Meeting Minutes: 3rd Case Study Management Board meeting
8th November, 2017, Poitiers, France

Meeting Information

Meeting: 3rd Case Study Management Board	Location: Poitiers, France (Pprime)
Initiated by: Atle Harby	Date: 08.11.2017
Distribution: CSMB, FIThydro partners	Time: 10:00 – 12:00

Disclaimer: This is a decision-making protocol where an overview of the main contents of the session and decisions are recorded. It is not a word-protocol and only essential points and highlights are recorded. Word-logging is made only based on concrete requests during the meetings. For this reason, all statements and questions of the participants are not automatically and fully recorded in the meeting minutes.

Agenda

Item	Topic
1	Test Case changes – status
2	Water Framework Directive compliance and representativeness in Test Cases
3	Work Plan for each Test Case - link to WPs, tasks and sub-tasks
4	Any other business

List of attendees:

S/N	Family Name:	Name:	Organisation:
1	Abo El Wafa	Hany	TUM
2	Albayrak	ismail	VAW, ETH Zurich
3	Angelopoulos	Natalie	UHULL
4	Bakken	Tor Haakon	SINTEF Energy Research
5	Bean	Colin	EEAB (University of Glasgow/Scottish Natural Heritage)
6	Boavida	Isabel	IST-ID
7	Boes	Robert M.	VAW, ETH Zurich
8	Bravo-Córdoba	Francisco Javier	SAVASA
9	Bussettini	Martina	ISPRA
10	Coeck	Johan	EV INBO - Research Institute for Nature and Forest
11	Courret	Dominique	AFB (CNRS)

12	Cowx	Ian	University of Hull
13	DAVID	Laurent	CNRS-Pprime
14	Dewitte	Manon	CNRS
15	Doessegger	Andreas	Limmatkraftwerke AG
16	Dr. Pander	Joachim	Technical University Munich
17	Eira Leitão	Pedro	HIDROERG
18	Epple	Tobias	BEW
19	Felber	Cornelia	UNIPER
20	Fenz	Robert	Federal Ministry of Agricultue and Forestry, Environment and Watermanagement
21	García Vega	Ana	Centro Tecnológico Agrario y Agroalimentario (ITAGRA-GEA)
22	Gerdes	Holger	Ecologic Institute
23	Godinho	Francisco	Hidroerg
24	Harby	Atle	SINTEF Energi
25	Høberg	Pål	Statkraft
26	Jarny	Sébastien	Pprime Institute / CNRS
27	Kampa	Eleftheria	Ecologic Institute
28	Katopodis	Christos And Shirley Anne	Katopodis Ecohydraulics Ltd.
29	Kriewitz-Byun	Carl Robert	BKW Energie AG
30	Lechner	Thomas	BEW GmbH
31	Lemkecher	Fatma	Pprime institute
32	Milzow	Christian	AF-Consult Switzerland Ltd (AFC)
33	Müller	Melanie	Technische Universität München, Aquatic Systems Biology
34	Pauwels	Ine	EV INBO - Research Institute for Nature and Forest
35	Peter	Armin	Peter FishConsulting
36	PINEAU	Gerard	Institut Pprime - (Univ. Poitiers - CNRS - Ensma)
37	Pinheiro	António	IST-ID
38	Portela	Maria Manuela	Hidroerg/Instituto Superior Técnico
39	Reckendorfer	Walter	VERBUND Hydro Power GmbH
40	Rüther	Nils	NTNU
41	Rutkowski	Terese	TUM, Lehrstuhl für Produktions- und Ressourcenökonomie
42	Rutschmann	Peter	TUM
43	Sagnes	Pierre	French Agency for Biodiversity (in collaboration with CNRS)
44	Schneider	Matthias	SJE Ecohydraulic Engineering
45	Schwarzwälder	Kordula	TUM
46	Stoltz	Ulli	Voith Hydro
47	Tuhtan	Jeffrey	Tallinn University of Technology, Centre for Biorobotics
48	Van Wichelen	Jeroen	EV INBO - Research Institute for Nature and Forest
49	Winkler	Sarah	Voith
50	Wolter	Christian	IGB
51	Wuepper	David	TUM

1. Test Case changes

The status of Test Case changes is:

- From Vales to Bragado, both in Portugal:
  Approval by EU pending – work started in Bragado
- Turgi to Schiffmühle, both in Switzerland:
  Approval by EU pending – work started in Schiffmühle
- Iller River to Günz River (both rivers have a series of hydropower plants), both in Germany:
  Iller River remains official Test Case. We are able to use both rivers in FIThydro.
- Additional Test Case: Las Rives, France
  Approval by EU pending – work started in Las Rives

We are hoping to receive the formal approval soon.

2. Water Framework Directive compliance and representativeness in Test Cases

We need to know what are the status and plans of affected Water Bodies in the WFD. As we are working on fish population impacts, we need information on the whole river, or at least for the upstream and downstream Water Body. A questionnaire about WFD has been developed by SINTEF with support from Martina Bussettini (EEAB). A summary of answers to the questionnaires was presented at the meeting (see attached presentation).

There was some discussion on the mitigation measures, as a draft list of measures is prepared. As the list is not comprehensive, further mitigation measures will be added to the list. The main question is how efficiently such mitigation measures can be used. This is more important the question if the measure itself is right or wrong.

3. Work Plan for each Test Case - link to WPs, tasks and sub-tasks

FIThydro is developing a Work Plan for each Test Case with the following information:

- Overview of activities
  – a popular science summary
- Who is working there
- What will be done
- When will the work be done
- Which sub-tasks is working in the Test Case
- Personnel
- Equipment
- Budget for operator

This will be possible to find on the Sync&Share platform and potentially on the web-site.

More dissemination activities for the Test Cases should be implemented on the project´s webpage. If possible including a map showing the different locations in each region. A datasheet needs to be created which can be filled by any operator and will be uploaded as detailed information on the webpage including at least 3 pictures per Test Case highlighting the FIThydro topics at each test case.

The new part “test cases” on the data management platform workbench should include more descriptive information which might be of relevance for the partners working at each test case. This could be publications linked to the test cases or data sheets etc.

4. Any other business

There were no items under any other business.

Test Case Management Board meeting

Poitiers GA2

8.11.2017

Atle Harby

SINTEF Energi

Agenda

- Test Case changes – status
- Water Framework Directive compliance and representativeness in Test Cases
- Work Plan for each Test Case - link to WPs, tasks and sub-tasks
- Any other business

Test Case changes

- Vales → Bragado
  Approval by EU pending – work started in Bragado

- Turgi → Schiffmühle
  Approval by EU pending – work started in Schiffmühle
- Iller → Günz (both rivers have a series of hydropower plants)
  Iller River remains official Test Case
  We are able to use both rivers in FIThydro

- Additional Test Case: Las Rives, France
  Approval by EU pending – work started in Las Rives

WFD compliance and representativeness

- We need to know what are the status and plans of affected Water Bodies in the WFD
- We are working on fish population impacts
  → We need information on the whole river, or at least for the upstream and downstream Water Body
- Questionnaire developed by SINTEF with support from Martina Bussettini (EEAB)

Thank you to all for submitting questionnaires!

