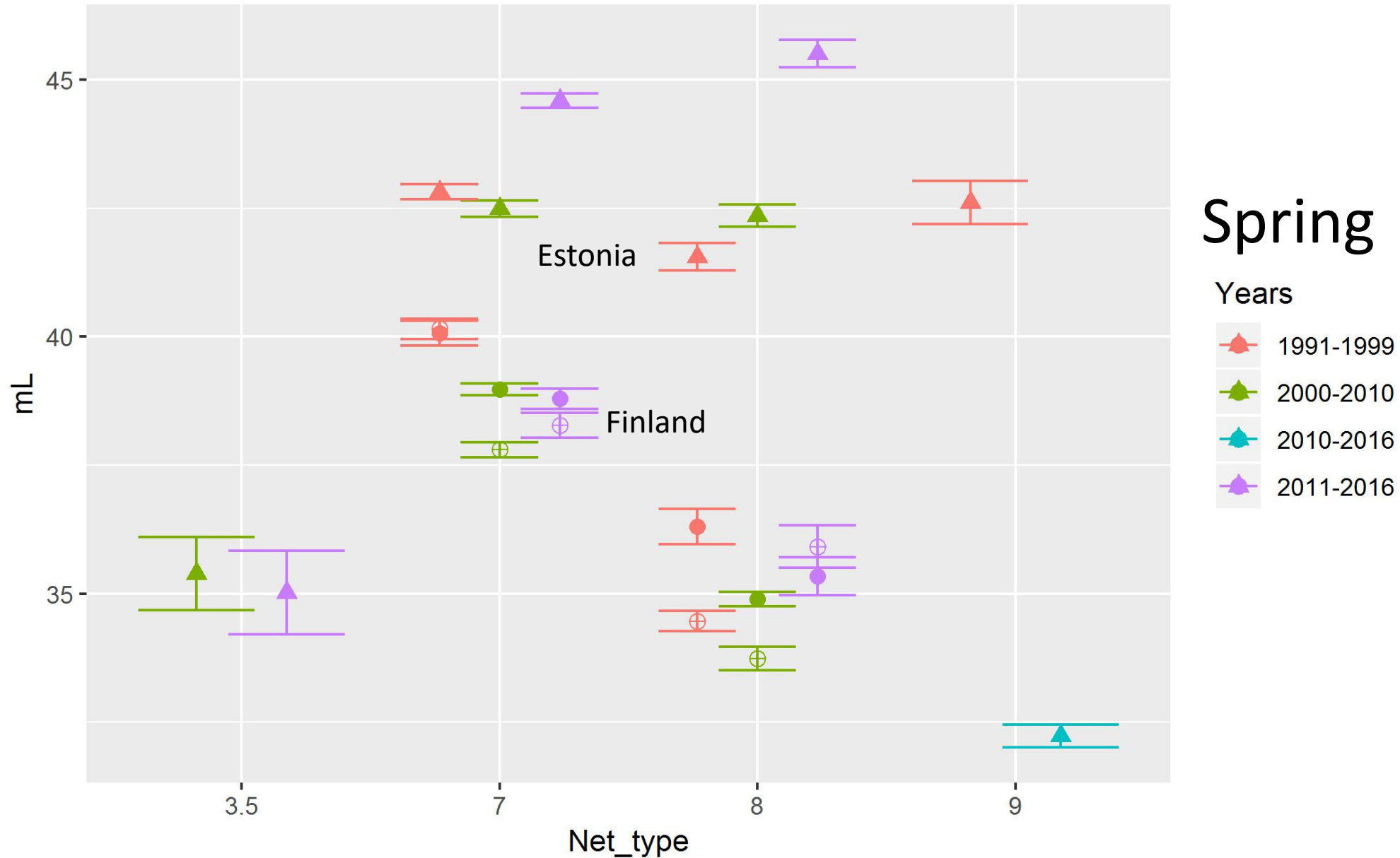
- Data on cod, flounder, perch, pikeperch, and whitefish from around 50 fishery independent surveys from Poland, Estonia, Finland, and Sweden
- Commercial data of pikeperch from Estonia and Finland
- Different gears, gillnets dominating but fykenets and trawl data as well
- Data over the whole ice-free season, summer dominates

Pikeperch

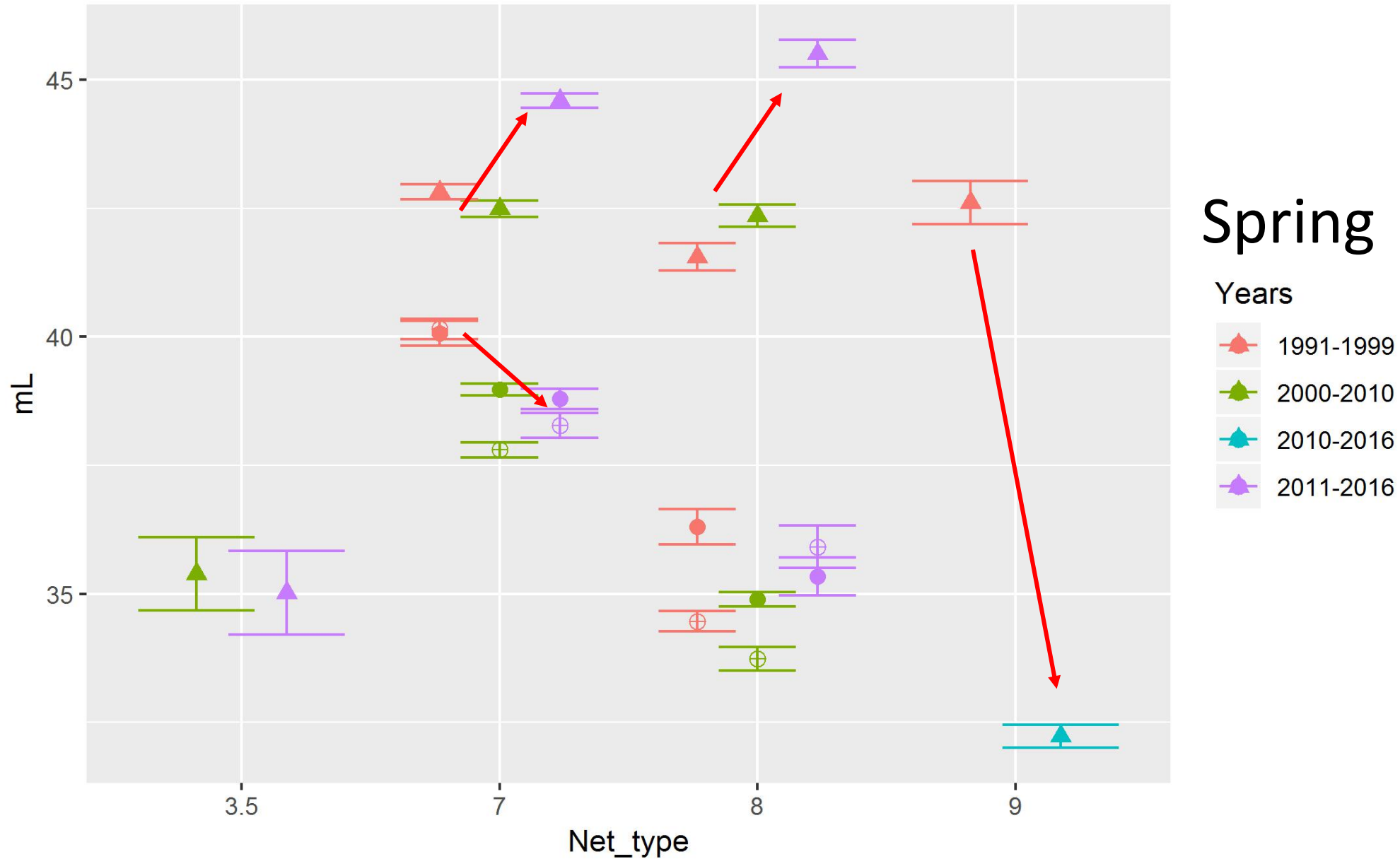
- We have data from:
 - Estonia (commercial + survey)
 - Sweden (survey)
 - Finland (commercial + survey)
- Threshold values
 - MinSize = 25 cm
 - LFI = 40 cm
 - Q90

Precision generally good at a sample size of 300 individuals. Size-spectra poor accuracy, up to 500 individuals needed

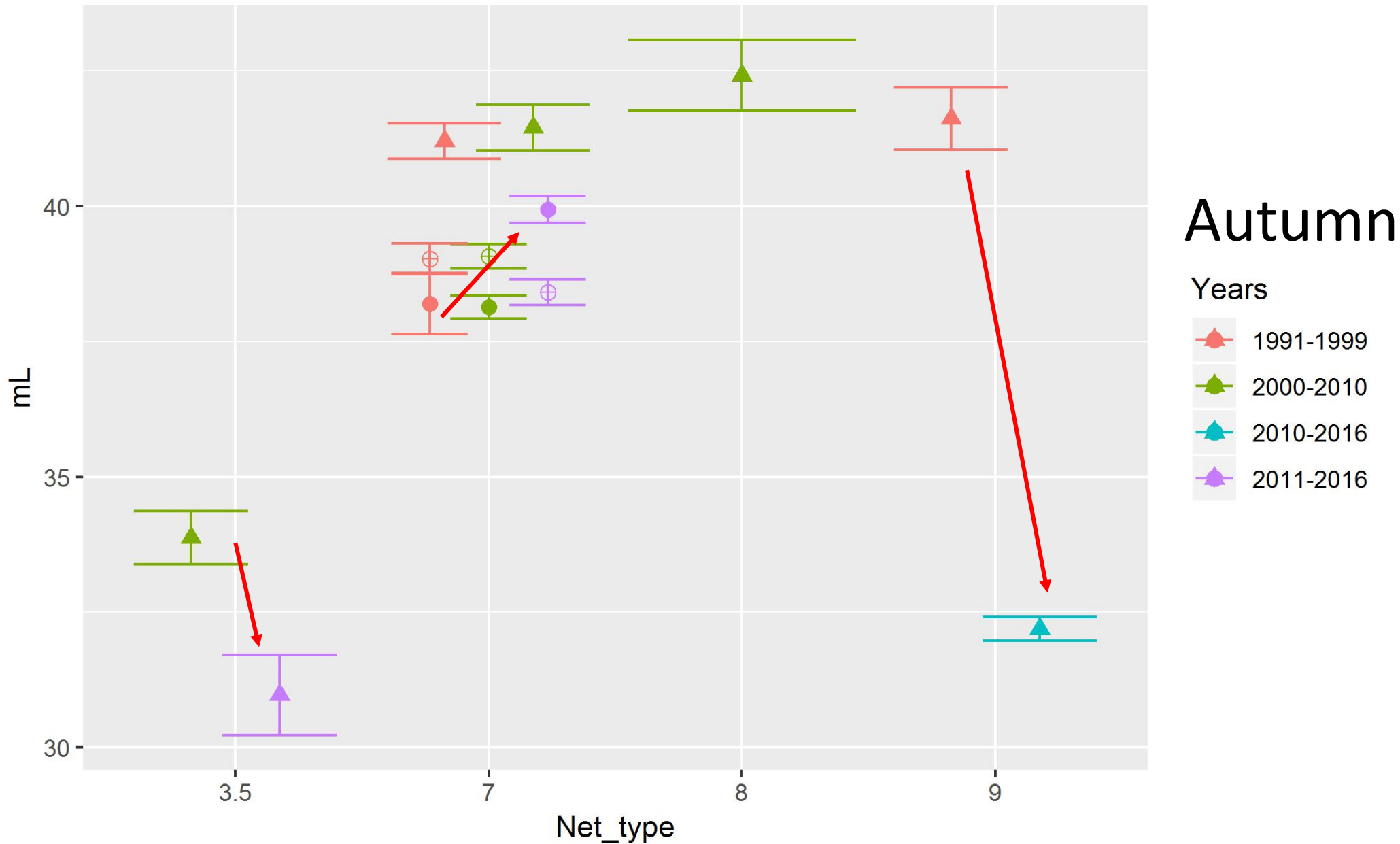
Estonia (\blacktriangle) and Finland SD30 (\oplus), SD29(\bullet)



