FAIRSEA (ID 10046951)

"Fisheries in the AdriatIc Region - a Shared Ecosystem Approach"

D 2.4.4 Final conference

Work Package:	WP2, Communication activities Activity 2.4: Events
Type of Document	The deliverable includes the main information on the FAIRSEA Final Conference: Invitation, Description of the events, Agenda, Participant list/Signature sheets, Photos and Presentations
Use	Public
Responsible PP	PP7
Authors	Ivo Benzon - PI RERA S.D. for coordination and development of Split-Dalmatia County
Version and date	Version 01, 18/11/2011

Deliverable 2.3.1
Final conference

FAIRSEA – Fisheries in the Adriatic Region – a shared Ecosystem Approach

FAIRSEA is financed by Interreg V-A IT-HR CBC Programme (Priority Axis 1 – Blue innovation)

Start date: 01 January 2019
End date: 31 August 2021

Acronyms used

AB	Advisory Board
CFP	Common Fisheries Policy
EAF	Ecosystem Approach to Fisheries
EAFM	Ecosystem Approach to Fisheries Management
FAIRSEA	Fisheries in the AdrIatic Region – a Shared Ecosystem Approach
FS	Factsheet
JS	Joint Secretariat
KoM	Kick-off Meeting
LP	Lead Partner
MA	Managing Authority
OGS	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - OGS
PA	Partnership Agreement
PC	Project Coordinator
PM	Project Manager
PMU	Project Management Unit
PP	Project Partner
SC	Subsidy Contract
SC	Steering Committee
TC	Technical Committee
WP	Work packages

About the project

The FAIRSEA project aims at enhancing transnational capacity and cooperation in the field of an ecosystem approach to fisheries in the Adriatic region by exchanging knowledge and sharing good practices among partners. The complementary expertise of the partners is shared, interlinked and integrated, considering also challenges and opportunities identified by stakeholders. The efforts are embedded in a spatially explicit management platform that will allow to share expertise, create a common pool of knowledge, boost the operational application of the ecosystem approach to fisheries, enhance the competence in complex system dynamics, and foster a consensus on the state of the environment and fisheries in the region. The process developed in FAIRSEA will provide an opportunity to describe best practices and define guidelines for a sustainable fishery management.

Participants – organizations: 8 July 2021

Here in the table it is listed out the name of the organization to which the participants belong.
Registered participants: 33
Total users: 103

OMISSIS Participant list

FAIRSEA

Fisheries in the Adriatic Region –a shared Ecosystem Approach

FAIRSEA (ID 10046951) is financed by Interreg V-A IT-HR CBC Programme (Priority Axis 1 – Blue innovation)

Final project Conference

8 July 2021, Split (Croatia)

Cornaro Hotel, Sinjska ul 6,

Split& ONLINE

Agenda

8th July 2021 (9:00-17:30)

9.00-10.00 Opening, welcome by host (IZOR/IOF), Institutional welcome, JS/MA welcome,Introduction to FAIRSEA (OGS)

Session 1: Building blocks for the EAF in the Adriatic Sea (10:00-11:45)

10:00-10:15 Current and future projections of the Adriatic Ionian system state and variability(Marco Reale et al., OGS) IN PERSON

10:15-10:30 Standardizing fishery independent trawl survey data (Giulia Cipriano, CONISMA;Walter Zupa, COISPA; et al.) ONLINE

10:30-10:45 Analysing VMS shared data (Tommaso Russo et al., Univ. Tor Vergata)

10:45-11:15 coffee break

Session 2: Scientific Tools for an EAF in Adriatic sea (11:15-12:00)

11:15-11:30 Bio-economic modelling: hindcasting trajectories with BEMTOOL model (IsabellaBitetto et al., COISPA) ONLINE

11:30-11:45 Data integrated into the food web modelling (Igor Celic et al.; OGS) IN PERSON

11:45-12:00 Detecting hot spots for demersal species in current and future oceanographicconditions (Diego Panzeri et al., OGS) IN PERSON

session 3: Participatory tools in FAIRSEA (12:00-12:45)

12:00-12:10 Participatory process implementation and results (MEDAC) ONLINE

12:10-12:30 Increasing awareness: tools and results (Tea Kuzmičić Rosandić, SUNCE) IN PERSON

12:20-12:45 Increased skills and capacities on EAF through FAIRSEA advanced schools (SvjetlanaKrstulović Šifner, UNIST) IN PERSON

session 4: Evaluating management strategies in the EAF context (14:00-15:30)

14:00-14:15 Pilot studies: Istra, Veneto, Marche (MPS, VEGAL, ASSAM) IN PERSON MPS;ASSAM online, VEGAL IN PERSON

14:15-14:30 Bio-economic evaluation of alternative management scenarios with BEMTOOL(Maria Teresa Spedicato et al. COISPA) ONLINE

14:30-14:45 Scenarios of alternative management with ECOSPACE (Natalia Serpetti et al., OGS)IN PERSON

14:45-15:00 Scenarios of alternative management with SMART (Tommaso Russo et al., UNI TorVergata) ONLINE

15:00-15:15 The FAIRSEA Integrated platform for EAF (Francesco Masnadi et al., CNR-IRBIM)IN PERSON

15:15-15:30 Discussion moderated by CNR

15:30-16:00 coffee break

session 5: Interacting with other projects for finding next steps for an EAF implemented(16:00-17:30)

Round table ONLINE with representatives of related projects of Axis 1 - Blue Innovation in thearea:

PRIZEFISH (Alessia Cariani & Luca Mulazzani, University of Bologna), ADRISMARTFISH (Francesco Cavraro, University of Venice), ITACA (Marco Spinadin, Confcooperative Veneto),SUSHIDROP (Luca De Marchi, University of Bologna).

. Weaknesses, linkages, opportunities and how we can see the next future.

17:30 closure of the event and drink together

About the final conference

The final conference held on July 8 2021 in Split began with an introductory speech by the host, the Institute of Oceanography and Fisheries.

At the very beginning we were approached by Marco Reale, OGS who presented Current and future projections of the Adriatic Ionian system state and variability.

Giuliano Cipriano, CONISMA and Walter Zupa, COISPA participated online conferences, and presented the Standardization of Independent Fishing Trap Data.

Tommaso Russo shared Analyzing VMS shared data with conference participants.

After a short break by COISPA representatives, Isabella Bitetto presented Bioeconomic Modeling: A Backward Trajectory with the BEMTOOL Model.

Igor Celic from OGS shared with the participants data integrated into food web modeling.

Tea Kuzmičići Rosandić from SUNCE presented Awareness Raising: Tools and Results.

Svjetlana Krstulović Šifner from UNIST introduced increased skills and capacities at EAF through FAIRSEA advanced schools. The presentation was related to FAIRSEA activity 3.3. Improving the technical capacity for access to the Fisheries Ecosystem (EAF) under WP3 Mapping, benchmarking, sharing and improving the capacity of the EAF. Within this activity two schools were organized: the first one held in 2019 in Venice called Single and Multispecies approaches for data rich and data limited conditions, and the second one held in 2021 entitled Multidisciplinary ecosystem management approaches using spatial modeling with addressing socio-economic and environmental. The two schools were organized by OGS and UNIST, respectively. The presentation deals with all the aspects of the organization and implementation of this activity with explanations on how Advanced schools contributed to the Project objectives. Moreover, the programs, lectures, worldwide geographical representation of students, challenges of the organization of the Second school in hybrid mode (in person and online), and the results of the student evaluations for both schools were presented. Istria, Veneto, Marche and VEGAL and ASAM presented Pilot studios.

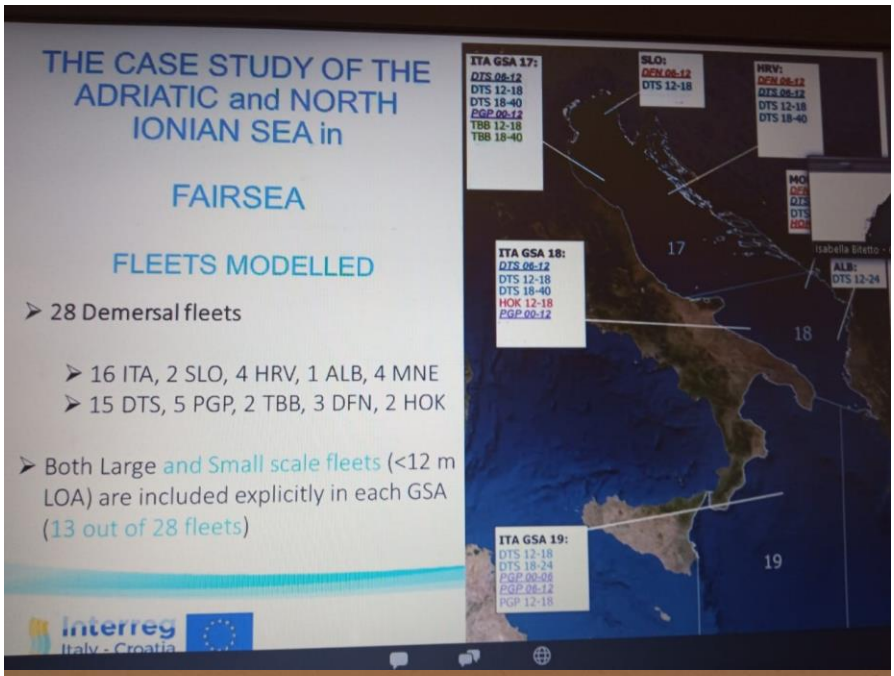
Maria Teresa Spedicato from COISPA gave a lecture on Bio-economic evaluation of alternative management scenarios with BEMTOO.

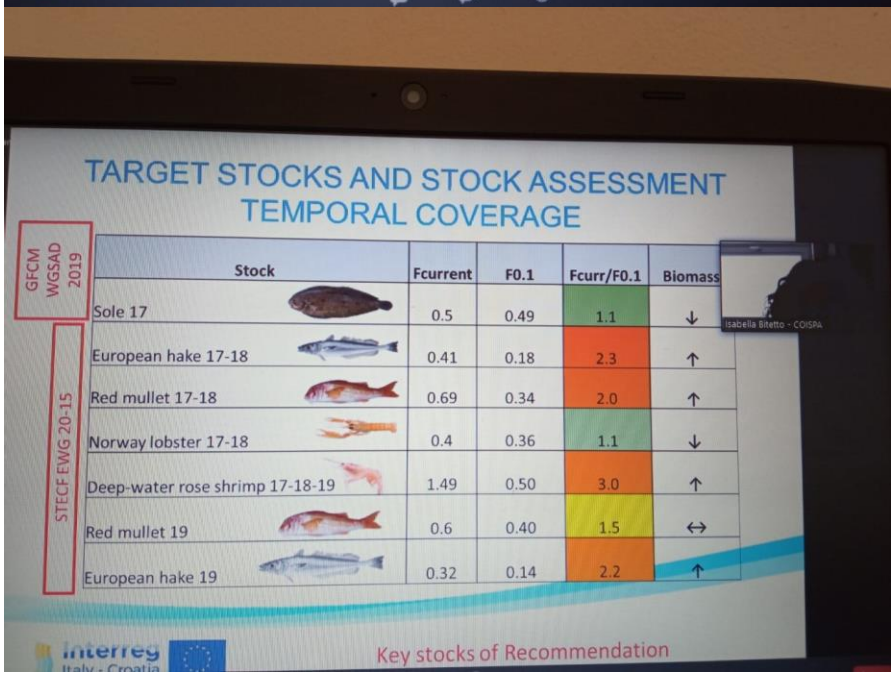
Natalia Serpetti from OGS presented scenarios of alternative management with ECOSPACE, and Tommaso Russo presented scenarios of alternative management with ECOSPACE.

At the very end of the conference, interaction was held with other projects to find the next steps for the implemented EAF.

A round table was held with representatives of related projects Axis 1 - Blue Innovation in the field of: PRIZEFISH (Alessia Cariani & Luca Mulazzani, University of Bologna), ADRISMARTFISH (Francesco Cavraro, University of Venice), ITACA (Marco Spinadin, Confcooperative Veneto), SUSHIDROP (Luca De Marchi, University of Bologna).

Photo

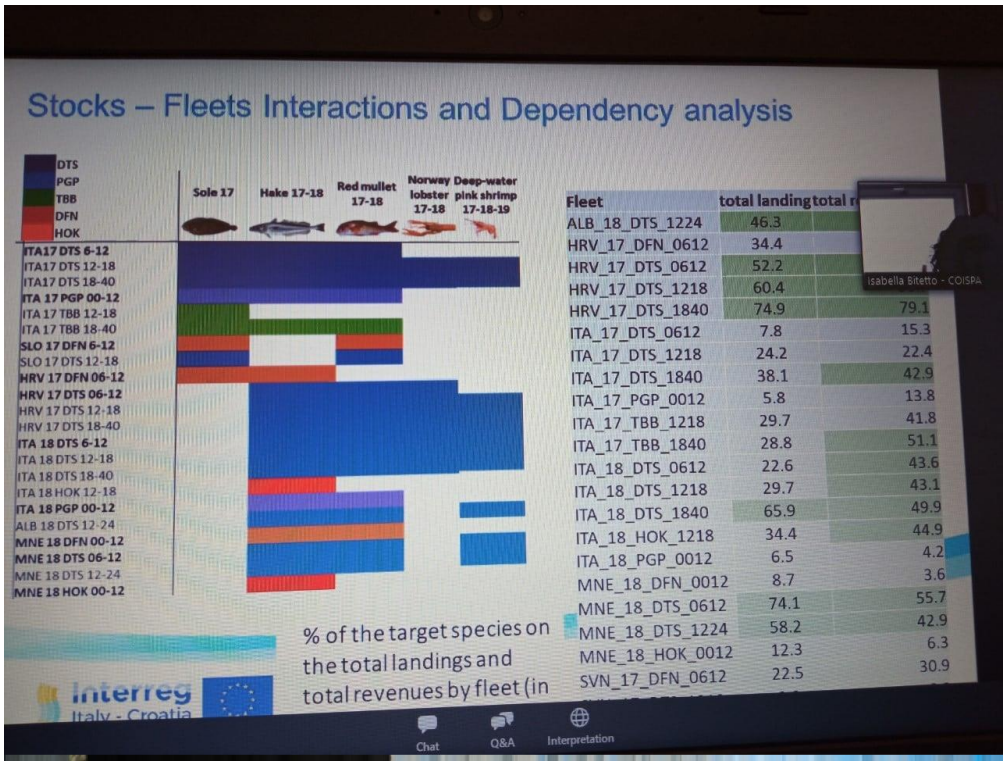

THE CASE STUDY OF THE ADRIATIC and NORTH IONIAN SEA in
FAIRSEA
FLEETS MODELLED
28 Demersal fleets
16 ITA, 2 SLO, 4 HRV, 1 ALB, 4 MNE
15 DTS, 5 PGP, 2 TBB, 3 DFN, 2 HOK
Both Large and Small scale fleets (<12 m LOA) are included explicitly in each GSA (13 out of 28 fleets)
ITA GSA 17:
DTS 06-12
DTS 12-18
DTS 18-40
PGP 00-12
TBB 12-18
TBB 18-40
SLO:
DFN 06-12
DTS 12-18
HRV:
DFN 06-12
DTS 06-12
DTS 12-18
DTS 18-40
ITA GSA 18:
DTS 06-12
DTS 12-18
DTS 18-40
HOK 12-18
PGP 00-12
ALB:
DTS 12-24
ITA GSA 19:
DTS 12-18
DTS 18-24
PGP 00-06
PGP 06-12
PGP 12-18
17
18
19
interreg

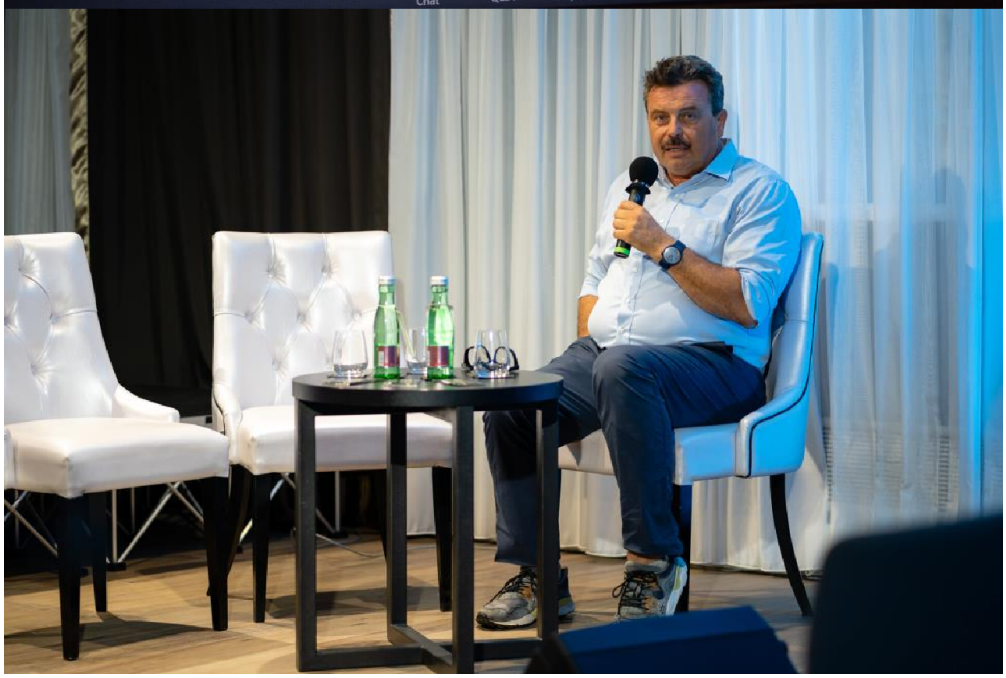

TARGET STOCKS AND STOCK ASSESSMENT TEMPORAL COVERAGE
GFCM WGSAD 2019
STECF EWG 20-15
Stock
Fcurrent
F0.1
Fcurr/F0.1
Biomass
Sole 17
0.5
0.49
1.1
European hake 17-18
0.41
0.18
2.3
Red mullet 17-18
0.69
0.34
2.0
Norway lobster 17-18
0.4
0.36
1.1
Deep-water rose shrimp 17-18-19
1.49
0.50
3.0
Red mullet 19
0.6
0.40
1.5
European hake 19
0.32
0.14
2.2
Isabella Bitetto - COISPA
Key stocks of Recommendation
interreg

Speaker: Diego Panzeri (OGS)

Speaker: Svjetlana Krstulović Šifner (UNIST)

Speaker: top - moderator; bottom – Igor Celic (OGS)


Stocks – Fleets Interactions and Dependency analysis
DTS
PGP
TBB
DFN
HOK
Sole 17
Hake 17-18
Red mullet 17-18
Norway lobster 17-18
Deep-water pink shrimp 17-18-19
ITA17 DTS 6-12
ITA17 DTS 12-18
ITA17 DTS 18-40
ITA 17 PGP 00-12
ITA 17 TBB 12-18
ITA 17 TBB 18-40
SLO 17 DFN 6-12
SLO 17 DTS 12-18
HRV 17 DFN 06-12
HRV 17 DTS 06-12
HRV 17 DTS 12-18
HRV 17 DTS 18-40
ITA 18 DTS 6-12
ITA 18 DTS 12-18
ITA 18 DTS 18-40
ITA 18 HOK 12-18
ITA 18 PGP 00-12
ALB 18 DTS 12-24
MNE 18 DFN 00-12
MNE 18 DTS 06-12
MNE 18 DTS 12-24
MNE 18 HOK 00-12
Fleet
total landing
ALB_18_DTS_1224 46.3
HRV_17_DFN_0612 34.4
HRV_17_DTS_0612 52.2
HRV_17_DTS_1218 60.4
HRV_17_DTS_1840 74.9 79.1
ITA_17_DTS_0612 7.8 15.3
ITA_17_DTS_1218 24.2 22.4
ITA_17_DTS_1840 38.1 42.9
ITA_17_PGP_0012 5.8 13.8
ITA_17_TBB_1218 29.7 41.8
ITA_17_TBB_1840 28.8 51.1
ITA_18_DTS_0612 22.6 43.6
ITA_18_DTS_1218 29.7 43.1
ITA_18_DTS_1840 65.9 49.9
ITA_18_HOK_1218 34.4 44.9
ITA_18_PGP_0012 6.5 4.2
MNE_18_DFN_0012 8.7 3.6
MNE_18_DTS_0612 74.1 55.7
MNE_18_DTS_1224 58.2 42.9
MNE_18_HOK_0012 12.3 6.3
SVN_17_DFN_0612 22.5 30.9
Isabella Bitetto - COISPA
% of the target species on the total landings and total revenues by fleet (in
Chat
Q&A
Interpretation



Speaker: bottom – Natalia Serpetti (OGS)

Speaker: top – Simone Libralato (OGS)

Speaker: top – Danijela Mioković; bottom – Tea Kuzmičić Rosandić (SUNCE)

Speaker: top – Simone Libralato (OGS) and Nego Vrgoč (IOF); bottom – Simone Libralato (OGS)

Speaker: Natalia Serpetti (OGS)

Promotion on the Croatian TV channel HRT1: TV show MORE (minute 12”)
https://www.youtube.com/watch?v=RpQ7VQe53Js

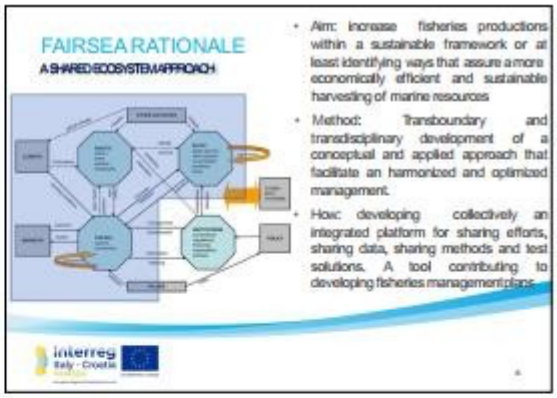
Q & A

Synergy projects PRIZEFISH & FAIRSEA. A working example
How to exploit the potential of ecological, economic and social sustainability in Adriatic fisheries?
Live Questions & Answers from Luca Mulazzani (UNIBO - fisheries economist) to a PO Representative (OP BIVALVIA - Mauro Vio).

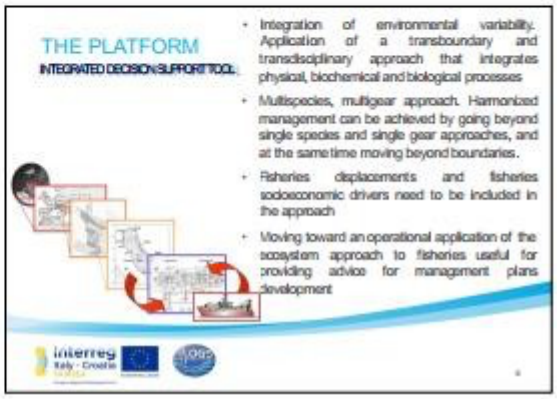
1) Clam management is characterised by the existence of COGEMO or COGEVO consortia. Many of the people who listen to us may think that this is a very special fishery, whose successes can hardly be generalized to other types where consortia do not exist. I ask you: what kind of relations (formal and informal) exist between OP Bivalvia and the COGEVO of Veneto? In what way are COGEVO important for the efficient operation of the OP? And so, if absurdly no longer existed the COGEVO, what should be the functions that the OP should incorporate? Do you think it would be feasible?
2) How are the daily quantities that each vessel of the PO fishes decided on? Is it based only on biological parameters (ie how much resource is at sea) or depends on the orders received from your customers? And the price that will be paid to individual fishermen is already known when he goes to sea or will only be after landing the clams?
3) Could you describe what kind of bargaining takes place on a daily basis between the PO and the different customers? Does the PO have any way of affecting the price, for example by limiting the quantities fished, or is the price decided exclusively by the buyers?
4) We know that OP Bivalvia is a cooperative, so members during the assembly have to take important decisions on how to divide the company's profits between rebates and investments. Without going into too much detail, could you tell us what kind of choices the cooperative takes on average in terms of investment?
5) Veneto clams are the first product in the whole Mediterranean to have obtained the MSC certification. What would you balance the costs and benefits of this operation? Do your customers value this certification or has the price of your clams remained almost unchanged?
6) You have invested a lot to add value to your product. You have freezing implants, and now you're thinking about new forms of transformation. What are the advantages of being able to sell processed products as well as fresh products?
7) You have recently started selling products through social networks and distributing them door-to-door. For a big company like yours, it looks like a marginal business. What do you think of the prospects for this form of sales and distribution?

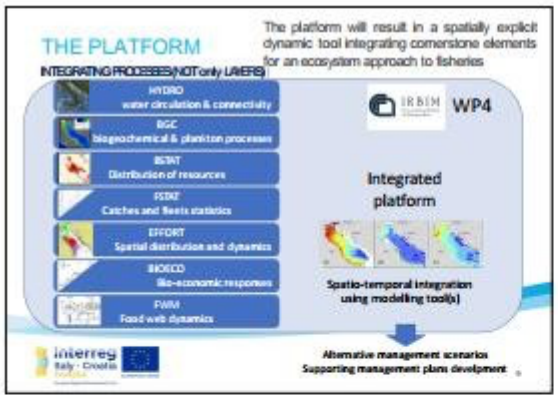
Presentations


BACKGROUND
ECOSYSTEM APPROACH TO FISHERIES
translate the economic, social and ecological policy goals and aspirations of sustainable development of EAF into operational objectives, indicators and performance measures (FAO guidelines)
INSEPARABLE
"Clearly, economic and social objectives [of fisheries] will not be met while a stock is in such a depleted state that the long-term sustainability of the fishery is threatened, but equally, biological objectives are unlikely to be met without consideration being given to economic and social objectives." Beddington et al., 2007, Science


FAIRSEA RATIONALE
A SHARED ECOSYSTEM APPROACH
Aim: increase fisheries productions within a sustainable framework or at least identifying ways that assure a more economically efficient and sustainable harvesting of marine resources
Method: Transboundary and transdisciplinary development of a conceptual and applied approach that facilitate an harmonized and optimized management.
How: developing collectively an integrated platform for sharing efforts, sharing data, sharing methods and test solutions. A tool contributing to developing fisheries management plans


FAIRSEA GENERAL OBJECTIVES
DEVELOP INTEGRATED UNDERSTANDING
Develop a spatially explicit science-based shared integrated platform that will constitute an innovative and applied framework in the Adriatic region for management and planning management. The platform that will allow to share expertise, create a common pool of knowledge, boost the operational application of the ecosystem approach to fisheries, enhance the competence in complex system dynamics, foster a consensus on the state of the environment and fisheries in the region, evaluate management alternatives to support management plans.
Enhancing transnational capacity and cooperation in the field of an ecosystem approach to fisheries in the Adriatic region by exchanging knowledge and sharing good practices among partners and beyond. The best way to reach sustainability, in fact, is to ensure stakeholders' participation in the process that requires time, trust, transparency and efficient steering.


