

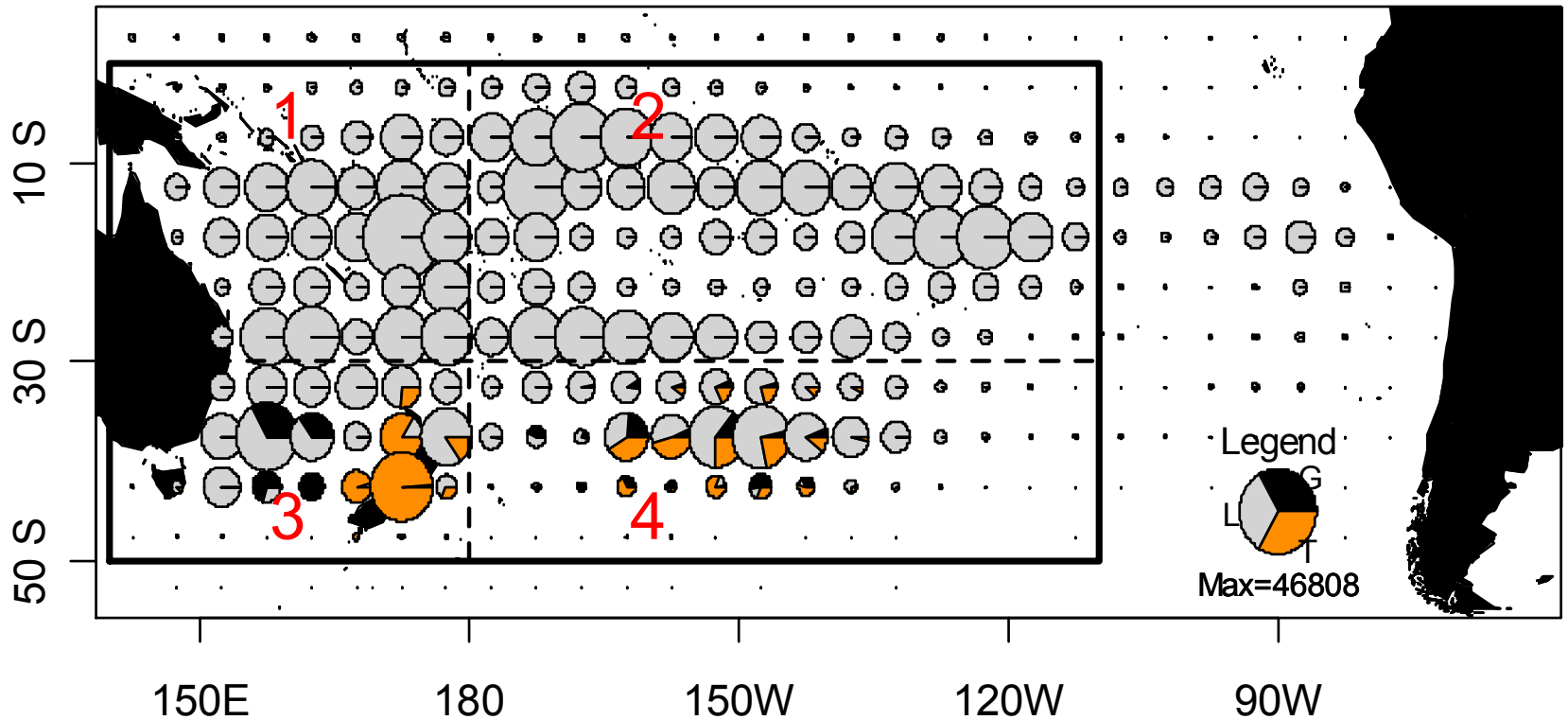
Albacore Stock Assessment

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OFP, SPC

Introduction

- Last assessment 2003 using MFCL.
- Update with most recent data (catch, effort, LF, existing tag).
- Revise regional and fishery structure.
- Movement dynamics.
- Estimation of current and reference biomass, exploitation rates, and yields.

Spatial structure



Four-region of three-region model in 2003. 180 boundary separates key domestic fisheries.

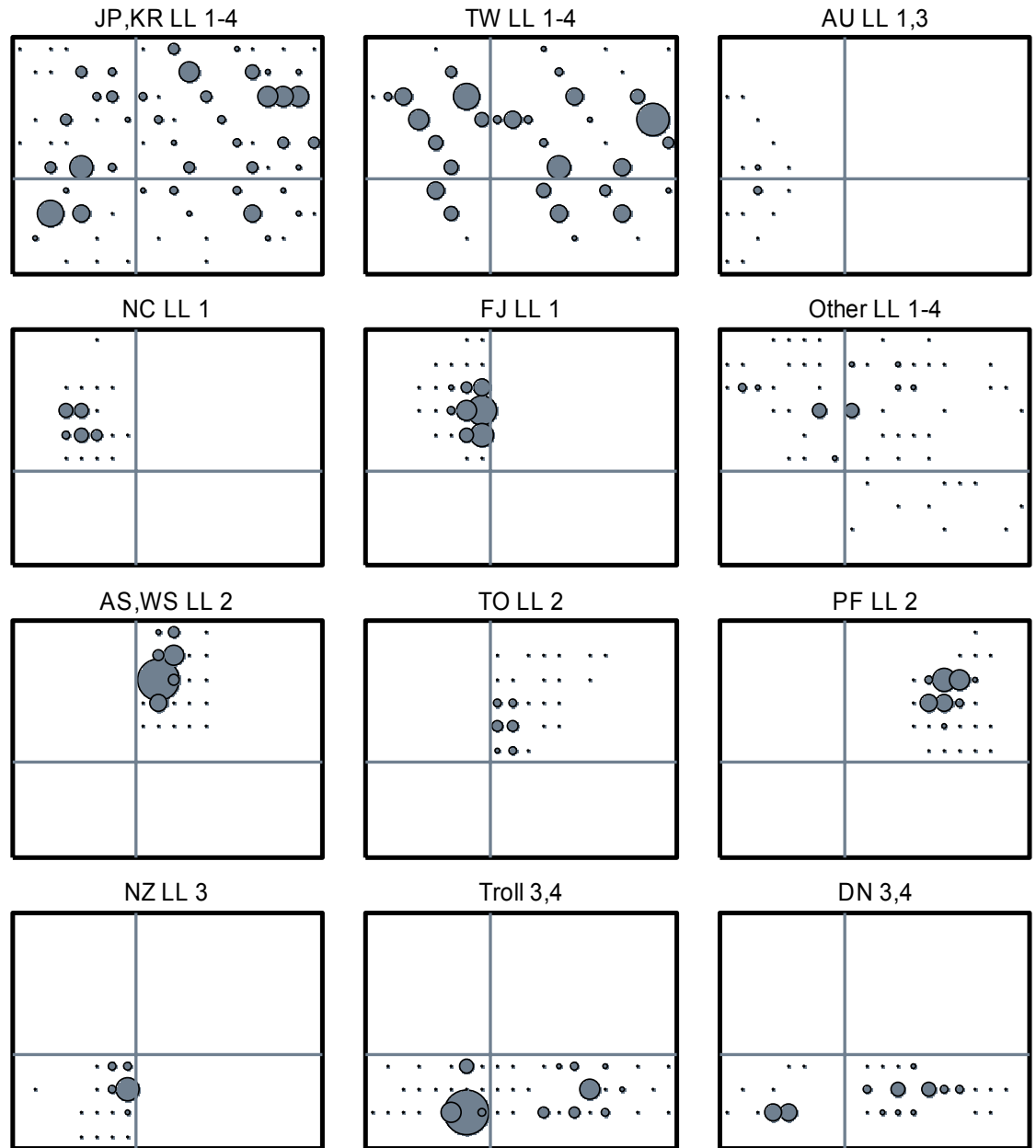
Fishery stratification

23 Fisheries defined by region and flag.

TW fishery represents main CPUE index in model.

Troll fisheries provide information on recruitment.