Estonia (\blacktriangle) and Finland SD30 (\oplus), SD29(\bullet)



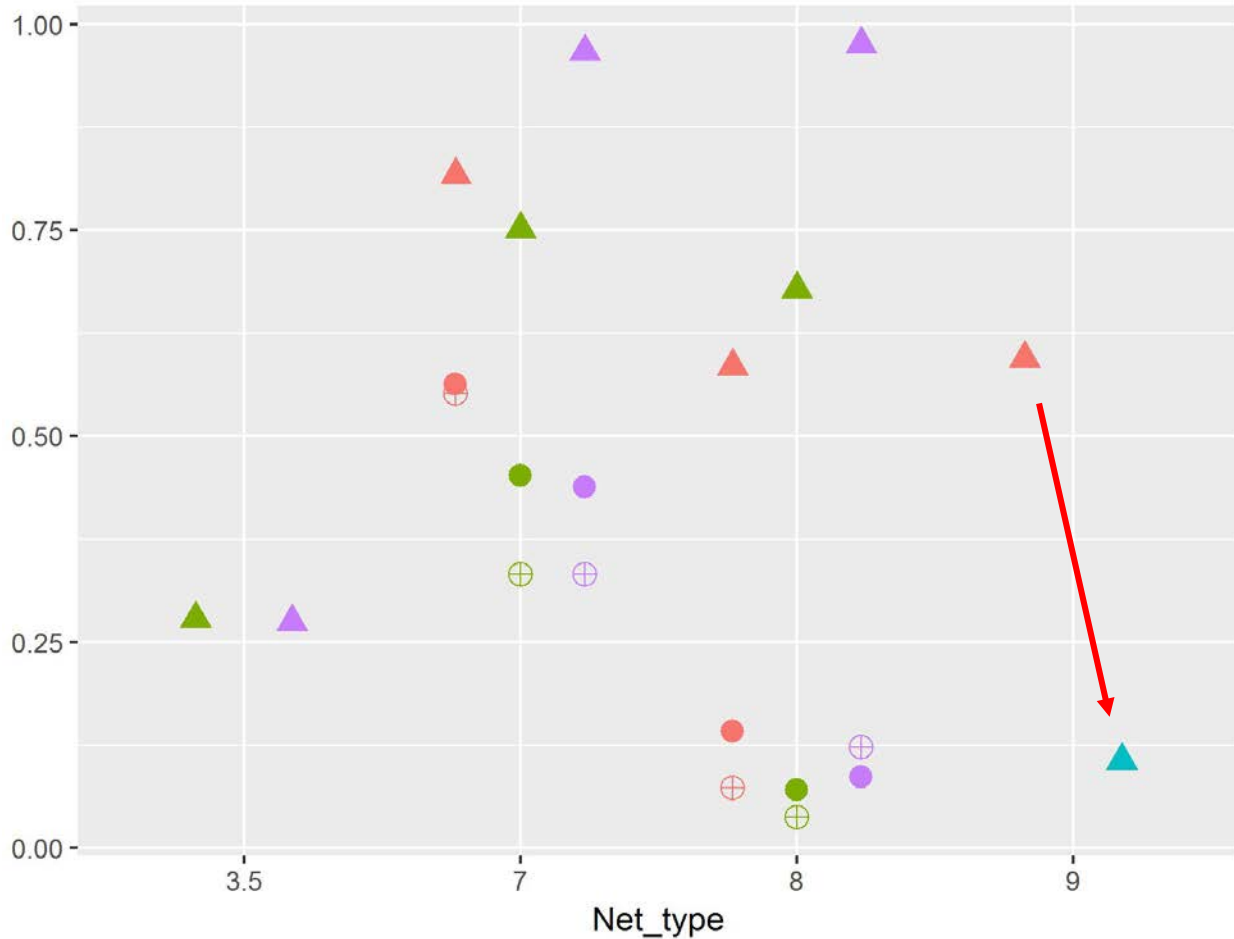
Estonia (\blacktriangle) and Finland SD30 (\oplus), SD29(\bullet)



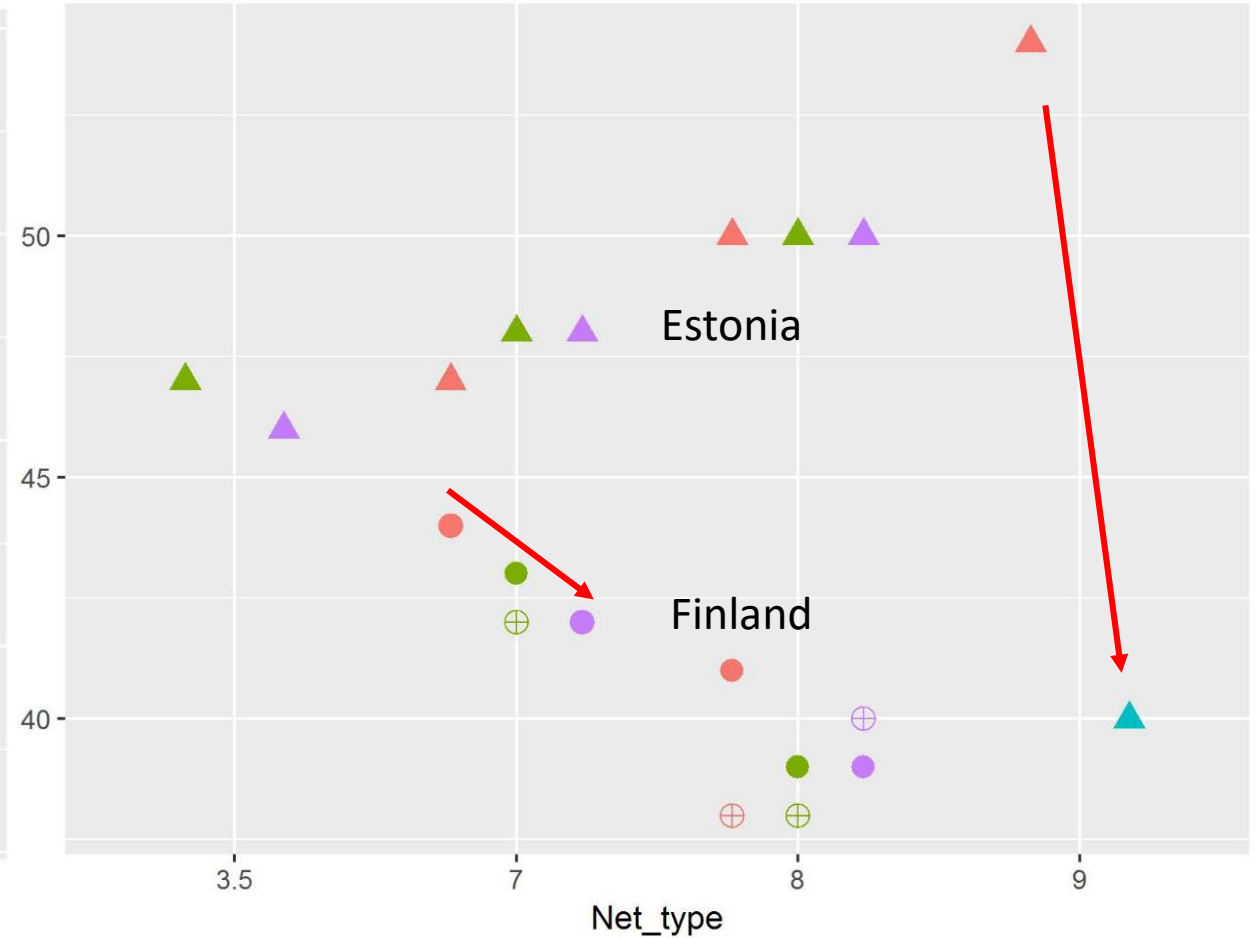
Estonia (\blacktriangle) and Finland SD30 (\oplus), SD29(\bullet) Spring