For all water bodies

SINTEF FIThydro

Additional information regarding status of implementation of EU WFD and other relevant directives

Test Case:	Filled in by:	Date:

Questions regarding filling the template? Contact SINTEF by atle.harby@sintef.no or tor.haakon.bakken@sintef.no.

Instructions: This part of the questionnaire shall be filled in for the whole river system affected or important in relation to the Test Case in FIThydro. Please give information on the water body where the hydropower plant and dam are included, affected water body or bodies downstream, as well as important water body or bodies upstream.

Questionnaire Table 1: General information for the whole river system affected:

No	Topic/question	Explanation	Alternative answers
1A	Location of hydropower plant (HPP) and the regulated system in relation to designated water bodies upstream and downstream	Describe where the hydropower plant, dam and other infrastructure for the regulated river system are located. A simple drawing/map could be developed in order to support the text.	TEXT and possibly MAP/PICTURE (see next page)
1B	Brief description of affected fish populations in the river system, including both upstream and downstream water bodies	Describe briefly what kind of fish populations are found in the river system where the hydropower plant (HPP) is located – including both relevant upstream and downstream reaches	TEXT
1C	Is the river system and relevant water bodies under any special protection?	Enter information about the other directives or special protection that might affect the status or the environmental goal of the water body considered, such as Natura2000 sites, Bird Directive, Habitat Directive, etc.	TEXT

1

Please fill in 1A-1C

Please add maps, schematic view, illustrations.
See examples in this file

SINTEF FIThydro

MAP, IMAGE or DIAGRAM of the river network with Water Bodies	MAP, IMAGE or DIAGRAM of Power Plant system

2

For water body upstream and downstream the water body containing the power plant

Remember name of water body

Instructions: The rest of this questionnaire shall be filled in for each water body influenced by the power plant and related regulation given as a Test Case in FIThydro. In most Test Cases this will involve two or more water bodies, which will mean that the whole table should be copied and new information enter in the copied table.

Questionnaire Table 2 (fill in unique tables for each water body considered): Typology and characterisation [write name of water body]

No	Topic/question	Explanation	Answers
2A	Typology information about the water body under consideration	Enter information about the typology of the water body under consideration, according to the chosen system (A or B described in Annex II WFD – attached)	TEXT
2B	Length of water body	The length of	
2C	Water body designation	Describe what under conside	
2D	Characterisation – risk of not reaching environmental target defined by EU WFD before 2021	The water bo back. Enter in characterisati	
2E	Other important factors on typology and characterisation?	Describe othe under conside	

Questionnaire Table 3 (fill in unique tables for each water body considered): Pressures and status today [write name of water body]

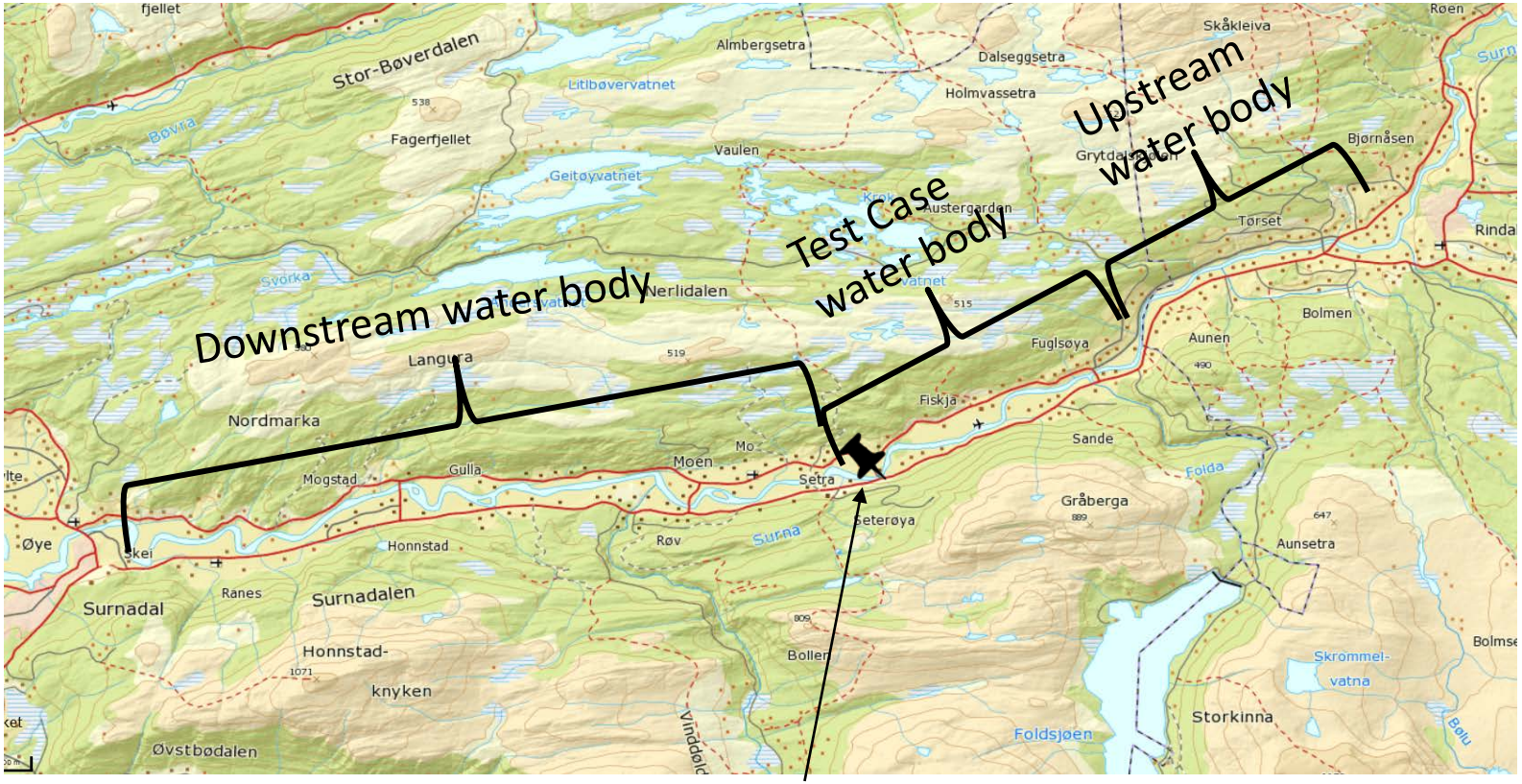
No		Topic/question	Explanation	Alternative answers
3A	Enter data for both Natural and HMWB	Main pressures identified	Enter information about pressures (physical pressures, pollution, biological pressures, other pressu water body.	TEXT
3B		Describe which measures that has been implemented (including measures not related to hydropower as pressure – identify this in TEXT)	Describe the measures that have been impl	
			Flow changes	
			Habitat measures in-channel	
			Morphological measures off-channel	
			Fish migration measures	
			Measures for sediment control	
			Measures for pollution control	
			Others	
3C		Effect on the HP production from the measures	Based on the proposed measures – what ar effects on the power production (losses in a production, reduced flexibility, costs)	
3D	If Natural water body	Ecological status	Enter information about which ecological st has been assigned to the water body currer	
3E		Chemical status	Enter information about which chemical sta assigned to the water body currently.	
3F		Reference conditions for fish used when status assessed	Describe the approach/classification system define reference conditions.	
3G	If Heavily Modified	Ecological potential	Enter information about which ecological p been assigned to the water body.	

