

Coastal Environments in the West of Ireland

Coastal Environments in the West of Ireland:

Sea, Land, and Spirit

Edited by

John B. Roney and Mark Beekey

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CHAPTER ONE

INTRODUCTION

JOHN B. RONEY

SACRED HEART UNIVERSITY

The concept of this book originated from a conference held in Dingle, County Kerry, Ireland, on June 5-8, 2017. The conference, entitled ‘Sea, Land, and Spirit: Coastal Environment in the West of Ireland’, offered a unique multi-disciplinary forum for scholars who have a primary interest in the coastal environment as a shared national treasure to come together to increase their understanding, and to offer ideas and best practices to sustain the coasts for future generations. The conference was hosted by Sacred Heart University on its extension campus in Dingle and was co-sponsored by University College Cork and the Institute of Technology Tralee (now Munster Technological University), as well as assistance from SHU’s partnership with the Dingle Oceanworld Aquarium/Mara Beo Teo. The purpose of a multi-disciplinary group was to respond to the fact that too often valuable research and work is done in specific fields of scholarship that are not necessarily noticed by academics in other fields. In many ways this gathering attempted to follow the guidelines of the original Royal Irish Academy, founded in 1785, which aimed to promote the sciences, literature, and antiquities with eleven members from scientific disciplines and ten from humanities.

The conference presentations explored both the natural sciences and the humanities to understand the connections between the natural environment, the built environment and the effect of human engineering, and the cultural heritage of communities along the west of Ireland. In this way attention was given to the distant and recent past relationship with the environment, as well as anticipating future changes. The conference invited participation from community leaders and practitioners to discuss their current projects and opportunities. Thus, participants were concerned with the more recent changes to the environment and the threats due to global climate change; the lack of adequate environmental protections in many

areas of the world; and the ways and means by which scholars, practitioners, and governments could together address these developments. One of the clarion calls at the conference was an address by Dr. Robert Devoy (UCC), “Coastal Systems as Jig-saw Puzzles: Projecting Future Coasts,” in which he outlined the threats of impending sea rise and the contemporary impacts of ‘storminess’. He cited several examples of vulnerable areas on the Kerry coast, namely Inch Beach and Ballyheigue, where low-lying areas and dunes have already seen major changes. In general, while much of Ireland is at low risk when it comes to sea rise, due to its ‘cliffed coasts’ and meso to macrotidal coastal regimes, there is much work to be done in terms of public education, research, and government action. In an earlier article, Devoy concluded that “a significant deficiency exists in the establishment of local- to national-scale studies of coastal management and functioning. Coastal research, of all types, is frequently directed more towards the generic questions involved in helping the understanding of coastal functioning and evolution and in the development of coastal management concepts.”¹ Thus the economic problem “has been an endemic lack of public resourcing of infrastructural development. Coastal defences and other infrastructure are often old, and less than 4% of the coastline is protected by shoreline defences. In many rural areas, structures now serving as defences were originally built as property or agricultural boundaries (e.g., walls and dikes). Existing structures frequently have their origin in the 19th century and have been modified subsequently on a piecemeal, needs-must.”²

This book is a reflection on the history and culture of communities and their interaction with the coastal environment. Knowledge of the sea and marine life and what it means to humanity are dependent on both scientific study and local knowledge. According to Camilla Brattland and Tero Mustonen, in their study of Atlantic Salmon Governance in Norway and Finland, “the principle of including traditional ecological knowledge (TEK) in the knowledge basis for environmental management is gaining increasing recognition.”³ An advanced cooperative program began in 1991 when eight Arctic countries signed the Arctic Environmental Protection Strategy (AEPS). This led to the 1996 Ottawa Declaration that established the Arctic Council to promote cooperation, coordination, and interaction

¹ Robert Devoy, “Coastal Vulnerability and the Implications of Sea-Level Rise for Ireland.” *Journal of Coastal Research*, 24, 2, (2008), 325.

² Devoy, “Coastal Vulnerability and the Implications of Sea-Level Rise for Ireland,” 333.

