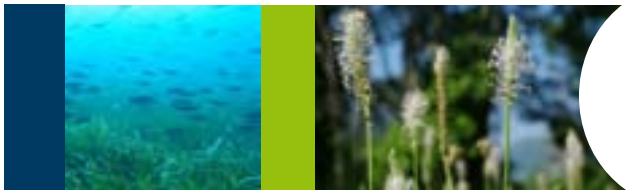
Kick-off meeting 3rd October 2014 - Paris

SalmoInvade

Jörgen I. Johnsson, coordinator
Department of Biological and Environmental Sciences
University of Gothenburg

UNIVERSITY OF GOTHENBURG

formas
The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning



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Project participants

The **SalmoInvade** consortium covers Scandinavia and continental Europe, and insights from North American Salmonid invasions.

Partner institutions

- University of Gothenburg (Sweden)
- Leibniz-Institute of Freshwater Ecology and Inland Fisheries in the Forschungsverbund Berlin e.V. (Germany)
- Norwegian Institute for Nature Research, NINA (Norway)
- CNRS/University Paul Sabatier (France)
- Memorial University (Canada)

Steering group

- Jörgen Johnsson, Sweden (coordinator)
- Robert Arlinghaus, Germany
- Julien Cucherousset,France
- Kjetil Hindar, Norway
- Ian Fleming, Canada

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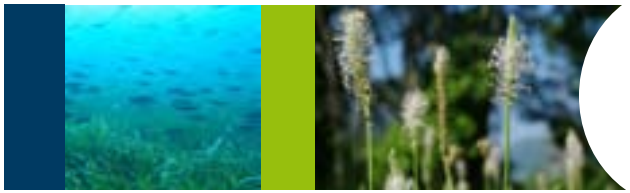

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The main objectives of SalmoInvade are:

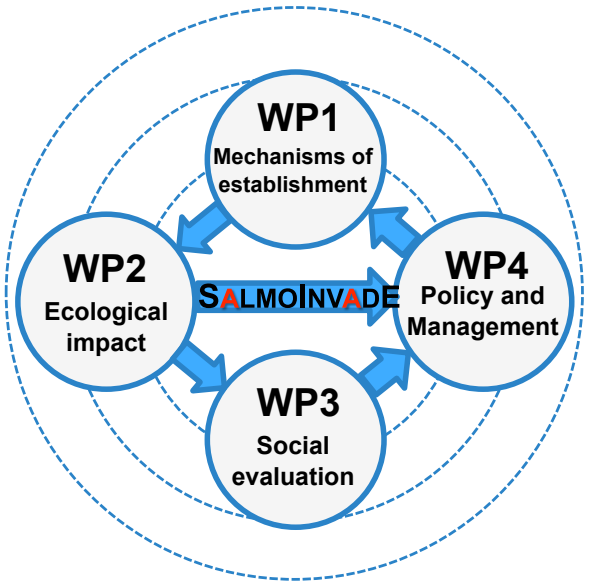
1. to evaluate current releases of non-native salmonids in Europe and the social, economic and ecological mechanisms underlying their invasion potential,

2. to investigate the ecological and evolutionary impacts of biological invasions by salmonids,

3. to evaluate how salmonid invasions are perceived by the public and by key stakeholders and

4. to provide integrated recommendations for policy and management of salmonid invasions.

SalmoInvade will integrate novel eco-evolutionary and socio-economic hypotheses to evaluate the impacts and consequences of non-native salmonid invasions. The results are expected to influence policy and management of this economically important group of fish.



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WP1. Mechanisms of establishment and transfer of non-native salmonids

Task 1.1 Socio-economic and governance determinants of salmonid transfer

- Desk top study on governance effects of transfer
- Understanding stocking decisions in Germany, France, and Sweden
- Transfer routes of invasive salmonids

Carsten Riepe

Task 1.2 Performance of con- and heterospecific salmonid invaders

Task 1.3 The role of angling in affecting invasion success of salmonids

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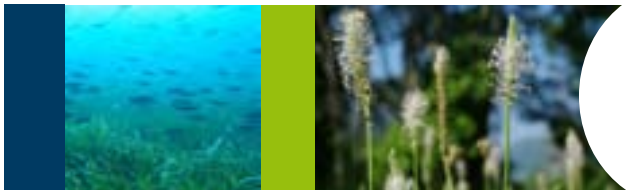

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Task 1.1.2 Understanding stocking decisions in Germany, France, and Sweden

- **Aim**
- **Understand stocking decision-makers' views** on fish stocking (focus on salmonids)
- **Explain decision-making processes** related to (salmonid) stocking using

- **psychological** information related to the decision makers (e.g., attitudes, norms, beliefs)
- **social context** of the angling clubs (e.g., number of club members, quality of water bodies, club income)
- **institutional context** using external information (e.g., different regional regulations)

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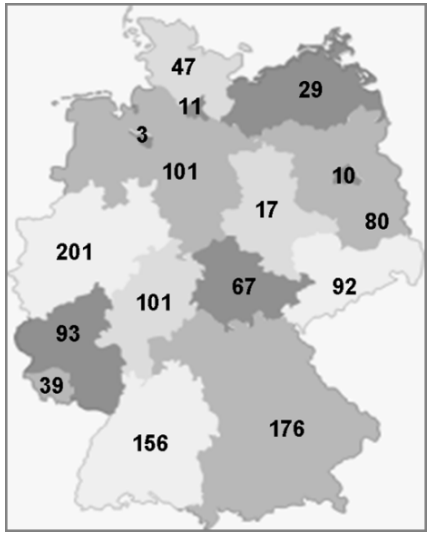
Task 1.1.2 Understanding stocking decisions in Germany, France, and Sweden

- **Modelling the multi-level character of the data** (i.e., individuals nested in organizational and institutional contexts), e.g.:

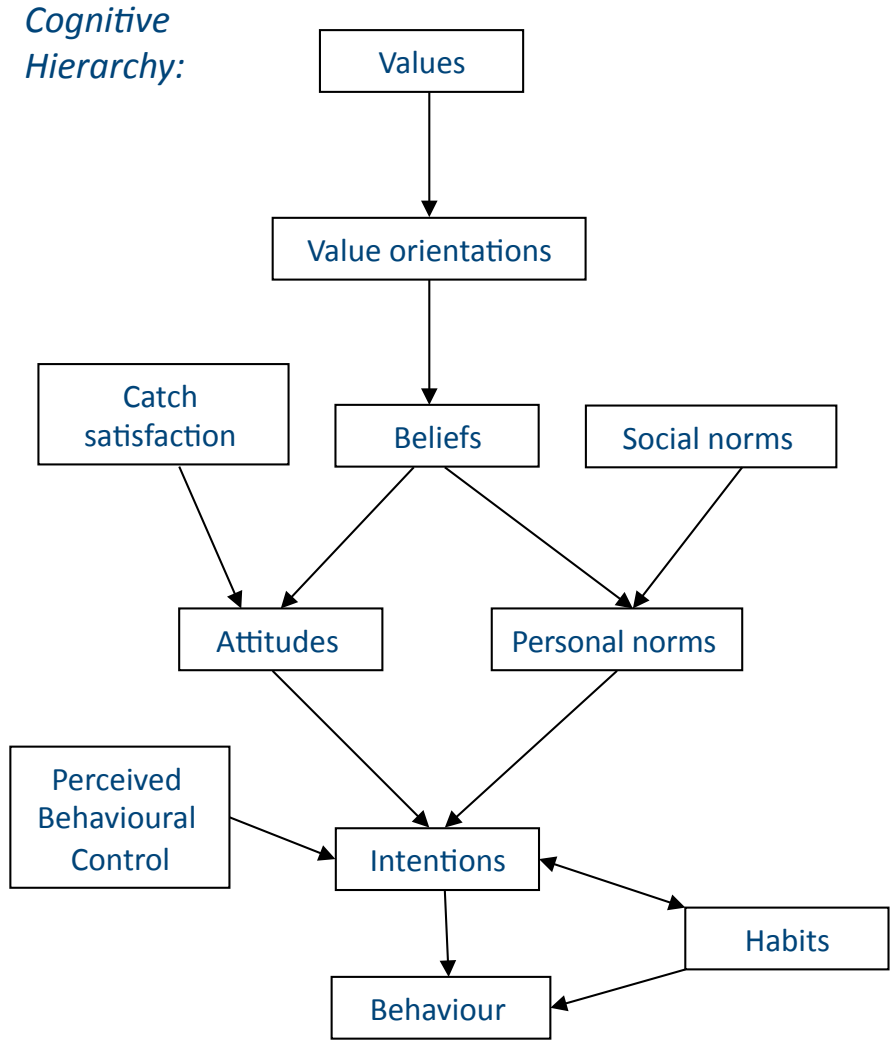
- **Level 1**: Decision-making individuals
- **Level 2**: Social / environmental context (e.g., angling clubs with different qualities of water bodies, number of club members, [relative] club income)
- **Level 3**: Institutional context (e.g., different regulations in the 16 German federal states)