Questionnaire Table 4 (fill in unique tables for each water body considered): River Basin Management Plans and other plans for the future

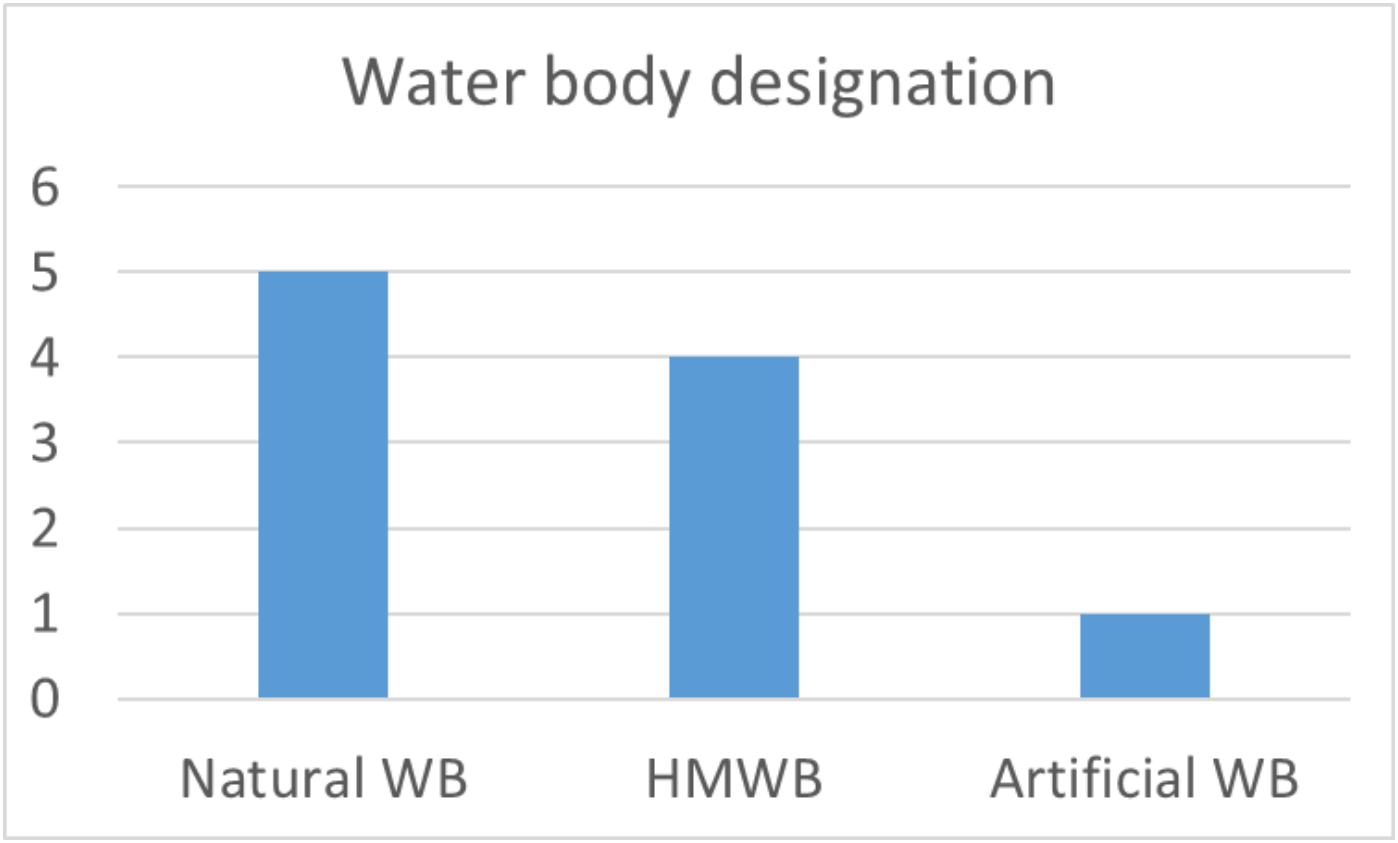
[write name of water body]

No	Topic/question	Explanation	Alternative answers
4A	Mitigation measures proposed in River Basin Management Plans (RBMP) that are not yet implemented	Enter information about which mitigation measures that are proposed in order to reach the environmental goal. Measures may be in the following categories (Tick one or several):	TEXT TO DESCRIBE MEASURES
		Flow changes	
		Habitat measures in-channel	
		Morphological measures off-channel	
		Fish migration measures	
		Measures for sediment control	
		Measures for pollution control	
		Others	
4B	Mitigation or other measures not related to RBMP that are planned	Enter relevant information about mitigation measures not directly related to RBMP, if any	TEXT

