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Author(s)	Long, Ronan
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A European Law Perspective: Science, Technology and New Challenges to Ocean Law

Ronán Long*

Introduction

Over the past number of years, I have worked on reviewing some of the law and policy considerations that are influencing the implementation of an ecosystem-based approach to the management of the various activities that take place in the European marine environment.¹ In light of this experience, it is with much gratitude that I thank Professor Scheiber for the opportunity to deliver a keynote at this prestigious conference here in Berkeley and to contribute to a volume of chapters written by truly distinguished jurists, legal academics, practitioners, scientists, policy professionals, historians, as well as many other experts, on the topic of science, technology and new challenges to ocean law. For reasons that I hope are self-evident, I have taken a European Union (EU) legal perspective on the subject matter of this chapter, and focus much of my discussion on some of the challenges and indeed the legal impediments on putting scientific advice and technology to good use in EU regulatory and policy processes, which is a multifaceted *milieu* at the best of times.

The subject of ecosystem-based management is certainly stimulating and in my view it is closely linked with the role of law as an instrument for regulating and managing human activities that impinge upon the marine environment. Moreover, our European project team has been greatly influenced by the groundbreaking research undertaken at Boalt Hall by Dr. Harry Scheiber, including his seminal article on ecosystem-based management, which was first published in the *Ecology Law Quarterly* in 1997.² Dare I say it, as many of you are aware, much of this scholarship was undertaken a decade before the EU or indeed European coastal States sought to apply the ecosystem-based management as one of the principal normative approaches to the many tasks undertaken in modern ocean governance. In so many ways, Harry is both a trailblazer and a pre-eminent academic scholar on numerous facets of international and public law. In Europe, we have benefited from his industry and his invaluable insights into how best to resolve some of the intractable problems associated with economic uses of the ocean. Therefore, I am doubly grateful for

* Jean Monnet Chair European Union Law and Personal Professor, School of Law, National University of Ireland Galway, Ireland.

¹ Further information is available at www.ODEMM.com. Also see, Ronán Long, "Legal Aspects of Ecosystem-Based Marine Management in Europe" in Aldo Chircop, Moira McConnell, Scott Coffen-Smout (ed.), *Ocean Yearbook*, Vol. 26, (Boston/Leiden: Brill Academic Publishers, 2012), 417-484.

² Harry N. Scheiber, "From Science to Law to Politics: An Historical View of the Ecosystem Idea and Its Effect on Resource Management," *Ecology Law Quarterly* 24 (1997), 631-761.

this opportunity to pay homage to a great professor who has informed much of our thinking on ecosystem-based management, as well as in several other specialist fields of inquiry pertaining to ocean law. Surely, there is no finer tribute to commemorate the memory of the illustrious Stefan Riesenfeld than the work undertaken by Harry and his colleagues in Berkeley, which continues to inform the laws and policies of Stefan's country of birth and early career before he moved to the United States.³

Some general remarks on the role of science and technology in ocean law

As is well documented in the specialist literature, the rights and duties set down in the United Nations Convention on the Law of the Sea (hereinafter, the 1982 Convention) are applied frequently if not continuously in a number of diverse fields of scientific inquiry and marine technology.⁴ Moreover, the universal right of enjoying the benefits of scientific progress is codified in several human rights instruments.⁵ Accordingly, perhaps it is pertinent to start by pointing out that in this era of globalization, many governments and international organizations are turning to science and technology to address worldwide problems, rather than by recourse to the more traditional methods of intervention.

What is unusual about this phenomenon is that they are not acting alone. For example, Simon Kuper writing in the *Financial Times*, has noted that technology companies are also influencing political and social problems as evidenced by the so-called Facebook and Twitter revolution in the Middle East, Google's private humanitarian mission to North Korea, as well as the noble endeavours made by the Gates Foundation to eradicate disease and poverty in developing countries.⁶ There is some support, therefore, for the view that recent trends in transnational relations seem to be increasingly linked with a new understanding of the role of science and technology in facilitating innovative solutions by private and public bodies to long-standing worldwide, regional and national problems.

This phenomenon is undeniably true at a European regional level, where the crucial role that science, technology and innovation play in competitiveness is no longer disputed, nor indeed does it lack a solid legal foundation.⁷ *Au contraire*, the European treaties

³ John Briscoe, Keynote address, "Stefan Riesenfeld," 12 October 2013.

⁴ Parts XIV and XV, United Nations Convention on the Law of the Sea, 10 December 1982, 1833 U.N.T.S. 397.

⁵ Articles 27(1), Universal Declaration of Human Rights; and Article 15(1) International Covenant of Economic, Social and Cultural Rights. See William Schabas, "Study of the right to enjoy the benefits of scientific and technological progress and its applications," in *Human Rights in Education, Science and Culture: Legal Developments and Challenges*, ed. Yvonne Donders and Vladimir Volodin (Paris: UNESCO, 2007), 273-308; Audrey Chapman, "Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications," *Journal of Human Rights* 8.1 (2009), 1-36.

⁶ See, Simon Kuper, "In tech we trust," *Financial Times*, 7-8 September 2013.

⁷ Ronán Long, "Regulating Marine Scientific Research in the European Union: It Takes More Than Two to Tango," in Myron Nordquist, John Norton Moore, Fred Soons, and Hak-So Kim (ed.), *The Law of the Sea Convention: U.S. Accession and Globalisation*, eds. Myron Nordquist, John Norton Moore, Fred Soons, and Hak-So Kim, (Leiden/Boston: Martinus Nijhoff Publishers, 2012), 427-491.

mandate expressly the advancement of science and technology as core objectives that lie at the very heart of European efforts to integrate the political and economic systems of the Member States.⁸ To this end, the EU is one of the biggest spenders on ocean science research programmes at a global level.⁹ What is more, over the past two decades, it has adopted many legal instruments and policies that are science-driven in substance and orientation in fields such as: energy, fisheries management, nature conservation, spatial management of the marine environment, maritime security, immigration, and climate change, to name but a few.¹⁰ The rationale for such an approach is multidimensional and underpinned by greater political awareness of the importance of maritime sectors to the future peace, growth and economic prosperity of the EU.