Number of clubs per federal state



- **Level 4**: 4 different countries

- **Hypothesized psychological model of fish stocking decisions** [1]



[1] Model developed by Besatzfisch Team (Arlinghaus, R., Hilsberg, J. & McFall, A.)

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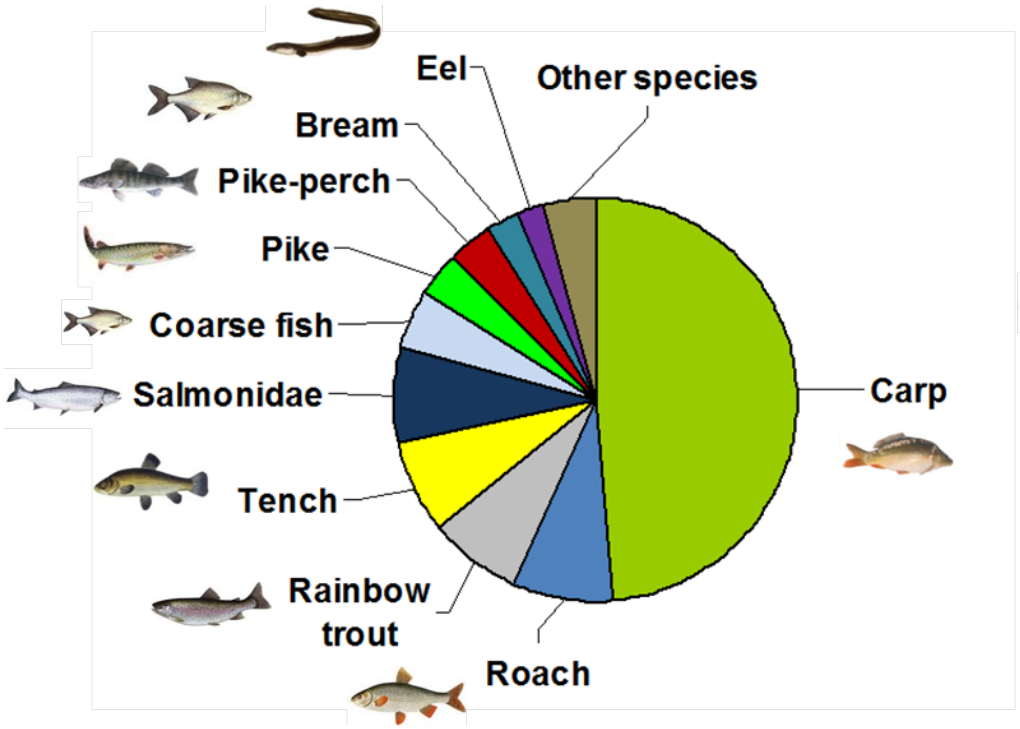
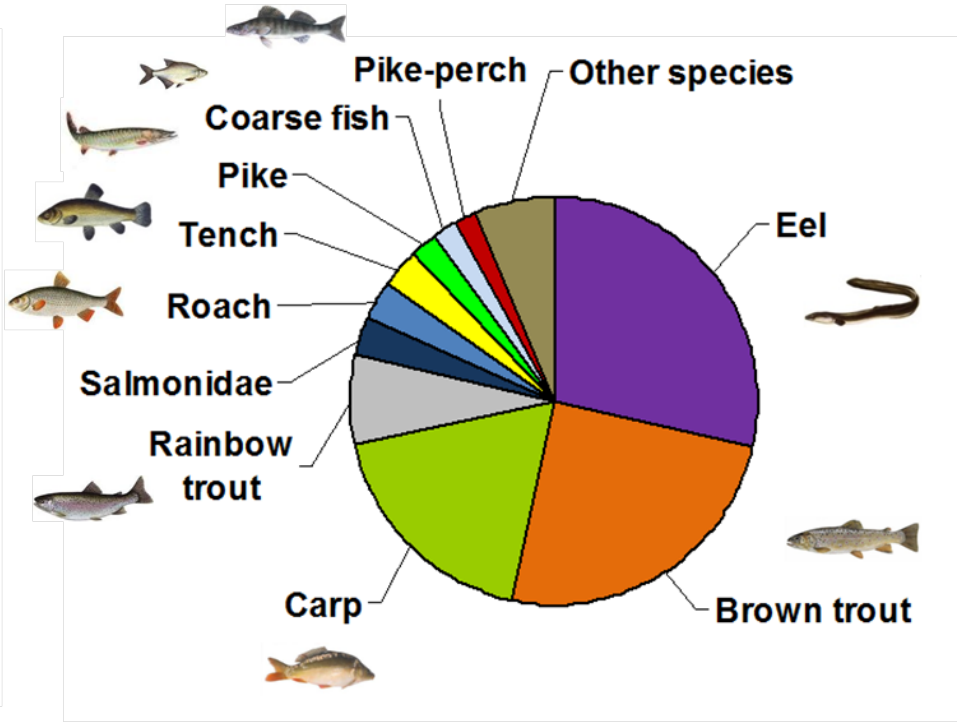
Species-specific biomass stocked in lentic and lotic ecosystems

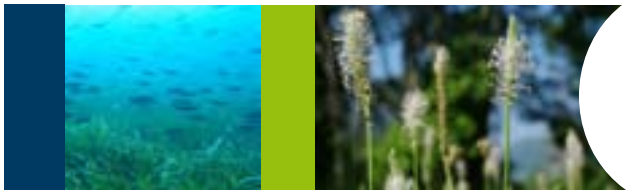
Lakes & Ponds:



Streams & Rivers:



4.090 t stocked in 2010



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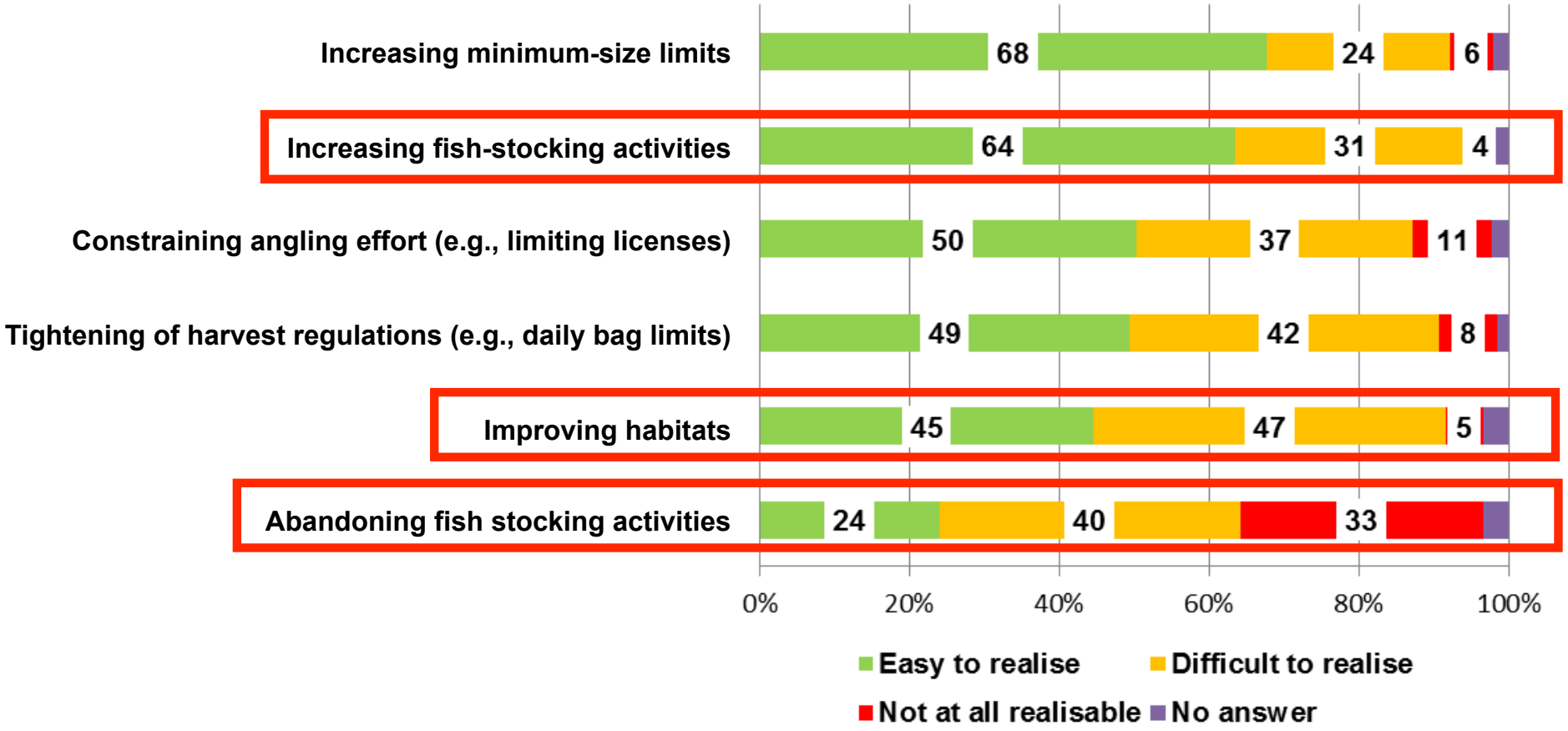
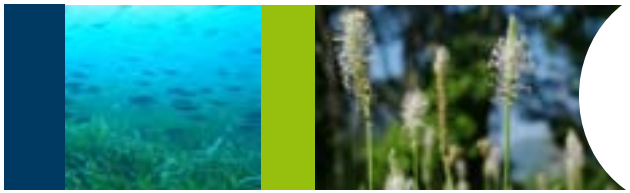
Ease of implementing fisheries management measures (%)





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WP1. Mechanisms of establishment and transfer of non-native salmonids

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Line Sundt-Hansen

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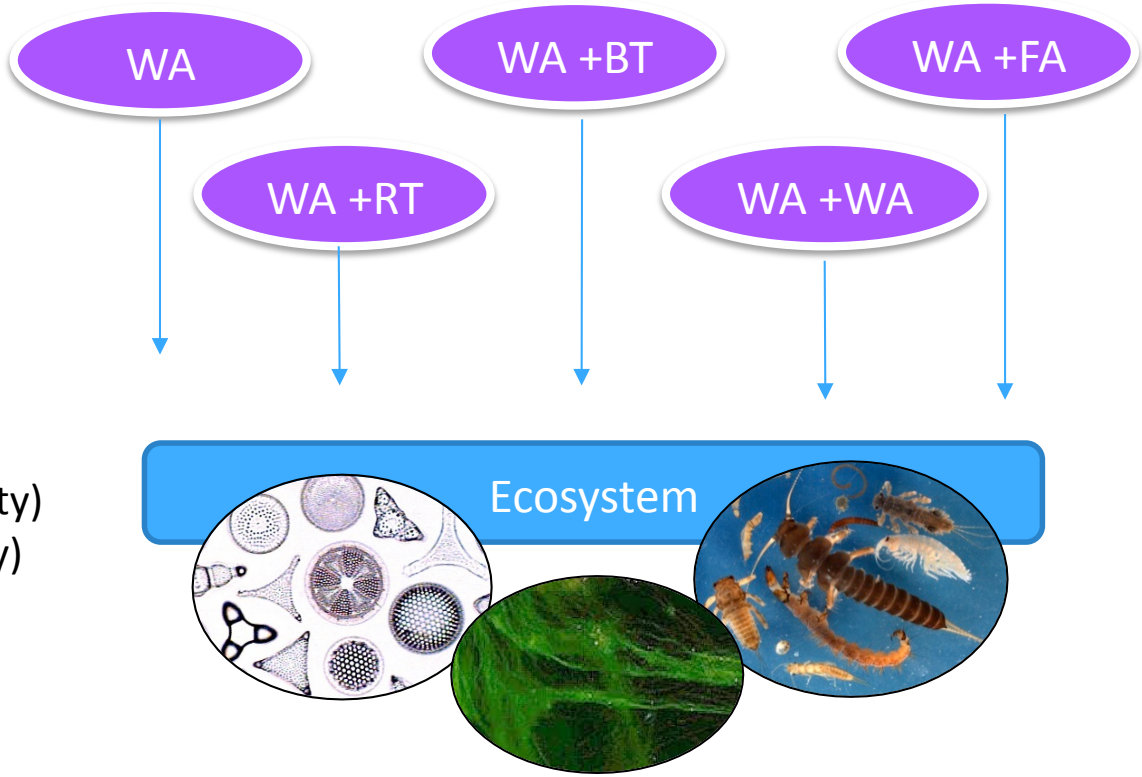
Task 1.2 and 2.2: Exp.1

Semi-natural stream channels (2014)

Experimental juvenile fish:

- Wild Atlantic salmon (WA)
- Farmed Atlantic salmon (FA)
- Brown trout (BT)
- Rainbow trout (RT)



ASSESMENTS:

- Performance of invaders (growth, mortality)
- Effect on native species (growth, mortality)
- Effect of competition on ecosystem:
  - Benthic invertebrates
  - Primary production
  - Diatomes