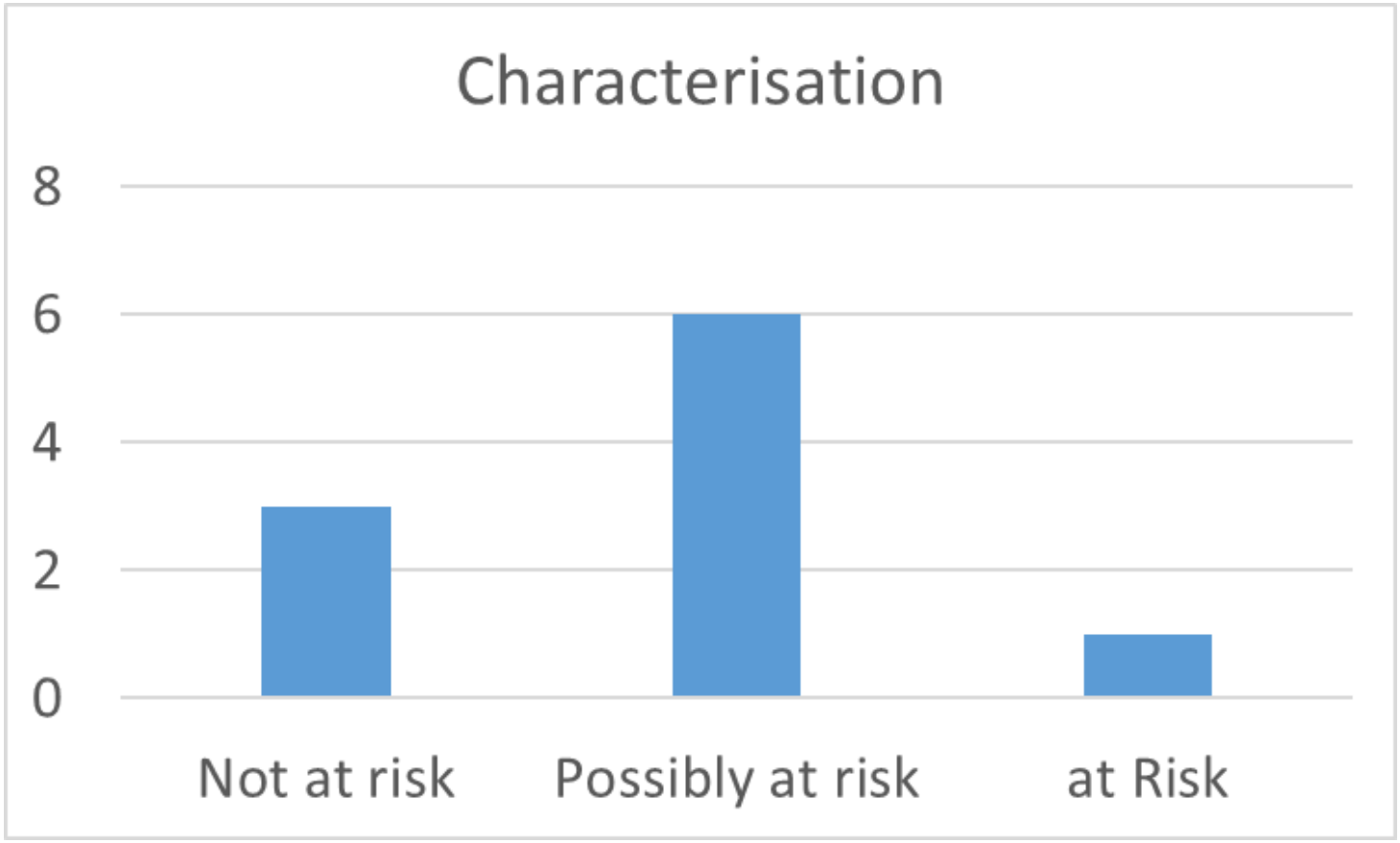
Overview of water bodies

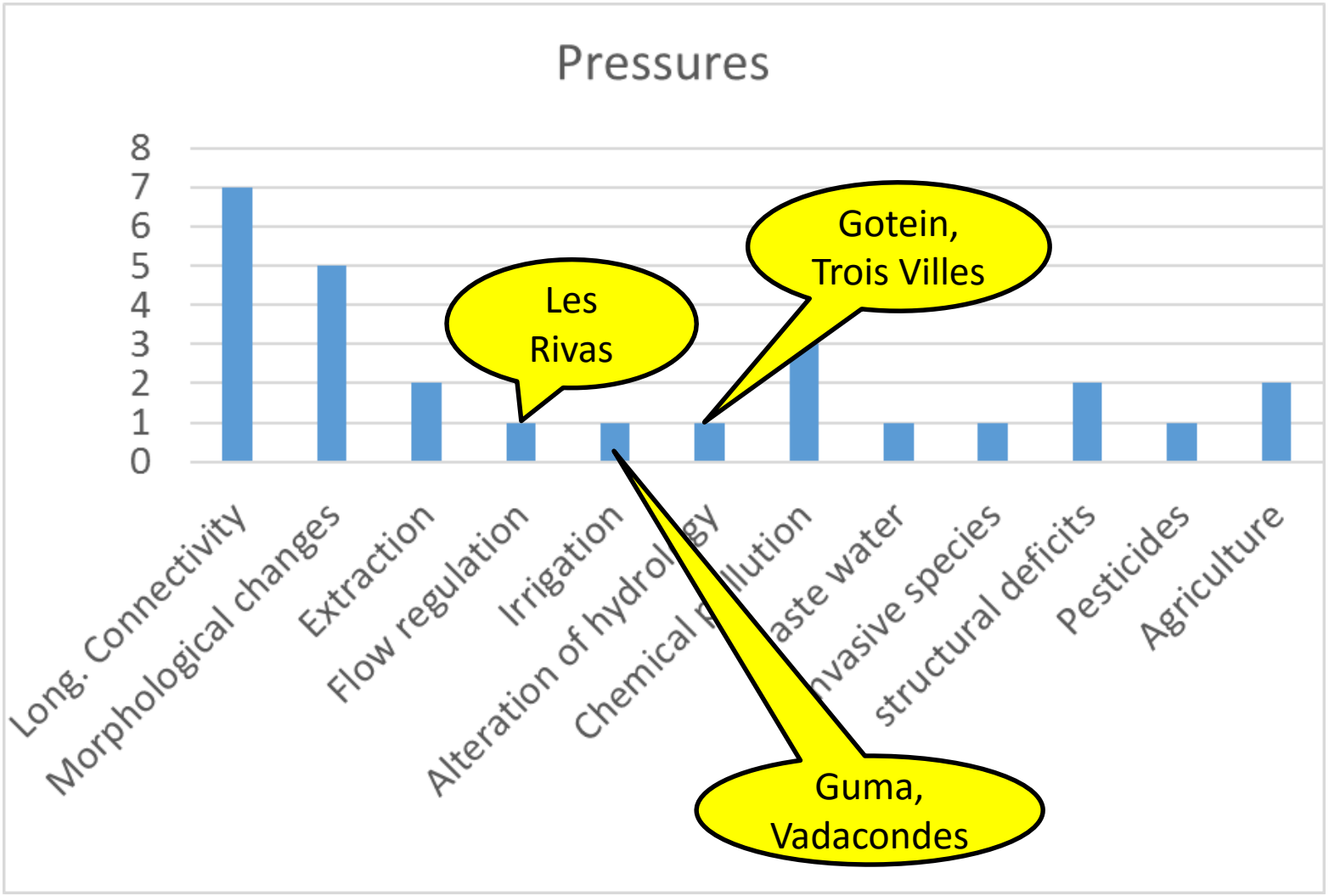


Overview of water bodies

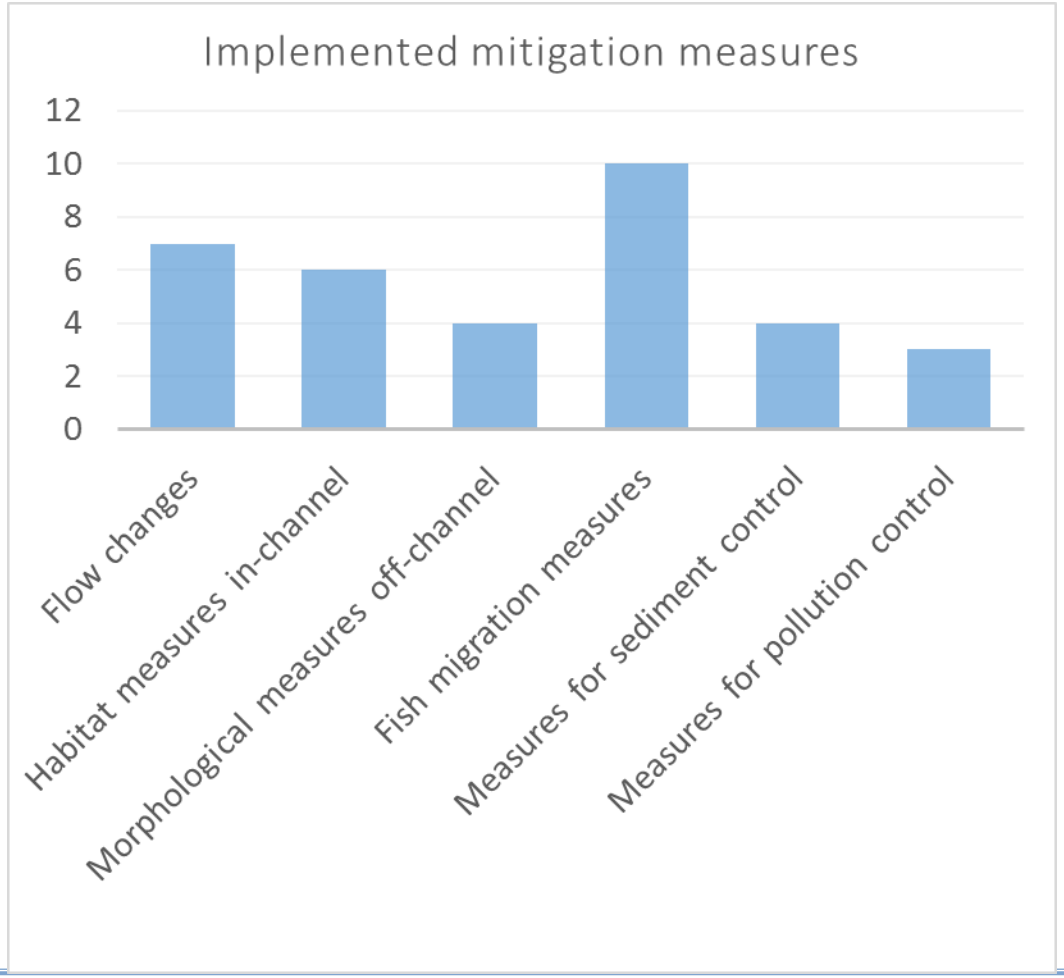


Overview of water bodies




Pressures
8
7
6
5
4
3
2
1
0
Long. Connectivity
Morphological changes
Extraction
Flow regulation
Irrigation
