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

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larva

Age 0

Age 1~2

Age >3

Fisheries Research Agency
Introduction

Distribution of walleye pollock

Targets of this study
JPS : Japanese Pacific stock
JSS : northern Japan Sea stock

Distribution Area

Pacific Ocean

Distribution of JPS and JSS

Japan Sea

Pacific Ocean
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.
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
Recent decline in biomass
Recent poor recruitments
Recent low RPSs
Recent unfavorable environments (low February SST)

About 10 years

Recent decline in biomass
Recent decrease in recruitment
Recent fall in RPS
Recent reduction in SSB
Recent unfavorable environments (high February SST)

About 20 years
Recent rise in fishing pressure
② Practical management measures for JPS and JSS
Managed 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

- **JPS**

**Biomass (×10^6 MT)**

- **Projection**
- **Observed**

**Year**

- **1997-2006** Average
- **1981-1995** Average
  - (Low)
  - (High)
**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

![Graph showing stock-recruitment relationship for JSS](image-url)
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.