LFI



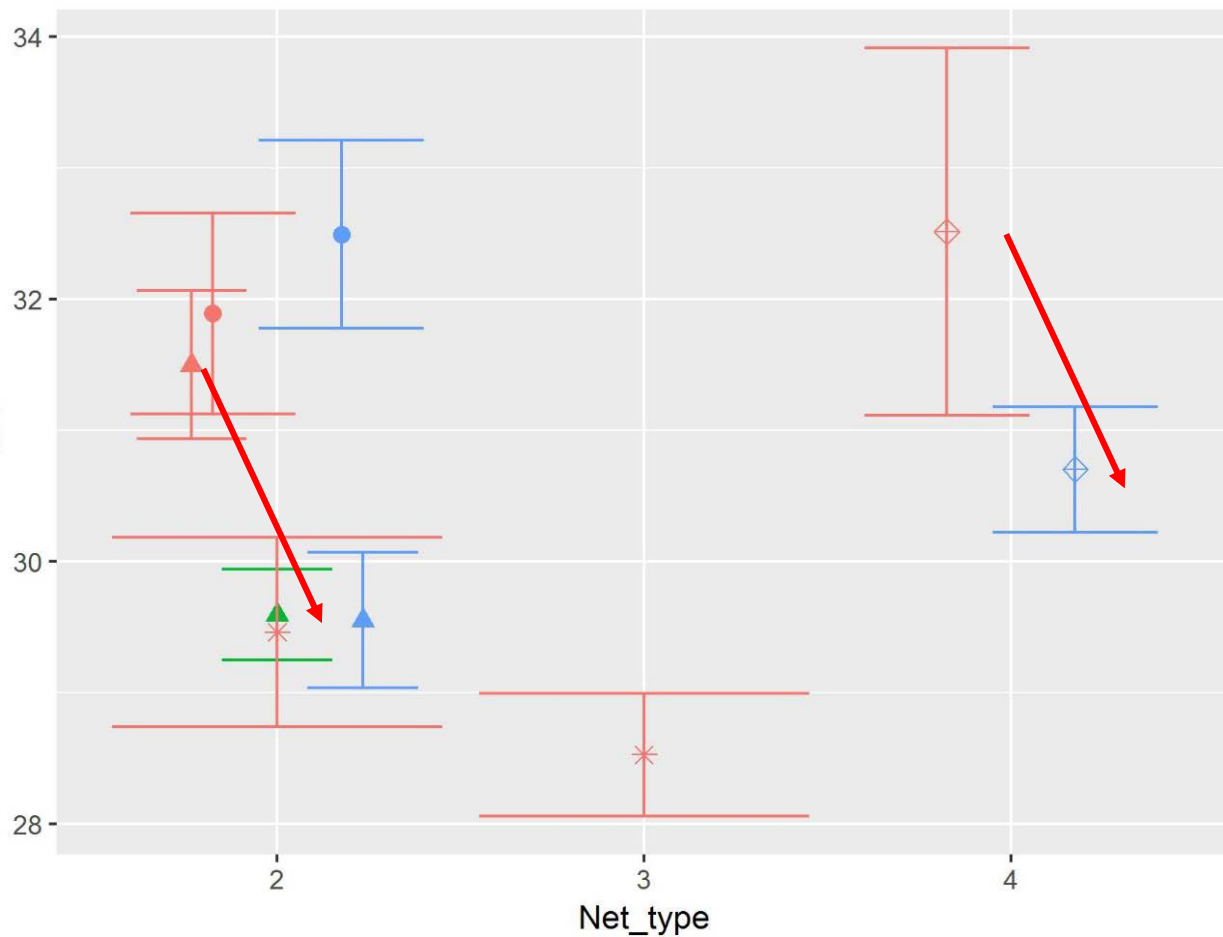
L90



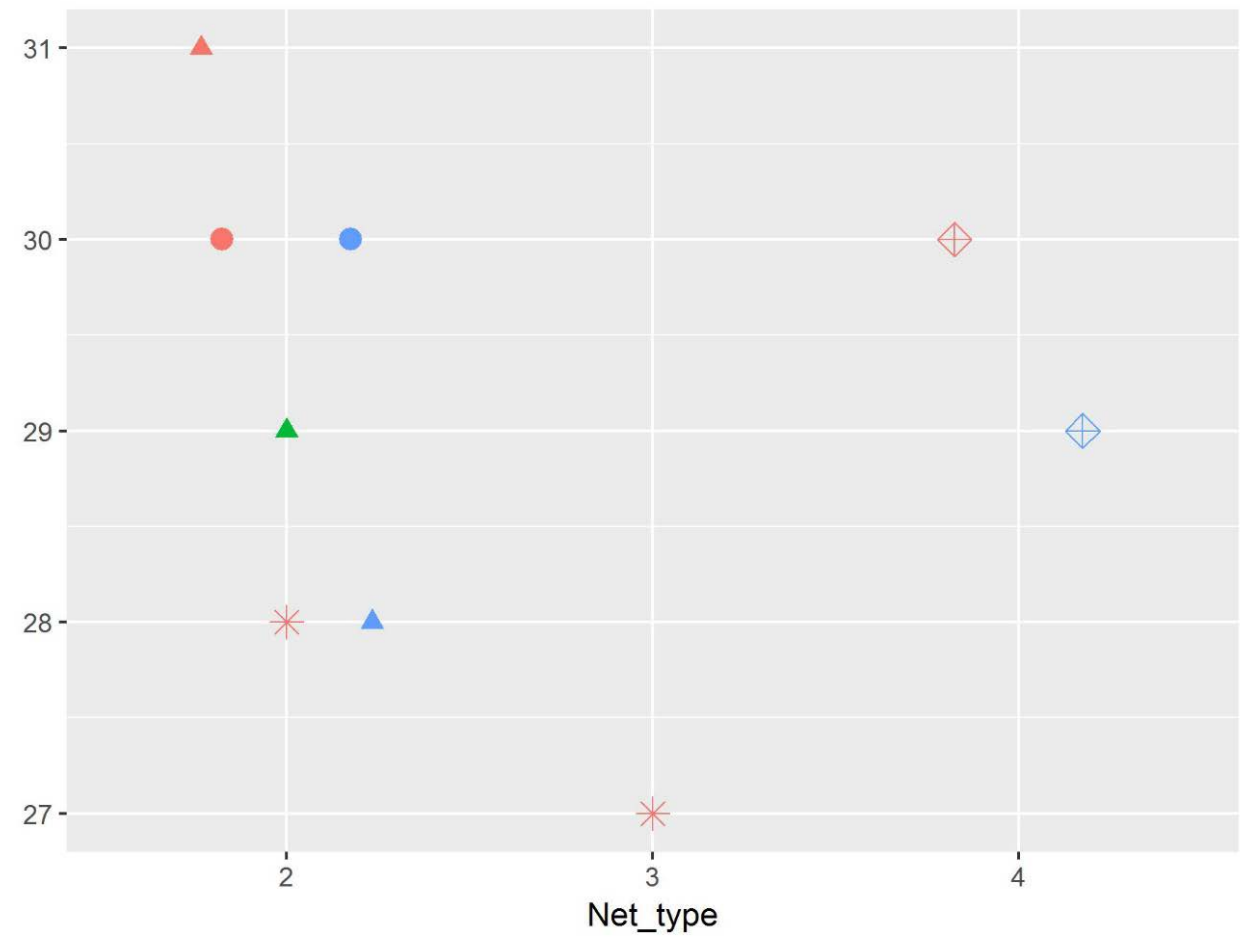
Åland (▲), Sweden combined (●),
Kvädöfjärden (◊) and Galtfjärden (*)



mL



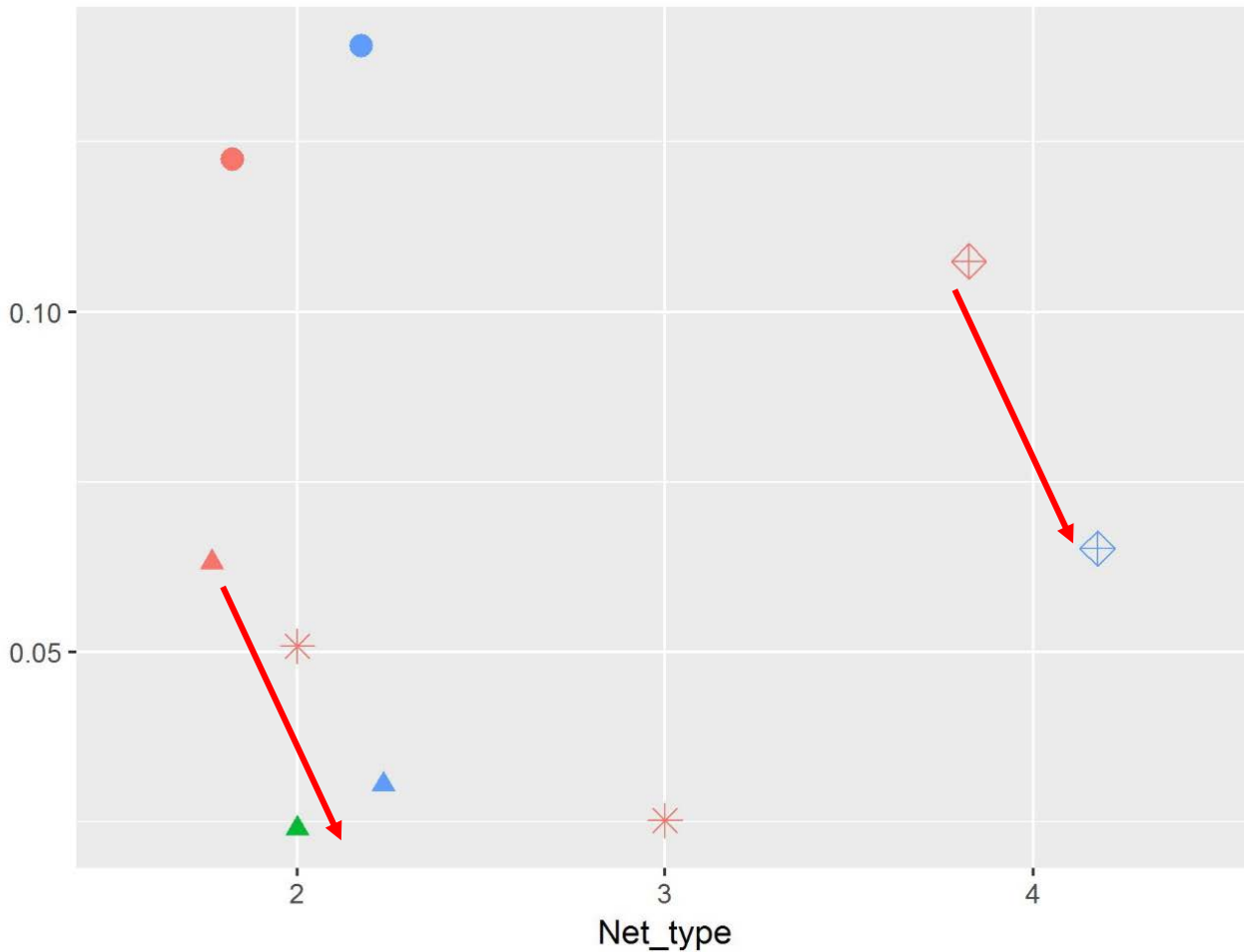
median



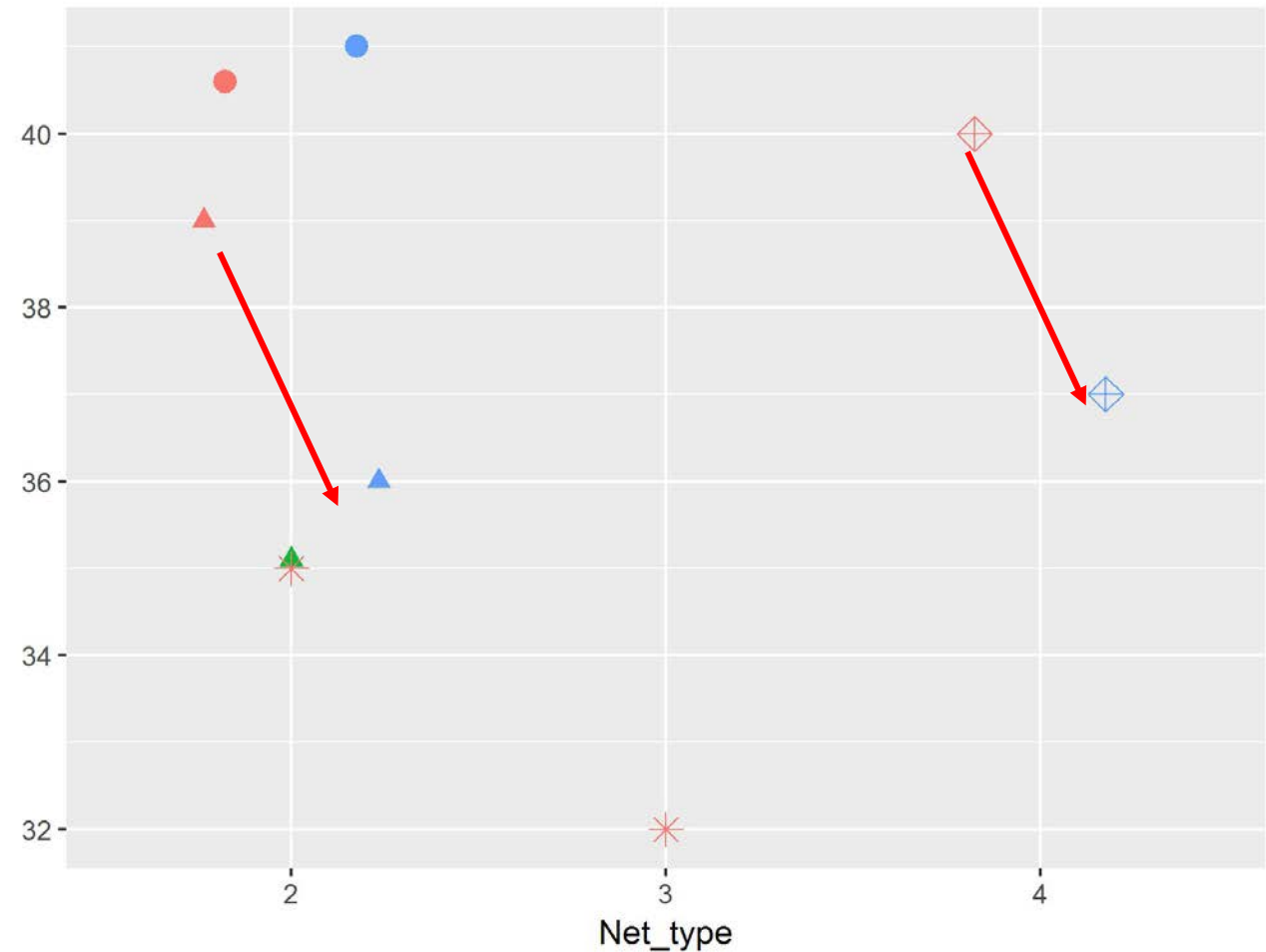
Åland (▲), Sweden combined (●),
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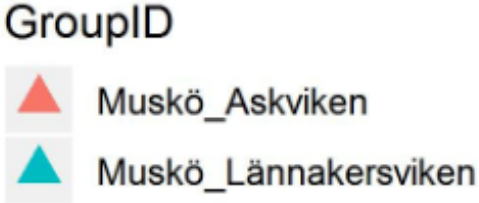
LFI