Alteration of hydrology
Chemical pollution
Waste water
Invasive species
structural deficits
Pesticides
Agriculture
Les Rivas
Gotein, Trois Villes
Guma, Vadacondes

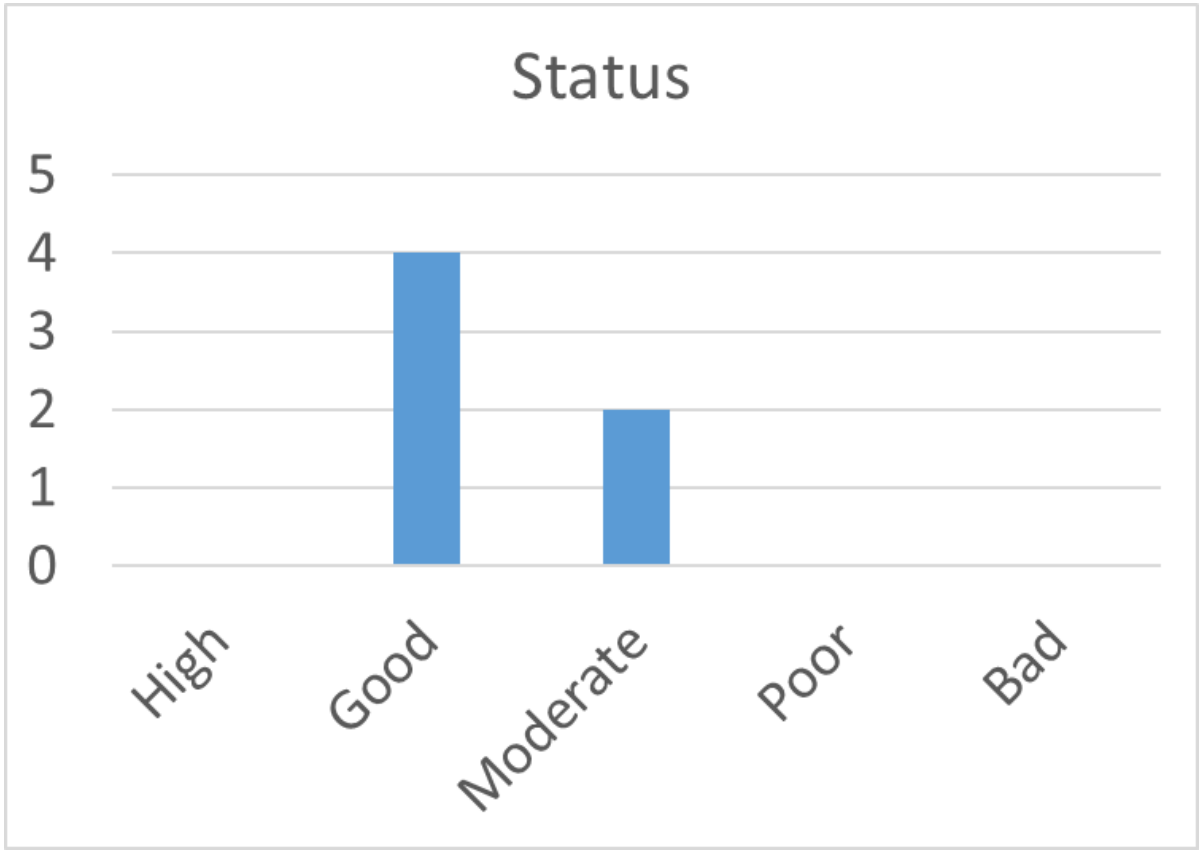
Affected Water body



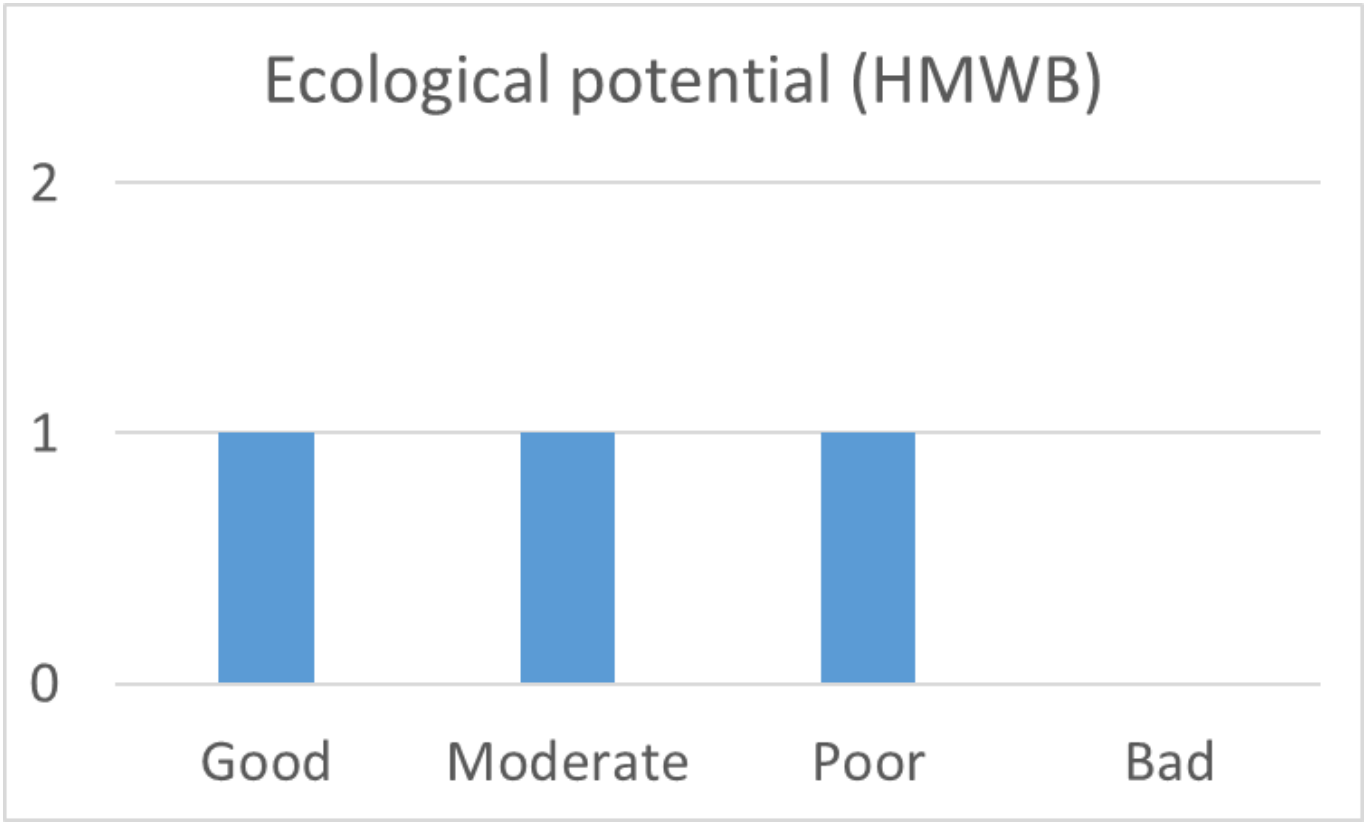
Effect of measures on Hydropower production

