

Project Proposal

Comparing the anadromous Atlantic salmon in Iceland and UK to
research the impacts of temperature on Atlantic salmon

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1 Key words

2 Bayesian Life-cycle Model; Population Ecology; Salmon; North Atlantic

3 2 Introduction

4 Atlantic salmon (*Salmo salar*) are found to have two forms of life cycle in North Atlantic, the non-
5 anadromous form and anadromous form [Verspoor et al., 2007]. The non-anadromous Atlantic salmon
6 spend their entire life in a landlocked location, while the anadromous ones have more complicated life
7 cycle. The anadromous Atlantic salmon are first born as eggs in freshwater, where they spend 2-4
8 years to slowly grow into smolts [Verspoor et al., 2007]. Then they go into the marine and live most of
9 their time there except spawning. The first time of anadromous Atlantic salmon returning to spawn in
10 rivers can range from 3 to 14 years after entering the sea [Chaput, 2012]. According to studies, both
11 the smolt age and the sex mature age of anadromous Atlantic salmon is significantly dependent on
12 temperature [Metcalf and Thorpe, 1990, Scarnecchia, 1983]. Regarding the steeply declination of native
13 Atlantic salmon in North Atlantic since 1989 and the continuously ascending of global average marine
14 temperature since 1950, temperature becomes a potential crucial factor that affects Atlantic salmon
15 population and size [Parrish et al., 1998, Brohan et al., 2006]. Both located in North Atlantic, UK and
16 Iceland has obvious different temperature during all season. Thus, the anadromous Atlantic salmon in
17 Iceland and UK can be excellent examples to represent the cold area and warm area in North Atlantic,
18 which helps study the impacts of temperature on anadromous Atlantic salmon. The population model of
19 salmon in Iceland has already been completed by Hannah Levis. At the moment, the population model
20 of salmon in UK is required to be constructed to compare with the ones in Iceland.

21 3 Methods

22 The project is mainly conducted by computational methods. We intend to use Bayesian life-cycle model
23 to construct the stage-structured population model of anadromous Atlantic salmon in UK. Bayesian life-
24 cycle model is able to link different life stages of salmon and estimate stage-specific population of salmon
25 under the effects of intrinsic and extrinsic factors [Ohlberger et al., 2018].

26 4 Objectives

27 The project is expected to construct the stage-structured population model of anadromous Atlantic salmon
28 in UK. This model can improve stock assessment and calculation of conservation limits(CLs) and Quo-
29 tas(QU), which provides both guidance on the conservation and fisheries. Further more, the project
30 aims at comparing the anadromous Atlantic salmon between Iceland and UK to research the impacts of
31 temperature on anadromous Atlantic salmon.

5 Project feasibility

The project is part of the SAlmonoid MAnagement Round the CHannel(SAMARCH). SAMARCH is a 7.8m five-year project (2017-2022) part funded by the France England Interreg Channel programme. The timeline of tasks is listed Figure.1.

Task		Month								
		1	2	3	4	5	6	7	8	9
1. Data preparation	1.1 Revision of Iceland data									
	1.2 Preparation of UK data									
2. Model construction	2.1 Revision of Iceland model									
	2.2 Construction of UK model									
3. Analysis	3.1 Analyzing the influence of temperature									
4. Write-up	4.1 Introduction									
	4.2 Methods and results									
	4.3 Discussion and conclusion									
5. Milestone	5.1 Research plan									
	5.2 Introduction submission									
	5.3 Presentation and viva									
	5.4 Report submission									

Figure 1: Gantt chart of the project

6 Budget

The budget required is listed in table 1.

	Fee (£)
Transportation	200
Accommodation	300
Total	500

Table 1: Budget required for the project

References

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I have seen and approved the proposal and the budget.

Signature:

Date: