

# Task 2

## PSA

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## Logical Framework

### Activity

Conduct a PSA for all stocks in Celtic and North Seas, to identify main risks, i.e. those stocks where there is insufficient data to estimate reference points and stock status or no management in place, low productivity, high value and high vulnerability to fishing.

### Workplan

Develop an data.frame with biological, assessment, fleet, fishery, gear and economic parameters for all stocks, fisheries and fleets in Celtic and North Seas.

Implement code to conduct the PSA by stock and fishery including social and economic analysis

### Outputs

- data.frame with all parameters, NAs as appropriate
- code to conduct the “P” and “S” analyses, including estimation of missing values, uncertainty and conduction of qualitative assessments
- Additional social and economic analysis
- Interactive Shiny-app

### Outcomes

Identification of main stocks and fisheries at risk

## Work

### Stocks and Species (LK)

- list all stocks in Celtic and North Sea
- list all species in Celtic and North Sea
- list all MyDas Stocks
- obtain all data rich assessments

Stocks and species

	code	spp	wg	area
1	anf	Lophiidae	North Sea	3a46
2	bll	Scophthalmus rhombus	Celtic Sea	3a47de

4	bss	<NA>	North Sea	4bc7ad-h
3	bss	<NA>	North Sea	6a7bj
6	cod	Gadus morhua	Celtic Sea	21
10	cod	Gadus morhua	Celtic Sea	47d20
8	cod	Gadus morhua	North Sea	6a
5	cod	Gadus morhua	North Sea	6b
7	cod	Gadus morhua	North Sea	7a
9	cod	Gadus morhua	North Sea	7e-k
11	dab	Limanda limanda	Celtic Sea	3a4
12	fle	Platichthys flesus	Celtic Sea	3a4
14	had	Melanogrammus aeglefinus	Celtic Sea	46a20
16	had	Melanogrammus aeglefinus	North Sea	6b
13	had	Melanogrammus aeglefinus	North Sea	7a
15	had	Melanogrammus aeglefinus	North Sea	7b-k
17	her	Clupea harengus	Celtic Sea	3a47d
18	her	Clupea harengus	North Sea	6a7bc
19	her	Clupea harengus	North Sea	irls
20	her	Clupea harengus	North Sea	nirs
21	hom	Trachurus trachurus	Celtic Sea	3a4bc7d
22	lem	Microstomus kitt	Celtic Sea	3a47d
23	lez	Leuconidae	North Sea	4a6a
24	lez	Leuconidae	North Sea	6b
25	meg	Lepidorhombus whiffiagonis	North Sea	7b-k8abd
26	mur	Mullus surmuletus	Celtic Sea	3a47d
39	nep	Nephrops norvegicus	Celtic Sea	3-4
33	nep	Nephrops norvegicus	Celtic Sea	6
40	nep	Nephrops norvegicus	Celtic Sea	7
27	nep	Nephrops norvegicus	Celtic Sea	8
32	nep	Nephrops norvegicus	Celtic Sea	9
35	nep	Nephrops norvegicus	North Sea	11
29	nep	Nephrops norvegicus	North Sea	12
38	nep	Nephrops norvegicus	North Sea	13
30	nep	Nephrops norvegicus	North Sea	14
31	nep	Nephrops norvegicus	North Sea	15
41	nep	Nephrops norvegicus	North Sea	16
36	nep	Nephrops norvegicus	North Sea	17
37	nep	Nephrops norvegicus	North Sea	19
34	nep	Nephrops norvegicus	North Sea	2021
28	nep	Nephrops norvegicus	North Sea	22
42	nop	Trisopterus esmarki	Celtic Sea	3a4
48	ple	Pleuronectes platessa	Celtic Sea	420
44	ple	Pleuronectes platessa	Celtic Sea	7d
43	ple	Pleuronectes platessa	North Sea	7a
47	ple	Pleuronectes platessa	North Sea	7bc
46	ple	Pleuronectes platessa	North Sea	7e
49	ple	Pleuronectes platessa	North Sea	7fg
45	ple	Pleuronectes platessa	North Sea	7h-k
50	pok	Pollachius virens	Celtic Sea	3a46
51	pol	Pollachius pollachius	North Sea	67
52	pra	Pandalus borealis	Celtic Sea	4a20
53	raj	<NA>	Celtic Sea	3a47d
54	rjc	<NA>	Celtic Sea	3a47d
55	rjh	<NA>	Celtic Sea	4c7d
56	rjh	<NA>	North Sea	4a6