Loss of power production	**6**
Construction and maintenance costs of mitigation measure	1
Limited flexibility of operation (no hydropeaking allowed anymore)	1

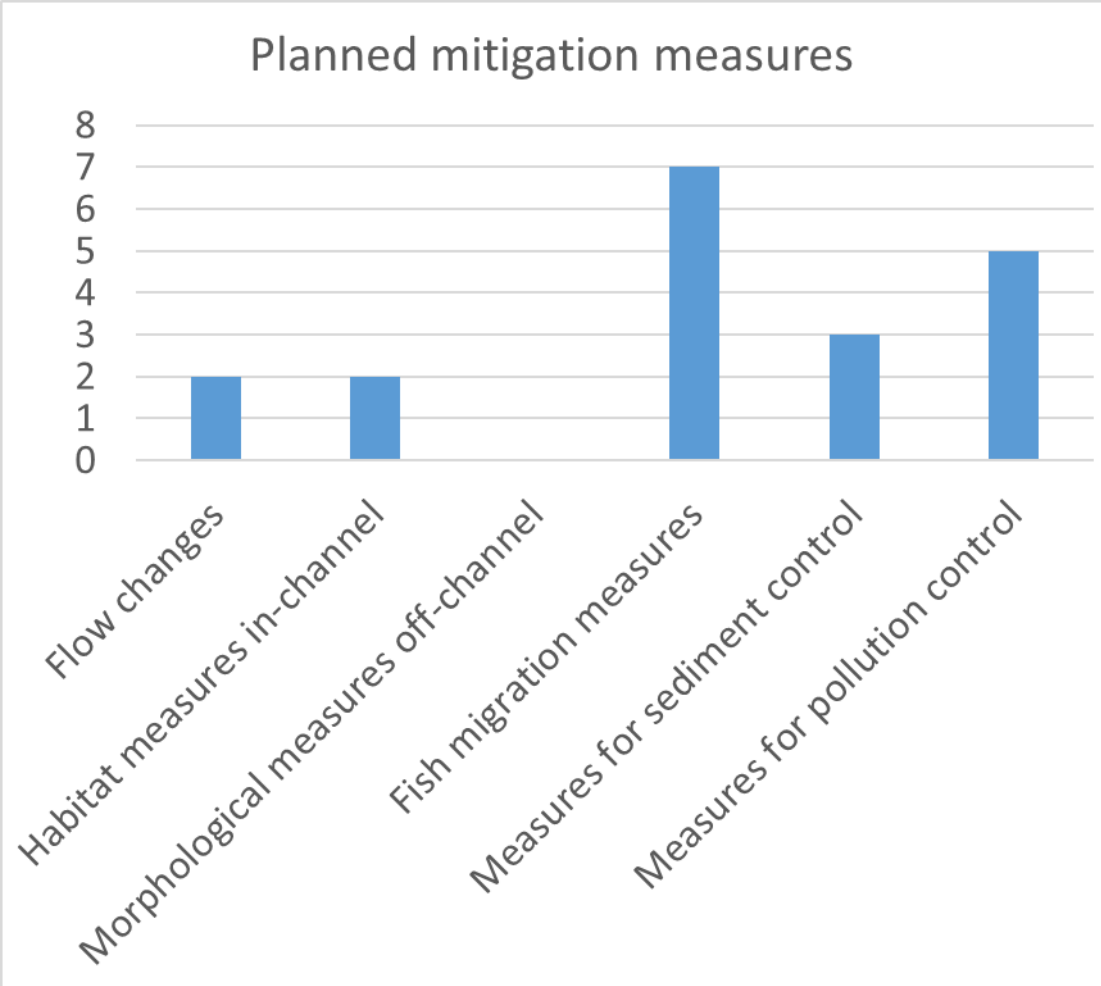
Affected Water body



Affected Water body



Affected Water body



Upstream and Downstream Water bodies

Designation and characterisation

Topic	Upstream	Downstream
Natural WB	4	6
HMWB	2	4
Artificial WB	0	0
Not at risk	1	2
Possibly at risk	5	5
At risk	0	2

Upstream and Downstream Water bodies

Pressures

Topic	Upstream	Downstream
long. Connectivity	4	6
Chemical pollution	2	3
Alteration in Morphology	2	4
Water extraction	1	2
Nutrients	2	2
existing HPP	1	2
Alteration of hydrology	0	2

Upstream and Downstream Water bodies

Implemented mitigation measures

Topic	Upstream	Downstream
Flow changes	3	5
Habitat measures in-channel	5	4
Morphological measures off-channel	1	3
Fish migration measures	3	5
Measures for sediment control	0	1
Measures for pollution control	1	2

Upstream and Downstream Water bodies

Topic	Upstream	Downstream
High ecological status		
Good ecological status	2	3
Moderate ecological status	2	2
Poor ecological status	2	2
Bad ecological status	0	0
Good chemical status	4	5
Failing to achieve good chemical status		
Good ecological potential or above	1	0
Moderate ecological potential	0	2
Poor ecological potential	0	0
Bad ecological potential	0	0

