Contribution ID: **72** Type: **Presentation**

Establishing a Data Culture using Data Frameworks to Navigate the Waves of Marine Data

Tuesday 14 October 2025 12:14 (11 minutes)

Advancing sustainable, high-quality, long-term data stewardship and management is fundamental to ensuring that marine data remains a valuable resource for research, policy, and environmental monitoring. This paper explores the practicalities of establishing organisational policies and methodological approaches that govern how operational and research data are collected, processed, stored, shared, and preserved for long-term sustainability. By engaging a multidisciplinary team of scientists, data managers, and IT specialists, the Marine Institute has demonstrated how structured frameworks evolve to meet the needs of diverse stakeholders while maintaining core principles of high-quality data stewardship; sharing the lessons learned along the way.

Since 2017, the Marine Institute has focused on implementing best practices, organisational strategies, and institutional frameworks that align with the FAIR principles. By adopting internationally recognised accreditation and certification processes - such as the Data Management Quality Management Framework (DM-QMF) (Leadbetter, Carr, et al., 2020) and the CoreTrustSeal Certification - the Institute has established a foundation for responsible data stewardship within a global digital ecosystem.

Good practices in data stewardship require a balance between technical standards and effective collaboration with data producers. The Marine Institute has developed structured workflows to facilitate seamless data deposition, ensuring that researchers and stakeholders can contribute data in a way that meets high-quality standards while also respecting ethical considerations and long-term usability. These practices have been integral to the Marine Spatial Planning (MSP) process in Ireland (Flynn et al., 2020, 2023), where multi-disciplinary and multi-stakeholder data are managed in a way that supports transparency, accessibility, and interoperability.

Long-term data stewardship is not only about maintaining technical infrastructure but also about fostering trust between data providers, users, and governing institutions. Certifications and frameworks provide a strong foundation, but successful implementation relies on the human element - ensuring that data producers are supported with clear guidelines, training, and incentives to deposit their data in a way that meets sustainability and accessibility goals. Expectation management, investment in capacity building, and continuous process improvement are key to advancing data stewardship at an institutional level.

Aligning marine data management with international best practices ensures that oceanographic and environmental data remain usable, interoperable, and impactful for global research efforts. The integration of FAIR principles supports data governance, transparency, and long-term preservation. Sustainable data stewardship also enhances collaborative research on pressing environmental challenges such as climate change, marine biodiversity conservation, and ocean resource management.

Marine data management requires a comprehensive approach that bridges scientific research, technological advancements, and policy frameworks. It involves rigorous processes for data validation, standardisation, and long-term curation, alongside the use of advanced sensing technologies, remote monitoring tools, and scalable data storage platforms. The Marine Institute's commitment to data frameworks and international certifications reflects its ongoing efforts to enhance trust, accessibility, and sustainability in marine data stewardship.

Ultimately, while structured frameworks set the foundation for best practices, it is the commitment to continuous improvement, stakeholder engagement, and investment in skilled personnel that elevates marine data management from a procedural necessity to a strategic advantage for long-term environmental and scientific impact.

Leadbetter, A., Carr, R., Flynn, S., Meaney, W., Moran, S., Bogan, Y., … & Thomas, R. (2019). Implementation of a Data Management Quality Management Framework at the Marine Institute, Ireland. Earth Science Informatics, 1-13. DOI: 10.1007/s12145-019-00432-w

Flynn, S., Meaney, W., Leadbetter, A., Fisher, J. P. & Nic Aonghusa, C. (2020). Lessons from a Marine Spatial

Planning data management process for Ireland, International Journal of Digital Earth, DOI: 10.1080/17538947.2020.1808720

Flynn, S., Tray, E., Woolley, T., Leadbetter, A., Nic Aonghusa, C., … Conway, A. (2023). Management of spatial data integrity including stakeholder feedback in Maritime Spatial Planning, Marine Policy, DOI: 10.1016/j.marpol.2023.105799

Primary authors: Mr CONWAY, Andrew (Marine Institute); Dr CURRIE, David (Marine Institute); Mr O'GRADY, Eoin (Marine Institute); Mrs FLYNN, Sarah (Marine Institute); Ms KEENA, Tara (Marine Institute)

Presenters: Mr CONWAY, Andrew (Marine Institute); Dr CURRIE, David (Marine Institute); Mr O'GRADY, Eoin (Marine Institute); Mrs FLYNN, Sarah (Marine Institute); Ms KEENA, Tara (Marine Institute)

Session Classification: Presentations Session 4: Data Stewardship

Track Classification: SciDataCon Persistent Themes: Data Stewardship