THE PLATFORM
INTEGRATED DECISION SUPPORT TOOL
Integration of environmental variability. Application of a transboundary and transdisciplinary approach that integrates physical, biochemical and biological processes
Multispecies, multigear approach. Harmonized management can be achieved by going beyond single species and single gear approaches, and at the same time moving beyond boundaries.
Fisheries displacements and fisheries socioeconomic drivers need to be included in the approach
Moving toward an operational application of the ecosystem approach to fisheries useful for providing advice for management plans development

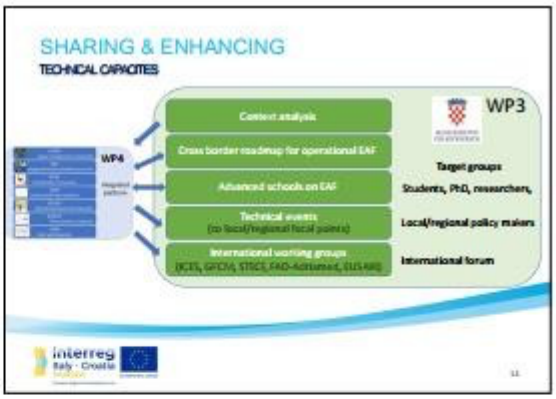

THE PLATFORM
The platform will result in a spatially explicit dynamic tool integrating cornerstone elements for an ecosystem approach to fisheries
HYDRO
water circulation & connectivity
BGC
biogeochemical & plankton processes
BSTAT
Distribution of resources
FSTAT
Catches and fleets statistics
EFFORT
Spatial distribution and dynamics
BIOECO
Bio-economic responses
FWM
Food web dynamics
WP4
Integrated platform
Spatio-temporal integration using modelling tool(s)
Alternative management scenarios
Supporting management plans development


A QUANTITATIVE
The main result of FAIRSEA will be the development of an INTEGRATED PLATFORM FOR A QUANTITATIVE ECOSYSTEM APPROACH TO FISHERIES that goes across territorial boundaries and involves several disciplines.
FAIRSEA
PLATFORM
objectives


IVORY TOWER?
NO PARTECIPATORY APPROACH
Developing the platform also through (your) involvement as a way to:
Share objectives to reduce the risk to make something useless;
Identify the perceived important factors to be embedded;
Decide together scenarios to test;
Evaluate results

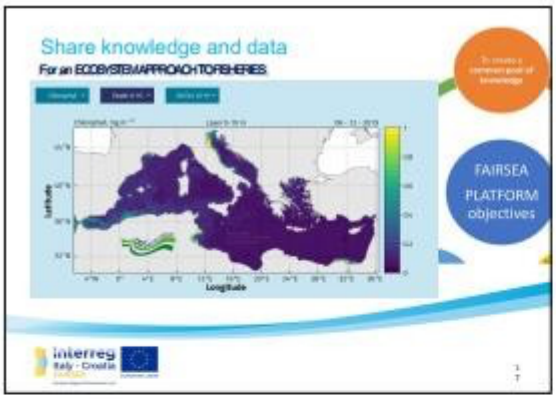

PARTECIPATORY APPROACH
The platform development can be a mutual occasion
MUTUAL BENEFIT
FAIRSEA workplan
Jan 2019
Jan 2020
Jan 2021
Inputs on:
- General objectives
- management scenarios
- Indicators to evaluate
Drafting management scenarios
Quantitative ranking of indicators
Evaluating scenarios and tool produced
STAKEHOLDERS

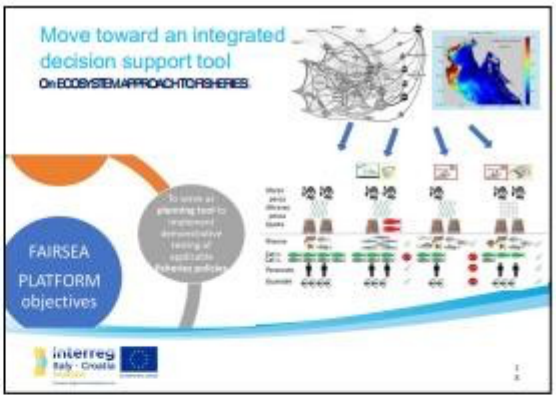

STAKEHOLDER ENGAGEMENT
to ensure stakeholders' participation (two ways) in the process
TOWARDA DECISION SUPPORT SYSTEM
WP5
WP4
Stakeholder events
Pilot actions
Scenarios of policy application
Best practices and guidelines
Fishermen and all range of stakeholders
Local/regional policy makers
International forums
Target groups
MEDAC


SHARING & ENHANCING
TECHNICAL CAPACITES
WP4
WP3
Context analysis
Cross border roadmap for operational EAF
Advanced schools on EAF
Technical events
International working groups
Target groups
Students, PhD, researchers,
Local/regional policy makers
International forum


GENERAL STRUCTURE
Managing, coordinating and communicating the project
WP1- Management & Coordination
WP2- Communication
WP5
WP4
WP5
MEDAC


A QUANTITATIVE
The main result of FAIRSEA will be the development of an INTEGRATED PLATFORM FOR A QUANTITATIVE ECOSYSTEM APPROACH TO FISHERIES that goes across territorial boundaries and involves several disciplines.
FAIRSEA
PLATFORM
objectives


Share knowledge and data
For an ECOSYSTEM APPROACH TO FISHERIES
FAIRSEA
PLATFORM
objectives


Move toward an integrated
decision support tool
On ECOSYSTEM APPROACH TO FISHERIES
FAIRSEA
PLATFORM
objectives


Increasing public awareness
On fisheries issues
FAIRSEA
PLATFORM
objectives


Develop tools for discussion
On ECOSYSTEM APPROACH TO FISHERIES
FAIRSEA
PLATFORM
objectives


Increasing capacities
On ECOSYSTEM APPROACH TO FISHERIES
FAIRSEA
PLATFORM
objectives


Partecipatory approach
On ECOSYSTEM APPROACH TO FISHERIES
FAIRSEA
PLATFORM
objectives


THANKS for the attention
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS
(National Institute of Oceanography and Applied Geophysics - OGS)
Section Oceanography
ECHO Group Ecology and Computational Hydrodynamics in Oceanography
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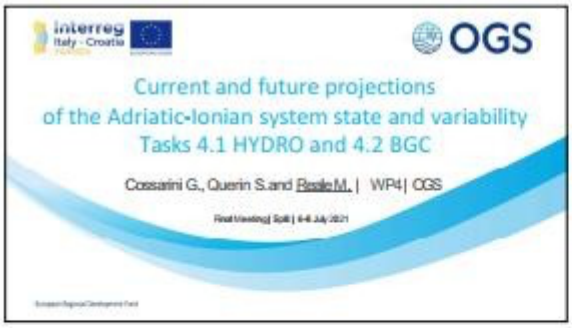
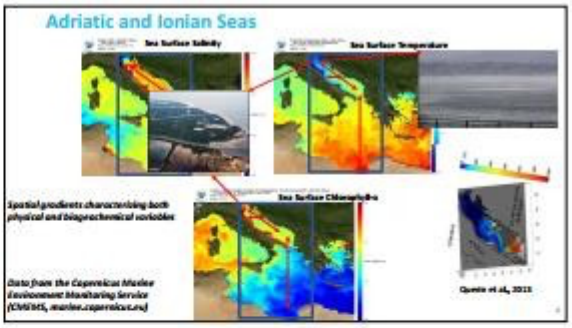
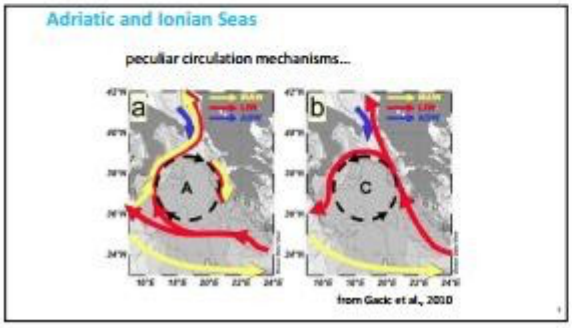
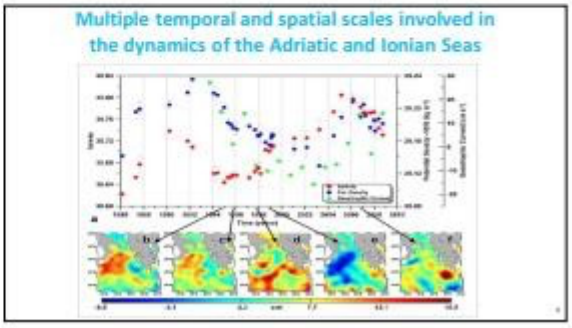
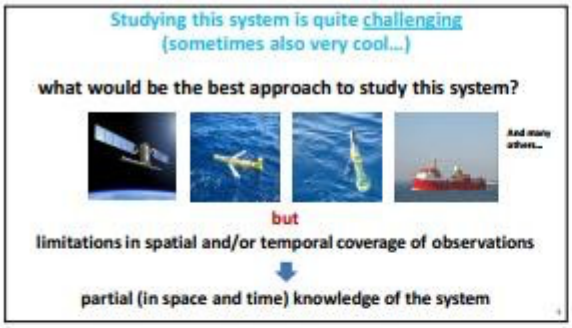
www.italy-croatia.eu/fairsea

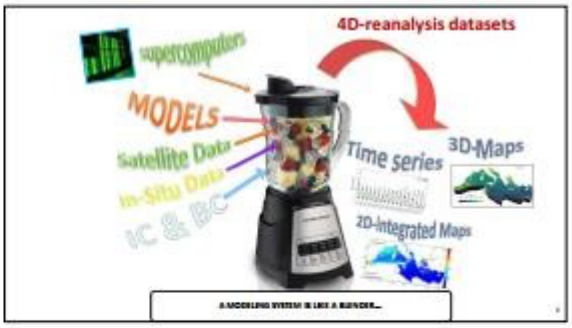

OGS
Current and future projections
of the Adriatic-Ionian system state and variability
Tasks 4.1 HYDRO and 4.2 BGC
Cossarini G., Querin S.and Reale M. | WP4| OGS

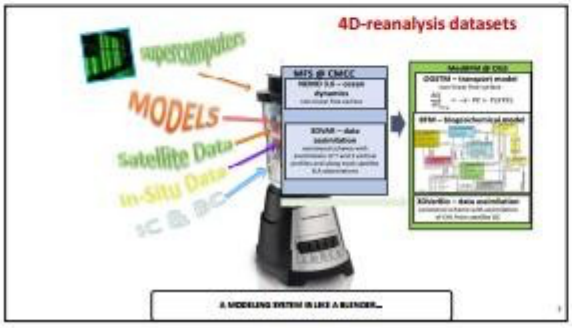

Adriatic and Ionian Seas

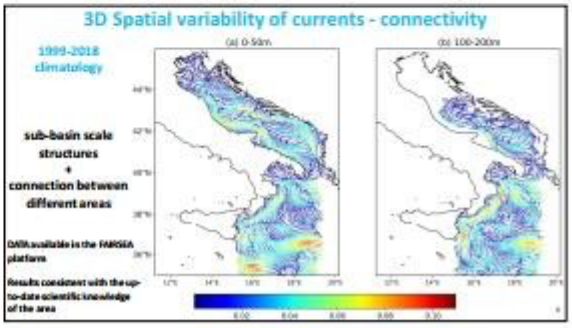

Adriatic and Ionian Seas
peculiar circulation mechanisms...
a
b
A
C
from Gacic et al., 2010

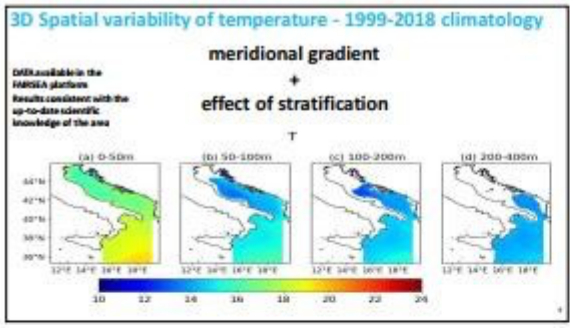

Multiple temporal and spatial scales involved in
the dynamics of the Adriatic and Ionian Seas

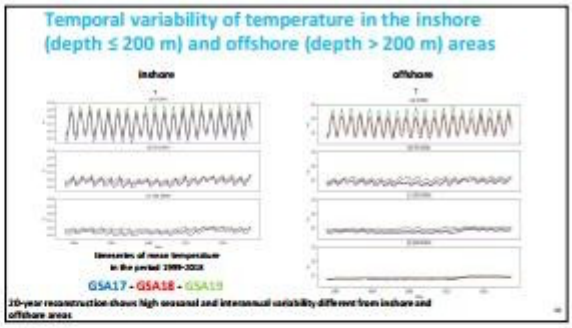

Studying this system is quite challenging
(sometimes also very cool...)
what would be the best approach to study this system?
And many others...
but
limitations in spatial and/or temporal coverage of observations
partial (in space and time) knowledge of the system

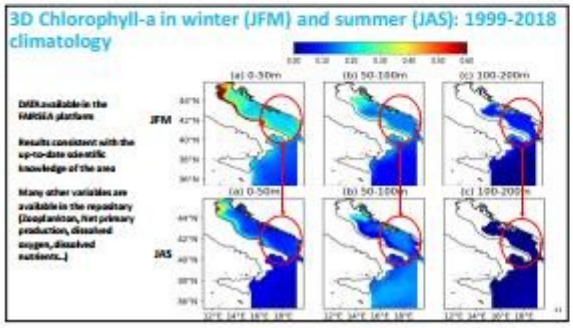

4D-reanalysis datasets
supercomputers
MODELS
Satellite Data
In-Situ Data
IC & BC
Time series
3D-Maps
2D-Integrated Maps

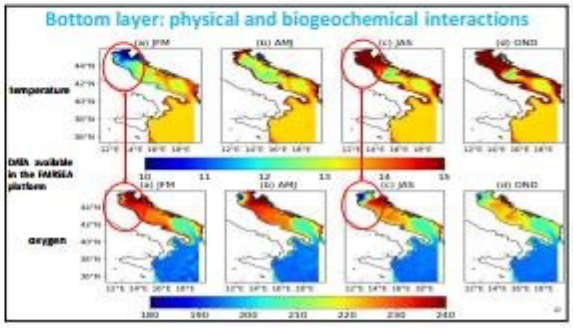

4D-reanalysis datasets
supercomputers
MODELS
Satellite Data
In-Situ Data
IC & BC

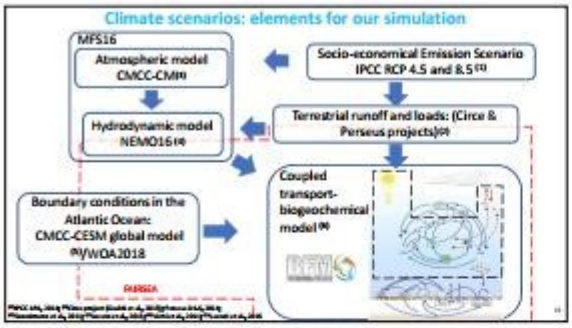

3D Spatial variability of currents - connectivity
1999-2018
climatology
sub-basin scale structures
+
connection between different areas
DATA available in the FAIRSEA platform
Results consistent with the up-to-date scientific knowledge of the area

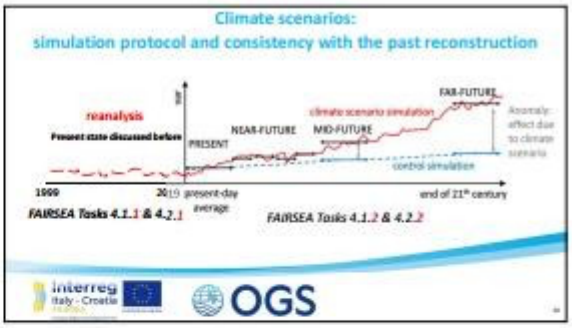

3D Spatial variability of temperature - 1999-2018 climatology
meridional gradient
+
effect of stratification
T
(a) 0-50m
(b) 50-100m
(c) 100-200m
(d) 200-400m

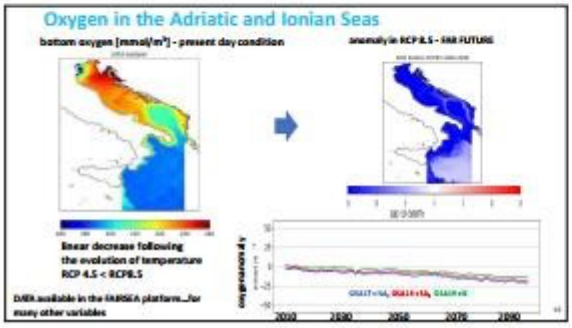

Temporal variability of temperature in the inshore (depth ≤ 200 m) and offshore (depth > 200 m) areas
inshore
offshore
GSA17 - GSA18 - GSA19

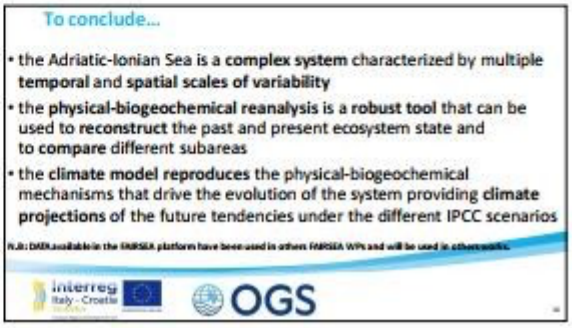

3D Chlorophyll-a in winter (JFM) and summer (JAS): 1999-2018 climatology
JFM
JAS
(a) 0-50m
(b) 50-100m
(c) 100-200m

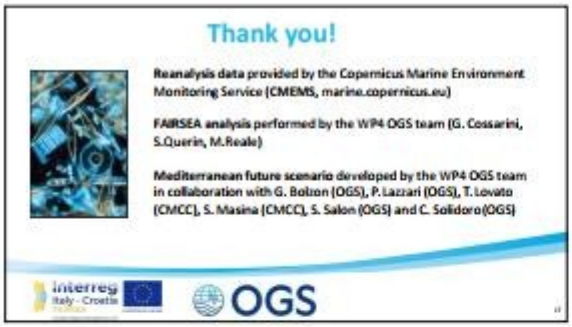

Bottom layer: physical and biogeochemical interactions
temperature
oxygen


Climate scenarios: elements for our simulation
MFS16
Atmospheric model CMCC-CMIP
Hydrodynamic model NEMO16
Socio-economical Emission Scenario IPCC RCP 4.5 and 8.5
Terrestrial runoff and loads: (Circe & Perseus projects)
Coupled transport-biogeochemical model
Boundary conditions in the Atlantic Ocean: CMCC-CESM global model
WOA2018

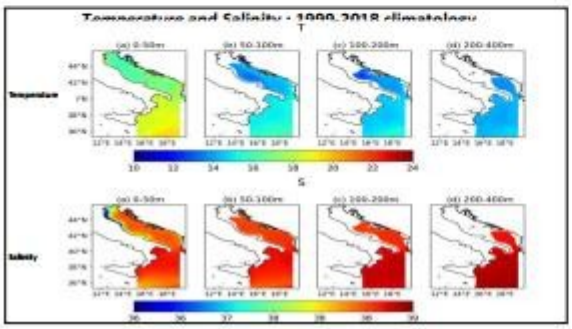

Climate scenarios:
simulation protocol and consistency with the past reconstruction
reanalysis
Present state discussed before
PRESENT
NEAR-FUTURE
MID-FUTURE
FAR-FUTURE
climate scenario simulation
control simulation
1999
2019 present-day average
end of 21st century
FAIRSEA Tasks 4.1.1 & 4.2.1
FAIRSEA Tasks 4.1.2 & 4.2.2
OGS

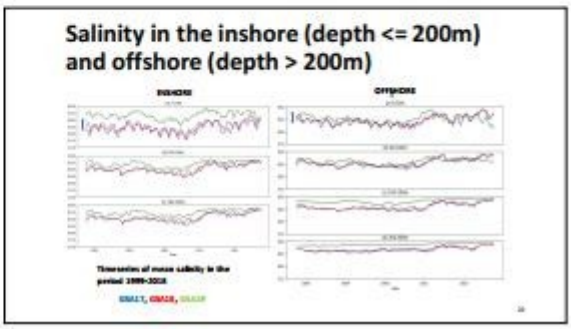

Oxygen in the Adriatic and Ionian Seas
bottom oxygen [mmol/m³] - present day condition
anomaly in RCP 8.5 - FAR FUTURE
linear decrease following the evolution of temperature RCP 4.5 < RCP8.5
DATA available in the FAIRSEA platform...for many other variables

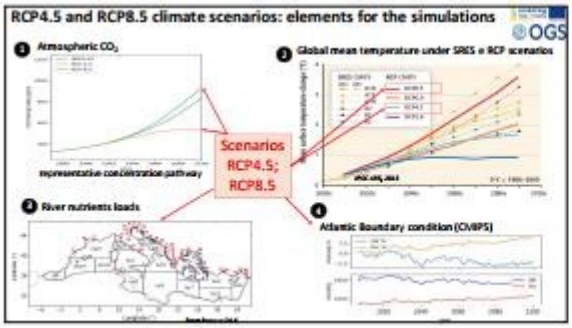

To conclude...
• the Adriatic-Ionian Sea is a complex system characterized by multiple temporal and spatial scales of variability
• the physical-biogeochemical reanalysis is a robust tool that can be used to reconstruct the past and present ecosystem state and to compare different subareas
• the climate model reproduces the physical-biogeochemical mechanisms that drive the evolution of the system providing climate projections of the future tendencies under the different IPCC scenarios
OGS

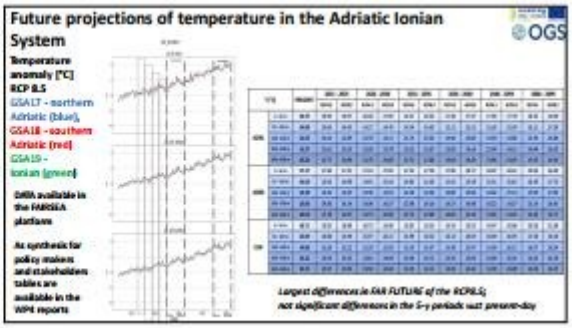

Thank you!
Reanalysis data provided by the Copernicus Marine Environment Monitoring Service (CMEMS, marine.copernicus.eu)
FAIRSEA analysis performed by the WP4 OGS team (G. Cossarini, S.Querin, M.Reale)
Mediterranean future scenario developed by the WP4 OGS team in collaboration with G. Bolzon (OGS), P. Lazzari (OGS), T. Lovato (CMCC), S. Masina (CMCC), S. Salon (OGS) and C. Solidoro (OGS)
interreg
Italy - Croatia
OGS


FAIRSEA – WP4.1, WP4.2
National Institute of Oceanography and Applied Geophysics - OGS
Marco Reale
interreg
Italy - Croatia
OGS

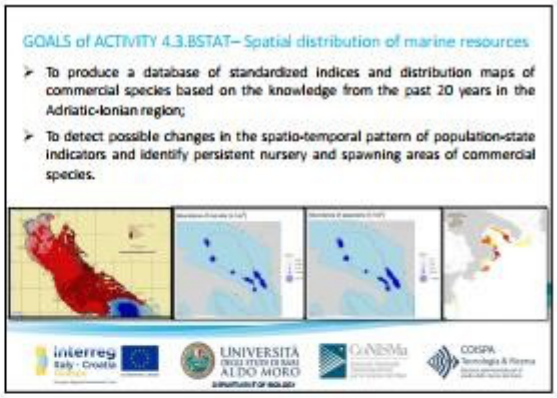

Temperature and Salinity - 1999-2018 climatology
Temperature
Salinity


Salinity in the inshore (depth <= 200m) and offshore (depth > 200m)
INSHORE
OFFSHORE


RCP4.5 and RCP8.5 climate scenarios: elements for the simulations
OGS
Atmospheric CO2
representative concentration pathway
Global mean temperature under SRES e RCP scenarios
Scenarios
RCP4.5;
RCP8.5
River nutrients loads
Atlantic Boundary condition (CMIP5)


Future projections of temperature in the Adriatic Ionian System
OGS
Temperature anomaly [°C]
RCP 8.5
GSA17 - northern Adriatic (blue),
GSA18 - southern Adriatic (red)
GSA19 - Ionian (green)
Data available in the FAIRSEA platform
As synthesis for policy makers and stakeholders tables are available in the WP4 reports


Standardizing fishery independent trawl survey data
WP4 - Implementation of a shared and integrated platform
Activity 4.3-BSTAT – Spatial distribution of marine resources
FAIRSEA Final project Conference
G. Cipriano[1], W Zupa[2]
[1]Department of Biology, University of Bari| Local Research Unit CoNISMa|
[2]COISPA Tecnologia & Ricerca
Split, Croatia & online|8 July 2021


GOALS of ACTIVITY 4.3.BSTAT– Spatial distribution of marine resources
To produce a database of standardized indices and distribution maps of commercial species based on the knowledge from the past 20 years in the Adriatic-Ionian region;
To detect possible changes in the spatio-temporal pattern of population-state indicators and identify persistent nursery and spawning areas of commercial species.

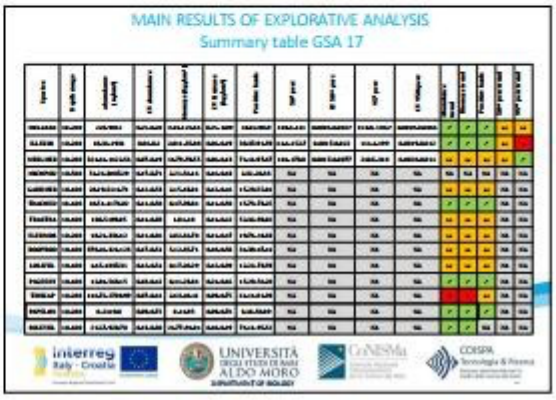

METHODOLOGY 1/ 4
FISHERY-INDEPENDENT DATA (MEDITS and SOLEMON data) were used to:
I. identify spatio-temporal variation of abundance and biomass indices of species of commercial interest within the GSAs 17, 18 and 19 (BIOINDEX routine);
II. estimate the spatial distribution of standardized indices of these species in the study area (BIOSTAND routine).
SELECTION OF TARGET SPECIES IN DIFFERENT GSAs
TIME FRAME: 10 years for MEDITS (2009-2018) and SOLEMON (2005-2018)
LIST OF SPECIES:
MEDITS: all species except benthos and small pelagic species
SOLEMON: common sole (Solea solea) and spottail mantis shrimp (Squilla mantis)

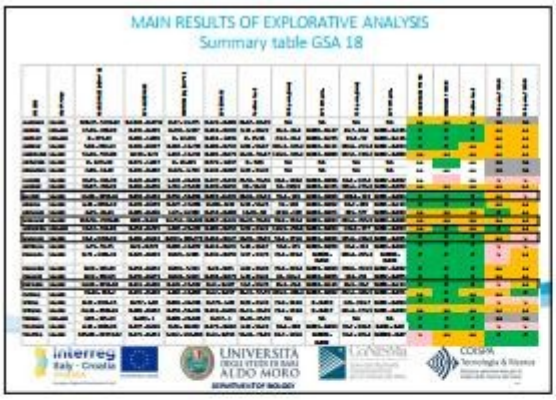

METHODOLOGY 2/4
15 selected species
26selected species
18selected species


METHODOLOGY 3/4
Exploratory analysis by BioIndex 2.1.2 routine in R environment
Environment
R version > 3.6.0
RStudio > 1.2.1335
1. Analysis for different sampling protocols
Simple Random Sampling
Random Stratified Sampling
Random stratified sampling with post-stratification
2. Analysis at GSA level
Number of positive hauls to the target species
Mean abundance index (n/km²)
Mean biomass index (kg/km²)
Inverse of CVs of the mean abundance index
Mean Individual Weight (MW)
Sex ratio
Abundance index of recruits (n/km²)
Abundance index of spawners (n/km²)
3. Analysis of trends
Spearman's rho test
Interception Union Test
4. Analysis at GFCM grid level (30')
Mean abundance index (n/km²)
Mean biomass index (kg/km²)
Inverse of CVs of the mean abundance index
Mean Individual Weight (MW)
Sex ratio
5. Bubble plot of hauls data
Abundance index of recruits (n/km²)
Abundance index of spawners (n/km²)

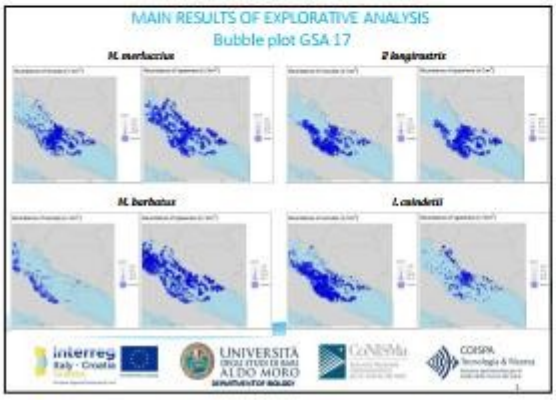

METHODOLOGY 4/4
Standardization of main indices for 5 selected species for each GSA by BioStand 2.1.2 routine in R environment
GSA 17
M. merluccius
M. barbatus
R longirostris
I. coindetii
S. solea
GSA 18 and 19
M. merluccius
M. barbatus
R longirostris
A. foliacea
I. coindetii
Environment
R version > 3.6.0
RStudio > 1.2.1335
1. Preparation of merge Tr-Ti-Ta file
abundance index by hauls (n/km²)
biomass index by hauls (kg/km²)
Presence of the predictive grid
2. Explorative analysis of data
Depth distribution of the species
Variance Inflation Factor (VIF)
Correlation matrix
3. Modelling
Transformation of data
Stepwise selection of the best models
Inspection of residuals of the final model
plot of splines
plot of factors
4. Time series standardization
Prediction of standardized indices
Plot of predictions and time series

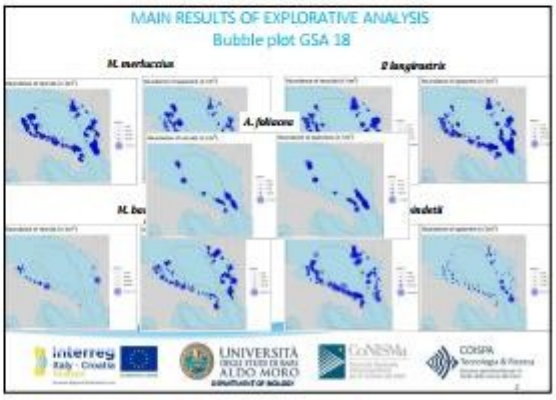

FAIRSEA (ID 1044881)
"Fairness in the Adriatic Region – a Shared Ecosystem Approach"
D 4.3.1-Spatio-temporal distribution of marine species

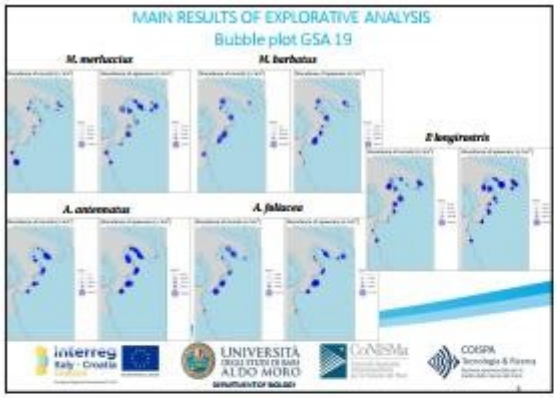

MAIN RESULTS OF EXPLORATIVE ANALYSIS
Summary table GSA 17

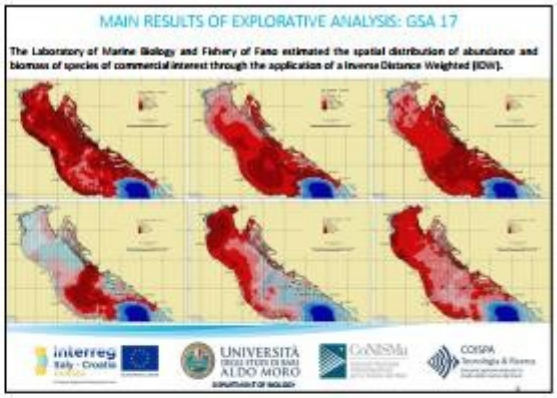

MAIN RESULTS OF EXPLORATIVE ANALYSIS
Summary table GSA 18

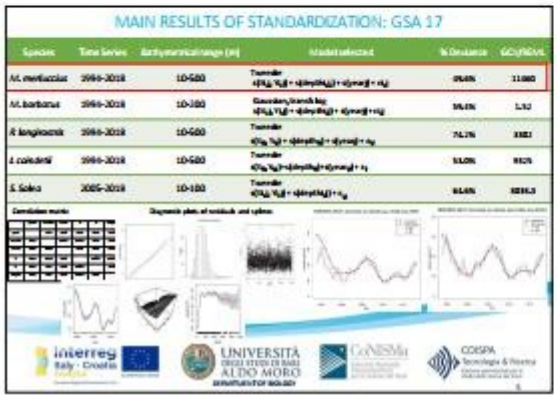

MAIN RESULTS OF EXPLORATIVE ANALYSIS
Summary table GSA 19


MAIN RESULTS OF EXPLORATIVE ANALYSIS
Bubble plot GSA 17

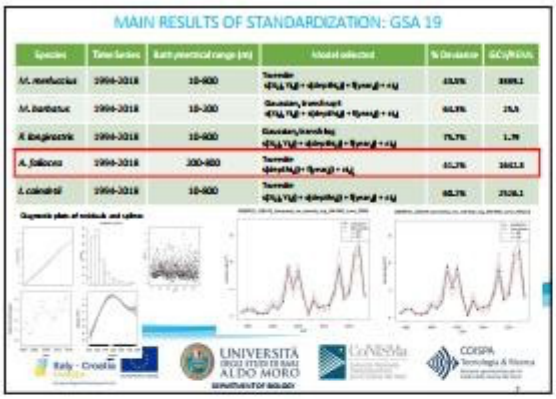

MAIN RESULTS OF EXPLORATIVE ANALYSIS
Bubble plot GSA 18


MAIN RESULTS OF EXPLORATIVE ANALYSIS
Bubble plot GSA 19
M. merluccius
M. barbatus
A. antennatus
A. fallacox
UNIVERSITÀ ALDO MORO


MAIN RESULTS OF EXPLORATIVE ANALYSIS: GSA 17
The Laboratory of Marine Biology and Fishery of Fano estimated the spatial distribution of abundance and biomass of species of commercial interest through the application of a Inverse Distance Weighted (IDW).
UNIVERSITÀ ALDO MORO