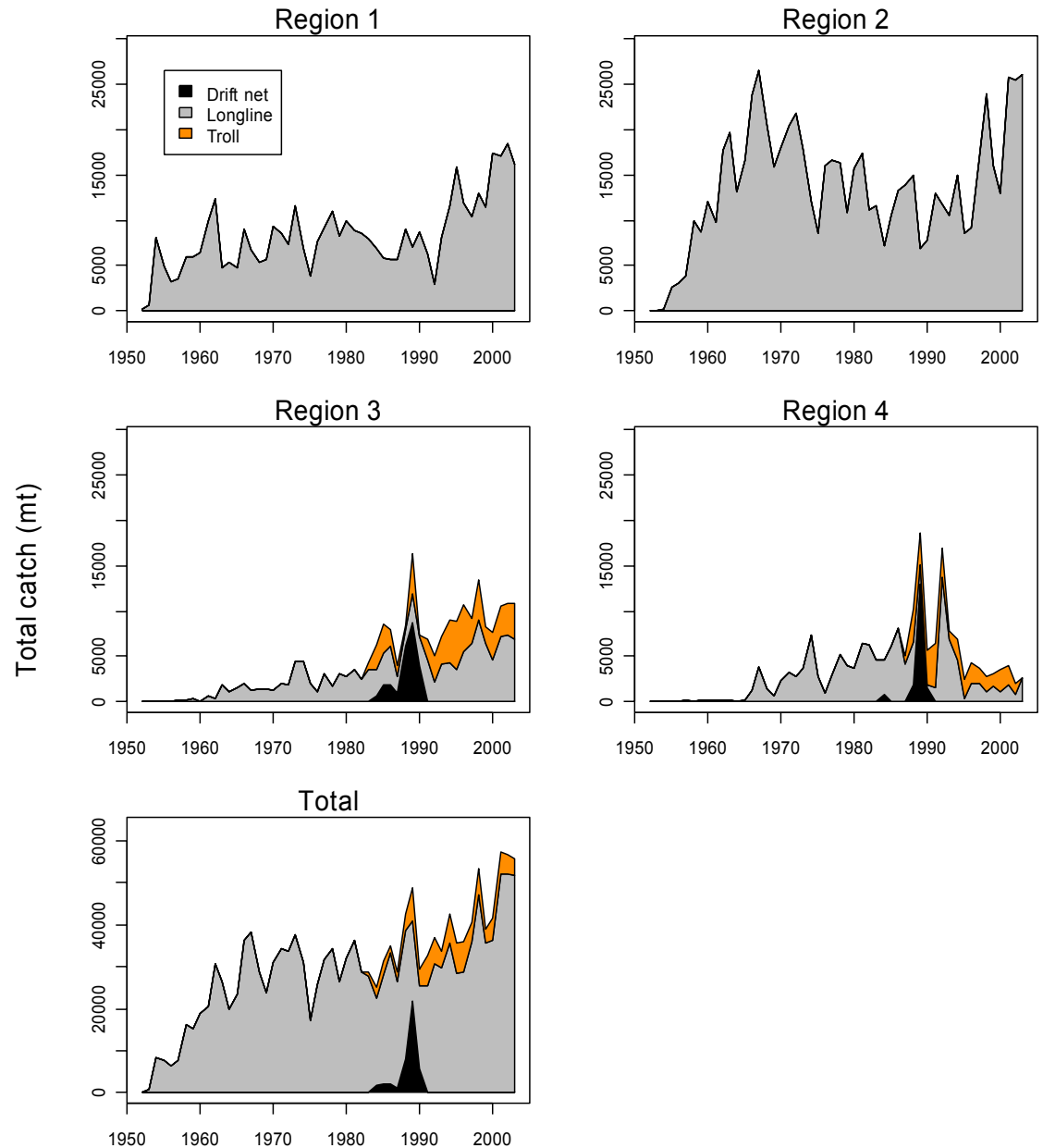
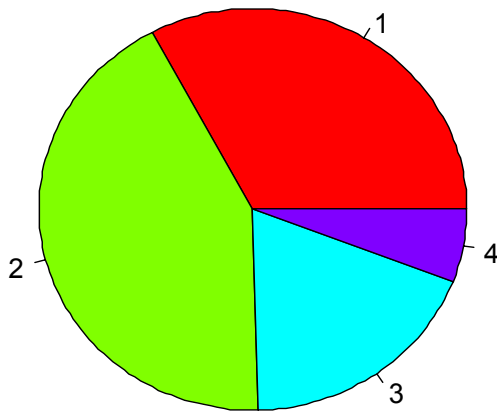
Key PI domestic fisheries defined.



Catch

Recent catches about 55,000 mt.

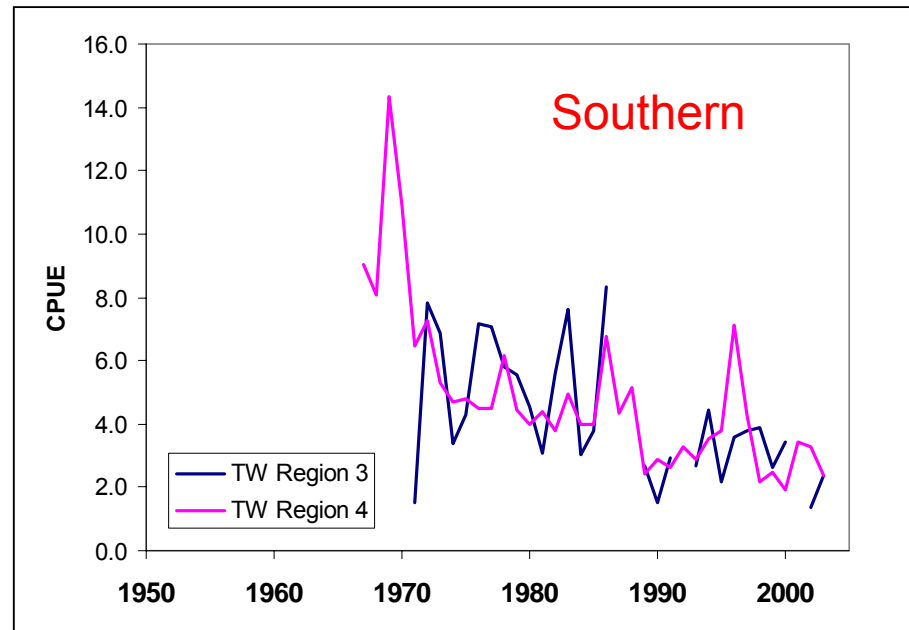
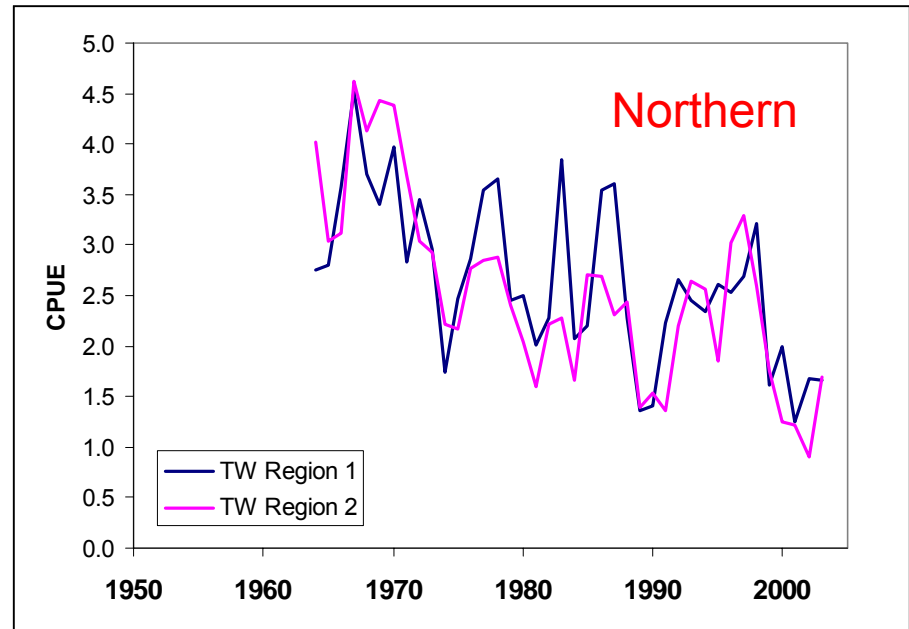
Data available up to 2003.
Problems with provision of TW catch and effort data for entire PO.



CPUE

TW fisheries = principal index.