³ Camilla Brattland, Tero Mustonen, “How Traditional Knowledge Comes to Matter in Atlantic Salmon Governance in Norway and Finland,” *Arctic*, vol. 71, no. 4 (December 2018), 375. <https://doi.org/10.14430/arcti4751>.

among the Arctic states and Arctic Indigenous communities on issues concerning sustainable development and environmental protection. Closer to Ireland's shores, Magnus Course and Alastair Cole, in an article about "How Scottish Gaelic is helping protect Scotland's seas," have found that "nurturing the culture and language of these islands is as important as protecting wildlife to preserve a thriving marine environment for generations to come."⁴ 75% of the fishermen off the coast of the Outer Hebrides are Scottish Gaelic speakers, and much of the local knowledge about the best fishing habitats uses mainly Gaelic names for directions and locations. Course and Cole point out that the fishermen's culturally-embedded knowledge also promotes a centuries-old commitment to sustainability: "Certain grounds are left untouched during spawning season and undersized specimens and egg-bearing females are safely returned."⁵

Ireland's lack of public resources for marine research and protection has been a long-standing problem. Until 1922 Ireland was part of the United Kingdom of Great Britain and Ireland, however, Britain rarely gave the same attention to Ireland as England, Wales, and Scotland in terms of economic support and capital development. As early as 1819 Ireland commissioned a research vessel when the Inspectors of Irish Fisheries was first established. By 1830 the government disestablished the Inspectors and made them a branch of the Board of Inland Navigation, and the power to make byelaws regulating fishing were made by many who were not educated in the marine sciences. It was only in 1842, when the Inspectors of Irish Fisheries was re-started, that a new concern for marine research commenced. Noël Wilkins has made a very important distinction between the early 19th century Inspectors who had a focus on the social needs of local communities in contrast to a growing scientific interest in the 20th century:

That predominant ethos was a profoundly humane one: all three men [19th century Inspectors James Redmond Barry, Thomas Francis Brady, William Spotswood Green] were drawn more to the plight of the persistently impoverished, sometimes destitute, always socially neglected, part-time fishermen and fishing communities of the west and south coasts

⁴ Magnus Course and Alastair Cole, "How Scottish Gaelic is helping protect Scotland's seas," *Irish Sun*, Volume No. 0205, March 6, 2021.

<https://www.irishsun.com/news/268015334/how-scottish-gaelic-is-helping-protect-scotlands-seas>. For example, they have found that "An entire system of comharran - Gaelic navigational marks - surrounds the islands. Most are known only to the fishermen. An Creagan Breac refers to a fishing ground that can be found by lining up a large, pale rock on the mountainside of South Uist with the end of a promontory on which stands a church."

⁵ Course and Cole, "How Scottish Gaelic is helping protect Scotland's seas."

than to the more active, more prosperous commercial fishermen and communities of the east and north coasts.⁶

Attention to the growing need for a more robust scientific marine science came from outside government departments. William Andrews (1802–1880), a Member of the Royal Irish Academy and president of the Natural History Society of Dublin, was well-known for his early scientific studies in botany, and he turned his attention to the study of marine ichthyology. He became one of the earliest ‘scientists’ to study fish species and ocean conditions in Ireland. Andrews staked his claim on the ‘science of the day’. He underlined that “...the validity of any doctrine on these subjects reposes on facts in the natural history of the animal to which it refers, and that evidence given from a scientific knowledge of Ichthyology, combined with experience, through practical investigations of the subject, could alone be depended upon, the habits of fish being so little known to those in whose presumed facts they relied as the best authority.”⁷ Yet, in reality there was very little science of the day compared to the 20th century. The government did not see its role in providing scientific expertise, and all the Inspectors until 1880 had no scientific training. However, despite no formal training, Thomas Francis Brady, Inspector 1869–1891, was conscious of the need to apply scientific principles.⁸ Interest in marine science expanded with the International Fisheries Exhibition, a Victorian era scientific, cultural, and animal exhibition which opened in London in May 12, 1883, and ran until October 31, 1883. One of the keynote speakers was T. H. Huxley, who made his famous statement that fisheries are “inexhaustible.”⁹ Stacy Alaimo has concluded that “The conception of the

⁶ Noël P. Wilkins, *Species of Delusion? The Inspectors of Irish Fisheries 1819–2019* (Dublin: Institute for Public Administration, 2020), 5.

⁷ William Andrews, “On the cod and ling fisheries of Ireland.” Read before the Royal Dublin Society April 16th. 1861. Reprint from the *Royal Dublin Society Journal*, Dublin, 1861. In 1847 Andrews established the Royal Irish Fisheries Company in Dingle, and a royal charter was granted, however by 1853 it closed due to government restrictions on trawling.

⁸ Wilkins, *Species of Delusion? The Inspectors of Irish Fisheries 1819–2019*, 113, see also 93.

