

Suggestion of management measures for two walleye pollock stocks around northern Japan

Testuichiro Funamoto*, Satoshi Honda, Keizo Yabuki and Akihiko Yatsu

Hokkaido National Fisheries Research Institute,
Fisheries Research Agency, Japan



larva



Age 0



Age 1~2

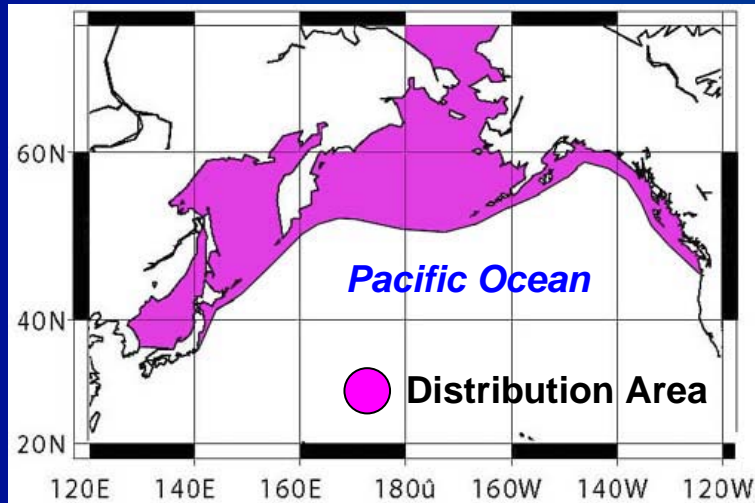


Age >3



Introduction

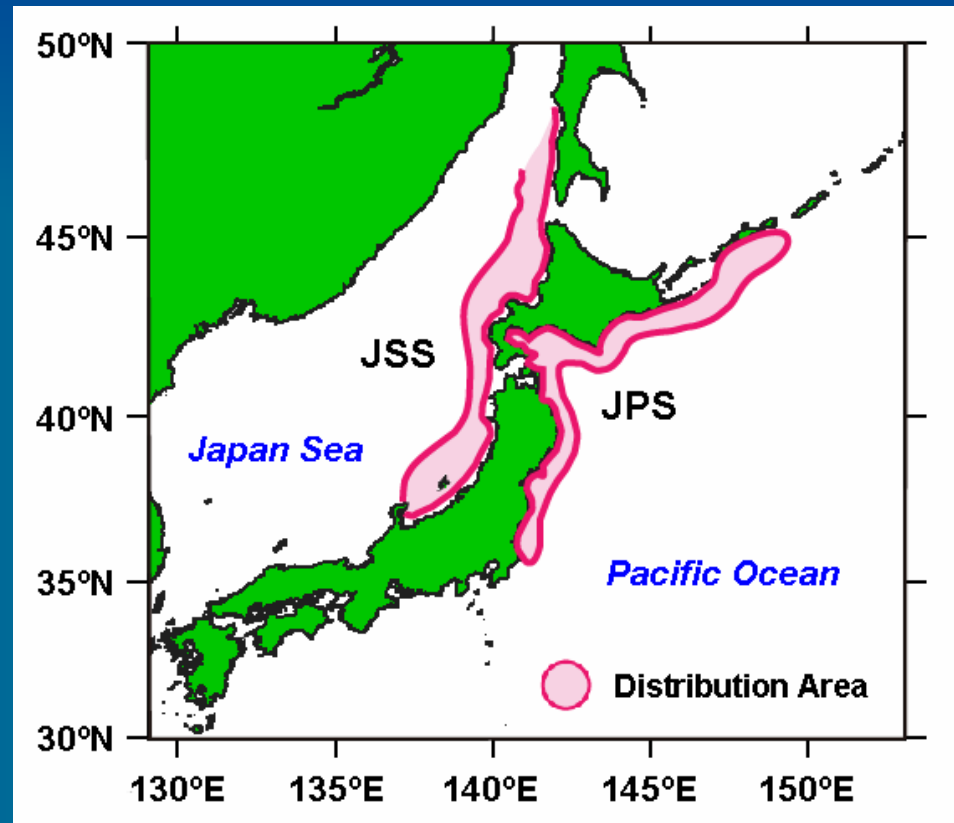
Distribution of walleye pollock



Targets of this study

JPS : Japanese Pacific stock
JSS : northern Japan Sea stock

Distribution of JPS and JSS

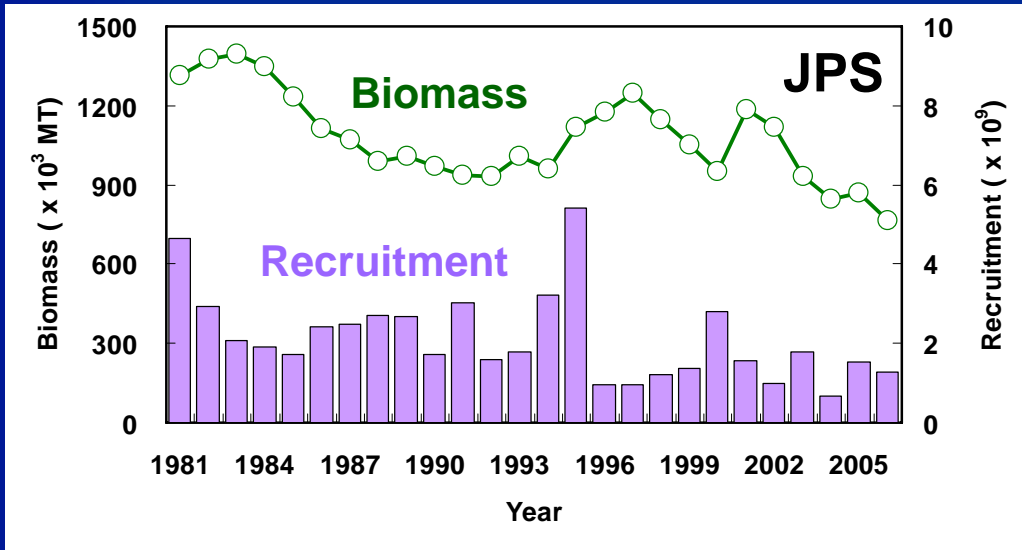


Contents

- ① Major factors responsible for the recent stock status of JPS and JSS
- ② Practical management measures for JPS and JSS