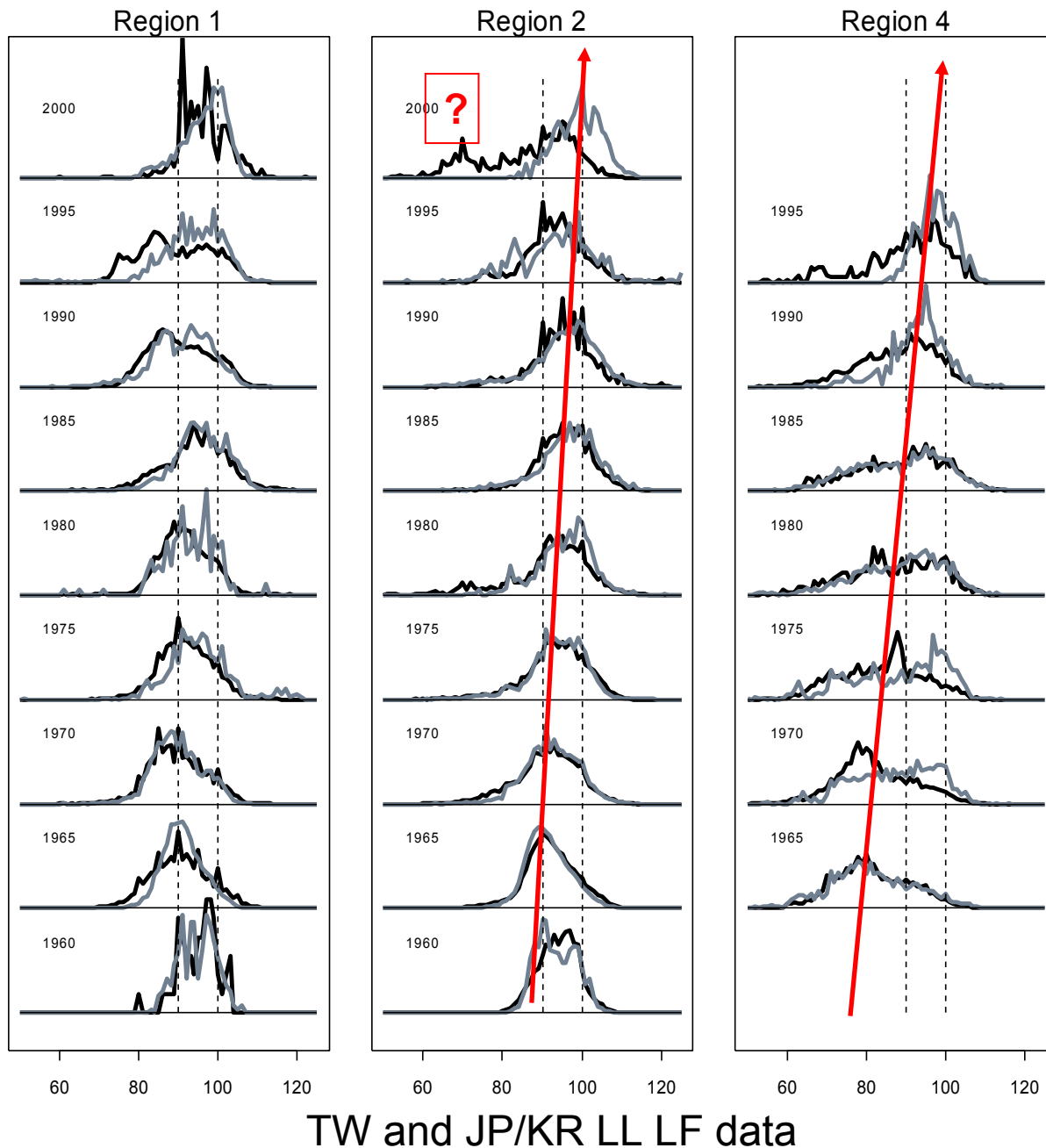
General declining trend in all regions.



Length data

Data available for most of main fisheries, although coverage varies temporally.

Some systematic trends in size composition – increase in size of fish caught over time.



Movement definition

Previous assessment estimates of movement inconsistent with understanding of seasonal movement.

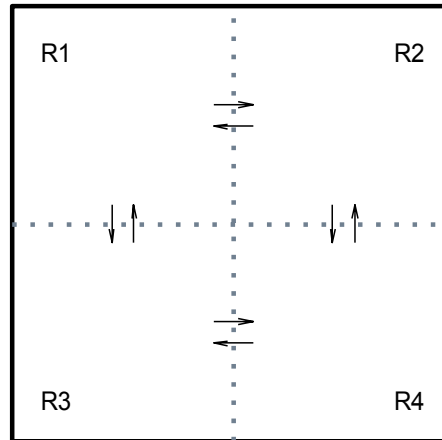
Explored through fixing movements. Compared results to estimated movements.

Movement still problematic and assumptions have large impact on assessment.

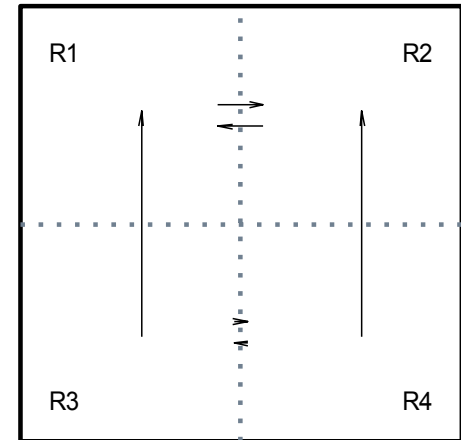


SINGLE REGION MODEL
retaining regional definitions of fisheries.

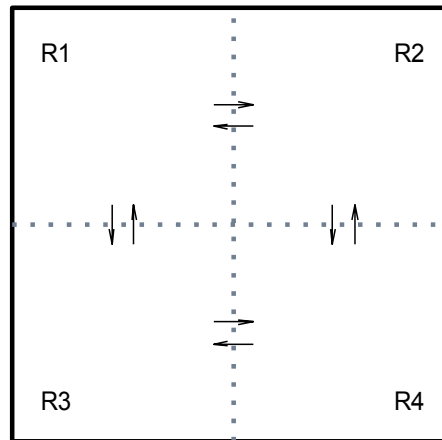
Quarter 1



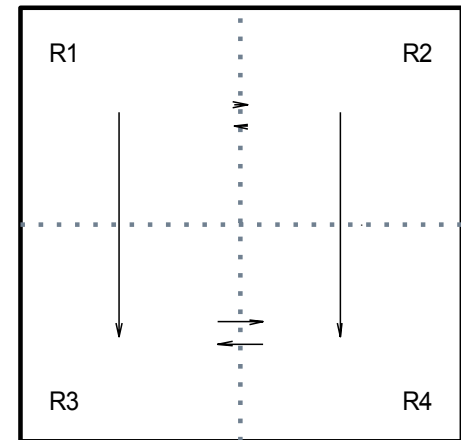
Quarter 2



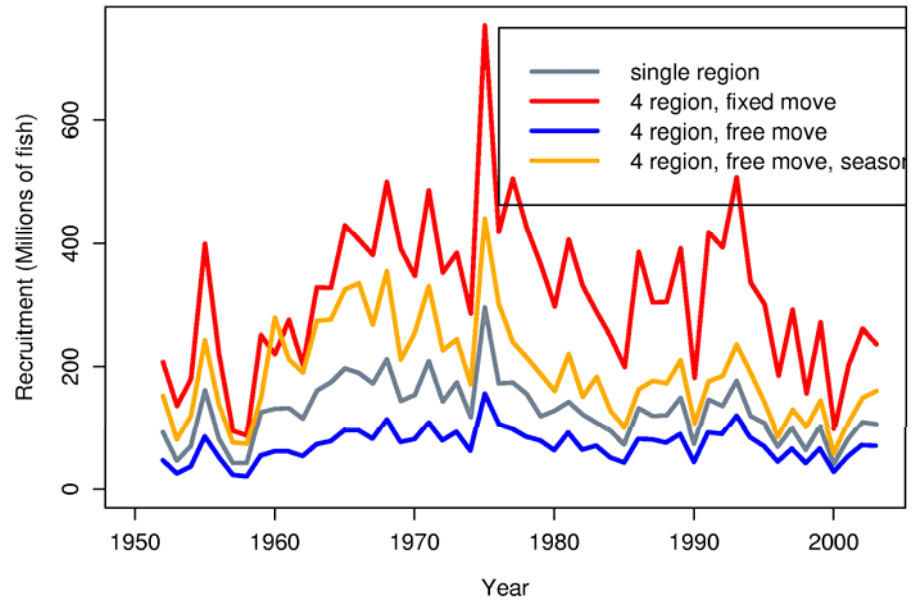
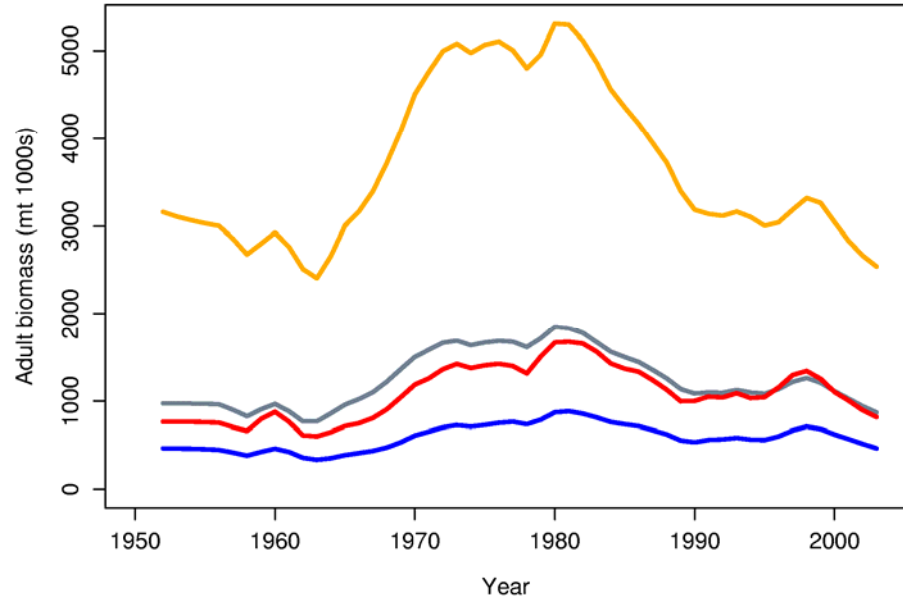
Quarter 3