Bragado
Guma/Vadocondes

Iller
Guma/Vadocondes

Altheim

Iller
Altheim

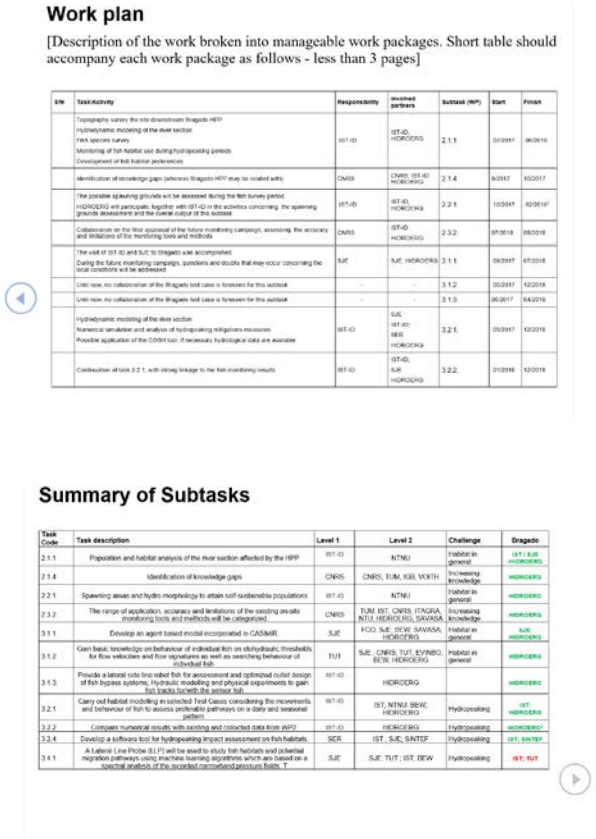
Upstream and Downstream Water bodies

Future plans

Topic	Upstream	Downstream
Flow changes	1	2
Habitat measures in-channel	3	3
Morphological measures off-channel	3	3
Fish migration measures	3	6
Measures for sediment control	1	4
Measures for pollution control	3	5

Work Plan for each Test Case - link to WPs, tasks and sub-tasks

- Overview of activities – a popular science summary
- Who is working there
- What will be done
- When will the work be done
- Which sub-tasks is working in the Test Case
- Personnel
- Equipment
- Budget for operator



Work plan

[Description of the work broken into manageable work packages. Short table should accompany each work package as follows - less than 3 pages]

S/N	Task/Activity	Responsibility	Involved partners	Subtask (WP)	Start	Finish
	Topography survey the site downstream Bragado HPP Hydrodynamic modeling of the river section Fish species survey Monitoring of fish habitat use during hydropeaking periods Development of fish habitat preferences	IST-ID	IST-ID, HIDROERG	2.1.1	01/2017	06/2019
	Identification of knowledge gaps (whereas Bragado HPP may be related with)	CNRS	CNRS, IST-ID HIDROERG	2.1.4	6/2017	10/2017
	The possible spawning grounds will be assessed during the fish survey period HIDROERG will participate, together with IST-ID in the activities concerning the spawning grounds assessment and the overall output of this subtask	IST-ID	IST-ID, HIDROERG	2.2.1.	10/2017	02/2018
	Collaboration on the final appraisal of the future monitoring campaign, assessing the accuracy and limitations of the monitoring tools and methods	CNRS	IST-ID HIDROERG	2.3.2.	07/2018	08/2018
	The visit of IST-ID and SJE to Bragado was accomplished. During the future monitoring campaign, questions and doubts that may occur concerning the local conditions will be addressed	SJE	SJE, HIDROERG	3.1.1.	09/2017	07/2018
	Until now, no collaboration of the Bragado test case is foreseen for this subtask	-	-	3.1.2.	05/2017	12/2018
	Until now, no collaboration of the Bragado test case is foreseen for this subtask	-	-	3.1.3.	06/2017	04/2019
	Hydrodynamic modeling of the river section Numerical simulation and analysis of hydropeaking mitigations measures Possible application of the CASiMiR tool, if necessary, hydrological data are available	IST-ID	SJE, IST-ID, SER HIDROERG	3.2.1.	05/2017	12/2018
	Continuation of task 3.2.1, with strong linkage to the fish monitoring results	IST-ID	IST-ID, SJE HIDROERG	3.2.2.	01/2018	12/2018

Summary of Subtasks

Task Code	Task description	Level 1	Level 2	Challenge	Bragado
2.1.1	Population and habitat analysis of the river section affected by the HPP	IST-ID	NTNU	Habitat in general	IST / SJE HIDROERG
2.1.4	Identification of knowledge gaps	CNRS	CNRS, TUM, IGB, VOITH	Increasing knowledge	HIDROERG
2.2.1	Spawning areas and hydro-morphology to attain self-sustainable populations	IST-ID	NTNU	Habitat in general	HIDROERG
2.3.2	The range of application, accuracy and limitations of the existing on-site monitoring tools and methods will be categorized	CNRS	TUM, IST, CNRS, ITAGRA, NTUI, HIDROERG, SAVASA	Increasing knowledge	HIDROERG
3.1.1	Develop an agent based model incorporated in CASiMiR	SJE	FCG, SJE, BEW, SAVASA, HIDROERG	Habitat in general	SJE, HIDROERG
3.1.2	Gain basic knowledge on behaviour of individual fish on dichydraulic thresholds for flow velocities and flow signatures as well as searching behaviour of individual fish	TUT	SJE , CNRS, TUT, EVINBO, BEW, HIDROERG	Habitat in general	HIDROERG
3.1.3.	Provide a lateral side line robot fish for assessment and optimized outlet design of fish bypass systems; Hydraulic modelling and physical experiments to gain fish tracks for/with the sensor fish	IST-ID	HIDROERG		HIDROERG
3.2.1	Carry out habitat modelling in selected Test Cases considering the movements and behaviour of fish to assess preferable pathways on a daily and seasonal pattern	IST-ID	IST, NTNU, BEW, HIDROERG	Hydropeaking	IST, HIDROERG
3.2.2	Compare numerical results with existing and collected data from WP2	IST-ID	HIDROERG	Hydropeaking	HIDROERG?
3.2.4	Develop a software tool for hydropeaking impact assessment on fish habitats.	SER	IST , SJE, SINTEF	Hydropeaking	IST, SINTEF
3.4.1	A Lateral Line Probe (LLP) will be used to study fish habitats and potential migration pathways using machine learning algorithms which are based on a spectral analysis of the recorded narrowband pressure fields. T	SJE	SJE, TUT, IST, BEW	Hydropeaking	IST, TUT

Test Cases and WP

SUBPROJECTS in test cases

Work plan

[Description of the work broken into manageable work packages. Short table should accompany each work package as follows - less than 3 pages]

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	Identification of knowledge gaps (whereas Bragado HPP may be related with)	CNRS	CNRS; IST-ID; HIDROERG	2.1.4	5/2017	10/2017
	The possible spawning grounds will be assessed during the fish survey period. HIDROERG will participate, together with IST-ID in the activities concerning the spawning grounds assessment and the overall output of this subtask.	IST-ID	IST-ID; HIDROERG	2.2.1.	10/2017	03/2018
	Collaboration on the final appraisal of the future monitoring campaign, assessing the accuracy and limitations of the monitoring tools and methods	CNRS	IST-ID; HIDROERG	2.3.2.	07/2018	09/2018
	The visit of IST-ID and SJE to Bragado was accomplished During the future monitoring campaign, questions and doubts that may occur concerning the local conditions will be addressed	SJE	SJE; HIDROERG	3.1.1.	09/2017	01/2018
	Until now, no collaboration of the Bragado test case is foreseen for this subtask	-	-	3.1.2.	05/2017	12/2018
	Until now, no collaboration of the Bragado test case is foreseen for this subtask	-	-	3.1.3.	05/2017	04/2019
	Hydrodynamic modeling of the river section Numerical simulation and analysis of hydropeaking mitigations measures Possible application of the COSH tool, if necessary hydrological data are available	IST-ID	SJE; IST-ID; SGR; HIDROERG	3.2.1.	09/2017	12/2018
	Continuation of task 3.2.1. with strong linkage to the fish monitoring results	IST-ID	IST-ID; SJE; HIDROERG	3.2.2	01/2018	12/2018

