ClimeFish

Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change

- support sustainable fisheries, enable an increase in European aquaculture production, facilitate employment and regional development in the sectors, and develop forecasting and management tools for adapting to climate change, all in co-creation with stakeholders

ClimeFish – a Horizon 2020 project

Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change

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Overall Goal:

Help ensure that the increase in seafood production comes in areas and for species where there is a potential for sustainable growth, given the expected climate scenarios

Project Coordinator: The Arctic University of Norway
Project leader: Michaela Aschan
Consortium: 21 participants from 16 countries

Duration: 48 mnd
Starting: 04/2016
Ending: 03/2020

Granted: 5 MEUR

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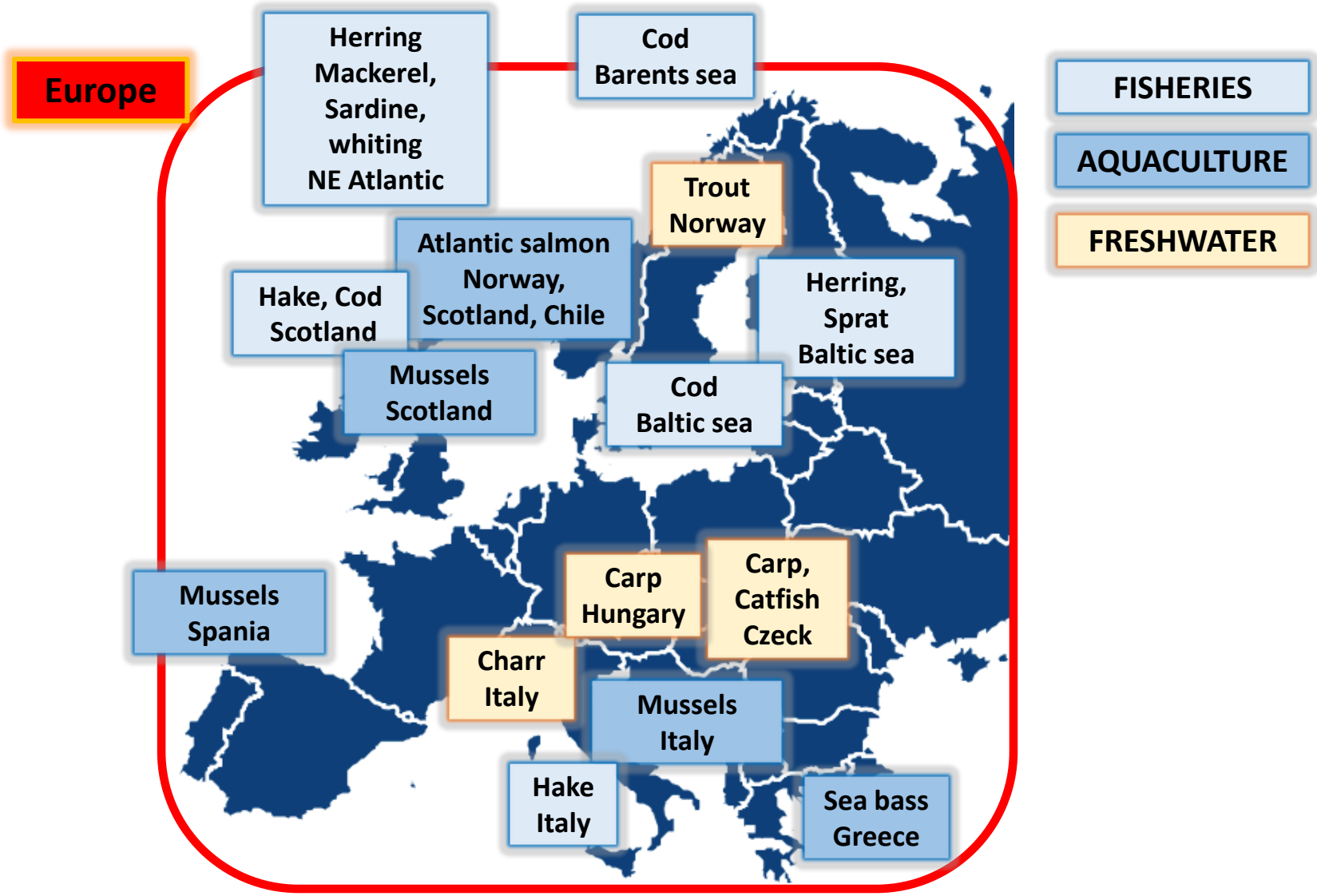
Impact Generators

- Forecasting models for fish production
- Guidelines for making Climate Adaptation plans for fisheries and aquaculture - European voluntary standard (CWA)
- Guidelines for establishing legal good practice when resources move and/or diseases occur
- The ClimeFish Decision Support Framework including a Decision Support System

ClimeFish 16 Case Studies



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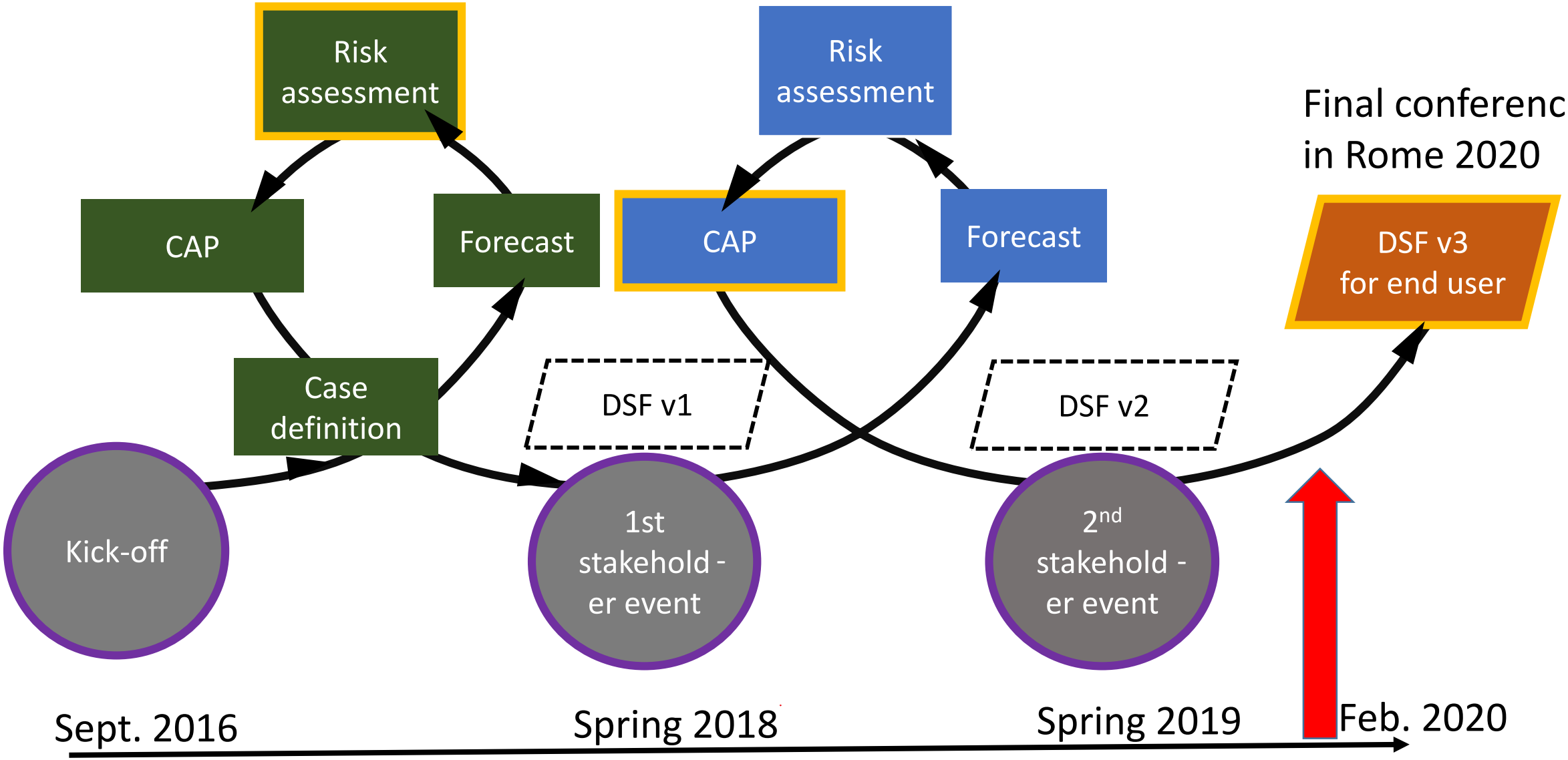
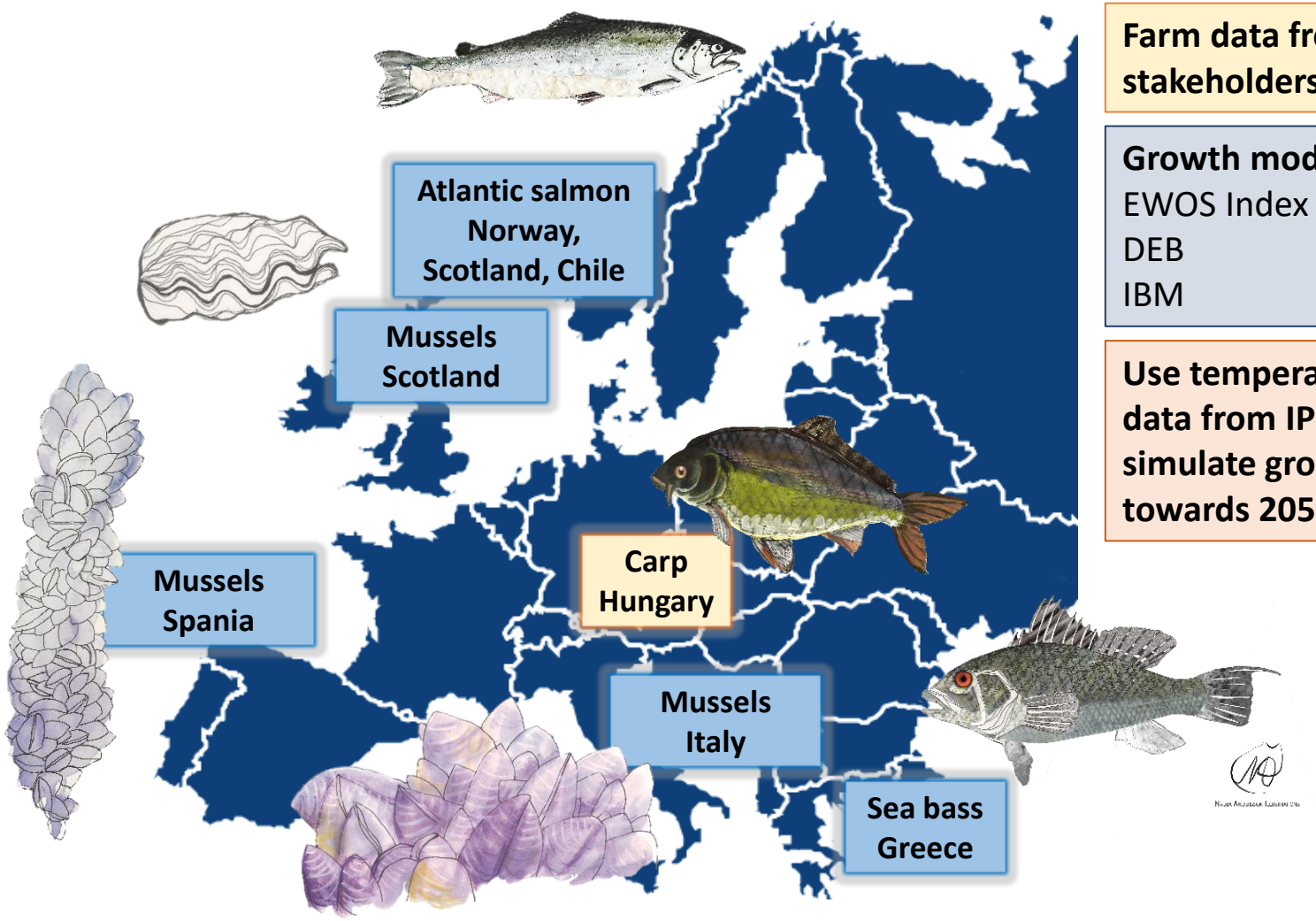
ClimeFish Decision Support Framework developed with stakeholders