⁹ T. H. Huxley, Inaugural Address, Fisheries Exhibition, London (1883), 87: “I believe that it may be affirmed with confidence that, in relation to our present modes of fishing, a number of the most important sea fisheries, such as the cod fishery, the herring fishery, and the mackerel fishery, are inexhaustible.” Huxley File, Charles Blinderman and David Joyce, <https://mathcs.clarku.edu/huxley/SM5/fish.html>, accessed April 4, 2021. This merely repeated the conclusion of the 1863 Royal Commission. This belief continued into the 20th century.

ocean as inexhaustible, as an open space to be freely plundered, has long held sway. Even Rachel Carson believed, at least until 1950 when *The Sea around Us* was first published, that the immense seas were immune from anthropogenic harms. The fantasy of inexhaustibility continues to underwrite capitalist and neocolonialist exploits of areas conveniently considered outside the terrains of nation-state, law, or concern.”¹⁰ No doubt Huxley had experienced the immensity of the sea, yet with no inkling of what modern technology would do to exploit a certain number of desired species of fish, as well as a host of other fish caught as bycatch, that would bring them to the brink of extinction. It was not until 1974 that the North East Atlantic Fisheries Commission set standards for ‘Total Allowable Catches’ and quotas for Irish herring fisheries.¹¹

While these late nineteenth-century Ichthyologists made some important scientific discoveries, there was very little cooperation with local environmental knowledge, and very little British support for marine research. By the end of the nineteenth century, rapid population growth brought a more desperate search for new sources of protein, so more support was given for increasing fish catch, but little for serious research.¹² Some relief came with the passing of the Sea Fisheries (Ireland) Act in 1883, which funded the construction of new piers and harbours and regulated the Irish coastline, with some restrictions on off-shore foreign boats. The Royal Irish Academy sponsored a number of research expeditions in 1885 and 1886 under the leadership of Rev. William Spotswood Green aboard the *Lord Bandon* [renamed *Flying Falcon*, 1887] off the southwest coast. He became Inspector of Fisheries in 1890, and at this time Ireland began its first complete survey of fishing grounds from Kerry to Donegal, with the help of a 158 gross tonnage vessel, the *Fingal*.¹³ Additional support was given in 1891 when the Congested District Board (CDB) was established with the goal of relieving poverty in Connacht, Donegal, and Kerry.¹⁴ In 1891 the

¹⁰ Stacy Alaimo, “Adequate Imaginaries for the Anthropocene Seas,” in *Blue Legalities: The Life and Laws of the Sea*, edited by Irus Braverman, Elizabeth R. Johnson (Chapel Hill, NC: Duke UP, 2020), 311.

¹¹ See John Molloy, *The Herring Fisheries of Ireland (1900-2005): Biology, Research, Development and Assessment* (Rinville, Oranmore, Galway: Marine Institute, 2006), 5.

¹² John K. Walton, “Fish and Chips and the British Working Class, 1870-1930,” *Journal of Social History*, Vol. 23, No. 2 (Winter, 1989), 243-266.

¹³ See Tom McDermott, “Scientific Investigations at the Limnological Laboratory Hayes Channel, Portumna, 1921-1923, Part I,” *Sliabh Aughty* (2019), 21-27, for an excellent study of this early development.

¹⁴ See Ciara Breathnach, *The Congested Districts Board of Ireland, 1891-1923: Poverty and Development in the West of Ireland* (Dublin: Four Courts Press, 2005),

139 gross ton vessel *Harlequin* was purchased; W.S. Green became its captain. In 1897 the Royal Dublin Society proposed the establishment of a Marine Laboratory to undertake a five-year study of mackerel, salmon and sea trout on the west coast of Ireland, and they purchased the *Saturn*, 220-ton brigantine, and the *SS. Helga I*, a fast twin-screw 345-ton steamer, in 1900. This was followed in 1908 with the arrival of the first dedicated fishery research vessel, the *SS. Helga II*, renamed *L.E. Muirchú* after the founding of the Free State in 1922. In Wilken's evaluation, W. S. Green was a 'practising naturalist' or a 'professional scientist', whereas Ernest W. H. Holt became Ireland's first truly scientific advisor when he became an Inspector of Fisheries in 1901.¹⁵