As will be seen further on below, this is only the beginning, and there are many new initiatives underway in Europe to improve the way that science and technology are applied to enhance the management of ocean resources, address new challenges concerning the protection of the marine environment, and deal with discrete areas of public law such as irregular migration and smuggling by sea. Yet, at the same time, the relationship between European law, science, and technology is undeniably complex and sometimes appears to be in a perpetual state of flux. As a result, opinion is often divided within the European institutions and in the Member States on how best to integrate scientific advice and technical developments into decisions and policies to control activities that take place at sea.

Most conspicuously, within this maelstrom, the Court of Justice of the European Union has sought to ensure that the law is observed and applied in accordance with the letter and tenor of the European Treaties.¹¹ In particular, the Court has held that decisions based upon scientific advice must uphold the axioms of excellence, transparency and independence.¹² Moreover, the European institutions themselves have been quick to use new technologies where warranted, such as for vessel monitoring and remote sensing purposes.¹³ In marked contrast, despite the undeniable significance of the evolving body of

⁸ Article 3(3) of the Treaty on European Union.

⁹ There was an expenditure of about € 1.4 billion between 2007-2010 on marine and maritime research related projects. The overall spending on research in the EU is nothing short of impressive. According to the European Commission, this figure amounts to close to one quarter of total world expenditure on research, resulting in one-third of all high impact publications and patent applications. Communication from the Commission, "Enhancing and focusing EU international cooperation in research and innovation: A strategic approach," COM (2012) 497 final, Brussels, 14 September 2012: 2; see also Commission Staff Working Document, SWD(2012) 258 final, Brussels, 14 September 2012, available at http://ec.europa.eu/research/iscp/pdf/staff_working_paper_com_2012_497.pdf.

¹⁰ See discussion *infra*.

¹¹ Article 19 of the Treaty on European Union.

¹² Case T-70/99, *Alpharma v Council* [2002] ECR II-3495, para. 183.

¹³ Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy, OJ L 112/1, 30.4.2011. See Ronán Long and Peter Curran, *Enforcing the Common Fisheries Policy* (Oxford: Blackwell Science, 2000), 314-326.

jurisprudence emanating from the European Court of Human Rights in cases with a maritime dimension,¹⁴ many countries appear to be less inclined to apply technology constructively in novel areas such as to monitor compliance with human rights obligations during the course of law enforcement operations at sea.¹⁵

Similarly, at the level of the European citizen, the role of science in public policy decision-making is often poorly understood, as typified by the recent controversy in Ireland concerning the development of large-scale offshore salmon farms in Galway Bay.¹⁶ This process is not helped by highbrow academic discourse by epistemic communities on subjects, such as the applicability of normative principles in dispute settlement, or the most appropriate interface between science and the law in a given case, or the primacy of the peer review process in benchmarking the merit of scientific research.

Conversely, European civil society and environmental organizations are concerned about practical matters that have scientific and technical facets, such as the activities of the Japanese whaling fleet in Antarctica,¹⁷ or the commercial exploration of the Arctic for hydrocarbons,¹⁸ or, indeed, the absence of appropriate international standards for offshore drilling at the Macondo Prospect, and the resulting calamity in the Gulf of Mexico.¹⁹ As is plain for all to see, these and similar incidents are placing new stresses on the traditional role of science and technology in ocean management and governance. Churchill and Lowe noted well over a decade ago, this trend is compounded by the "irresistible lure of profits and resources," which is compelling States and international bodies to adopt a range of

¹⁴ See the decisions of the European Court of Human Rights, *inter alia*: *Rigopolos v. Spain* (Application no. 37388/97) 12 January 1999; *Medvedyev v France* (Application no. 3394/03) 29 March 2010; *Xhavara and Others v. Italy and Albania* (Application no. 39473/98) 11 January 2001; *Hirsi Jamaa and Others v. Italy* [Application no. 27765/09] 23 February 2012. See also Douglas Guilfoyle, "Mevedyev and Others v. France, European Court of Human Rights," *International Journal of Marine and Coastal Law* 25 (2010), 437-442; by the same author, "The Laws of War and the Fight against Somali Piracy: Combatants or Criminals," *Melbourne Journal of International Law* 11 (2010), 141-153.

¹⁵ As noted by the European Union Agency for Fundamental Rights, "Fundamental rights at Europe's southern sea borders," Vienna, EUAFR (2013), 154.

¹⁶ See Martin Krkošek *et al.*, "Comment on Jackson *et al.* 'Impact of *Lepeophtheirus salmonis* infestations on migrating Atlantic salmon, *Salmo salar* L., smolts at eight locations in Ireland with an analysis of lice-induced marine mortality," *Journal of Fish Disease* (2013), available at <http://www.salmon.ie/files/2013/130821Krkosek-et-al-comment-on-Jackson-et-al-2013.pdf>. For press reports also see, *inter alia*: Fintan O'Toole, "If you can't win the scientific argument, suppress it," *Irish Times*, 16 September 2013; Derek Evans, "Salmon Watch Ireland Welcomes Reopening of File on Sea Lice Issue," *Irish Times*, 2 December 2013.

¹⁷ *Institute of Cetacean Research et al. v Sea Shepherd Conservation Society*, No. 12-35266 (9th Cir., 2013).

¹⁸ See ITLOS Order in the "Arctic Sunrise" case, *Kingdom of the Netherlands v. Russian Federation*, 22 November 2013.

¹⁹ See Ashley Roach, "International Standards for Offshore Drilling," in *The Regulation of Continental Shelf Development: Rethinking International Standards*, eds. Myron Nordquist, John Norton Moore, Aldo Chircop, Ronán Long (Leiden/Boston: Martinus Nijhoff, 2013), 105-152.

pragmatic legal solutions in regulating oceanic activities.²⁰

Structure and content

With some of the aforementioned remarks in mind, the aim of this chapter is to describe some of the features of EU ocean law, as well as the complex structures and procedures for the delivery of scientific and technical advice within the European institutions. This part is followed by a short assessment of the standards that apply to the use of such advice for EU regulatory and policy purposes in matters such as ecosystem-based management. Thereafter, three aspects of present-day legal developments with a scientific and technology dimension are outlined, namely: fisheries management under the European common fisheries policy; the tragedy of irregular migration by sea with a particular focus on the Mediterranean Sea; and some maritime aspects of the EU response to climate change.