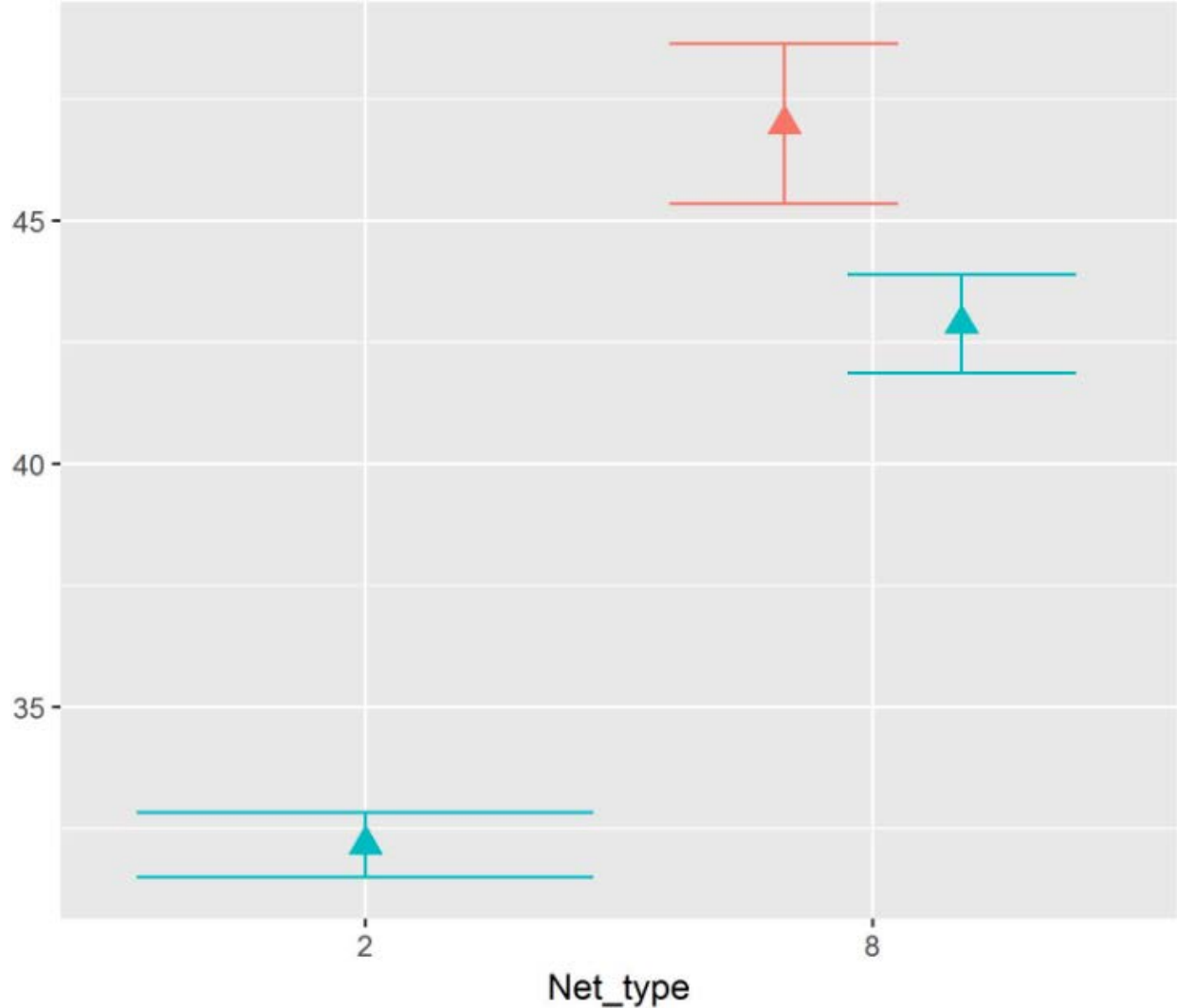
L90



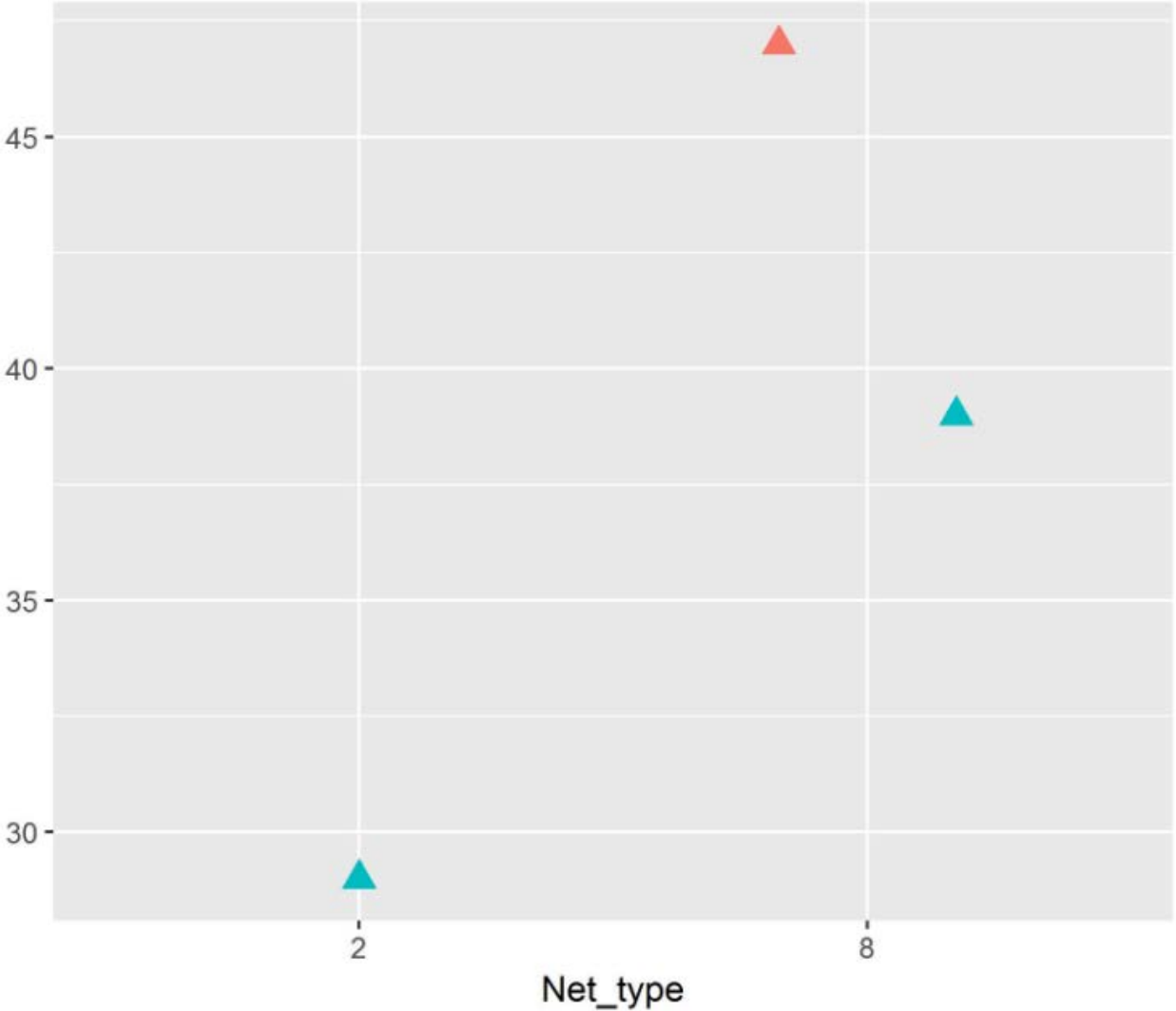
Muskö no-take-zone and reference area, years 2009-2016