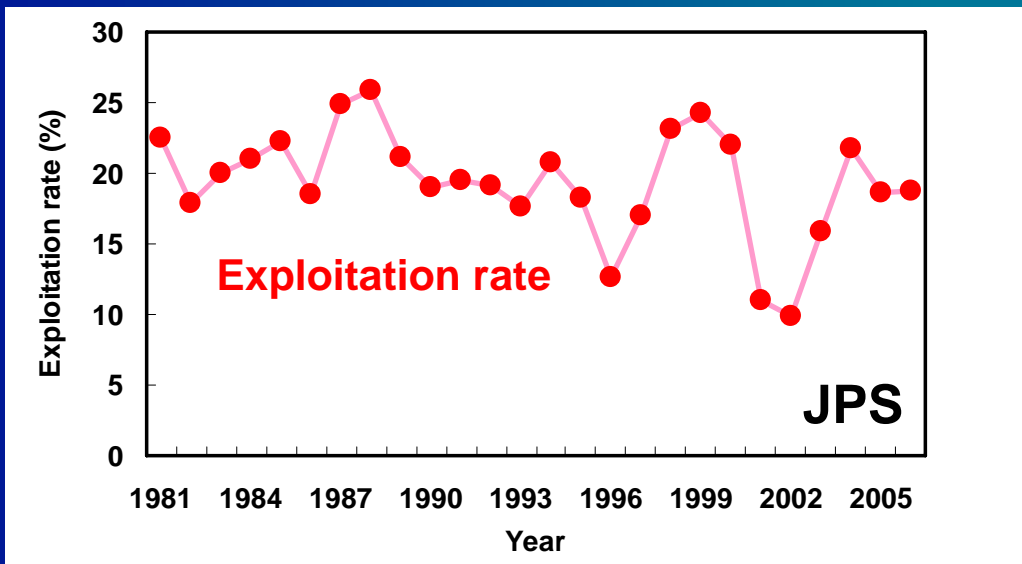
① Major factors responsible for the recent stock status of JPS and JSS

Biomass, recruitment and exploitation rate of JPS



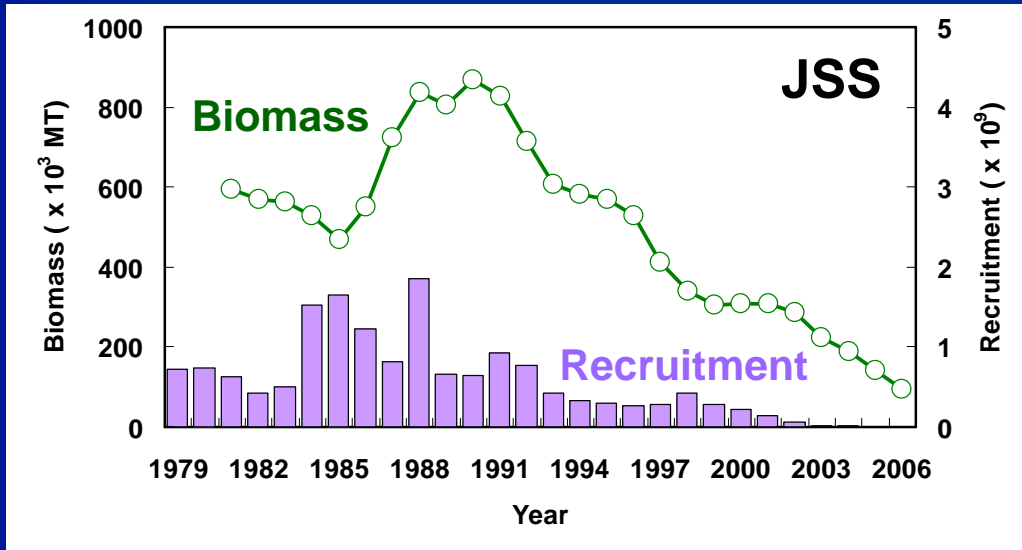
Biomass and recruitment of JPS were calculated by tuned VPA

Exploitation rate :
Percent biomass removed
by fishing
(Catch / Biomass (%))



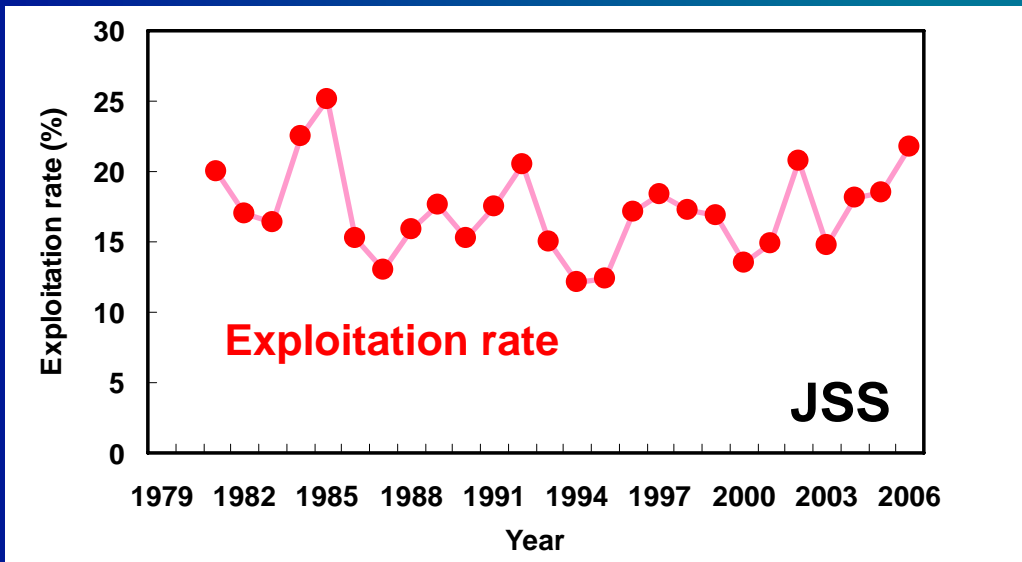
Recent decline in biomass is primarily due to the recent poor recruitments

