inventWater

ESR Project 12
Employing ISIMIP projections to model the phenology, production, and distribution of diadromous fish populations

Host institution: University College Cork

Supervisor: Prof. Philip McGinnity

Co-Supervisor: Dr Elvira de Eyto (Marine Institute)

The successful Early Stage Researcher will be registered in University College Cork on a three year PhD programme (3 year minimum enrolment).

Project description

The regulatory and demand-driven ecosystem services provided by freshwater fish include food production, recreation, regulation of aquatic foodwebs and nutrient cycling. In addition, freshwater fish provide a crucial link between aquatic and terrestrial ecosystems. Moreover migratory fish such as Atlantic salmon (Salmo salar L.), extend this aquatic linkage into the marine environment. Models which can accurately forecast future responses of climate sensitive ecosystems and their dependent biota are vital for the definition and fashioning of sustainable management practices that favor species conservation and support their resilience to multiple stressors, including global warming. The development of the Lakes and Water Sectors within ISIMIP makes it now possible to examine the controls of freshwater fish production and survival within a holistic inter-sectoral framework, and provide open source workflows and tools to aid management. In this PhD study, the successful candidate will aim to expand the range of geographically explicit models available through ISIMIP to include growth, phenology, distribution and, ultimately, production of freshwater fish, specifically focusing of diadromous Atlantic salmon across its native range. The project will cooperate with ISIMIP to define adaptations options to counteract the impacts of climate change on fishes.

Expected Results:

1. Identification and parameterization of key freshwater fish response projection models relevant to the production of Atlantic salmon under interacting multiple stressors including climate and land use change.

2. Simulations of these models using established ISMIP protocols and driver data, leading to the inclusion of freshwater fish information (growth, phenology, distribution) in the suite of ISIMIP impact models translatable and available for policy makers.

3. Integration of impact models into innovative tools for informing fisheries and land-use management on potential adaptation measures.

ESR Project 12
Employing ISIMIP projections to model the phenology, production, and distribution of diadromous fish populations

Host laboratory

Established in 1845, University College Cork, (UCC) is one of the premier research institutions in Ireland. As Ireland's first five-star university (with internationally-recognised expertise in science, food, engineering, medicine, business, law, social sciences and the humanities), UCC boasts a vibrant, modern, environmentally sustainable campus and a top-ranked student experience, second to none in Ireland. Supporting approx. 20,000 students pursuing undergraduate and postgraduate studies, the University provides the full range of academic disciplines and plays a crucial role in the development of Ireland's knowledge-based society.

The student will also spend the bulk of their time (subject to COVID19 restrictions) at the Marine Institute's research station in the Burrishoole catchment, near Newport, Co. Mayo, including one official 3 month secondment. The Burrishoole research station has been a centre for diadromous fish monitoring since the 1950s, and is one of the few index catchments for Atlantic salmon and European Eel in the North Atlantic region. https://www.marine.ie/Home/site-area/infrastructure-facilities/newport-catchment-facilities/newport-catchment-facilities?language=en. Research is focused on fish dynamics, climate change, land use impacts and long term ecological change in aquatic habitats. A comprehensive view of the research outputs of the station can be viewed here: https://scholar.google.com/citations?user=u2WpsgIAAAAJ&hl=en&authuser=2 . There are currently about 30 people working in the research station, including Marine Institute core staff and researchers from many of the HEIs in Ireland. This ESR will build on work carried out by the UCC/MI network of researchers who work in the area of fish ecology and evolution in dynamic ecosystems https://fisheye.ucc.ie/ .

The student will also be expected to participate in 5 training schools and workshops around Europe, as well as secondments in the University of Stirling and the Potsdam Institute for Climate Impact Research. A willingness to travel and spend time abroad is therefore essential.

Secondments

The fellowship will also include opportunities to work with other InventWater partner organizations:

- US (Ian Jones), 3 months (Month 17-20) - use of 1D models to project changes in lacustrine fish habitat;

- MI (Elvira de Eyto), 3 months (Month 25-27) - refining of fish modules of 1D models;

- PIK (Katya Frieler), 2 months (Month 30-31) – connecting freshwater fish models to ISIMIP and ISIPedia

Specific requirements

- Academic skills: Candidates must have a primary degree (honours level) at a 2-1 equivalent in either zoology, environmental science, bioinformatics, or similar.
- Technical skills: strong mathematical ability with programming skills in typical scientific programming languages (e.g., Python, R, etc.); strong skills in statistical analysis including ecological modelling and GIS analysis.
- English language: Any applicant whose first language is other than English must have either a certified English language proficiency of at least IELTS 6.5 or equivalent, or have undertaken their qualifying degree through English.
- Additional desirable requirements: experience in ecological modelling of fish populations; experience in handling very large data sets; experience in producing reproducible modelling workflows.

HOW TO APPLY

Download the application form from this link: http://u.pc.cd/LP8ctalK and fill it. The application form, together with an official copy of degree(s) (if applicable, an official English translation), course transcripts (if applicable, an official English translation), and English proficiency test results cited in the form, must be sent as a **SINGLE** pdf in a **SINGLE** email to *inventWater-jobs@icra.cat.*

Enquires

For additional information on this project, please contact Prof. Phil McGinnity (p.mcginnity@ucc.ie)