Advanced Mooring Systems (AMS) Workshop 2020
Workshop Report
30/01/2020

Jan Maclennan
NATURAL ENGLAND

LIFE Recreation ReMEDIES (LIFE18 NAT/UK/000039)
Reducing and Mitigating Erosion and Disturbance impacts affecting the Seabed.
Acknowledgements
This event was organised by Richard Hill at the Royal Yachting Association for the LIFE Recreation ReMEDIES project and hosted by the National Marine Aquarium

Contact
LifeRemedies@naturalengland.org.uk

Further information
Presentations from the workshop available here: https://www.rya.org.uk/knowledge-advice/planning-environment/Pages/efm-documentation.aspx
https://www.gov.uk/government/publications/life-recreation-remedies-project
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1. DEFINING THE NEED

Introduction to the Ocean Conservation Trust and the LIFE Recreation ReMEDIES project (Mark Parry, OCT and Roger Covey, NE)

- The LIFE Recreation ReMEDIES project (Reducing and Mitigating Erosion and Disturbance Impacts affecting the Seabed) runs from July 2019 - Oct 2023 and will improve the condition of five Special Areas of Conservation (SACs) between Essex and Isles of Scilly. The project focuses on four habitats of European importance with seagrass and maerl being key features.

- One aim is demonstrating large scale successful management techniques including use of Advanced Mooring Systems (AMS). Current budget for around 76 moorings to be installed – different designs and environmental conditions working closely with manufacturers and harbour authorities.

- The project is addressing two recommendations from the 2018 AMS workshop – securing legacy funding for long term trials and developing best practice guidance.

The need for advanced mooring systems in the protection of seagrass beds (Nigel Mortimer, South Devon Estuaries AONB)

- The ecological importance of seagrass and the scale of the habitat in the UK and internationally was outlined. The scours from mooring blocks are well illustrated e.g. from google earth and are cumulative – e.g. 35 traditional moorings can remove up to the total area of a football pitch due to scouring.

- Removing or floating the chain from a mooring has been shown to significantly reduce scouring (Salcombe mooring trials). Removing the concrete block doesn’t lead to a significant additional reduction in impact - consideration for promoting mooring adaptations and focussing on easy wins.

- Management options could include greater focus on use of pontoons rather than moorings in the future. In Salcombe estuary, designated swimming areas over shallow seagrass are being investigated as management tools which would remove impacts from anchoring.

Seagrass: Defining issues and trialling solutions in Wales (Laura Grant, Natural Resources Wales).

- A recent 2018/19 project has mapped the distribution and intensity of anchoring, mooring and launching in Wales over sensitive habitats to identify potentially vulnerable areas and management requirements.

- Laura also presented on behalf of Alison Palmer Hargrave on the Porthdinllaen Seagrass Project. The project has assessed the extent and health of seagrass and established the effect of existing moorings. Seagrass beds were highly fragmented amongst moorings. To address these impacts, excess moorings have been removed and trott moorings replaced with concrete block anchors as well as trials of helical screw
anchors in 2019. Options for adapting moorings in the outer harbour are being considered which includes 3 point systems, wrapping the chain and adding floatation devices to the riser. Next steps are to continue these trials.

2. Workshop notes: Defining the Impacts & Solutions

Are the impacts from traditional anchoring and moorings acknowledged and understood?

- Often it seems that the concept is acknowledged and it is accepted that activities can cause damage, however it is not an issue in their local area and that the seagrass is fine. A view persists that other activities are responsible for seagrass decline rather than boating. In general, mooring impacts are better understood than anchoring - anchoring is more difficult to quantify and is at a smaller individual scale although frequent.

- There is a lack of information about where seagrass is – stakeholders are just not aware of its presence e.g. Sailing schools in the Solent anchoring and trampling on seagrass didn’t know they were causing damage, harbour authorities may not be aware of seagrass in their area (is only a topic that ever comes up in communications with Natural England)

- There are misconceptions about the significance of damage – ‘seagrass grows back’. For example, in Studland Bay. There is a perception that anchoring can actually improve seagrass by a ploughing action. There is no evidence for this but it has been hard to refute.

Has the perceptions of ‘eco-moorings’ improved over the last year (since 2018 workshop) in your organisations?

- There is local interest e.g. with ongoing trials and TEVI workshops

- However, perceptions still exist that AMS are not as strong, boats are fine on traditional moorings so why bother, these systems are too expensive particularly compared to simple block and chain, they don’t work in tidal environments, insurance is impossible, boats move differently on AMS which would be an issue in a tight space alongside conventional moorings... There is some evidence to the contrary for most of these perceptions but this needs to be communicated and further trials will improve knowledge.