Quarter 4



Movement scenarios



SINGLE Region model

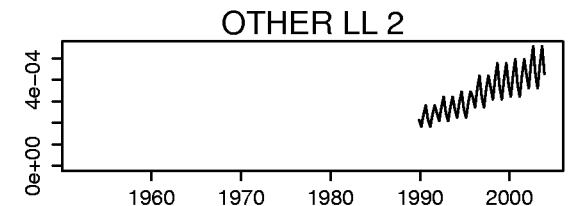
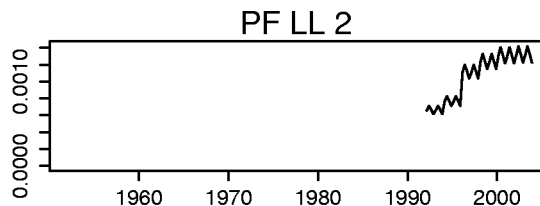
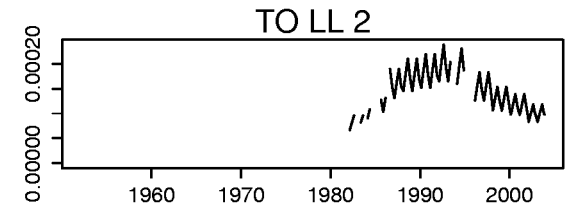
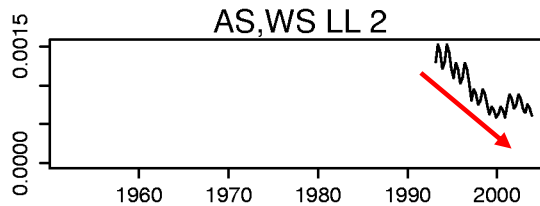
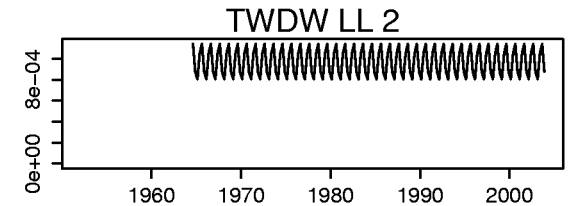
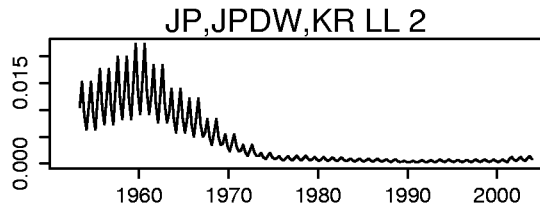
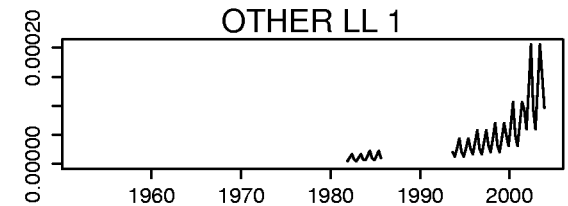
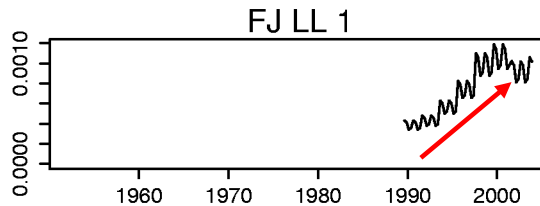
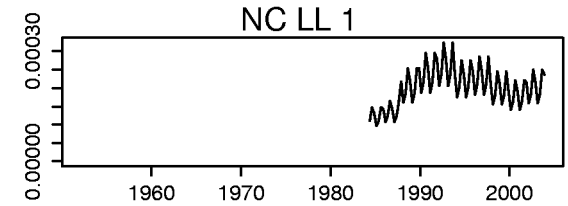
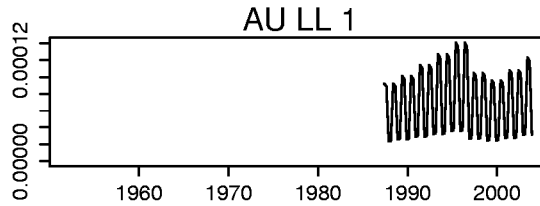
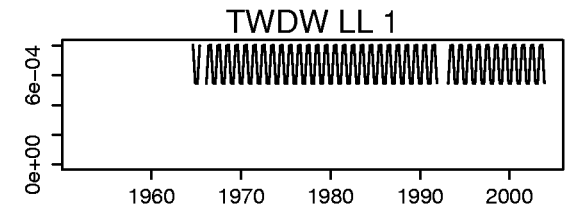
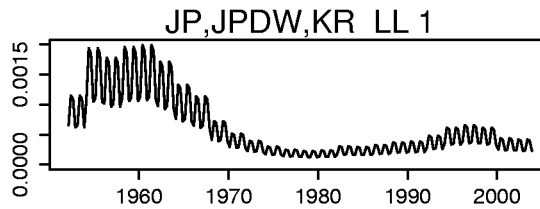
- Seasonal trends in fishery CPUE estimated via catchability coefficients.
- Some issues regarding fit to catch and effort data – high effort devs to fit initial decline in TW CPUE.
- Temporal trend in the fit to the size frequency data.
- Indicates some conflict between the two main sources of data in the model.
- Tagging data uninformative in the model.

Catchability

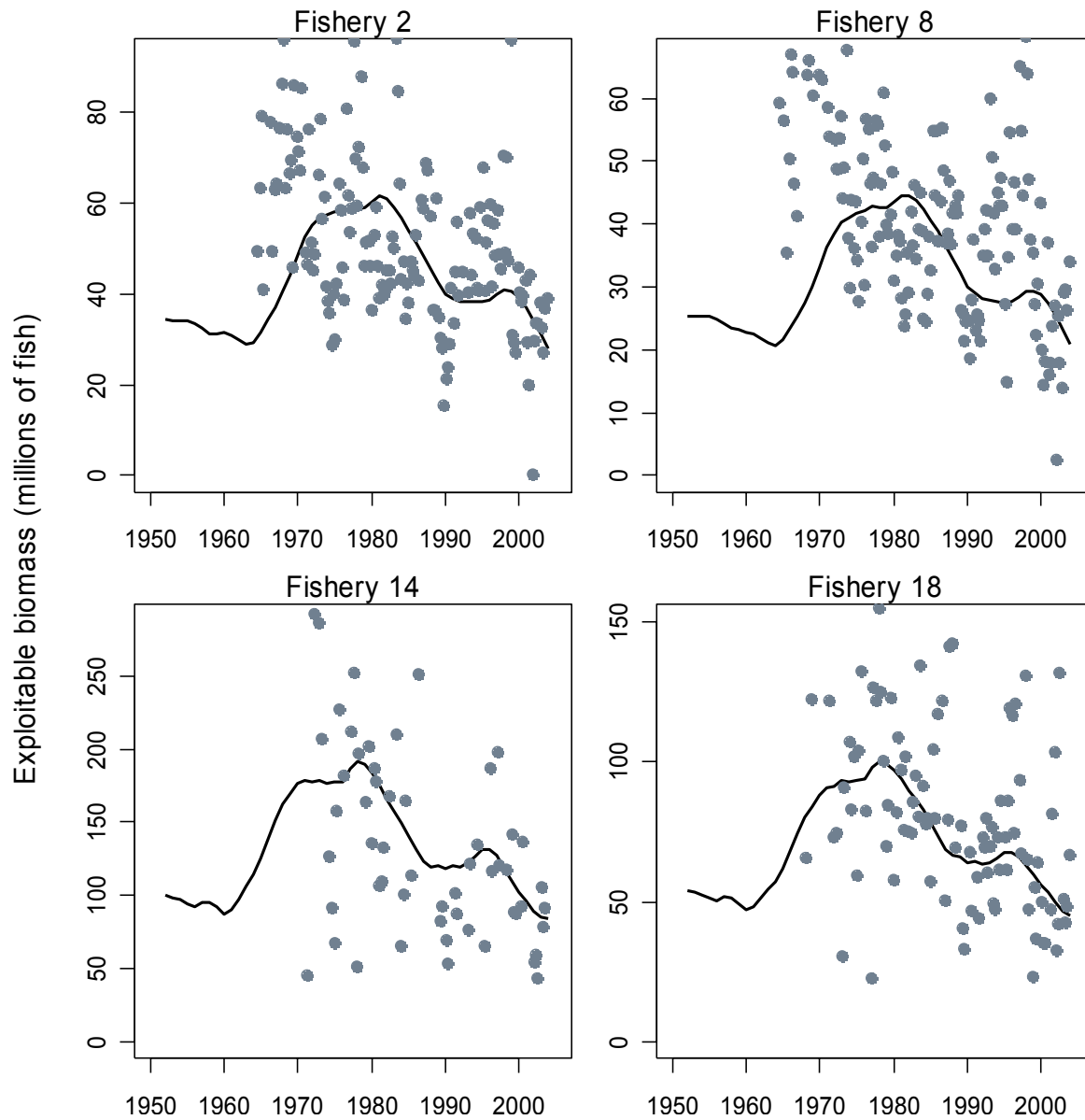
Strong seasonal trend.