MAIN RESULTS OF STANDARDIZATION: GSA 17
UNIVERSITÀ ALDO MORO

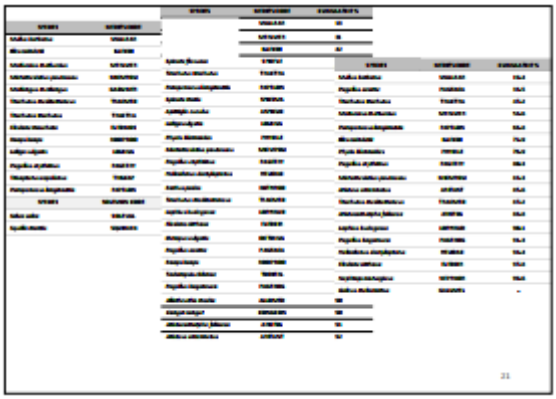

MAIN RESULTS OF STANDARDIZATION: GSA 18


MAIN RESULTS OF STANDARDIZATION: GSA 19

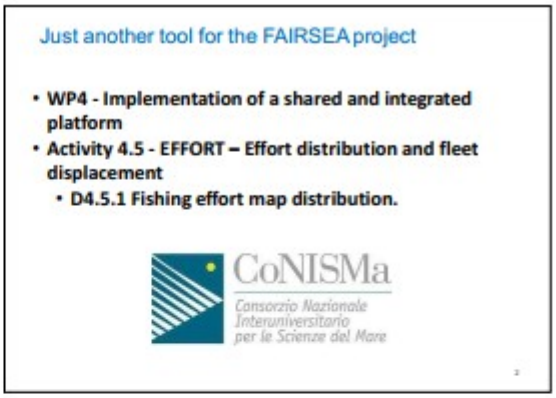

SHARING RESULTS
FAIRSEA
Integration of trawl surveys data, relevant ocean variables and effort for accurate estimation of spatial distribution of demersal species in Adriatic-Ionian region

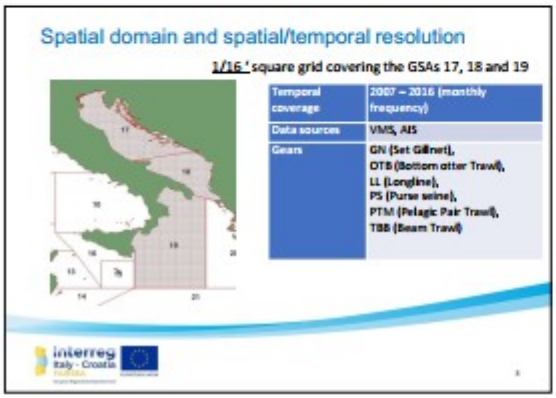

SHARING RESULTS
OCEAN STATE REPORT
Section 3.6. Developing spatial distribution models for demersal species by the integration of trawl surveys data and relevant ocean variables
Authors: Panzeri D., Bitetto I., Carlucci R., Cipriano G., Cossarini G., D'Andrea L., Masnadi F., Querin S., Reale M., Russo T, Scarcella G., Spedicato M.T., Teruzzi A., Vrgoč N., Zupa W., Libralato S.*

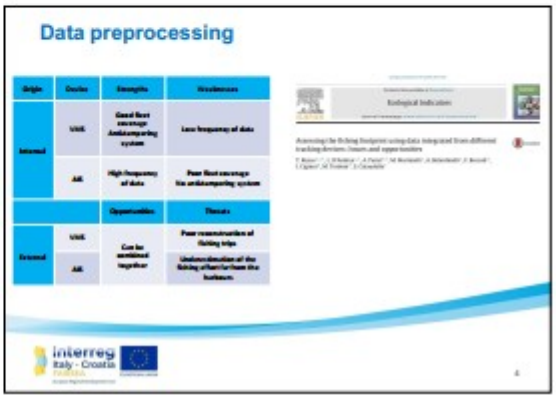

THANKS FOR YOUR ATTENTION
Department of Biology, University of Bari Local Research Unit CoNISMa
Via Orabona, 4 – 740125 Bari, Italy
giulia.cipriano@uniba.it
+39 0805443342
www.italy-croatia.eu/acronym



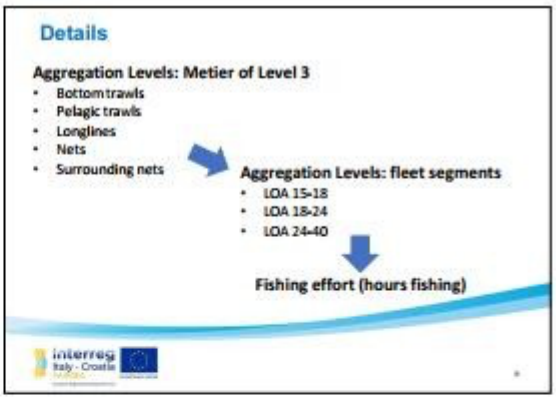

FAIRSEA
Fisheries in the Adriatic Region - a Shared Ecosystem Approach
Presentation and discussion on scenarios of spatial management with ecological and fisheries implications
Final project Conference | 8 July 2021
Tommaso Russo
Department of Biology – University of Rome Tor Vergata & CoNISMa
Roberto Carlucci – Giulia Cipriano
Department of Biology – University of Bari Aldo Moro & CoNISMa

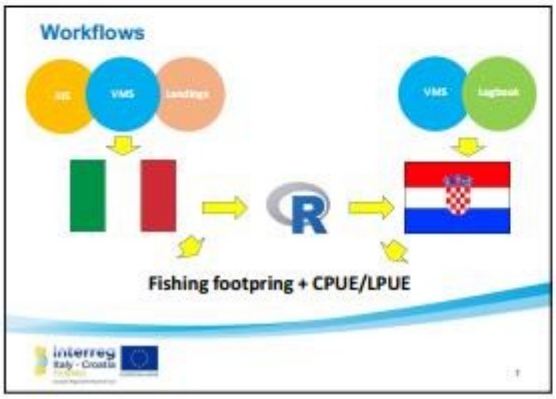

Just another tool for the FAIRSEA project
• WP4 - Implementation of a shared and integrated platform
• Activity 4.5 - EFFORT – Effort distribution and fleet displacement
• D4.5.1 Fishing effort map distribution.
CoNISMa
Consorzio Nazionale Interuniversitario per le Scienze del Mare


Spatial domain and spatial/temporal resolution
1/16 ° square grid covering the GSAs 17, 18 and 19
Temporal coverage
2007 – 2016 (monthly frequency)
Data sources
VMS, AIS
Gears
GN (Set Gillnet),
OTB (Bottom otter Trawl),
LL (Longline),
PS (Purse seine),
PTM (Pelagic Pair Trawl),
TBB (Beam Trawl)

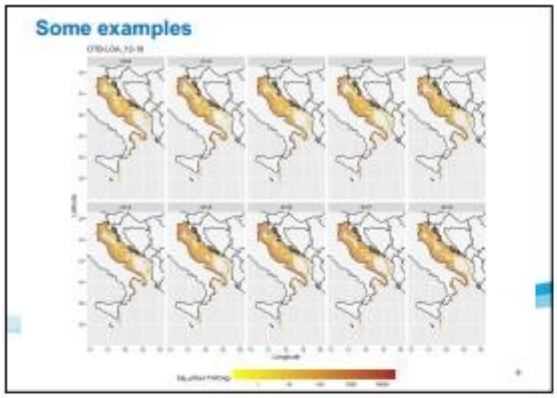

Data preprocessing

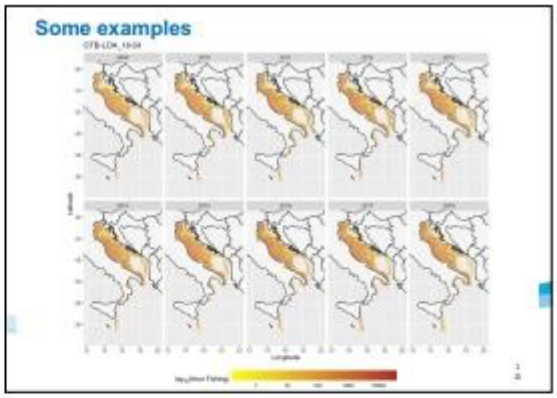

Data preprocessing
Data will be processed following the standard analysis routines provided by the vmsbase R package (Russo et al., 2014).
This standard procedure will yield different separated databases, for each case study.
DON'T PANIC
The Official Hitchhiker's Guide to the
VMS/AIS DATA
VMS
AIS
Raw Data Merging

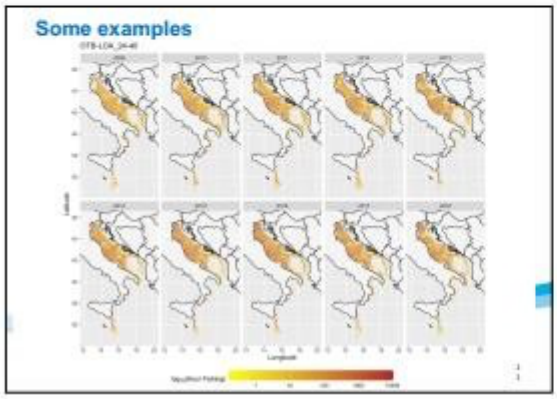

Details
Aggregation Levels: Metier of Level 3
Bottom trawls
Pelagic trawls
Longlines
Nets
Surrounding nets
Aggregation Levels: fleet segments
LOA 15-18
LOA 18-24
LOA 24-40
Fishing effort (hours fishing)

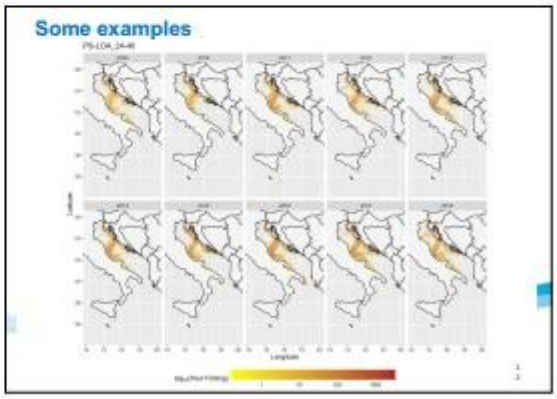

Workflows
VMS
Fishing footpring + CPUE/LPUE

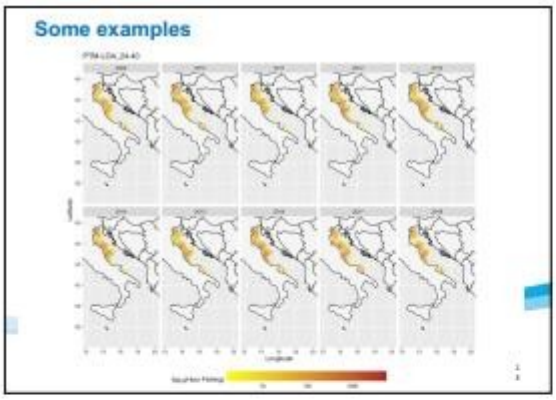

A joint success story

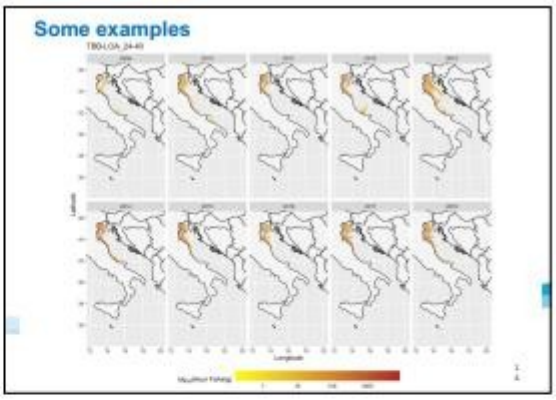

Some examples

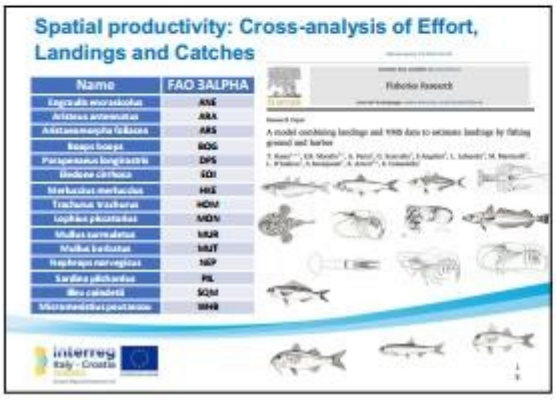

Some examples

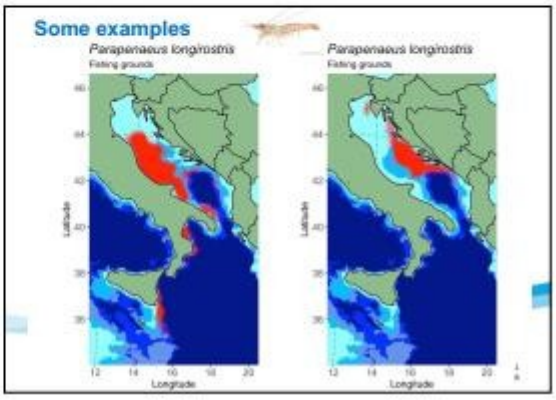

Some examples

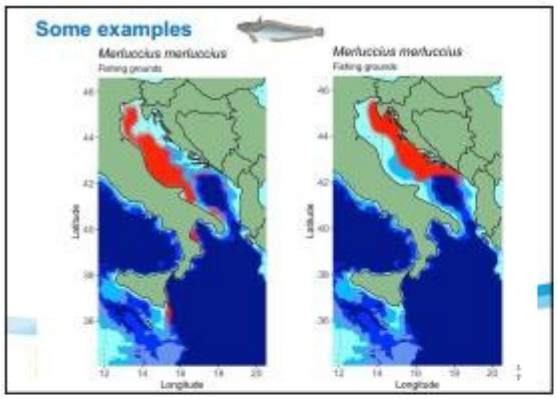

Some examples

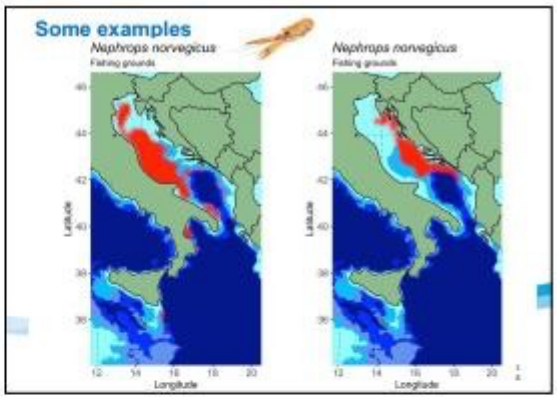

Some examples

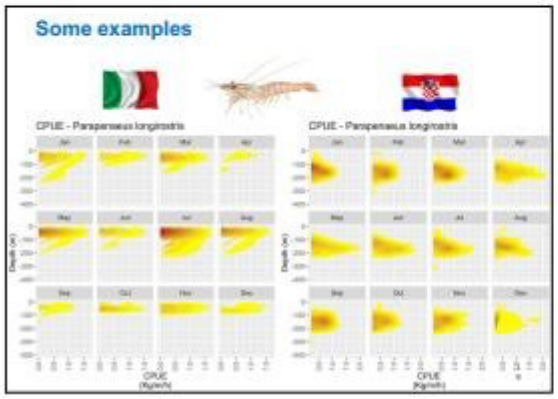

Some examples

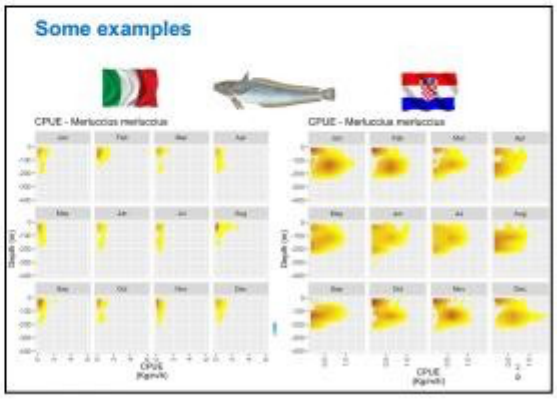

Spatial productivity: Cross-analysis of Effort, Landings and Catches
Name
FAO 3ALPHA

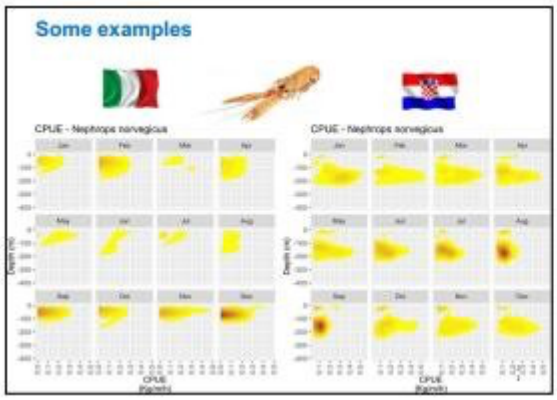

Some examples
Parapenaeus longirostris
Fishing grounds
Parapenaeus longirostris
Fishing grounds
Latitude
Longitude
Latitude
Longitude


Some examples
Merluccius merluccius
Fishing grounds
Merluccius merluccius
Fishing grounds
Latitude
Longitude


Some examples
Nephrops norvegicus
Fishing grounds
Nephrops norvegicus
Fishing grounds
Latitude
Longitude


Some examples
CPUE - Parapenaeus longirostris
CPUE - Parapenaeus longirostris
CPUE (Kg/km²)

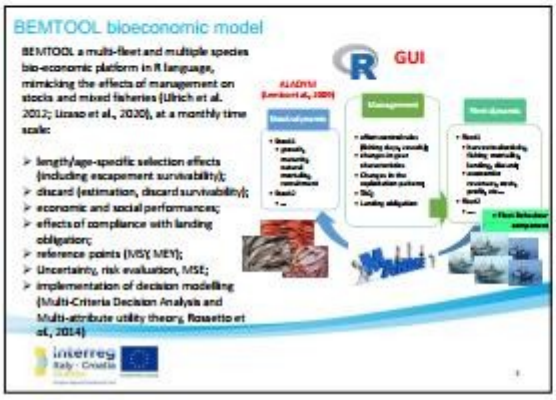

Some examples
CPUE - Merluccius merluccius
CPUE - Merluccius merluccius
CPUE (Kg/km²)

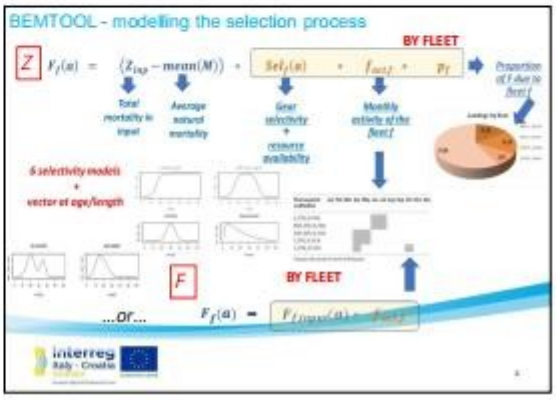

Some examples
CPUE - Nephrops norvegicus
CPUE - Nephrops norvegicus
CPUE (Kg/km²)

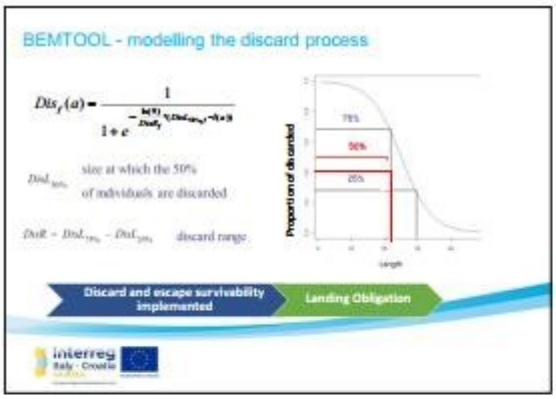

THANKS for the attention
University of Rome Tor Vergata
CoNISMa – www.conisma.it
Tommaso.Russo@Uniroma2.it
www.tommasorusso.org

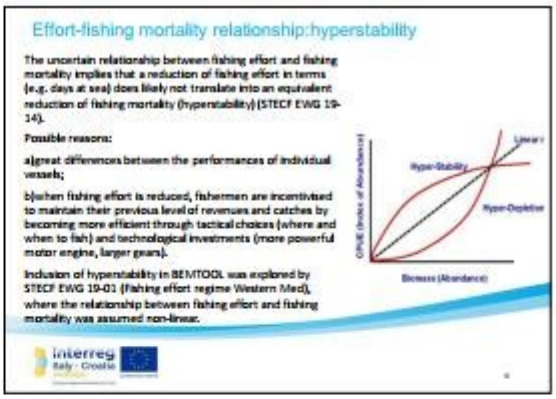

Bio-economic modelling: hindcasting trajectories with BEMTOOL model
FAIRSEA Project
Isabella Bitetto, Giovanni Romagnoni, Giuseppe Lembo and Maria Teresa Spedicato
COISPA
Final Conference | 8.07.2021

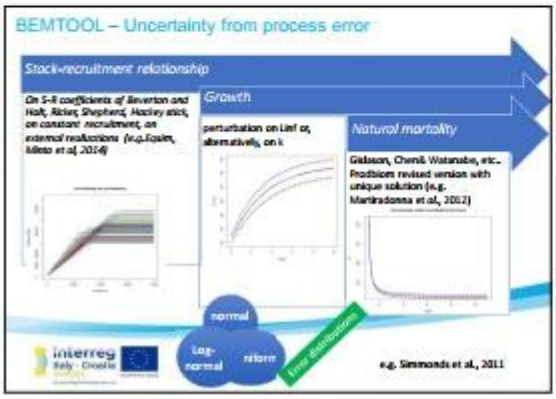

WP 4 - BIOECO – A multi-fleet and multi-stock platform for mixed fisheries
Main objectives
investigating the consequences of alternative scenarios, using BEMTOOL bio-economic model, to evaluate how changes/shifts in fishery-driven impacts (e.g. fishing mortality, fleet selectivity) and management or fishing strategies (e.g. closed season/areas, changes in fishing opportunity), affect stock and fisheries dynamics in terms of SSB, landings, discards and economic performance.
monthly time scale;
mimicking stock assessments for the whole Adriatic and for sub-regions,
fleets' selectivity;
mixed fisheries interactions (gears/species);
implementation of pilot actions;
management scenarios

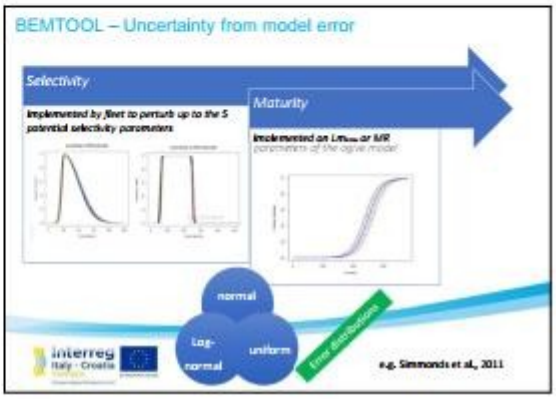

BEMTOOL bioeconomic model
BEMTOOL a multi-fleet and multiple species bio-economic platform in R language, mimicking the effects of management on stocks and mixed fisheries (Ulrich et al. 2012; Lizaso et al., 2020), at a monthly time scale:
length/age-specific selection effects (including escapement survivability);
discard (estimation, discard survivability);
economic and social performances;
effects of compliance with landing obligation;
reference points (MSY, MEY);
Uncertainty, risk evaluation, MSE;
implementation of decision modelling (Multi-Criteria Decision Analysis and Multi-attribute utility theory, Rossetto et al., 2014)
GUI


BEMTOOL - modelling the selection process
BY FLEET
6 selectivity models
vector of age/length
F
BY FLEET
...Or...


BEMTOOL - modelling the discard process
$Dis_f(a) = \frac{1}{1+e^{-\frac{\ln(9)}{Dis_{f_{75\%}}-Dis_{f_{25\%}}}(a-Dis_{f_{50\%}})}}$
$Dis_{f_{50\%}}$ size at which the 50% of individuals are discarded
$DisR = Dis_{f_{75\%}} - Dis_{f_{25\%}}$ discard range
Proportion of discarded
75%
50%
25%
Length
Discard and escape survivability implemented
Landing Obligation


Effort-fishing mortality relationship:hyperstability
The uncertain relationship between fishing effort and fishing mortality implies that a reduction of fishing effort in terms (e.g. days at sea) does likely not translate into an equivalent reduction of fishing mortality (hyperstability) (STECF EWG 19-14).
Possible reasons:
a)great differences between the performances of individual vessels;
b)when fishing effort is reduced, fishermen are incentivised to maintain their previous level of revenues and catches by becoming more efficient through tactical choices (where and when to fish) and technological investments (more powerful motor engine, larger gears).
Inclusion of hyperstability in BEMTOOL was explored by STECF EWG 19-01 (Fishing effort regime Western Med), where the relationship between fishing effort and fishing mortality was assumed non-linear.
Linear
Hyper-Stability
Hyper-Depletive
CPUE (Index of Abundance)
Biomass (Abundance)


BEMTOOL – Uncertainty from process error
Stock-recruitment relationship
On S-R coefficients of Beverton and Holt, Ricker, Shepherd, Hockey stick, on constant recruitment, on external realizations (e.g.Equini, Mikto et al, 2014)
Growth
perturbation on Linf or, alternatively, on k
Natural mortality
Gislason, Chen& Watanabe, etc.. Prodbiom revised version with unique solution (e.g. Mantiradonna et al., 2012)
normal
Log-normal
uniform
Error distributions
e.g. Simmonds et al., 2011


BEMTOOL – Uncertainty from model error
Selectivity
Implemented by fleet to perturb up to the 5 potential selectivity parameters
Maturity
normal
Log-normal
uniform
Error distributions
e.g. Simmonds et al., 2011

Relevant economic indicators

The BEMTOOL formulations of the economic indicators are in line with the Annual Economic Report on the EU Fishing Fleet.

The relevant economic indicators taken into consideration in AER (2020) are:

- Revenues, GVA (Gross Value Added) and their ratio;
- Gross profit and gross profit margin (%);
- Net profit and net profit margin (%);
- Capital productivity (ROI or Return on Fixed Tangible Assets ROFTA);
- Break-even revenue and CR/Break-even revenue

Modelling the economic processes

Different options to mimicking the trend of economic processes, modelling:

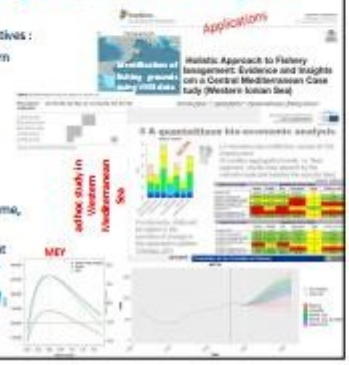
- total landing and the corresponding total revenues by fleet based on the landing and revenues of the assessed stocks (e.g. Leonart et al., 2003);
- Price dynamic (e.g. modified from Salz et al., 2011);
- Variable costs (fuel and others) (e.g. Accadia & Spagnolo, 2006; Salz et al., 2011);
- Maintenance and fixed costs;
- Capital costs (e.g. e.g. Froest et al., 2013);
- Labour costs;
- Behavioural module to simulate fishermen response to changes in the profitability related to the introduction of new management measures (Salz et al., 2011; Froest et al., 2013).

BEMTOOL – Short and long-term predictions of management alternatives

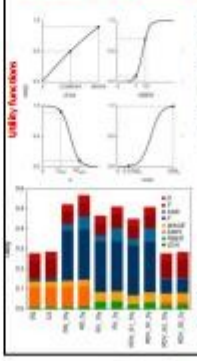
A wide set of managements alternatives :

- ✓ Change of the exploitation pattern (gear selectivity and/or spatial closures of EFH);
- ✓ Fishing ban;
- ✓ Effort opportunities and fishing activity limitations;
- ✓ Capacity reduction;
- ✓ Landing obligation (additional costs, additional income, etc..);
- ✓ Annual TAC based on escapement strategy (Besc=Bpa; Fcap=F_{MSY}).

Combinations also by fleet



Multi-Criteria Decision Analysis

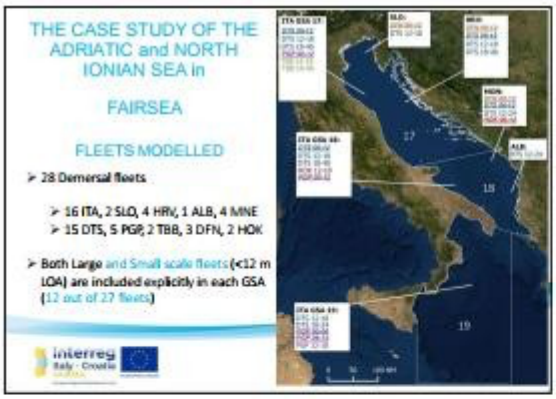


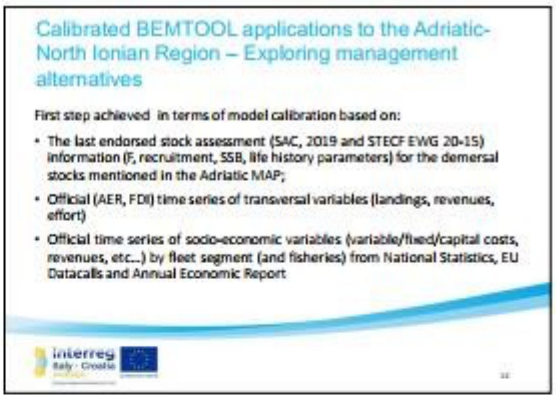
A multi-criteria decision analysis (MCDA) component is implemented in BEMTOOL by combining two multi-criteria techniques: multi-attribute utility theory (MAUT) and the Analytic Hierarchy Process (AHP) (Rossetto et al., 2014).

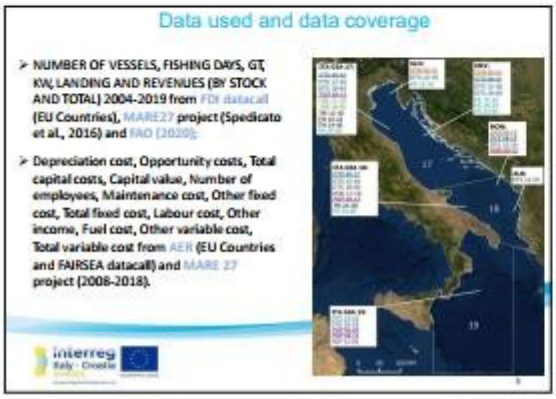
MAUT relies on the idea that decision-makers attempt to maximize their utility with respect to a number of independent attributes (Keeney et al., 1993), each one representing a management objective.

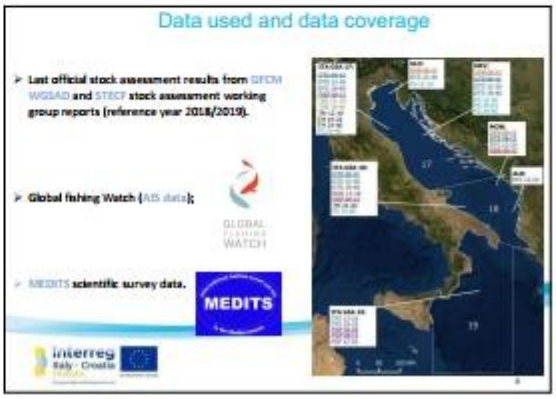
- ✓ biological and socioeconomic indicators are identified and organized into an appropriate hierarchy;
- ✓ utility functions are defined to express the level of satisfaction associated with different values of the indicators;
- ✓ weights, representing the relative importance of each indicator to the overall utility, is derived through a pair-wise comparison of the indicators.