When Ireland declared independence and formed the Ministry of Dáil Éireann (*Aireacht Dáil Éireann* 1919-1922) it created the Department of Fisheries in 1921, and later as the Irish Free State (Saorstát Éireann), Fisheries was given statutory basis by the Ministers and Secretaries Act 1924. However, the new Cumann na nGaedheal government inherited considerable debts and a contentious settlement after the Civil War; thus, funding for marine science was very limited.¹⁶ Moreover, the coming of the Great Depression and World War II diverted meager funding, and open sea travel and industry was increasingly dangerous. The government had very little to do with marine science and lacked a national science policy, despite the clarion call of J. D. Bernal in his book *The Social Function of Science* written in 1939, and later Patrick Lynch's critique in "Whither Science Policy" as late as 1979.¹⁷ The Irish Department of Education required no science education in schools. J. J. Lee found that "as late as 1962-3 only 30 per cent of boys and 14 per cent of girls took a science subject in the Leaving Certificate."¹⁸ In 1936, despite little government support, Arthur E. J. Went was appointed Assistant Inspector (first appointment since 1914) and in 1947 he became Inspector and Scientific Advisor; under his leadership the

and John B. Roney, "[Mis-]managing Fisheries on the West Coast of Ireland in the Nineteenth Century," *Humanities*, 8, 4 (2019), doi:10.3390/h8010004.

¹⁵ Wilkins, *Species of Delusion? The Inspectors of Irish Fisheries 1819–2019*, 136.

¹⁶ See Mícheál Ó Fathartaigh, "Cumann na nGaedheal, sea fishing and west Galway, 1923-32," *Irish Historical Studies*, vol.36, no.141 (May 2008), 72-90.

¹⁷ See John Desmond Bernal, *The Social Function of Science* (London: George Routledge & Sons, 1939); Dermot O' Doherty, "THE APPLIANCE OF SCIENCE: STI (science, technology & innovation) and economic development," *History Ireland*, Vol. 25, No. 1 (January–February 2017), 14-15. Patrick Lynch, "Whither Science Policy." Administration. Dublin: Institute of Public Administration. 27, 3 (Autumn 1979).

¹⁸ J. J. Lee, *Ireland 1912-1985: Politics and Society* (Cambridge: Cambridge UP, 1989), 131.

Inspectorate grew. However, the government in essence demoted Went and Irish fisheries management by giving this top position a lesser service rank and status, as well as income.¹⁹ Essentially, from 1922 to the 1950s the Irish government promoted inshore fisheries and neglected offshore and commercial fisheries, following a policy of isolationism when it came to cooperation with English and Scottish fishery scientists. Despite Ireland's isolationism, Went was a very active member of the International Council for the Exploration of the Sea, established in 1902, attending meetings and holding different offices until his retirement in 1975.²⁰

After WWII, the Organization for Economic Cooperation and Development, part of the Marshall Plan (1948-1951, then Mutual Security Act until 1961), recommended the establishment of a National Science Council in Ireland. In 1952 the Irish government passed the Sea Fisheries Act and established the Bord Iascaigh Mhara (BIM) to undertake the duties of regulation of the marine fishing and aquaculture industries. Brendan O'Kelly, the BIM's first chief executive, established the need for marine scientific research when he underlined that "no major expansion of the fishing industry could take place unless it was based on fuller fishery research".²¹ He also organized a study and implementation of new technology in vessels and equipment. Likewise, Albert Swan has been called the "Father of the modern Irish fishing industry."²² He was known for his innovative techniques in fishing and was the longest surviving member of the first board of BIM and chairman of the Killybegs Fishermen's Association. The Irish government passed the Marine Institute Act of 1991, creating the Marine Institute/ Foras na Mara to "undertake, to co-ordinate, to promote and to assist in marine research and development and to provide such services related to marine research and development, that in the opinion of the Institute will promote economic development and create employment and protect the marine environment."²³ Shortly after this

¹⁹ Wilkens, *Species of Delusion? The Inspectors of Irish Fisheries 1819–2019*, 207.

²⁰ The International Council for the Exploration of the Sea (ICES) was founded in Copenhagen, Denmark on July 22, 1902, by Denmark, Finland Germany, the Netherlands, Norway, Sweden, Russia, and Britain. See Wilkins, *Species of Delusion? The Inspectors of Irish Fisheries 1819–2019*, 209-210.

²¹ John de Courcy Ireland, *Ireland's Sea fisheries: A History* (Dublin: The Glendale Press, 1981), 128.

²² "Father of the modern Irish fishing industry," *Irish Times*, Sat, Feb 23, 2002, <https://www.irishtimes.com/news/father-of-the-modern-irish-fishing-industry-1.1051583>. Albert Swan founding director of Swan Net.