ClimeFish 6 aquaculture cases



Farm data from stakeholders

Growth models
EWOS Index
DEB
IBM

Use temperature data from IPCC to simulate growth towards 2050

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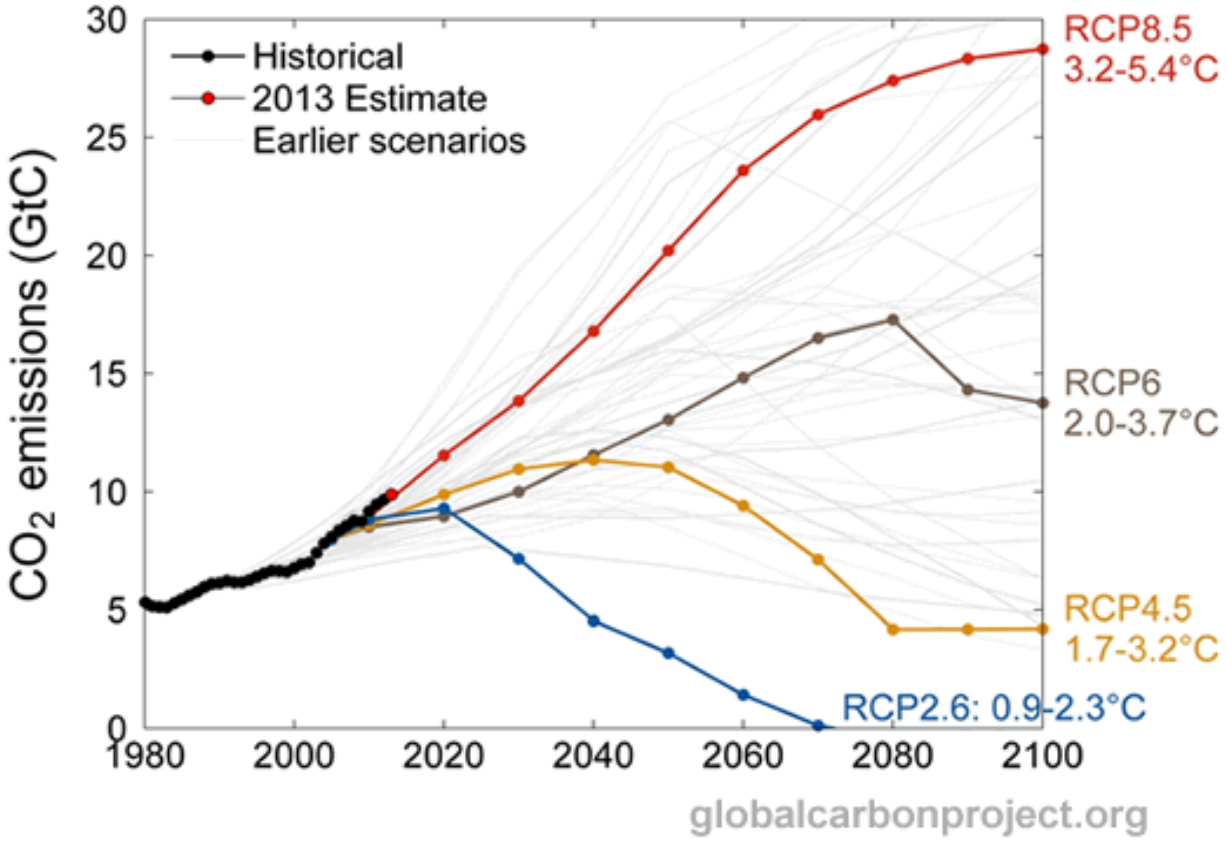
Temperature scenarios

LOST opportunity

Optimistisc scenario, RCP 2.6:
~1°C warmer by 2100

Most likely scenario, RCP 4.5:
~ 2°C warmer by 2100

Worst case scenario, RCP 8,5:
~ 4°C warmer by 2100



So far we are following the 8.5 scenario, 'business as usual'

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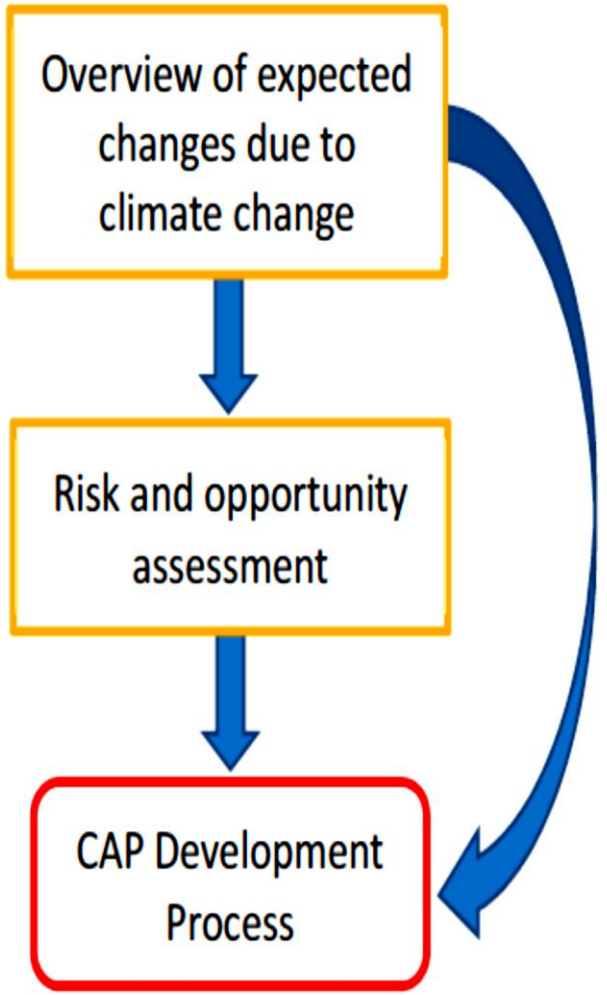
Obviously a need for good adaptation strategies

How can the biological forecast be used when preparing for the future?