Biomass, recruitment and exploitation rate of JSS



Biomass and recruitment of JSS were calculated by VPA

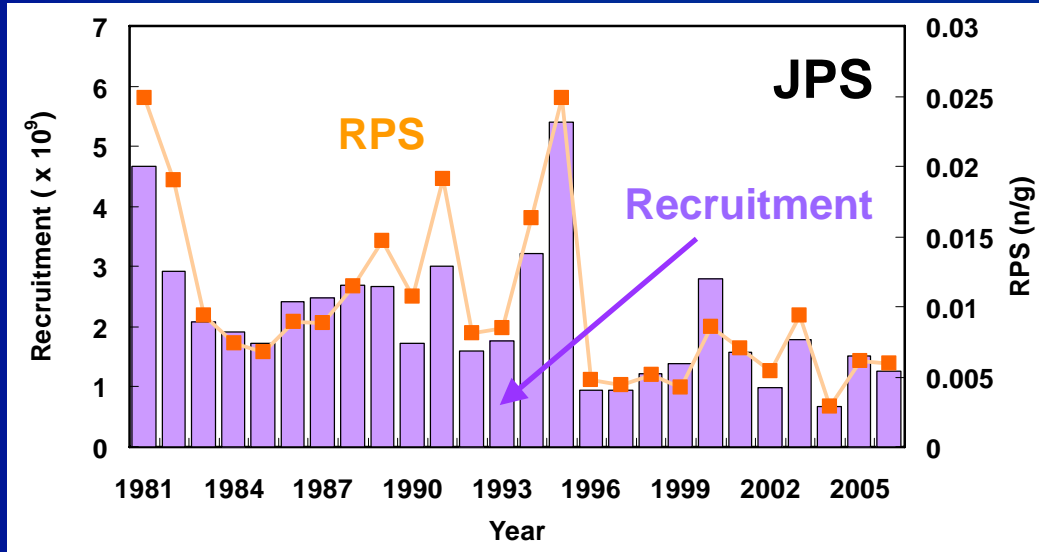
Exploitation rate :
Percent biomass removed by fishing
(Catch / Biomass (%))



Recent decline in biomass is primarily due to the recent decrease in recruitment

Recent rise in fishing pressure accelerates the recent decline in biomass

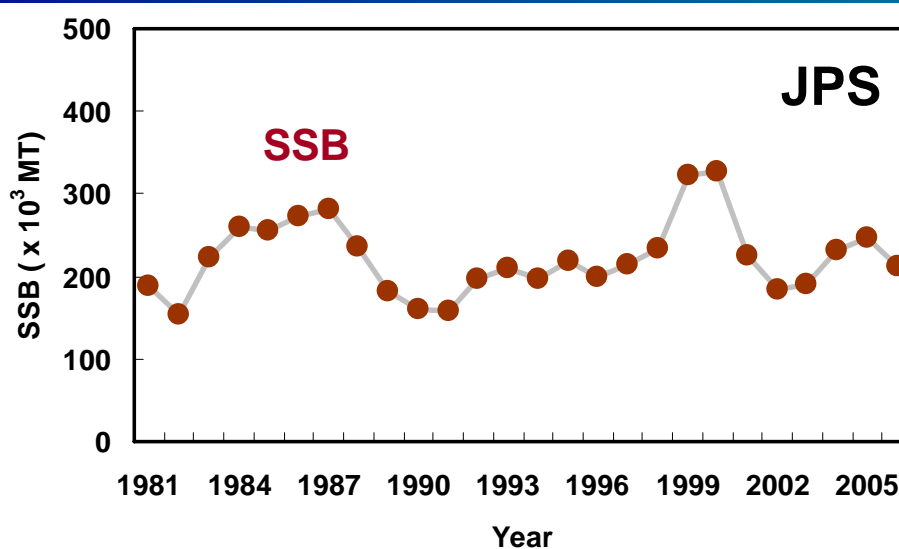
Recruitment, RPS and SSB of JPS



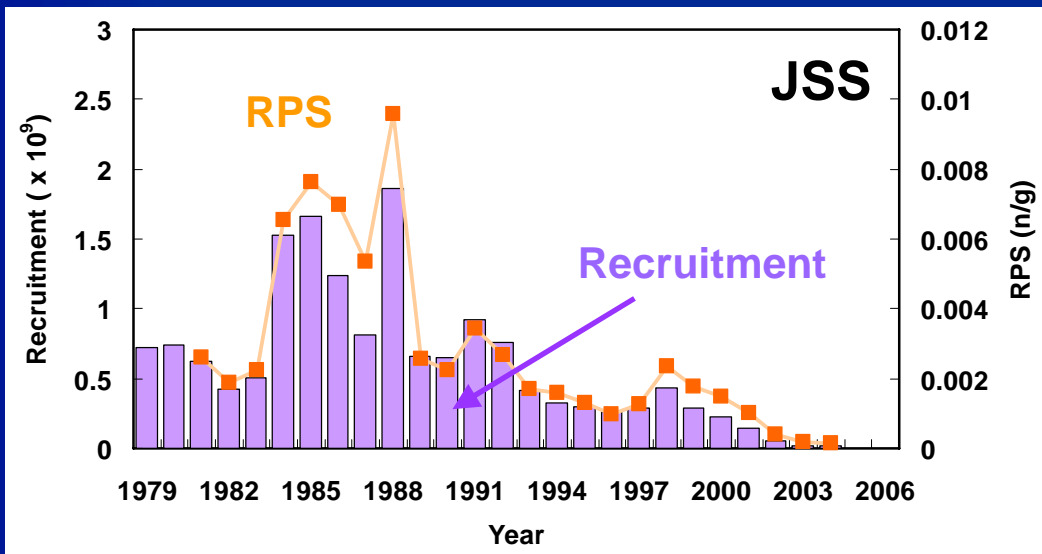
RPS : Recruitment per spawning
(survival rate from egg to recruitment)

SSB : Spawning stock biomass

Recent poor recruitments are mainly due to the recent low RPSs

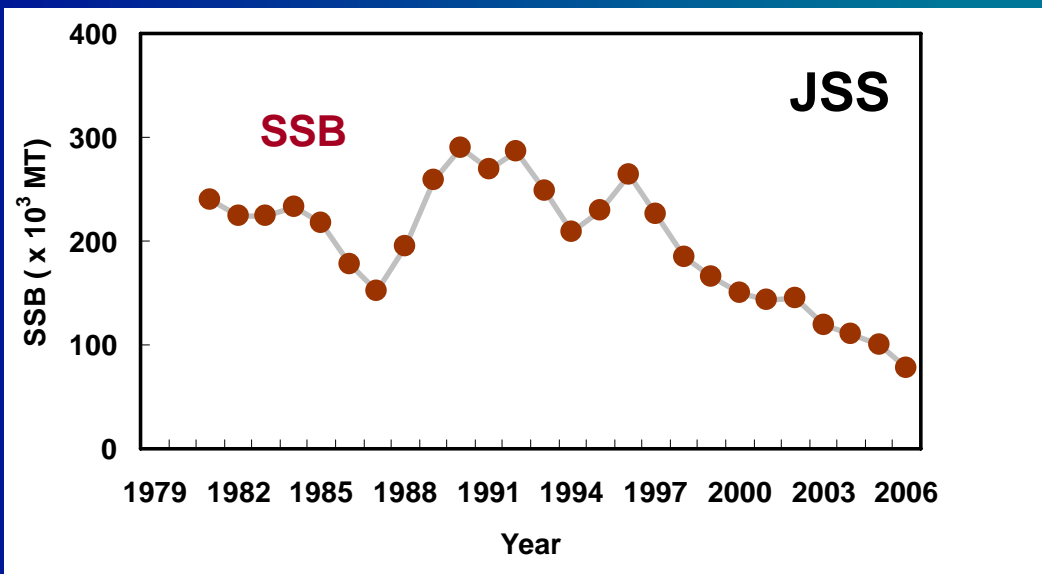


Recruitment, RPS and SSB of JSS



RPS : Recruitment per spawning
(survival rate from egg to recruitment)