The chapter concludes by identifying a number of contemporary trends in EU law and policy that suggest that the future of many marine related activities will be shaped by the results of scientific research, as well as the application of new technologies to the practical aspects of ocean management, with the ultimate goal of giving greater effect to the rule of law as it applies to the ocean.

EU perspective on new challenges: *Res ipsa loquitur*

As noted by James Kraska in this volume, the ancient and modern history of Europe are very much linked with the ocean.²¹ Down through the ages, European maritime powers have influenced the progressive development of the law of the sea including the major codification efforts in the 20th century.²² If we look back, history teaches us that the law applicable to maritime activities evolves continuously in light of scientific and technical knowledge, as well as with the changing relationships of human interactions with the sea.

Today, the EU is one of the world's largest trading blocks, and its 28 Member States derive important rights from this unique regional integration organization that impact upon maritime matters. The relationship between the EU and the Member States is intricate as a result of the transfer of legal competence from the Member States to the EU in several policy fields, some of which are science and technology dependent, such as in the management of fisheries and the protection of marine biodiversity. Importantly, however,

²⁰ Robin Churchill and Vaughan Lowe, *The Law of the Sea* (Manchester: Manchester University Press, 1999), 3.

²¹ James Kraska, "From the Age of Discovery to the Atomic Age: The Conflux of Marine Science, Seapower and Oceans Governance", Chapter XX of this volume.

²² See, *inter alia*: David J. Bederman, "The Sea," in *The Oxford Handbook of the History of International Law*, eds. Bardo Fassbender, Anne Peters, Simone Peter and Daniel Högger (Oxford University Press, 2012), 359-378; Myres McDougal & William Burke, *World Public Order of the Oceans* (New Haven: Yale University Press, 1958); Daniel O'Connell, *The International Law of the Sea* (Oxford: Clarendon Press, 1982); Ram Anand, *Origin and Development of the Law of the Sea* (The Hague: Martinus Nijhoff, 1983).

the EU can only act within the limits of the powers conferred on it by the Member States.²³ In many other areas such as maritime delineation and delimitation, the powers to conclude international agreements and to legislate remain with the Member States at a national level.²⁴

When viewed from a distance, there are several geographical, economic and political features of European integration that catch the eye because of the manner in which they shape the progressive development of ocean and coastal law at both the level of the EU and the Member States. Chief among these elements are demographic and spatial considerations that stem from the fact that over 200 million Europeans live in coastal cities and regions. Likewise, the economic importance of the maritime sector should not be underestimated, as it contributes close to half a trillion euros to Member State GDP annually.²⁵ As a global economic power, shipping is the lifeblood of the EU and fundamental to the future prosperity of Europe with over 75 percent of foreign trade by volume and close to 35 percent of internal trade going by sea.²⁶ As will be seen further on below, the European shipbuilding industry is seeking to rely on technology and innovation to remain competitive at a global level and to reduce its environmental footprint. Also, in this volume, Tara Davenport's chapter highlights the importance of submarine cables to global security, with 90 percent of all Internet traffic routed by means of seabed cables (optical fiber).²⁷ Similar concerns have been raised at a major European workshop, which highlighted the importance of seabed interconnectors and pipelines to Europe's long-term energy security needs.²⁸

There are several other technology-driven sectors that are influencing the progressive development of discrete areas of ocean law. Most notably, following the Fukushima disaster in Japan, several European countries, including Germany, Belgium, Spain and Sweden, have commenced the process of decommissioning their nuclear power plants. At the same time, over a dozen EU Member States are developing renewable energy to meet their international commitments to reduce greenhouse gas emissions.²⁹ As became

²³ Article 5(2) of the Treaty of European Union.

²⁴ Ronán Long, "Stepping over Maritime Boundaries to Apply New Normative Tools in EU Law and Policy," in *Maritime Border Diplomacy*, eds. Myron Nordquist and John Norton Moore (Boston/Leiden: Martinus Nijhoff Publishers, 2012), 213-264.

²⁵ In 2012, it was estimated at € 495 billion Gross Value Added. See para. 3 of the Declaration of the European Ministers responsible for the Integrated Maritime Policy and the European Commission, on a Marine and Maritime Agenda for growth and jobs adopted at Limassol during the Cyprus Presidency of the Council of the European Union.

Copy available at: http://ec.europa.eu/maritimeaffairs/policy/documents/limassol_en.pdf.

²⁶ See Communication from European Commission, Blue Growth opportunities for marine and maritime sustainable growth, COM(2012) 494 final, Brussels, 13 September 2012, at 1.

²⁷ Tara Davenport, "Science and Submarine Communications Cables: A New Frontier for Ocean Governance", at Chapter XX in this volume.

²⁸ See 2013 Aspen European Strategy Forum, 23-25 October 2013.

²⁹ Ronán Long, "Offshore wind energy and ecosystem-based management: Are the EU regulatory answers really blowing in the wind?" in M. Nordquist, J. Norton Moore, A. Chircop, R. Long, Ed., *The Regulation of*

evident during the course of my work on the European ODEMM project,³⁰ there is also a major shift in emphasis in EU law and policy towards ensuring the protection of marine ecosystem goods and services, most notably by relying on a number of scientific and legal mechanisms that are given effect by the Marine Strategy Framework Directive.³¹ Furthermore, the EU is committed to implementing ambitious programmes aimed at improving ocean observation, marine scientific research, and the mapping of the seabed, all by 2020.

