SARDINE & ANCHOVY IN ADRIATIC SEA

(BIOLOGICAL INFORMATION ON SMALL PELAGIC STOCKS RELEVANT FOR THE FORTHCOMING MANAGEMENT PLAN)

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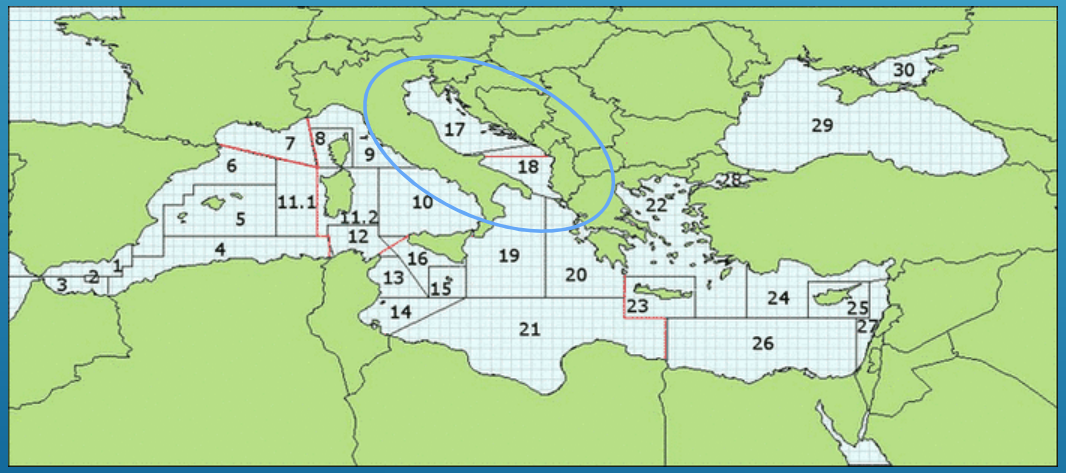
TASK:

- results of small pelagics stock assessment and benchmark;
- scientific perspective on the following aspects related to the management scenarios:

- TAC or fishing effort (including the minimum requirements of the official scientific advices needed in terms of robustness, reliability and timeliness in both options)

- separated or mixed quotas (both in terms of fishing effort or TAC)

- *Sardina pilchardus* sardine
- *Engraulis encrasicolus* anchovy
- commercially most important species in Adriatic sea (GSA 17 and 18)
- fished by Albania, Croatia, Italy, Montenegro, Slovenia
- purse seiners and pair trawlers



➢ Status of the stock → modelling

input

- number@age
- weight@age
- landing
- maturity@age
- mortality@age
- proportion of F and M before spawning

output

- spawning stock biomass
- recruitment
- fishing mortality

- F_{MYS}
- predictions

Input data (DCF EU protocol):

Fishery **dependant** information:

- from commercial catches (on board, on landing place)- biological data- length, weight, sex, maturity stage, age

- total landing data - catch and discard

number@age, weight@age, maturity@age, mortality@age

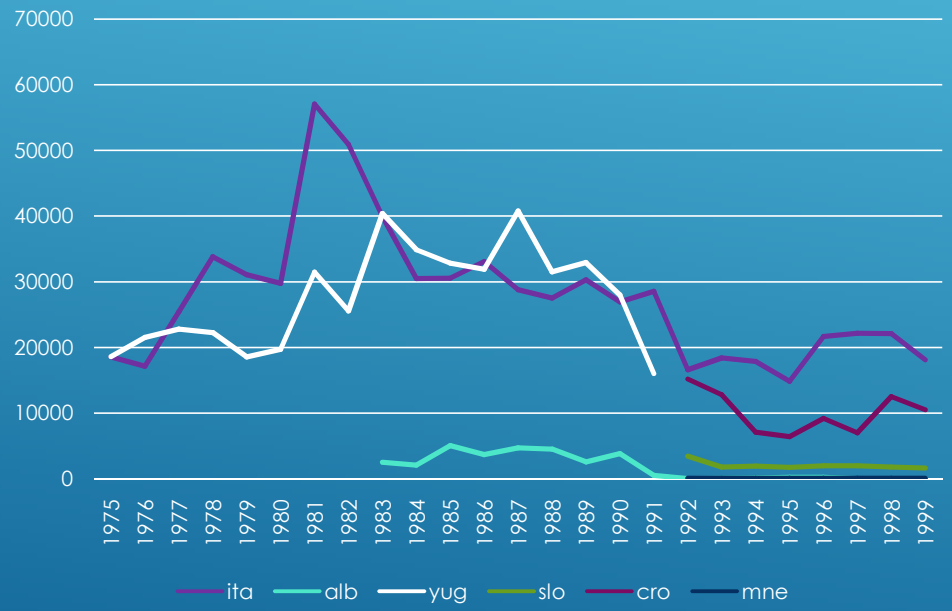
Fishery **independent** information (tunning index):

- from acoustic survey- length, weight, sex number@age, biomass index

➢ **Old** input data (1975-2018):

- landing data
- biological data

Country	Landing data	Biological data
ALB	From 1983-	2012,2013,2017, 2018
CRO	From 2000-	From 2000-
ITA	From 1975- (no 1982,1983)	1977,1978,1986,1989,1995,1996, from 2000- (ane) 1984,1988,1998, from 2000- (sar)
MNE	From 2011-	From 2007- (no 2012)
SLO	From 2006-	From 2006- (no 2009)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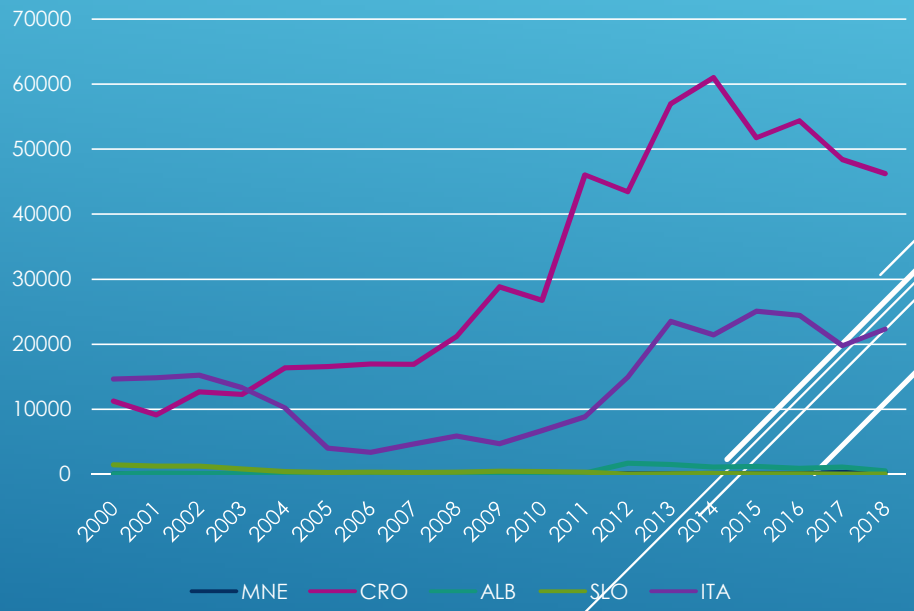
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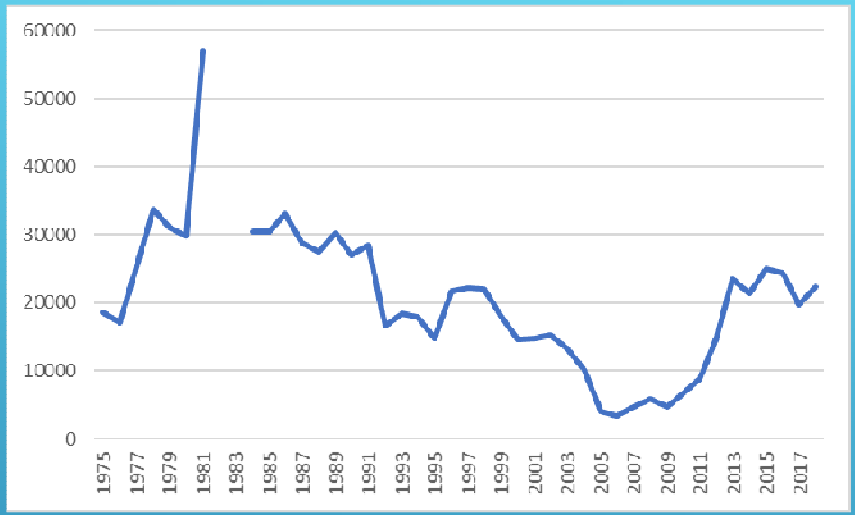
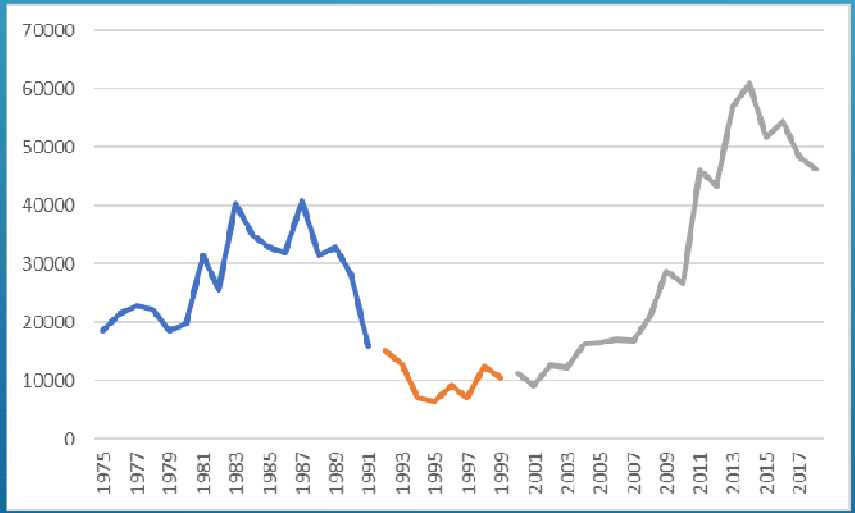
Ita- official data from 1975