²³ Marine Institute Act, 1991, <http://www.irishstatutebook.ie/eli/1991/act/2/section/4/enacted/en/html>.

the Irish Environmental Protection Agency was founded (1993), with a responsibility for protecting and improving the environment as a valuable asset for the people of Ireland.

Ignorance of the coastal environment is no longer an option in the 21st century. Environmental change, which is leading to sea rise and a disruption of the migratory patterns of sea life, has become a global problem. An estimated 200 million people worldwide live along coastlines of less than 16 feet (5 metres) above sea level; for them the prediction of rising sea levels is a reality. By the end of the 21st century this figure is estimated to increase to 400 to 500 million people.²⁴ Thus, there are growing concerns for health, food security, clean and efficient energy, use of natural resources, and the security of individuals and communities. To date it has been hard to gauge the general public's awareness of the vulnerability of the environment, however, the government of the Republic of Ireland has begun to take on the task of education. Stephen Hynes, Danny Norton, and Rebecca Corless have found that "In recent times, the governance of the marine environment has also evolved from being primarily top down and state directed to being more participatory, inclusive and community based. Coupled with this fact is recent research that demonstrates how higher levels of citizen involvement in the management of the marine environment would greatly benefit the marine environment."²⁵ Still, the idea of sustainability is often bogged down with not only economic but with contentious political debates.²⁶

At stake in a shifting economy, loss of vibrant rural communities, and changing climatic conditions is the possible loss of cultural heritage. Catherine Kelly has noted that "'Heritage' emerged as a buzz-word in [Irish] government policy in the early 1990s and has since weathered many debates within government and society as to 'what it is and what it is not'."²⁷ Poul Holm, Professor of Environmental History, Trinity College Dublin, was a keynote speaker at the Sea, Land, and Spirit conference in Dingle,

²⁴ World Ocean Review, <https://worldoceanreview.com/en/wor-1/coasts/living-in-coastal-areas/>.

²⁵ Stephen Hynes, Danny Norton, Rebecca Corless "Investigating societal attitudes towards the marine environment of Ireland." *Marine Policy*, 47 (2014), 57. <http://dx.doi.org/10.1016/j.marpol.2014.02.002>.

²⁶ See *A Living Countryside? The Politics of Sustainable Development in Rural Ireland*, edited by John McDonagh, Tony Varley, Sally Shortall (London: Routledge, 2009).

²⁷ Catherine Kelly, "Tourism and Heritage," in *Understanding Contemporary Ireland*, edited by Brendan Bartley and Rob Kitchin (London: Pluto Press, 2007), 170.

where he offered an important talk focused on the importance of coastal cultural heritage. While natural forces and changes to the environment are strong, he underlined the fact that societies can mediate and cope with change when education and governmental action are taken seriously. Holm underlined how coastal cultural heritage is a legacy as well as a resource for shaping the future. He used the cooperative Wadden Sea project (PROWAD – Protect and Prosper: Sustainable Tourism in the Wadden Sea, 2011–2015), an initiative for the development of sustainable tourism aimed at the entire Wadden Sea area covering Denmark, Germany and the Netherlands, as an example of what could be done to improve the environment. The Wadden Sea project offers a concrete example of how it is possible to work with communities and industry to promote cultural heritage and sustainability. Holm and Ruth Brennan have been at the forefront in a call to involve the humanities as a “...vital part in global change scholarship and indeed politics. We believed that there was a need to bring out the best of humanities to identify tools and insights that might contribute to the greater good.”²⁸ Thus, there is a great need to combine scholarly studies and collaboration between the physical sciences and humanities: “Science measures and informs us of the scale of environmental change. Science will not, however, make us change direction. The global challenges of the 21st century are about human behaviours, preferences and motivations, individual and collective.”²⁹

The Portuguese Centre for Humanities (CHAM), directed by João Paulo Oliveira e Costa, has a well-developed statement about importance of the coastal environment:

Coastal seas and open oceans have always been a realm for epic adventures, for misfortunes and new discoveries, a place for the construction of stories and legends, and for the creation of myths and imaginary geographies. Home of different ecosystems and of plentiful resources, in the offshore waters of the world oceans and in the nearby shores of all continents, sources of food were found and exploited, new industries, cities and ports were established and developed, different ways of communication and transfer of people, products and knowledge were created and explored. Humans throughout time and geographies, by exploring the oceans and coastal regions, have produced new technical competences, new political and social strategies, new systems of exchange and circulation, new cultures and ways of living, and new worldviews.