The EU and its Member States cannot be viewed in isolation, as they are a pivotal part of the global community. As such, they face precisely the same threats to international peace and security as sister countries around the world. Some of the most pressing maritime challenges stem from illegal migration from Africa and the Middle East, as well as the crimes of piracy and armed robbery at sea. The latter continues to threaten seaborne trade between Europe, Asia and Africa. The International Maritime Organization (IMO) recorded the figure of 341 pirate attacks on shipping in 2012, with many vessels subject to incidents while on passage to and from Europe.³² The IMO estimates that there were 6,569 incidents of piracy and armed robbery against ships worldwide between 1984 and 2012.³³ The number of attacks in the Mediterranean Sea (six) and the North Atlantic (one) is not hugely significant but the high level of incidents in the Arabian Sea, East Africa, the Gulf of Guinea, the South China Sea, and the Straits of Malacca, continue to have a major bearing on the cost of insurance as well as other operational matters for European and global shipping.

There are many other maritime law enforcement problems, including the unabated nature of illegal, unreported, and unregulated fishing, which are destroying fisheries worldwide. The European Commission has identified illegal fishing, drug smuggling, and human trafficking at sea as priority law enforcement tasks.³⁴ Moreover, this is one of the chief reasons why the EU is establishing an electronic system to undertake integrated maritime surveillance, with the specific aim of improving law enforcement at sea through greater use of remote sensing technologies and the sharing of surveillance information at a pan-European level.³⁵

Continental Shelf Development: Rethinking International Standards (Leiden/Boston: Martinus Nijhoff, 2013), pp.15-52.

³⁰ *Op cit.*, *supra* note 1.

³¹ Ronán Long, "The EU Marine Strategy Framework Directive: A new European approach to the regulation of the marine environment, marine natural resources and marine ecological services," *Journal of Energy And Natural Resources Law* 29.1 (2011), 1-45.

³² Annual Report 2012 Acts of Piracy and Armed Robbery Against Shipping, IMO MSC.4/Circ.193, 2 April 2013.

³³ *Ibid.*

³⁴ See speech of the European Commissioner for Maritime Affairs and Fisheries, Damanaki, "Maritime Security: an EU approach," European Commission, Speech/13/289, 8 April 2013, available at: http://europa.eu/rapid/press-release_SPEECH-13-289_en.htm.

³⁵ See discussion on fisheries law enforcement *infra*.

In Europe, the pollution of the marine environment remains of primary concern, with the near collapse and destruction of marine ecosystems in the Black Sea and Baltic Sea, and the risk of similar catastrophe in the North Sea and Arctic Ocean.³⁶ Again, the overall scientific picture is pretty grim with the European Environment Agency (EEA) noting that a miniscule 8 percent of coastal habitats and 10 percent of marine habitats have achieved an appropriate conservation status in line with the targets set down by EU biodiversity instruments.³⁷

Many marine and coastal species and habitats are at serious risk of extinction unless appropriate management and conservation measures are implemented immediately.³⁸ If one paraphrases the findings of the EEA report on the quality and status of the European marine environment, the success of the regulatory framework is contingent upon four factors, namely: (1) enhanced implementation of existing conservation instruments; (2) greater policy coherence with the regulatory regimes governing other maritime sectors; (3) application of an ecosystem-based management approach to the task of ocean governance; and (4) engendering greater public appreciation of the intrinsic value of marine biodiversity to maintaining a healthy ocean.³⁹ The EEA observed that the EU has considerable difficulty in dealing with scientific uncertainty, reconciling competing values, and in using science and technology as tools in decision-making and policy implementation.⁴⁰ This is not helped by the cumbersome architecture within the European institutions for the delivery of scientific and technological advice to inform the policy and regulatory processes that are in place at a pan-European level to address matters of common concern to the Member States and to the EU more generally in a global context.

Institutional architecture for delivering scientific and technical advice

A fundamental objective of the EU's integrated maritime policy is to strengthen interdisciplinary and multidisciplinary approaches to scientific inquiry in support of the formulation and implementation of sector policies on the environment, shipping, energy, regional development, fisheries and climate change.⁴¹ In this regard, the European Commission perceives scientific research and technology as one of the keys to "decoupling the development of sea based activities from environmental degradation."⁴² One obvious shortcoming in EU law, however, stems from the considerable complexity that arises from the institutional architecture for the delivery of scientific and technological advice to the

³⁶ European Environment Agency, *The European environment — state and outlook 2010: marine and coastal environment*, (Copenhagen: EEA, 2010).

³⁷ *Ibid.*, at 12.

³⁸ *Ibid.*, at 14.

³⁹ *Ibid.*, at 5.

⁴⁰ *Ibid.*

⁴¹ COM(2007) 575 final. Brussels, 10 October 2007.

⁴² *Ibid.*, at 11.

services of the European institutions and the Member States for regulatory and policy purposes.

This particular topic merits a study in its own right. Suffice to note here that the principal EU institutions (the European Commission, the Council, and the European Parliament) depend upon advice from many specialist agencies and bodies such as the Joint Research Centre (discussed below), whose mission is to provide independent, evidence-based scientific and technical support throughout the whole policy cycle. Internally within the EU institutions, specialist scientific committees made-up of experts from the Member States deliver advisory support during the course of the law-making process. This work is very much complemented by the scientific reports and findings of many international bodies such as the International Council for the Exploration of the Sea [ICES], the United Nations Environment Programme, the Organization for Economic Cooperation and Development, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Intergovernmental Oceanographic Commission, as well as the International Organization for Standardisation, among many others.

The EU has formalized the working relationship with many of these external scientific bodies by concluding agreements on the delivery of scientific advice for policy development and implementation. A good example is the Memorandum of Understanding (MOU) that has been concluded with ICES pertaining to advice concerning the management of activities that affect marine ecosystems, as well as advice that relates to international agreements that are binding on the EU and the Member States such as the 1995 United Nations Fish Stocks Agreement.⁴³ Advice relating to fisheries and aquaculture, the Marine Strategy Framework Directive, the Arctic Ocean, and all sustainable uses of the North Atlantic Ocean, come within the scope of the MOU. The importance of the relationship between ICES and the European Union, and with other international bodies concerned with ocean affairs such as OSPAR, is very much intrinsic to the EU approach to modern ocean governance. The advice is usually in the form of recommendations for action (regulatory and otherwise), and is independently peer reviewed. In general, this system has served the EU well but suffers from a fatal flaw in that scientific recommendations are not legally binding on the European institutions or the Member States.

