

A pragmatic approach to developing Climate Adaptation Plans for fisheries and aquaculture

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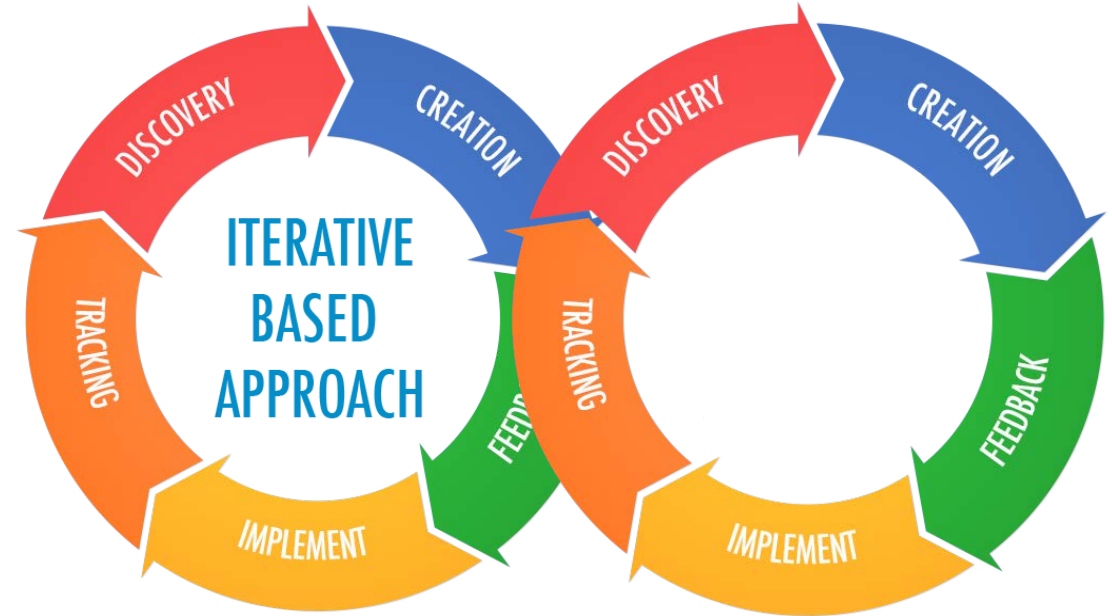
*Authors: **Unn Laksa**, Juliana Arias-Hansen, Jónas R. Viðarsson, Thuy Pham Thi Thanh, Ragnhildur Friðriksdóttir, Sigurður Örn Ragnarsson, Rosa Chapela, Mariola Norte, and Michaela Aschan³*

Climate change adaptation challenges

Eric Galbraith:

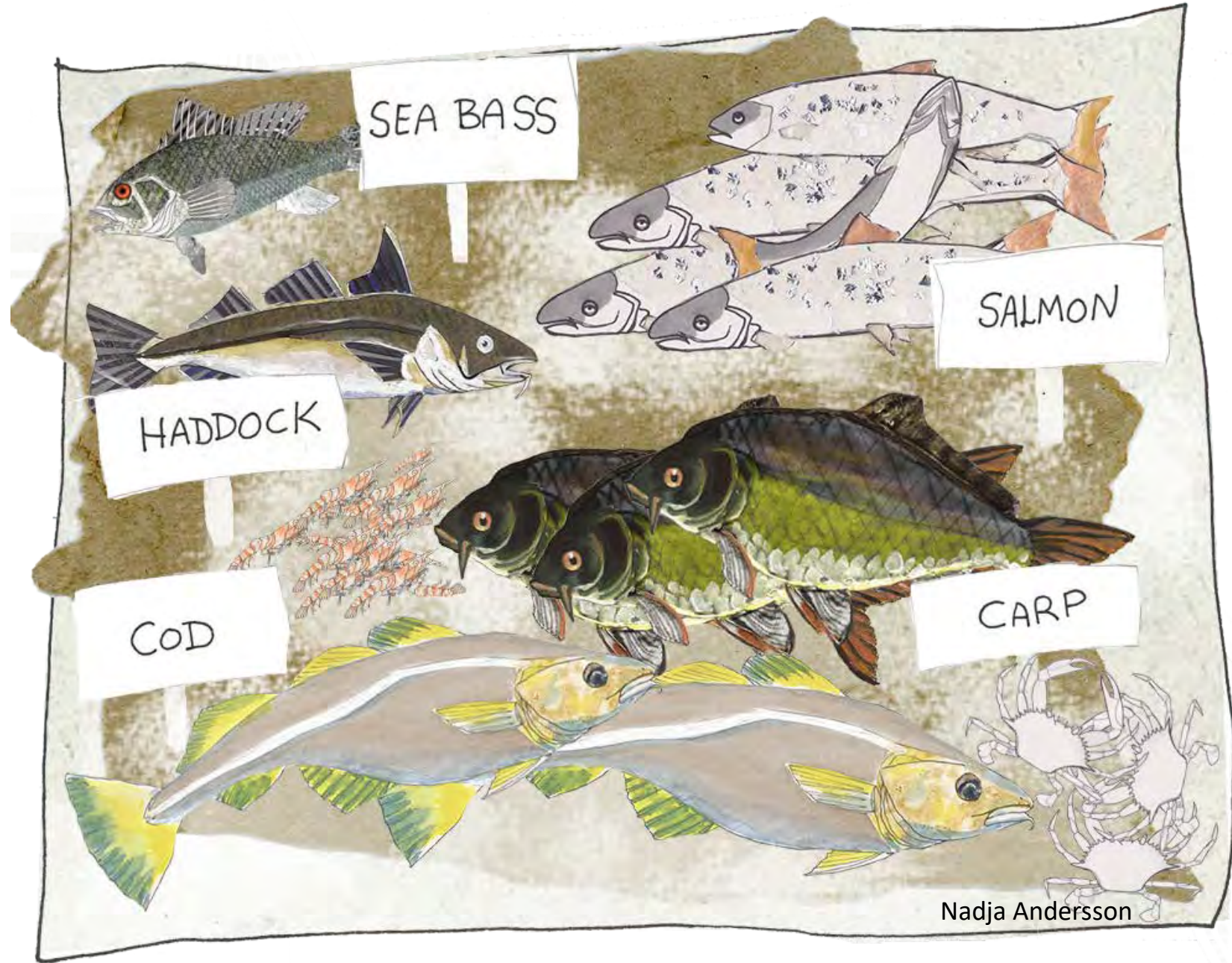


Sarah Cooley:



ClimeFish:

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



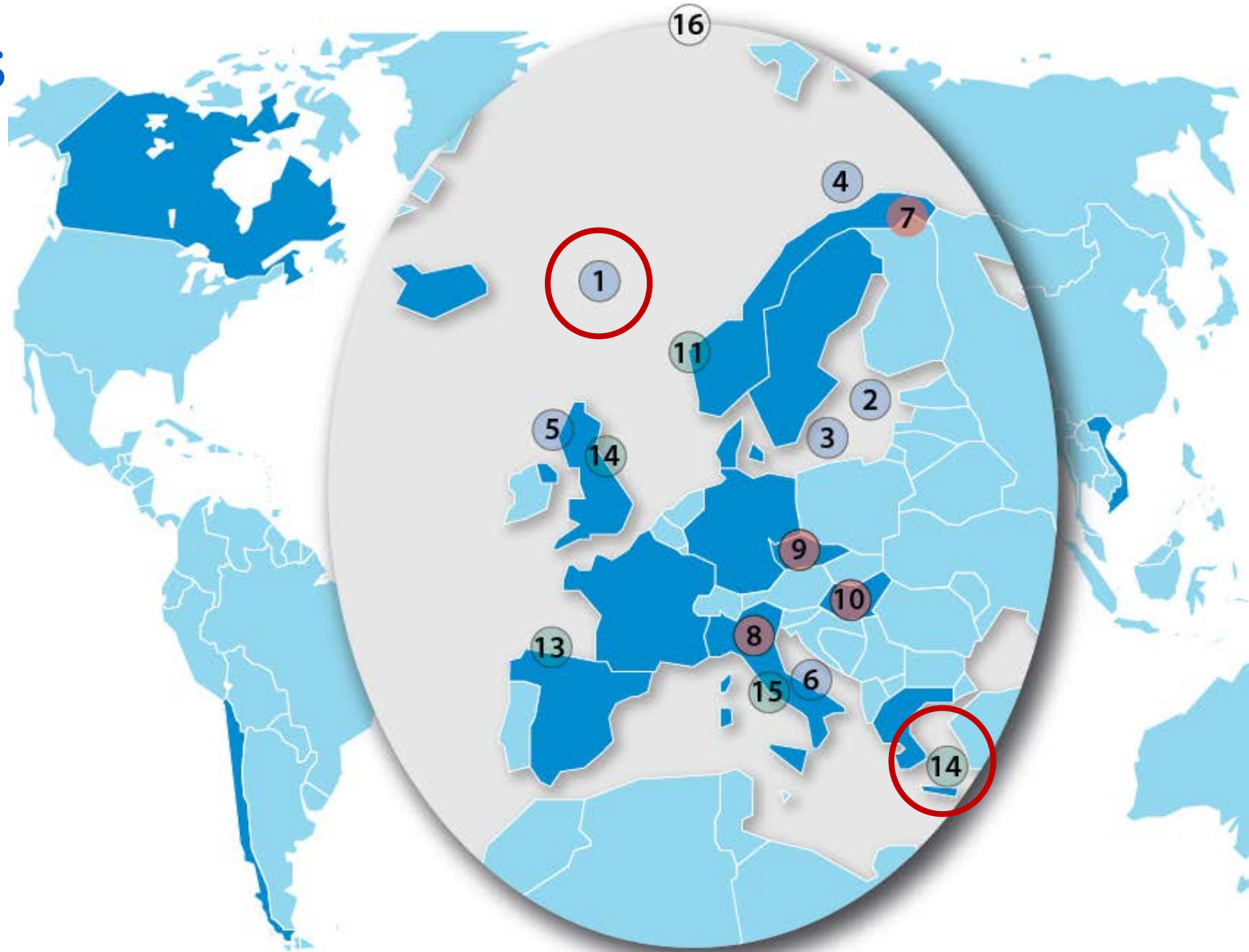
Nadja Andersson

Partner countries and case studies

Fisheries

Aquaculture

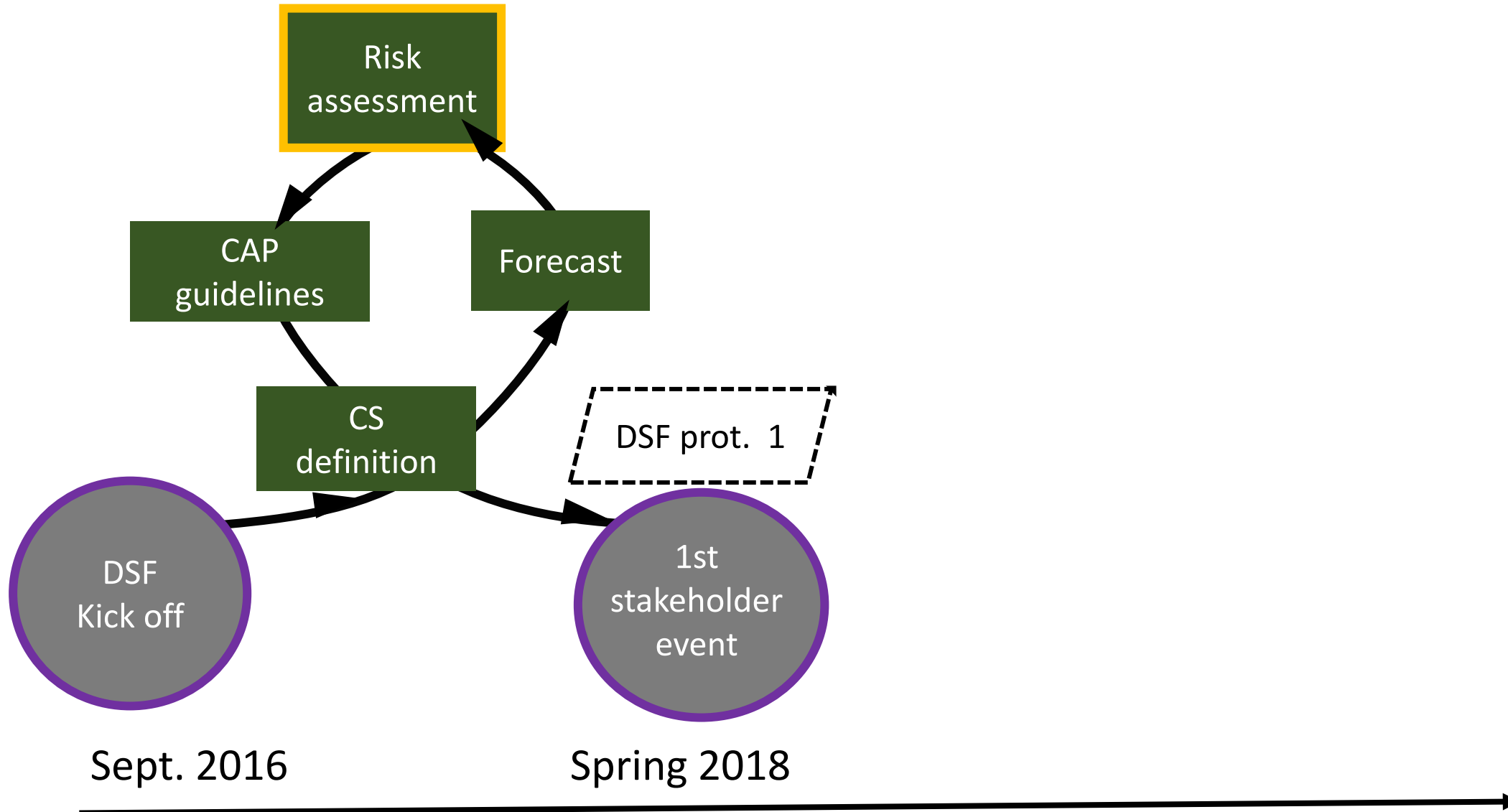
Lakes and ponds



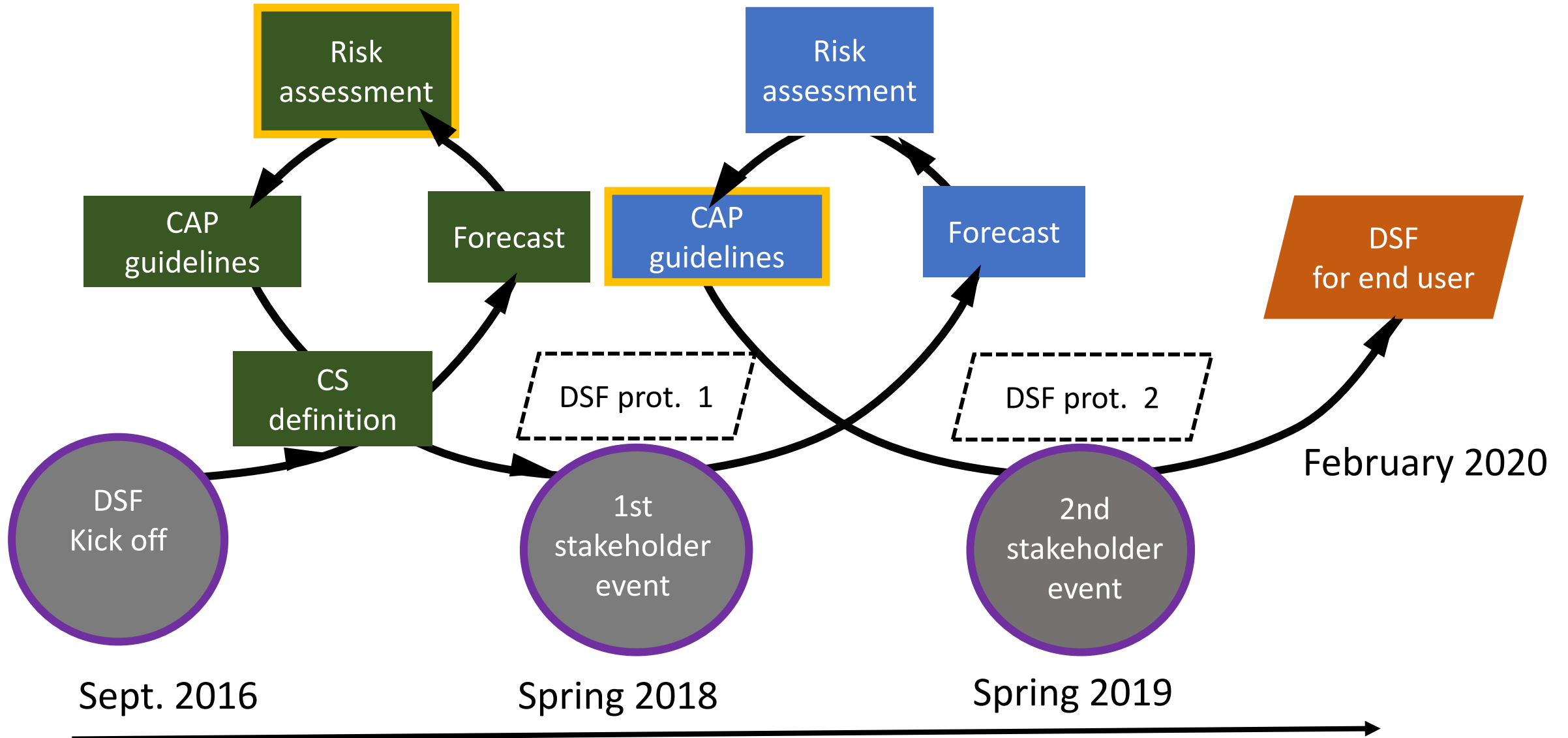
ClimeFish applies a co-creation approach



An iterative process ensures that the CAPs developed are applicable



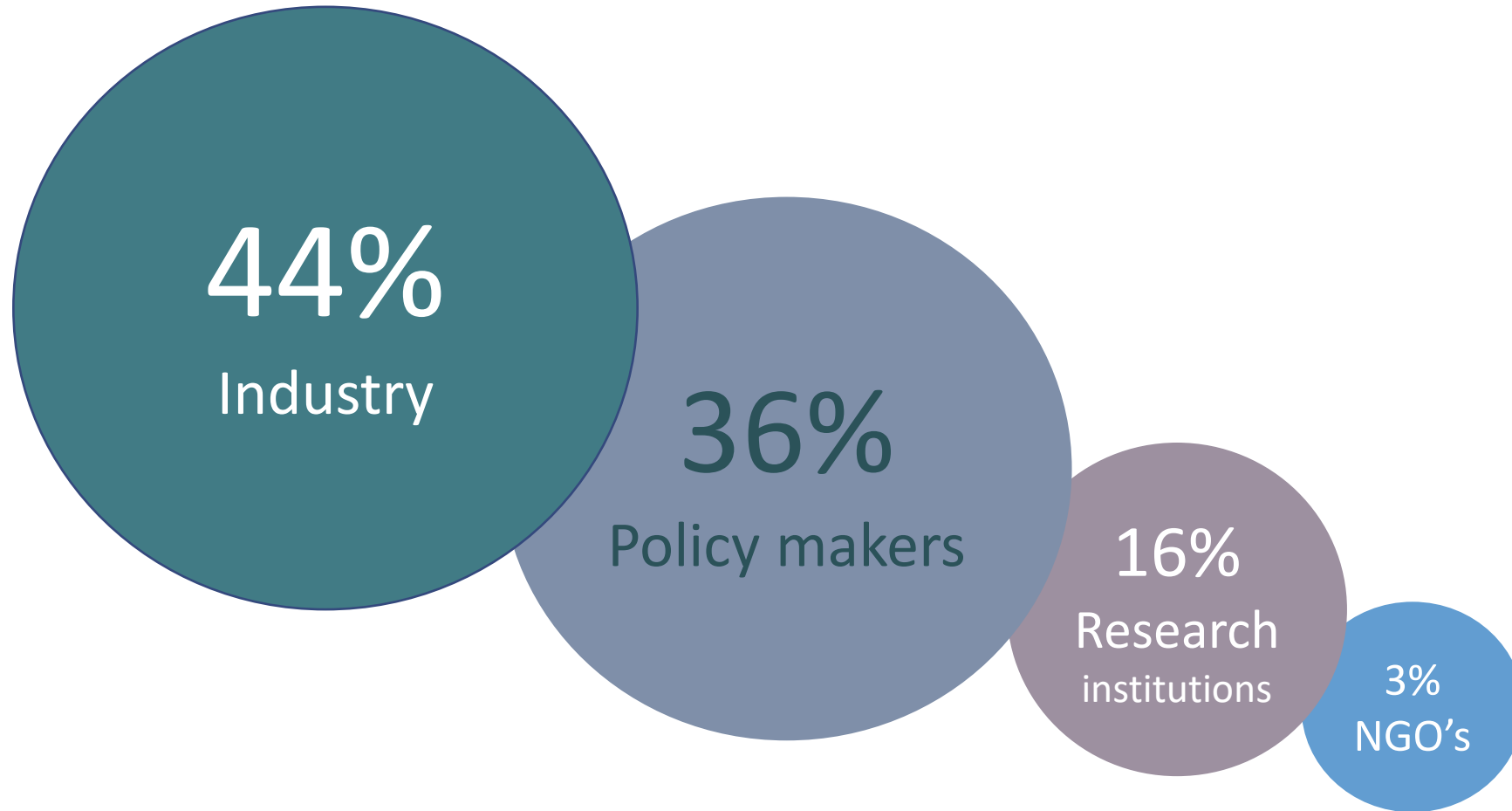
An iterative process ensures that the CAPs developed are applicable



ClimeFish stakeholder events in 2018

Case study	Date	Place	Impact generator
Italian Lake Garda	17 January	Lake Garda	CAP
Spain, Iberian upwelling	22 February	Galicia	CAP
NE Atlantic (fisheries)	6-7 March	Copenhagen	CAP
NE Atlantic (aquaculture)	5 April	Oslo	CAP
West of Scotland	10 April	Aberdeen	CAP + DSS
Greece	18 April	Athens	CAP + DSS
Hungary	23 April	Szarvas	CAP + DSS
European waters overall	10 September	Brussels	CWA standard


112 persons have attended seven stakeholder events



Lessons learned in stakeholder events

- Where there is evident impact industry is eagerly taking part
- Case leader knowledge and contact with stakeholders benefits the process
- Stakeholder events facilitates discussion and problem solving among actors
- Necessary to fine tune expectations up front
- Distinguish between risk assessment and adaptation measures


The ClimeFish approach to CAP development applies previously presented principles

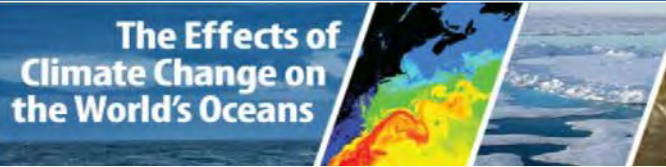
 Food and Agriculture Organization of the United Nations

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Assessing climate change vulnerability in fisheries and aquaculture

Available methodologies and their relevance for the sector



**The Effects of Climate Change on the World's Oceans**

W4: Climate change adaptation of fisheries: examples of field projects supporting coastal communities

Convenors:
[Tarub Bahri](#), Corresponding (FAO), Amber H... (FAO)

Invited Speaker:
[Edward Allison](#) (College of Environment, Univ...)

Climate change adaptation in UK seafood: Understanding and...