- The boating community need evidence as to why AMS are needed. Comparisons to traditional swing moorings (some existing moorings are better than others).

- It was felt that the term ‘Advanced Mooring System’ was an improved name especially for building acceptance amongst users. It highlights that these moorings are beneficial to boaters not just the environment. However, it is important to communicate the term ‘eco-mooring’ or similar internationally – the term needs to be spread across manufacturer and industry webpages.
• Potential charging for visitor buoys was discussed as alternative to anchoring (if on large scale costs would be lower) but others views were that there would not be the uptake and it would just encourage anchoring.

• Note: In trials there may be issues with more than one boat being attached to a mooring – bad publicity if they break even if you put signage on ensuring only one boat is moored.

**What additional projects, trials or management techniques are you aware of in the UK that are looking to address the impacts of anchoring and mooring on seagrass?**

- TEVI – different strand of EU funding to promote private sector growth into industry
- Potential swimming buoy trials in Plymouth
- Examples from abroad are also useful to review and improve evidence

**Recommendations**

*To improve information and evidence available for stakeholders:*

  o Produce a ‘question and answer/frequently asked questions’ document
  
  o Make information about sensitive habitats available on charts (leaflets or local maps are unlikely to be read but also note local boaters are unlikely to look at charts as know the area)
  
  o Local visual communications would help illustrate damage – potentially also more site specific evidence of impacts so that stakeholders can understand the relevance to their own area.
  
  o Positive framing of messages and engagement with the right audiences. Initial buy in from harbour authority and a few mooring owners can then promote to wider users – people are most greatly influenced by their own peers. Boat owners could also be engaged to report any environmental damage.
  
  o Engagement with charter companies would be useful to raise awareness as well as other areas of industry which already use these AMS to promote to the recreational sector e.g. ports.
  
  o Provide list of existing AMS that are in place (Note: this has been started on RYA Environmentally Friendly Mooring webpages but needs communicated). Improve information about AMS generally e.g. articles in boating magazines.
  
  o Videos of AMS proving capabilities and distribute these to improve perceptions
  
  o Further trials and deployment— promote trials that are already in place as well, including examples from abroad (e.g. helical screws withstanding hurricanes). Use owners/users to promote suitability of these AMS.
Management tools:

- Need to create generic outcomes that will satisfy the spread of mooring owners, harbour associations and boaters.
- Use polite voluntary signage on the water (e.g. don’t anchor past this line please).

3. ADDRESSING THE PROBLEM


- An overview of the Hazelett mooring system – the company has been manufacturing elastic mooring systems for 30 years in order to improve the performance of traditional moorings (by reducing peak loads on swing moorings) rather than from a conservation perspective.
- The elasticated mooring system allows an increase in mooring density (e.g. Vermont, USA) and is also designed to absorb energy from dynamic events such as wind gusts and waves.
- Each system is designed specifically for the environment and conditions that it will be used in taking into account a number of factors including vessel length and weight, depth, tidal variation, wind speed, wave height and current.

Seaflex systems (Robin Wilhelmsson, Seaflex AB)

http://www.seaflex.net/

- Seaflex systems were first designed in 1975 – now with over 1800 installations in 85 countries for a range of floating structures such as pontoons, buildings, marinas and solar panels as well as single point moorings.
- The Seaflex system is a reinforced elastomer (rubber) hawser custom made specific to the site and conditions – each system can have 1 seaflex unit or multiple units depending on the forces acting and conditions. Lengths are also custom to cope with variations in water levels.
- Seaflex system lessens peak loads, keeps installations stable and in position, provide greater lifespan than chain and require less inspections than traditional systems.

Some history and current thoughts on Helical Anchors (Richard Robinson, ABC Anchors)

- Helical screw anchors have been around for a very long time (e.g. Used on piers such as Margate) so the technology is not new.
The lifespan of helical screws in soil can be 100+ years – lifespan will increase with increase in the amount of metal used (but this will increase expense so needs to be balanced).

Specialist equipment has been developed to easily install these anchors underwater and has been used in a number of example AMS trials.

The Stirling Advanced Mooring System: A simple mooring modification reduces impacts on seagrass meadows (Anna Luff (GoBe Consultants), Mark Parry (OCT), Joshua Baker (OCT))

- Updates on the trials of the ‘Stirling’ mooring system in Cawsands and Salcombe which is a modified traditional mooring system with small floats attached to raise the chain off the seafloor.
- In Salcombe, the AMS design was monitored in comparison to a traditional swing mooring and after three years seagrass density surrounding the AMS was reported as twice as high than around the traditional mooring.
- 5 Stirling type moorings are also in place in Cawsand Bay, Plymouth. Surveys were carried out in 2019 to look at the differences in seagrass around the Stirling moorings compared to traditional swing moorings and reference areas with no moorings. Percentage cover, number of shoots and average leaf lengths were all greater at the Stirling moorings compared to the traditional swing mooring sites.