A number of specialist agencies with a scientific and technical remit were established under the Treaties and secondary legislation. Indeed, a cursory examination of the institutional landscape reveals that there is a proliferation of bodies (over thirty) spread-out across Europe, who as independent legal entities are tasked with providing scientific, technical, operational and regulatory advice to the European Institutions and the Member

⁴³ Agreement in the form of a Memorandum of Understanding between the European Union and the International Council for the Exploration of the Sea, available at www.ices.dk/community/advisory-process/Documents/2013_EC_ICES_MoU_WEB.pdf. The full title of the 1995 Fish Stocks Agreement is: Agreement for the implementation of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks, entered into force 11 December 2001, 2167 UNTS 88; (1995) 34 ILM 1542.

States. In particular, the Commission's in-house advisory service, the Joint Research Centre, which has 2,500 scientific and technical staff, provides advice to support the development of Union policies such as fisheries, environment and maritime safety and security. Similarly, the European Environmental Agency (EEA) plays an important role in collecting, evaluating and publishing information on the status of the marine environment. Into the bargain, there are several specialist agencies whose mandate is focused on specific aspects of maritime affairs and these include the European Fisheries Control Agency, the European Agency for the Management of Operational Cooperation at the External Borders, the European Maritime Safety Agency, and the European Network and Information Security Agency. Several non-governmental organizations, such as the European Marine Board, play an essential role by agreeing common positions on research priorities and outlining strategies for the future development of EU policies.⁴⁴

The national scientific agencies in the Member States, such as the French Research Institute for Exploitation of the Sea (IFREMER), have fostered a close working relationship with the European institutions. Moreover, similar to other national bodies, they provide experts for the many specialist scientific committees that serve the work of the European institutions in the law-making process on a day-to-day basis. Typical of these bodies is the Scientific, Technical and Economic Committee for Fisheries (STECF), which is an independent body made up of experts in the fields of marine biology, marine ecology, fisheries science, nature conservation, population dynamics, statistics, fishing gear technology, aquaculture, and the economics of fisheries and aquaculture.

They are consulted by the Commission at regular intervals on draft legislation concerning the conservation and management of living aquatic resources, including biological, economic, environmental, social and technical considerations. Members of STECF are appointed in their personal capacity and they must act independently of Member States and the interests of the various stakeholder groups for the various ocean regions. Across the European institutions, there are many similar specialist committees that provide advice on different aspects of Union law with respect to marine affairs and related policy themes.

Technology is critical to the work of such scientific groups and a pertinent example of inter-jurisdictional collaboration is the rolling-out of new electronic tools such as the Marine Observation and Data Network at a pan-European level.⁴⁵ The network is based upon the view that "each country's territorial or jurisdictional waters are part of a dynamic global system connected by shifting winds, seasonal currents and migrating species" and

⁴⁴ The European Marine Board also host a major marine science conference on an annual basis (referred to as EurOcean), where many contemporary ocean related problems are subject to detailed analysis and further discussion. For further information, see <http://www.eurocean.org>.

⁴⁵ See European Commission Staff Working Paper, *Building a European marine knowledge infrastructure: Roadmap for a European Marine Observation and Data Network*, SEC (2009) 499 final, Brussels, 7 April 2009.

therefore there is need for easy and quick access to numerous sources of scientific information.⁴⁶

At a multilateral level, European scientific experts have also been very active in the work programme of the United Nations including contributing to the formulation of the annual General Assembly resolution on oceans and the law, the open-ended Informal Consultative Process on Oceans and the Law of the Sea, meetings of the *Ad Hoc* Open-Ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction, as well the meetings of States Parties to the 1982 Convention. Recently, the EU has taken a lead in providing technical and scientific expertise as well as financial support to the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects. The first World Ocean Assessment, when it is published at the end of 2014, will provide a scientific baseline that informs EU and global policy decisions regarding the sustainable management of the marine environment and the resources it supports. This is a long over-due and welcome development that will help close the scientific information deficit about the environmental status of the world's oceans and the resources therein.

In summary, there is a multiplicity of bodies and expert groups engaged in the provision of scientific advice for a wide variety of purposes. In the main, regional cooperation on the provision of scientific advice is institutionalised within EU, inter-governmental and national organizations, for the purpose of discharging many of the tasks associated with the formulation and implementation of ocean law and policy, including obligations that arise on foot of the 1982 Convention and associated agreements. Similarly, the general trend is to use the good offices of specialist scientific bodies or committees, established on transnational basis, to undertake many of the functions associated with the delivery of advice and the application of new technologies in discrete EU policy areas that have a maritime dimension.

What standards apply to scientific advice in the EU?

From a legal perspective, this question does not appear to have any easy answers. Indeed, any tentative answer is very much contingent upon the field of policy or regulatory inquiry. In many instances, nonetheless, EU primary and secondary law sets down express requirements regarding the use of scientific information and new technologies for the purpose of providing policy advice and to assist the European institutions and the Member States in the formulation and implementation of the law in specific policy areas. Thus, for example, the Treaty is unequivocal in so far as it provides explicitly that the Union must take account of available scientific and technical data in preparing its policy on the

⁴⁶ *Ibid.*, at 9.

environment.⁴⁷ This obligation extends to taking account of the environmental conditions in the various regions of the Union, the potential benefits and costs of action or in-action, the economic and social development of the Union as a whole, as well as the balanced development of its regions.⁴⁸ Clearly, these are very broad requirements, which present their own challenges when it comes to implementing some of the EU environmental instruments such as the Marine Strategy Framework Directive.⁴⁹

Perhaps one noteworthy feature of the Treaty is that it requires nothing more than account to be taken of "available" scientific and technical data (emphasis added).⁵⁰ Following a literal interpretation of the Treaty provisions, one leading scholar has concluded that the European institutions do not, *strictu sensu*, have to commission their own scientific reports or studies or indeed establish that a particular management or legislative measure will be effective.⁵¹ Indeed, the application of the precautionary principle allows for the adoption of regulatory measures under EU policies such as climate change or fisheries management, where scientific evidence is considered to be "insufficient, inconclusive or uncertain", provided there are indications of potentially dangerous effects to health or the environment if the proposed action is not taken.⁵²