- Creating Climate Adaptation Plans (CAPs)
- CAPs identifies how managers can *reduce negative effects* and find effective ways to *utilize opportunities* that may arise
- CAPs can be found at the European Climate Adaptation Platform Climate-ADAPT



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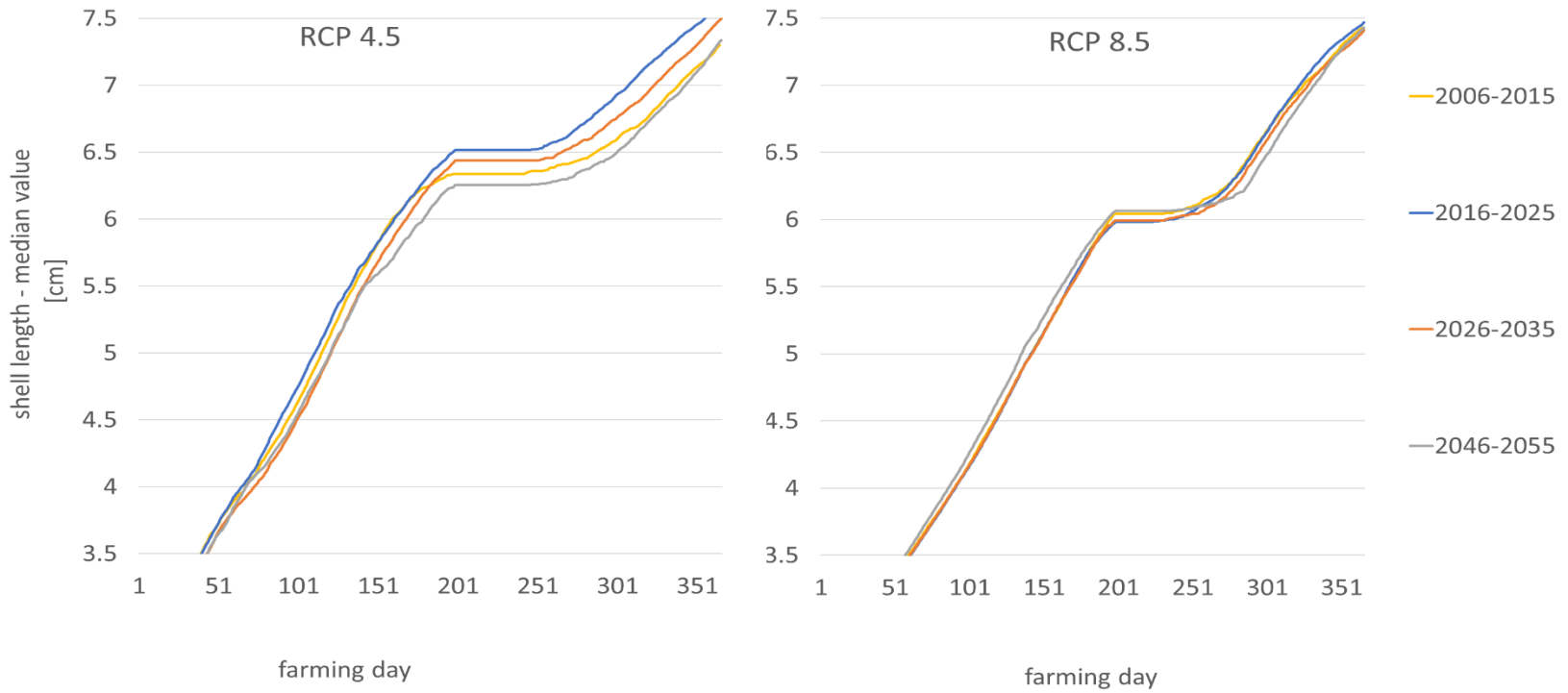
Italian CS Biological forecasting – mussel growth



Time to commercial size [days]	RCP4.5			RCP8.5		
	Median	1st quartile	3rd quartile	Median	1st quartile	3rd quartile
2010 - 2015	116	93	148	143	129	167
2016 - 2025	111	88	153	142	128	166
2026 - 2035	121	92	159	142	125	170
2046 - 2055	120	93	176	135	122	171