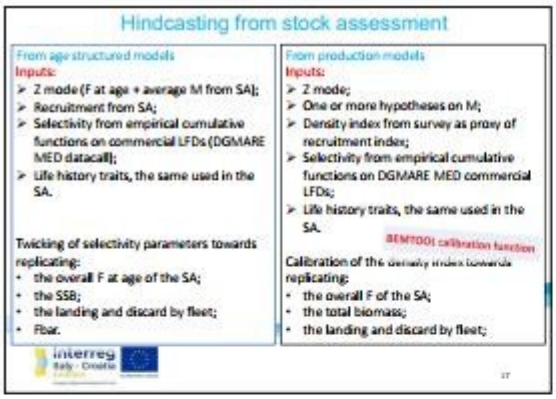
The flexible structure of the framework allows the incorporation of different management criteria and utility functions to adapt it to different decision problems.

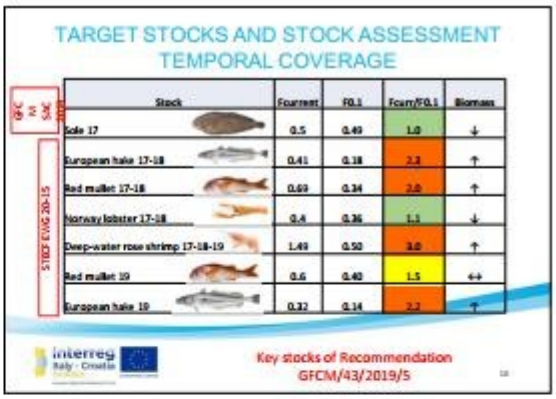

THE CASE STUDY OF THE ADRIATIC and NORTH IONIAN SEA in
FAIRSEA
FLEETS MODELLED
28 Demersal fleets
16 ITA, 2 SLO, 4 HRV, 1 ALB, 4 MNE
15 DTS, 5 PGP, 2 TBB, 3 DFN, 2 HOK
Both Large and Small scale fleets (<12 m LOA) are included explicitly in each GSA (12 out of 27 fleets)

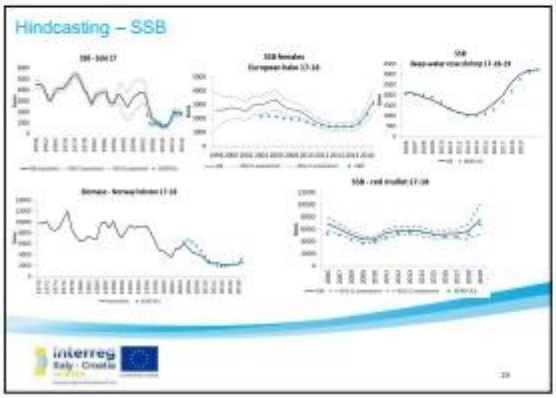

Calibrated BEMTOOL applications to the Adriatic-North Ionian Region – Exploring management alternatives
First step achieved in terms of model calibration based on:
The last endorsed stock assessment (SAC, 2019 and STECF EWG 20-15) information (F, recruitment, SSB, life history parameters) for the demersal stocks mentioned in the Adriatic MAP;
Official (AER, FDI) time series of transversal variables (landings, revenues, effort)
Official time series of socio-economic variables (variable/fixed/capital costs, revenues, etc...) by fleet segment (and fisheries) from National Statistics, EU Datacalls and Annual Economic Report

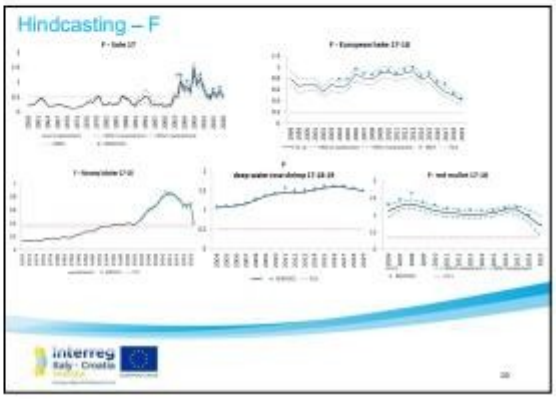

Data used and data coverage
NUMBER OF VESSELS, FISHING DAYS, GT, KW, LANDING AND REVENUES (BY STOCK AND TOTAL) 2004-2019 from FDI datacall (EU Countries), MARE27 project (Spedicato et al., 2016) and FAO (2020);
Depreciation cost, Opportunity costs, Total capital costs, Capital value, Number of employees, Maintenance cost, Other fixed cost, Total fixed cost, Labour cost, Other income, Fuel cost, Other variable cost, Total variable cost from AER (EU Countries and FAIRSEA datacall) and MARE 27 project (2008-2018).

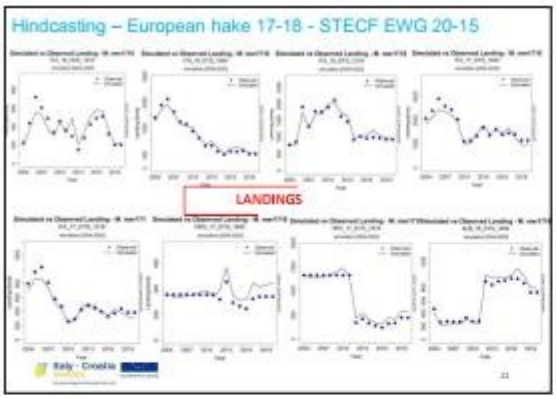

Data used and data coverage
Last official stock assessment results from SFOM WGSAD and STECF stock assessment working group reports (reference year 2018/2019).
Global fishing Watch (AIS data);
MEDITS scientific survey data.
MEDITS

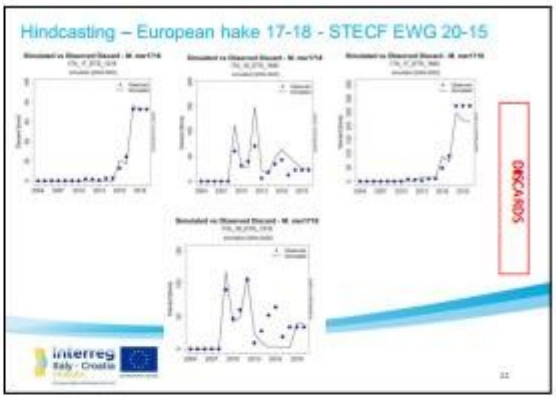

Hindcasting from stock assessment
From age structured models
Inputs:
Z mode (F at age + average M from SA);
Recruitment from SA;
Selectivity from empirical cumulative functions on commercial LFDs (DGMARE MED datacall);
Life history traits, the same used in the SA.
Twicking of selectivity parameters towards replicating:
the overall F at age of the SA;
the SSB;
the landing and discard by fleet;
Fbar.
From production models
Inputs:
Z mode;
One or more hypotheses on M;
Density index from survey as proxy of recruitment index;
Selectivity from empirical cumulative functions on DGMARE MED commercial LFDs;
Life history traits, the same used in the SA.
BEMTOOL calibration function
Calibration of the density index towards replicating:
the overall F of the SA;
the total biomass;
the landing and discard by fleet;

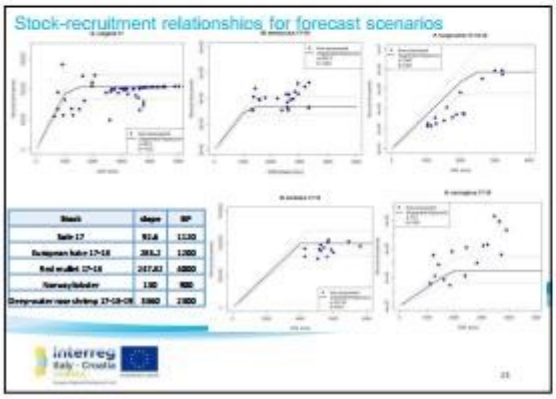

TARGET STOCKS AND STOCK ASSESSMENT
TEMPORAL COVERAGE
Stock
Fcurrent
F0.1
Fcurr/F0.1
Biomass
Sole 17
European hake 17-18
Red mullet 17-18
Norway lobster 17-18
Deep-water rose shrimp 17-18-19
Red mullet 19
European hake 19
STECF EWG 20-15
Key stocks of Recommendation
GFCM/43/2019/5


Hindcasting – SSB


Hindcasting – F


Hindcasting – European hake 17-18 - STECF EWG 20-15
LANDINGS

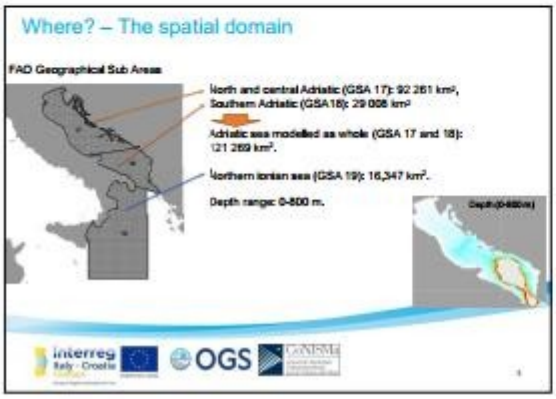

Hindcasting – European hake 17-18 - STECF EWG 20-15
DISCARDS

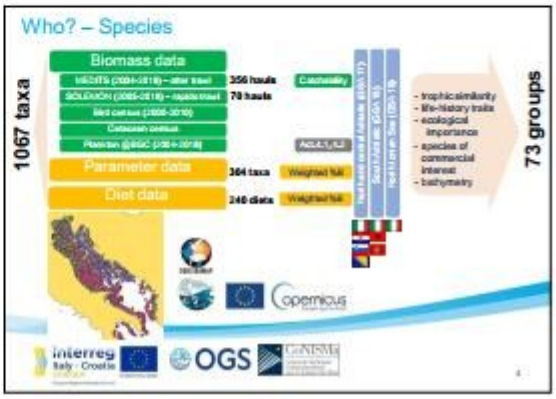

Stock-recruitment relationships for forecast scenarios


THANKS FOR YOUR ATTENTION!

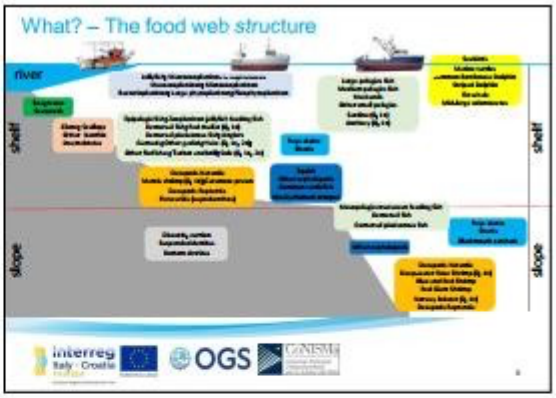

FAIRSEA
Fisheries in the Adriatic Region – a Shared Ecosystem Approach
Data integrated into the food web modelling
Igor Ćelić, Pasquale Ricci, Natalia Serpetti, Giulia Cipriano, Diego Panzeri, Davide Agnetta, Marco Reale, Gianpiero Cossarini, Lucio Labanchi, Tommaso Russo, Ante Vujević, Isabella Bitetto, Francesco Masnadi, Silvia Angelini, Martina Scanu, Enrico Armelloni, Maria Teresa Spedicato, Giuseppe Lembo, Roberto Carlucci, Giuseppe Scarcella, Nedo Vrgoč, Igor Isajlović, et al., Simone Libralato
| Split, Croatia | 8 July 2021

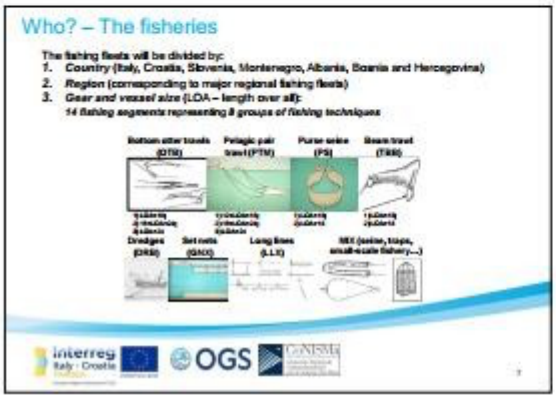

The cookbook for an ecosystem model
Biological and interspecific dynamic
Fishery
Model structure
Food consumption
Production
Predation
Other mortality
The food web model
OGS


Where? – The spatial domain
FAO Geographical Sub Areas
North and central Adriatic (GSA 17): 92 251 km²,
Southern Adriatic (GSA18): 29 008 km²
Adriatic sea modelled as whole (GSA 17 and 18):
121 259 km².
Northern Ionian sea (GSA 19): 16,347 km².
Depth range: 0-800 m.
OGS

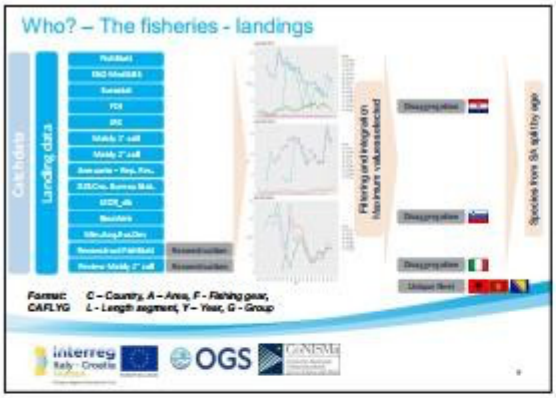

Who? – Species
1067 taxa
Biomass data
356 hauls
78 hauls
Catchability
Parameter data
364 taxa
Diet data
240 diets
- trophic similarity
- life-history traits
- ecological importance
- species of commercial interest
- bathymetry
73 groups
Copernicus
OGS

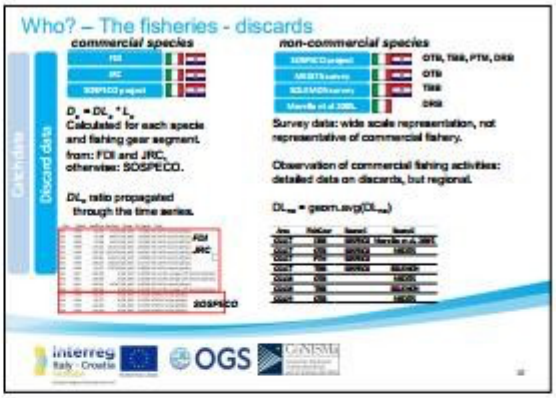

Who? – Species of commercial interest
Sardine, anchovy, common sole, red mullet, European hake, mantis shrimp, Norway lobster, deep-water rose shrimp.
The representation of species into multi-stanzas is very useful to represent different ages (juvenile, adult) and life stages.
Parameters: Age, biomass, mortality, consumption, diet, growth rate, maturity.
From Stock Assessment (GFCM or STECF): biomass and mortality rate

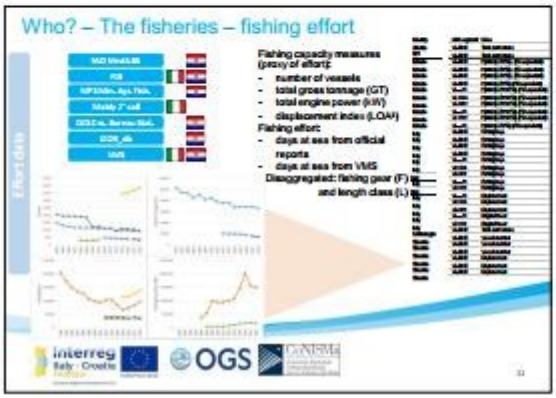

What? – The food web structure
river
shelf
slope
shelf
slope

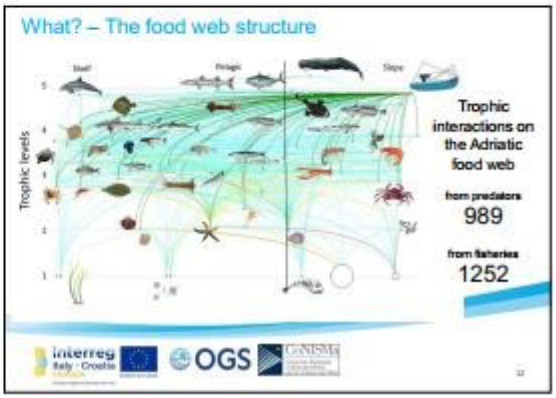

Who? – The fisheries
The fishing fleets will be divided by:
1. Country (Italy, Croatia, Slovenia, Montenegro, Albania, Bosnia and Hercegovina)
2. Region (corresponding to major regional fishing fleets)
3. Gear and vessel size (LOA – length over all):
14 fishing segments representing 8 groups of fishing techniques
Bottom otter trawls (OTB)
Pelagic pair trawl (PTM)
Purse seine (PS)
Beam trawl (TBB)
Dredges (DRB)
Set nets (GNS)
Long lines (LLS)
MIX (seine, traps, small-scale fishery,...)

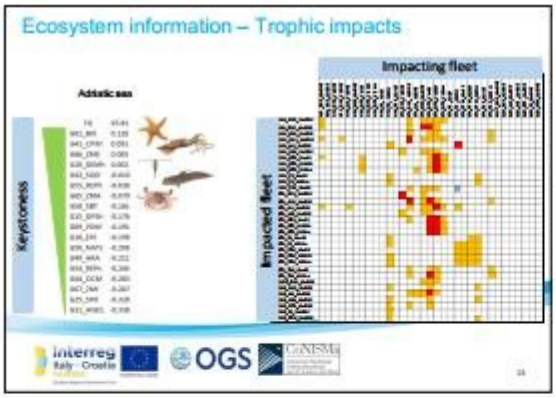

Who? – The fisheries
Landings data
Discards data

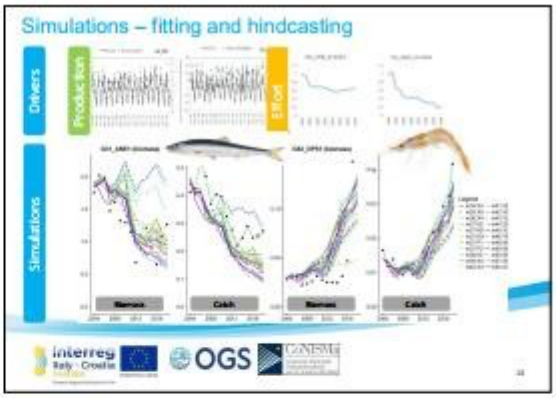

Who? – The fisheries - landings
Catchdata
Landing data
Format: C – Country, A – Area, F - Fishing gear, L - Length segment, Y – Year, G - Group
CAFLYG

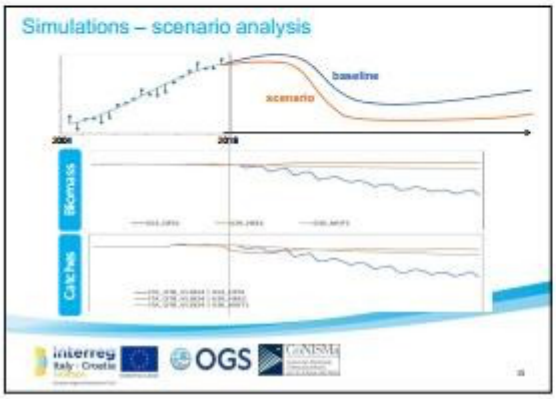

Who? – The fisheries - discards
commercial species
non-commercial species
Catchdata
Discard data
Survey data: wide scale representation, not representative of commercial fishery.
Observation of commercial fishing activities: detailed data on discards, but regional.
FDI
JRC
SOSPECO

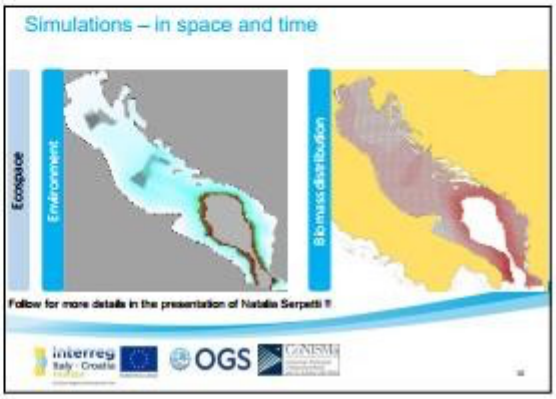

Who? – The fisheries – fishing effort
Catchdata
Fishing capacity measures (proxy of effort):
- number of vessels
- total gross tonnage (GT)
- total engine power (kW)
- displacement index (LOA²)
Fishing effort:
- days at sea from official reports
- days at sea from VMS
Disaggregated: fishing gear (F) and length class (L)


What? – The food web structure
Trophic levels
Trophic interactions on the Adriatic food web
from predators
989
from fisheries
1252


Ecosystem information – Trophic impacts
Impacting fleet
Adriatic sea
Keystoness
Impacted fleet


Simulations – fitting and hindcasting
Drivers
Production
Error
Simulations


Simulations – scenario analysis
baseline
scenario
Biomass
Catches


Simulations – in space and time
Ecospace
Environment
Biomass distribution
Follow for more details in the presentation of Natalia Serpetti !!


THANKS for the attention
This work has been possible thanks to the interaction among all partners.
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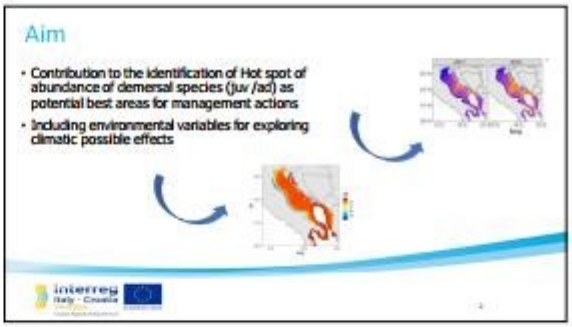
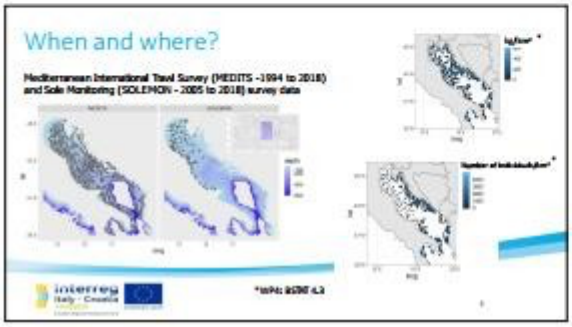
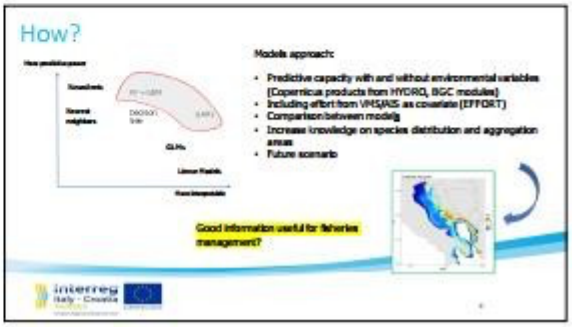
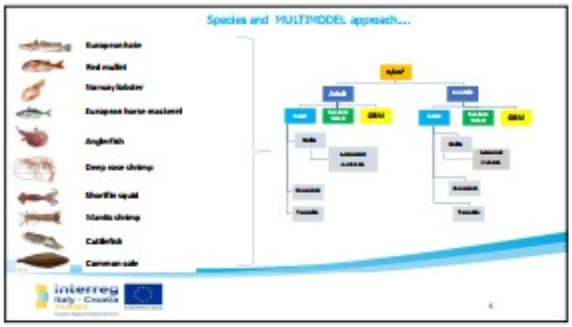
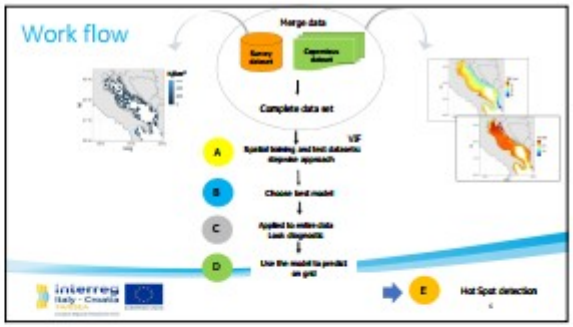
FAIRSEA
Detecting hot spots for demersal species in current and future oceanographic conditions

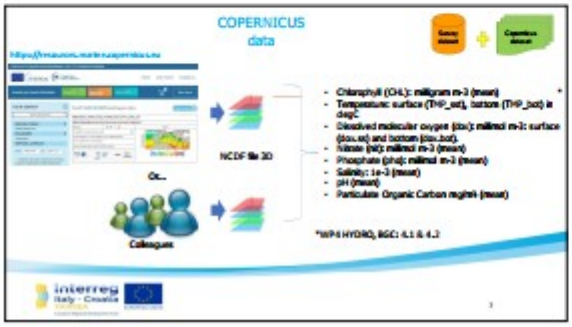

Aim
• Contribution to the identification of Hot spot of abundance of demersal species (juv /ad) as potential best areas for management actions
• Including environmental variables for exploring climatic possible effects

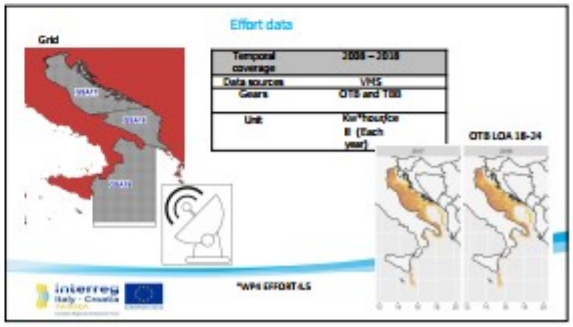

When and where?
Mediterranean International Trawl Survey (MEDITS -1994 to 2018) and Sole Monitoring (SOLEMON - 2005 to 2018) survey data

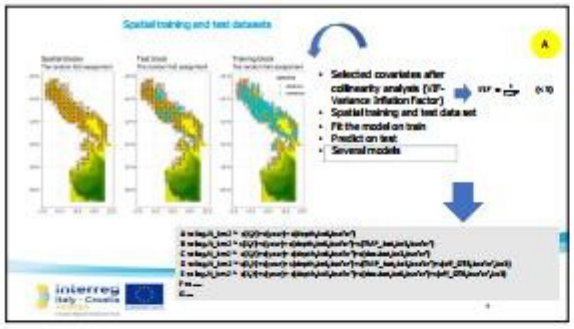

How?
Models approach:
• Predictive capacity with and without environmental variables (Copernicus products from HYDRO, BGC modules)
• Including effort from VMS/AIS as covariate (EFFORT)
• Comparison between models
• Increase knowledge on species distribution and aggregation areas
• Future scenario
Good information useful for fisheries management?