TW catchability constant over time = index.

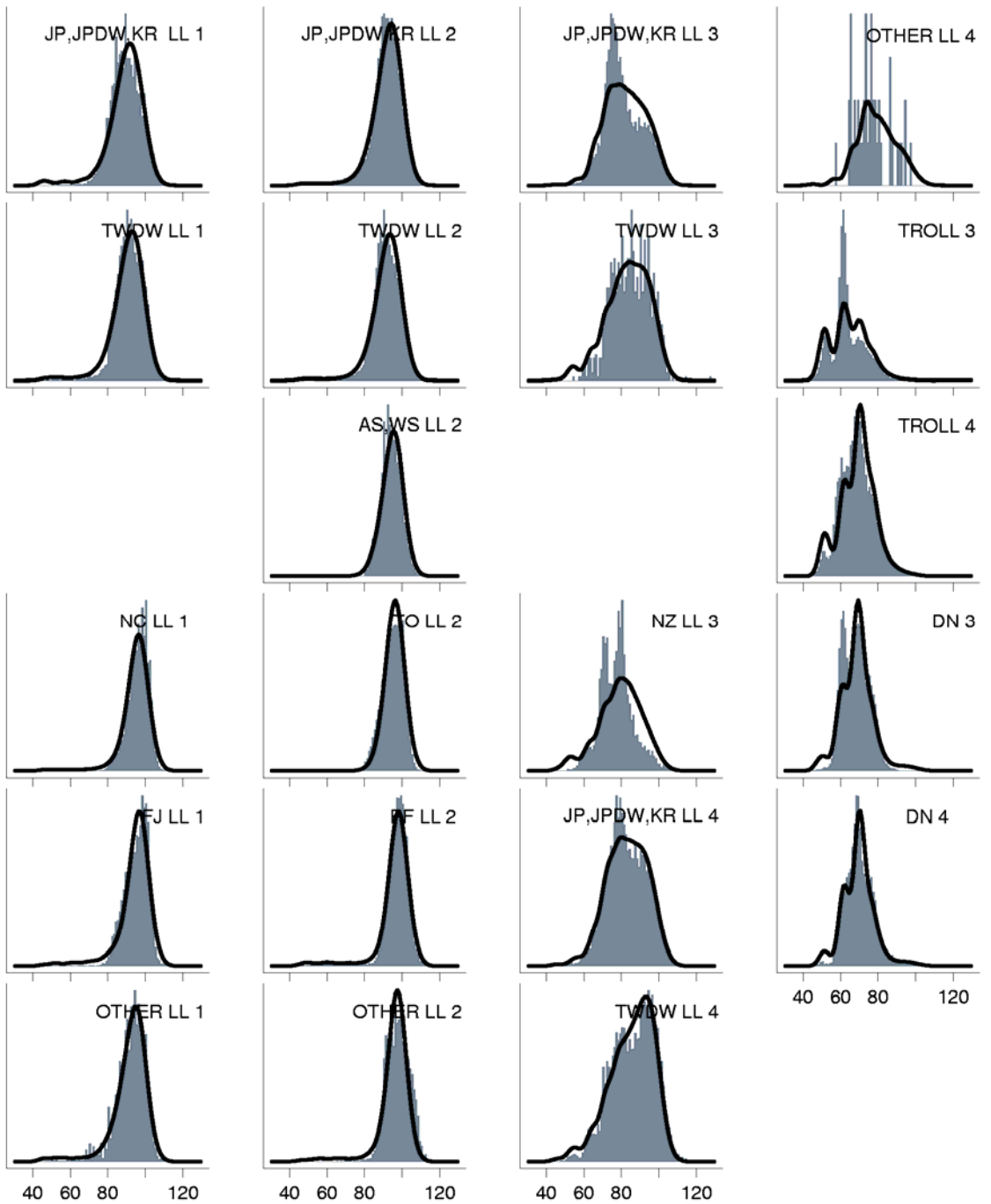
Compare fishery performance for domestic fisheries.



Fit to TW catch
and effort data.

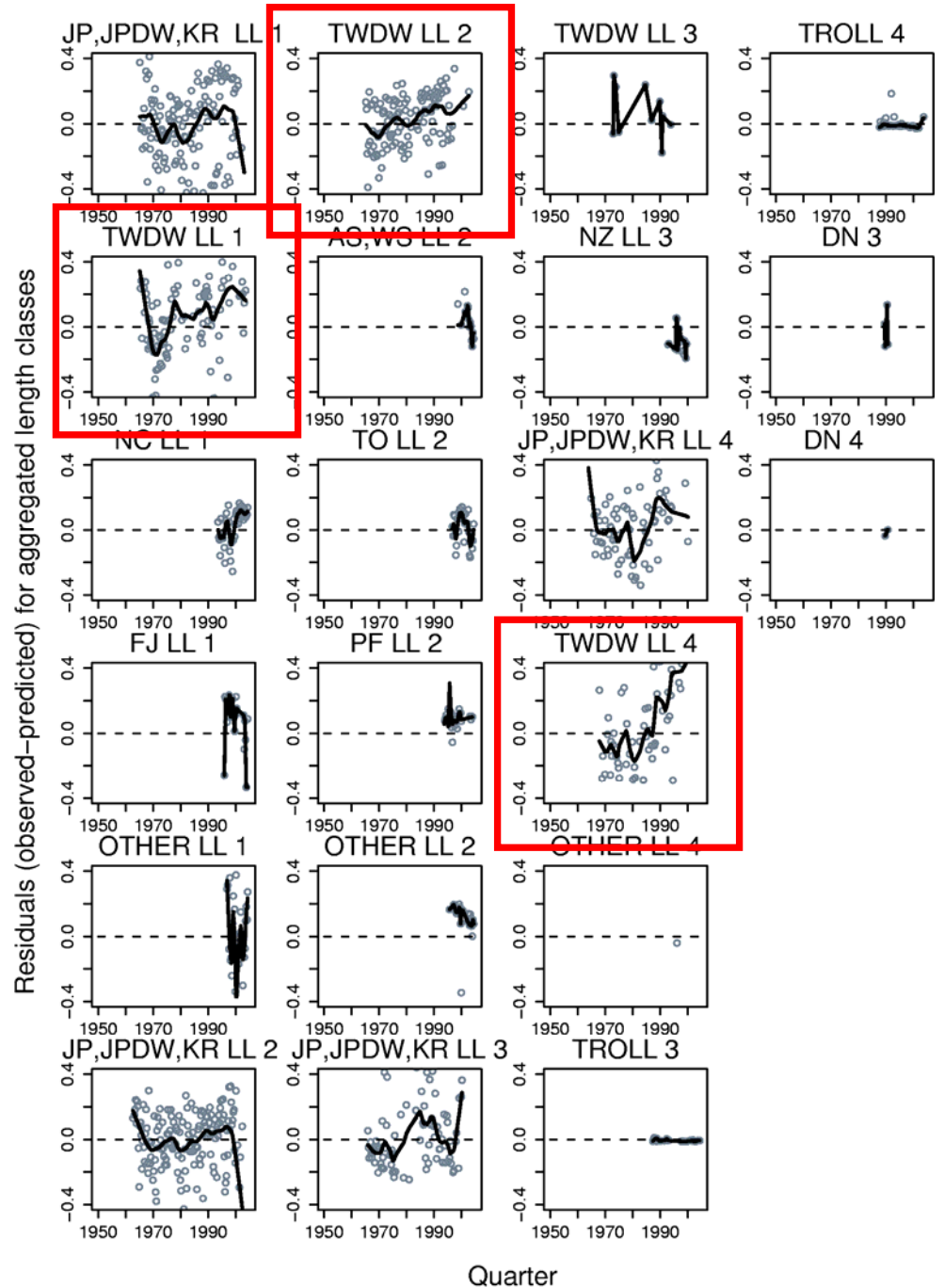
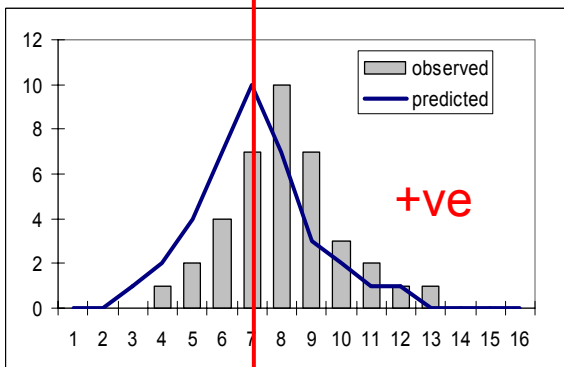
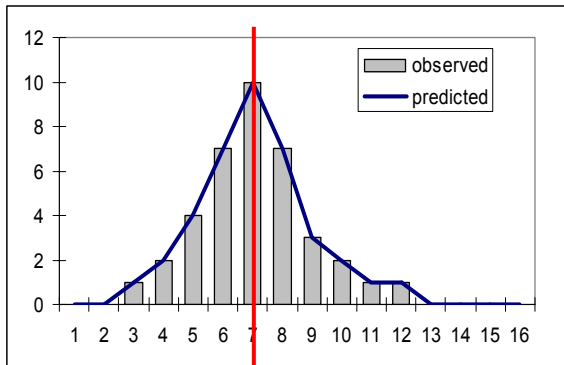