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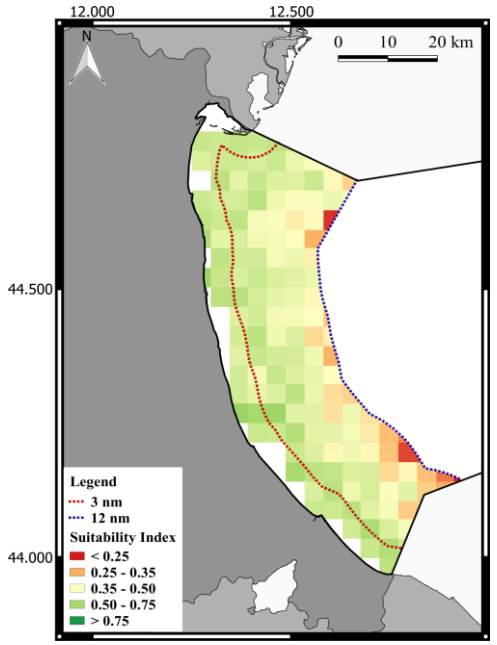
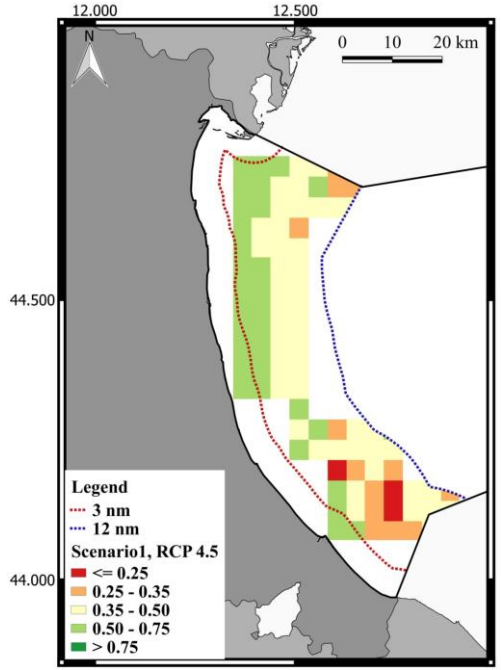
Based on model results:

Opportunities: Decrease of the minimum Time required to Reach the Commercial Size (TRCS) of 8 days under RCP8.5, is due to the higher number of days falling within the optimal thermal regime of this species under this scenario. **A change in this direction can produce a positive impact on the operational costs of farming (working days).**

Risks: Increases of Time required to Reach the Commercial Size (TRCS) of 5 days to 4 weeks, under RCP4.5, **can produce a negative impact on the operational costs of farming (working days).**





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Non-modeled threats

1: **Increase in storm events** (inducing major damages to farm socks and cables)

2: **Changes in the timing of natural recruitment** (could be an opportunity)

3: **Mussels detachment** (summer heat waves)

4: **Natural predation** (increase in predation pressure due to a change in the trophodynamics)

5: **Lower food availability** (e.g. in 2017, when the Po river plume presented a more limited extension in summer, affecting farms located in the lower part of the Northern Adriatic area