Summary of Subtasks

Task Code	Task description	Level 1	Level 2	Challenge	Bragado
2.1.1	Population and habitat analysis of the river section affected by the HPP	IST-ID	NTNU	Habitat in general	IST / SJE HIDROERG
2.1.4	Identification of knowledge gaps	CNRS	CNRS, TUM, ICD, VOITH	Increasing knowledge	HIDROERG
2.2.1.	Spawning areas and hydro-morphology to attain self sustainable populations	IST-ID	NTNU	Habitat in general	HIDROERG
2.3.2	The range of application, accuracy and limitations of the existing on-site monitoring tools and methods will be categorized	CNRS	TUM, IST, CNRS, ITAGRA, NTU, HIDROERG, SAVASA	Increasing knowledge	HIDROERG
3.1.1	Develop an agent based model incorporated in CASiMiR.	SJE	ICD, SJE, BFW, SAVASA, HIDROERG	Habitat in general	SJE; HIDROERG
3.1.2	Gain basic knowledge on behaviour of individual fish on etchydraulic thresholds for flow velocities and flow signatures as well as searching behaviour of individual fish.	TUT	SJE ; CNRS; TUT, EVINEO; BFW, HIDROERG	Habitat in general	HIDROERG
3.1.3	Provide a lateral side line robot fish for assessment and optimized outlet design of fish bypass systems. Hydraulic modelling and physical experiments to gain fish tracks for/with the sensor fish.	IST-ID	HIDROERG		HIDROERG
3.2.1	Carry out habitat modelling in selected Test Cases considering the movements and behaviour of fish to assess preferable pathways on a daily and seasonal pattern	IST-ID	IST, NTNU, BFW, HIDROERG	Hydropeaking	IST; HIDROERG
3.2.2	Compare numerical results with existing and collected data from WP2.	IST-ID	HIDROERG	Hydropeaking	HIDROERG?
3.2.4	Develop a software tool for hydropeaking impact assessment on fish habitats.	SGR	IST ; SJE; SINTEF	Hydropeaking	IST; SINTEF
3.4.1	A Lateral Line Probe (LLP) will be used to study fish habitats and potential migration pathways using machine learning algorithms which are based on a spectral analysis of the recorded narrowband pressure fields. T	SJE	SJE; TUT ; IST, BFW	Hydropeaking	IST; TUT

Resources

Personnel

S/N	Partner	Personnel month	Remarks
	IST-ID	3	The man-months are only for the depicted WPs (WP2 and WP3). However, the man-month Allocated to some of the subtasks will be redistributed by other subtasks, either of the same WPs, or of different ones.
	HIDROERG	18	
	SJE	3	
	Total		

Equipment

S/N	Equipment (As per GA)	Cost (As per GA)	Partner
	Fish electric equipment	7300	IST-ID
	Flow meter	3900,70	IST-ID
	Other equipment	1900	IST-ID
	Fish marks (PIT tags) and respective reader	3900	HIDROERG
	Total		

Subcontracting

S/N	Subcontracting (As per GA)	Cost (As per GA)	Partner
	VAMAPA (topography survey)	3000	IST-ID
	Total		

Summary of Operator's budget

17. HIDROERG	Cost (€)	Justification
Travel	7 000,00€	Travel costs include field work and travel for project meetings, conferences and workshops.
Equipment	3.500,00€	Telemetry equipment for field measurements.
Other goods and services	1.500,00€	Conference fees.
Total	12 000,00€	

WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	Total Person/Months per Participant

Guma and Vadocondes subproject

Test case:	Guma and Vadocondes HPP
Region:	Iberian Peninsula
Regional leader:	Antonio Pinheiro
HPP Repre.:	Juan Carlos Romeral de la Puente /Fco. Javier Sanz-Ronda
Date:	9/10/2017

Summary of work:

All the activities are related to:

- Detect and reduce environmental problems in this river reach, specially upstream and downstream migration and spawning..
- Help and facilitate research in native fish ecology, migration and conservation.
- Show River, Energy and Environmental Authorities and NGO’s the sustainability in hydropower production plants, following protection and environmental criteria.
- Project to River, Energy and Environmental Authorities and NGO’s an image of environmental compromise of our firm.

Task Code	Task description	Level 1	Level 2	Challenge	Bragado
2.1.1	Population and habitat analysis of the river section affected by the HPP	IST-ID	NTNU	Habitat in general	IST / SJE /HIDROERG
2.1.4	Identification of knowledge gaps	CNRS	CNRS, TUM, IGB, VOITH	Increasing knowledge	HIDROERG
2.2.1.	Spawning areas and hydro-morphology to attain self-sustainable populations	IST-ID	NTNU	Habitat in general	HIDROERG
2.3.2.	The range of application, accuracy and limitations of the existing on-site monitoring tools and methods will be categorized	CNRS	TUM, IST, CNRS, ITAGRA, NTU, HIDROERG, SAVASA	Increasing knowledge	HIDROERG
3.1.1	Develop an agent based model incorporated in CASiMiR.	SJE	FCO; SJE; BEW; SAVASA; HIDROERG	Habitat in general	SJE; HIDROERG
3.1.2	Gain basic knowledge on behaviour of individual fish on etohydraulic thresholds for flow velocities and flow signatures as well as searching behaviour of individual fish.	TUT	SJE ; CNRS; TUT; EVINBO; BEW; HIDROERG	Habitat in general	HIDROERG
3.1.3.	Provide a lateral side line robot fish for assessment and optimized outlet design of fish bypass systems; Hydraulic modelling and physical experiments to gain fish tracks for/with the sensor fish	IST-ID	HIDROERG		HIDROERG
3.2.1	Carry out habitat modelling in selected Test Cases considering the movements and behaviour of fish to assess preferable pathways on a daily and seasonal pattern.	IST-ID	IST; NTNU; BEW; HIDROERG	Hydropeaking	IST; HIDROERG
3.2.2	Compare numerical results with existing and collected data from WP2.	IST-ID	HIDROERG	Hydropeaking	HIDROERG
3.2.4	Develop a software tool for hydropeaking impact assessment on fish habitats.	SER	IST ; SJE; SINTEF	Hydropeaking	IST; SINTEF
3.4.1	A Lateral Line Probe (LLP) will be used to study fish habitats and potential migration pathways using machine learning algorithms which are based on a spectral analysis of the recorded narrowband pressure fields. T	SJE	SJE; TUT ; IST; BEW	Hydropeaking	IST; TUT

S/N	Equipment (As per GA)	Cost (As per GA)	Partner
	Fish electric equipment	7300.3	IST-ID
	Flow meter	3600.70	IST-ID
	Other equipment	1000	IST-ID
	Fish marks (Pit tags) and respective reader	3500	HIDROERG
Total			

Test Case Work Plans

- Fulfil the description of all Test Case Work Plans
- Communicate to all partners
- Develop a flyer for each Test Case
  - Description of FIThydro
  - Description of work at the Test Case
- Work with operators to disseminate information
- Use stakeholder workshops?

Thank you for your attention!

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