

BES Invasion Science SIG Event: Improving the contribution of invasion science to policy and management, Llandudno, Tuesday 20th June 2023

09.30-10.00	Registration & Refreshments		
10.00-10.15	Welcome	Katie O'Shaughnessy & Steph Bradbeer	
10.15-10.45	Keynote Speaker	Dr Emily Smith	Invasive management in practice – translating invasive research to the angling community
10.45-11.20	Lightning Talks	Lucinda Lintott	The Marine Invasive Non-Native Species (INNS) Risk Assessment Tool (MIRAT): a risk assessment tool for the introduction and establishment of marine INNS
		Oluwadunsin Adekola	Recording impacts of invasive species through citizen science: a pilot study
		Katie Dey	The potential impacts of the non-native Asian date mussel in the UK
		Niall Moore	Introduction to the Evidence Strategic Plan
11.20-11.40	Break		
11.40-13.00	Early Career Researcher Panel Session	Panellists: Jessica Minett, North Wales Wildlife Trust/WaREN Theresa Kudelska, Natural Resources Wales Finn Eaton, DEFRA Paul Stebbing, APEM Katharina Dehnen-Schmutz, Coventry University	
13.00-14.00	Lunch		
14.00-14.25	Lightning Talks	Sam Reynolds	Meta dataset: Using global evidence for local decision making
		Tomos Jones	Garden Escapers! - Involving gardeners in preventing 'future invaders'
		Manoa Rajaonarivelo	Framing forest landscape restoration to avoid invasions of non-native tree species in hotspot tropical country: Madagascar
14.25-14.55	Keynote Speaker	Prof. David Aldridge	Integrating invasive species research with policy and management
14.55-15.15	Break		
15.15-15.40	Lightning Talks	Mandy Marsh	What CIEEM does for the ecologists and the environment
		Emily Stevenson	Synthesising 35 years of invasion science research
		Hannah Tidbury	Improved evidence to inform marine invasive species monitoring
15.40-16.40	Workshop: Evidence Strategic Plan	GB NNSS	Link to the evidence strategic plan here
16.40-17.00	Closing Remarks	Katie O'Shaughnessy & Steph Bradbeer	



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Lightning Talks (5 minutes + 2 minutes for questions)

<p>Lucinda R. Lintott, Kathryn A. O'Shaughnessy & Paul D. Stebbing</p>	<p>The Marine Invasive Non-Native Species (INNS) Risk Assessment Tool (MIRAT): a risk assessment tool for the introduction and establishment of marine INNS</p> <ul style="list-style-type: none"> • Reducing the risk of introduction and establishment of marine invasive non-native species (INNS) is vital for mitigating the adverse impacts of these species. Understanding and assessing these risks is necessary for the development of site-specific biosecurity plans as a management measure. • To facilitate this process, we have developed a tool to assess the risk of INNS introduction and establishment based on site-specific pathways and habitat suitability variables. This tool has been built following a literature review of marine INNS pathways and biosecurity measures (in preparation). • By taking a modular approach to marine sites and activities, it examines potential introductory pathways within the risk assessment area and outputs a relative risk score for each pathway identified. • The tool can also account for temporary events (e.g., boating competitions), producing relative risk scores which can be used to inform event-specific biosecurity measures. • For each risk assessment area, a UK-specific list of INNS is generated based on the presence of suitable pathways and habitats. This list can be used to focus monitoring objectives. • A separate module of the tool assesses the existence and suitability of current biosecurity measures within the risk assessment area that are intended to address activities that risk introducing or spreading INNS (e.g., regulations on hull cleaning and provision of washdown facilities). • The outputs from this tool can be used to inform the downstream development of pathway-based biosecurity plans which are vital in reducing the introduction and spread of marine INNS.
<p>Oluwadunsin Adekola, Tomos Jones and Katharina Dehnen-Schmutz</p>	<p>Recording impacts of invasive species through citizen science: a pilot study</p> <ul style="list-style-type: none"> • Invasive alien species (IAS) continue to have negative environmental and socio-economic impacts globally, and evidence of their impacts is crucial for effective management and policy responses. • The current global standard for IAS impact assessments, the EICAT (Environmental Impact Classification of Alien Taxa) framework, is based on expert assessments of published evidence, which can be scarce, not up to date or not collected using standardised field protocols. • To address this gap, this project aims to explore a novel approach using citizen science to develop and test field and digital protocols for impact assessments. • Results will be analysed and compared for different species and protocols, providing an improved evidence base for directing resources for IAS risk assessment and management. • This project offers an innovative opportunity to not only pioneer the development and testing of standardized field protocols for assessing the impacts of IAS, but also to provide evidence about how citizen science approaches can contribute to the assessment of the impacts of IAS and how these approaches can be integrated into existing impact assessment frameworks and risk assessments. • This study can serve as a model for future research aiming to investigate the social and economic impacts of IAS. The outcomes of this project are not limited to the UK, as the protocols can be applied internationally, offering a valuable contribution to the global efforts to manage and mitigate the impacts of IAS.