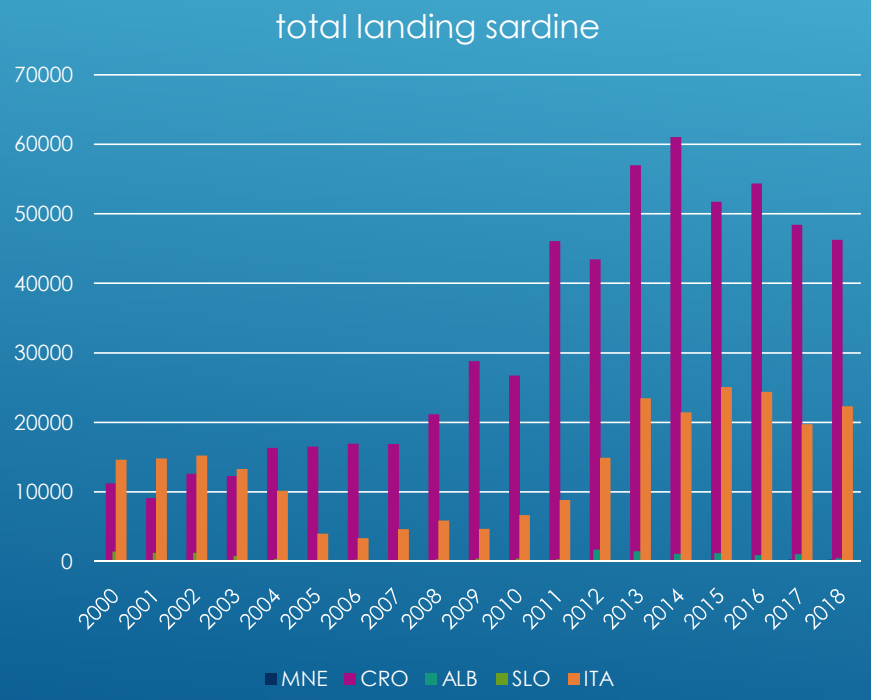
Cro- offical data from 2000. before that Yugoslavian data and „war” data