mL



median

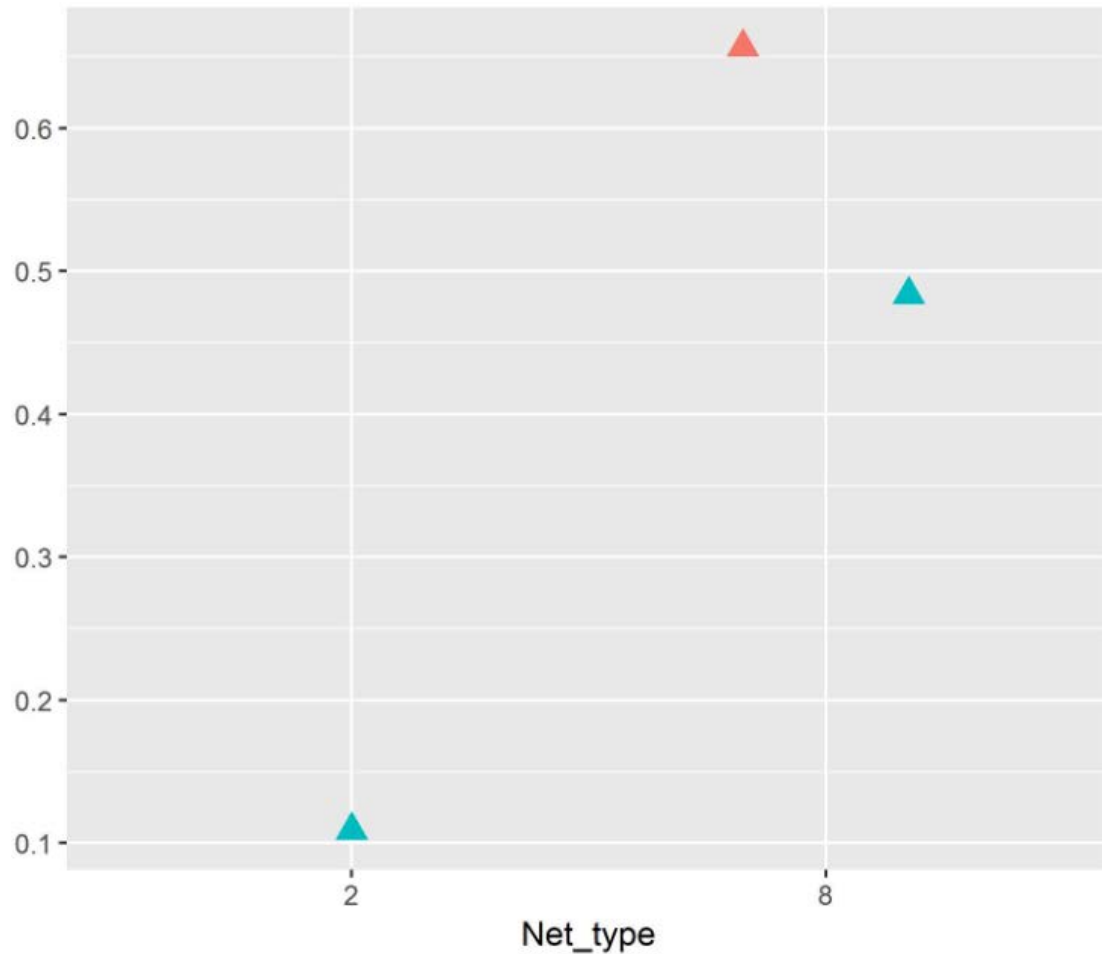


Muskö no-take-zone and reference area, years 2009-2016

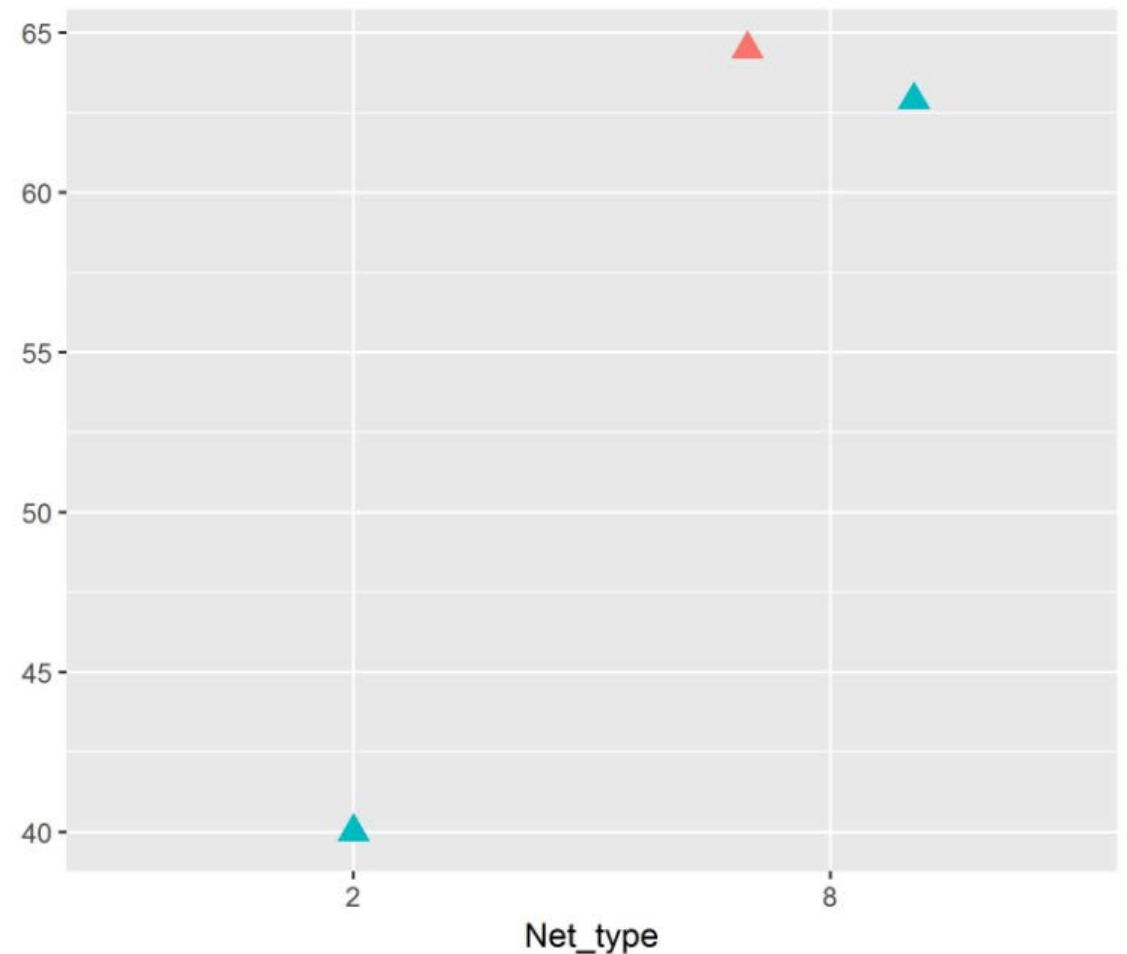
GroupID

- Muskö_Askviken
- Muskö_Lännakersviken

LFI



L90

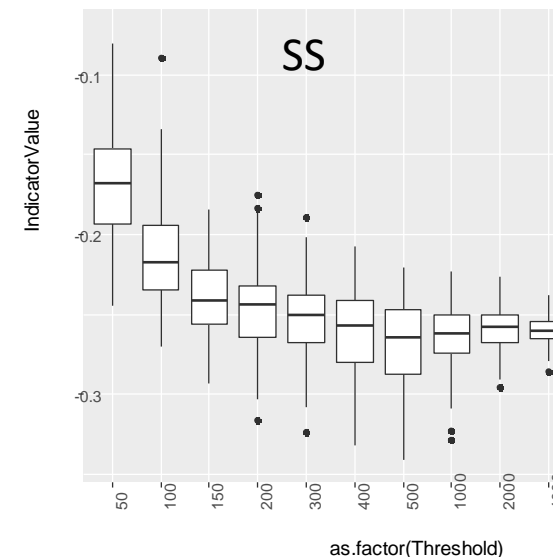
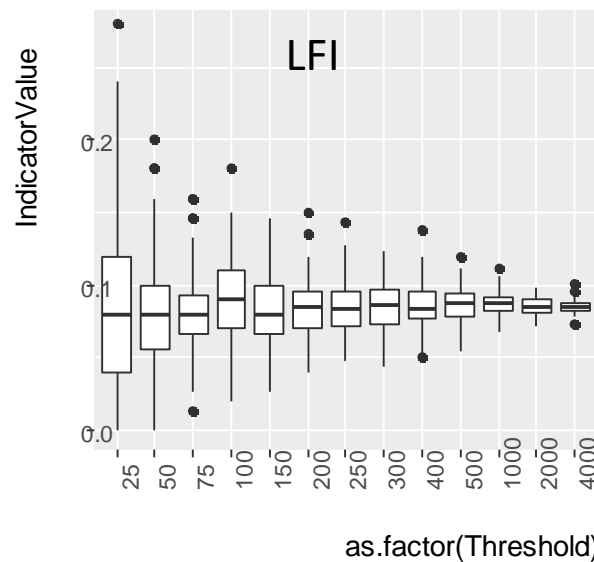
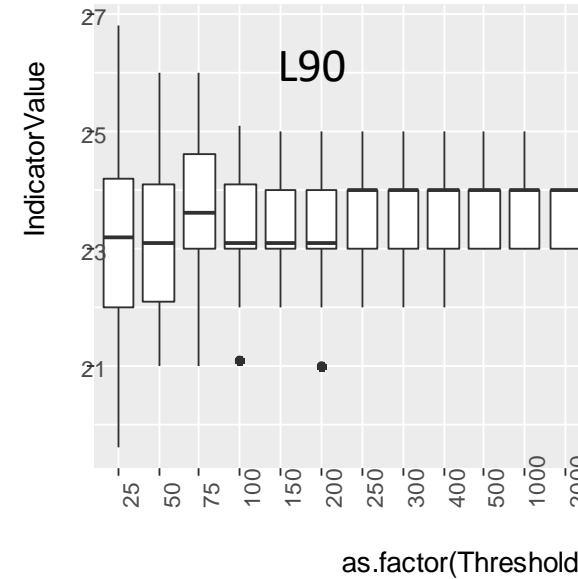
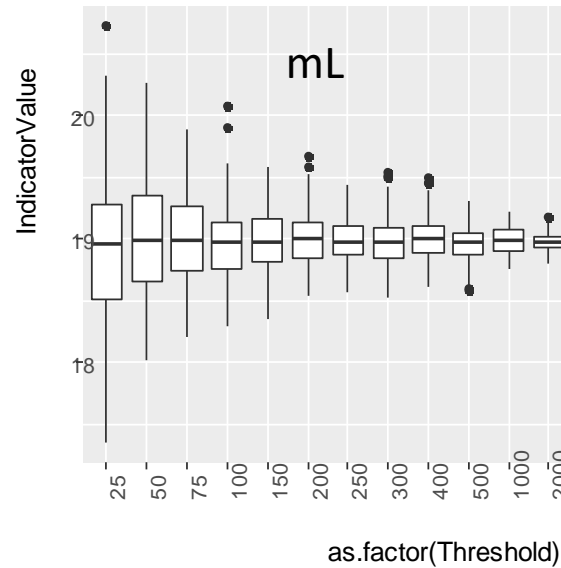


Conclusions Pikeperch

- Mean, median, L90, LFI good precision for 200-300 individuals
- Differ between gears, commercial data related to fishing regulations
- Regional differences, largest in Estonia – smallest around Ålands Sea
- Decreased over time in many areas
- A couple cm smaller in autumn than in spring
- Not larger in a no-take area