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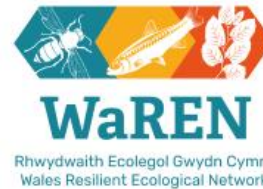
<p>Dey KG, Tidbury H, Stebbing P, Watson GJ</p>	<p style="text-align: center;">The potential impacts of the non-native Asian date mussel in the UK</p> <ul style="list-style-type: none"> • The Asian date mussel (<i>Arcuatula senhousia</i>) is one of the most globally widespread non-native marine species which is invasive throughout much of its introduced range. Recently recorded in the UK for the first time, <i>A. senhousia</i> may be on the cusp of significantly expanding its range across the UK and Europe. • Understanding <i>A. senhousia</i>'s ecology and its interactions with other species is key to effective impact assessment, however vast knowledge gaps remain. To address this, we demonstrate a holistic and balanced impact assessment approach for <i>A. senhousia</i> in the UK. • Subtidal surveys combined with morphometric and reproductive analyses confirmed <i>A. senhousia</i>'s population dynamics, revealing low densities but persisting populations within commercially and ecologically important habitats. An extended summer reproduction may overlap with other keystone bivalves, creating substrate competition and causing the fouling of infrastructure, including aquaculture equipment, if densities increase. • Feeding rate experiments, using the indirect clearance rate method, evidenced that <i>A. senhousia</i>'s clearance rate was 2-26 x higher than that of other suspension-feeding bivalves when standardised per g of tissue. <i>A. senhousia</i>'s invasion could therefore cause food competition and alter benthic and plankton communities. • We will determine associations with other benthos using historical and recent survey datasets to further assess whether <i>A. senhousia</i> could influence macrobenthic community composition. • Together these data confirm that <i>A. senhousia</i> currently poses a moderate threat to European ecosystem goods and services. However, species distribution modelling suggests that this threat is likely to increase in the UK and Northern Europe as climate change makes environmental conditions more suitable.
<p>Sam Reynolds</p>	<p style="text-align: center;">Meta dataset: Using global evidence for local decision making</p> <ul style="list-style-type: none"> • When deciding how to manage invasive species, we are often faced with several questions: What management actions can we take? Will they be effective? Will they be effective in my situation? Deciding what to do requires weighing up available evidence but assessing and interpreting the complexity of evidence is often challenging. • Meta-analysis is often used to make generalisations across all available evidence at the global scale. But how can these global generalisations be used for evidence-based decision making at the local scale, when some of the evidence is unlikely to be relevant to local decisions? • We developed a method called "dynamic meta-analysis", which enables users to interact with the global evidence base to assess the effectiveness of management actions for their chosen species in their chosen context. We have built a free online tool called Metadataset that facilitates this (www.metadataset.com). • The current focus of Metadataset is to collate the effect sizes of different management actions for the 88 invasive species of concern in the European Union, as well as quantifying the off-target effects on native species and other biotic and abiotic factors. • We have developed a prototype app, which allows users to filter the global data by numerous factors including country, ecosystem, and intervention type. The app automatically calculates effect sizes, provides graphs and assesses publication bias for the selected data. Additionally, it presents users with the opportunity to download the raw data to conduct bespoke analyses.



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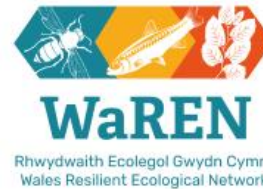
<p>Tomos Jones, Lisa Toth and Katharina Dehnen-Schmutz</p>	<ul style="list-style-type: none"> • We hope to further develop this tool with input from potential users. <p>Garden Escapers! - Involving gardeners in preventing 'future invaders'</p> <ul style="list-style-type: none"> • Globally and here in Wales, ornamental plants spreading from gardens are one of the main sources of invasive species. • This project is engaging with gardeners across northwest Wales to look at which ornamental plants are spreading in gardens to identify those with invasive potential, 'future invaders'. • Target areas have been chosen by analysing the distribution of long-term management plants (Wales Invasive Priority Species for Action list), as well as population data (for sufficient participants) and the location of protected sites. The target areas are: Bangor and Porthaethwy; Porthmadog and Penrhyndeudraeth; and Llandudno and Bae Colwyn. • An initial list of fifteen species of interest has been compiled by consulting a study which asked Botanical Society of Britain and Ireland vice-county recorders to name plants they considered were having the highest environmental impacts. The most recent horizon scanning for GB and Plant Alert records in Wales have also been consulted. • The novelty of this project is in engaging directly with gardeners in their own gardens. Also, importantly, in looking at which species can already be found outside gardens. For example, in nearby protected areas because this is where it is most important to prevent 'future invaders'. • This will inform specific advice and recommendations for the target areas, including ornamentals which are less likely to become a problem in the future. • Public engagement through events and tours of protected sites as part of this project will also increase awareness of this important issue.
<p>Manoa Rajaonarivelo</p>	<p>Framing forest landscape restoration to avoid invasions of non-native tree species in hotspot tropical country: Madagascar</p> <ul style="list-style-type: none"> • Nature-based solutions have been recognized one of the effective solutions to mitigate the climate change which consist among others the promotion of landscape and forest restoration. • For Madagascar, the commitments remain on the conservation and protection of natural resources. Apart of the conservation effort under protected areas, the tropical country committed to Bonn challenge to restore 4 million ha by 2030. However, it has been observed that the strategies focus mainly on large-scale reforestation which since the past has always focused with non-native species plantation gradually leading to biological invasions. • Social analysis of the promotion of tree invasive species such as pine showed that despite administrative pressure to eradicate pine propagation inside endemic Malagasy woodland, people resist because these are a source of income for them, and they do not perceive real impact by existing invasions. • The analysis of international convention and agreement in climate change but also Malagasy regulatory and legislative texts for restoration and reforestation shows the same outcome: the non-consideration of biodiversity in the proposed solutions, the lack of recognition of non-native species as dangerous and the promotion of development beyond environmental impacts. • Finding right balance in the fulfilment of international commitments and implementation on the ground should therefore require national policies that are more adapted to the socio-economic and local environmental context to achieve the effectiveness of forest landscape restoration as part of mitigation for climate change.
<p>Mandy Marsh</p>	<p>What CIEEM does for the ecologists and the environment</p>