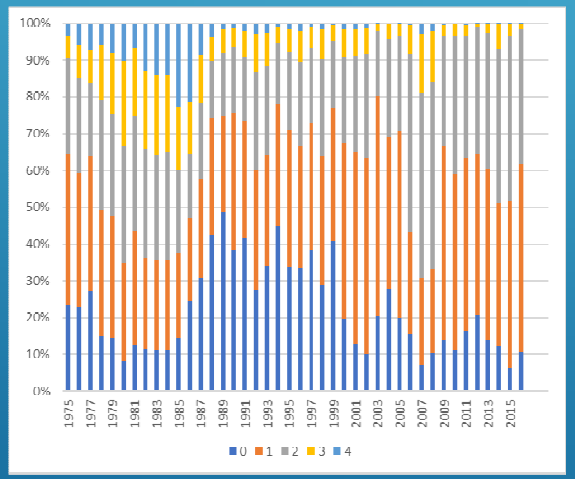


Alb, Mne and Slo data- as percentage in Cro landings from 2000-2005

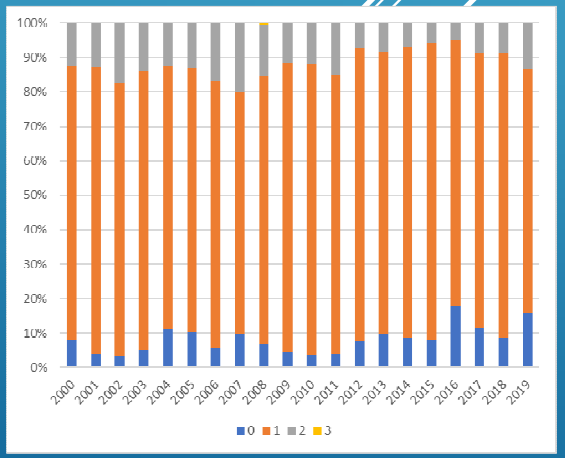
➢ **New** input data (2000-2020):

- landing data validated from each country
- biological data from each country, based on real sampling
- anchovy new age length key (ALK) in 2019 to translate number@lenght to number@age