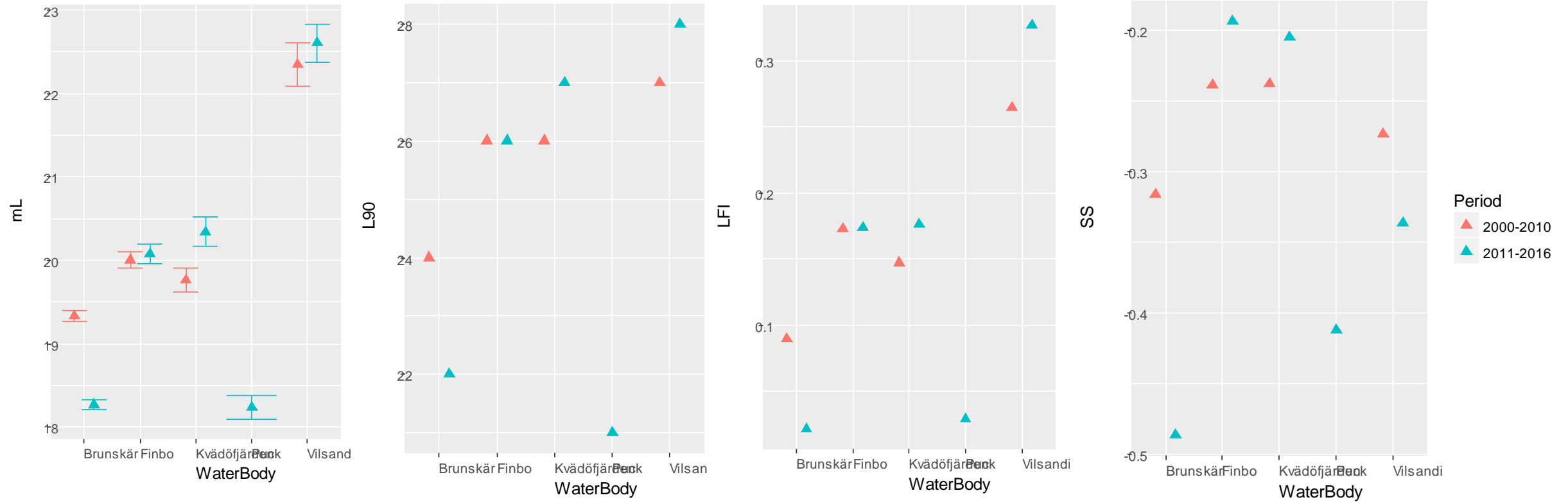
Perch precision

- We have data from:
 - Estonia (survey)
 - Sweden (survey)
 - Finland & Åland (survey)
 - Poland (survey)
- Threshold values
 - MinSize = 15 cm
 - LFI = 25 cm
 - Q90



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



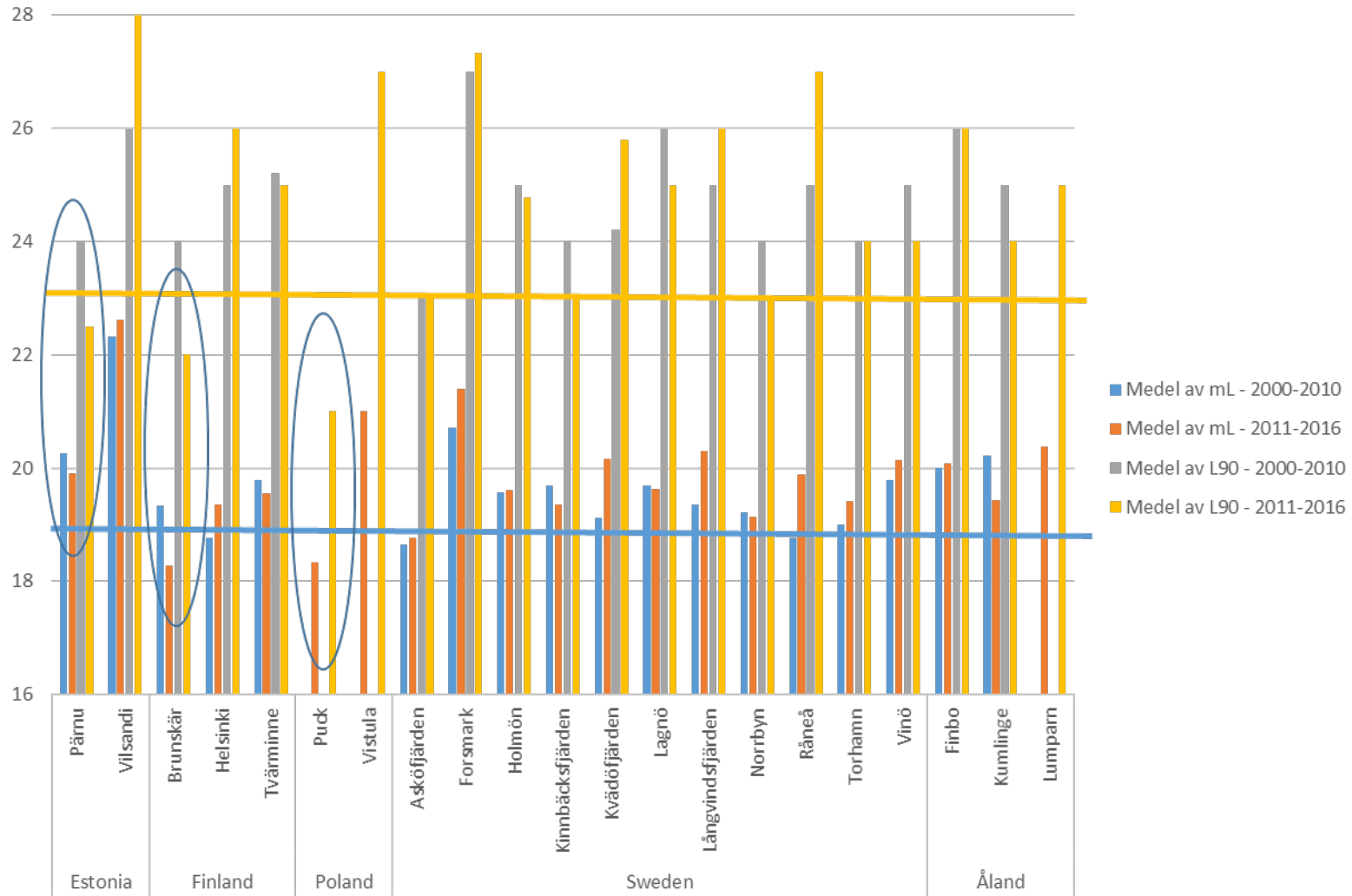
Different indicators show similar patterns
SS stands out a bit

Perch

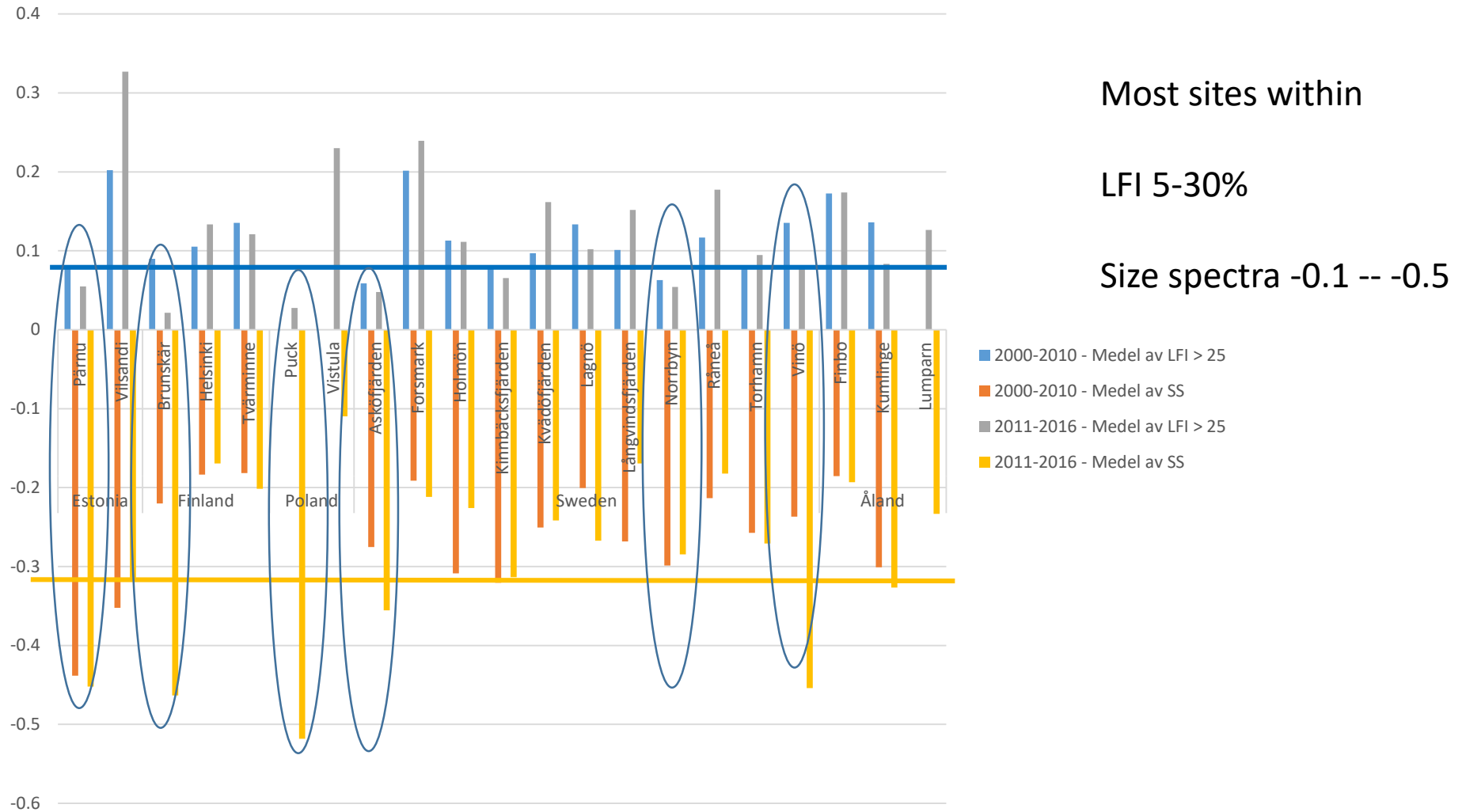
Relative similar between sites

Most sites within
L90 22-27 cm

mL 18-22 cm



Perch



Conclusions Perch

- Mean, median, L90, LFI good precision for 150 individuals
- No major difference between gears and seasons, commercial data not included
- Relative small regional differences, largest in Estonia – smallest in Puck?
- Should be possible to set regional assessment criteria