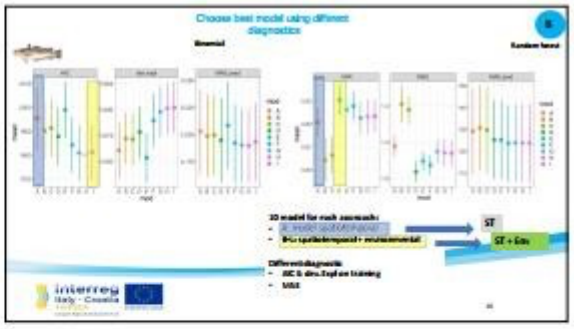

Species and MULTIMODEL approach....
European hake
Red mullet
Norway lobster
European horse mackerel
Anglerfish
Deep rose shrimp
Shortfin squid
Mantis shrimp
Cuttlefish
Common sole

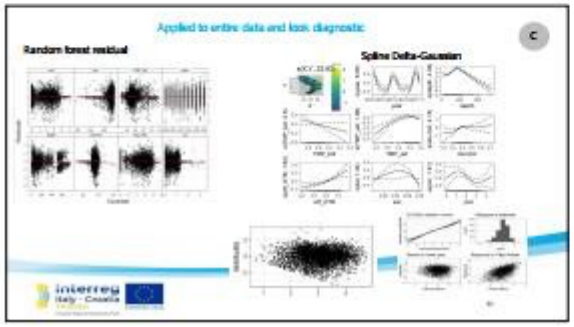

Work flow
Merge data
Complete data set
A
B
C
D
E
Hot Spot detection

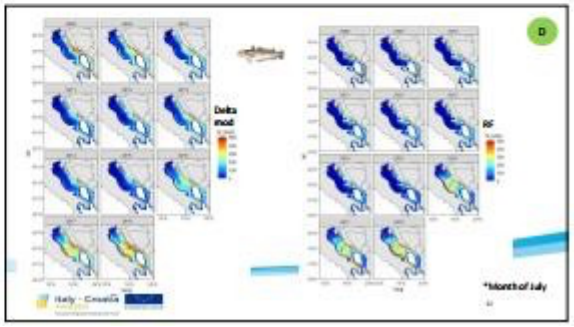

COPERNICUS
data
NCDF file 3D
Or...
Colleagues
*WP4 HYDRO, BGC: 4.1 & 4.2

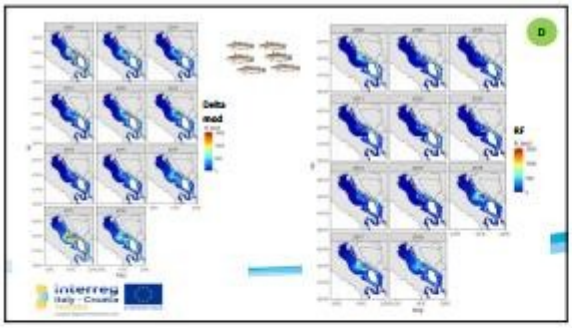

Effort data
Grid
Temporal coverage
2008 – 2018
Data sources
VMS
Gears
OTB and TBB
Unit
OTB LOA 18-24
*WP4 EFFORT 4.5

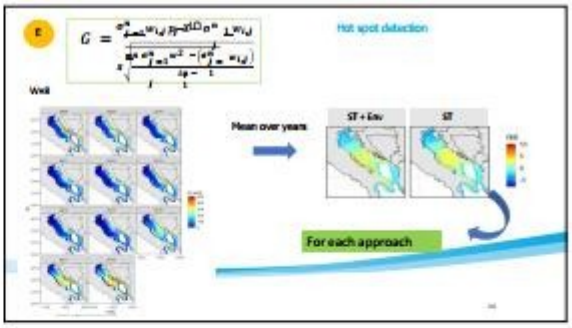

Spatial training and test datasets
A
Selected covariates after collinearity analysis (VIF-Variance Inflation Factor)
Spatial training and test data set
Fit the model on train
Predict on test
Several models

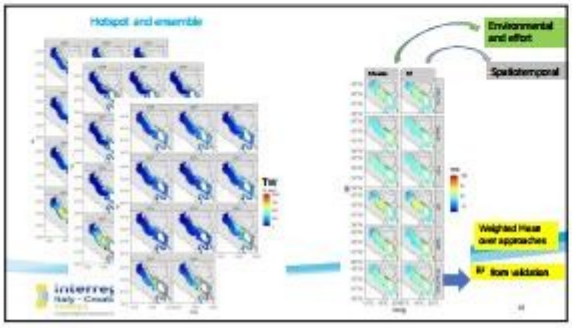

Choose best model using different diagnostics
B
Binomial
Random forest
ST
ST + Eds
Different diagnostic
MSE

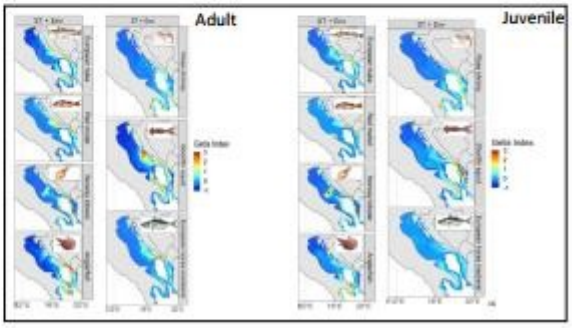

Applied to entire data and look diagnostic
C
Random forest residual
Spline Delta-Gaussian

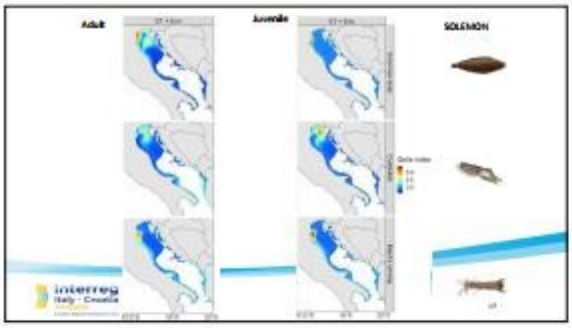

D
Delta mod
RF
*Month of July

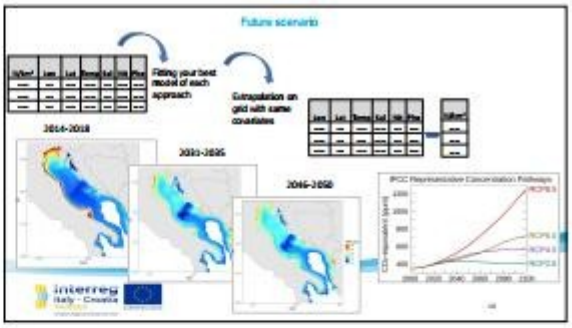


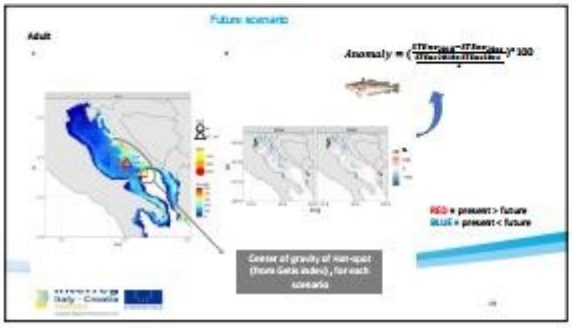

Hot spot detection
Mean over years
ST + Env
ST
For each approach

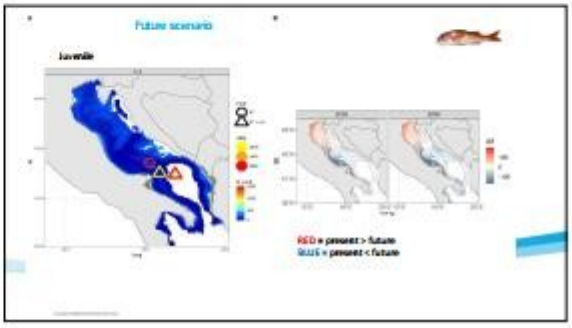

Hotspot and ensemble
Environmental and effort
Spatiotemporal
Weighted mean over approaches

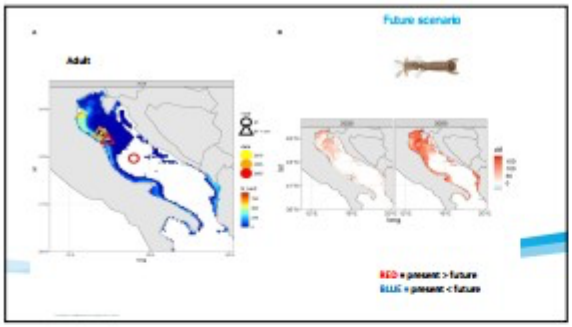

Adult
Juvenile

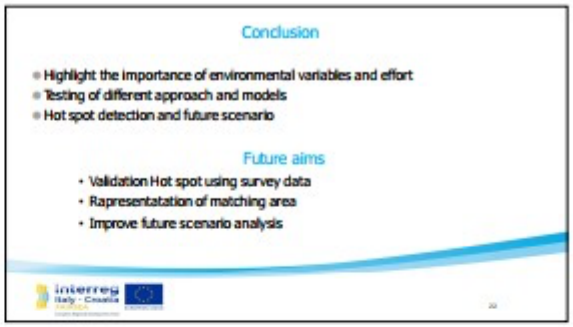

Adult
Juvenile
SOLEMON


Future scenario
Fitting your best model of each approach
Extrapolation on grid with same covariates
2016-2018
2031-2035
2046-2050

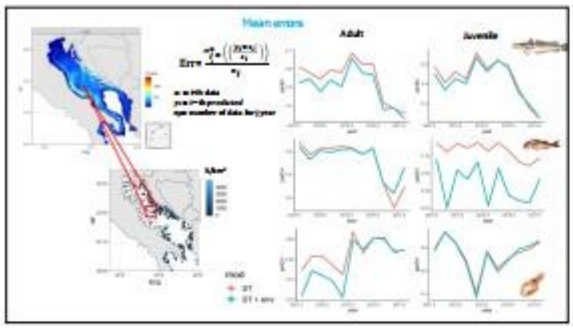

Future scenario
Adult
RED = present > future
BLUE = present < future

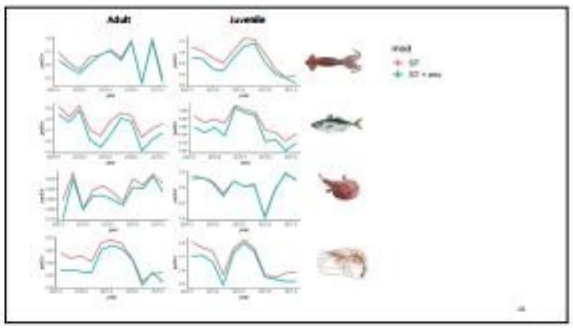

Future scenario
Juvenile
RED = present > future
BLUE = present < future

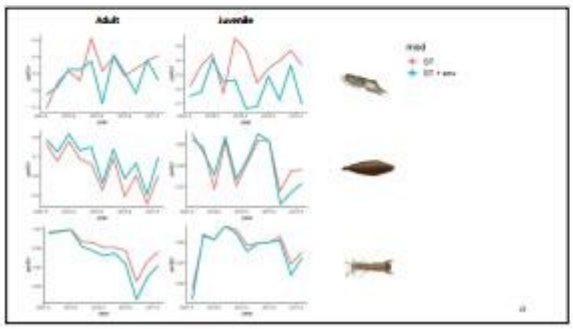

Future scenario
Adult
RED = present > future
BLUE = present < future

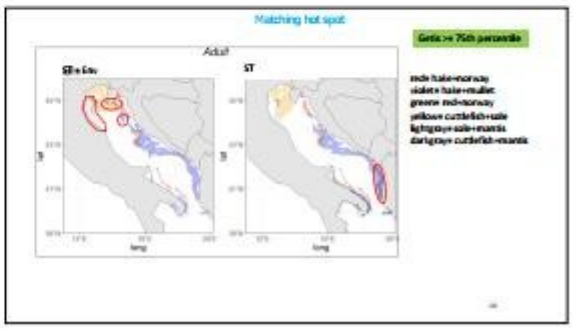

Conclusion
Highlight the importance of environmental variables and effort
Testing of different approach and models
Hot spot detection and future scenario
Future aims
Validation Hot spot using survey data
Rapresentatation of matching area
Improve future scenario analysis

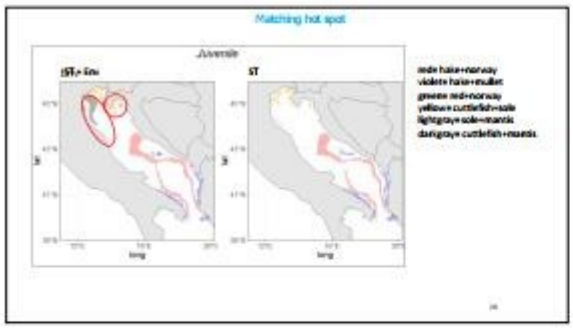

Thank you for the attention....
Question or suggestion?
dpanzeri@inogs.it

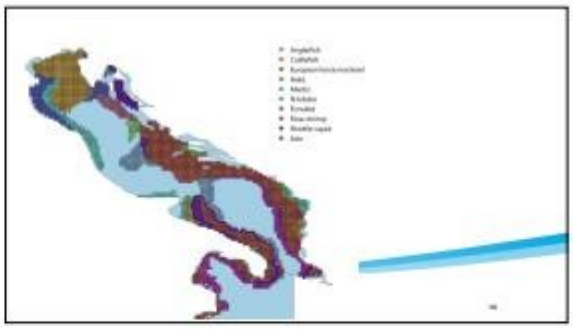

Mean errors
Adult
Juvenile
mod
ST
ST + env

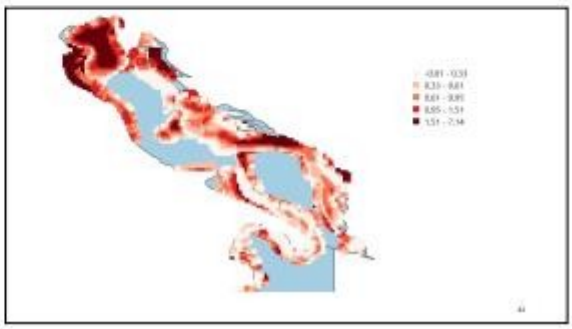

Adult
Juvenile
mod
ST
ST + env


Adult
Juvenile
mod
ST
ST + env


Matching hot spot
Adult
ST


Matching hot spot
Juvenile
ST
red= hake+norway
violet= hake+mullet
green= red+norway
yellow= cuttlefish+sole
lightgray= sole+mantis
darkgray= cuttlefish+mantis





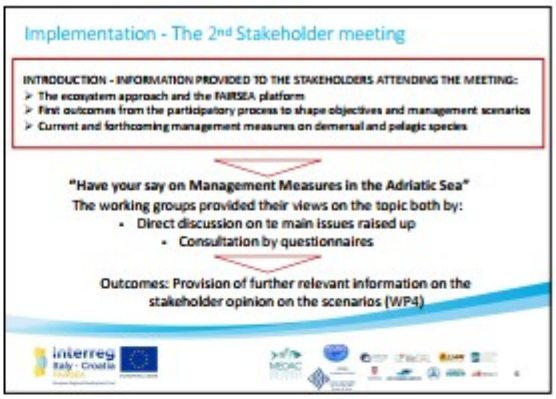

Participatory process
implementation and results
FAIRSEA| MEDAC | Rosa Caggiano
Final Conference | Split (Croatia) & Online | 8 July 2021

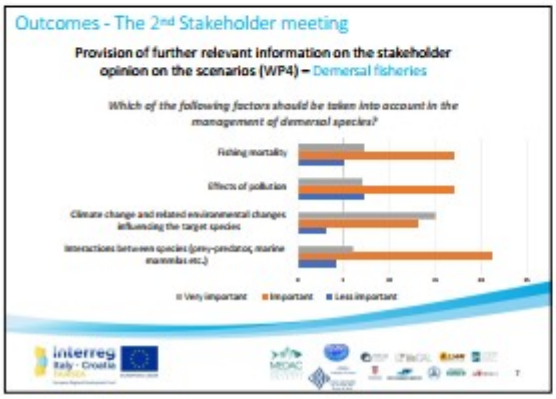

Participatory approach to avoid the Ivory tower
Developing the platform also through the stakeholder involvement as a way to:
Share objectives to reduce the risk to make something useless;
Identify the perceived important factors to be embedded;
Decide together scenarios to test;
Evaluate results

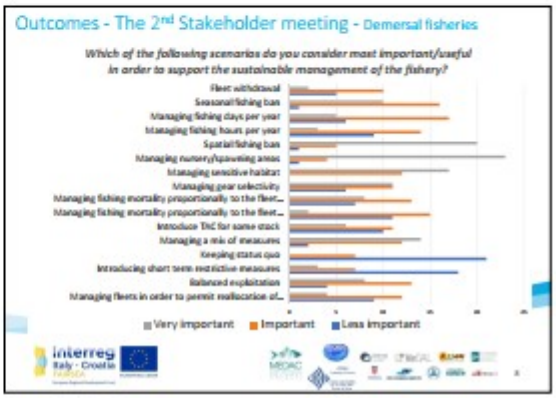

STAKEHOLDER ENGAGEMENT
to ensure stakeholders' participation in the process
TOWARD A DECISION SUPPORT SYSTEM
WP5
WP4
Integrated platform
Stakeholder events
Pilot actions
Scenarios of policy application
Best practices and guidelines

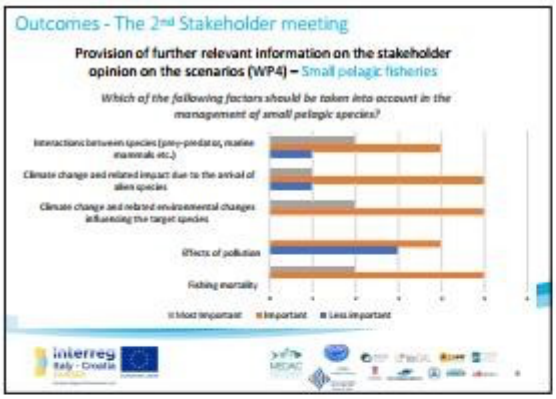

Implementation - The 1st Stakeholder meeting
• Overview of the project key data
•Main components of the management platform
• Preference modelling techniques to facilitate the participatory process
Priorities and sensitive issues raised by stakeholders have been discussed and their feedback on the fishery sustainability has been collected


Outcomes - The 1st Stakeholder meeting
✓ the perception of the objectives supporting the sustainable management of the fishery,
✓ the perception of the indicators applied to achieve the previous objectives,
✓ the scenarios considered more suitable to support the sustainable management of the fishery
Outcomes of the first consultation
➢ Non significant differences between the opinions of the different categories of stakeholders.
➢ Socio-economic objectives are taken into greater consideration by fishermen and their associations.
➢ The concept of MSY is not properly taken and, in any case, generates mistrust by the group Fishermen & Associations.
➢ Fishing mortality indicators also generate distrust or are considered less useful.
➢ The most reliable management scenarios are those based on spatial (nursery and sensitive habitat) or temporal fishing ban, or fishing days per year.
➢ The least appreciated management scenario is the one based on TACs.


Implementation - The 2nd Stakeholder meeting
INTRODUCTION - INFORMATION PROVIDED TO THE STAKEHOLDERS ATTENDING THE MEETING:
➢ The ecosystem approach and the FAIRSEA platform
➢ First outcomes from the participatory process to shape objectives and management scenarios
➢ Current and forthcoming management measures on demersal and pelagic species
"Have your say on Management Measures in the Adriatic Sea"
The working groups provided their views on the topic both by:
• Direct discussion on te main issues raised up
• Consultation by questionnaires
Outcomes: Provision of further relevant information on the stakeholder opinion on the scenarios (WP4)


Outcomes - The 2nd Stakeholder meeting
Provision of further relevant information on the stakeholder opinion on the scenarios (WP4) – Demersal fisheries
Which of the following factors should be taken into account in the management of demersal species?
Fishing mortality
Effects of pollution
Climate change and related environmental changes influencing the target species
Interactions between species (prey-predator, marine mammals etc.)
Very important
Important
Less important


Outcomes - The 2nd Stakeholder meeting - Demersal fisheries
Which of the following scenarios do you consider most important/useful in order to support the sustainable management of the fishery?
Fleet withdrawal
Seasonal fishing ban
Managing fishing days per year
Managing fishing hours per year
Spatial fishing ban
Managing nursery/spawning areas
Managing sensitive habitat
Managing gear selectivity
Managing fishing mortality proportionally to the fleet...
Managing fishing mortality proportionally to the fleet...
Introduce TAC for some stock
Managing a mix of measures
Keeping status quo
Introducing short term restrictive measures
Balanced exploitation
Managing fleets in order to permit reallocation of...
Very important
Important
Less important


Outcomes - The 2nd Stakeholder meeting
Provision of further relevant information on the stakeholder opinion on the scenarios (WP4) – Small pelagic fisheries
Which of the following factors should be taken into account in the management of small pelagic species?
Interactions between species (prey-predator, marine mammals etc.)
Climate change and related impact due to the arrival of alien species
Climate change and related environmental changes influencing the target species
Effects of pollution
Fishing mortality
Most important
Important
Less important


Outcomes - The 2nd Stakeholder meeting – Small pelagic fisheries
Which of the following scenarios do you consider most important/useful in order to support the sustainable management of the fishery?
Most important
Important
Less important


Implementation - The 2nd Stakeholder meeting
The FAIRSEA Pilot Actions in the Adriatic Sea, management scenarios in:
- North Adriatic Sanctuary: changing selectivity of trammel nets (MPS)
- Decision support tool applied to the management of the Veneto professional and recreational fisheries (VeGaS)
- Socio-economic effects of different management scenarios applied to Rapido trawl fishery targeting common sole in Marche Region (ASSAM)
"Have your say: debate and inputs from stakeholders on the next steps of pilot actions"
Inputs from stakeholders (questionnaire) for comparing management scenarios
OUTCOMES of scenarios in the 3rd Stakeholder meeting


The 3rd Stakeholder meeting contents
Scenarios of fisheries policy application in the Adriatic
Management advice aimed to rationalise the fishery activities in order to reduce the loss of jobs. An analysis shared with the stakeholders and decision makers on the virtual actions implemented in the management scenarios.
Best practices and guidelines emerging from FAIRSEA
Results emerging from the application to the integrated platform to define different management measures (e.g. spatio-temporal measures, closure of nursery areas, etc.) serve as a basis for defining best practices for developing a shared ecosystem approach and guidelines in the region.
Best practices for fisheries management can be taken into consideration toward the future development of multiannual fishery management plans. Finally, the guidelines will facilitate improvements of the tools developed and their use.


Participatory process implementation and results
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INCREASING AWARENESS - tools and results
FAIRSEA| Sunce | Tea Kuzmičić Rosandić
Final Conference, Split, 08.07.2021.
sunce


TOOLS
PLAYDECIDE - DISCUSSION GAME
allows to talk in a simple, respectful and fact-based way about controversial issues,
the game enables players to get familiar with a question, see it from different perspectives and form or clarify their own opinion,
invites players to look at issues as a group,
the game culminates in a vote on a number of proposed policy positions.
A PlayDecide session lasts approximately 90 minutes in total. The ideal number of players is 4 to 8.


TOOLS
PLAYDECIDE - DISCUSSION GAME


TOOLS
FOOD WEB CARD GAME – Fish and ships
Fish in a sustainable way in your sea in order to obtain more points than the other players for cards in the sea and cards of caught species.


TOOLS
FOOD WEB CARD GAME- Fish and ships


TOOLS
SEMINAR SERIES


•SEMINAR SERIES – Practical workshop


• SEMINAR SERIES – Field trip workshop


SEMINAR SERIES –Practical workshop


RESULTS
PLAYDECIDE - DISCUSSION GAME


RESULTS
PLAYDECIDE - DISCUSSION GAME
Youth seminar (Split) – in total 12 participants (students)
Practical workshop (Split) – in total 20 participants (students)
Practical workshop (Split) – in total 17 participant (students)


RESULTS
FOOD WEB CARD GAME – Fish and ships
Practical workshop (Split) – in total 20 participants (students)
Practical workshop (Split) – in total 17 participant (students)
Practical workshop (Vis) -in total 12 participants (students)
Practical workshop (Hvar)


RESULTS
FOOD WEB CARD GAME – Fish and ships
DISTRIBUTION
In total we distributed 410 Fish and Ships game among different stakeholders from the Croatian and Italian sides


RESULTS
SEMINAR SERIES
In total we educated 79 students and professors about FAIRSEA project and Ecosystem approach to fisheries.
In total 78 students and professors were involved in Field trip workshop.
In total 37 students and professors were involved in the Practical workshop.


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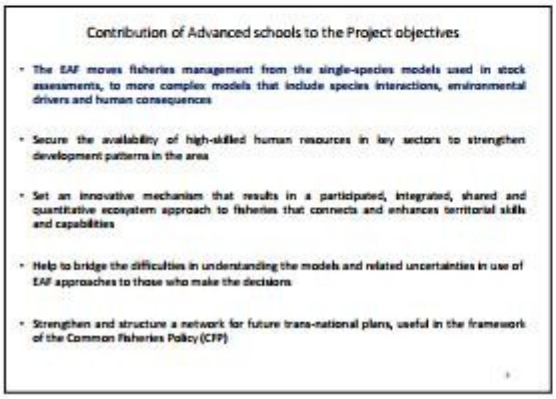
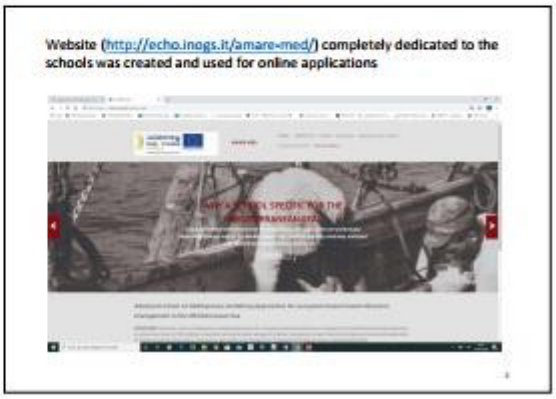
Increased skills and capacities on EAF through FAIRSEA advanced schools
FAIRSEA project
Final conference
Svjetlana Krstulović Šifner and Jure Brčić
University of Split, Department of Marine Studies
Split, 8th July 2021
OGS
sunce


WP3: Mapping, benchmarking, sharing and enhancing EAF capabilities
Activity 3.3. Enhancing technical capabilities on Ecosystem Approach to Fisheries (EAF)
WP3
Two advanced school were foreseen by the Project proposal:
First (2019)
Single and Multispecies approaches for data rich and data limited conditions
Second (2021)
Multidisciplinary ecosystem management approaches using spatial modelling with addressing socio-economic and environmental issues
sunce


Contribution of Advanced schools to the Project objectives
The EAF moves fisheries management from the single-species models used in stock assessments, to more complex models that include species interactions, environmental drivers and human consequences
Secure the availability of high-skilled human resources in key sectors to strengthen development patterns in the area
Set an innovative mechanism that results in a participated, integrated, shared and quantitative ecosystem approach to fisheries that connects and enhances territorial skills and capabilities
Help to bridge the difficulties in understanding the models and related uncertainties in use of EAF approaches to those who make the decisions
Strengthen and structure a network for future trans-national plans, useful in the framework of the Common Fisheries Policy (CFP)


Website (http://echo.inogs.it/amare-med/) completely dedicated to the schools was created and used for online applications

First advanced school on quantitative methods for EAF application

- First advanced school entitled AMARE-MED 2019 (Advanced school on Multispecies modelling Approaches for ecosystem based marine REsource management in the MEDiterranean Sea)
- Organized by the National Institute of Oceanography and Experimental Geophysics (OGS) in collaboration with CNR-IRBIM (National Research Council – Institute for Marine Biological Resources and Biotechnology), and Istituto Veneto di Scienze Lettere ed Arti (IVSLA).
- Held from 1st to 6th July 2019 at the historical premises of the IVSLA, Palazzo


Programme

- The First advanced school covered single species approaches in data poor and data rich conditions and multispecies approaches for EAF
- In-depth investigation of options for data-limited situations using the fishPath decision support tool and of single and multispecies models using CEATTLE
- An introduction to Monte-Carlo methods for data-limited stock assessment

Highly technical course with practical hands-on computer activities, assignments and programming

Lecturers 2019

André Punt
(School of Aquatic and Fishery Sciences, University of Washington – USA)

Gianpaolo Coro
(Istituto di Scienza e Tecnologie dell'Informazione A. Faedo" - CNR, Italy)

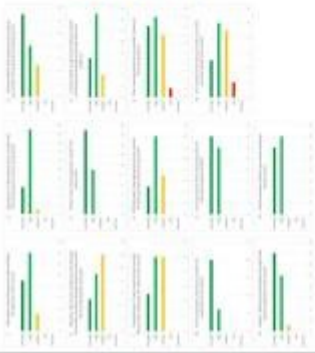
Natalie Dowling
(Oceans and Atmosphere in Hobart, Tasmania - Australia)

The flyer developed and distributed for the First advanced school

- Information was sent to more than 400 institutions/individuals
- Selection committee selected 33 candidates among 100 applicants
- 22 selected students were supported by the Project for travel and accommodation and 5 applicants received the full support from the FAO General Fisheries Commission for the Mediterranean and Black Sea (GFCM).
- All selected students successfully finished the course

- Participants from the Italy-Croatia CBC program area: 14 (3 from Croatia and 11 from Italy). Other 3 participants were from Italy (out of the CBC program area), 2 from Spain and Turkey, and 1 from Algeria, France, Germany, India, Ireland, Mexico, Morocco, Tunisia, UK, Ukraine and USA.

Student evaluation



Second advanced school on quantitative methods for EAF application

- Organized by UNST, OGS and Sunce
- Announced in December 2019
- Information was sent to over 600 potentially interested stakeholders (individuals + institutions)
- online applications were opened from 15th January to 15th March 2020
- The selection among 123 applicants (from 32 countries) and final ranking was agreed by the Selection committee and announced to the applicants by the end of April 2020
- 30 students coming from 12 different countries were selected

Members of the Scientific Committee

- Angelo Bonanno, CNR-IAMC, Italy
- Roberto Carlucci, CONISMA
- Piera Carpi, CEFAS, UK
- Francesco Colloca, CNR-IAMC, Italy
- Fabio Fiorentino, CNR-IAMC, Italy
- Tomaso Fortibuoni, ISPRA, Italy
- Sujettana Krstulović Šifner, UNIST, Croatia
- Simone Libralato, OGS, Italy
- Saša Raicevich, ISPRA, Italy
- Giuseppe Scarcella, CNR-IAMC, Italy
- Cosimo Solidoro, OGS, Italy
- Maria Teresa Spedicato, Coispa, Italy
- Nedo Vrgoč IOF, Croatia

Members of the Selection Committee

- Francesco Colloca, CNR-IAMC, Italy
- Sujettana Krstulović Šifner, UNIST, Croatia
- Simone Libralato, OGS, Italy
- Giuseppe Scarcella, CNR-IAMC, Italy
- Nedo Vrgoč IOF, Croatia

Participants

- 14 from the Italy-Croatia CBC programme area: 10 from Italy and 4 from Croatia. One Italian participant was not from the CBC program area.
- Other participants: Peru (1), USA (1), Brazil (1), Egypt (4), Tunisia (2), Turkey (2), Spain (1), Belgium (1), Ukraine (1) and Finland (1).

- Initially planned to be held in Split, 20th -25th July 2020
- Lectures were planned to be held in the building Z3F at the University campus and accommodation for teachers and students in the hostel, also at University campus

Building Z3F (Zgrada tri fakulteta)

Hostel Dr. Franjo Tuđman

- Due to the COVID-19 pandemic the School was postponed to June 21st – 26th 2021
- Situation with pandemic worsen – final decision made by the Organizing Committee in mid April, only students from the partner institutions with the possibility to come in person
- Mixed model: in person (10 students) and others on-line
- Not possible to be at the Campus (students still in the Dormitory and classrooms all occupied as the number of students is much lower – pandemic epidemiological measures)
- School fully organized in the hotel Ora (accommodation and lectures)
- Travel and accomodation for all students in person were fully covered by the Project

Hotel Ora in Split


Lecturers 2021
Kim de Mutsert
School of Ocean Science and Engineering, University of Southern Mississippi, USA
André Punt
School of Aquatic and Fishery Sciences at the University Washington, Seattle
Simone Libralato
National Institute of Oceanography and Applied Geophysics – OGS, Italy
Natalia Serpetti
National Institute of Oceanography and Applied Geophysics – OGS, Italy


1. day: opening

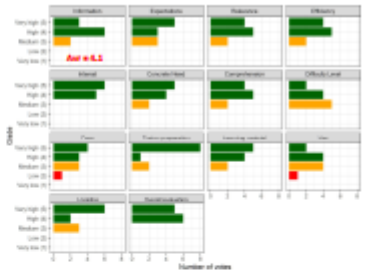

Programme
• Modeling in Ecospace using EwE (Ecopath with Ecosim)
• Spatial population dynamics modeling
• Spatial multispecies model from data to management scenarios: excercises with available data from the Adriatic Sea (working groups = different perspectives: policy makers, fisherman, NGOs and scientists)
Just like the previous one, the Second advanced school was highly technical with practical hands-on computer activities and assignments


• 21 students successfully finished the course: 10 attended school in person and 11 on-line
ANAMAE-MED 2021
OGS
sunce
Students who successfully finished the Advanced schools (First and Second) received certificates (above: an exemple of the Second advanced school certificate)

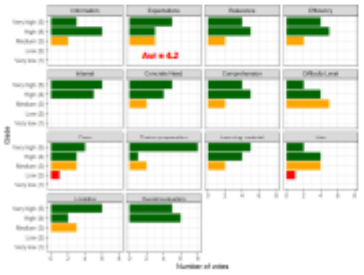
Student evaluation

- How was it performed?
  - The questioner was created using MS Forms and sent to students via e-mail
- How many responses did we get?
  - A total of **11 responses** to this date
    - In person = 6
    - On-line = 5

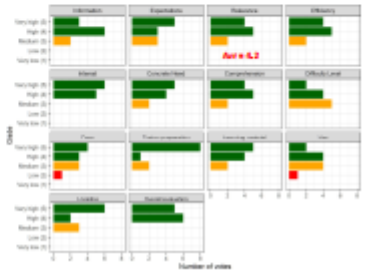
Information: How well were you informed about the objectives of this course?



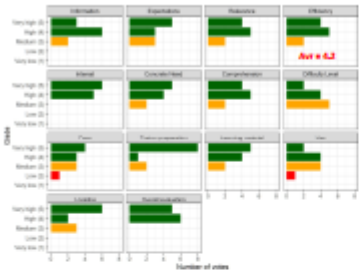
Expectations: To what extent do you consider that this training course met your expectations?



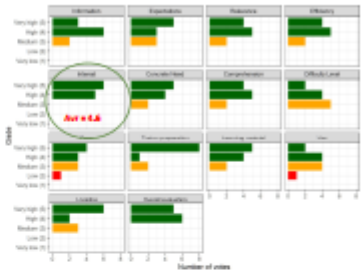
Relevance: How relevant to your work do you consider the content of this training course?



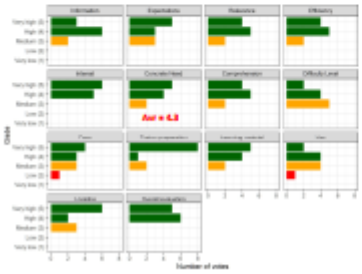
Efficiency: How do you consider the ratio between the number of subjects lectured within the course and the time allocated for each topic?