Anchovy age structure

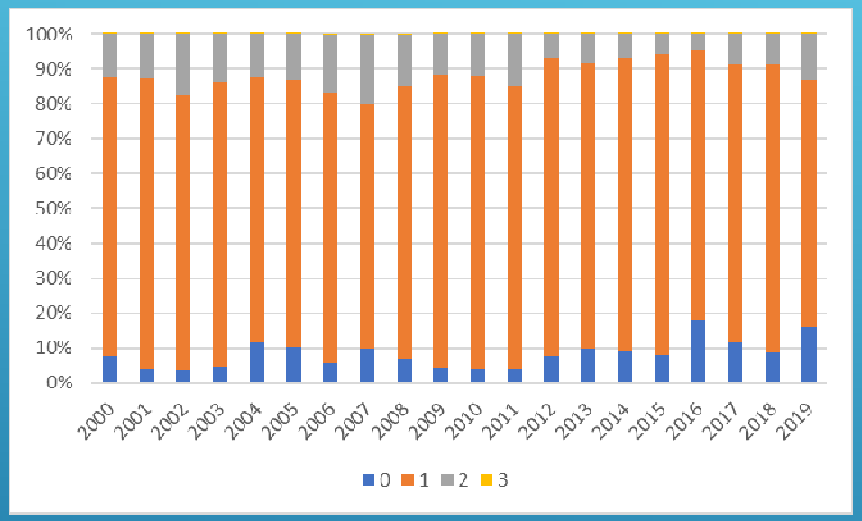


Expected differences in model outputs

shorter timeseries ➡ different perspective, different reference values

shorter lifespan for anchovy ➡ different impact of F and M

anchovy

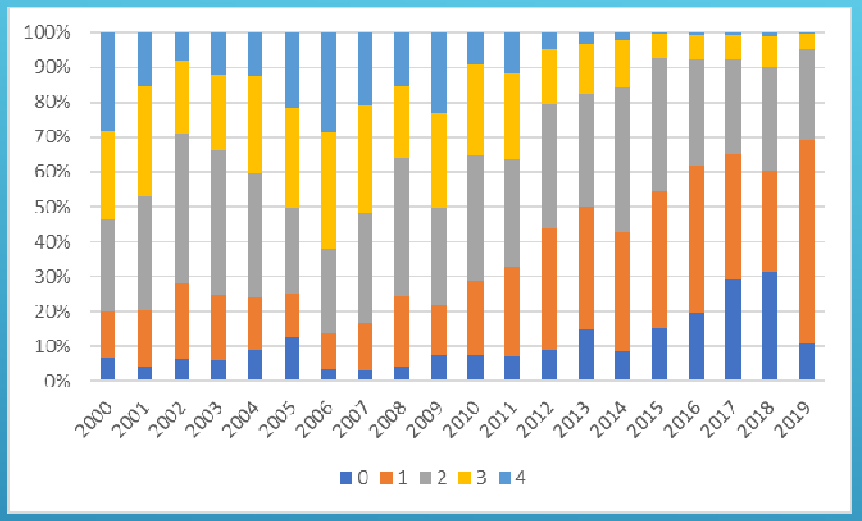


- Relatively stable relationship between older and younger individuals

Could possible lead to stable biomass

?