SSB : Spawning stock biomass

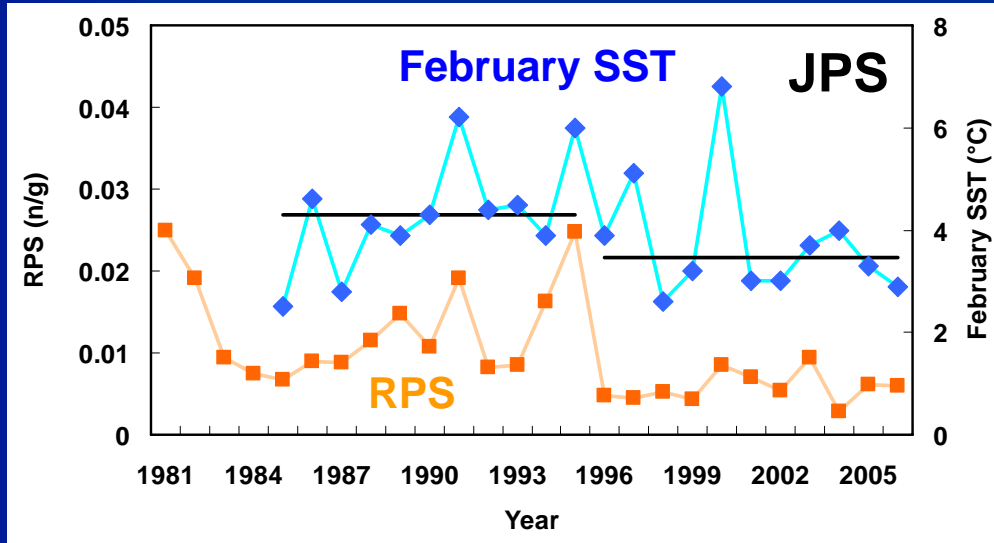


Recent decrease in recruitment is mainly due to not only the recent fall in RPS but also the recent reduction in SSB

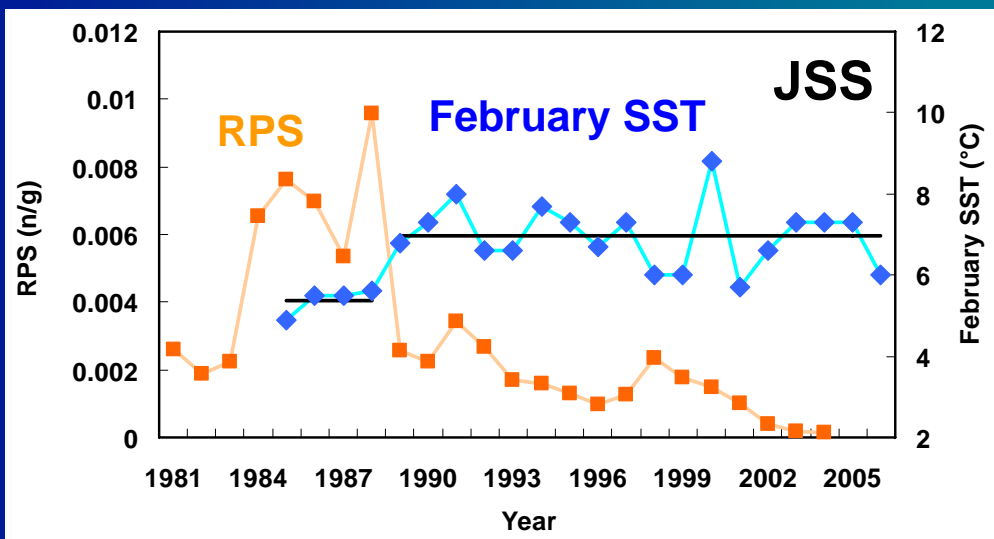
RPSs of JPS and JSS and February SSTs around their spawning areas

SST : Sea surface temperature

February : Main spawning season for JPS and JSS



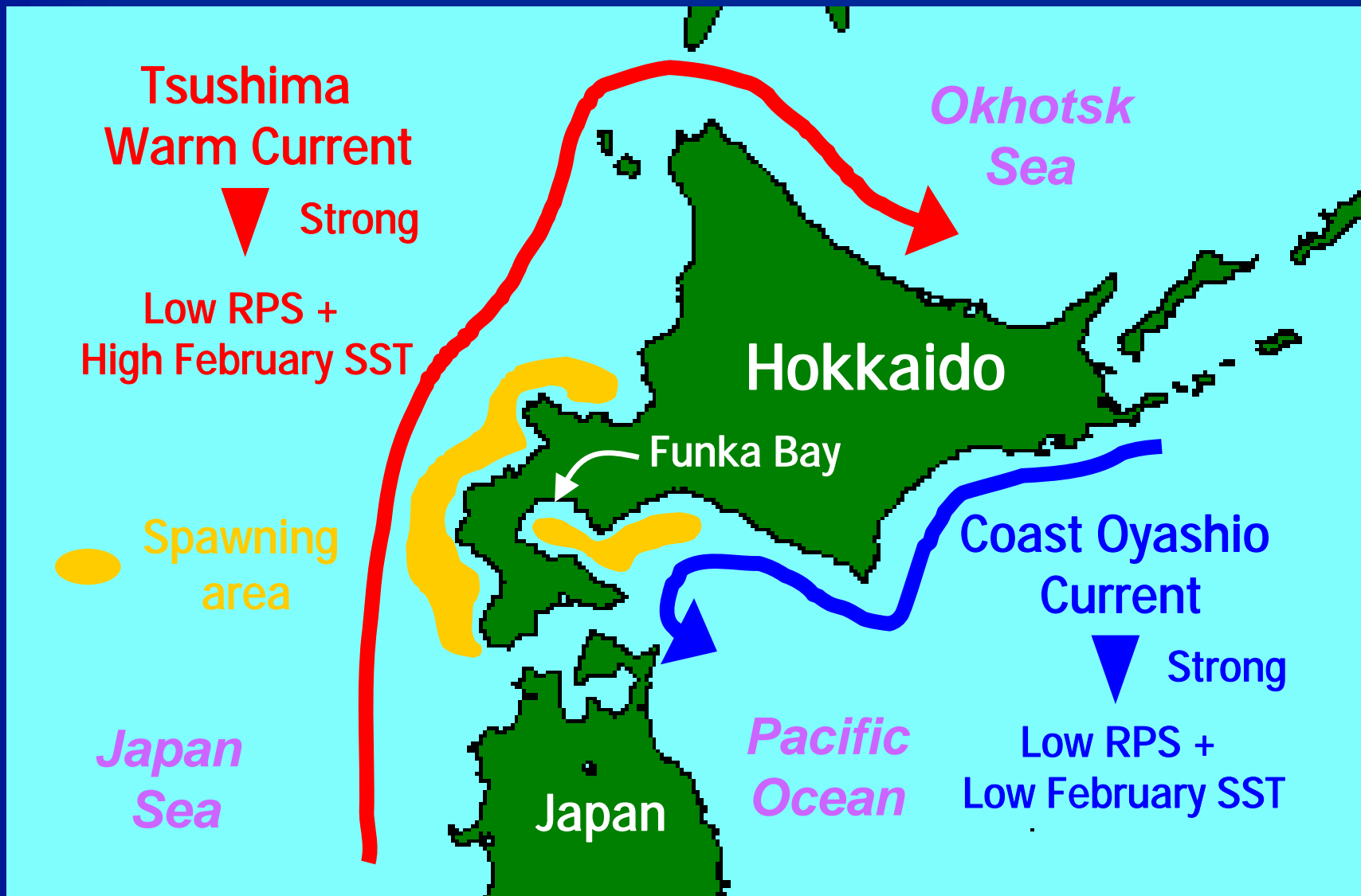
RPSs of both stocks are under the influence of environmental factors represented by February SSTs