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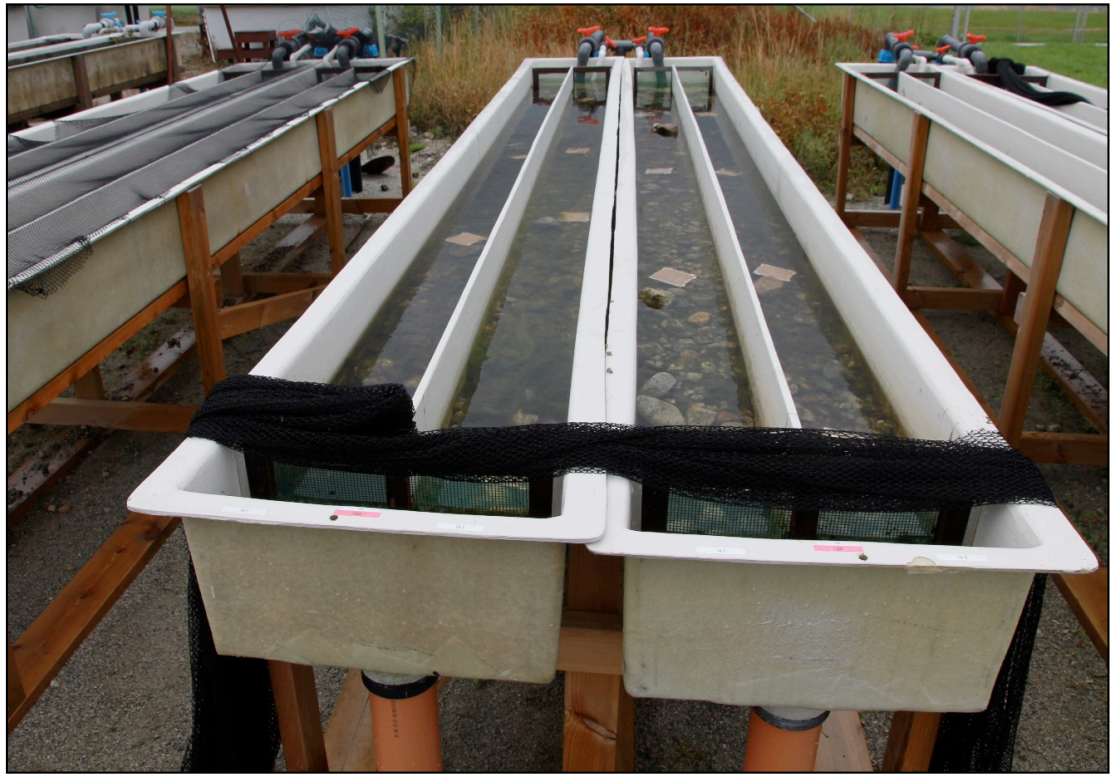
Experiment I: initiated 19 August; terminated 29-30 September 2014



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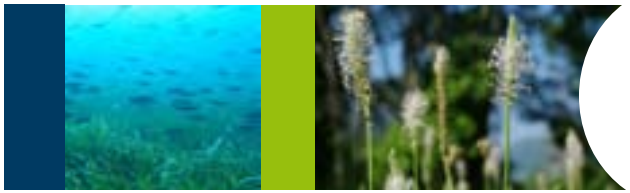

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Task 1.2 and 2.2: Experiment II.
Based on results of stream channel exp.
River Park, two channels (100m long)

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Barbara Koeck

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Task 1.3 Angling effects on the fitness of salmonid invaders

Main AIM.

Evaluate the invasion potential of introduced rainbow trout, by comparing its behavioral pattern and vulnerability to angling with the native brown trout.

SportFiskarna
Sveriges Sportfiske- och Fiskevårdsförbund

Does angling pressure reduce the invasion potential of rainbow trout?

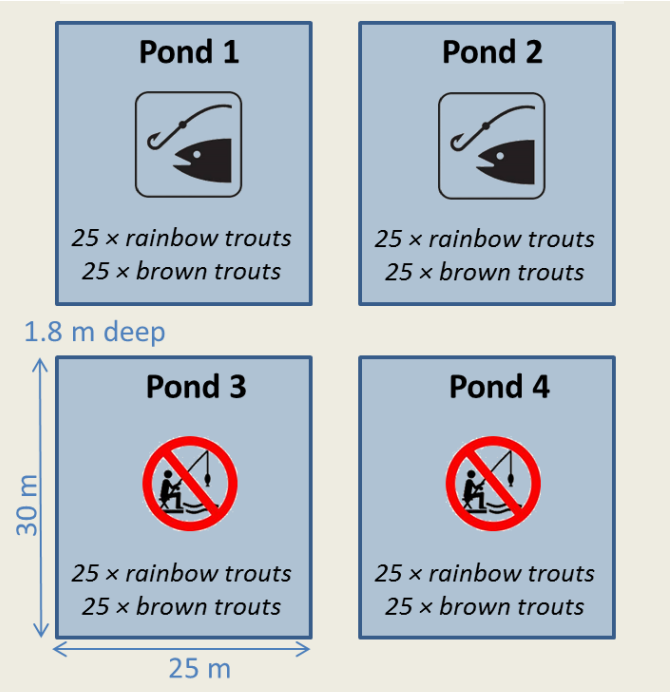
Methods.

→ **Monitor activity of species**: PIT antennas + individual video scoring

→ **Quantify trophic niche of species & behavioral types:** stable isotopes

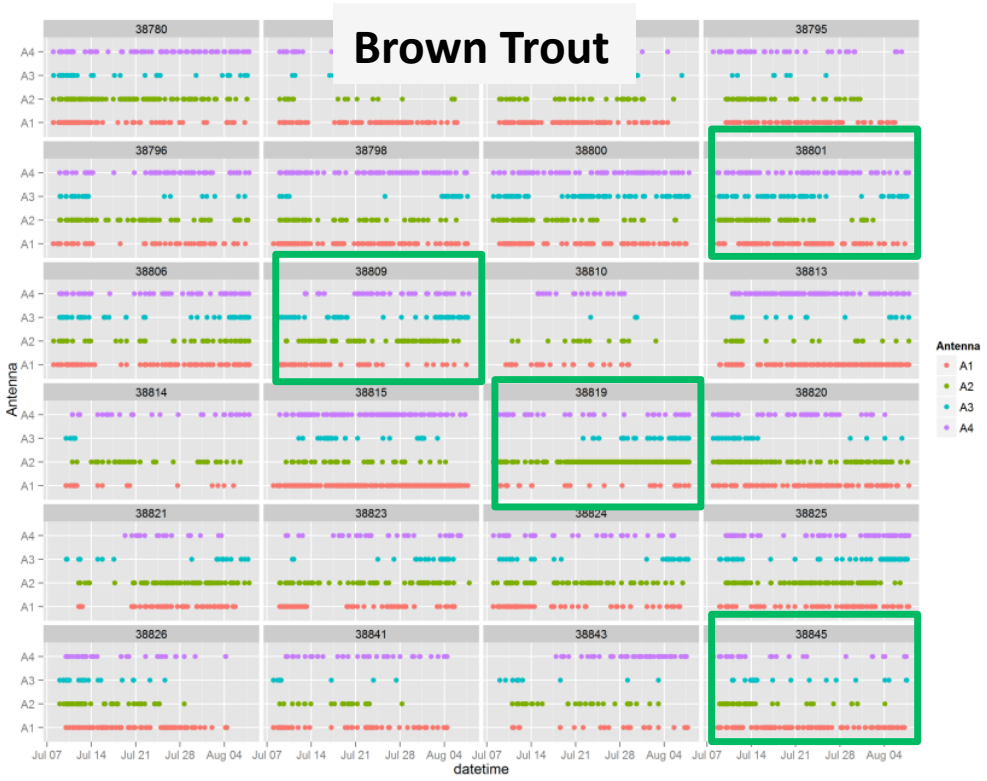
→ **Measure fitness:** growth, survival

4 ponds: 2 experimental treatments with 2 replicats



Current Status of the Task.