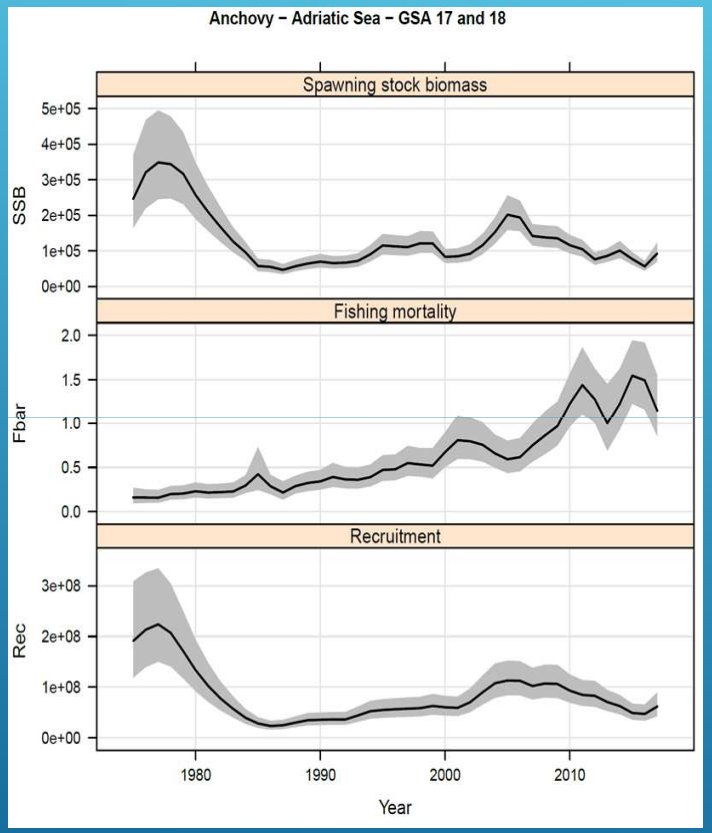
sardine



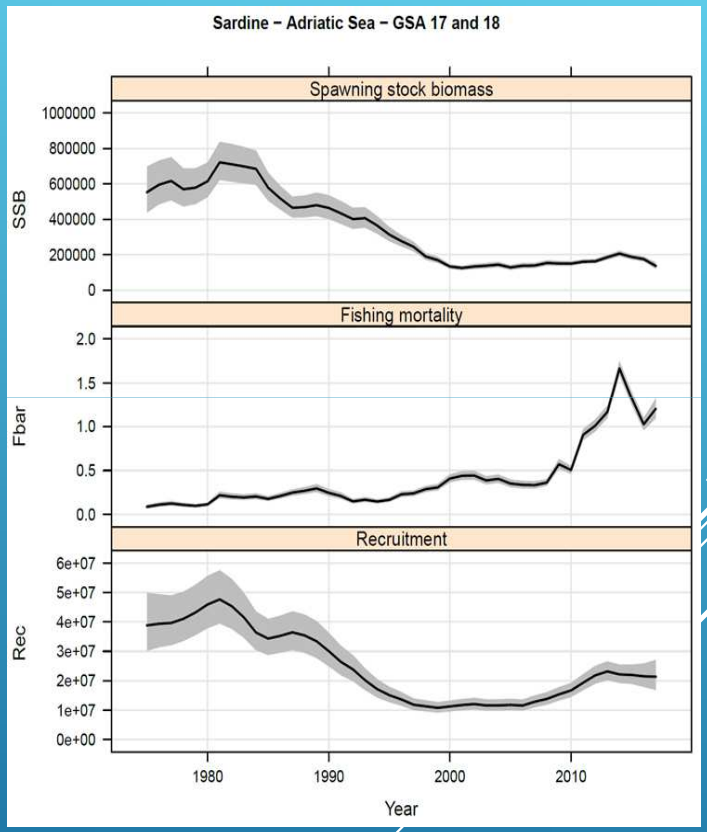
- Disappearance of older individuals in catch in last years
- Reduction in number of younger individuals in last year

Could possible lead to drop in biomass

Output from last assessment (ref.year 2018)



	anchovy	sardine
Bcur	113353	157251
Blim	*45936*	*125318*
Bpa	*91872*	*250636*
Fcur	1.075	1.529
Ecur	0.75	0.68



(new assessment is in progress, publishing at the end of year)

Short term predictions for 2021 by changing fishing effort

Anchovy

1. no fishing: SSB change +31.1%, catch change -100%
2. Status quo: SSB change -5.3%, catch change -0.4%
3. E=0.4: SSB change +6.2%, catch change -38.2%

Sardine

1. no fishing: SSB change +31.7%, catch change -100%
2. Status quo: SSB change -0.7%, catch change +11%
3. E=0.4: SSB change +16.3%, catch change -48.7%

(SSB change from 2019 to 2021, catch change from 2018 to 2021)

Fmsy

- biological reference point for fisheries management
- fishing pressure that gives the maximum sustainable yield in the long term
- overfishing means that fishing pressure (F) is higher than Fmsy (overfished/depleted means that biomass level (B) is below Bmsy)
- Aiming to reach Fmsy, by reducing fishing efford or with TAC (fishing quotas)