Recent environments are unfavorable for both stocks

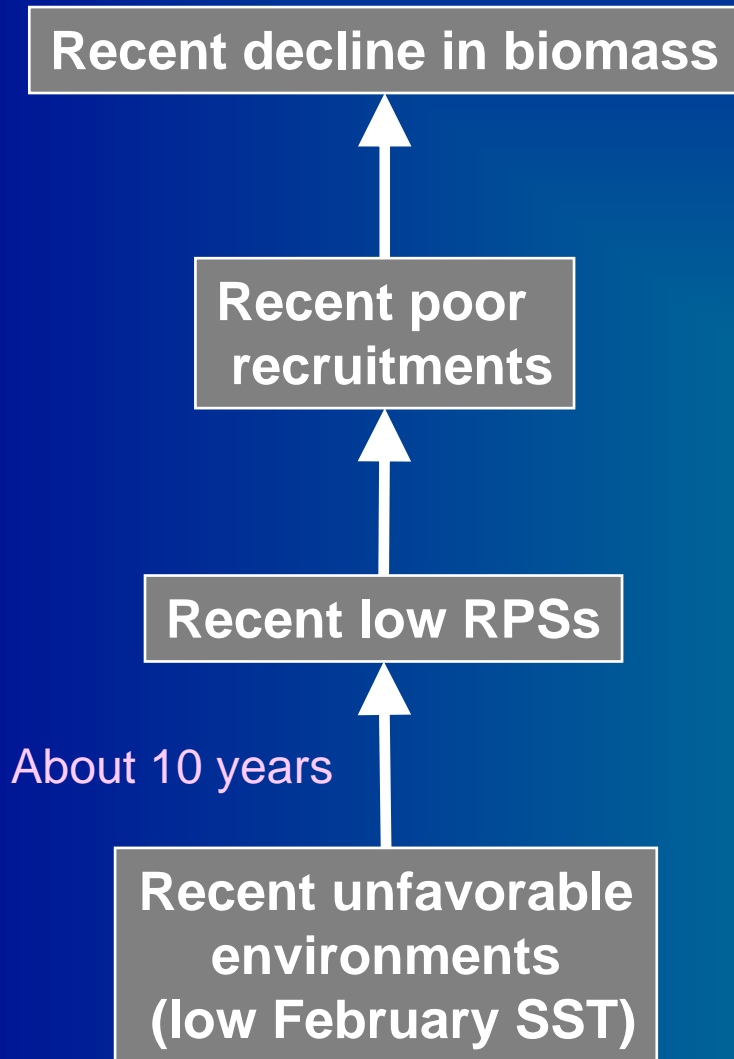
It is unlikely that environments will be improved in the near future for JSS