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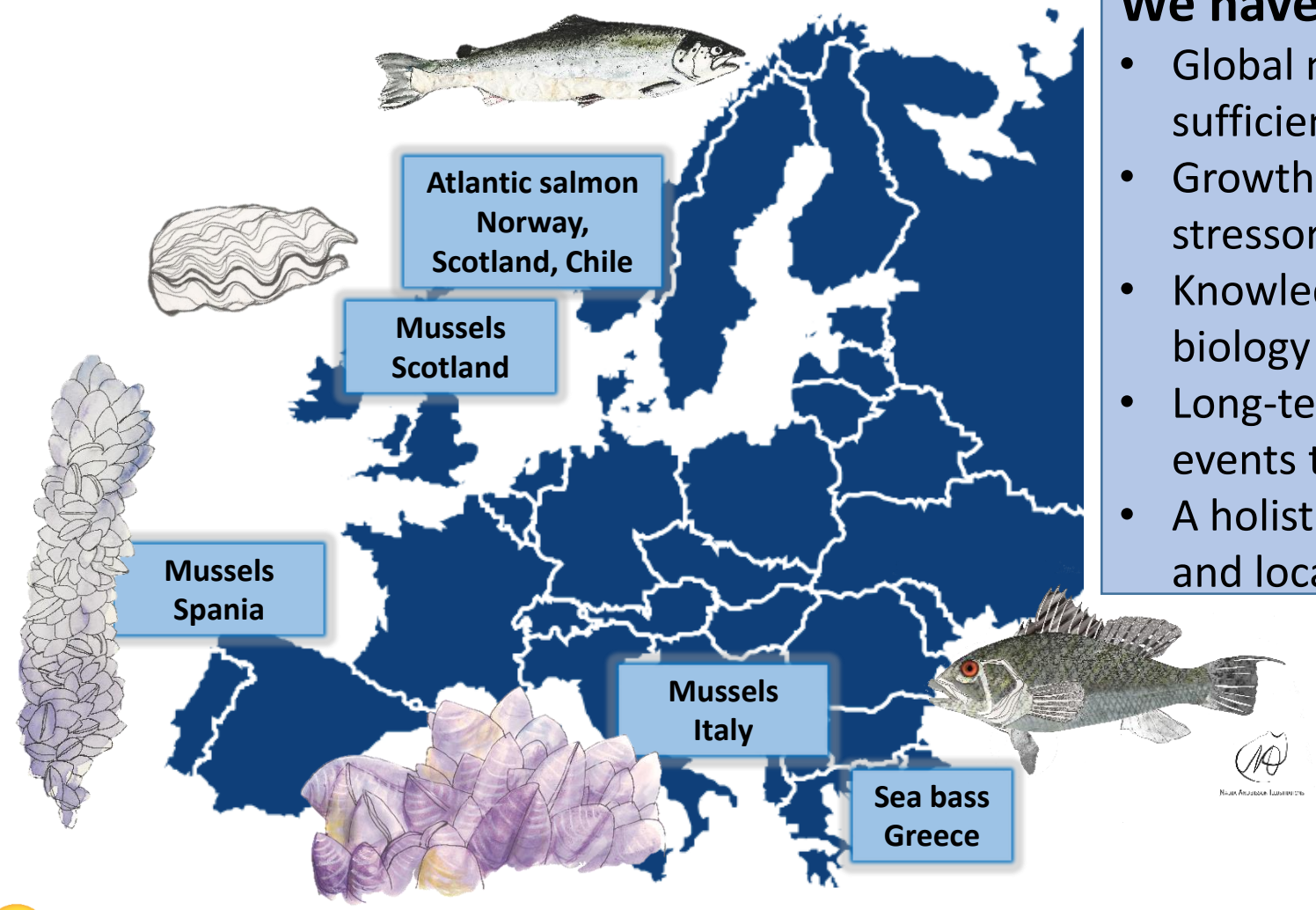
Summary marine Aquaculture cases



We have identified 5 main challenges:

- Global nor regional climate projections are at sufficiently high resolution
- Growth models must be expanded to include more stressors, like dO2, salinity, pH and diseases
- Knowledge gaps linking environmental data to the biology of the farmed species is huge
- Long-term climate models should include extreme events to capture real risks for aquaculture
- A holistic approach when evaluating future sites and locations suitable for farming is necessary

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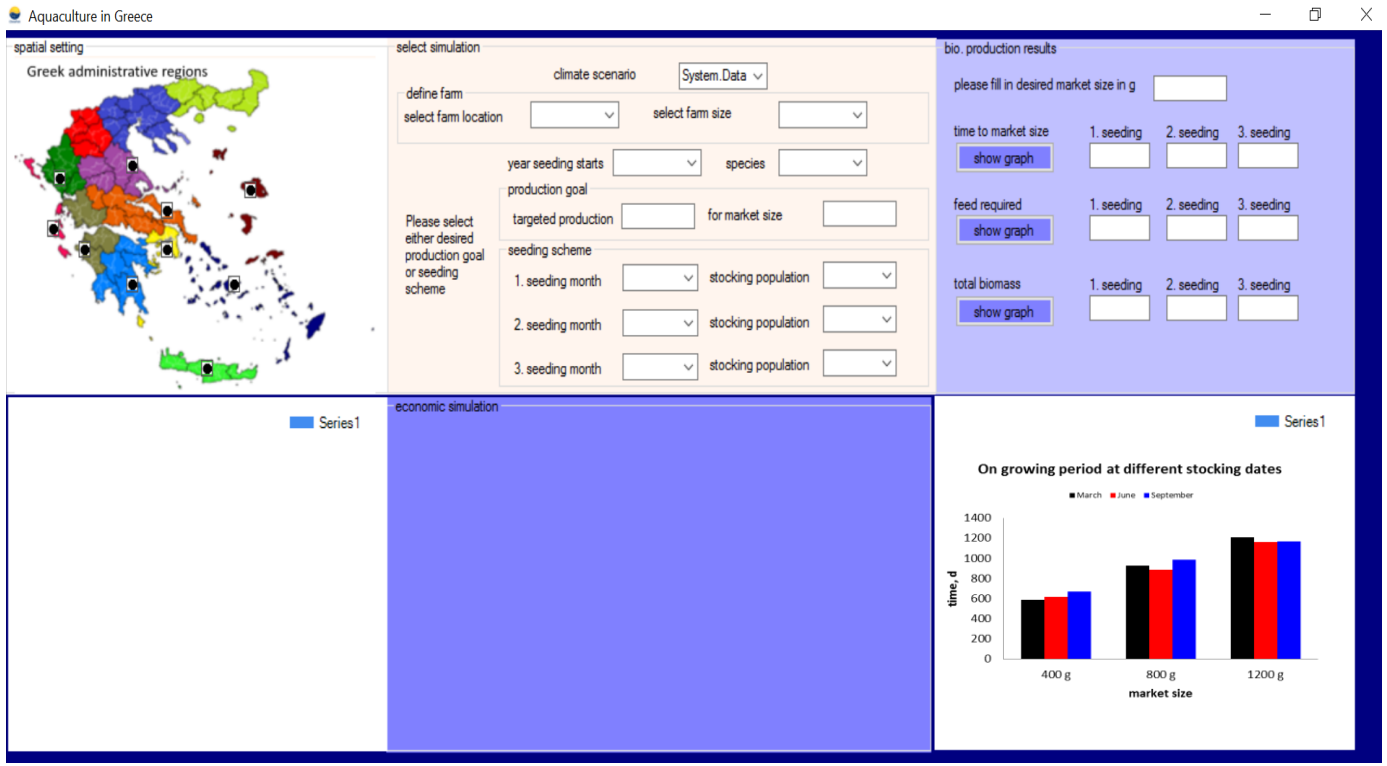
The ClimeFish decision support software for aquaculture production