4. Workshop notes: Do systems address impacts & issues?

Do you have any concerns about how AMS might work in your area?

- There is still the need to determine how these systems might work intertidally and the potential impacts of the equipment lying on the substrate. Damage to boats due to systems protruding from the seafloor was also queried.
- Clear cost information needs to be provided for users and managers – based on typical scenarios of winds, tides, depth etc.
- Is the use of the helical screw anchor worth it in terms of environmental benefit as the reduction in impact to seagrass seems minimal when the installation cost and purchase is higher?
- Concerns about the Stirling mooring design that there would still be scour from the chain in the intertidal and whether there would be entanglement issues with the floats below the surface.
- The maintenance and installation requirements for each type of AMS mooring design is unclear.
- Cost benefit analysis – the cost of installing these AMS will decrease per mooring with increased number of replacements, what are the numbers involved?
Is it possible to increase mooring density by replacing with AMS?

There is concern about the ability to sell these AMS to users – particularly fishing communities.

Still concern about depths/tidal ranges of elastomer products.

Installing new AMS in anchoring areas could actually just encourage more anchoring as not enough AMS to meet demand.

There was also surprise from some that stakeholder responses to the concept of AMS are still that they are ‘untested’ which is not the case as demonstrated by Seaflex and Hazelett moorings which are in use in the 1000s around the world.

What modifications could be made to address any issues?

More research into suitability in the intertidal.

Potential modifications to Stirling mooring design to reduce entanglement issues.

Each specific site needs a bespoke mooring design – different solutions for different places even within the same bay or Special Area of Conservation. Local knowledge currently guides types of moorings that are installed and this knowledge is important to continue to use.

Pull tests used on AMS could be replicated on standard moorings for comparison to demonstrate. This may be needed, even though it is proven technology.

Engineering studies to compare function of different types of AMS and conventional moorings and assistance from engineers to communicate the technical aspects of these moorings to stakeholders.

What other types of AMS designs have you had experience of?

No responses were provided

5. ENGAGEMENT & SOLUTIONS

Do conservation moorings work to minimize impacts to seagrass in Massachusetts and should they be used as mitigation for permitted losses elsewhere? (Tay Evans, Commonwealth of Massachusetts, Div. marine Fisheries, USA)

Between 2014 and 2019, 301 moorings were installed across Massachusetts and were surveyed. These mooring types included Helix anchors, Hazelett, Eco-mooring and Stormsoft designs.

The project concluded that conservation moorings can reduce impacts to seagrass and seagrass does regrow. Where AMS failed to reduce impacts, this was due to poor design (flex rodes dragging, top chain
being too long), owners changing back to chain, detritus in depressions affecting regrowth or fundamental sediment changes due to long term scarring and poor maintenance (fouling and sinking, weathering).

- Determined that these mooring systems should be recommended for use as long as they are designed, monitored and maintained correctly – more work needs to be done to improve success. It is recommended that there is a high level of oversight by harbour masters to track AMS in order to improve collective understanding of success and longevity.

Poole Harbour seagrass recovery after removal of chain moorings and the MARINEFF Project (Dr Ken Collins, University of Southampton)

- Report of a series of studies 2009-2013 looking at impacts of chain moorings in Poole Harbour using google earth aerial images and side scan sonar indicating scar area reduction after removal of moorings.
- The Marineff project is also eco-designing new concrete blocks for mooring anchors which provide improved artificial habitats in comparison to traditional concrete blocks. This could be considered an option for trialling in conjunction with the AMS systems for the Remedies project [http://marineff-project.eu/en/marineff-project/action-plan/](http://marineff-project.eu/en/marineff-project/action-plan/)

6. Workshop 3: Transferring ideas and creating solutions

How do we engage with a wider audience e.g. business, research etc who may be able to support the development and trialling of AMS beyond the Remedies project area?

- Potential to use Countryfile/Springwatch to include piece on project development.
- Use articles in boating magazines (question and answer information).
- Engage with and gain confidence with harbour masters and mooring associations through existing groups, networks, meetings and conferences e.g. South West regional ports association.

How do we best transfer knowledge and learning on AMS beyond our current project areas in the UK?

- RYA connections with European Boating Association which provides a large audience.
- Liaison with British Overseas Territories – large ports and marinas in those locations.

Remedies has funding for at least two further annual AMS workshops – what would you like to see discussed/covered at future workshops?

- Real and clear progress report on mooring trials – evidence that knowledge has moved forward and videos of installations.
• More regulators involved and harbour authority attendees.
• Engineer expertise – comparison of different performance types and success.
• Organise events in liaison with UK Harbour Masters Association - timing with annual conferences.
• Hold in a different location and continue online attendance facility.