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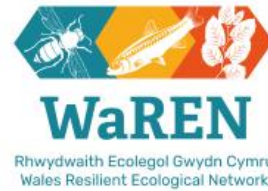
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	<ul style="list-style-type: none"> • CIEEM is the Chartered Institute for Ecology and Environmental Management and works to build a stronger sector, securing high professional standards and better working conditions. • We set and reinforce standards through guidance, Codes of Practice and Conduct, and accountability. Our competency framework ensures that only those who reach a required level of experience and expertise will be admitted as members. • We help with Professional Development via courses and conferences, sector and e-news, In Practice, a Mentoring Scheme and Green Jobs for Nature website. • Through Policy and Advocacy we represent expert interests, bringing science to policy, influencing and representing at a national level. • Who are our members? We have members at all levels, from student to Chartered Ecologist, and increasingly via non-degree routes
<p>Emily Stevenson, Aileen Mill, Peter Robertson, Emily Hickinbotham, Louise Mair, Nigel Willby, Olaf Booy, Kirsty Witts and Zarah Pattison</p>	<p style="text-align: center;">Synthesising 35 years of invasion science research</p> <ul style="list-style-type: none"> • We reviewed a corpus of ~10 000 research papers and used Topic Modelling to identify the major research themes and topics in the invasion science literature and to understand how these have changed over the last 35 years. • We specifically focus on how well research topics on invasive non-native species are connected to management and policy as previous studies have found a disconnect between the research generated and its policy and management applications. • We were particularly interested in how the prevalence of topics changed over time e.g. an increase in prevalence of articles focussed on risk assessments since the 1980/90s. • We discuss the generality or specificity of topics and how well topics were connected with each other. There was a distinct lack of articles focussed on socio-economic implications of invasive non-native species and specific habitats such as the arctic. Results showed a focus on specific taxonomic groups and a lack of interdisciplinary collaboration in areas of policy and management. • We found Policy showed little connectedness with other topics and was also a highly specific topic, therefore most likely being the only focus of an article. Perhaps something that as a community we need to improve on if we are to meet future global targets for invasive species management
<p>Hannah Tidbury</p>	<p style="text-align: center;">Improved evidence to inform marine invasive species monitoring</p> <ul style="list-style-type: none"> • Regular monitoring is required to detect invasive species early, mitigate their impacts, assess compliance with relevant legislation, and determine the effectiveness of management actions. • Currently, there is no bespoke monitoring for marine invasive species in UK waters. • A Defra funded Cefas R&D project aims to develop and implement methodologies to prioritise invasive species and high-risk sites, and improve the evidence base regarding the application of eDNA to invasive species monitoring. • This work will inform policy decisions around invasive species monitoring and marine monitoring more broadly.



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Posters

Posters will be available throughout the day in the main room for attendees to view. There is no formal poster session. Please do view the posters during our breaks and lunch.

First author	Title / Topic Area
Gareth Holland-Jones, WaREN	Wales Resilient Ecological Network's Protect Nature Now Charter & the Welsh Biosecurity Strategy
Steph Bradbeer, Yorkshire Water	INNS Mapper: an app and website for reporting sightings, surveys and management of INNS in GB
Katie Dey, University of Portsmouth	Potential impacts of the non-native Asian date mussel (<i>Arcuatula senhousia</i>) in the UK
Mandy Marsh, CIEEM	Chartered Institute of Ecology and Environmental Management
Yevhen Suprunenko, University of Cambridge	Estimating expansion of the range of oak processionary moth (<i>Thaumetopoea processionea</i>) in the UK from 2006 to 2019
	Analytical approximation for invasion and endemic thresholds, and the optimal control of epidemics in spatially explicit individual-based models
Aileen Mill, University of Newcastle	Adaptive management of the iconic invasive goat <i>Capra hircus</i> population of Llandudno
Oluwandunsin Adekola, Coventry University	Recording impacts of invasive species through citizen science: a pilot study
Katie O'Shaughnessy, APEM On behalf of Natural England	Audit, review and prioritisation for marine invasive non-native species biosecurity planning in England.