Ocean current hypothesis

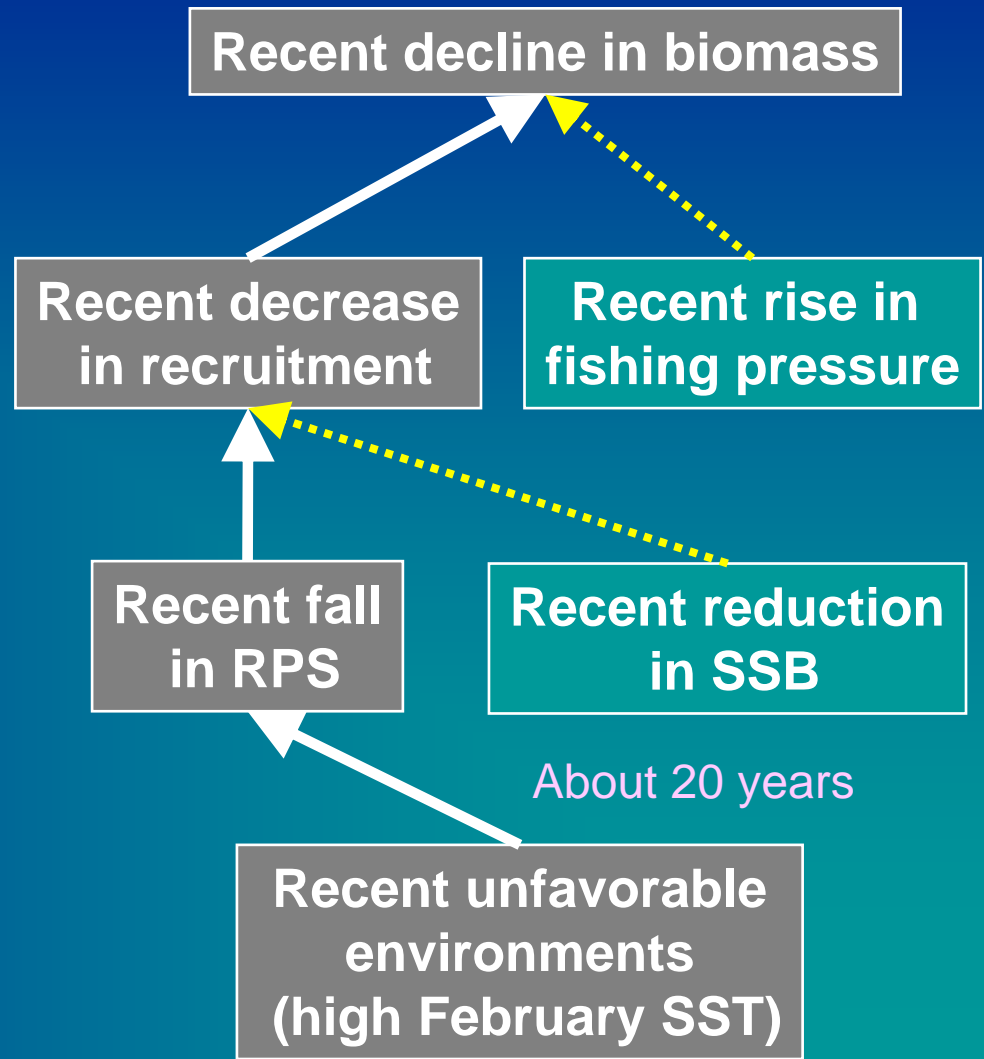


Summary-1

JPS



JSS

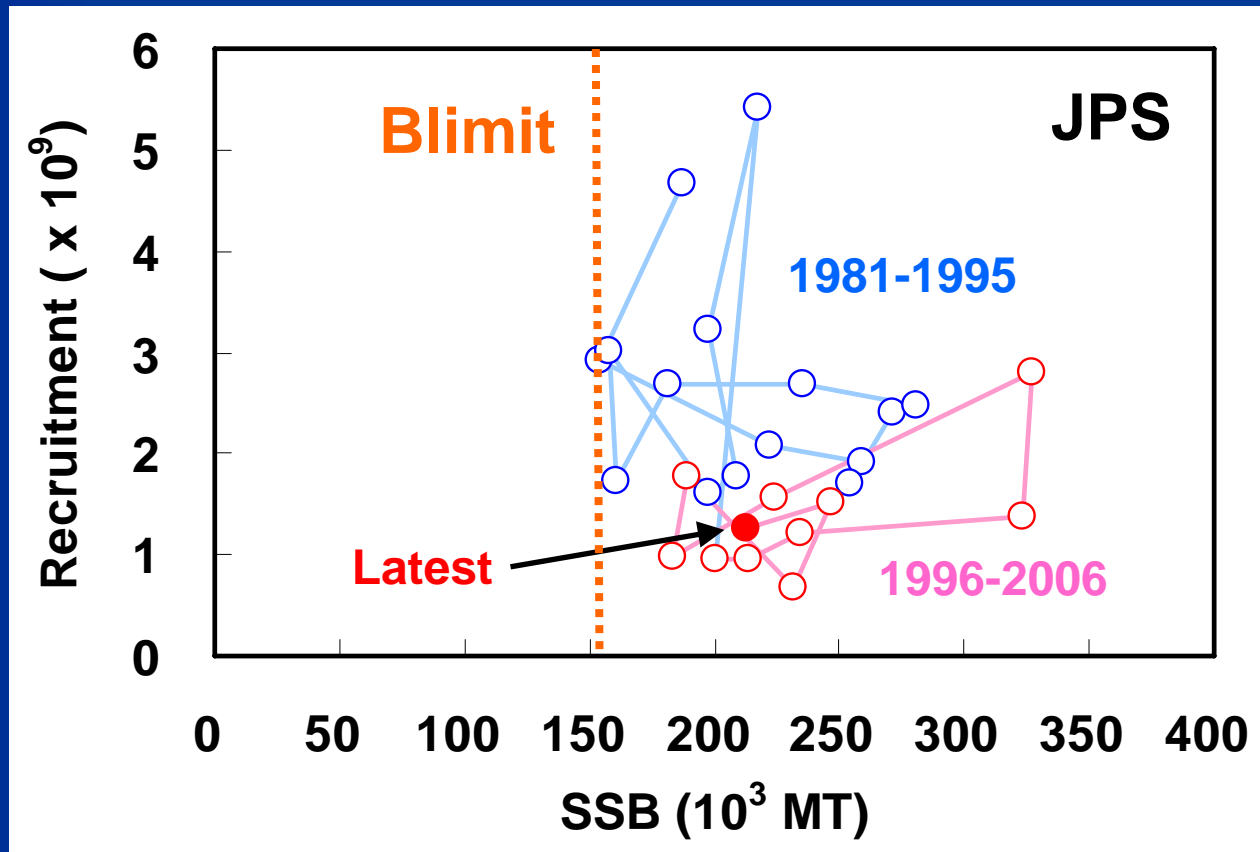


**② Practical management measures
for JPS and JSS**

Stock-recruitment relationship for JPS

RPS : Slope of each plot

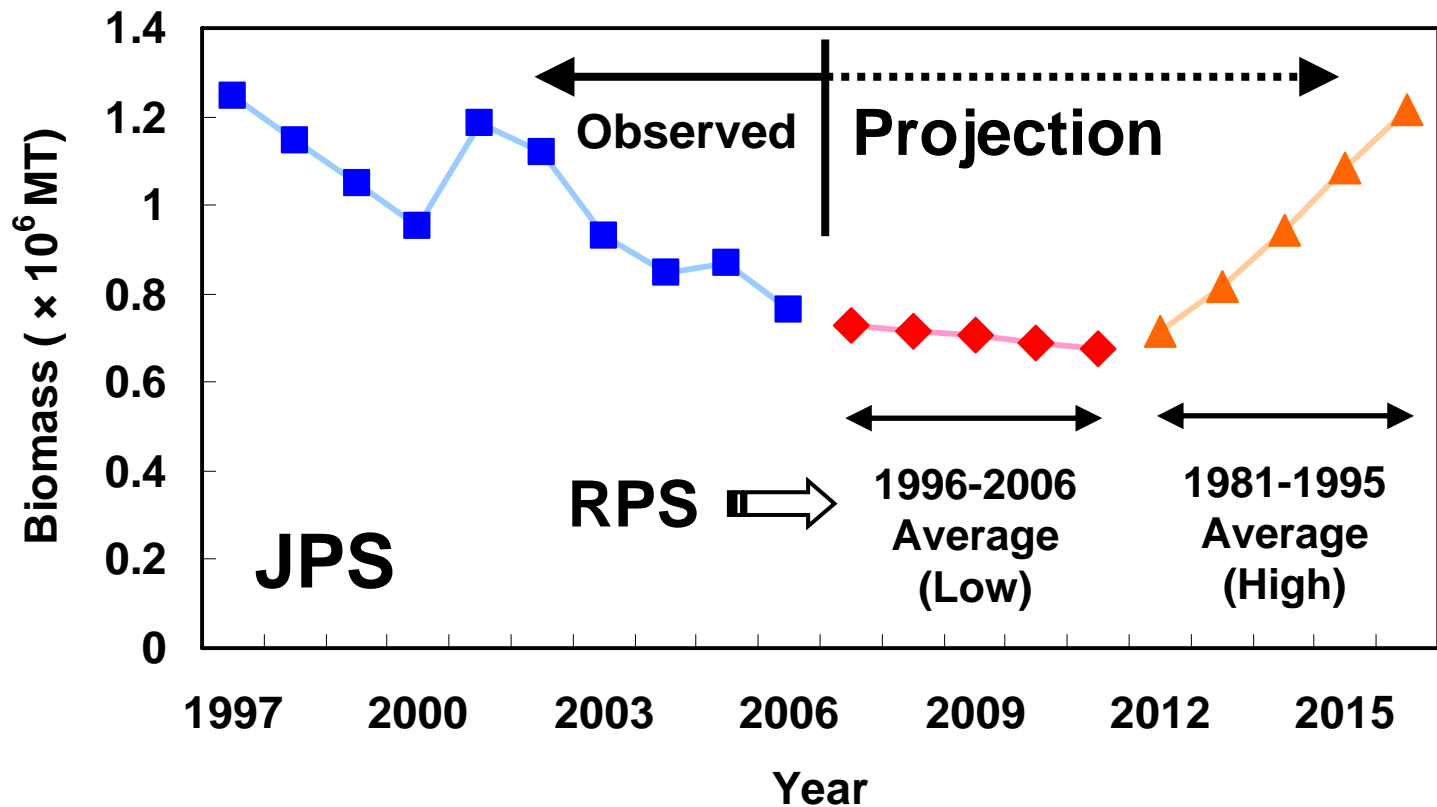