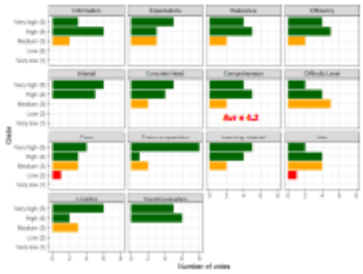
Interest: How interesting did you consider this course to be?



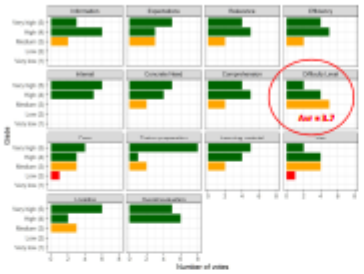
Concrete Need: To what extent did you consider the training was oriented to concrete needs and problems?



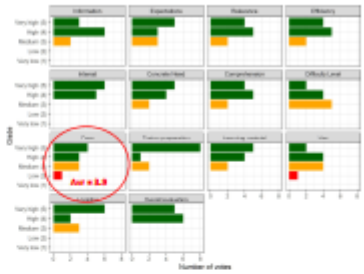
Comprehension: To what extent do you consider that you have understood the content of the course?



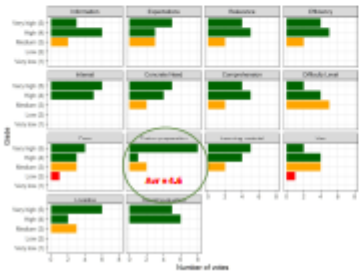
Difficulty Level: How appropriate do you consider the difficulty level of this training course?



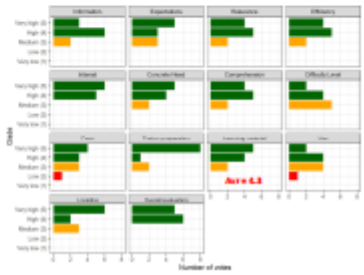
Pace: How appropriate do you consider the pace of this training course?



Trainer preparation: How do you consider the preparation of the trainers?

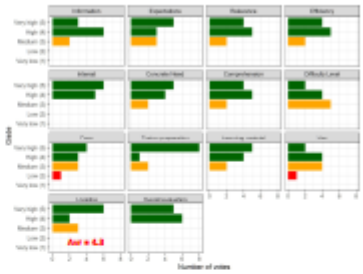


Learning material: Were the learning aids and materials of a good standard?



Use: To what extent will you be able to use what you have learned in this course?

Logistics: What do you think about the logistic and general organization of the course?



Overall evaluation: What is your overall evaluation for this course?

First vs. second school pooled (in-person + online)

Question	First school	Second school Pooled
Information	4.2	4.1
Expectations	4.2	4.2
Relevance	4.3	4.2
Efficiency	3.7	4.2
Interest	4.7	4.5
Concrete Need	4.1	4.3
Comprehension	3.8	4.2
Difficulty Level	3.9	3.7
Pace	4.0	3.9
Trainer preparation	4.8	4.5
Learning material	4.5	4.3
Use	3.7	3.6
Logistics	4.5	4.3
Overall evaluation	4.5	4.5

Is this a fair comparison?

First vs. Second (in-person only)

Question	First school	Second school
		In-person
Information	4.2	4.3
Expectations	4.2	4.5
Relevance	4.3	3.8
Efficiency	3.7	4.5
Interest	4.7	4.5
Concrete Need	4.1	4.3
Comprehension	3.8	4.3
Difficulty Level	3.9	4.0
Pace	4.0	4.0
Trainer preparation	4.8	4.5
Learning material	4.5	4.5
Use	3.7	3.7
Logistics	4.5	4.7
Overall evaluation	4.5	4.7

What did we learn from this experience?

Participants prefer in-person over online!

Question	First school	Second school	
		In-person	Online
Information	4.2	4.3	3.8
Expectations	4.2	4.5	3.8
Relevance	4.3	3.8	4.6
Efficiency	3.7	4.5	3.8
Interest	4.7	4.5	4.6
Concrete Need	4.1	4.3	4.2
Comprehension	3.8	4.3	4.0
Difficulty Level	3.9	4.0	3.4
Pace	4.0	4.0	3.8
Trainer preparation	4.8	4.5	4.6
Learning material	4.5	4.5	4.0
Use	3.7	3.7	3.6
Logistics	4.5	4.7	3.8
Overall evaluation	4.5	4.7	4.2

Suggestions? What would you change? What would you keep? (N = 3)

- Very interesting the aggregation of students in groups of stakeholders to work on the models. I think that is very useful to adopt in next AMARE-MED editions.
- Hybrid teaching was not so easy. Perhaps next time you could allocate more people to help online students, e.g. having one or two helping those online, and similar number helping those in presence. I had the feeling in a few cases that the online participants struggled to get help, but maybe it was just my perception.
- In case the future workshops need to be online, I would strongly recommend to record the lectures and sessions. They can have a limited availability, but it would help greatly. Personally, I would prefer to have some of the exercise materials available well in advance and also, it would be good to really stress and point out materials and/or programs that need to be downloaded beforehand for the exercise. I think it would have save us a lot of time.

Any other comments you want to share? (N = 3)

- Even online attending was great!! congratulations for such a good organization. Hope we can meet soon :-)
- the online participation was not so easy. This is nobody's fault. I am more familiar with Zoom as a platform, perhaps that would have made my experience better. Anyway, given the limitations, the course was a great experience, and the technical help, logistics as well as lecturer all went smoothly despite occasional challenges. Overall, good job!
- I appreciate the effort and time put into the organisation of the workshop, particularly the online one. I know that this was the last option and that many things were done for the first time without prior experience or the time to test it. All in all, it was a fun and wonderful workshop! Looking forward to the next one!

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FAIRSEA| MPS| dr.sc. Danijela Mioković

SECOND INTERNATIONAL STAKEHOLDER MEETING
Virtual| 23-24 February 2021

Activity 5.2. Pilot actions

Description

- The pilot actions regard the scenarios of local management actions in the integrated decision support tool developed
- Pilot actions regard 3 subareas (eastern Veneto; Marche region; Istria County).
- The simulation of management activities implementation for the 3 areas will provide applicative and demonstrative case studies.

Activity 5.2. Pilot actions: identification of conflicts and possible solutions

CROATIA

- The participants attending the stakeholder meetings in Poreč on 24th of July 2019 were interviewed and ideas and suggestions regarding local management actions were noted.
- These suggestions were further discussed with PP on the technical meeting in Split and on Skype meeting held on 20th of November, as wellll as in personal communication within PP.

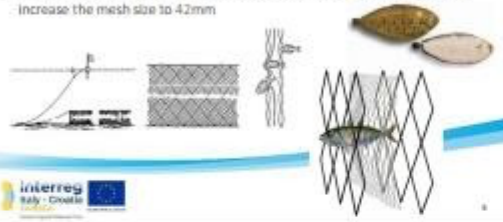
Activity 5.2. Pilot actions: identification of conflicts and possible solutions

CROATIA

- The management action chosen for pilot action in Istria County is a proposal for the increase in mesh size of trammel nets for catching sole (*Soleo sp.*) and the resulting effects on stock and on marketing price, as well as economic consequences for fishermen.
- The testing of these nets has already started with the project ARIEL – this was accepted as an innovation idea. Selectivity data was gathered by scientists from IOF.

Activity 5.2. Pilot actions: identification of conflicts and possible solutions

- Trammel nets for catching sole are made from 3 layers of netting with a slack small mesh inner netting between two layers of large mesh netting within which fish will entangle.
- The minimum mesh size for the inner net is 40mm, and the proposal is to increase the mesh size to 42mm



Activity 5.2. Pilot actions: identification of conflicts and possible solutions

THE DATA

- The data used for pilot actions was collected by IOF, Split
- The data was collected for the INTERREG project Ariel (ARIEL overall objective is to promote technological and non-technological solutions for innovation up take of small-scale fishery and aquaculture in Adriatic-Ionian basin)
- during the period from June 2018 to December 2019, in fishing area A1 (around Salvore and Umago)
- The catch and discard by 15 fisherman was analyzed in detail, two mash sizes were used

The Multiannual Management Plan in the Adriatic Sea

Recommendation GFCM/43/2019/5 on a multiannual management plan for sustainable demersal fisheries in the Adriatic Sea (geographical subareas 17 and 18)

PART III
Technical measures
Minimum conservation reference size

MCRS

c) for common sole, at 20 cm TL

Multiannual Management Plan

Focus in GSA17
target species: common sole, *Solea solea*
fleet: trammel netters in Istra county

Simulations using bioeconomic modelling – BIOECO

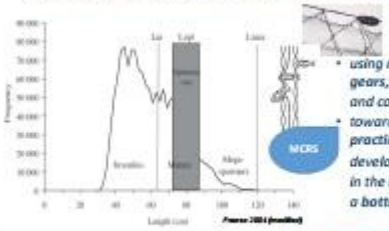
Improving the exploitation pattern – the technical approach

Impacts of potential management actions at the local and basin scale, in the short and medium terms by considering technical interactions.

- *investigating the consequences of scenarios, to evaluate how changes/shifts in fishery-driven effects (e.g. fishing mortality, gear selectivity) influence stock and fisheries productivity.*

Simulations using bioeconomic modelling – BIOECO

Improving the exploitation pattern – the technical approach



- *using more selective gears, ensuring control and compliance;*
- *towards defining best practices for developing guidelines in the region as steps of a bottom up approach*

Thank you!

Ministry of agriculture
Croatia
(ex CAFAS – Croatian agricultural and forestry advisory service)
Drac. Danijela Miokovic

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MINISTARSTVO POLJOPRIVREDE

Bio-economic evaluation of alternative management scenarios with BEMTOOL

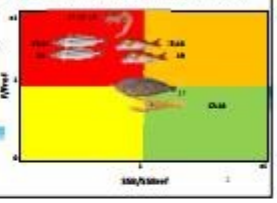
FAIRSEA Project

Maria Teresa Spedicato, Isabella Bitetto, Giovanni Romagnoni, and Giuseppe Lembo,
COISPA

Final Conference | 8.07.2021

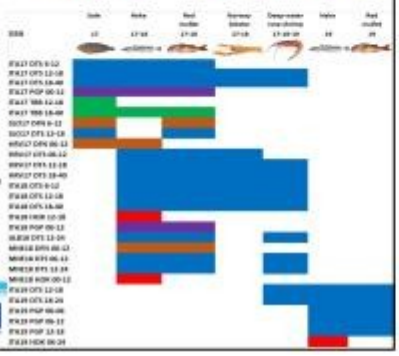
Elements for scenarios' settings and forecsts using BEMTOOL

- ✓ the nature of the Adriatic-Ionian mixed fisheries with interactions among fleets and target stocks;
- ✓ the Recommendation GFCM/43/2019/5 and its management targets;
- ✓ the awareness that efforts towards the improvement of the exploitation pattern might mitigate other too restrictive measures;
- ✓ the concept of mitigating species underutilization under scenario of fishing effort reduction, given that some species are close to a sustainable exploitation and other are not;
- ✓ the inputs received during the previous stakeholder meeting as regards the setting of a weighed reference point;
- ✓ the risk that limiting the activity over a certain level might cause unrecoverable losses in the medium term



Stocks – Fleets interactions in the demersal mixed fisheries of the Adriatic sea

Several interactions, especially in the Adriatic mixed fisheries, between trawlers, at a wider spatial scale, and between trawlers and small scale at a more local scale



Dependency of the fisheries from the assessed stocks

The assessed species in the GSA 17-18 are included in the Recommendation GFCM/43/2019/5. The % of the target species on the total landings and total revenues by fleet (in green >30%) reveals a quite relevant dependency of some fleets

Fleet	total landing	total revenues	Fleet	total landing	total revenues
SVN_17_DFN_0612	22.5	30.9	MNE_18_DFN_0012	8.7	3.6
SVN_17_DTS_1218	9	8.3	MNE_18_HOK_0012	12.3	6.3
ITA_17_DTS_0612	7.8	15.3	ITA_18_DTS_0612	22.6	43.6
ITA_17_DTS_1218	24.3	22.4	ITA_18_DTS_1218	29.7	43.1
ITA_17_DTS_1840	38.1	42.9	ITA_18_DTS_1840	65.9	46.9
ITA_17_PGP_0012	5.8	13.8	ITA_18_HOK_1218	34.4	44.9
ITA_17_TBB_1218	29.7	41.8	ITA_18_PGP_0012	6.5	4.2
ITA_17_TBB_1840	28.8	51.1	ALB_18_DTS_1224	46.3	50.5
HRV_17_DFN_0612	34.4	32.9	ITA_19_DTS_1218	38.9	25.5
HRV_17_DTS_0612	52.2	55.1	ITA_19_DTS_1824	41.0	35.8
HRV_17_DTS_1218	60.4	56.7	ITA_19_HOK_0624	6.0	1.8
HRV_17_DTS_1840	74.9	79.1	ITA_19_PGP_0006	9.6	13.0
MNE_18_DTS_0612	74.1	55.7	ITA_19_PGP_0612	11.9	15.1
MNE_18_DTS_1224	58.2	42.9	ITA_19_PGP_1218	0.8	3.4

Assumptions on socio-economic functions by fleet for the BEMTOOL forecasts

- ✓ total landing and total revenues (assessed stocks + other species) proportional to the landings of assessed stock;
- ✓ price dynamic modelled as a function of the variation of landing (modified from Salz et al., 2011), through an elasticity coefficient;
- ✓ variable costs simulated as a function annual fishing activity;
- ✓ the fixed or non-variable costs based on the annual GT;
- ✓ the capital costs depend on the annual GT (Saltz et al., 2011; Froest et al., 2013).
- ✓ labour costs modelled according to the crew share system.

Recommendation GFCM/43/2019/5

- Transition phase 2020-2021: At least 12% reduction for OTB and 16 % for TBB with respect to the annual effort exerted in 2015 or to the three-year average within the 2015-2018 period.
- A five-year fishing effort regime shall be established for 2022-2026: each year, on the basis of SAC advice, the GFCM shall establish yearly effort quotas, thus contributing to reaching Fmsy and staying within safe biological limits.
- In 2020 and 2021, a transitional fishing effort regime shall be established. CPCs
- The provisions in paragraphs 11 and 12 shall not apply to national fleets operating with OTB and fishing for less than 1 000 days during the reference period;
- Closure of coastal zone (6 NM) (alternatively 30 continuous days FB) + exhisting FRAs + new FRAs.

Effort allocation formula

[CPC a reduction = Overall reduction * ($CPCa^2$/ ($CPCa^2$+$CPCb^2$+ $CPCc^2$+$CPCd^2$+$CPCe^2$))]

Target reference point

- We estimated a combined (all target species) F target, based on the landing value of each stock and its F_{MSY} proxy:

$$F_{MSY,combined} = \frac{\sum_{sp=1}^{S}(ValueLand_{sp} * F_{MSY,sp})}{\sum_{sp=1}^{S} ValueLand_{sp}}$$

$F_{current,combined}$ (2021) =0.64

$F_{MSY,combined}$=0.35

$F_{MSY(for\ combined)}$ ~0.2
i.e. the RP corresponding to the target of European hake (F_{MSY}=0.18; F_{hake}=0.25)

A strategy to mitigate possible underutilization of certain stocks when reductions of fishing effort affect mixed fisheries in which species with a different level of exploitation are the targets

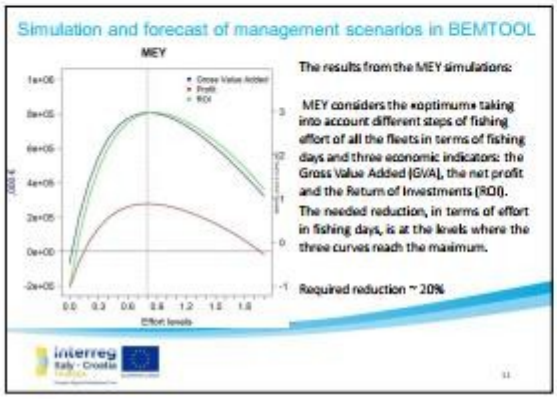
Simulation and forecast of management scenarios in BEMTOOL

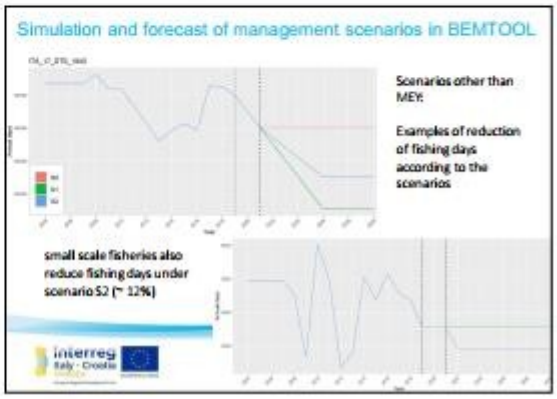
After the transition phase (2020-2021):

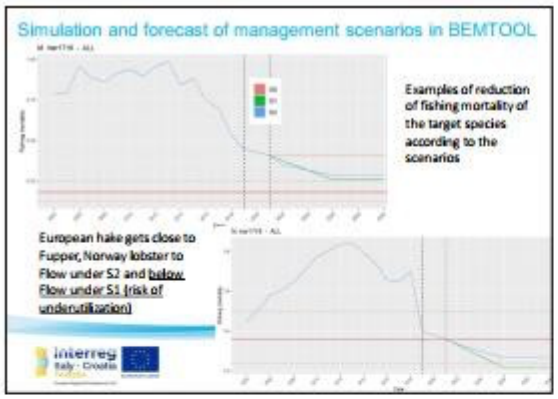
- S0: status quo, i.e. no variations compared to 2021, this scenario, as the other ones, incorporates the transition phase; all the measures already in place (seasonal fishing ban, existing closed areas) are included;
- S1: linear reduction of 40% in FD until 2026 for trawlers and rapido toward the $F_{MSY\ combined}$ (0.35 value), we used a combined RP considering the target species of the GFCM Recommendation instead of European hake F_{MSY} (0.18)
- MEY (Maximum Economic Yield); MEY considers the «optimum» taking into account the whole fishing effort deployed and takes as reference 3 economic indicators.

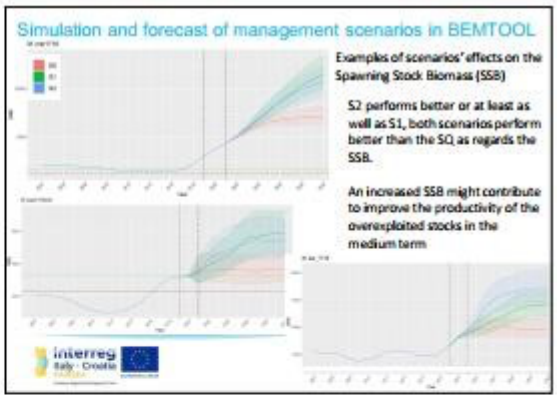

Simulation and forecast of management scenarios in BEMTOOL
After the transition phase (2020-2021):
S2: is a composite scenario with a combination of measures:
fleet selectivity improvements +
spatial closure areas (within 6 nautical miles, until December) taking into account the presence of nurseries of the main target species in the same areas +
2 months of fishing bans for other gears (PGP 17-18 and DFN Croatia fishing ban in Feb and May; HOK GSA 18 in March and May) +
linear reduction of 25% in FD for trawlers and rapido fleets

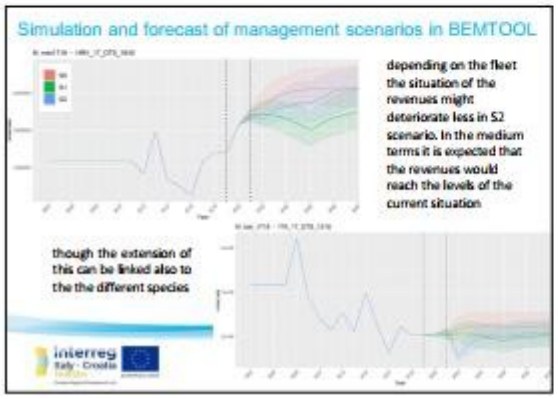

Simulation and forecast of management scenarios in BEMTOOL
S02 = combined reductions
+ spatial closure areas (within 6 nautical miles, until December) taking into account the fishing pressure in the area from AIS (Global Fishing Watch) and the presence of nurseries of the main target species in the same areas
and

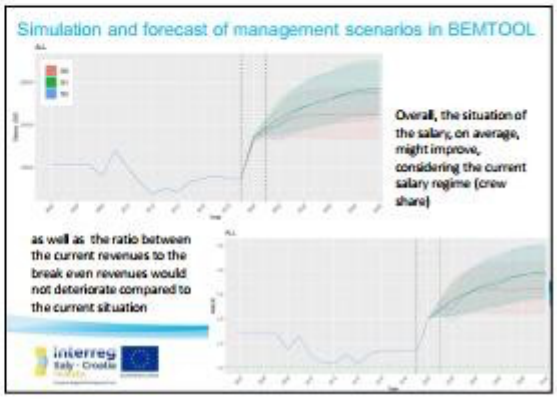

Simulation and forecast of management scenarios in BEMTOOL
MEY
The results from the MEY simulations:
MEY considers the «optimum» taking into account different steps of fishing effort of all the fleets in terms of fishing days and three economic indicators: the Gross Value Added (GVA), the net profit and the Return of Investments (ROI).
The needed reduction, in terms of effort in fishing days, is at the levels where the three curves reach the maximum.
Required reduction ~ 20%

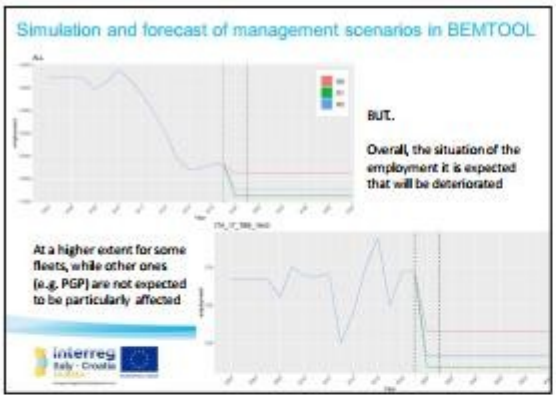

Simulation and forecast of management scenarios in BEMTOOL
Scenarios other than MEY:
Examples of reduction of fishing days according to the scenarios
small scale fisheries also reduce fishing days under scenario S2 (~ 12%)

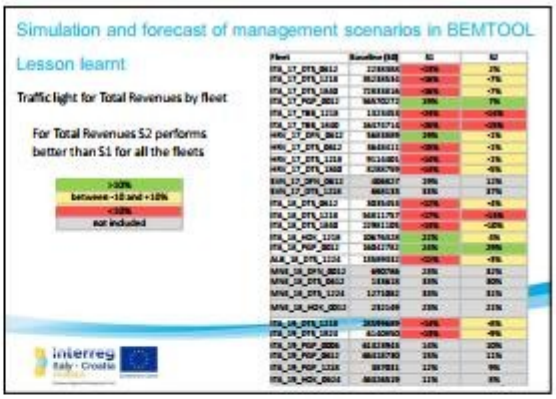

Simulation and forecast of management scenarios in BEMTOOL
Examples of reduction of fishing mortality of the target species according to the scenarios
European hake gets close to Fupper, Norway lobster to Flow under S2 and below Flow under S1 (risk of underutilization)

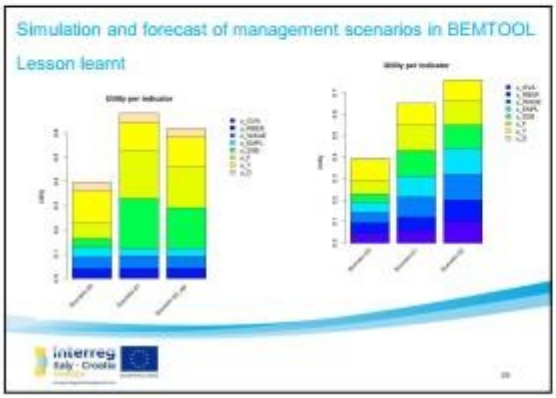

Simulation and forecast of management scenarios in BEMTOOL
Examples of scenarios' effects on the Spawning Stock Biomass (SSB)
S2 performs better or at least as well as S1, both scenarios perform better than the SQ as regards the SSB.
An increased SSB might contribute to improve the productivity of the overexploited stocks in the medium term


Simulation and forecast of management scenarios in BEMTOOL
depending on the fleet the situation of the revenues might deteriorate less in S2 scenario. In the medium terms it is expected that the revenues would reach the levels of the current situation
though the extension of this can be linked also to the the different species


Simulation and forecast of management scenarios in BEMTOOL
Overall, the situation of the salary, on average, might improve, considering the current salary regime (crew share)
as well as the ratio between the current revenues to the break even revenues would not deteriorate compared to the current situation

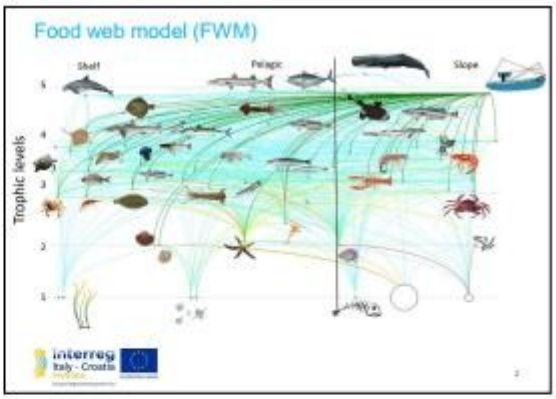

Simulation and forecast of management scenarios in BEMTOOL
BUT.
Overall, the situation of the employment it is expected that will be deteriorated
At a higher extent for some fleets, while other ones (e.g. PGP) are not expected to be particularly affected

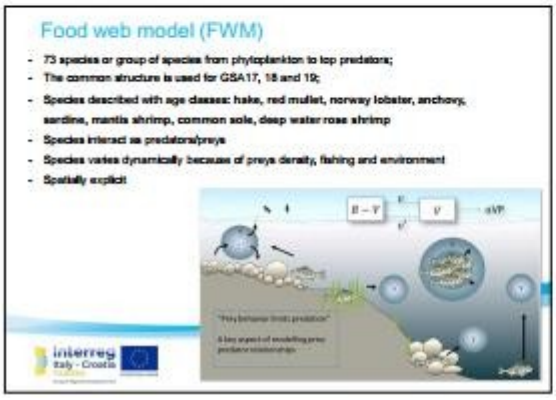

Simulation and forecast of management scenarios in BEMTOOL
Lesson learnt
Traffic light for Total Revenues by fleet
For Total Revenues S2 performs better than S1 for all the fleets

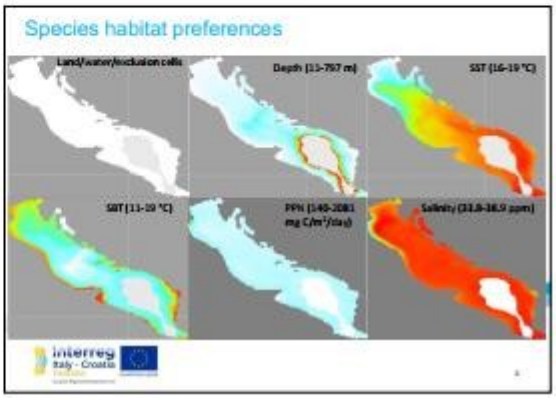

Simulation and forecast of management scenarios in BEMTOOL
Lesson learnt

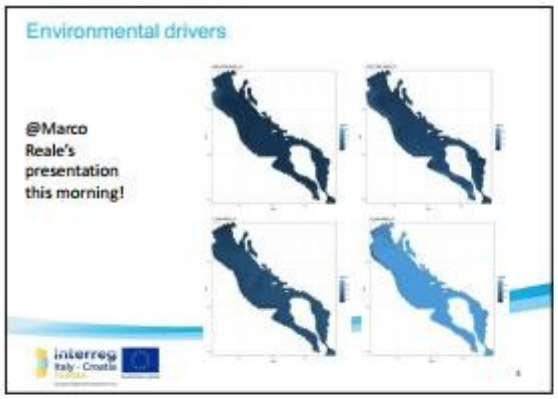

THANKS FOR YOUR ATTENTION!

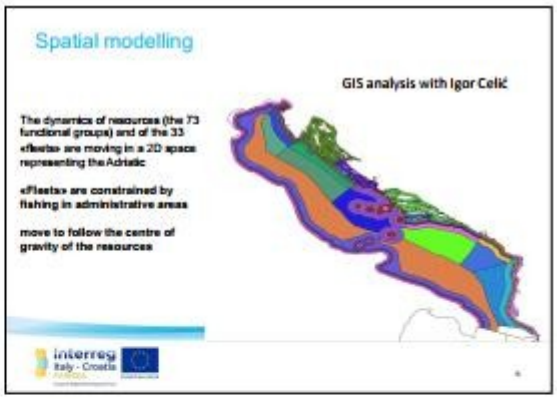

FAIRSEA
Fisheries in the Adriatic Region - a Shared Ecosystem Approach
Scenarios of spatial management with ecological and fisheries implications
FAIRSEA final meeting | 8 July 2021 | Split
Natalia Serpetti, Igor Celić, Pasquale Ricci, Davide Agnetta, Diego Panzeri, Marco Reale, Giampiero Cossarini, Roberto Carlucci, Simone Libralato
OGS

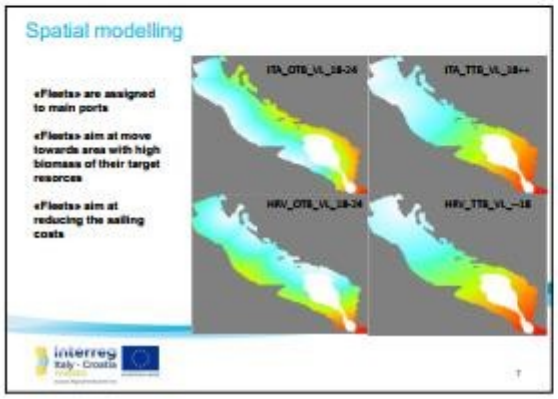

Food web model (FWM)
Shelf
Pelagic
Slope
Trophic levels

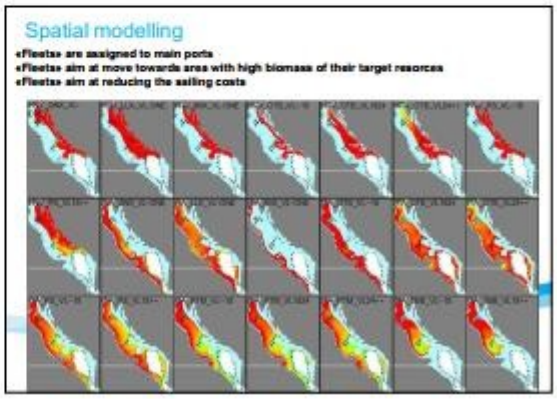

Food web model (FWM)
- 73 species or group of species from phytoplankton to top predators;
- The common structure is used for GSA17, 18 and 19;
- Species described with age classes: hake, red mullet, norway lobster, anchovy, sardine, mantis shrimp, common sole, deep water rose shrimp
- Species interact as predators/preys
- Species varies dynamically because of preys density, fishing and environment
- Spatially explicit


Species habitat preferences
Land/water/exclusion cells
Depth (11-797 m)
SST (16-19 °C)
SBT (11-19 °C)
Salinity (33.8-38.9 ppm)


Environmental drivers
@Marco Reale's presentation this morning!


