



# MASTS Annual Science Meeting 2014

3rd-5th September 2014 at Heriot Watt Conference Centre

**“MAKING WAVES”**

**Workshop: Marine Invasive Species: Prevention, Detection and Management Challenges**

**Times: 9.30am – 12.30pm**

**Location: Room Bruce A**

**Date: Friday 5th September 2014**

**Convenor: Professor Terence Dawson, School of the Environment, University of Dundee, Contact email: [t.p.dawson@dundee.ac.uk](mailto:t.p.dawson@dundee.ac.uk); mobile: 07876 114509**

## Speakers and Schedule

Time	Speaker	Title
9.30	<b>Terry Dawson</b> School of the Environment, University of Dundee ( <a href="mailto:t.p.dawson@dundee.ac.uk">t.p.dawson@dundee.ac.uk</a> )	Welcome and introduction to the workshop
9.45	<b>Inti Keith</b> Charles Darwin Foundation, Galapagos Island, Ecuador ( <a href="mailto:inti.keith@fcdarwin.org.ec">inti.keith@fcdarwin.org.ec</a> )	Improved management and analysis of Marine Invasive Species in the Galapagos Marine Reserve
10.00	<b>Sandy Murray</b> Epidemiology group leader, Aquaculture & Marine Environment, Marine Scotland Science ( <a href="mailto:Sandy.Murray@scotland.gsi.gov.uk">Sandy.Murray@scotland.gsi.gov.uk</a> )	Invasive pathogens and Scottish aquaculture: import risk reduction, detection, and control strategies
10.15	<b>Ken Collins</b> Ocean and Earth Science, University of Southampton ( <a href="mailto:kjc@noc.soton.ac.uk">kjc@noc.soton.ac.uk</a> )	Southampton based marine invasive studies
10.30	Coffee break	
11.00	<b>Rebecca Giesler</b> School of Geosciences, University of Edinburgh ( <a href="mailto:giesler.rebecca@gmail.com">giesler.rebecca@gmail.com</a> )	The Achilles' heel of marine biosecurity in the Isle of Man - The establishment and spread of the invasive Wireweed, <i>Sargassum muticum</i> .

<b>11.15</b>	<b>Robert Irving</b> Sea-Scope Marine Environmental Consultants, Devon, UK ( <a href="mailto:robert@sea-scope.co.uk">robert@sea-scope.co.uk</a> )	Remote islands and their marine provenance - the risks posed by unwanted introductions
<b>11.30</b>	<b>Sarah Brown</b> Scottish Natural Heritage and Project Manager, Firth of Clyde Forum ( <a href="mailto:Sarah.Brown@snh.gov.uk">Sarah.Brown@snh.gov.uk</a> )	Biosecurity Planning – Turning Guidance into Action
<b>11.45</b>	<b>Elizabeth Cook</b> Scottish Marine Institute, Oban ( <a href="mailto:Elizabeth.Cook@sams.ac.uk">Elizabeth.Cook@sams.ac.uk</a> )	Marine Pathways – Effectiveness of early warning monitoring techniques in detecting marine non-native species
<b>12.00</b>	<b>Rachel Shucksmith</b> NAFC Marine Centre, Port Arthur, Scalloway, Shetland ( <a href="mailto:rachel.shucksmith@uhi.ac.uk">rachel.shucksmith@uhi.ac.uk</a> )	A risk based approach to invasive non-native species management
<b>12.15</b>	<b>Concluding remarks</b>	
<b>12.30</b>	<b>Lunch break</b>	

## Abstracts

### **Sarah Brown: ‘Biosecurity Planning – Turning Guidance into Action’**

The Firth of Clyde Forum, in partnership with SNH and CCW recently published guidance on how to go about biosecurity planning in a marine context. The guidance was based on a review of relevant literature and included practical and pragmatic approaches that smaller recreational marine sites and events could make use of. The RYA Scotland adopted the guidance for the recent Commonwealth Games Flotilla, 250 boats from all over the UK and further afield sailing up the Clyde to celebrate the Games. Sarah Brown, Project Manager for the Clyde Forum, will give an overview of the guidance and RYAS’s experiences of using it in reality.