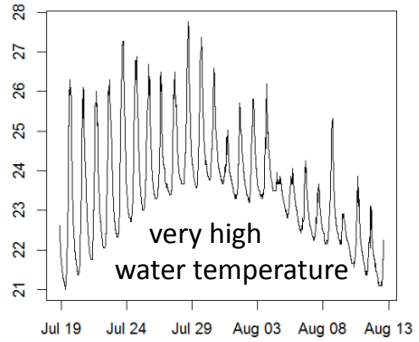
➢ **PILOT EXPERIMENT 07/2014: preliminary results.**

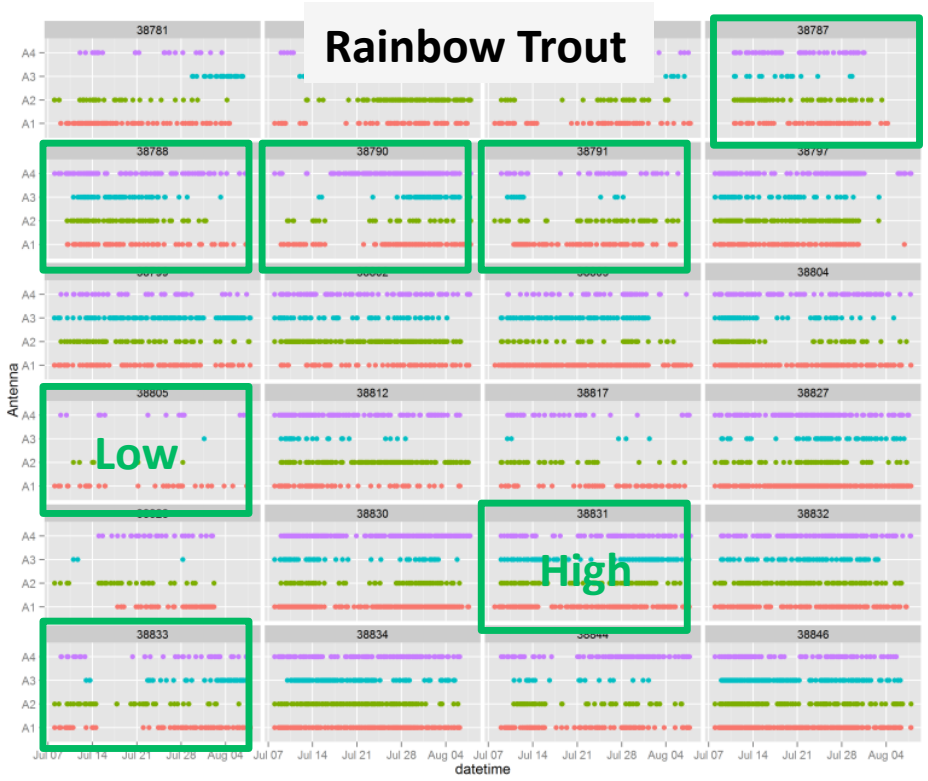


low Angling Catch Rate:

7 / 31 Brown Trout

13 / 31 Rainbow Trout

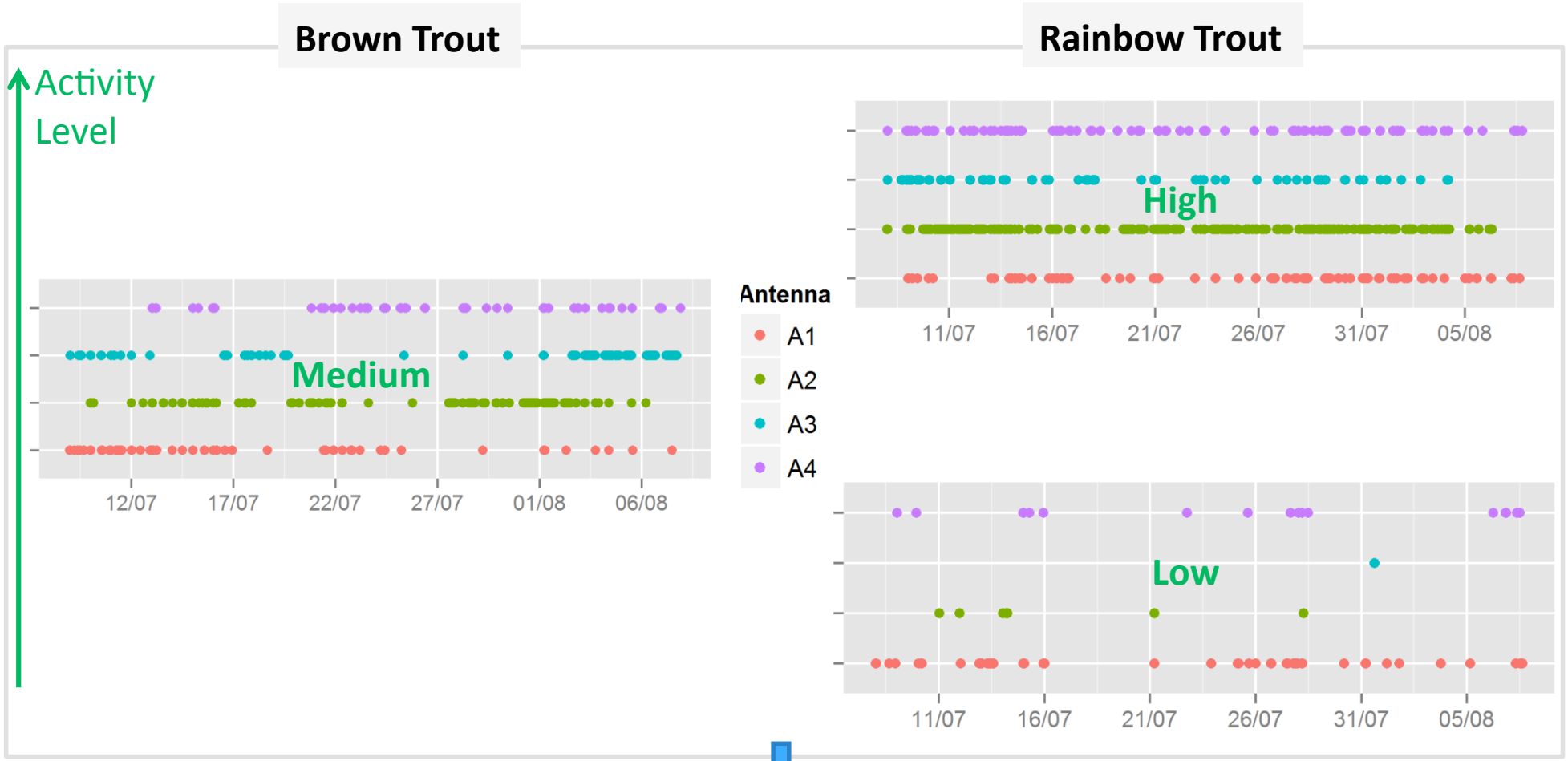




Variable detection patterns of caught fish:
High & low activity pattern

Current Status of the Task.