 Food and Agriculture Organization of the United Nations

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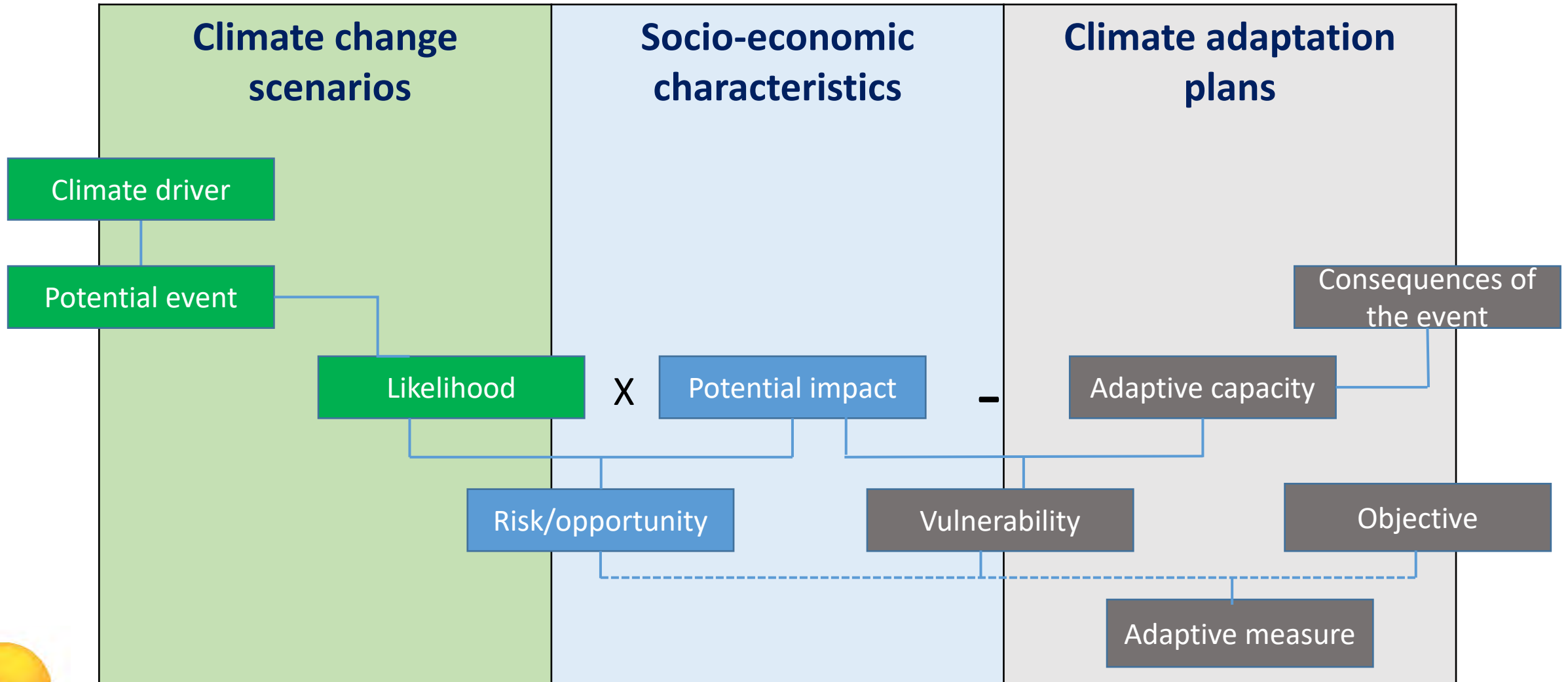
Impacts of climate change on fisheries and aquaculture

Synthesis of current knowledge, adaptation and mitigation options



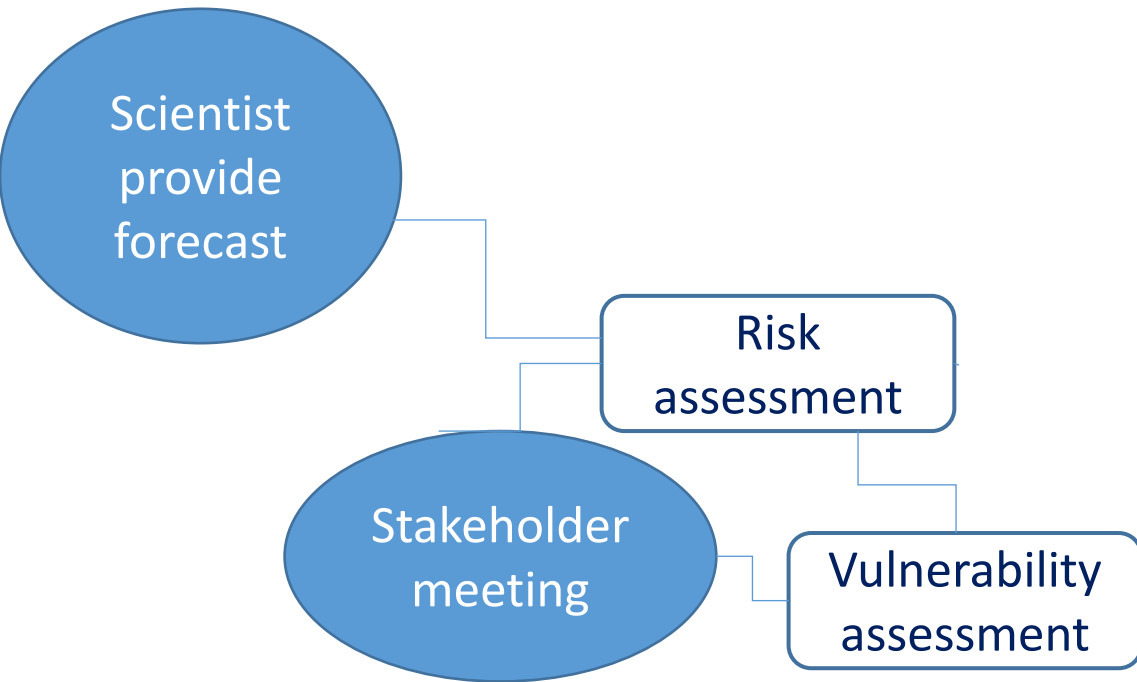
To be released July 2018 at FAO Committee on Fisheries #COFI33

The development of CAPs is based on EAF, EAA and RBM



Adapted from IPCC (2014) and FAO (2015)

Adaptive measures are identified based on risk assessment and vulnerability assessment

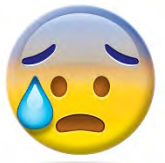
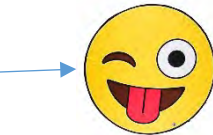