²⁸ Poul Holm, Ruth Brennan, “Humanities for the Environment 2018 Report—Ways to Here, Ways Forward,” *Humanities*, 7, 3 (2018), 1. doi:10.3390/h7010003.

²⁹ Holm, Brennan, “Humanities for the Environment 2018 Report—Ways to Here, Ways Forward,” 2.

And by doing so, have created a panoply of historical, cultural and natural models that can nowadays be perceived and analysed in a multitude of perspectives. The presence of the sea in human societies and the use of sea by people have produced both tangible and intangible heritage, impacts and memories, that can help us understand the historical relation of people and the sea and shape its legacy for future generations.³⁰

It has become more and more important to protect the environment from pollution, over-use, and depletion of resources that will not sustain communities over time. A vital characteristic of human culture is story, whose foundation rests in collective memory; it is how those experiences are recorded that gives meaning and identity to communities. In the west of Ireland, the important elements of geography that affect culture are the extensive coastline with rugged cliffs, hills and some mountains, and in the south-west several prominent peninsulas extending out in the Atlantic, the westerly region of Europe. Beyond an ability to merely live with nature, there is a realization that a deep connectiveness between nature and humanity exists that has often been lost in the modern world. One of the leading problems is the loss of community-based management. In a recent book, *Transforming the Fisheries: Neoliberalism, Nature, and the Commons*, Patrick Bresnihan makes a solid argument that the problem of sustainable fishing is rooted in neoliberal belief in "... *homo economicus*, and the illiberal subject whose activities work against the common good..."³¹ Too often 'science' becomes divorced from the complex interplay of economic and biophysical agencies. He concludes that "In this new open-ended process of data collection, consensus-based decision making, and pragmatic policy making, scientists, fisheries managers, and fishermen are brought together to better coordinate and understand the interplay of biological and economic processes."³² A new model that can maintain cultural heritage and more sustainable fisheries, in contrast to an institutional approach, is a "communing" where resources and capacities are shared, with a recognition of care between humans and non-humans.

³⁰ Concept "Oceans and Shores: Heritage, People and Environments," CHAM, an inter-University research unit of the Faculdade de Ciências Sociais e Humanas, Universidade NOVA de Lisboa and of the Universidade dos Açores. https://www.chamconference.org/2017/CHAM2017_programme.pdf.

³¹ Patrick Bresnihan, *Transforming the Fisheries: Neoliberalism, Nature, and the Commons* (Lincoln and London: University of Nebraska Press, 2016), 49. Neoliberal approaches have too often led to the "tragedy of the commons." See Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990).

³² Bresnihan, *Transforming the Fisheries*, 53.

No doubt there are several challenges to understand nature and seek sustainability. Globally, oceans have undergone extensive changes because of human influence. As a result, we are forced to manage marine ecosystems relative to environmental baselines that have already shifted from their pristine states.³³ In many regions, human interaction with the marine environment originated hundreds, thousands, or even tens of thousands of years before record keeping began.³⁴ While our ability to monitor the marine environment has greatly improved through technological innovations such as submersibles and remotely-operated video technology, by the time these advances occurred many ecosystems had already been altered by human activities.³⁵ Thus, the temporal gaps in our knowledge created by the beginning of our influence on ocean life, and the advent of technology to truly assess impacts on ocean environments, are significant and create uncertainties about the extent to which humans have influenced changes in marine ecosystems, particularly as our activities have only expanded and intensified over the past several decades.

Historical data gaps contribute to shifting environmental baselines or cultural amnesia, described as social or institutional losses in memory.³⁶ These shifted baselines can ultimately lower ambitions for conservation if degraded states are accepted as natural.³⁷ Targets to rebuild or restore ecosystems or communities can only reflect what is known about previous ecosystems and/or species abundance. Thus, a lack of appreciation for how an ecosystem has changed can have major implications for conservation and

³³ P. K. Dayton, P. K. “Reversal of the burden of proof in fisheries management,” *Science*, 279 (1998), 821-822; J. B. C. Jackson, et al., “Historical overfishing and the recent collapse of coastal ecosystems,” *Science*, 293 (2001), 629-638; D. Pauly, “Anecdotes and the shifting baseline syndrome of fisheries,” *Trends Ecology & Evolution*, 10 (1995), 430; C. M. Roberts, *Ocean of Life: How Our Seas are Changing* (London: Penguin Books, 2012), 390.