7. Key conclusions

1. Information about where seagrass is located, why it is important and communicating this in the right way to the right audiences is important e.g. on charts. A lack of awareness is still an issue.

2. There is still the perception that Advanced Mooring Systems don’t work in UK conditions, insurance is an issue and cost is prohibitive. Information gaps reduce confidence and uptake. Further trials will help improve experience but improved communication also continues to be required such as providing key facts and answers to frequently asked questions.

3. Future workshops need to report back on concrete trials and examples of success and include a wider range of delegates e.g. experience of harbour masters using these systems.

Annex 1: Feedback summary

29 attendees completed feedback forms at the event – and were asked to review the following aspects of the event. Average score for each question was 5 (with 1 being low and 6 being high) including prior
knowledge of AMS systems. Usefulness of background material and event handouts/posters scored slightly lower overall (4).

- Overall satisfaction with the event
- The benefit of hearing about LIFE recreation Remedies
- Relevance of event for current work
- Benefit of meeting colleagues/exchanging info
- I have made new contacts today
- Before attending the event my knowledge of AMS was
- My knowledge of AMS has improved as a result
- Quality of presentations and discussions
- Time devoted to interactive activities
- Usefulness of background activity
- Administration
- Pre event information
- Quality of venue

Attendees planned to use info from the event....

- Developing initiatives with local moorings operators/owners
- Public events, communication and awareness
- Delivery of Remedies project
- Continue with installation of AMS and conduct further trials
- Sharing AMS knowledge with partners and colleagues

How do you think the event could be improved....

- More harbour authorities/end users contributing and presenting and wider range of delegates general
- More breaks and opportunities for networking as well as more time for breakout/workshop sessions
- Demonstrations of actual mooring systems in the room
- Poster presentations for more detail on trials and improved technical system by system comparisons
• Improved sound and IT systems for online presentations

Generally feedback comments suggested the event was an informative, interesting and useful day.

Annex 2: Workshop delegate list

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<tr>
<th>Full Name</th>
<th>Organisation</th>
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<tr>
<td>George Graydon</td>
<td>ABC Anchors</td>
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<td>Richard Robinson</td>
<td>ABC Anchors</td>
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<td>Richard Allan</td>
<td>Cattewater Harbour Commissioners</td>
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<td>Tay Evans (via video link)</td>
<td>Commonwealth of Massachusetts</td>
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<td>Catherine Pinney</td>
<td>Cornwall Wildlife Trust</td>
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<td>Marta Curmi (via video link)</td>
<td>Environment &amp; Resources Authority, Malta</td>
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<td>Scott Susan</td>
<td>Fal and Helford Estuary Officer</td>
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<td>Claire Hoddinott</td>
<td>Fowey Harbour Commissioners</td>
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<td>Anna Luff</td>
<td>GoBe Consultants</td>
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<td>Tim Ferrero</td>
<td>Hampshire &amp; Isle of Wight Wildlife Trust</td>
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<td>Homer Hill (via video link)</td>
<td>Hazelett Marine</td>
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<td>Marcial Bardolet</td>
<td>Institut Balear de la Natura (IBANAT)</td>
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<td>Louise MacCallum</td>
<td>Langstone Harbour</td>
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<td>Clare Rugg</td>
<td>Living Coasts</td>
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<td>Mike Ward</td>
<td>Marina Projects</td>
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<td>Jules Agate</td>
<td>Marine Conservation Society</td>
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<td>Angus Jackson</td>
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<td>Jean-Luc Solandt</td>
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<td>Alisdair Naulls</td>
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<td>Eleanor Johnston (via video link)</td>
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<td>Katie Cross (via video link)</td>
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<td>Andrew Jones</td>
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<td>Emma Wright</td>
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<td>Roger Covey</td>
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<td>Carolyn Waddell</td>
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<td>Joshua Baker</td>
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<td>Fiona Crouch</td>
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<td>Kaja Curry</td>
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<td>Tanya Ferry</td>
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<td>Amanda Goodwin</td>
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<td>Martin Willis</td>
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<td>Ken Collins</td>
<td>University of Southampton</td>
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<td>Jennifer Mallinson</td>
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The LIFE Recreation ReMEDIES: Reducing and Mitigating Erosion and Disturbance Impacts affecting the Seabed project (LIFE18 NAT/UK000039) runs from July 2019 – October 2023 and will improve the condition of five SACs between Essex and Isles of Scilly. This will be achieved by restoration, demonstration and reducing recreational pressures. Promoting awareness, communications and inspiring better care of sensitive seabed habitats will be key.