Natural Environment Group (NEG) Project Bidding Pro Forma

Please complete all sections and read the eligibility criteria and timescale at
http://www.solentems.org.uk/natural_environment_group/NEG_Projects/.

Project Title:	It's the water quality, stupid! Identifying the risks to support successful restoration in the Solent.
Project Sponsor/Lead (and full contact details):	Gordon Watson, Institute of Marine Sciences, University of Portsmouth, Gordon.watson@port.ac.uk
Full Address that any Purchase Order should be made out to	University of Portsmouth
Project Description and Objectives:	***Background*** Successful coastal management requires extensive water quality monitoring for nutrients released from terrestrial agriculture and human sewage. Reducing these inputs is essential for achieving clean and healthy seas now, but most importantly, habitats that are targets for restoration (seagrass, oysters and saltmarsh) require good water quality to be healthy and thrive. If poor water quality (a key driver for the loss and degradation of these habitats) has not improved then the success of seascape restoration will be in doubt. For over 20 years relevant data (e.g. nutrients, turbidity) have been collected by agencies (e.g. Environment Agency) from hundreds of sites. These are then placed in publicly-accessible repositories. However, these data-sources are extremely challenging to work with due to a) database size (several million data points), b) frequent changes in sampling techniques; c) inconsistent data coding and d) limited site-specific data (Richir et al., 2021). Thus, this wealth of big data (BD) information is inaccessible and unusable in the current format. Therefore, decisions on the location of restoration without access to water quality data is a significant risk for the success of restoration projects. BD analysis is now at the forefront of coastal monitoring and has significant potential for addressing key marine challenges. This project will develop, test and validate BD approaches to maximise the chances of success for restoration in the Solent coastal system. There are three objectives that the project will address: 1. Select and extract relevant data from the EA repository for the Solent 2. Adapt, test and validate BD approaches for targeted research questions 3. Generate spatially and temporally relevant outputs in an ecological context that inform restoration decisions.

	Approach and methodology *1. Select and extract relevant data* Water quality data (including nutrients and other physiochemical data) will be requested for the Solent water-shed catchment (coastal, riverine and aquifer) and then quality controlled, organised and interrogated to help formulate the key questions. An iterative process will be used for quality assessment including geographic locations and material codes etc with the merging of standardized datasets to generate a 'working' sub-dataset. *2. Adapt, test and validate BD approaches* Algorithms and Python code will be written to extract, organise and validate Solent-relevant catchment data appropriate to the specified research questions e.g. Has the nitrogen concentration of the water reduced in Portsmouth Harbour over the last 20 years? Data will be manipulated and organised as required depending on the water quality parameter, temporal and spatial parameters specified. *3. Generate spatial and temporally relevant outputs* Riverine, transitional, estuarine and coastal sites will be georeferenced (Google Earth) enabling outputs to be incorporated in to GIS software (ArcGIS/QGIS) or other applications (e.g. R-Studio). Maps and other methods (e.g. infographics) will then be shared with stakeholders to inform the selection of restoration sites.
What is the value of the project to the Solent European Marine Sites (SEMS), other designated sites or areas of conservation interest?	The success of the project will be measured against the objectives. However, the significance and legacy will be providing data that informs seascape restoration to maximise the success of all planned restoration projects within the Solent.
Project Outputs:	Maps of locations to inform restoration
Project Timescale and Milestones:	6 months from 1st March 2023. 1-page summary, technical report (as a scientific paper), presentations to Solent Forum
Overall Project Cost (£): *Please detail other funding sources secured/sought.*	The only project cost is staff time for Dr Jonathan Richir @ £26.85 per hour (Senior Research Fellow) based in Belgium. Project RaNTrans will cover 4 months @ 0.27 FTE (10 hours per week, 16 weeks: £4296), but we request funding to cover 2 months (10 hours per week for 8 weeks: £2148).
Funding contribution sought from NEG (£): *The amount requested should be match funded.*	£2148. Yes, but we would not be able to cover the full Solent area; selecting only a small number of locations/areas.
Will the project still go ahead without NEG funding?	
Geographical coverage of the project:	The Solent and water catchments

Please list any project partners:	Dr Joanne Preston

Additional information to support the Bid:	*References*

Richir, J., Bray, S., McAleese, T. and Watson, G.J. (2021). Three decades of trace element sediment contamination: the mining of governmental databases and the need to address hidden sources for clean and healthy seas. *Environment International*, *149*, p.106362.

Programme of work

Research tasks, start 1/3/23	Month					
	1	2	3	4	5	6
Existing data acquis., qual. control	▓					
Data pre-processing		▓	▓			
Code writing, validation			▓	▓	▓	
Output overlaying (GIS)						▓
Output maps to stakeholders						▓

Submission date:

Please email completed forms to solentforum@hants.gov.uk by the last day of February. Important: If you do not get a receipt for your application please phone the office.