Metaphorically speaking, this aspect of EU law is a minefield and one has to thread softly across the legal landscape. Fortunately, much guidance may be derived from the jurisprudence of the Court of Justice, which has ruled on the application of scientific information in administrative and law-making practices and procedures.⁵³ Apart from imposing a duty of due diligence on the European institutions and the obligation to undertake an impartial examination of all aspects of the scientific evidence at hand, the Court demands that scientific advice must reflect international best practice and the empirical standards and methods commonly used by the pertinent scientific community.⁵⁴ For that reason, the requisite standard may be sector specific and vary according to the specialist field of scientific inquiry such as health, toxicology, biology, chemistry, fisheries science, and so forth. In line with best practice, information must be based upon the latest scientific information available and the obligation to obtain such information extends to all of the bodies or specialist committees involved in public policy decisions or in regulatory processes.⁵⁵ In light of the treaty obligations and for obvious reasons relating to human safety, particularly high standards are demanded as a matter of practice in EU policy areas

⁴⁷ Article 191(3) of the Treaty on the Functioning of the European Union (TFEU).

⁴⁸ *Ibid.*

⁴⁹ See discussion of the Marine Strategy Framework Directive, *infra*.

⁵⁰ Article 191(3) of the TFEU.

⁵¹ Ludwig Krämer, *EU Environmental Law 7ed.* (London: Sweet and Maxwell, 2011), 28.

⁵² See European Commission Communication on the precautionary principle, COM (2000) 1, Brussels, 2 February 2000.

⁵³ Much of the early case law on this aspect of Union law was developed in the context of the derogations to the fundamental freedoms of free movement of goods, persons and services under the Treaty.

⁵⁴ Case T-70/99, *Alpharma v Council* [2002] ECR II-3495.

⁵⁵ Case C-212/91, *Angelopharm GmbH v. Freie und. Hansestadt Hamburg* [1994] ECR I-171.

that impinge upon consumer protection and public health. The same cannot be said in relation to controversial policies such as the management of fisheries under EU law, which continues to be problematic as will be seen further on below.⁵⁶

Dealing with scientific uncertainty

In her chapter in this volume, Kathryn Mengerink makes brilliant reference to the "unknown unknowns." and to our limited scientific understanding of human impacts on the deep ocean.⁵⁷ We can see, however, some differences between the European and the United States approaches to ocean policy decisions when it comes to addressing the "known unknowns," and in responding to the challenges and conundrums presented by scientific uncertainty in decision-making under EU law and policy processes.

Specifically, the absence of definitive scientific evidence does not impede the EU from adopting legislative measures or indeed from making a policy intervention in order to protect the marine environment and the resources that it supports on the basis of the normative principles set down in the Treaty or EU secondary legislation. These principles include the precautionary principle, the principles that preventive action should be taken to prevent degradation of the environment, that environmental damage should be rectified at source, and that the polluter should pay.⁵⁸ These principles are canvassed elsewhere in the academic literature and it may therefore be appropriate to restrict the discussion here to a brief number of comments about their application in Europe.⁵⁹

First and foremost, the precautionary principle provides a legal basis for the adoption of a particular course of action or regulatory measure in the absence of definitive scientific evidence.⁶⁰ In contrast to its evolving status under international law,⁶¹ the precautionary principle is established and legally binding pursuant to the European treaties since the 1990s.⁶² As a result, secondary legislation pertaining to the marine environment tends to be permeated with references to the necessity of taking precautionary measures where warranted. Difficulties have arisen, however, because there are a number of different formulations of precaution, and the Court of Justice and the European Commission have both been active in enunciating a number of rules regarding its practical application as a

⁵⁶ See Part 1 *infra*.

⁵⁷ Kathryn Mengerink, "The Deep Ocean: Advancing Stewardship of the Earth's largest Living Space," at Chapter XXX in this volume.

⁵⁸ Article 191 (2) of the TFEU.

⁵⁹ For further information, see Ronán Long "Principles and normative trends in European Union ocean governance," in *The Limits of Maritime Jurisdiction*, eds. Clive Schofield, Seokwoo Lee, and Moon-Sang Kwon (Boston/Leiden: Brill/Nijhoff, 2014), 629-726.

⁶⁰ Case T-13/99 *Pfizer v European Commission* [2002] E.C.R. II-3305.

⁶¹ Caroline E. Foster, *Science and the Precautionary Principle in International Courts and Tribunals Expert Evidence, Burden of Proof and Finality* (Cambridge: Cambridge University Press, 2013), *passim*.

⁶² Joakim Zander, *The Application of the Precautionary Principle in Practice: Comparative Dimensions* (Cambridge: Cambridge University Press, 2010), 76-148.

legal principle. In the context of fisheries law, for example, the principle means that the absence of adequate scientific information or definitive scientific opinion should not justify the postponement or failure to take management measures.⁶³

Where there is scientific uncertainty, the precautionary principle is enabling in so far as the European institutions may adopt appropriate regulatory or policy measures without having to wait for definitive science regarding the potential risk of anthropogenic or human impacts. Crucially, they may adopt such measures to prevent "specific risks to public health, safety and the environment, by giving precedence to the protection of those interests over economic interests."⁶⁴

Markedly, the existence and application of the precautionary has been the subject of a hefty volume of case law in the Court of Justice concerning the protection of the environment, which includes addressing regulatory matters concerning human welfare and health.⁶⁵ More specifically, the Court has assessed the value of the principle as an interpretative tool in challenges to Union legislations and has held that if there is "uncertainty as to the existence or extent of risks to human health, the [European] institutions may take protective measures without having to wait until the reality and seriousness of those risks becomes fully apparent."⁶⁶ Moreover, the Court upheld the application of the principle in actions against national measures that impinged upon public safety.⁶⁷ Instructively and in marked contrast to the preferred approach of the United States, the European Court has reviewed the compatibility of EU climate change measures with precautionary principle and has ruled that legislation that completely fails to have regard to the principle may be annulled.⁶⁸

⁶³ Article 2 of the Basic Fisheries Management Regulation.