Length data

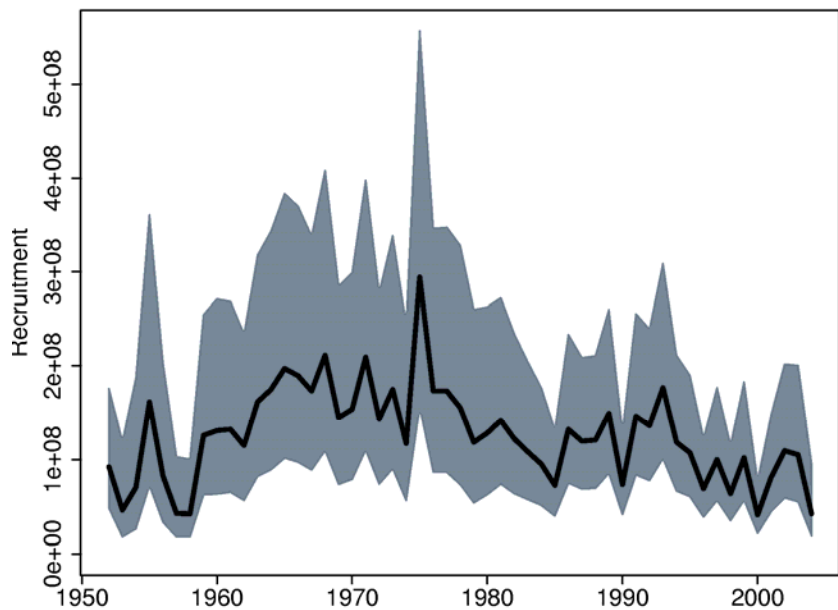


Length data

Increasingly under-estimating the proportion of larger fish in the TW LL catch.