Blimit : Reference point of SSB



Management measure : Maintaining the SSB more than the Blimit by control of the catch

Projection of JPS biomass under our recommended management measure

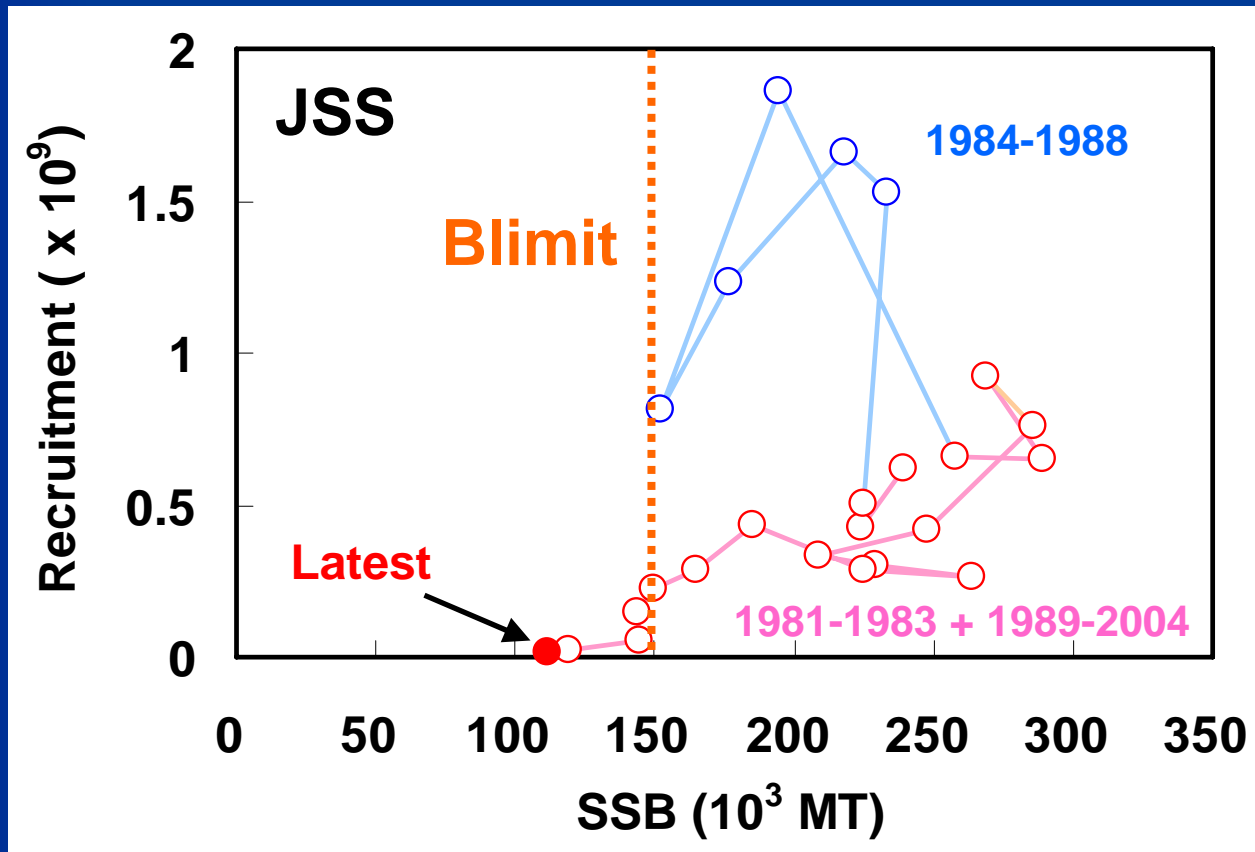
Assumption : Environments will be improved 5 years later