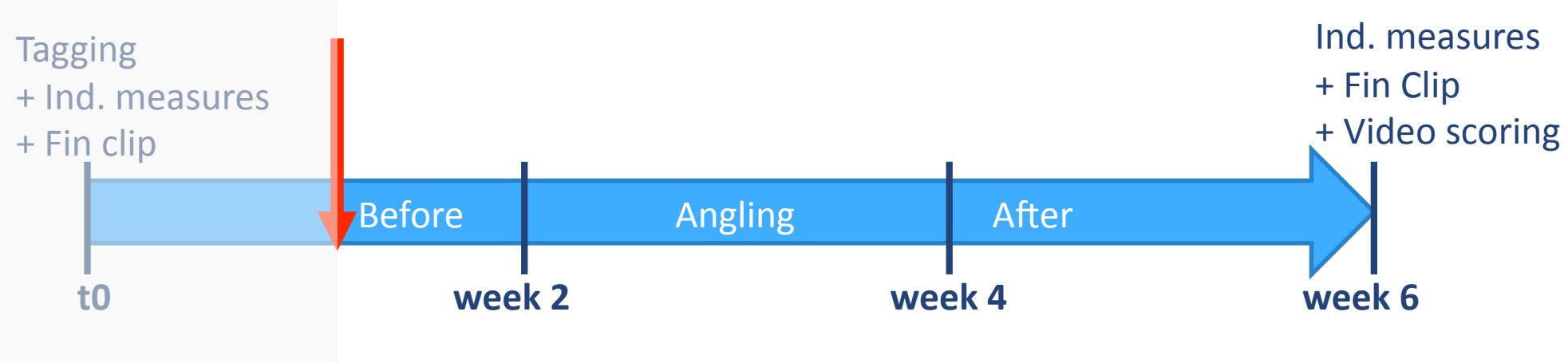
➢ **PILOT EXPERIMENT 07/2014: preliminary results.**



Higher variability
of activity pattern
for rainbow than for brown trout

Current Status of the Task.

→ MAIN EXPERIMENT 10/2014: in progress



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WP2. Ecological impact of salmonid invasions

Task 2.1 Global ecological impacts of con- vs heterospecific salmonid invasions

Task 2.2 Regional ecological impacts of con- vs heterospecific salmonid invasions

Julien Cucherousset

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Task 2.1: Global ecological impacts of salmonid invasions

Julien Cucherousset (*France*)

- **Aims** :

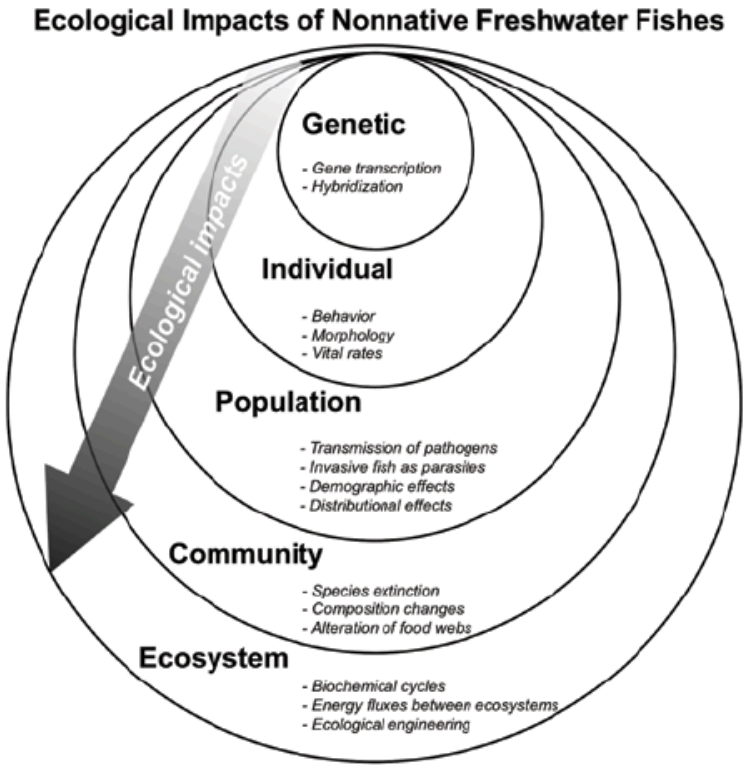
  - Determining which introductions have the strongest ecological impacts

  - Provide a first **global and quantitative** perspective of the relative importance of interspecific and intra-specific ecological impacts of nonnative Salmonids.

- **Predictions** :

  1) **intraspecific** invasions will have stronger impacts at lower levels of biological organization (*individual & population*)

  2) **interspecific** invasions will have stronger impacts at higher levels of biological invasions (*community & ecosystem*)



Cucherousset & Olden 2011 Fisheries

Task 2.1: Global ecological impacts of salmonid invasions

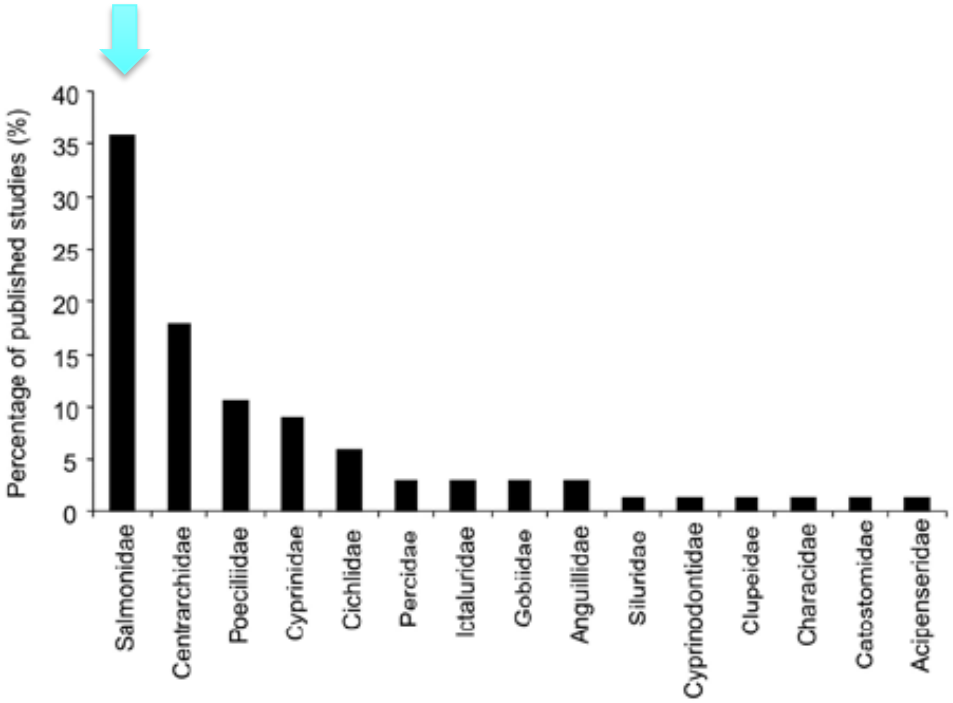
- **Methodology** : Review and meta-analysis of the scientific literature the ecological impacts across levels of biological organisation to:

  - provide a first **exhaustive review** of the ecological impacts

  - provide a first **quantification** across species of the the impacts

  - identify some potential **geographical** differences

=> a large amount of existing information on the ecological impacts of non-native Salmonids but no **global quantitative assessment** to date.



Cucherousset & Olden 2011 Fisheries

Literature search:

-ISI Web of Science: peer-reviewed papers and studies referenced

-Only manipulative experimental studies

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WP3. Public perception and evaluation of biological invasions

Task 3.1 Public perceptions on biodiversity and conservation of salmonids

Task 3.2 Stakeholder perceptions on biodiversity and conservation of salmonids

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WP 3.1: Public perceptions of biodiversity and conservation of salmonids - 1

➢ **Aim**

- **Understand public perception and evaluation** of aquatic biodiversity and invasions of aquatic ecosystems by non-native salmonid species and populations, e.g.