³⁴ J. M. Pandolfi, et al., “Global trajectories of the long-term decline of coral reef ecosystems,” *Science*, 301 (2003), 955-958; T. C. Rick, J. M. Erlandson, *Human Impacts on Ancient Marine Ecosystems: a Global Perspective* (Oakland, CA: University of California Press, 2008), 336; C. M. Roberts, “Our shifting perspectives on the oceans,” *Oryx*, 37 (2003), 166-177.

³⁵ S. F. Thrush, P. K. Dayton, “Disturbance to marine benthic habitats by trawling and dredging: implications for marine biodiversity,” *Annual Review of Ecology, Evolution, and Systematics*, 33 (2002), 449-473; R. H. Thurstan, et al., “Origins of the bottom trawling controversy in the British Isles: 19th century witness testimonies reveal evidence of early fishery declines,” *Fish and Fisheries*, 15 (2014), 506-522.

³⁶ S. K. Papworth, et al., “Evidence for shifting baseline syndrome in conservation,” *Conservation Letters*, 2 (2009), 93-100.

³⁷ Pauly, “Anecdotes and the shifting baseline syndrome of fisheries.”

management. In recent years, marine historical ecology has emerged as an interdisciplinary enterprise to produce data that fills gaps in our knowledge of the levels of change and long-term dynamics exhibited by marine ecosystems. J. N. Kittinger describes this as “the study of past human-environmental interactions in coastal and marine ecosystems and the ecological and social outcomes associated with these interactions.”³⁸ This field of research spans multiple disciplines, including history, sociology, and ecology, to unravel temporal changes in marine ecosystems over time ranging from decades to tens of thousands of years.³⁹ Historical data sources have a number of unique features that are of value to contemporary conservation and management. Historical data can improve our understanding of past system dynamics, enabling us to determine whether contemporary systems are acting within the historical range of variability exhibited prior to large-scale human impacts.⁴⁰ Historical data, if detailed enough, may also provide information on the rate and trajectory of temporal change. Long-term data can also assist in unravelling the mechanisms driving these changes, and whether the major driving forces have altered over time.⁴¹ Such data may also allow us to identify if contemporary communities are ‘novel’; that is, they have not previously occurred in the historical record. One of the most exciting new projects to emerge is the “4-OCEANS Project: Assessing the Importance of Marine Life to Human Societies,” funded via a European Research Council Synergy Grant, under the leadership of Poul Holm and Francis Ludlow of Trinity College Dublin, James H Barrett, McDonald Institute for Archaeological Research, University of Cambridge,

³⁸ J. N. Kittinger, et al., “Managing human legacies in a changing sea.” In J. N. Kittinger, L. McClenachan, K. B. Gedan, L. K. Blight, Editors, *Marine Historical Ecology in Conservation: Applying the Past to Manage for the Future* (Oakland, CA: University of California Press, 2015), 1-11.

³⁹ See M. Coll, et al., “Assessing fishing and marine biodiversity changes using fishers' perceptions: the Spanish Mediterranean and Gulf of Cadiz case study,” *PLoS One* 9, 1 (2014), 856-70; J. Erlandson, et al., “Human impacts on ancient shellfish: a 10,000 year record from San Miguel Island, California,” *Journal of Archaeological Science*, 35 (2008), 2144-2152; H. K. Lotze, et al., “Depletion, degradation, and recovery potential of estuaries and coastal seas,” *Science*, 312 (2006), 1806-1809; J. M. Pandolfi, J. B. C. Jackson, “Ecological persistence interrupted in Caribbean coral reefs,” *Ecology Letters*, 9 (2006), 818-826.

⁴⁰ See P. Morgan, et al., “Historical range of variability: a useful tool for evaluating ecosystem change.” *International Journal for Sustainable Future for Human Security*, 2 (1994), 87-111.