57	rjm	<NA>	Celtic Sea	3a47d
58	rjn	<NA>	Celtic Sea	3a4
62	san	Ammodytes spp	Celtic Sea	1r
63	san	Ammodytes spp	Celtic Sea	2r
64	san	Ammodytes spp	Celtic Sea	3r
65	san	Ammodytes spp	Celtic Sea	4
59	san	Ammodytes spp	Celtic Sea	5r
60	san	Ammodytes spp	Celtic Sea	6
61	san	Ammodytes spp	Celtic Sea	7r
66	sho	<NA>	North Sea	67
67	sol	Solea solea (s.vulgaris)	Celtic Sea	20-24
68	sol	Solea solea (s.vulgaris)	Celtic Sea	4
71	sol	Solea solea (s.vulgaris)	Celtic Sea	7d
69	sol	Solea solea (s.vulgaris)	North Sea	7bc
70	sol	Solea solea (s.vulgaris)	North Sea	7e
72	sol	Solea solea (s.vulgaris)	North Sea	7fg
73	sol	Solea solea (s.vulgaris)	North Sea	7h-k
74	spr	Sprattus (clupea) sprattus	Celtic Sea	3a
76	spr	Sprattus (clupea) sprattus	Celtic Sea	4
77	spr	Sprattus (clupea) sprattus	North Sea	67a-cf-k
75	spr	Sprattus (clupea) sprattus	North Sea	7de
78	syc	Styela coriacea	Celtic Sea	3a47d
79	syc	Styela coriacea	North Sea	67a-ce-j
80	syt	<NA>	North Sea	67
81	tur	Scophthalmus maximus	Celtic Sea	3a
82	tur	Scophthalmus maximus	Celtic Sea	4
84	whg	Merlangius merlangus	Celtic Sea	3a
86	whg	Merlangius merlangus	Celtic Sea	47d
85	whg	Merlangius merlangus	North Sea	7a
83	whg	Merlangius merlangus	North Sea	7b-ce-k
87	wit	Glyptocephalus cynoglossus	Celtic Sea	3a47d

#### Missing species

[1]	"anf.27.3a46"	"bll.27.3a47de"	"bss.27.4bc7ad-h"
[4]	"bss.27.6a7bj"	"cod.27.21"	"cod.27.47d20"
[7]	"cod.27.6a"	"cod.27.6b"	"cod.27.7a"
[10]	"cod.27.7e-k"	"dab.27.3a4"	"fle.27.3a4"
[13]	"had.27.46a20"	"had.27.6b"	"had.27.7a"
[16]	"had.27.7b-k"	"her.27.3a47d"	"her.27.6a7bc"
[19]	"her.27.irls"	"her.27.nirs"	"hom.27.3a4bc7d"
[22]	"lem.27.3a47d"	"lez.27.4a6a"	"lez.27.6b"
[25]	"meg.27.7b-k8abd"	"mur.27.3a47d"	"nep.fu.11"
[28]	"nep.fu.12"	"nep.fu.13"	"nep.fu.14"
[31]	"nep.fu.15"	"nep.fu.16"	"nep.fu.17"
[34]	"nep.fu.19"	"nep.fu.2021"	"nep.fu.22"
[37]	"nep.fu.3-4"	"nep.fu.6"	"nep.fu.7"
[40]	"nep.fu.8"	"nep.fu.9"	"nop.27.3a4"
[43]	"ple.27.420"	"ple.27.7a"	"ple.27.7bc"
[46]	"ple.27.7d"	"ple.27.7e"	"ple.27.7fg"
[49]	"ple.27.7h-k"	"pok.27.3a46"	"pol.27.67"
[52]	"pra.27.4a20"	"raj.27.3a47d"	"rjc.27.3a47d"
[55]	"rjh.27.4a6"	"rjh.27.4c7d"	"rjm.27.3a47d"
[58]	"rjn.27.3a4"	"san.sa.1r"	"san.sa.2r"
[61]	"san.sa.3r"	"san.sa.4"	"san.sa.5r"