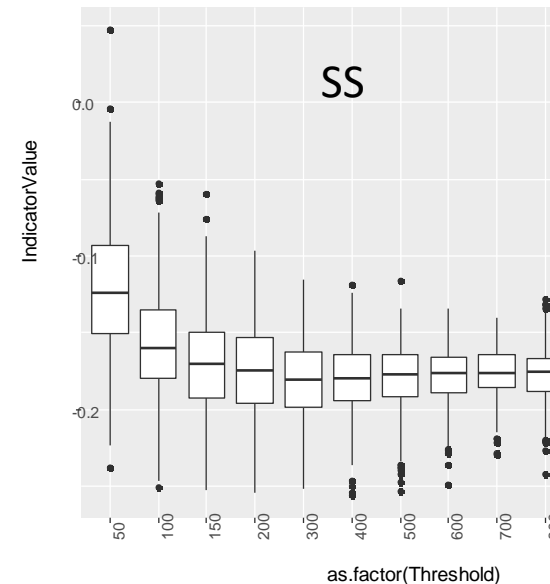
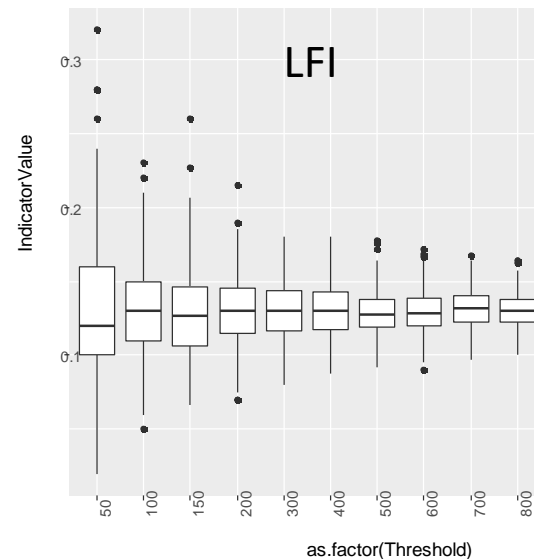
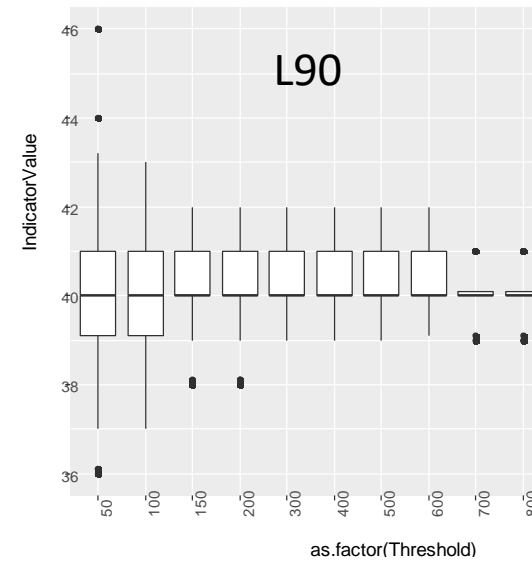
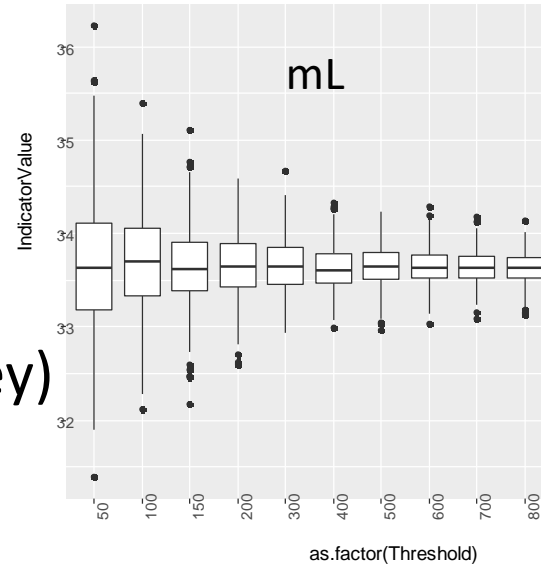
Whitefish precision

- We have data from:

- Estonia (survey)
- Sweden (survey)
- Finland & Åland (survey)
- Poland (survey)

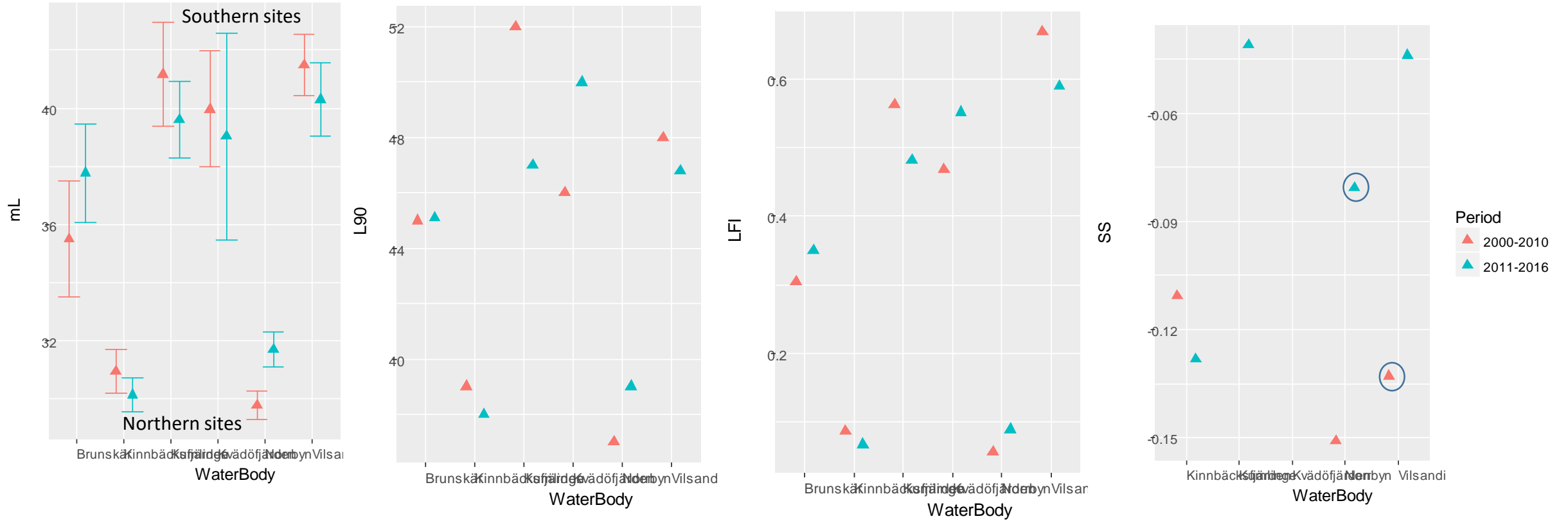
- Threshold values

- MinSize = 25 cm
- LFI = 40 cm
- Q90



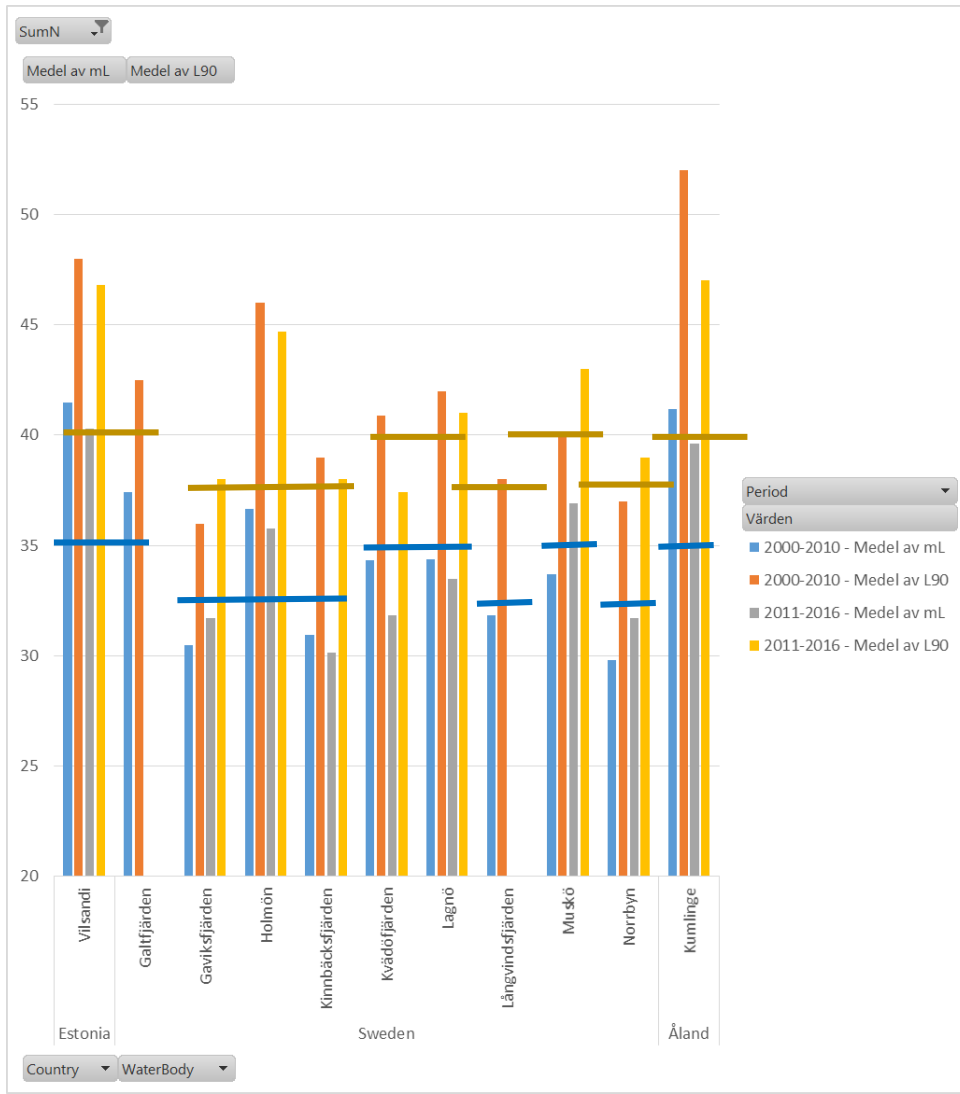
mL, L90 & LFI good precision at 200 ind., for size spectra > 400 needed (which is a high sample size for whitefish).

Whitefish



Different indicators show similar patterns

Whitefish

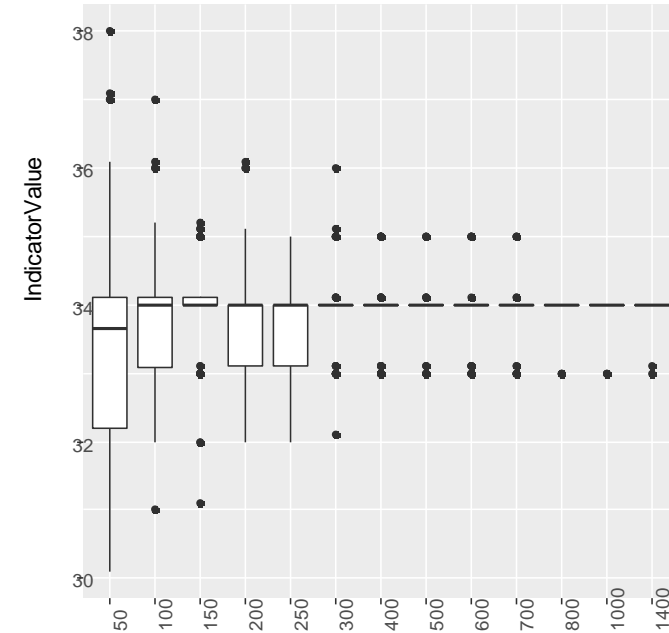
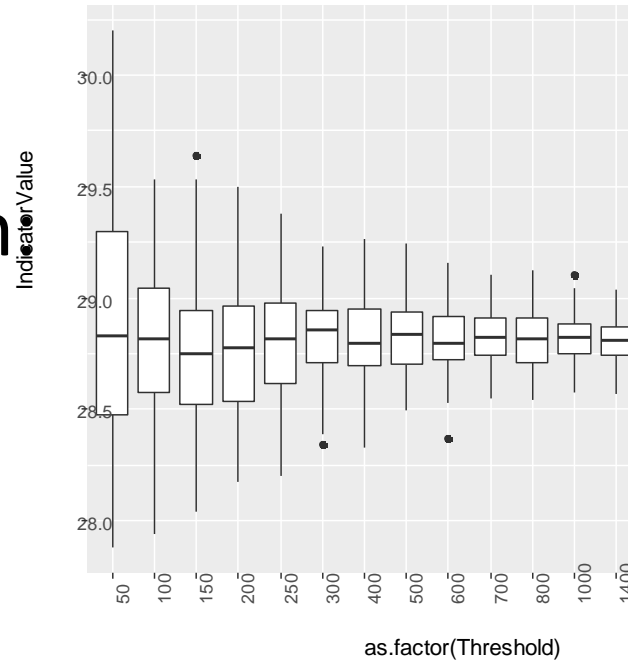