⁴¹ See S. T. A. Pickett, “Space for time substitution as an alternative to long-term studies,” in G. E. Likens, ed., *Long-term Studies in Ecology: Approaches and Alternatives* (New York: Springer Verlag, 1989), 110-135.

and Cristina Brito, Deputy Director of CHAM – Centre for the Humanities, at NOVA University Lisbon. This project will bring together leaders with expertise in marine environmental history, climate history, natural history, geography, historical ecology, and zooarchaeology, nurturing a unique collaboration and integration of researchers from the humanities, natural sciences, and social sciences.⁴²

Historical data have been used to illustrate changes in species abundance, and commonly show that the magnitude of change over long timescales is greater than contemporary data sets suggest. One of the better-known examples of how historical data can readjust our perspective of the productivity of past environments is in the comparison of historical and contemporary cod (*Gadus morhua*) biomass on Canada's Scotian Shelf.⁴³ Contemporary analyses of cod biomass showed an increase from 1970 (the beginning of recent records), then a decrease from 1980 onwards. Alone, these data would suggest that targets for the rebuilding of cod stocks be set to the 1980s level, for which people have indeed argued. However, historical data on individual vessel catch and effort during the mid-19th century, when combined with population modelling, suggest that total cod biomass during the species' contemporary peak in the 1980s was just 4% of the historical levels of cod on the Scotian Shelf alone.

Although there is much potential for historical data to contribute to conservation data gaps, these data are not without their challenges. These include disparate sources or incomplete data, historical data collection methodologies that may be of questionable reliability or uncertain analytical robustness, or where data reporting is subject to unknown biases (issues that are not just confined to historical data sets). Yet if these challenges are addressed, the insights afforded by a greater understanding of historical conditions can alter how scientists and the public perceive the condition of our natural environment today, with implications for how conservation goals are set and prioritized.⁴⁴

⁴² See 4-OCEANS Project: Assessing the Importance of Marine Life to Human Societies.

<https://scitechdaily.com/4-oceans-project-assessing-the-importance-of-marine-life-to-human-societies/>.

⁴³ A. A. Rosenberg, et al., "The history of ocean resources: modelling cod biomass using historical records," *Frontiers in Ecology and the Environment*, 3 (2005), 84-90.

⁴⁴ T. Caro, et al., "Conservation in the Anthropocene," *Conservation Biology*, 26 (2012), 185-188; C. Kueffer, C. N. Kaiser-Bunbury, "Reconciling conflicting perspectives for biodiversity conservation in the Anthropocene," *Frontiers in Ecology and the Environment*, 12 (2014), 131-137.

Taking the seabed area into account, Ireland is actually one of the largest EU states with sovereign or exclusive rights over one of the largest sea to land ratios (over 10:1) of any EU Member State.⁴⁵ The waters around Ireland used to contain a very productive and biologically diverse marine ecosystem, including a large area of shallow continental shelf (<200 m), two important offshore banks (Porcupine and Rockall) and a large area of continental slope. Irish fisheries have expanded from their initial fishing grounds in nearshore waters several centuries ago, throughout the shelf in the last century, to the deep sea and oceanic waters in the last few decades. Within Irish waters, there is significant concern as to the impact of the continued increasing catch on the fish species that reside year-round in Irish waters or rely on Irish waters for reproductive purposes. Irish waters are critically important in the life cycle of many species. For example, the largest and most valuable migratory pelagic stocks in the Northeast Atlantic (mackerel, horse mackerel, and blue whiting) all spawn off the west coast of Ireland. Large stocks of hake, anglerfish, and megrim also spawn along the continental slope west and south of Ireland. There are important herring, cod, haddock, whiting, plaice and sole spawning areas in the Irish Sea and the Celtic Sea. The shelf area and coastal waters are important nursery areas for young fish. Shellfish stocks such as prawn, crab, lobster, shrimp, scallop, whelk and cockles are also abundant regionally or locally.

Decades of mismanagement and over-fishing by many states have left the seas around Ireland and Europe practically devoid of fish, with familiar dinner plate specials such as cod, sole and whiting practically extinct in Irish waters. In fact, up to 88% of Ireland's fish stocks are being fished unsustainably while 30% are 'outside safe biological limits'. It has been estimated that by 2050 all commercially exploitable fish species will have been over-fished, depriving us not only of nutritious protein but also destroying livelihoods, communities and, in the case of many coastal communities, their cultural heritage. However, this scenario is not inevitable; decisions that are made today can reverse the path to destruction and ensure a sustainable fishing resource for generations to come. To make management decisions that ensure sustainable fisheries, it is critical that we understand the historical abundance of species so that we can evaluate current trends within the context of historical baselines.⁴⁶

⁴⁵ See Fisheries Management 2020 map of Ireland.
<http://www.bim.ie/media/bim/content/downloads/BIM-fisheries-management-chart-2020.pdf>.

⁴⁶ The Common Fisheries Policy in Ireland.
https://ec.europa.eu/ireland/news/key-eu-policy-areas/fisheries_en.

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