- Are people aware of current threats to salmonids?
- Do they assign intrinsic value to local trouts?

- **Gather information** about the attitudes, norms, emotions, preferences etc. held by the general populations in Germany, France, Norway and Sweden toward invasive species and populations, e.g.

- What attitudes do people hold toward aquatic invasive species?
- Do invasive salmonid species matter to people?

- **Explain behavioral intentions** and behaviour related to the conservation of salmonid biodiversity, e.g.

- Does awareness of aquatic invasions lead people to act, e.g., to vote, to sign a petition, to donate money?

WP 3.1: Public perceptions of biodiversity and conservation of salmonids - 2

➢ **Method and materials**

- **Survey** representative of the general populations of all four countries
- Based on samples of respondents from **high-quality online panels**
- **Questionnaire** asking for relevant information (length ca 20 minutes)
- Questionnaire **developed and project coordinated in Germany** (by the IGB) in cooperation with SalmoInvade partners in France, Norway and Sweden
- **Fieldwork** to be conducted by a professional polling institute

➢ **Current status**

✓ **Literature search** has been conducted

✓ **Relevant dimensions** have been identified and items, questions etc. collected

✓ **Call-for-tender** prepared and sent out to 14 renowned opinion poll institutes with own online panels asking for a quotation

✓ **More than 5 institutes** confirmed to submit their quotations

✓ **Fieldwork** to be conducted in the first months of 2015

✓ **Next steps**: Construct, pretest, refine, translate and field questionnaire

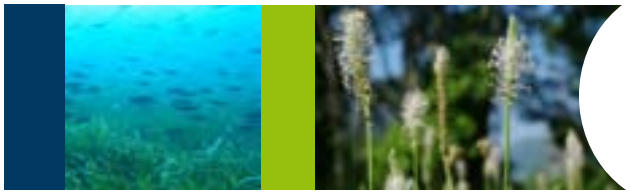
WP 3.2: Stakeholder perceptions of biodiversity and conservation of salmonids

➢ Aim

- **Understand how stakeholders** (managers of aquatic ecosystems) in Germany, France, Norway and Sweden **perceive and value invasions of aquatic ecosystems** by non-native salmonid species and populations
- **Map public discourses** and conservation conflicts due to different management goals
- Determine the **utility** that stakeholders gain **from non-native salmonids** and stakeholders' **preferences** for the future of aquatic ecosystems

➢ Method and materials

- **Survey** among relevant stakeholder groups in all four countries
- **Content of questionnaire** similar to the general population survey (WP 3.1), but more in-depth (e.g., more emphasis on salmonid fish biodiversity)
- Including a **discrete choice experiment** to identify the drivers of stakeholders' preferences for aquatic ecosystems
- **Development** of questionnaire and **data analyses done in Germany** (IGB)
- Fieldwork **conducted by each of the four SalmoInvade partners** on their own



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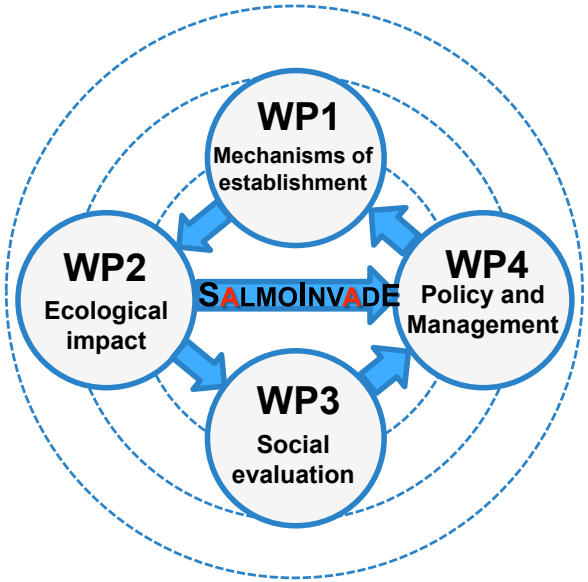
WP4. Implementations and recommendations for policy and management

Task 4.1 Policy management and knowledge transfer



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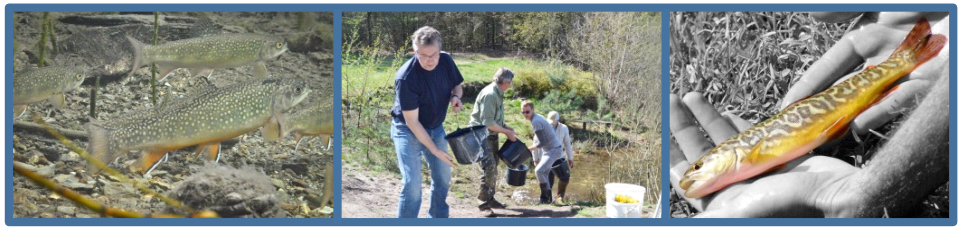
SALMOINVADE STAKEHOLDER WORKSHOP, 7-8 OCTOBER 2014 GOTHENBURG



Day 1 (7 October)

12:00-13:00	Lunch at Wallenberg Conference Centre	
13:00- 17:00	Meeting at the Zoology Building, Medicinaregatan 18	
13:00-13:15	Welcome and Introduction	
	JörgenJohnsson	University of Gothenburg (Ugot)
13:15-15:00	Introductory presentations by the members of the Stakeholder reference group	
13:15-13:30	*Nicolas Poulet*	ONEMA, France
13:30-13:45	*Sebastian Hanfland*	Managing Director, The Fisheries Association of Bavaria
13:45-14:00	*Anne Kristin Jøranlid*	Advisor, Miljødirektoratet, Norway
14:00-14:15	*Erik Sterud*	Chief Adviser, Norske Lakseelver, Norway
14:15-14:30	*Sofia Brockmark*	Senior Advisor, HaV, Sweden
14:30-14:45	*Per-Erik Jakobsen*	Manager, Swedish Anglers' Association Region West
14:45-15:00	*Erik Sparrevik*	Vattenfall AB, Sweden
15:00-15:30	Coffee	
15:30-17:00	Biological aspects of salmonid invasions (15 min presentation + 5 min questions)	
15:30-15:50	*Line-Sundt Hansen*, NINA	Task 1.2 and 2.2: Performance and impacts of invaders
15:50-16:10	*Barbara Koeck*, Ugot	Task 1.3: Angling and invasion success of salmonids
16:10-16:30	*Julien Cucherousset*, CNRS	Task 2.1: Global ecological impacts of salmonid invasions
16:30-17:00	Plenary discussion and stakeholder input on biological aspects of salmonid invasions	