Grafton, 2010
Johnson et al., 2016
FAO, 2015

Time line

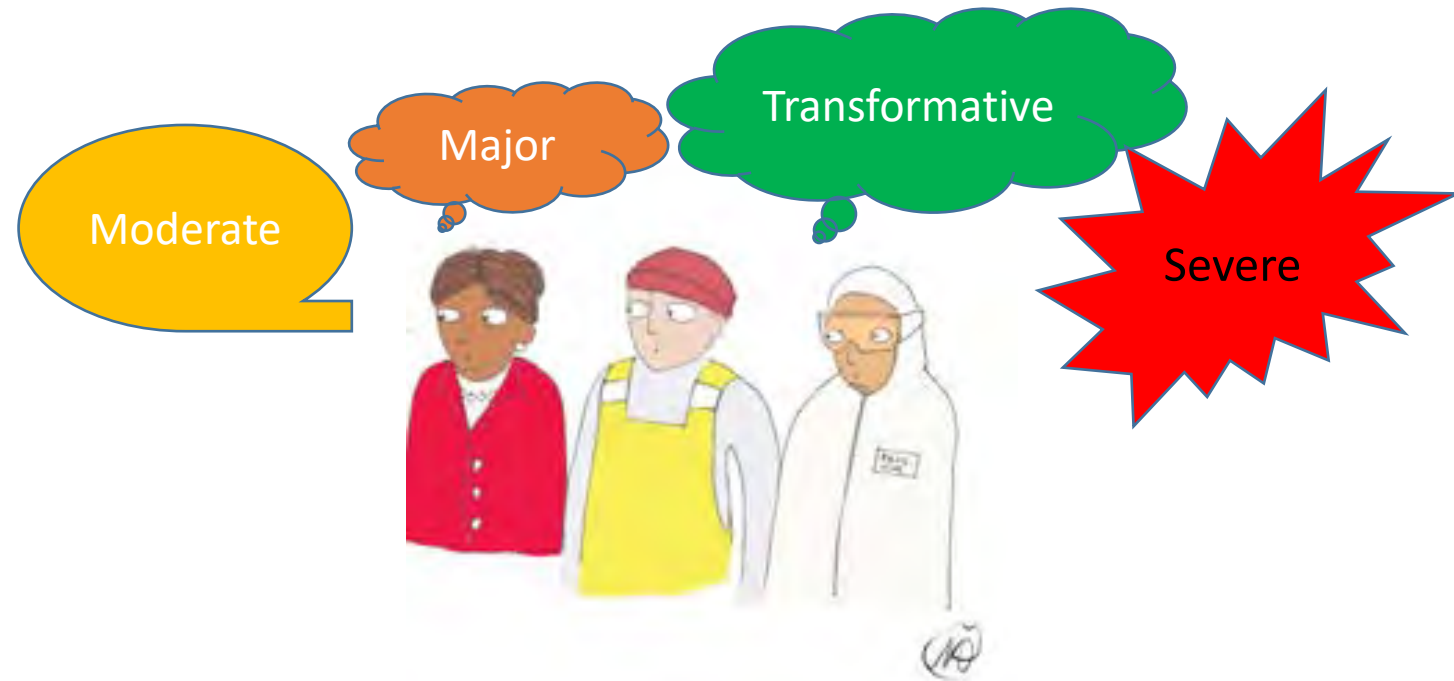
Stakeholders and scientists identify and score risks & opportunities

Category	Climate Change Drivers	Potential Impact	R/O	Stakeholder severity score	Stakeholder consensus	Severity Analysis	Consequence ranking	Likelihood Score	Risk score	Risk rating
				S	Std. Dev	A	C = (S, A)	L	R = (C, L)	
The Fisheries	Storminess and waves	11. Deployment and performance of fishing gear reduced due to storminess	R	2	↔ 1.27	2	2	Possible	C2, L Possible	Major
			O	-1		0	-1		C-1, L Possible	Moderate
	Temperature - changing distribution	12. Potential new fisheries due to emerging species	R	2	↔ 1.26	0	1	Possible	C1, L Possible	Moderate
			O	-2		-2	-2		C-2, L Possible	Major
	Temperature	13. Changes to catchability of target species	R	2	↔ 1.53	1	2	Possible	C2, L Possible	Major
			O	-2		-2	-2		C-2, L Possible	Major
Socio-economics and governance	Storminess and waves	14. Reduced safety at sea for crew due to waves and storminess	R	3	↔ 1.15	2	2	Possible	C2, L Possible	Major
	Storminess and waves	15. Reduced days at sea due to severe weather conditions	R	2	↗ 0.76	2	2	Unlikely	C2, L Unlikely	Moderate
	Increasing rainfall, storminess and waves, sea level rise	16. Damage to ports and land-based facilities due to weather conditions and sea level rise	R	2	↗ 0.83	2	2	Possible	C2, L Possible	Major
	Temperature - changing distribution	17. Increased complexity in negotiations on allocations of shared stocks	R	3	↗ 0.86	3	3	Likely	C3, L Likely	Severe
	Temperature	18. Overfishing of shared pelagic stocks due to unilaterally set quotas	R	3	↗ 0.69	3	3	Likely	C3, L Likely	Severe

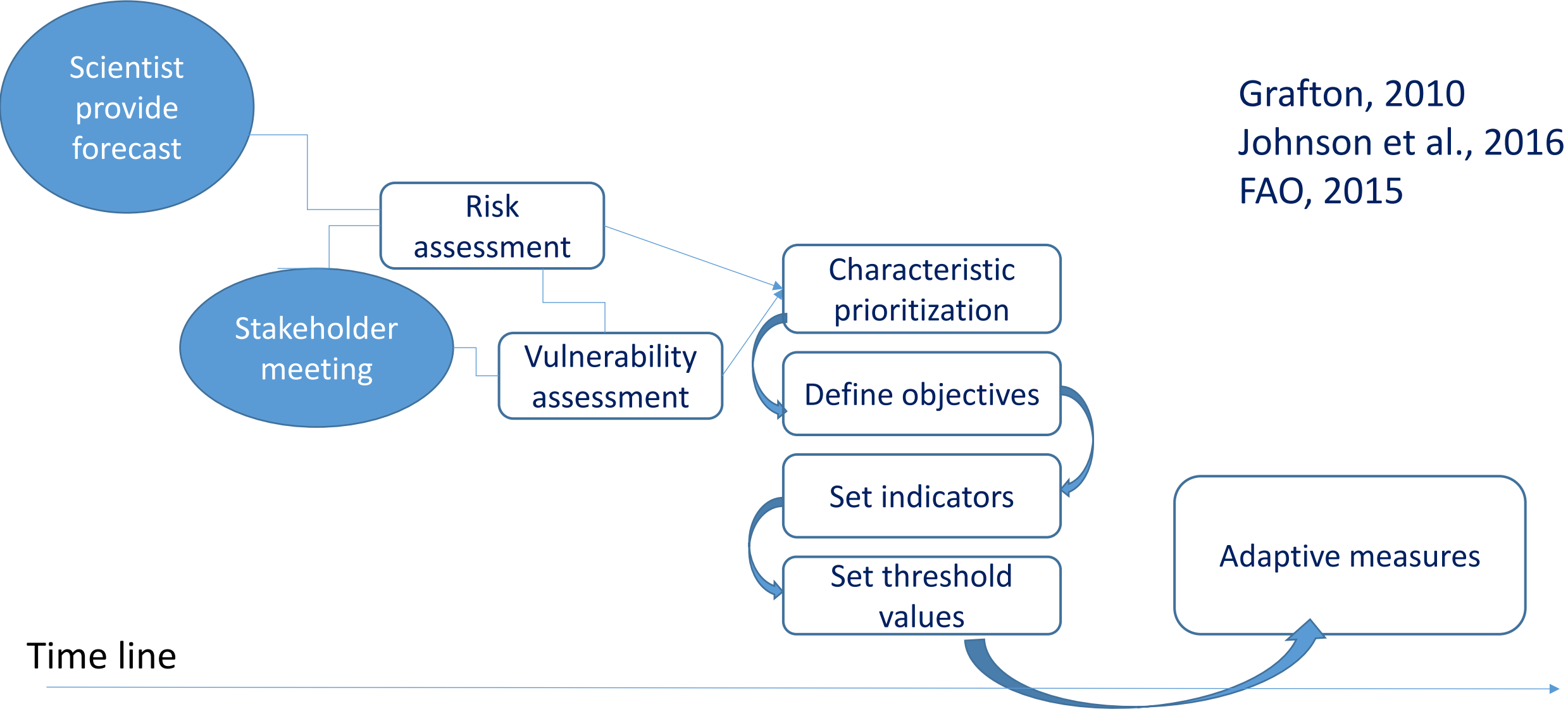


In case of stakeholders express different opinions

- We provide transparency through the stakeholder consensus index
- Explain the differing stakeholder perspectives on the impacts
- We revisit the science