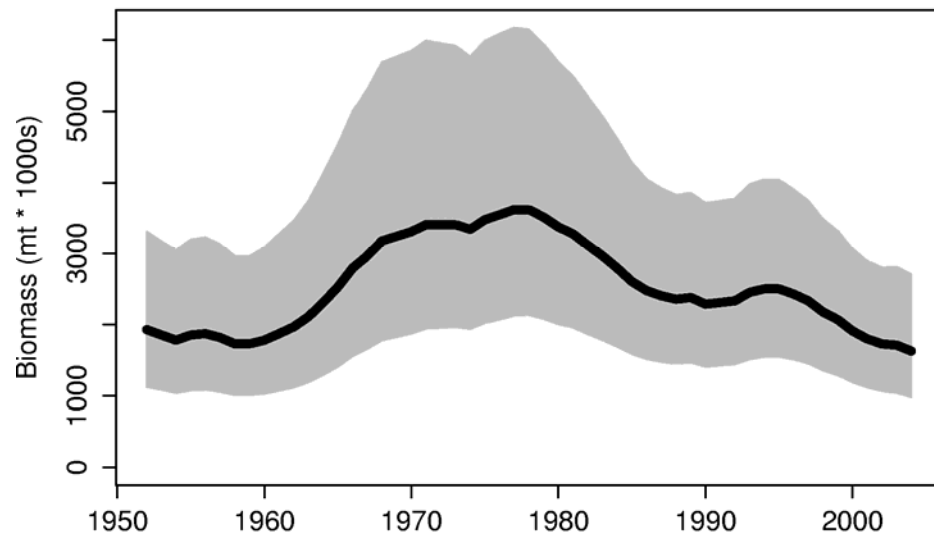


Recruitment

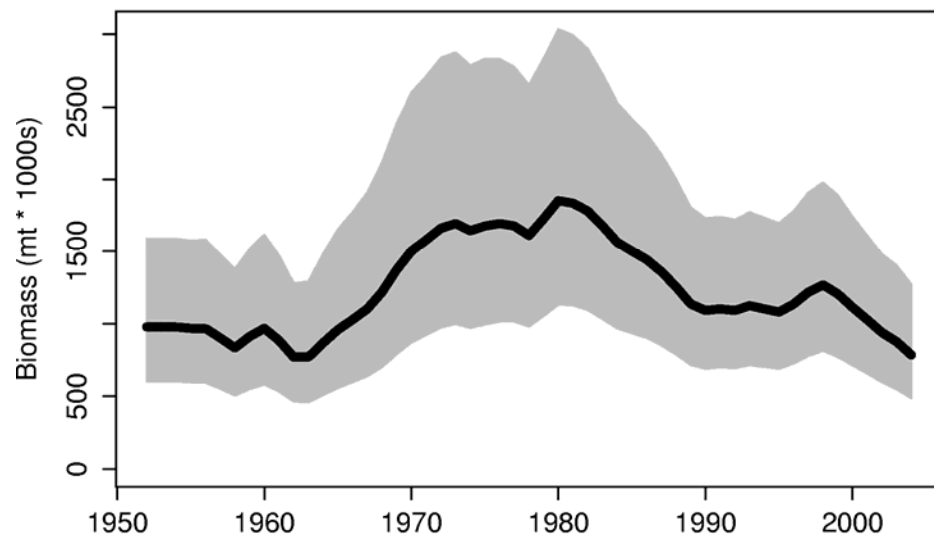


Biomass

Total

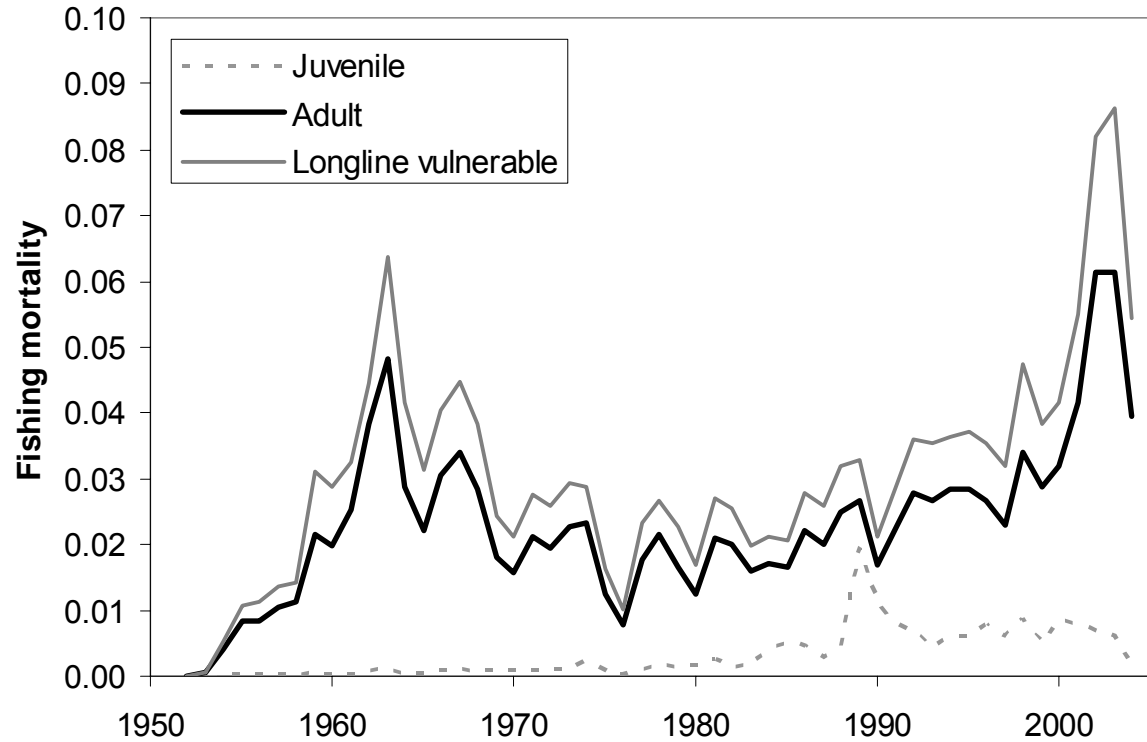


Adult



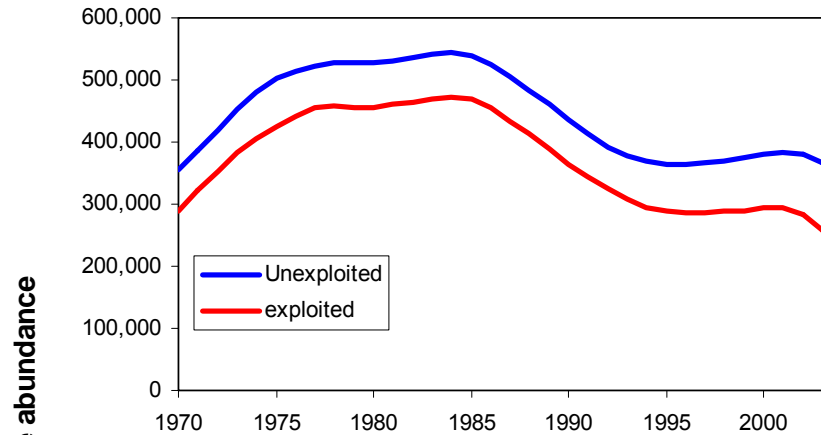
Exploitation rates

ER low through history of the fishery.
Increased in recent years.