### **Ken Collins: ‘Southampton based marine invasive studies’ (Authors: K. Collins, J. Mallinson, A. Jensen, S. Deane, F. Ali, S. Mohd Yunus)**

Southampton Water and the Solent is probably the most “alien” marine environment in the UK, with an large international port and numerous marinas hosting boats which regularly cross the English Channel. The history of species which have been conveyed by both commercial and recreational boat traffic will be given. Over the past decades new species have arrived most years. Commercial aquaculture of the Pacific Oyster *Crassostrea gigas* in Poole Harbour has probably triggered natural settlement of the species in the harbour and Southampton Water. Deane’s PhD is studying the controls on this natural settlement here are which are far less extensive than on the Essex coast. Mohud Yunus’ PhD is concentrating on the ecosystem function of the new established *Ruditapes phillipinarum* in competition with the native *Venerupis* spp. Ali’s PhD, close to completion, has been studying the diet, ecological impact and control measures for the Caribbean lionfish.

### **Elizabeth Cook: ‘Marine Pathways – Effectiveness of early warning monitoring techniques in detecting marine non-native species’ (Authors: E.J. Cook, C.B. Beveridge, G. Twigg, A. Macleod, I. Macdonald (TBC), N. Milne (TBC))**

The early detection of marine invasive non-native species (INNS) is critical in increasing the likelihood of successful eradication prior to secondary spread. The GB-wide Marine Pathways programme is evaluating the effectiveness of various early warning monitoring techniques. In Scotland, a variety of techniques have been used to detect INNS including; rapid surveys, photography, scrapes and settlement panels on both

offshore (e.g., navigation buoys), nearshore (e.g., fish farms, SEPA monitoring buoys) and onshore (e.g., marinas, oyster farms). The efficacy of the various techniques will be discussed in relation to the recent proposal for a EU regulation on the prevention and management of the introduction and spread of invasive alien species (COM/2013/0620).

### **Rebecca Giesler: ‘The Achilles’ heel of marine biosecurity in the Isle of Man - The establishment and spread of the invasive Wireweed, *Sargassum muticum*’**

The Japanese Wireweed, *Sargassum muticum* (Yendo) Fensholt, was first detected in the Isle of Man in 2005. A survey in June 2013 of 35 intertidal sites found that *S. muticum* was widely distributed around the island. 19 sites supported intertidal *S. muticum* populations with 8 sites supporting sublittoral populations. Presence of *S. muticum* in the intertidal zone was significantly associated with presence of tide pools. Tide pool area was also significantly correlated with the length of primary laterals of *S. muticum* samples. It is probable that *S. muticum* was introduced via natural dispersal. Its rapid spread around the Isle of Man highlights the challenge posed to marine biosecurity by naturally dispersing invasive non-native species. With the exception of *S. muticum*, the Isle of Man has low numbers of marine non-native species relative to the rest of the UK and Ireland. The only vector for introductions to the Isle of Man is transport via commercial and recreational shipping. Combined with the presence of mainly freshwater harbours and marinas, this affords the Isle of Man a large degree of natural protection. Of the ten marine non-natives recorded on the island since 1905, five are capable of secondary introductions via natural dispersal. The unpreventable problem of naturally dispersing invasive non-native species means that the Isle of Man must focus on developing regular monitoring and rapid response protocols to achieve marine biosecurity.

### **Robert Irving: ‘Remote islands and their marine provenance - the risks posed by unwanted introductions’ (Authors: R. Irving, T. P. Dawson and H. Koldewey)**

Remote islands, such as those that constitute the Pitcairn Islands group in the South Pacific, are perhaps the last place you might expect to find non-native marine species. And you'd be right - as far as we can tell, on the Pitcairn Islands at least, there are next to none. The waters are regarded as being 'near-pristine'. But is their remoteness alone a sufficient basis to assume that no unwanted visitor will come calling? Does this mean we shouldn't be prepared for such eventualities? And how can we be? Is the native biota sufficiently robust to withstand an incursion of some foreign intruder? Or is it so fragile that it could be altered irreversibly? Many questions and very few answers...