⁶⁴ Joined Cases T-74/00 and T-76/00 *Artegodañ a.o v Commission* [2002] ECR II-4945.

⁶⁵ Case C-331/88 *Fedesa and Others* [1990] ECR I-4023; Case C-405/92 *Mondiet* [1993] ECR I-6133; Case C-435/92 *APAS* [1994] ECR I-67; Case C-179/95 *Spain v Council* [1999] ECR I-6475; and Case C-6/99 *Greenpeace France and Others* [2000] ECR I-1651; Case T-199/96 *Bergaderm and Goupil v Commission* [1998] ECR II-2805, upheld on appeal by the Court of Justice in Case C-352/98 *P Bergaderm and Goupil v Commission* [2000] ECR I-5291; Case C-157/96 *The Queen v Ministry of Agriculture, Fisheries and Food, Commissioners of Customs & Excise, Ex p. National Farmers' Union, David Burnett and Sons Ltd, R. S. and E. Wright Ltd, Anglo Beef Processors Ltd, United Kingdom Genetics, Wyjac Calves Ltd, International Traders Ferry Ltd, MFP International Ltd, Interstate Truck Rental Ltd and Vian Exports Ltd.* [1998] E.C.R. I-02211; Case C-180/96 *United Kingdom of Great Britain and Northern Ireland v Commission of the European Communities* [1998] E.C.R. I-0226; *Pfizer Animal Health v Council, Pfizer Animal Health v Council*; Case T-70/99 *R Alparma v Council* [1999] ECR II-2027 and by the EFTA Court (Case E-3/00 *EFTA Surveillance Authority v Norway*, not yet published in the EFTA Court Reports); Case C-127/02 *Waddenvereniging and Vogelbeschermingsvereniging* [2004] ECR I-7405, paras. 43 and 44; Case C-6/04 *Commission v United Kingdom* [2005] ECR I-9017, para. 54; and Case C-418/04 *Commission v Ireland* [2007] ECR I-10947, para. 226; Case C-2/10 *Azienda Agro-Zootecnica Franchini sarl and Eolica di Altamura Srl v Regione Puglia.*

⁶⁶ Case C-180/96, *United Kingdom v. Commission* [1998] ECR I -2265; Case C-157/96, *National Farmers' Union and Others* [1998] ECR I-2211.

⁶⁷ Case C-473/98, *Kemikalieinspektionen and Toolex Alpha AB* (2000) ECR I-5681.

⁶⁸ Case C-341/95 *Bettai v Safety Hi-Tech SRL* [1998] ECR I-4435.

Putting the principle into practice poses an immense challenge to EU regulators and the supporting scientific bodies. In this regard, it is important to note that the European Commission has also elaborated considerable guidance on the meaning and the application of the precautionary principle and suggested that its invocation is contingent upon two factors; firstly, the identification of potentially dangerous effects of a phenomenon or process by scientific and objective evaluation; and secondly this evaluation does not allow the risk to be determined with sufficient certainty.⁶⁹ Moreover, according to the European Commission, legal and policy measures adopted to give effect to the principle should meet the following six criteria: (1) proportionate to the chosen level of protection; (2) non-discriminatory in their application; (3) consistent with similar measures already taken; (4) based on an examination of the potential benefits and costs of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis); (5) subject to review in the light of new scientific data; and (6) capable of assigning responsibility for producing the scientific evidence necessary for a more comprehensive risk assessment.⁷⁰

Is risk assessment a pre-requisite to the adoption of precautionary measures? Strictly speaking, the European treaties are silent on the need for risk assessment prior to invocation of the precautionary principle.⁷¹ Further guidance on the relationship between the principle and risk assessment, however, can be derived from the case law of the Court of Justice. Instructively, the Court has ruled that: "preventive measure cannot properly be based on a purely hypothetical approach to risk, founded on mere conjecture which has not been scientifically verified."⁷² On a similar note, the proper application of the precautionary principle presupposes "a comprehensive assessment of the risk to health based on the most reliable scientific data available and the most recent results of international research."⁷³ On this point, the Court is very clear that a vague reference to a general risk does not justify the adoption of preventative measures on the basis of precautionary principle.⁷⁴ In other words, an abstract or hypothetical risk does not trigger the adoption of precautionary measures in relation to the regulation or curtailment of offshore activities with a view to protecting the marine environment and their associated ecosystems.

We can thus conclude from the case law that in circumstances pertaining to the protection to human health, the application of the principle requires in the first instance, a determination of what level of risk are acceptable, and secondly, undertaking a scientific

⁶⁹ COM(2000) 1, 2 February 2000.

⁷⁰ Ibid.

⁷¹ See L. Ludwig Kramer, *EU Environmental Law* (London: Sweet and Maxwell, 7th ed., 2011), 22.

⁷² Case T-70/99 *Alpharma v. Council of the European Union* [2002] ECR II-3495.

⁷³ Case C-192/01 *Commission v. Kingdom of Denmark*, at para. 51.

⁷⁴ Case C-24/00 *Commission v. French Republic*: "the French Republic may decide at what level it wishes to ensure the protection of human life and health" at para. 68 even if "there is no argument based on mainstream toxicology" suggesting a risk at para. 67. Sufficiently specific: "it merely refers vaguely to the possibility of a general risk of excessive intake, without specifying the vitamins concerned, the extent to which limits would be exceeded or the risk raised thereby," at para. 61. See also Case C-420/01 *Commission v. Italy* [2003] ECR I-6445.

risk assessment.⁷⁵ This finding may be contrasted with the application of the precautionary principles under the EU common fisheries policy, discussed in Part below, which falls well short of the high standards that are demanded in other areas of EU law and policy.