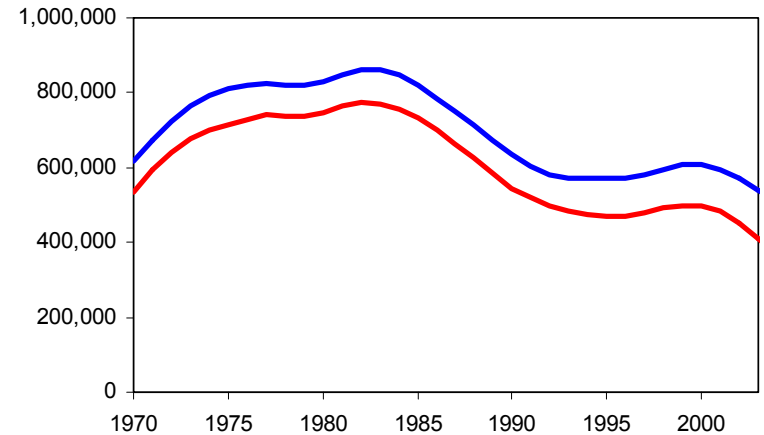


Fishery impact

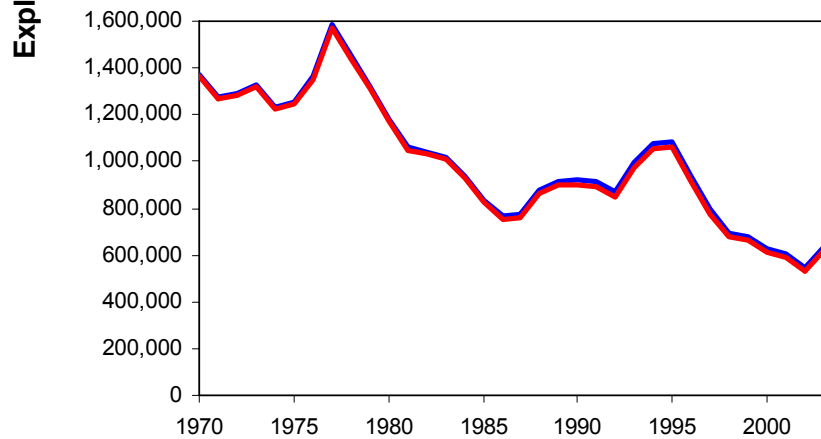
Fiji Longline



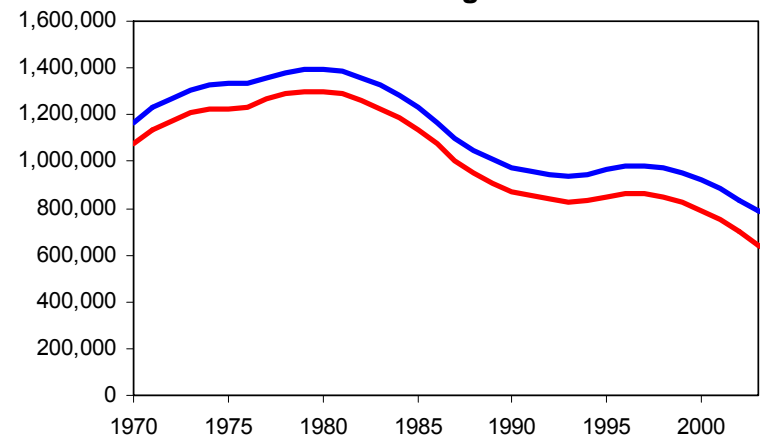
Taiwanese Longline North

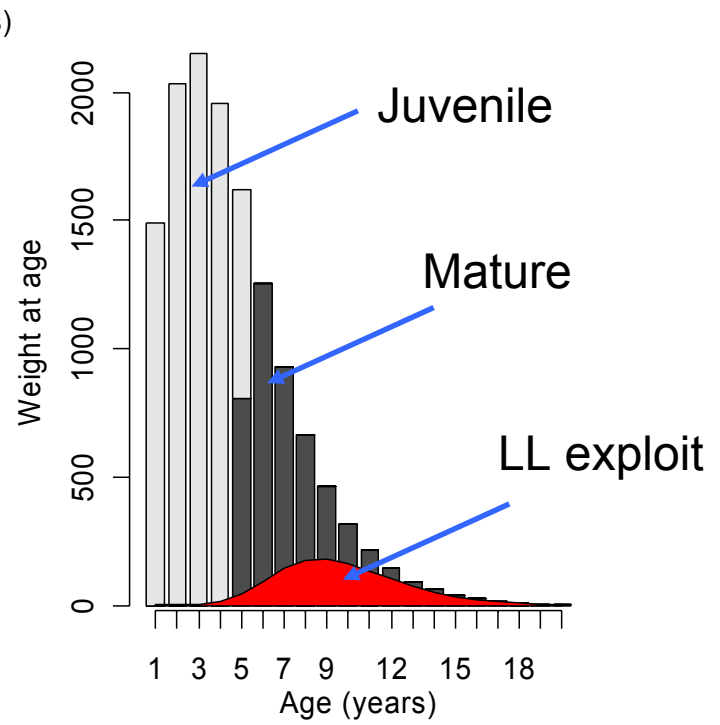
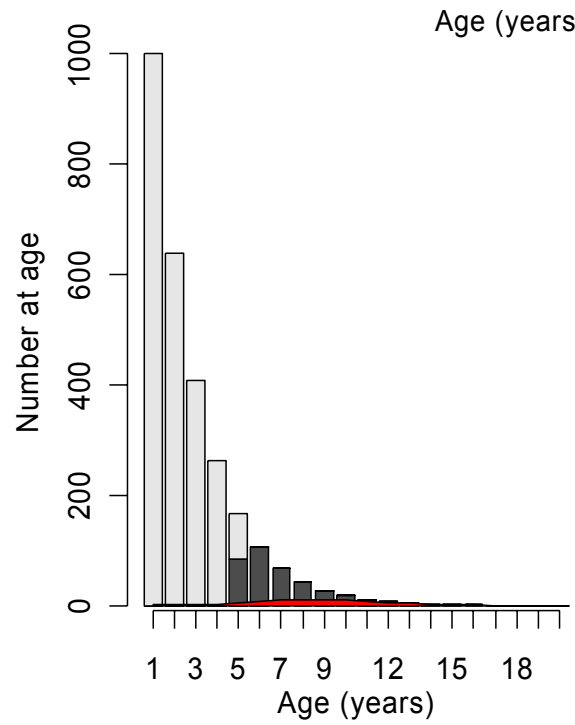
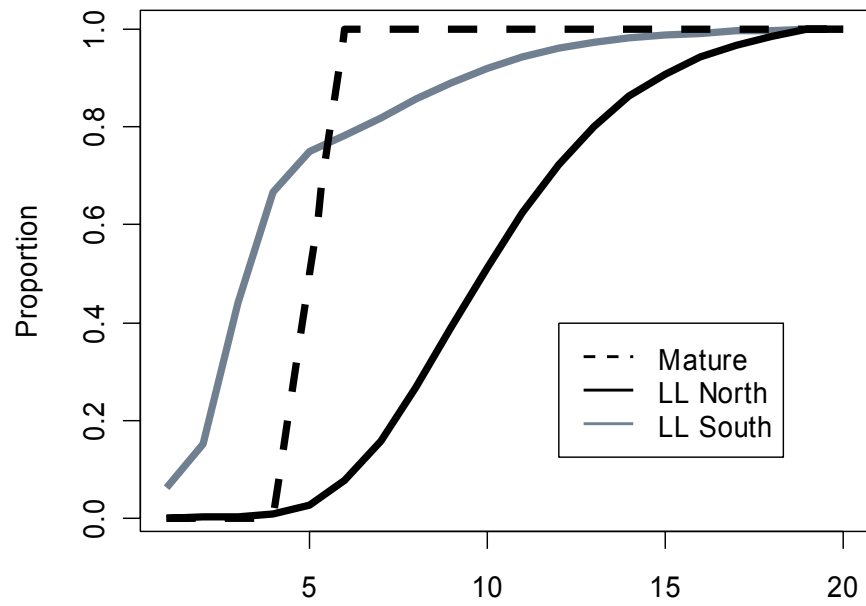


NZ Troll

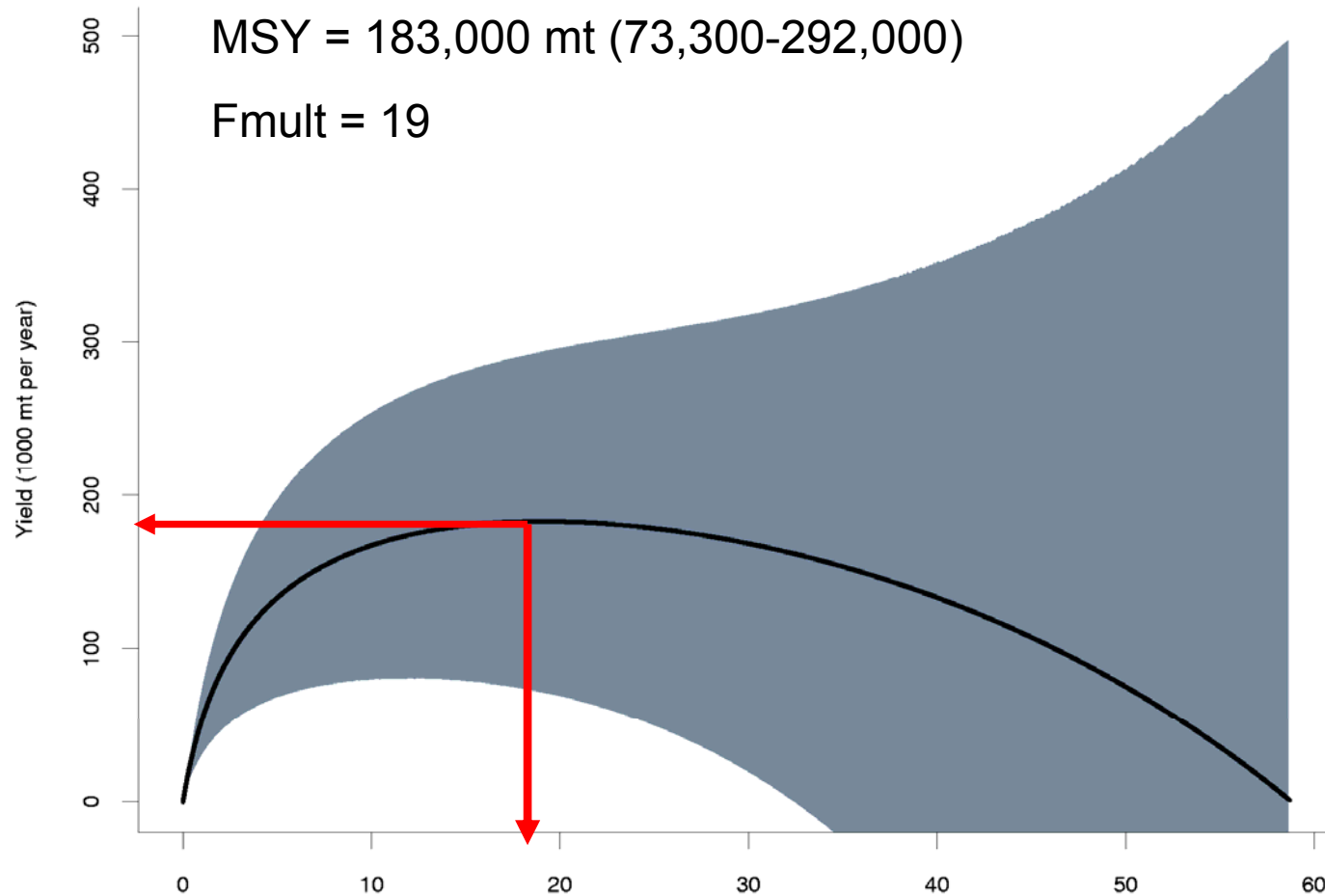


Taiwanese Longline South





Yield analysis (BH)



Management quantity	Units	
$\tilde{Y}_{F_{current}}$	t per year	53,000
$\tilde{Y}_{F_{MSY}}$ (or MSY)	t per year	183,000
\tilde{B}_0	t	2,406,000
$\tilde{B}_{F_{current}}$	t	2,377,000
\tilde{B}_{MSY}	t	1,056,000
$S\tilde{B}_0$	t	1,217,000
$S\tilde{B}_{F_{current}}$	t	1,191,000
$S\tilde{B}_{MSY}$	t	231,000
$B_{current}$	t	1,788,000
$SB_{current}$	t	989,000
$B_{current, F=0}$	t	1,958,000
$B_{current} / \tilde{B}_0$		0.74
$B_{current} / \tilde{B}_{F_{current}}$		0.75
$B_{current} / \tilde{B}_{MSY}$		1.69
$B_{current} / B_{current, F=0}$		0.91
$SB_{current} / S\tilde{B}_0$		0.81
$SB_{current} / S\tilde{B}_{F_{current}}$		0.83
$SB_{current} / S\tilde{B}_{MSY}$		4.29
$\tilde{B}_{F_{current}} / \tilde{B}_0$		0.99
$S\tilde{B}_{F_{current}} / S\tilde{B}_0$		0.98
$\tilde{B}_{MSY} / \tilde{B}_0$		0.44
$S\tilde{B}_{MSY} / S\tilde{B}_0$		0.19
F_{MSY}		0.17
$F_{current} / F_{MSY}$		0.05
$\tilde{B}_{F_{current}} / \tilde{B}_{MSY}$		2.25
$S\tilde{B}_{F_{current}} / S\tilde{B}_{MSY}$		5.16
$\tilde{Y}_{F_{current}} / MSY$		0.29

Conclusions

- Substantial changes to model structure → lower biomass and yields, but....
- Main conclusions the same as 2003.
 $B_{current} > B_{MSY}$ and $F_{current} < F_{MSY}$
- Assessment indicates higher higher yields available from stock (80,000-150,000mt), although highly uncertain.
- However, substantial increases in effort unlikely to be economically sustainable due to sharp decline in LL CPUE.