Spatial modelling
GIS analysis with Igor Celić
The dynamics of resources (the 73 functional groups) and of the 33 «fleets» are moving in a 2D space representing the Adriatic
«Fleets» are constrained by fishing in administrative areas
move to follow the centre of gravity of the resources


Spatial modelling
«Fleets» are assigned to main ports
«Fleets» aim at move towards area with high biomass of their target resorces
«Fleets» aim at reducing the sailing costs


Spatial modelling
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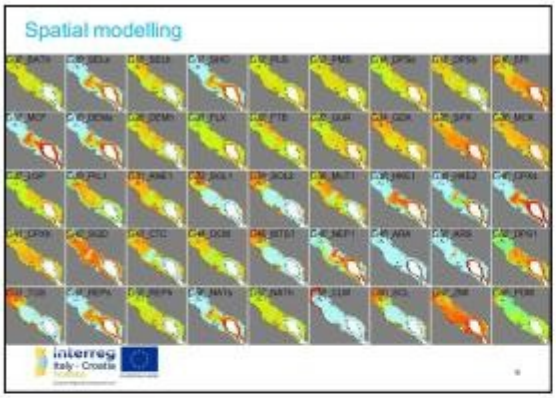
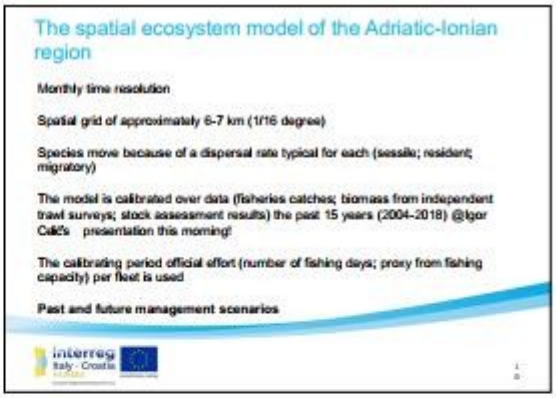
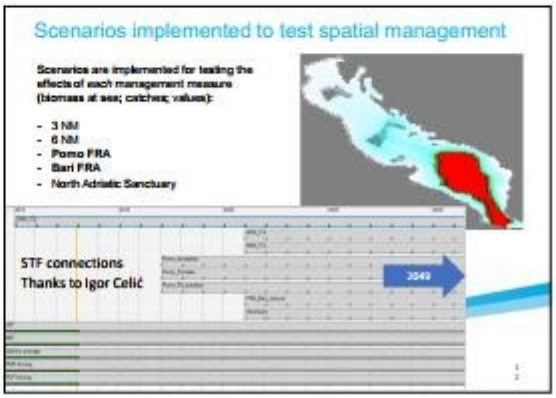
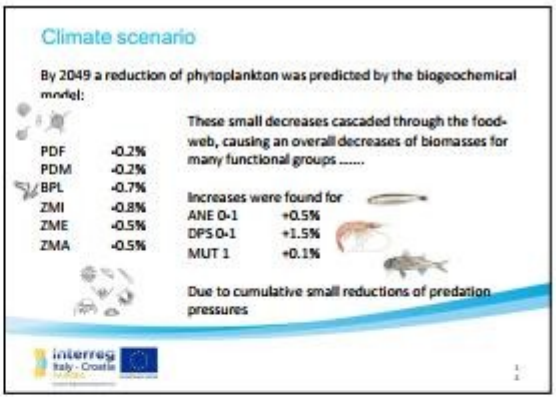

Spatial modelling

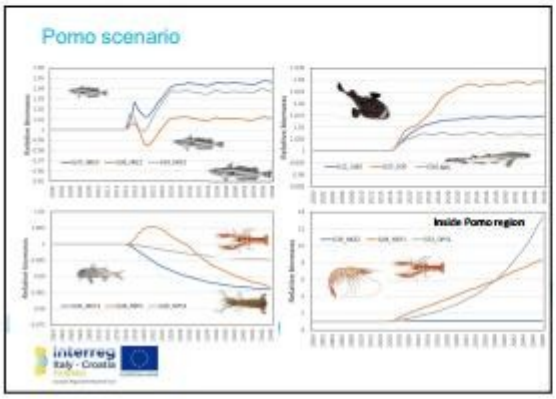

The spatial ecosystem model of the Adriatic-Ionian region
Monthly time resolution
Spatial grid of approximately 6-7 km (1/16 degree)
Species move because of a dispersal rate typical for each (sessile; resident; migratory)
The model is calibrated over data (fisheries catches; biomass from independent trawl surveys; stock assessment results) the past 15 years (2004-2018) @Igor Celić's presentation this morning!
The calibrating period official effort (number of fishing days; proxy from fishing capacity) per fleet is used
Past and future management scenarios

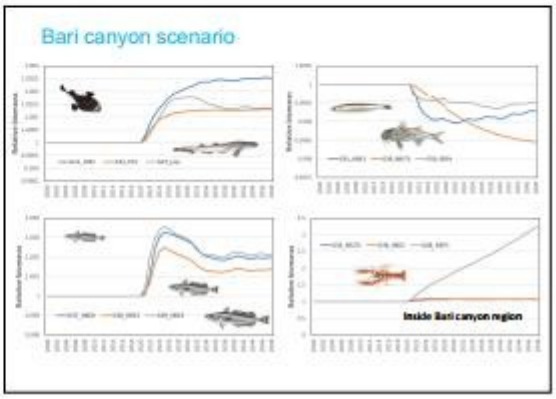

Recommendation GFCM/43/2019/5
•Transition phase 2020-2021: At least 12% reduction for OTB and 16 % for TBB with respect to the annual effort exerted in 2015 or to the three-year average within the 2015–2018 period.
•A five-year fishing effort regime shall be established for 2022–2026: each year, on the basis of SAC advice, the GFCM shall establish yearly effort quotas, thus contributing to reaching Fmsy and staying within safe biological limits. Approximately
•Closure of coastal zone (6 NM) (alternatively 30 continuous days FB) + existing FRAs + new FRAs.

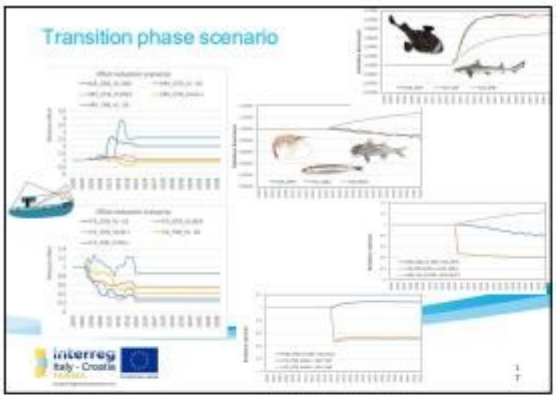

Scenarios implemented to test spatial management
Scenarios are implemented for testing the effects of each management measure (biomass at sea; catches; values):
- 3 NM
- 6 NM
- Pomo FRA
- Bari FRA
- North Adriatic Sanctuary
STF connections
Thanks to Igor Celić

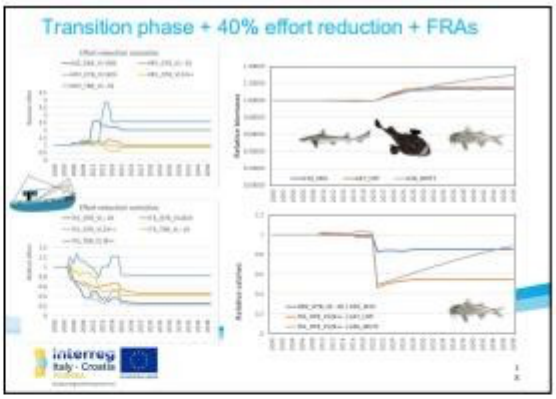

Scenarios implemented
Scenarios tested to evaluate effects of management:
Sc0) business as usual (effort 2018 kept constant);
Sc1) business as usual (effort 2018 kept constant) with climate changes;
Sc2) transition phase (2020-21) with reduction TBB-16% and OTB-12% (respect 2015) and then no variations compared to 2021;
Sc3) Sc2+ 40% reduction of the overall effort (2021-2026) + implementation of existing FRA (Pomo) and new (Bari & Sanctuary), and 6NM

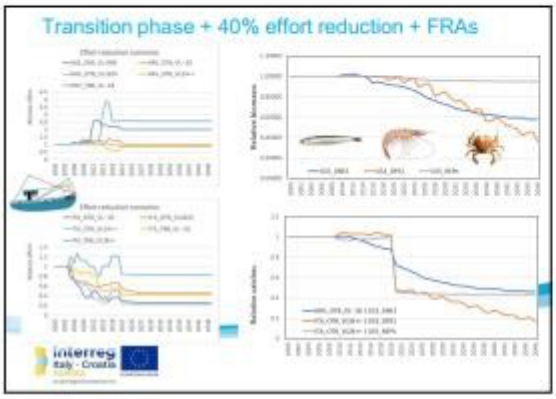

Climate scenario
By 2049 a reduction of phytoplankton was predicted by the biogeochemical model:
PDF -0.2%
PDM -0.2%
BPL -0.7%
ZMI -0.8%
ZME -0.5%
ZMA -0.5%
These small decreases cascaded through the food-web, causing an overall decreases of biomasses for many functional groups .....
Increases were found for
ANE 0-1 +0.5%
DPS 0-1 +1.5%
MUT 1 +0.1%
Due to cumulative small reductions of predation pressures

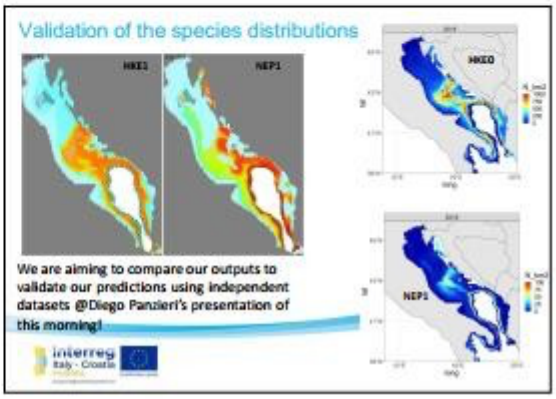

Pomo scenario
Inside Pomo region


Bari canyon scenario
Inside Bari canyon region


Transition phase scenario


Transition phase + 40% effort reduction + FRAs


Transition phase + 40% effort reduction + FRAs


Validation of the species distributions
HKE1
NEP1
HKE0
NEP0
We are aiming to compare our outputs to validate our predictions using independent datasets @Diego Panzieri's presentation of this morning!


THANKS for the attention
This work has been possible thanks to the interaction among all partners.
Model development: S. Libralato, N. Serpetti, I. Celic, F. Ricci
Data and parameters: D. Agnetta, D. Panzeri, M. Reale, G. Cossarini, L. Ribetto, G. Cipriano, T. Russo
Data providers: Italian Ministry Mipaaf, Croatian Ministry of Agriculture, Matly Scarl, Alberto Caccin
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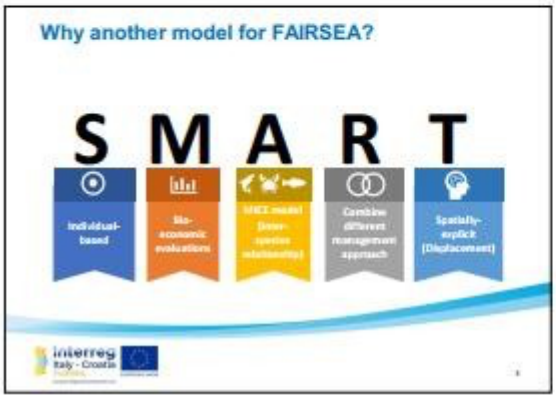
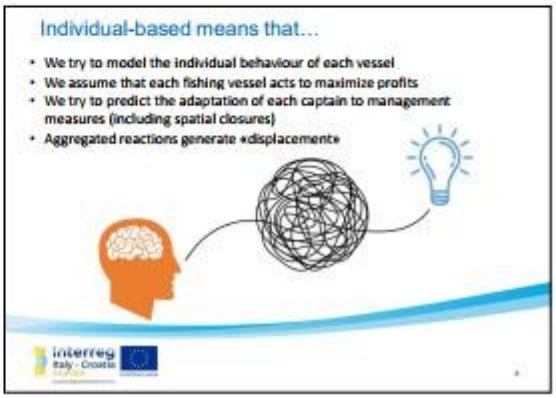
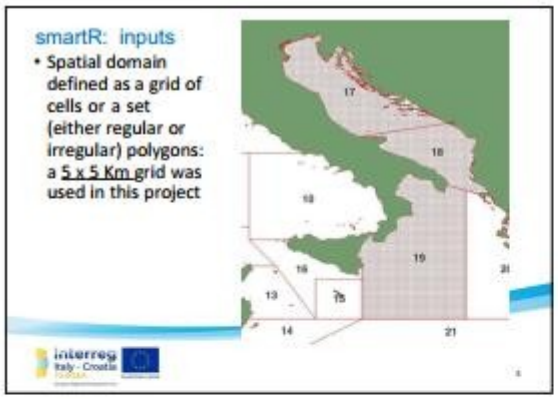
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS

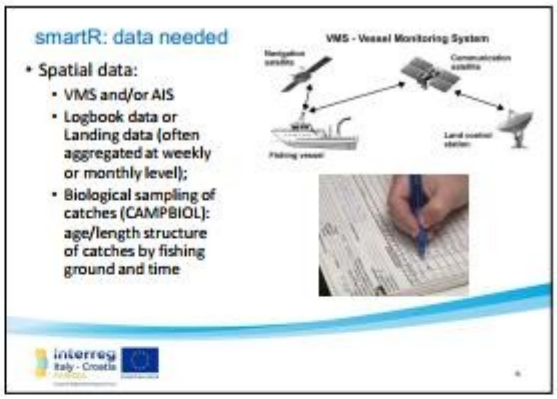

FAIRSEA
Fisheries in the Adriatic Region - a Shared Ecosystem Approach
Presentation and discussion on scenarios of spatial management with ecological and fisheries implications
Tommaso Russo
Department of Biology – University of Rome Tor Vergata & CoNISMa
Roberto Carlucci – Giulia Cipriano
Department of Biology – University of Bari Aldo Moro & CoNISMa

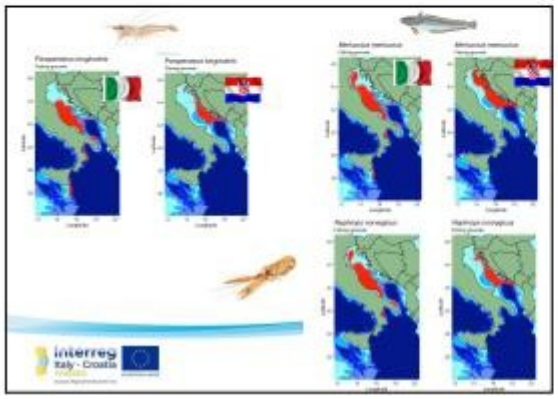

Just another tool for the FAIRSEA project
• WP5 - Decision support system for the development of sustainable fisheries
• Activity 5.3 Scenarios of fisheries policy application in the Adriatic Region
CoNISMa

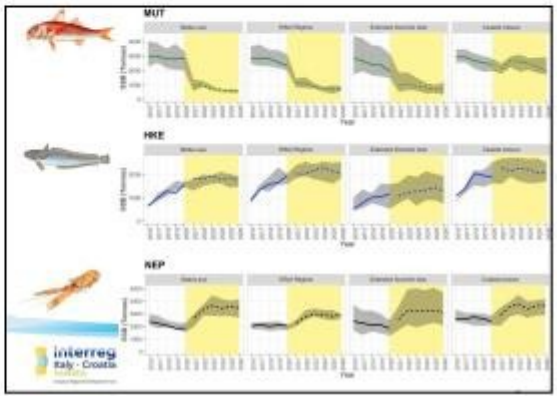

Why another model for FAIRSEA?
S M A R T
Individual-based
Bio-economic evaluations
Combine different management approach
Spatially-explicit (Displacement)

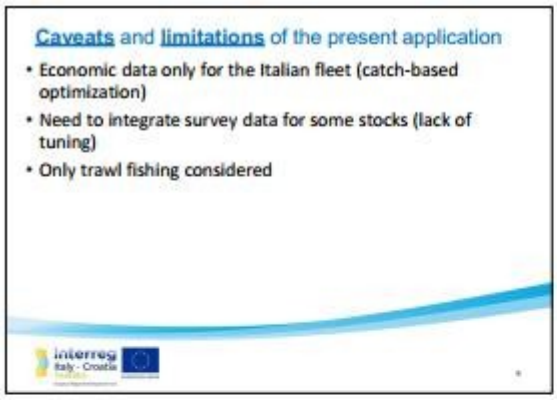

Individual-based means that…
• We try to model the individual behaviour of each vessel
• We assume that each fishing vessel acts to maximize profits
• We try to predict the adaptation of each captain to management measures (including spatial closures)
• Aggregated reactions generate «displacement»


smartR: inputs
• Spatial domain defined as a grid of cells or a set (either regular or irregular) polygons: a 5 x 5 Km grid was used in this project
17
18
19
21
13
14
21


smartR: data needed
• Spatial data:
• VMS and/or AIS
• Logbook data or Landing data (often aggregated at weekly or monthly level);
• Biological sampling of catches (CAMPBIOL): age/length structure of catches by fishing ground and time
VMS - Vessel Monitoring System




MUT
HKE
NEP


Caveats and limitations of the present application
• Economic data only for the Italian fleet (catch-based optimization)
• Need to integrate survey data for some stocks (lack of tuning)
• Only trawl fishing considered


Acknowledgments
This application of SMART is largely based on the work done in a previous research project
"Marine protected Areas Network Towards Sustainable fisheries in the Central Mediterranean" (MANTIS - http://jadran.izor.hr/mantis/index.html)


THANKS for the attention
University of Rome Tor Vergata
CoNISMa – www.conismo.it
SO LONG AND...
Thanks for all the fish!


WP4
The innovation approach of the FAIRSEA platform
FAIRSEA Project
Final Conference| 08.07.2021
CNR-IRBIM | Francesco Masnadi, Giuseppe Scarcella
INKODE soc. coop. | Giorgio Resci
and many more...

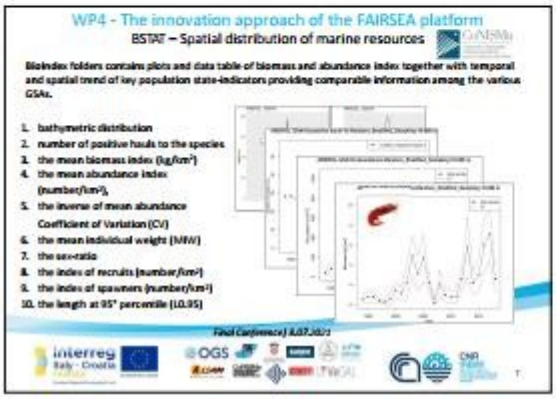

WP4 - The innovation approach of the FAIRSEA platform
IVP AIMS: This WP is dedicated to the development of an integrated platform (IP) for a quantitative ecosystem approach to fisheries that goes across territorial boundaries and across several disciplines. The platform will integrate datasets from physics to bioeconomy of fisheries as a state of the art and decision support tool.
The IP cornerstone elements are:
FSTAT
Catches and fleets statistics
HYDRO
Water circulation & connectivity
EFFORT
Spatial distribution and dynamics
BGC
Biogeochemical & plankton processes
BIOECO
Bio-economic responses
RSTAT
Distribution of resources
FWM
Food web dynamics
Implementation of local management actions in the IP will result in applicative pilot actions demonstrative of operative use and potential insights that can be gained from the shared integrated approach (WP5).

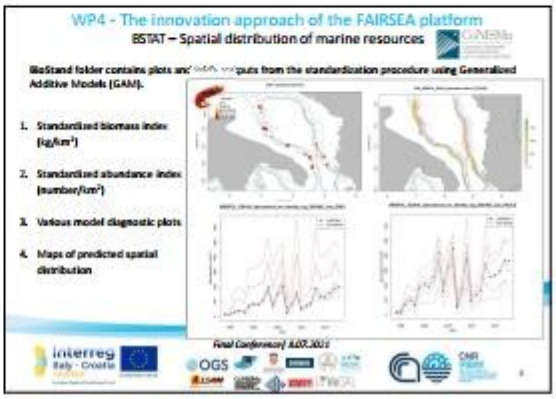

WP4 - The innovation approach of the FAIRSEA platform
IP structure and development
FAIRSEA IP is a web-GIS application based on open source software, all services are deployed by Docker containers, main services are:
Backend: REST API developed in Python with Django, Django Rest Framework and GeoDjango;
Frontend: a Single Page Application based on Angular5 with Angular Material framework;
Database: PostgreSQL with PostGIS;
Gis software: Geoserver;
Charts and dashboards: Plotly and Grafana;
Other used libraries and services: GDAL, scipy, Shapely, netCDF4, Pandas, MapProxy, Pillow.
docker
MapProxy
GeoServer


WP4 - The innovation approach of the FAIRSEA platform
HYDRO – Hydrodynamic circulation and connectivity
This module contains the description of the physical properties of the Adriatic and Ionian basins provided by a multidecadal reanalysis of the Mediterranean Sea for the past 20 years.
(CMEMS data, http://marine.copernicus.eu/).
The variables selected for the period 1999-2018 are:
Temperature
Bottom Temperature
Salinity
Currents (meridional and zonal component used as a proxy of the connectivity)

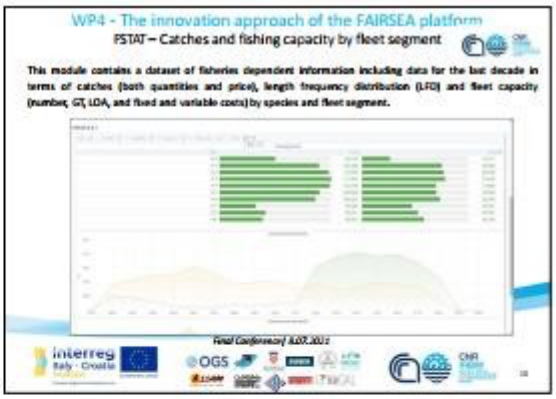

WP4 - The innovation approach of the FAIRSEA platform
BGC – Biogeochemical processes and dynamics
This module contains the description of the biogeochemical properties of the Adriatic and Ionian basins provided by a multidecadal reanalysis of the Mediterranean Sea for the past 30 years. (CMEMS data, http://marine.copernicus.eu/).
The variables selected for the period 1999-2018 are:
- Chlorophyll-a
- Dissolved Nitrogen
- Phosphate
- Dissolved Oxygen
- Phytoplankton carbon biomass
- Zooplankton carbon biomass
- Particulate organic carbon
- pH
- Net primary production


WP4 - The innovation approach of the FAIRSEA platform
BSTAT – Spatial distribution of marine resources
These sub-modules (BSTAT GSA17, BSTAT GSA18, BSTAT GSA19) contain database of standardized indices and maps of commercial species distribution based on the knowledge from the past 20 years divided by GSAs.
Data are gathered from the main bottom trawl surveys conducted in the Adriatic Sea and in the Western Ionian Sea by several FAIRSEA partners: MEDITS (GSA17,18,19) & SOLEMON (GS17)
Outputs from trawl surveys are provided thanks to specifically designed open source tools, as Rroutine BioIndex and BioStand (available at: https://www.coispa.it).
COISPA Tecnologia & Ricerca


WP4 - The innovation approach of the FAIRSEA platform
BSTAT – Spatial distribution of marine resources
BioIndex folders contains plots and data table of biomass and abundance index together with temporal and spatial trend of key population state-indicators providing comparable information among the various GSAs.
1. bathymetric distribution
2. number of positive hauls to the species
3. the mean biomass index (kg/km²)
4. the mean abundance index (number/km²),
5. the inverse of mean abundance Coefficient of Variation (CV)
6. the mean individual weight (MIW)
7. the sex-ratio
8. the index of recruits (number/km²)
9. the index of spawners (number/km²)
10. the length at 95° percentile (L0.95)

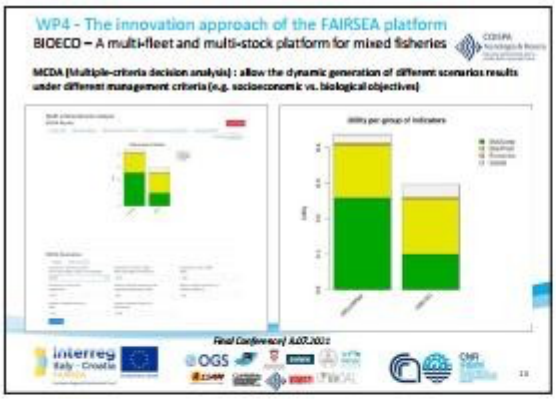

WP4 - The innovation approach of the FAIRSEA platform
BSTAT – Spatial distribution of marine resources
BioStand folder contains plots and outputs from the standardization procedure using Generalized Additive Models (GAM).
1. Standardized biomass index (kg/km²)
2. Standardized abundance index (number/km²)
3. Various model diagnostic plots
4. Maps of predicted spatial distribution

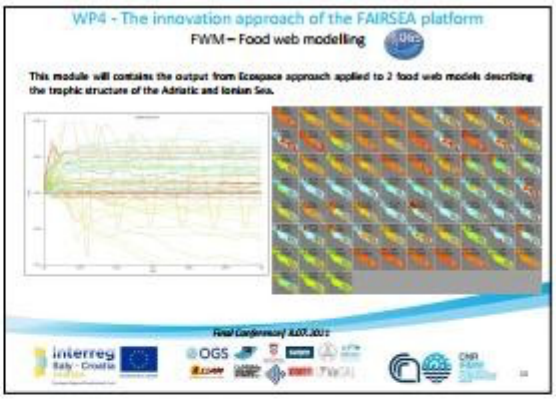

WP4 - The innovation approach of the FAIRSEA platform
BSTAT – Spatial distribution of marine resources
Spatial distribution of of interesting species in the GSA17 from MEDITS survey
Final Conference| JULY.2021


WP4 - The innovation approach of the FAIRSEA platform
FSTAT – Catches and fishing capacity by fleet segment
This module contains a dataset of fisheries dependent information including data for the last decade in terms of catches (both quantities and price), length frequency distribution (LFD) and fleet capacity (number, GT, LOA, and fixed and variable costs) by species and fleet segment.
Final Conference| JULY.2021


WP4 - The innovation approach of the FAIRSEA platform
EFFORT – Effort distribution and fleet displacement
This module contains fishing effort maps distribution by the main fishing segments obtained by VMS/MS data on vessel displacement using the state-of-the-art VMSbase platform (Russo et al., 2014; D'Andrea et al., 2020)
FAIRSEA
Slovenija
Hrvatska
Italia
Final Conference| JULY.2021


WP4 - The innovation approach of the FAIRSEA platform
BIOECO – A multi-fleet and multi-stock platform for mixed fisheries
This module contains the output of different alternative management scenarios in the Adriatic-Ionian region obtained using GEMTOOL bio-economic model (Spedicato et. al 2006). This tool allows to set scenarios for evaluating how management or fishing strategies affect stock and fisheries dynamics.
FAIRSEA Trend Scenarios:
1) S0 = Status quo
2) S1 = linear reduction 40% for trawlers
3) S2 = combination of measures (fleet selectivity + spatial closure + fishing bans + 25% reduction)
S0
S1
S2
Final Conference| JULY.2021


WP4 - The innovation approach of the FAIRSEA platform
BIOECO – A multi-fleet and multi-stock platform for mixed fisheries
MCDA (Multiple-criteria decision analysis) : allow the dynamic generation of different scenarios results under different management criteria (e.g. socioeconomic vs. biological objectives)


WP4 - The innovation approach of the FAIRSEA platform
FWM – Food web modelling
This module will contains the output from Ecospace approach applied to 2 food web models describing the trophic structure of the Adriatic and Ionian Sea.


WP4 - The innovation approach of the FAIRSEA platform
Summary Module
Interaction workspace between different modules. Possibility of simple calculations on the layers on a regional/county basis (mean, sum, min and max value)
FAIRSEA


WP4 - The innovation approach of the FAIRSEA platform
Alpha/testing version 0.8 running at
View-only credentials:
username → viewer
password → fairsea2020


THANKS for the attention
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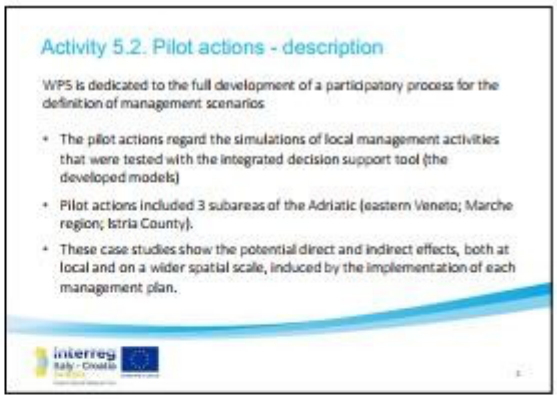
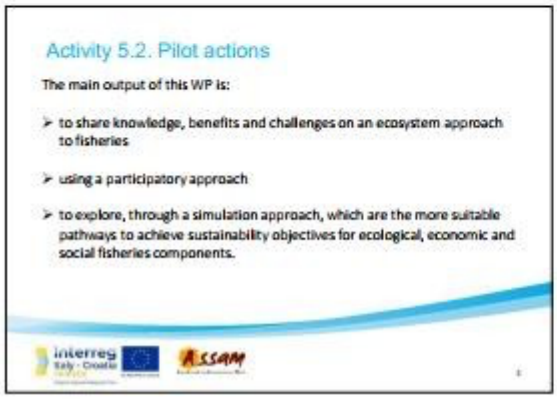
Pilot studies: Istra, Veneto, Marche
(MPS, VEGAL, ASSAM)
FAIRSEA| MPS| dr.sc. Danijela Mioković
FINAL PROJECT CONFERENCE


Activity 5.2. Pilot actions - description
WP5 is dedicated to the full development of a participatory process for the definition of management scenarios
The pilot actions regard the simulations of local management activities that were tested with the integrated decision support tool (the developed models)
Pilot actions included 3 subareas of the Adriatic (eastern Veneto; Marche region; Istria County).
These case studies show the potential direct and indirect effects, both at local and on a wider spatial scale, induced by the implementation of each management plan.


Activity 5.2. Pilot actions
The main output of this WP is:
to share knowledge, benefits and challenges on an ecosystem approach to fisheries
using a participatory approach
to explore, through a simulation approach, which are the more suitable pathways to achieve sustainability objectives for ecological, economic and social fisheries components.