### **Inti Keith: ‘Improved management and analysis of Marine Invasive Species in the Galapagos Marine Reserve’ (Authors: I. Keith, S. Banks, T. Dawson, K. Collins)**

The marine ecosystems of Galapagos harbour unique biological communities with a high incidence of endemic species. Galapagos is a UNESCO world heritage site, renowned for its high biodiversity and extraordinary oceanographic features that provide a great variety of habitats in a unique environmental setting. Marine biological invasions have increased due to global trade, transport and tourism. Invasions occur when species get transported from one region to another and establish themselves; these species compete for space, displace native species and change populations. Currently, the presence and impact of non-native species in the Galapagos marine environment are fortunately low, The Charles Darwin Foundation (CDF) supported by the UK government's Darwin Initiative, in close collaboration with the Galapagos National Park (GNP), the Ecuadorian Biosecurity Agency (ABG), the Ecuadorian Navy and their Oceanographic Centre (INOCAR) are working together to minimise the impact these species could have on the biodiversity of the Galapagos Marine Reserve (GMR), create risk assessment tools for the prevention, early detection and management of invasive marine species along with rapid response protocols for the GMR. The possible invasion of marine species to the GMR given the connectivity that exists with the Eastern Tropical Pacific (ETP), the increase in marine traffic, and possible climate changes is a reality that should not be ignored.

## **Sandy Murray: ‘Invasive pathogens and Scottish aquaculture: import risk reduction, detection, and control strategies’**

Scottish farmed fish and shellfish have good health status that is at risk from invasive pathogens. Marine Scotland Science (MSS) has considerable practical experience and theoretical knowledge that is used to prevent or control such invasive organisms. Imports of live host animals present high risks of introducing pathogens, with ova and equipment imports lower risk, other routes include ballast water or fishing gear. Pathogen’s ranges may expand with warming. MSS fish health inspectors (FHI) control risks using import risk analysis and inspection. Should introduction occur spread is restricted by rapidly imposing controls. This requires efficient surveillance using risk-based inspections by the FHI and diagnostic sampling by the MSS National Reference Laboratory. On detection, movement restrictions (site or area), depopulation (in extreme cases), and tracing of risk contacts may be carried out. Outbreaks of *Bonamia ostreae*, viral haemorrhagic septicaemia and infectious salmon anaemia have all been limited or eradicated. Pathogens such as *Gyrodactylus salaris* and oyster herpes virus have been excluded from Scotland to date. This has required the development of considerable experience in import risk assessment, risk-based surveillance and dispersal modelling.

## **Rachel Shucksmith: ‘A risk based approach to invasive non-native species management’ (Authors: R. Shucksmith, R. Shelmerdine, K. McIver)**

The Shetland Marine Spatial Plan (SMSP) is Scotland’s most advanced regional marine spatial plan. It was first initiated in 2006 as a voluntary plan, before statutory adoption in 2014. The SMSP establishes an overarching policy framework to guide development around the Shetland coast, ranging from aquaculture to marine renewables. Managing and reducing the spread of invasive non-native species (INNS) forms part of the SMSP, both through specific policies to which developers must adhere, and through the subsidiary document ‘the Shetland Biosecurity Plan’. The biosecurity plan has been developed through a risk based approach to invasive species management. Spatial data on the intensity and distribution of activities and developments have been used to identify potential risks for the movement and spread of INNS. This includes both the identification and scoring of vectors, and the presence of man-made structures which have potential to act as ‘stepping stones’ for the movement of invasive species. This information has been used to prioritise and develop targeted guidance to marine sectors to reduce the potential for the spread of INNS to Shetland. It has also been used to develop an INNS monitoring programme directed at areas of highest risk.