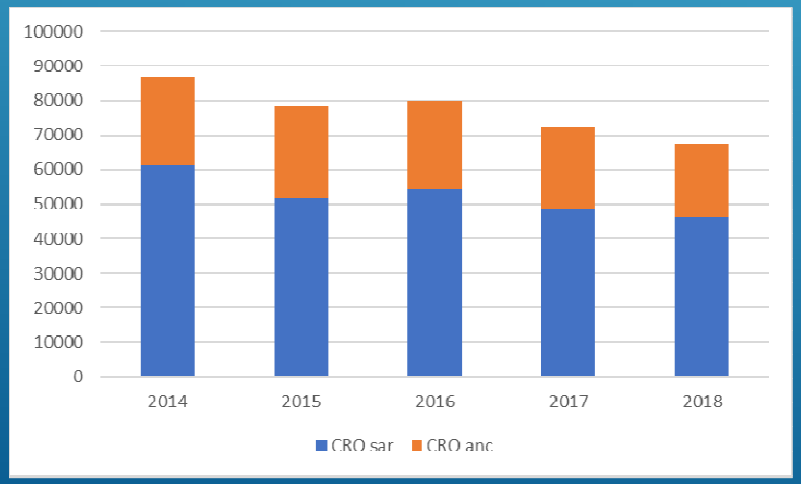
Fishing effort

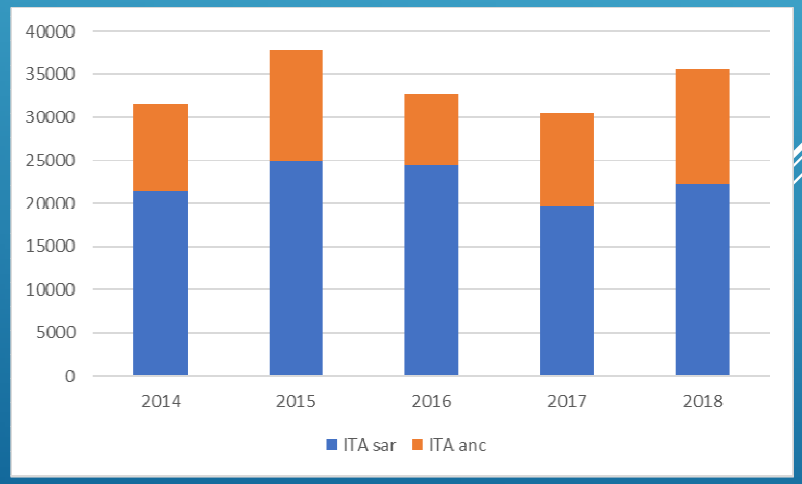
- not included as input parameter into modeling
- influence mortality of stock (along with enviroment)
- In predictions- relationship between changes in fishing effort and biomass growth

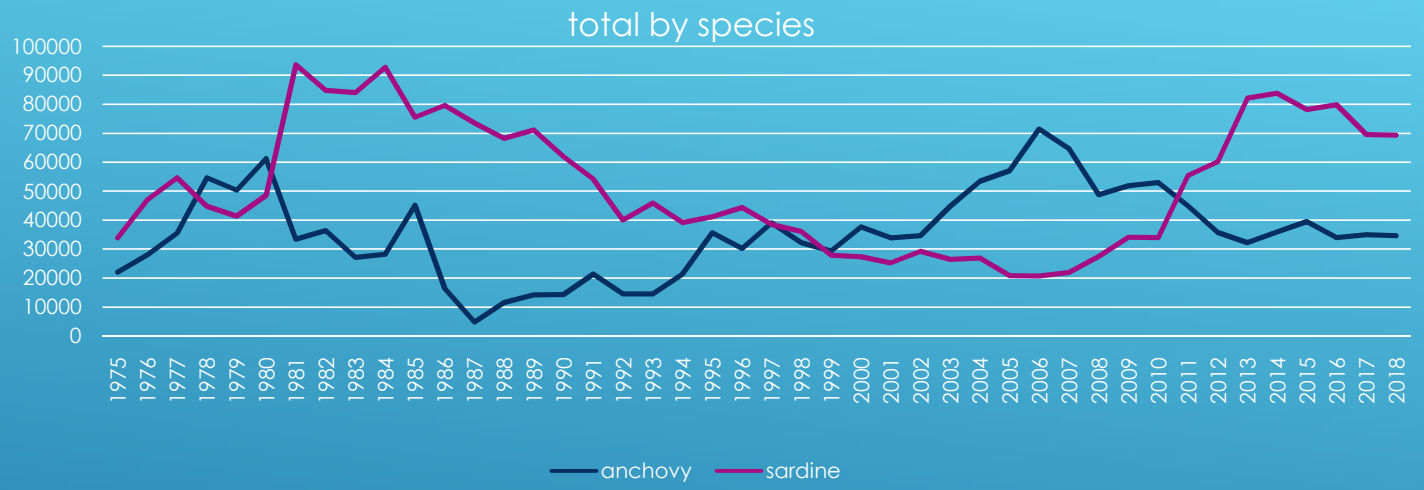
TAC (total allowable catch)

- set annually for most stocks
- based on projections to reach Fmsy
- shared between EU countries in the form of national quotas
- each stock - different allocation of percentage per country

Indirectly introduced into Adriatic Sea by GFCM managment plan- freezing catches of both species at 2014 level







- Alternations in catches, last cycle (from 2011) sardine is dominant ➡ could change in next few years

From biological perspective

One quota for both species together- mixed quota:

pro	contra
Biological alternations in biomass alowed	Models are running for each species-advice separated
Catches are mixed, reducing discarding	Lack of control over overexploitation

Separated quotas for each species:

pro	contra
Models are running for each species - advice seprated	Over-quota discarding (mixed catches)
Better control over exploitation	Changing catchabilities with fishing

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Thank you for your attention!!