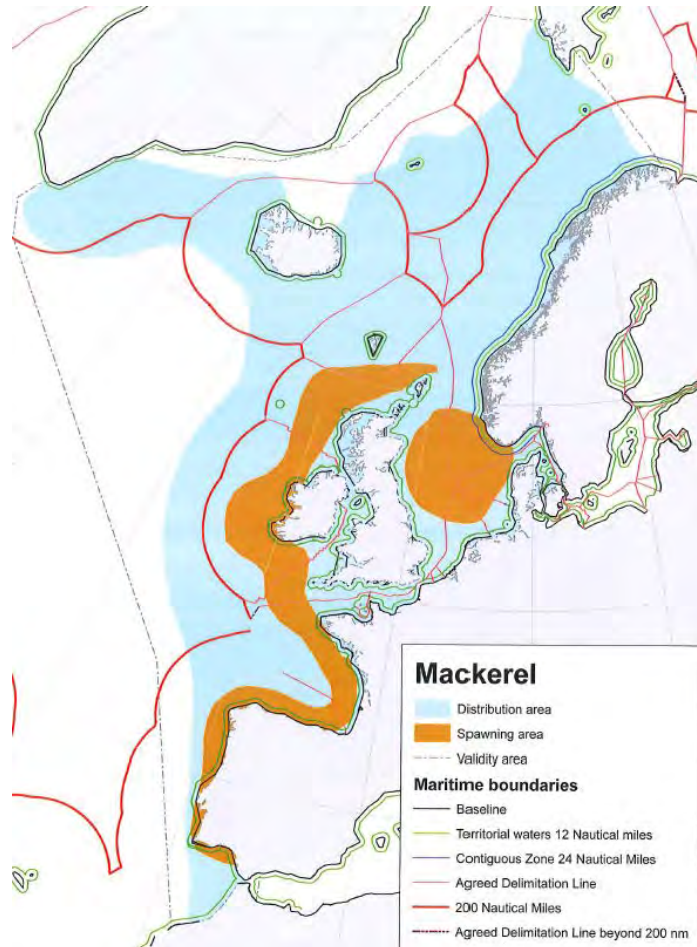
Adaptive measures are identified based on risk assessment, vulnerability assessment, and setting objectives



Grafton, 2010
Johnson et al., 2016
FAO, 2015

Case studies representing two sectors

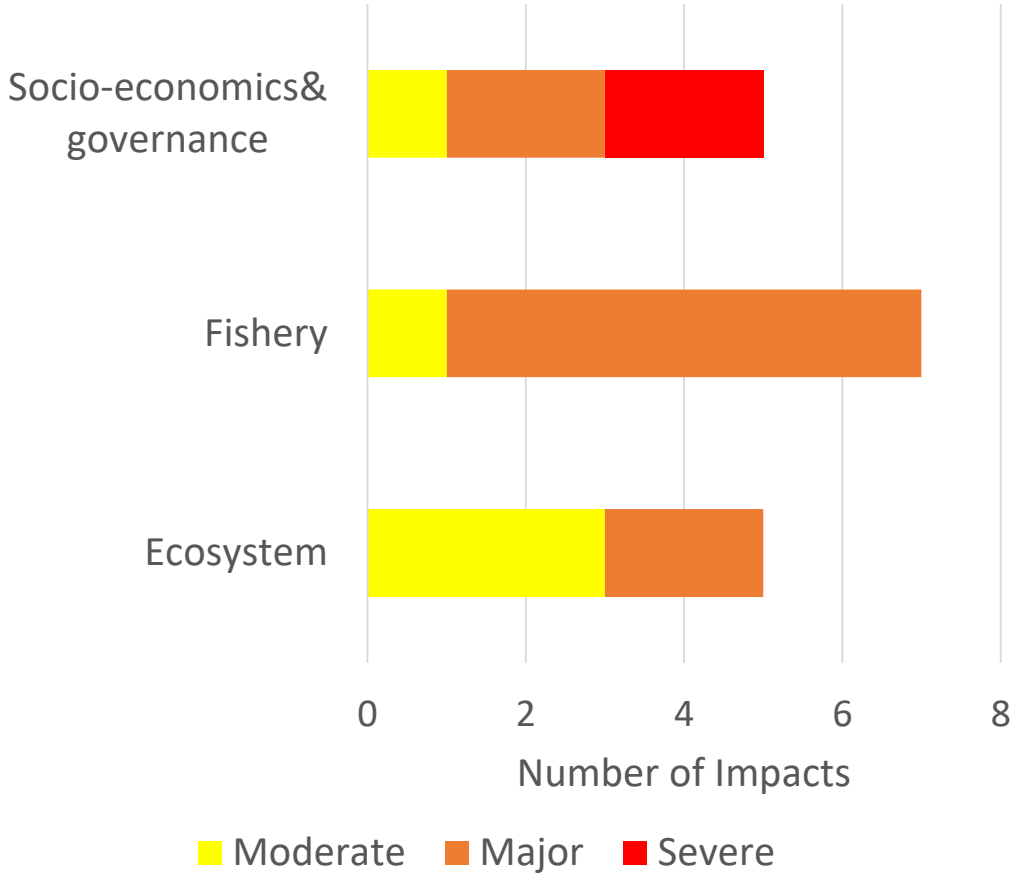
NE-Atlantic Pelagic fisheries



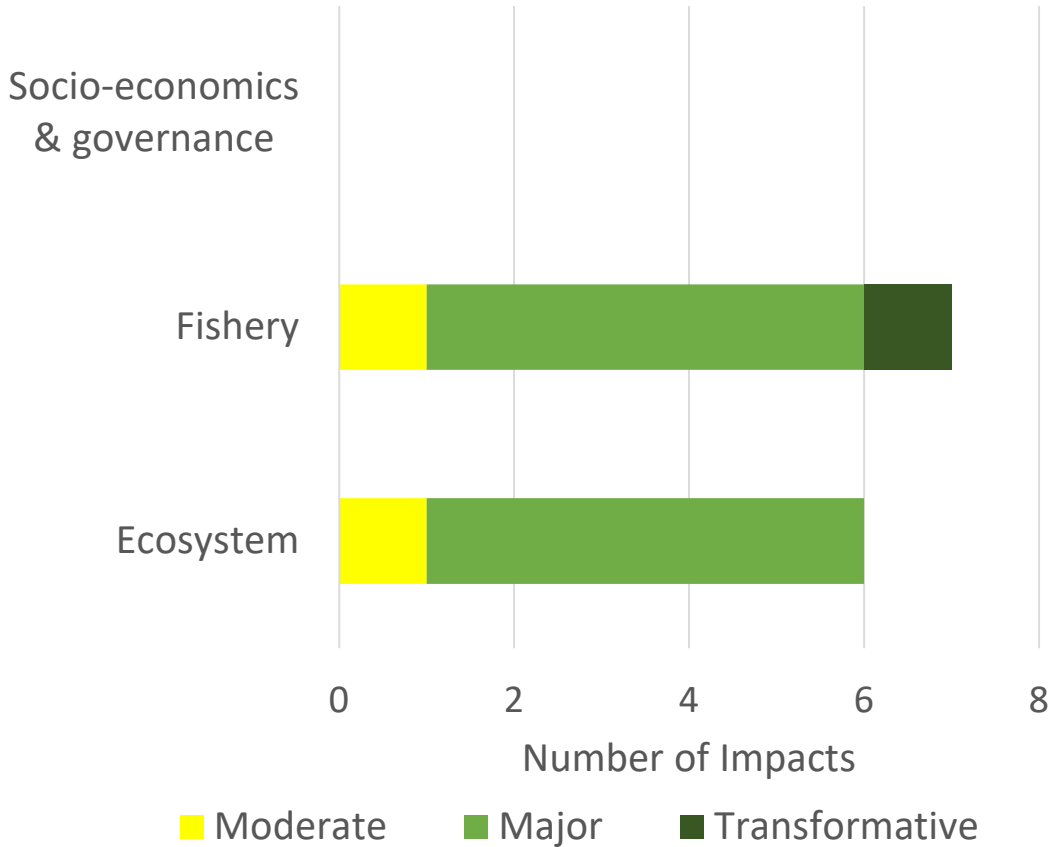
Greek aquaculture



Identified risks and opportunities in NE Atlantic fisheries



Risks



Opportunities



NE Atlantic fisheries:

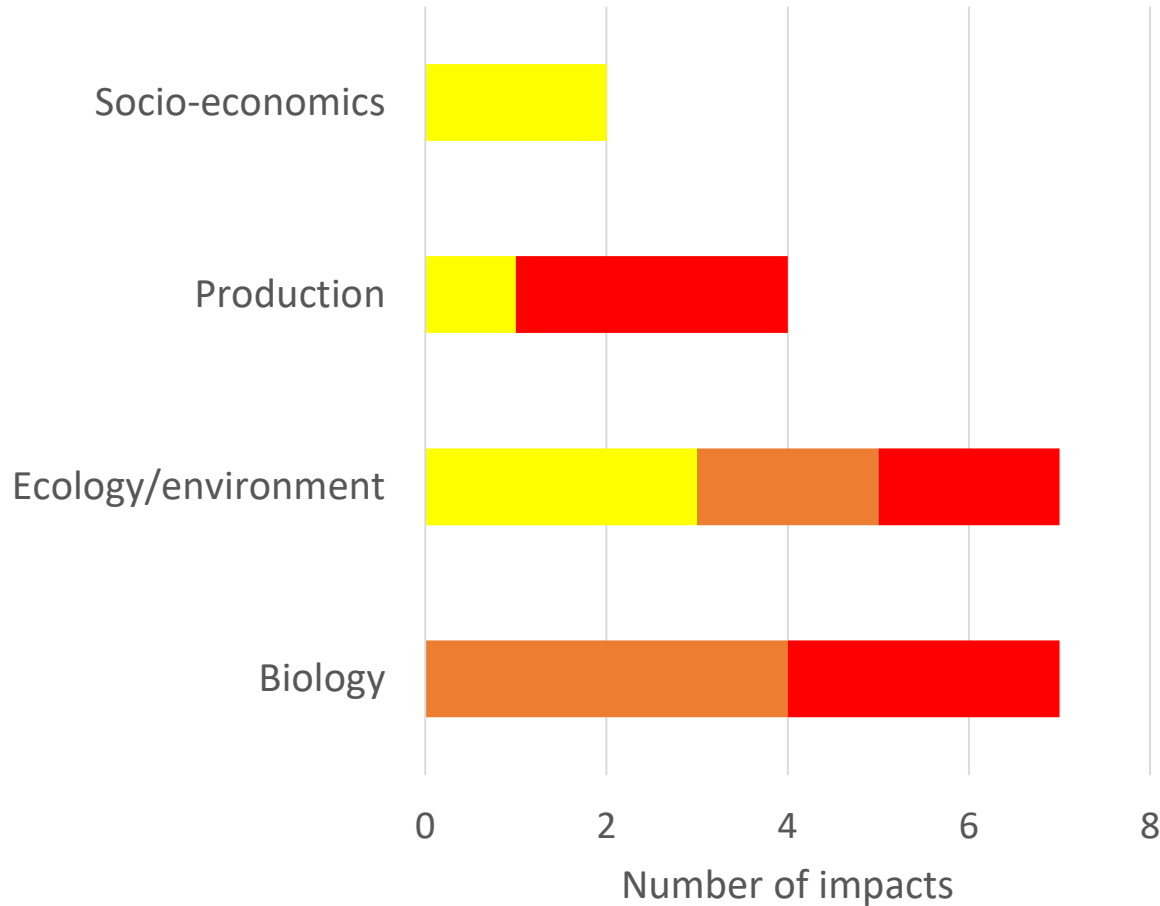
Main challenge when making CAP:

- Quota sharing agreements not applicable because of changes in fish distribution

Need guidelines for establishing legal good practice when resources move

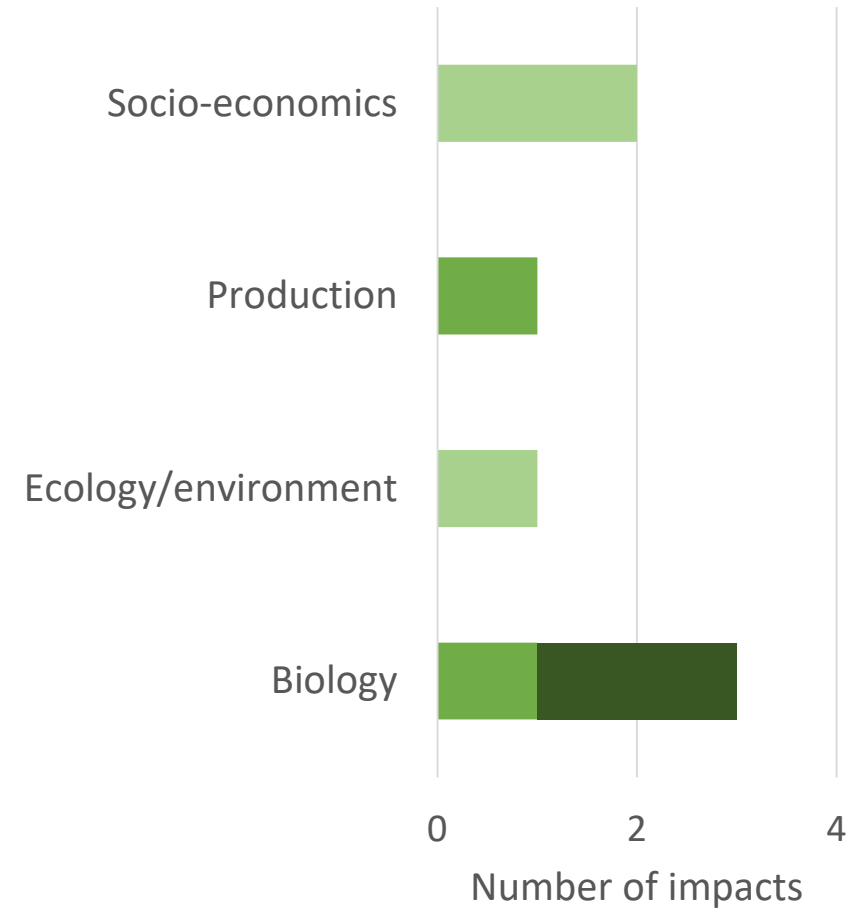


Identified risks and opportunities in Greek aquaculture



■ Moderate
 ■ Major
 ■ Severe
 ■

Risks



■ Moderate
 ■ Major
 ■ Transformative

Opportunities

Decision support software for Greek aquaculture supports CAP

Aquaculture in Greece

spatial setting

Greek administrative regions

select simulation

climate scenario: RCP4.5 | species: European sea bass

define farm
select farm location: South Regio | select farm size: medium

year seeding starts: 2015-2025

production goal
targeted production: | for market size: |

seeding scheme
1. seeding month: March | stocking population: 200000
2. seeding month: June | stocking population: 200000
3. seeding month: Septembe | stocking population: 200000

[get bio. result](#)

bio. production results

please fill in desired market size in g: 800

time to market size in weeks

1. seeding	2. seeding	3. seeding
118	111	110

feed required in kg

1. seeding	2. seeding	3. seeding
293235	295205	295319

total biomass in kg

1. seeding	2. seeding	3. seeding
134040	140295	146404

[show risk assesment](#)

Profit per selected market size

Seeding Scheme	Profit (approx.)
1. Seeding	400,000
2. Seeding	430,000
3. Seeding	460,000

economic simulation

Please enter for the economic calculations the following prices / cost.

	medium value over last 5 years	medium value over last 5 years
Feed price	1,15	Other costs (maintenance and other costs)
Species sales price /market price	6,44	Cost of depreciations (the equipment, buildings, storage, vessels)
Prices of juveniles	0,23	Interest rate
Price of labour	37,41	

calculate business economics based on user input

[calculate costs / profit](#) | Total costs for selected market size: 1413579,8 | [show graph \(costs/market size\)](#)

[show risk assesment](#) | Profit for selected market size: 1295979,3 | [show graph \(profit/market size\)](#)

[calculate profit maximising market size for given seeding scheme](#) | [calculate profit maximising market size and seeding scheme for given production goal](#)

Mean Individual weight in g per time in weeks

Time (weeks)	1. seeding (g)	2. seeding (g)	3. seeding (g)
0	0	0	0
50	~200	~250	~300
100	~600	~700	~800
150	~1200	~1300	~1400
170	~1500	~1600	~1700