The FAIRSEA case studies
Stakeholder identification & categorization
PARTICIPATORY APPROACH
Stakeholder consultation at local level for the definition of EAF state of the art
Stakeholder engagement and cooperation to identify and test scenarios and share results of simulations at local and international level

WP5 – Act. 5.2 - Eastern Veneto

Pilot actions: identification of conflicts and possible solutions

The Pilot Action implemented by VeGAL aims at verifying that the platform developed by the project effectively contributes to the identification of conflicts (inter- and intra-sectoral) and possible solutions and therefore represents a valid decision support system for sustainable development.

This is achieved by test-running the platform using data collected in the Venetian maritime compartment, specifically:

- Industrial fishery landings time series for the main target species
- Small-scale fishery landings time series
- Recreational fishing landings
- Clam dredging time series concerning landings and fleet composition
- Mapping of the main spatial management measures affecting fisheries in the study area
- Mapping of active and proposed resources management plans

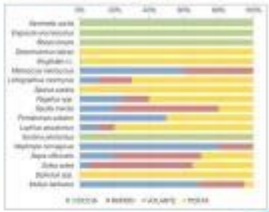
WP5 – Act. 5.2

Data collected – industrial and artisanal fishery landings

Market	Periodicity	Source
Pila	Yearly since 2001 Monthly since 2005	1
Chioggia	Yearly and Monthly since 1945	1, 2
Venice	Yearly since 1946	1, 2
Caorle	Yearly since 2003 Monthly since 2005	1

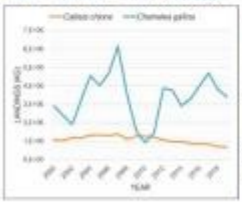
1- Osservatorio Socio-Economico della Pesca e dell'Acquacoltura
2– University of Padova, Dipartimento di Biologia – DAFE

Both based on Market reports



WP5 – Act. 5.2

Data collected – Clam dredging



Average days at sea

	C. Chione GK	C. Chione VE	C. gallina CH	C. Gallina VE
2006	57	62	105	105
2007	70	63	110	104
2008	66	96	103	90

N. Boats employed

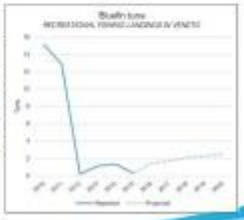
	C. Chione GK	C. Chione VE	C. gallina CH	C. Gallina VE
2016-2019	19	21	58	63

Source: Osservatorio Socio-Economico della Pesca e dell'Acquacoltura – based on CoGeVo data

WP5 – Act. 5.2

Data collected – Recreational fishing

Official data available for Bluefin Tuna (Thunnus thynnus) only (UNIMAR 2016 - rapporto finale WL0.1 Pesca ricreativa del tonno rosso del *Programma Nazionale Italiano per la raccolta dei dati primari di tipo biologico tecnico ambientale e socio economico nel settore della pesca*).
Actual data available for 2010-2015. Starting from 2006, landings are projected based on annual quota.



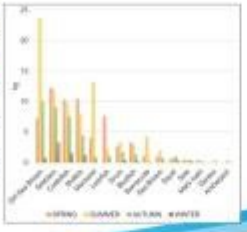
WP5 – Act. 5.2

Data collected – Recreational fishing

For all other target species, data was collected through a questionnaire distributed via social media groups, to anglers operating on the Veneto coast. It allowed to infer:

- CPUE (kg/angler/trip)
- Average number of fishing trips, per angler, per season
- Landing trend for the main target species in the last 20 years

The number of active anglers in Veneto was retrieved from the Ministry database of angling permits.

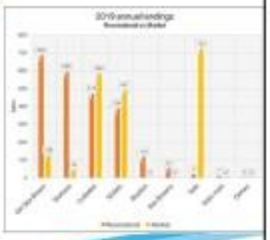


WP5 – Act. 5.2

Data collected – Recreational fishing

Considering estimated CPUE, the average number of fishing trips, and the number of registered anglers, it was possible to guess the annual landings of recreational fishing in Veneto.

Results show that, particularly for some species, recreational landings largely exceed those of commercial fisheries, even when using very conservative estimates.



WP5 – Act. 5.2

Results - estimated effect, using the tool, of increasing recreational fisheries x 5 times in 10 years, on other professional fleets

First observations made with the tool:

- recreational fisheries impact is not negligible
- improving data gathering is an important issue, for all of the Adriatic
- the tool could provide hints on the possible link between the small-scale fisheries decline and recreational fisheries increased trend presently ongoing

Pilot action in Marche Region: workflow

This activity was carried out – at Italian level - by ASSAM in cooperation with OGS and Vegal in the year 2020.

Key stakeholder identification and categorization at regional level for their engagement in consultation meetings aimed at:

- presenting and discussing the FAIRSEA project, its tools and expected results
- detecting the stakeholder point of view on EAF
- identifying scenarios of interest to test

Identification of a first list of scenarios to test using the BIOECO model developed by the scientific partner CORSPA. The activity was carried out also with the support of CNR-IRBIM

Sharing results: international stakeholder meetings and local technical events to share the integrated platform functionalities and potential uses

Pilot action in Marche Region: at a glance

Target species

- The pilot actions in Marche Region focuses on management scenarios targeting Common sole and Rapido trawl fleet.
- Common sole (*Solea sp.*) - one of the most important commercial species, highly valued by consumers
- nursery areas located along the coastal zone of Marche Region, explaining why catches are dominated by age 0 and age 1 sole
- targeted by Rapido trawl (all year round) and set nets (from spring to fall)

Tools

- Simulations using bio-economic model – BIOECO (developed by COISPA) to evaluate the impacts of potential management actions at the local basin scale, in the short and medium terms, considering spatial and temporal closures

Scenarios to test

- Effects of temporal and spatial measures (closure of the 6 or 9 nm for 2 or 4 months) following the Italian summer fishing ban in Rapido trawl fleet active in Marche Region.

Benefits for target group

- ☐ Better understanding of EAF framework at regional and cross-border level
- ☐ Increased competences in EAF
- ☐ Increased participation of stakeholder in planning co-management
- ☐ Better understanding of decision support tools potential for planning and performing co-management

Stakeholder recognizes the opportunity deriving from the application of models and tools to support, facilitate decision-making and implement EAF, however a strong and systematic cooperation and data exchange with scientific bodies shall be ensured.

- ☐ Increased cooperation between policy-makers – operators- scientists
- ☐ FAIRSEA integrated platform durability and transferibility

Capitalization actions of the FAIRSEA integrated platform

Activity 5.2. Pilot actions: Istria county

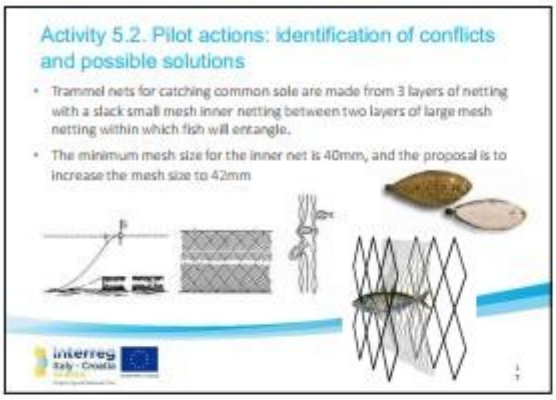
CROATIA

- The participants attending the stakeholder meetings in Poreč on 24th of July 2019 were interviewed and ideas and suggestions regarding local management actions were noted.
- These suggestions were further discussed with PP on the technical meeting in Split and on Skype meeting held on 20th of November, as well as in personal communication within PP.

Activity 5.2. Pilot actions: identification of conflicts and possible solutions

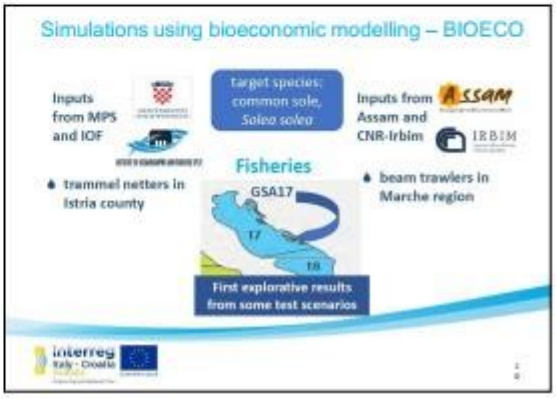
CROATIA

- The management action chosen for pilot action in Istria County is a proposal for the increase in mesh size of trammel nets for catching sole (*Solea sp.*) and the resulting effects on stock and on marketing price, as well as economic consequences for fishermen.
- The testing of these nets has already started with the project ARIEL – this was accepted as an innovation idea. Selectivity data was gathered by scientists from IOF.

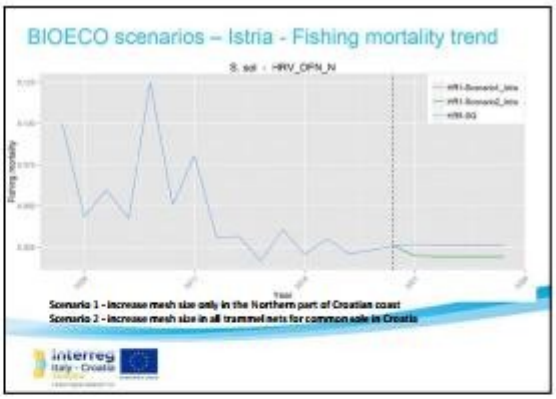

Activity 5.2. Pilot actions: identification of conflicts and possible solutions
Trammel nets for catching common sole are made from 3 layers of netting with a slack small mesh inner netting between two layers of large mesh netting within which fish will entangle.
The minimum mesh size for the inner net is 40mm, and the proposal is to increase the mesh size to 42mm

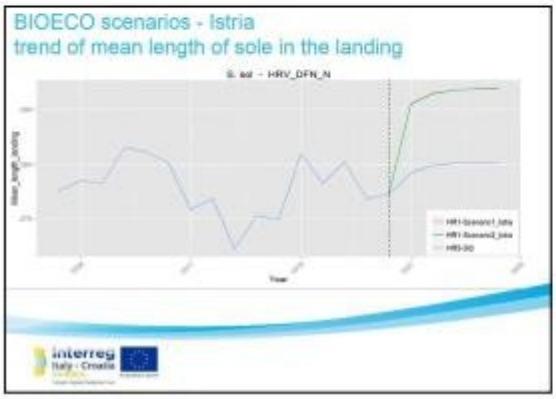

Activity 5.2. Pilot actions: identification of conflicts and possible solutions
THE DATA
The data used for pilot actions was collected by IOF, Split
The data was collected for the INTERREG project Ariel (ARIEL overall objective is to promote technological and non-technological solutions for innovation up take of small-scale fishery and aquaculture in Adriatic-Ionian basin)
during the period from June 2018 to December 2019, in fishing area A1 (around Salvore and Umago)
The catch and discard by 15 fishermen was analyzed in detail, two mash sizes were used
A1
A2


Preliminary results of Pilot Actions case studies
COISPA
Maria Teresa Spedicato
Address: COISPA, Bari, Italy
BIOECO Tools

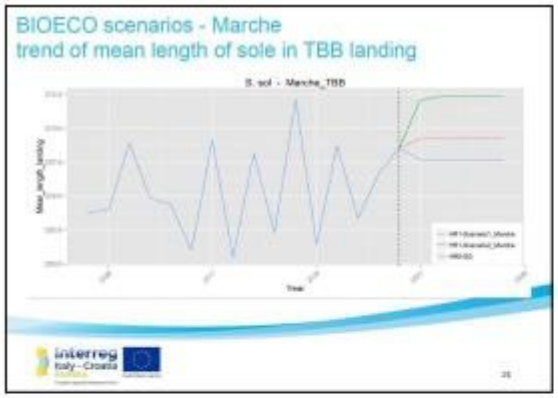

Simulations using bioeconomic modelling – BIOECO
Inputs from MIPS and IOF
Target species: common sole, Solea solea
Inputs from Assam and CNR-Irbim
Fisheries
trammel netters in Istria county
beam trawlers in Marche region
GSA17
First explorative results from some test scenarios

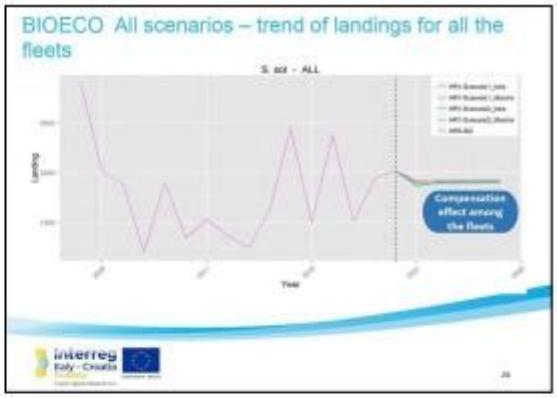

BIOECO – Four Management scenarios + Status Quo
Scenarios
Fishery/Fleet
Measure
Scenario 1-Istria
Croatia DNF Nord
Increase mesh size and then length at first capture (2cm)
Scenario 2-Istria
whole Croatia DNF
Increase mesh size and then length at first capture (2cm)
Scenario 1-Marche
TBB Marche
Improve fleet selectivity, extending the fishing prohibition within 6 nautical miles to December
Scenario 2-Marche
TBB Marche
Improve fleet selectivity implementing the fishing prohibition within 9 nautical miles in October, extended to December
Status Quo
All
No changes from the current situation


BIOECO scenarios – Istria - Fishing mortality trend
Scenario 1 - increase mesh size only in the Northern part of Croatian coast
Scenario 2 - increase mesh size in all trammel nets for common sole in Croatia


BIOECO scenarios - Istria
trend of mean length of sole in the landing


BIOECO scenarios - Marche – Fishing mortality trend
Scenario 1 - extending the fishing prohibition within 6 nautical miles to December
Scenario 2 - fishing prohibition within 9 nautical miles in October, extended to December


BIOECO scenarios - Marche
trend of mean length of sole in TBB landing


BIOECO All scenarios – trend of landings for all the fleets
Compensation effect among the fleets


Conclusion
The decision support tool created by FAIRSEA project can be used to:
Provide insight and compare impact from different segments of fisheries
Compare impact of different management measures and different spatial scales
Show the links between fishery segments
Show the resulting effects of management on all the segments as well as how one management measure targeted at one segment effects the others


Thank you!
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MINISTARSTVO POLJOPRIVREDE


FAIRSEA
Fisheries in the Adriatic Region – a shared Ecosystem Approach
Final project Conference
session 5: Interacting with other projects
for finding next steps for an EAF implemented
Adri.SmArtFish| Ca' Foscari University of Venice


Adri.SmArtFish
Aim of the project is to strengthen the role of Small-Scale Fishery in GSA17, in the Blue Growth context. Taking advantage of the great adaptability and flexibility of SSF, the project will promote this fishery as a best practice for the implementation of an integrated coastal management strategy, in the context of an ecosystemic approach.
WP3 Evaluation of the Small-Scale Fishery sector
WP4 Valorisation of Small-Scale Fishery and diversification of opportunities
WP5 Policy making and shared management


Adri.SmArtFish
WP4
Shared Sustainable Fishery protocol
↓
Regulation of Use
↓
Registered label for Sustainable Fishery
WP5
Cross-border Association of Small-Scale Fishermen of the Central-North Adriatic Sea
¬ voluntary association, non-governmental and non-profit
¬ to promote, develop and conserve the sector of SSF in GSA17


ITACA
PRESENTAZIONE DEL PROGETTO
Marco Spinadin – Confcooperative Veneto


ITACA
Titolo del progetto:
Strumenti innovativi per incrementare la competitività e la sostenibilità della pesca dei piccoli pelagici - ITACA
Asse 1 – Blue Innovation
Durata: 30 mesi; 01.01.2019 al 30.06.2021 ➡ 30.06.2022


La partnership
LP - Veneto Agricoltura – Oss. Socio Economico Pesca
PP1 - CNR Ancona
PP2 - Istituto Agronomico Mediaterraneo di Bari - IAMB
PP3 - Agenzia di Sviluppo della contea di Spalato e Dalmazia - RERA
PP4 - Agenzia di Sviluppo rurale dell'Istria - AZZRI
PP5 - Confcooperative Veneto
PP6 - Istituto Oceanografico e della Pesca di Spalato - IZOR


Azioni
1. Aggiornamento di un modello di gestione della pesca dei piccoli pelagici: stabilisce le quantità di offerta assorbibili dal mercato in diversi momenti dell'anno e misura l'impatto sul prezzo della minor/maggior offerta;
2. Raccolta dati puntuale per finalizzare il modello, sia di produzione che economici, insieme alle imprese ittiche;

TIPOLOGIA DI DATI RACCOLTI

+ dati bio-ecologici (clorofilla, temperatura, taglia..)

+ dati di tipo economico (costi vari, diritti di mercato, ghiaccio, carburante, acqua, manutenzione ordinaria...)

Azioni

1. Aggiornamento di un modello di gestione della pesca dei piccoli pelagici: stabilisce le quantità di offerta assorbibili dal mercato in diversi momenti dell'anno e misura l'impatto sul prezzo della minor/maggior offerta;
2. Raccolta dati puntuale per finalizzare il modello, sia di produzione che economici, insieme alle imprese ittiche;
3. Predisposizione di un software che permetta l'aggiornamento, a cura degli operatori, dei dati necessari e che dia indicazione dei quantitativi da pescare e delle modalità di allocazione al massimo rendimento sostenibile;

Azioni

4. Formazione degli operatori all'utilizzo e alla lettura dei risultati del software/app sia in fase di test/pilota che su scala adriatica;
5. Applicazione degli output del modello condiviso per concertare strategie produttive e commerciali, di concentrazione del prodotto e di sfruttamento delle economie di scala per il massimo rendimento economico da parte delle aziende.

Risultati attesi

- Network fra le OP del pesce azzurro adriatico;
-Software a supporto degli operatori per la definizione delle strategie produttive e di vendita;
- Controllo dell'offerta con conseguente tutela degli stock ittici;
- Maggiore rendimento economico delle imprese e possibilità di controllo di alcune variabili che regolano il mercato.

Grazie per l'attenzione!!!

Marco Spinadin
Confcooperative Veneto

www.italy-croatia.eu/itaca


FAIRSEA
Fisheries in the Adriatic Region –
a shared Ecosystem Approach
Final project Conference
Split (Croatia)| 8 July 2021


PRIZEFISH
Piloting of eco-innovative fishery
supply-chains to market added-value
Adriatic fish products
Luca Mulazzani & Alessia Cariani


PRIZEFISH
Increase the sustainability
of fisheries activities in Adriatic sea
by initiating innovative process
along the whole fishery supply chain


PRIZEFISH – L'IDEA
How much would you
be willing to spend to
buy a sustainable
product???


PRIZEFISH – THE COLLABORATION
OMEGA3
CESTHA
OGS
THANK YOU ALL !
HVALA SVIMA !
GRAZIE A TUTTI !
Assam
ZADAR COUNTY
JAVNA USTANOVA
rerasd


PRIZEFISH – THE AIM
ECO INNOVATION=
Improve long term sustainability of the Adriatic fisheries (environmental, social, economic) through a INNOVATION process in the fishery and sea-food value-chain.
SOCIAL
ENVIRONMENTAL
ECONOMIC
PRIZEFISH «3-step» motto:
«Fish(ing) better!
Gain(ing) more!
Respect(ing) the Adriatic sea!»
answers to:
- environment
- economy
- society


PRIZEFISH – THE APPROACH
Blue innovation and blue growth to improve framework conditions of:
Adriatic fishery
Key-enabling technologies for environmental-economic sustainable Adriatic fishery
Fish processing
Enabling SMEs to produce eco-labelled added-value Adriatic seafood
Marketing
Increasing Adriatic SMEs competitiveness in EU and non-EU markets

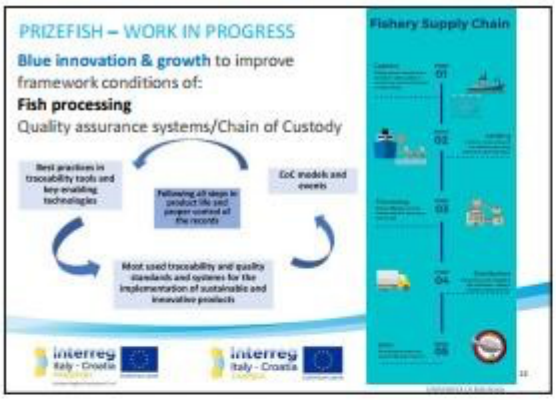

PRIZEFISH - KEY ACTIONS & OUTPUTS
Development and implementation of:
Best practices and associated guidelines for responsible fishery
Improved fish products processing technologies
Innovative supply-chain and value-chain
To market eco-certified and added-value Adriatic seafood products


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Adriatic fishery
Adriatic Responsible Fisheries management (ARFM)
ARFM
Established certification programmes


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Adriatic fishery
Adriatic Responsible Fisheries management (ARFM)


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Adriatic fishery
Adriatic Responsible Fisheries management (ARFM)
Pilot actions @Italy
Cuttlefish
Mussels
Mantis shrimp


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Adriatic fishery
Adriatic Responsible Fisheries management (ARFM)
Pilot actions @Croatia
Modified rampon testing

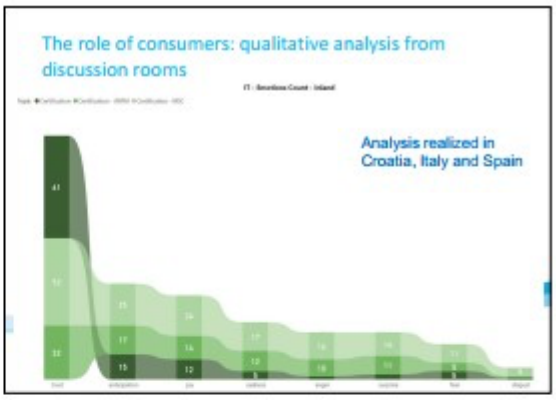

PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Fish processing
Quality assurance systems/Chain of Custody
Fishery Supply Chain

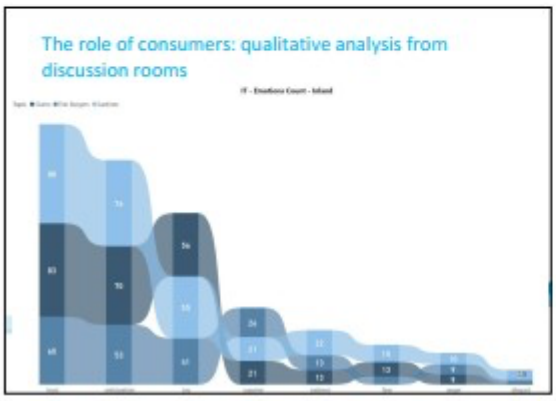

PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Fish processing
Innovating tools and processes for added-value Adriatic fish products
Pilot actions @Croatia FC OMEGA3
Sardine fillets innovative MAP
Sea Pump

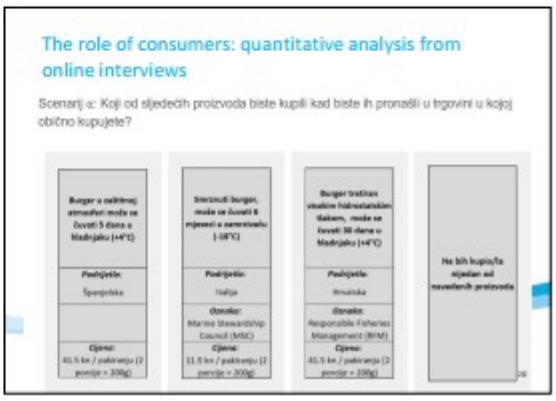

PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Fish processing
Innovating tools and processes for added-value Adriatic fish products
Pilot actions @Croatia FC ISTRA
Fish&Shrimps burgers innovative MAP & skin packaging
Shrimp processing

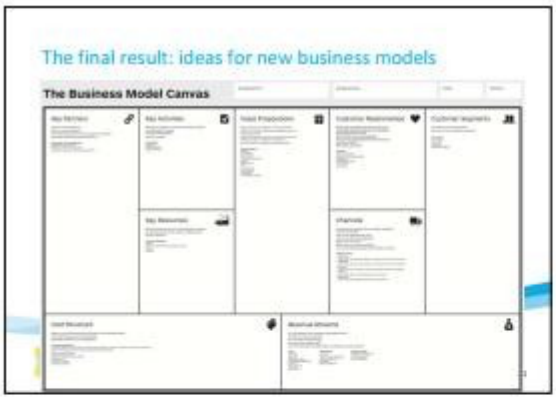

PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Fish processing
Innovating tools and processes for added-value Adriatic fish products
Pilot actions @Italy FC BIVALVIA
Clams treated HHP for Ho.Re.Ca & ready to cook
Clams selective fishing tools and selection methods on board & cold chain


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Marketing
Increasing Adriatic SMEs competitiveness in EU and non-EU markets
The role of consumers
The attitude of consumers towards «eco-certified» products
Sustainability
Convenience
Localism / fish origin
Novelty seeking behaviour


The role of consumers: qualitative analysis from discussion rooms
Analysis realized in Croatia, Italy and Spain

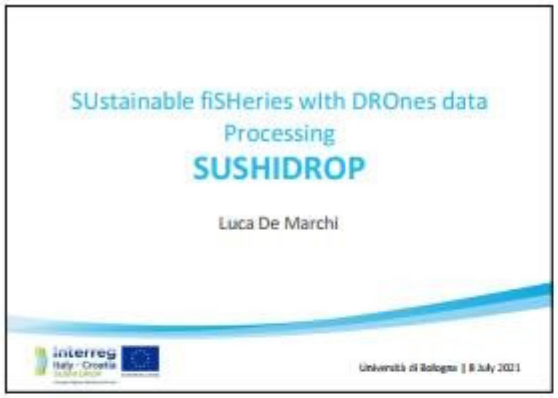

The role of consumers: qualitative analysis from discussion rooms


The role of consumers: quantitative analysis from online interviews
Scenarij a: Koji od sljedećih proizvoda biste kupili kad biste ih pronašli u trgovini u kojoj obično kupujete?


The final result: ideas for new business models
The Business Model Canvas


PRIZEFISH – WORK IN PROGRESS
Blue innovation & growth to improve framework conditions of:
Marketing
Increasing Adriatic SMEs competitiveness in EU and non-EU markets
Designing Eco-Innovative Value Chain – E-commerce app


THANK YOU ALL !
HVALA SVIMA !
GRAZIE A TUTTI !


SUstainable fiSHeries wIth DROnes data Processing
SUSHIDROP
Luca De Marchi
Università di Bologna | 8 July 2021


ACKNOWLEDGMENT
Interreg
Italy - Croatia
Among targeted actions: increase the marine environment knowledge through establishment of survey habitat-biodiversity mapping.
Sushi-drop project
SUstainable fiSHeries with DROnes data Processing
sunce


SUSHI DROP Project
Main outputs
Unmanned Underwater Vehicle
Georeferenced
OA Database
Strategies for biodiversity conservation
2019 - 2021
1.45 mln€
1.73 mln€
sunce


PROJECT OVERVIEW – The Consortium
Scientific Institutions
Fishermen and Environmental Associations
sunce
REGIONE MARCHE
Local Authorities


Why UUVs?
• Unmanned Underwater Vehicles (UUVs) have a wide range of applications in marine geoscience, and are increasingly being used in the scientific, military, commercial, and policy sectors
• UUV can carry out researches without interfering with the seabed and at reduced costs, if compared to the use of oceanographic vessels
• UUV car reach areas deeper than 200 m (unreachable by divers)


Territorial Challenge
A large part of Adriatic Sea bottoms extends on a flat shelf, covered with mud or sand but there are areas (depth 70/90 m) where bottom is rocky, with difficulties to trawl a net.
These areas most likely host sensitive benthic habitats and hotspots of biodiversity but cannot be studied by means of conventional vessels
UUVs could be employed in these contexts.


PROJECT Workflow
M0
M36
Drone selection
Drone sensorization
Surveying
Database creation
issia.cnr

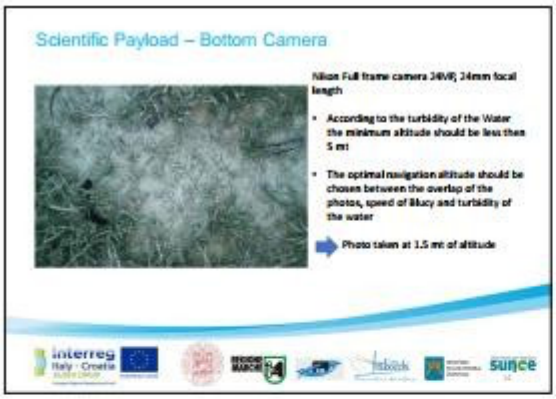

Sushi Drop Drone

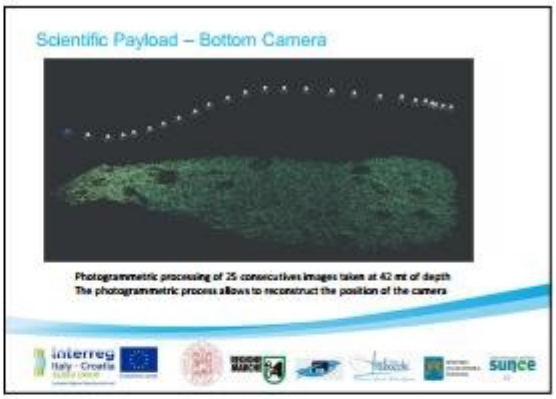

Sushi Drop Drone - Blucy


First Missions – Split 10/05/21 – 17/05/21

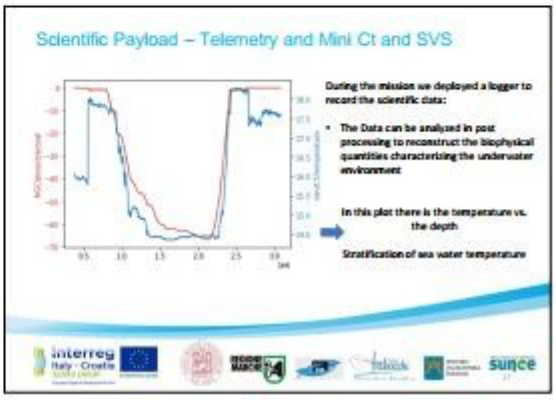

Scientific Payload – Pilot Camera


Scientific Payload – Pilot Camera


Scientific Payload – Bottom Camera
Nikon Full frame camera 24MP, 24mm focal length
According to the turbidity of the Water the minimum altitude should be less then 5 mt
The optimal navigation altitude should be chosen between the overlap of the photos, speed of Bluey and turbidity of the water
Photo taken at 1.5 mt of altitude


Scientific Payload – Bottom Camera
Photogrammetric processing of 25 consecutives images taken at 42 mt of depth
The photogrammetric process allows to reconstruct the position of the camera


Scientific Payload – Bottom Camera


Scientific Payload – Telemetry and Mini Ct and SVS
During the mission we deployed a logger to record the scientific data:
The Data can be analysed in post processing to reconstruct the biophysical quantities characterizing the underwater environment
In this plot there is the temperature vs. the depth
Stratification of sea water temperature


Next Steps
Further development before Pedaso Mission:
USBL Setting for Precision Navigation
Multibeam Setting for Bathymetry and Watercolumn Data
Better Logger and Telemetry output for the synchronization and alignment of geographic information (Database Open Access)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