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[64] "san.sa.6"          "san.sa.7r"          "sho.27.67"
[67] "sol.27.20-24"        "sol.27.4"           "sol.27.7bc"
[70] "sol.27.7d"          "sol.27.7e"          "sol.27.7fg"
[73] "sol.27.7h-k"        "spr.27.3a"          "spr.27.4"
[76] "spr.27.67a-cf-k"    "spr.27.7de"         "syc.27.3a47d"
[79] "syc.27.67a-ce-j"    "syt.27.67"          "tur.27.3a"
[82] "tur.27.4"           "whg.27.3a"          "whg.27.47d"
[85] "whg.27.7a"          "whg.27.7b-ce-k"     "wit.27.3a47d"

[1] "bss" "raj" "rjc" "rjh" "rjm" "rjn" "sho" "syt"

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Life history parameters

MyDas WKLife species

```

[1] Molva molva          Pollachius pollachius
[3] Scophthalmus rhombus Pollachius virens
[5] Sprattus sprattus sprattus Zeus faber
1878 Levels: Oreochromis niloticus niloticus ... Capoeta umbla

```

All Celtic and North Sea Stocks MyDas species

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[1] Gadus morhua          Glyptocephalus cynoglossus
[3] Lepidorhombus whiffiagonis Limanda limanda
[5] Melanogrammus aeglefinus Merlangius merlangus
[7] Microstomus kitt      Mullus surmuletus
[9] Platichthys flesus    Pleuronectes platessa
[11] Pollachius pollachius Pollachius virens
[13] Scophthalmus rhombus Trachurus trachurus
1878 Levels: Oreochromis niloticus niloticus ... Capoeta umbla

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## Fleets and gears (AT)

- list all main gears in Celtic and North Sea
- List all fisheries from a social economic view point

## PSA (AT)

Create a database with PSA parameters, including management and where possible economic values

## Productivity (LK)

- get life history parameters for all stocks/spp
- replicate Flavia et al.

```

[1] "lmax" "linf" "t0"    "k"      "a50"  "amax" "l50"  "fec"  "z/k"  "mort"

```

## Susceptibility (AT)

- Quantitative estimates
  - availability (horizontal overlap) by gear and stock
  - encounterability (vertical overlap) by gear and stock
  - post capture mortality
- Qualitative estimate

- availability (horizontal overlap) by gear and stock
- encounterability (vertical overlap) by gear and stock
- post capture mortality

[1] "stock" "fleet" "avail" "encout"

[1] "stock" "price" "value"

## Management or Harvest Strategy (AT & LK)

Based on MSC

- AT get assessment reports data together,
- LK goes through the assessments

### 1.2.1: Harvest Strategy

There is a robust and precautionary harvest strategy in place, i.e. target, threshold and limit reference points for F and biomass

### 1.2.2: Harvest Control Rules & Tools

There are well defined and effective harvest control rules (HCRs) in place, i.e. using ref pts to set TAC

### 1.2.3: Information/Monitoring

Relevant information is collected to support the harvest strategy, i.e which ICES category does the stock belong to?

### 1.2.4: Assessment of Stock Status

There is an adequate assessment of the stock status, i.e. when was the stock last assessed and what method

[1] "ftar" "fthresh" "flim" "btar" "bthresh" "blim"  
 [7] "cat" "assyr" "assmethod"

Figure 1 .

## References