Greek aquaculture

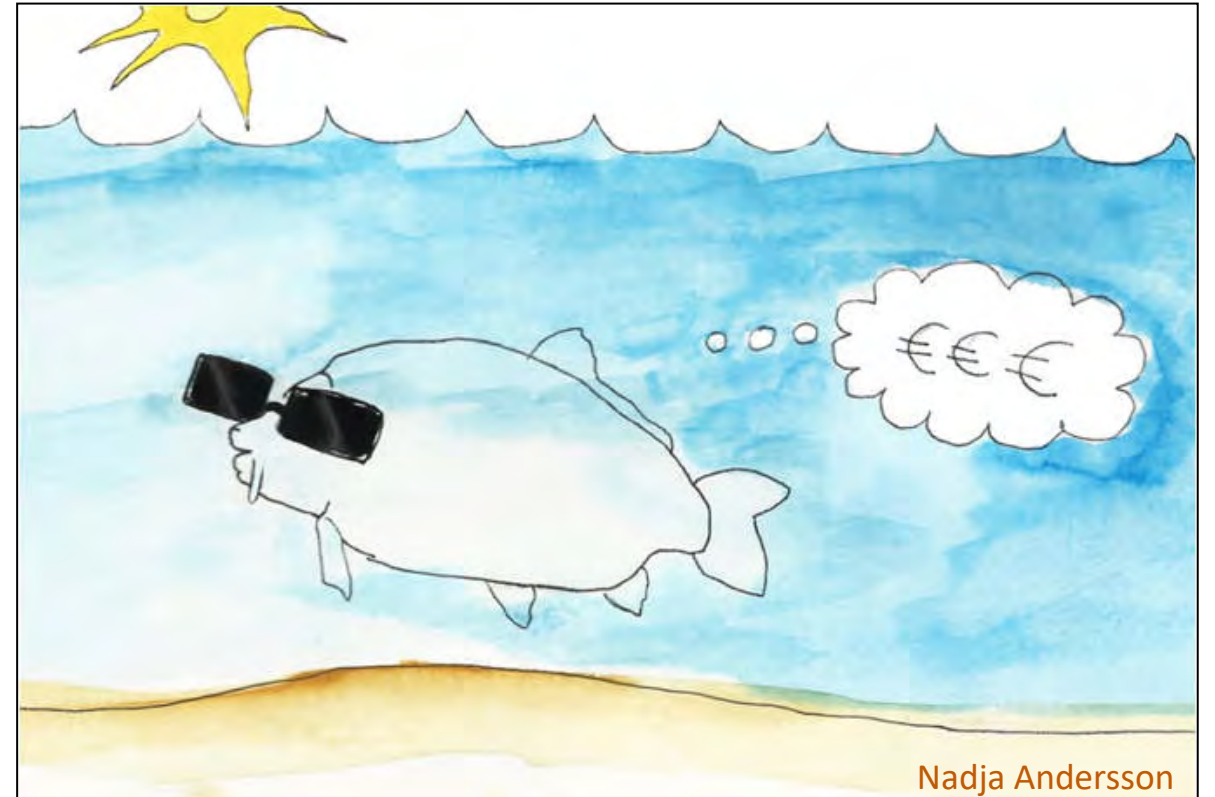
Main challenges when making a CAP:

- Complexity of the climate drivers involved
- High dependency of the profit on the market



Common conclusions after the first loop in seven cases

- Aquaculture is perceived to be more vulnerable than fisheries
- Temperature is considered the main driver across sectors
- CAP objectives: more monitoring, and better governance





Country information

EEA Member countries are at different stages of preparing, developing and implementing national [adaptation](#) strategies and plans.

See in the map below the information provided by each Member State of the European Union under the European mechanism for monitoring and reporting information relevant to climate change (Regulation (EU) No 525/2013).

For other EEA Member countries, the information provided is based on voluntary submissions to EEA.

Filter by any of the topics in the drop-down list ('Choose Thematic Map') and the map will indicate if links on the topic are available for each country. To navigate to the information just scroll over to one country on the map and a pop-up window will show the existing link(s) and allow clicking on them.




Select a country to go to country's page:



Choose Thematic Map:

Action plans

[Show Thematic Map](#)

-  No links available for this theme
-  Links available for this theme
-  Currently no information available

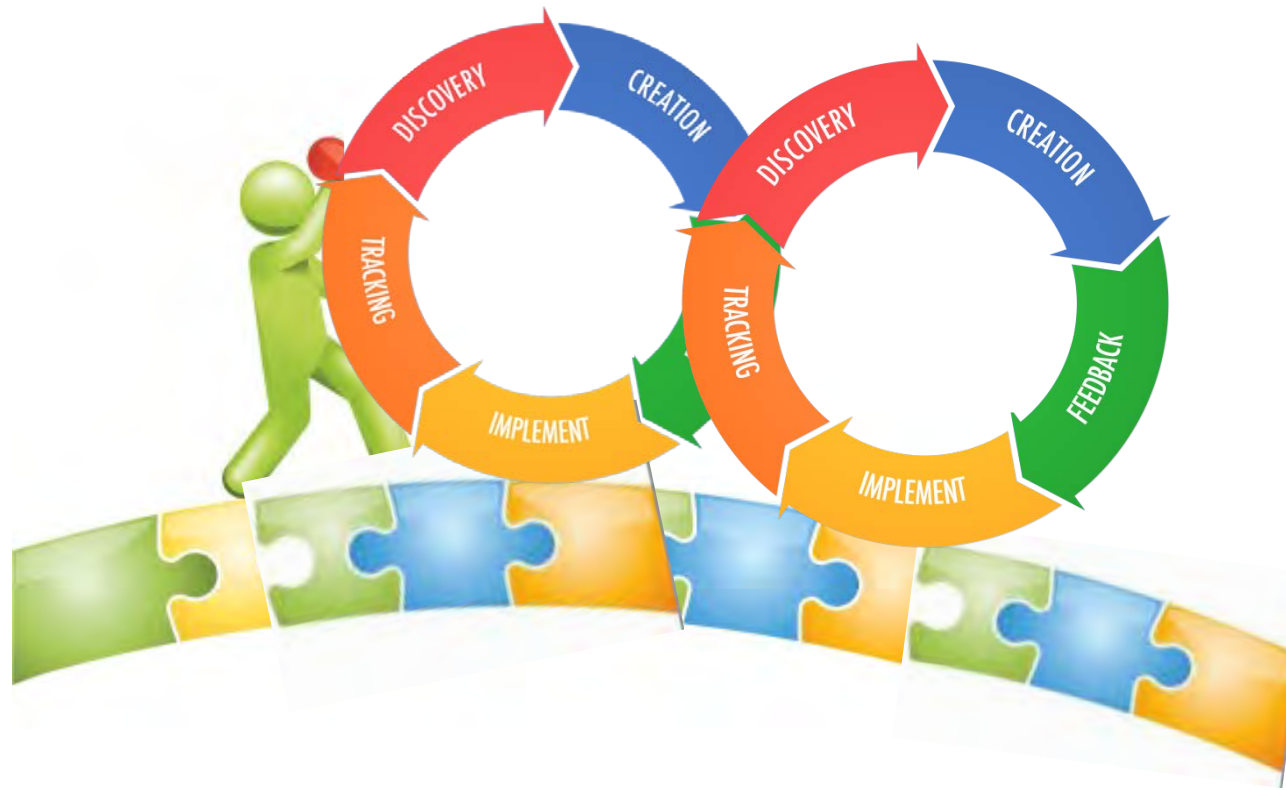
[\[Disclaimer\]](#)

Guidelines for how to make Climate Adaptation Plans for fisheries and aquaculture will become an European voluntary standard (CWA)

- A CEN Workshop Agreement (CWA) is developed and approved in an open CEN process during one year
- The first CEN work shop, in Brussels 10.10.2018



Join this iterative process and co-create guidelines to make Climate Adaptation Plans with stakeholders





<http://climefish.eu>

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