Stock-recruitment relationship for JSS

RPS : Slope of each plot

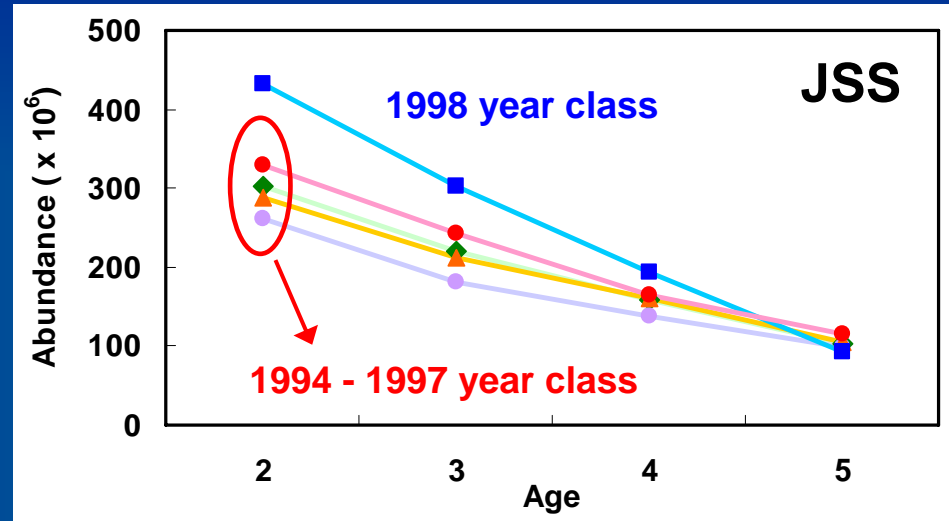
Blimit : Reference point of SSB



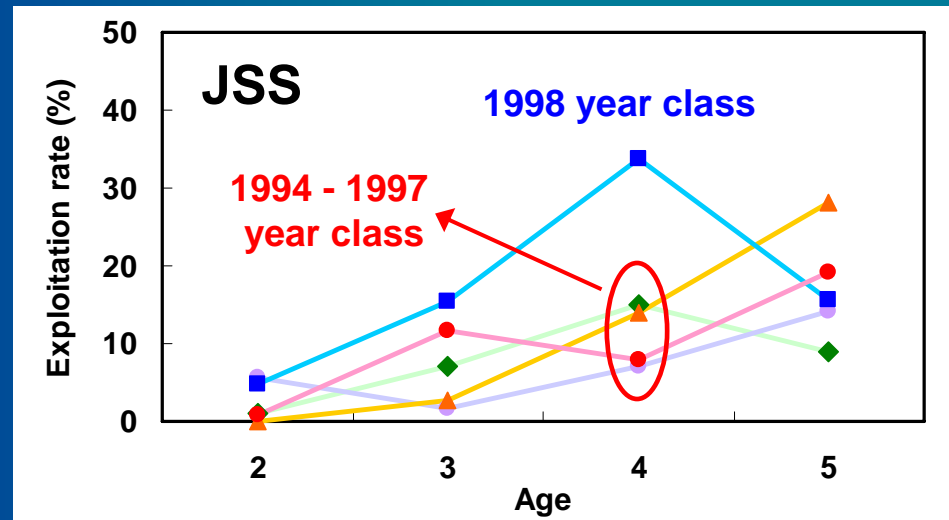
Management measure : Recovering the SSB to at least the Blimit by control of the catch

Abundance and exploitation rate of each year class of JSS

Abundance



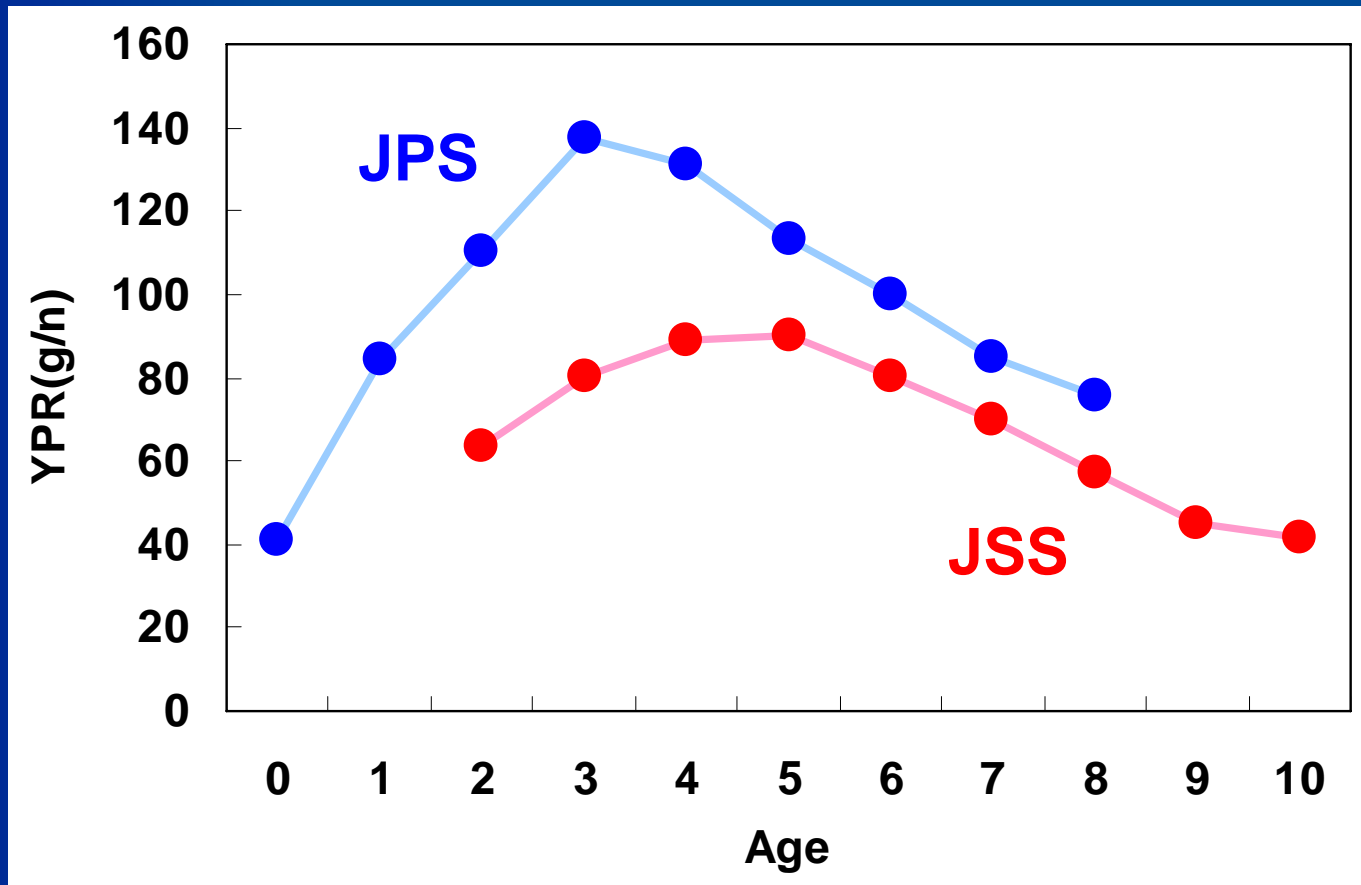
Exploitation rate



YPR for JPS and JSS

YPR : Yield per recruitment

Assumption : All fishes are harvested at given age



Summary-2

JPS

- We expect that environments will be improved in the near future.
- We recommend the management measure which aims to increase the biomass when environments will be improved.

JSS

- We don't expect that environments will be improved in the near future.
- We recommend the management measure which aims to increase the biomass even under the recent unfavorable environments.

Both stocks

- From the perspectives of rebuilding the SSB and YPR, high fishing pressure on young fish should be prohibited.