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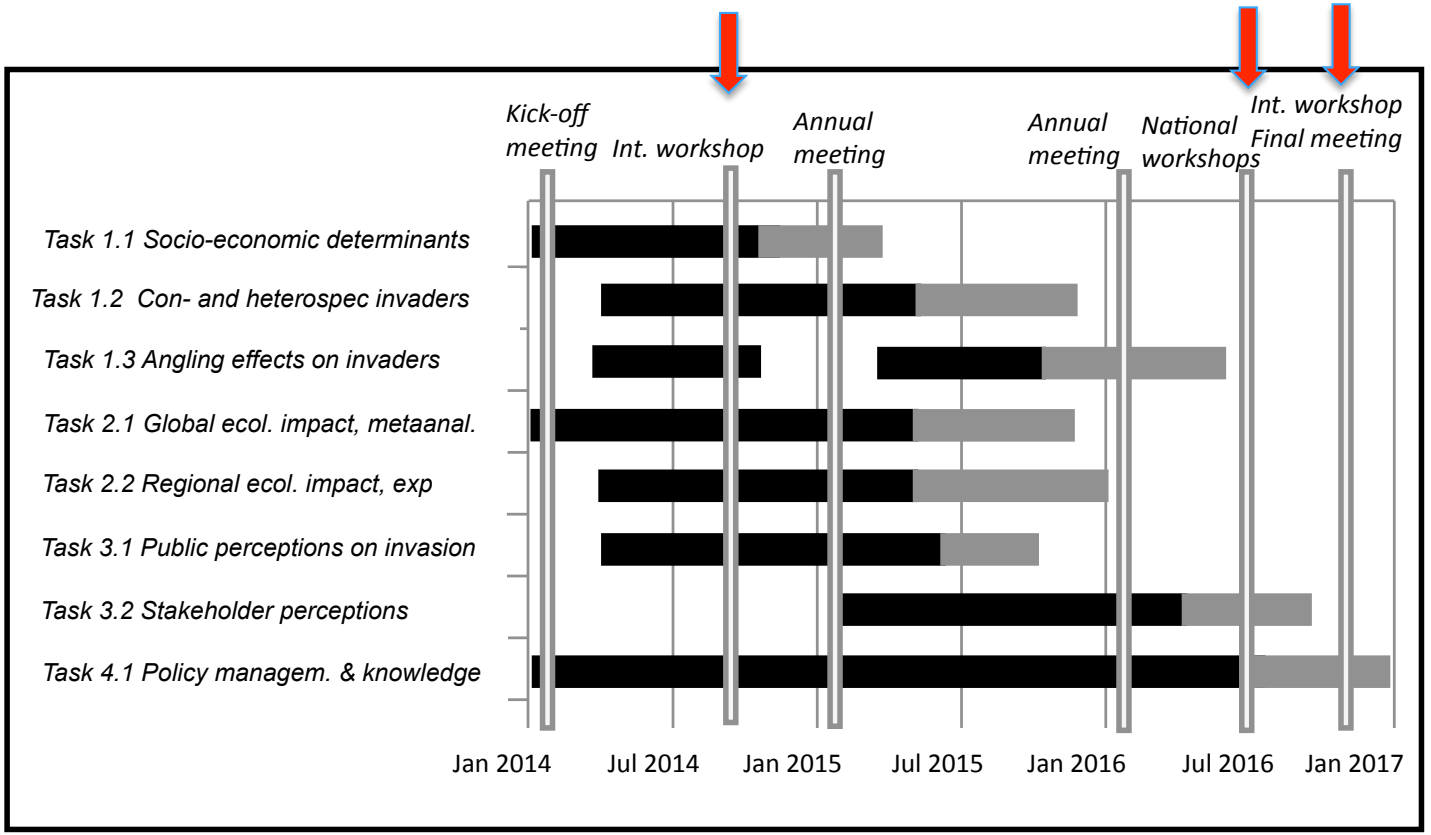

Fig. A. Gantt chart illustrating the timeline of the tasks in SalmoInvade. Black bars indicate timeline dedicated to planning and execution of each task. Grey bars indicate time dedicated to analysis and dissemination of results.

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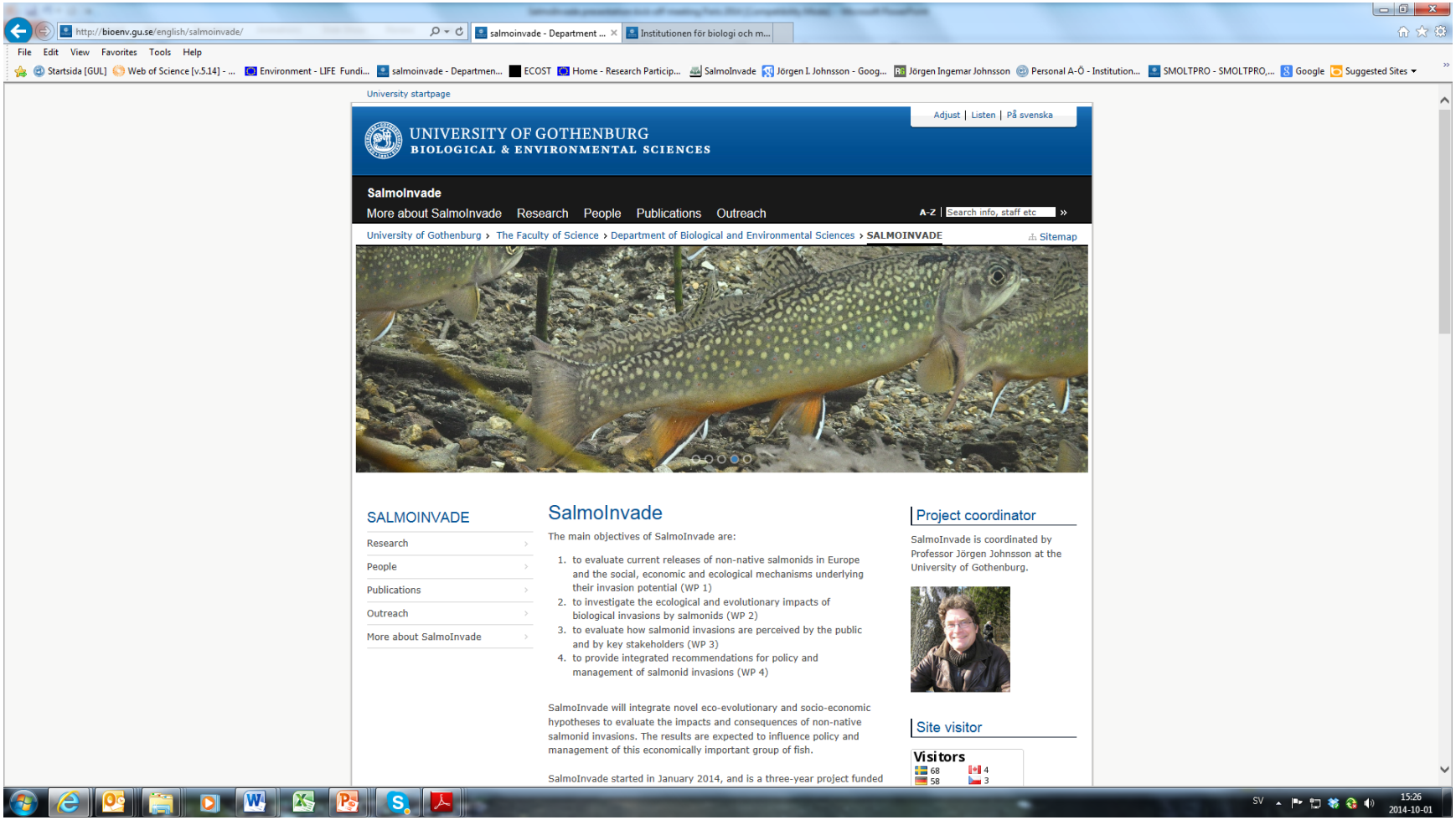

SalmoInvade web page: http://bioenv.gu.se/english/salmoinvade/

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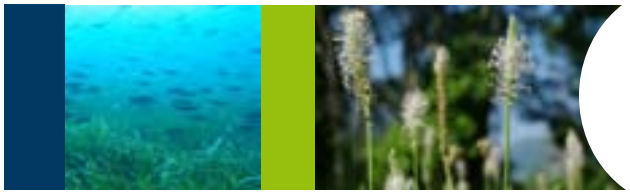

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