the ClimeFish DSF will be a web-based tool box to support seafood production in Europe under climate change

The ClimeFish DSF will include all tools, for example, maps, management guidelines, etc., created during the project period

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Virtual fact sheets at www.climefish.eu

Northeast Atlantic Aquaculture

Greek Aquaculture

Spanish Aquaculture

Scottish Aquaculture

Italian Aquaculture

European Waters Overall

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25th-26th of February 2020 at FAO , Rome

Follow our updates:
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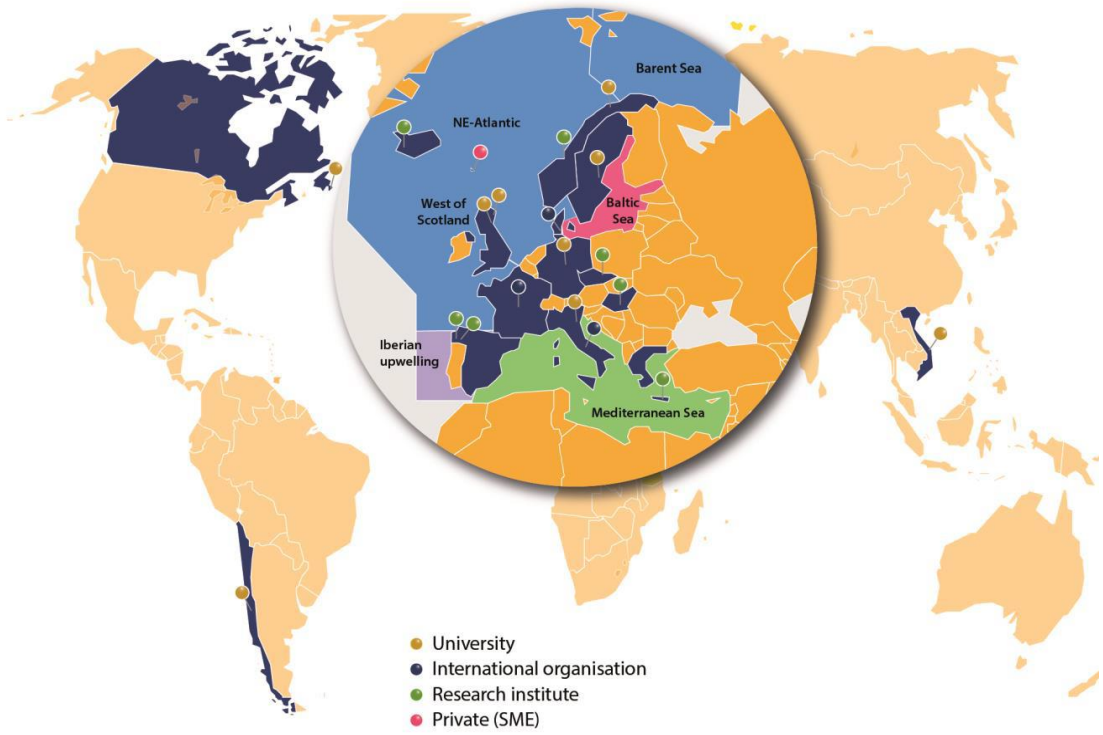

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