Conclusions Whitefish

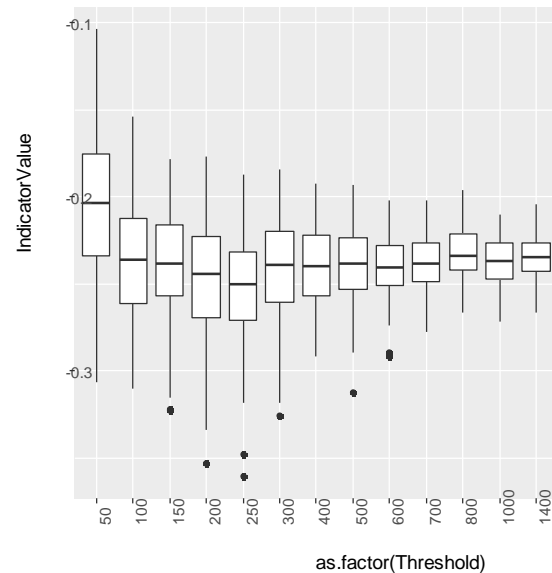
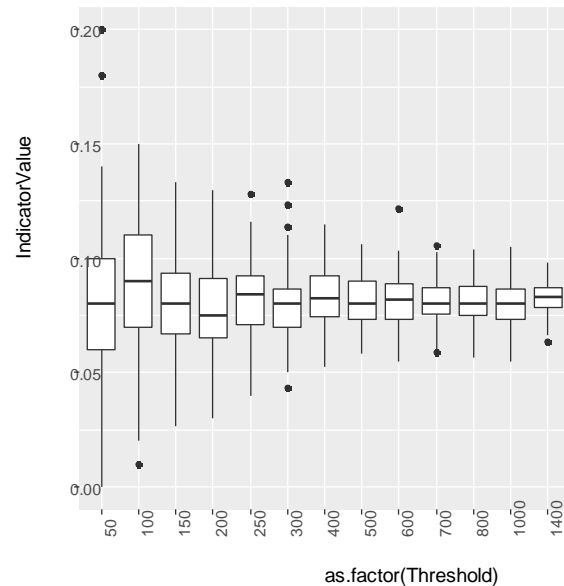
- Mean, median, L90, LFI good precision for 200 individuals
- No major difference between gears and seasons, commercial data not included
- Smaller in Gulf of Bothnia than Baltic Proper
- Should be possible to set assessment criteria per basin

Cod

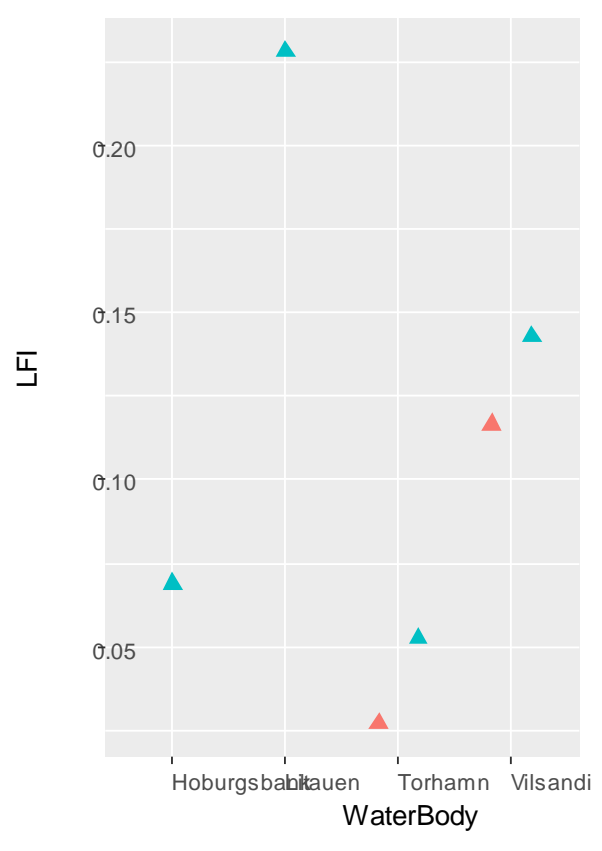
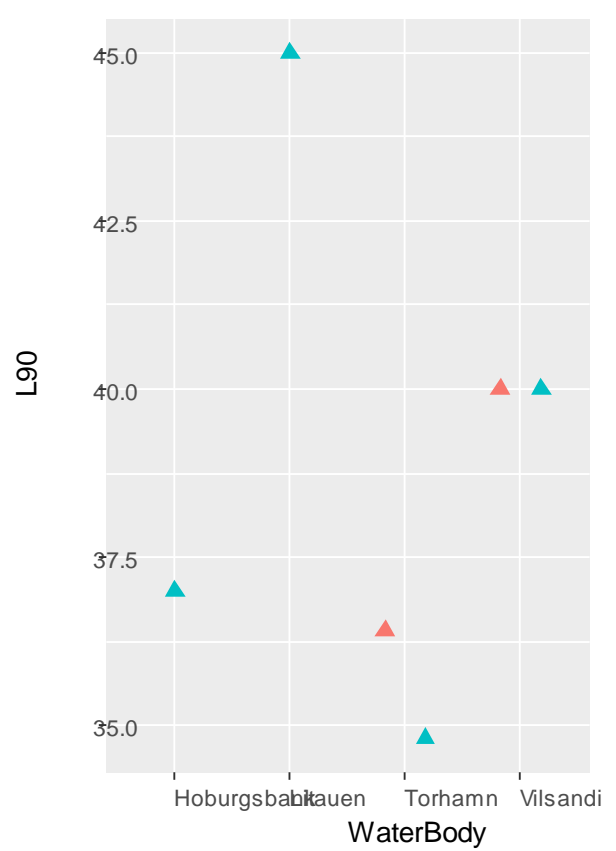
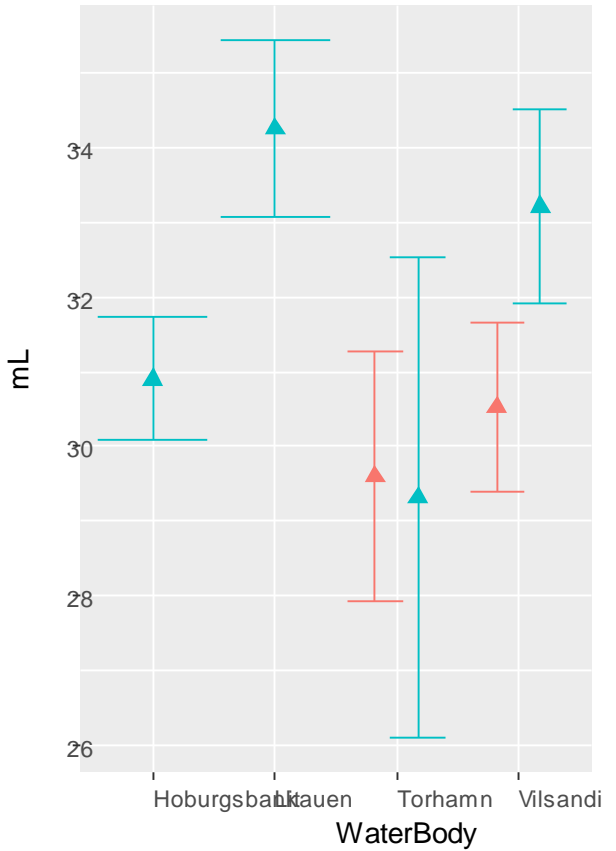
- We have data from
 - Estonia (survey)
 - Sweden (survey)
 - Lithuania?
- Threshold values
 - MinSize = 25 cm
 - LFI = 40 cm
 - Q90



Good precision at around 300 individuals



Cod

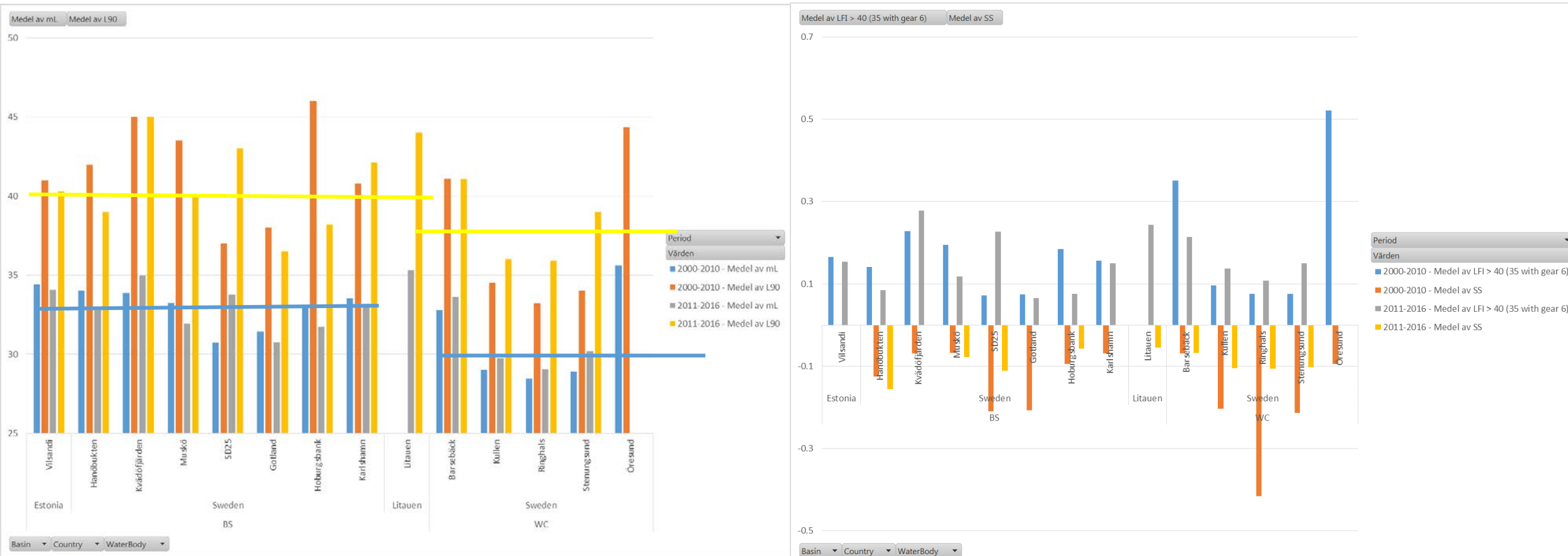


Period
▲ 2000-2010
▲ 2011-2016

Similar pattern between indicators

Cod

Evident differences between sites, smaller at the Swedish west coast (likely a gear effect)



Conclusions cod

- Mean, median, L90, LFI good precision for 300 individuals
- Difference between gears and seasons, commercial data not included
- Smaller in Kategatt & Skagerrak than Baltic Sea, but likely a gear effect
- Larger in the Sound (SD 23)
- Not an evident decrease during 2010's

Flounder – On Kristiina's computer ☹️

- Very good precision
- Difference between areas, smallest along Swedish and Polish coast, largest in central Baltic (SD 25)
- Relatively similar from the Strait to Skagerrak (SD21-23)
- I think...

Next

- What do spatial/temporal changes in size-based indicators reflect?