Finally, it is worth mentioning that the role of the Court of Justice in determining expert or scientific opinion is highly contentious and a fertile field for academic commentary.⁷⁶ The role of the European Commission, which has considerable discretion on the appointment of scientific expertise for the myriad of specialist committees tasked with discharging important regulatory functions, has been questioned. In 2013, the European Ombudsman held that three principles should govern such appointments, namely: (1) excellence (2) independence and impartiality, and (3) transparency.⁷⁷

Part I – EU Fisheries Law

Disregarding scientific advice on the grounds of political expediency

The success of fisheries management in Europe is very much contingent upon the structures and procedures that are in place for the integration of scientific advice into policy decisions concerning sustainable fisheries. As such, the common fisheries policy illustrates the tempestuous relationship that can often exist at the interface between science and law in the decision-making and regulatory processes within the EU institutions. Regrettably, we can all too often see that the Member States frequently fail to move beyond short-term political and economic imperatives when faced with tough political decisions regarding fisheries management.

Any retrospective review of European institutional practice reveals that the blatant disregard of scientific advice is a common feature of the practice of the Member States when exercising their voting rights in the Council of Ministers on setting the catch-limits for fish stocks. In the words of the European Commission, this practice is eroding the "ecological and economic basis" of fisheries management in Europe and damaging the international reputation of the EU as a good environmental actor on the world stage.⁷⁸ To fully understand the catastrophic nature of this practice, attention needs to be drawn to some of the scientific findings published by the European Commission. In 2009, for instance, the Commission estimated that 88 percent of European fish stocks were being fished beyond maximum sustainable yield (MSY), and this figure included 30 percent of

⁷⁵ Case T-13/99 *Pfizer Animal Health v Council* [2002] ECR II-3305 at para. 149; Case T-70/99 *Alpharma v. Council of the European Union* [2002] ECR II-3495 at paras. 152-160.

⁷⁶ Ellen Vos, "The role of the European Court of Justice in the face of scientific uncertainty and complexity," in *Judicial Activism at the European Court of Justice*, eds. Bruno de Witte, Elise Muir, Mark Dawson (Cheltenham: Edward Elgar Publishing, 2013), 142-167.

⁷⁷ Decision of the European Ombudsman closing his inquiry into complaint 2558/2009/(TN)DK against the European Commission, 4 January 2013.

⁷⁸ COM(2009)163 final, Brussels, 22 April 2009, 7.

stocks that were then outside safe biological limits and facing imminent collapse.⁷⁹ Incredibly, 93 percent of the cod in the North Sea were fished before they could reproduce, and as a result, the biomass of this stock is unlikely to recover to a level that can support a sustainable fishery.⁸⁰

This shameful situation has been facilitated by policy decisions based on short-term political, economic and social considerations, at the expense of long-term environmental sustainability.⁸¹ According to the European Commission, this can be shown by two elements in the voting practice of the Member States in the Council of Ministers (the law-making body with the exclusive right to make decisions on the total allowable catch for over 130 fish stocks):

First, the average percentage deviation of Council Total Allowable Catch [TACs] decisions from scientific advice (for stocks with such advice), for the years 2003-2010, was 47 percent. Since 2008 this deviation has been reduced to 34 percent in 2010. Nevertheless, TACs are still set well above what scientists recommend.

Second, the number of stocks for which scientific advice was a zero TAC, and for which the Council adopted a positive TAC, was 17 on average for the period 2003-2010. It has been decreasing since 2007 (20) to 2010 (14) but still is high.

The common fisheries policy establishes the precautionary approach to ensure sustainable exploitation of stocks and to ensure that the impact of fishing on marine ecosystems is kept at a sustainable level. *De facto*, the principle could amount to giving environmental sustainability some degree of precedence. However, it has been rarely used in reality, and in most situations, the general trend has been to roll-over TAC levels.⁸²

This bleak situation is compounded by the absence of complete or definitive scientific advice on the status of many stocks that come within the scope of EU management measures. For instance, the OSPAR Commission has noted that as many as 56 stocks assessed by ICES out of a total of 130 commercial fish stocks in the OSPAR area, were designated as being of "unknown status" due to poor scientific data about their abundance during the reference period from 2003 to 2009.⁸³ Overall, the scientific picture of both the status and prospects for European fish stocks is exceedingly pessimistic and is one of the predominate reasons why the CFP underwent an extensive period of reform that

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ SEC (2011) 891, Brussels, 13 July 2011, 10-11.

⁸² Ibid.

⁸³ See Figure 8.5 Status of ICES assessed stocks (excluding those in the Baltic Sea) for the period 2003 to 2009 in the OSPAR Quality Status Report 2010 (London: OSPAR Commission, 2010).

culminated with the adoption of a new basic regulation for fisheries management by the Council and European Parliament in 2013.⁸⁴ The provisions in the new regulation on scientific advice and technology are scrutinized below, but first it is necessary to explore the discretionary nature of scientific advice in EU fisheries management decision and law-making procedures.

Can law trump science in EU fisheries management decisions?

Compliance and adherence with scientific evidence is frequently problematic in controversial policy areas such as fisheries. In some instances, these difficulties are compounded if the European institutions are vested with legislative discretion to adhere or reject scientific advice from advisory bodies such as the Scientific Technical and Economic Committee for Fisheries. Moreover, EU administrative law imposes a number of legal constraints on the oversight role of the Court in such instances. In judicial review proceedings, for example, challenging the European institutions' obligation to take scientific data or advice into account in making a decision or adopting legislation, the role of the Court is limited, *prima facie*: "to examining whether the measure in question is vitiated by a manifest error or misuse of powers, or whether the authority in question has manifestly exceeded the limits of its discretion."⁸⁵ In other words, in such proceedings, the Court is not concerned with the scientific merit or otherwise of the evidence underpinning a particular course of action or legislative measure. The heads of jurisdiction for review under the Treaty are clearly set down as follows: lack of competence, infringement of an essential procedural requirement, infringement of the Treaties or any rule of law relating to their application, or misuse of power.⁸⁶

Despite the prescriptive nature of these requirements, questions concerning adherence to scientific advice are nonetheless submitted to the Court from time to time. Typical of the issues that arise can be seen in a case that addressed the prohibition on driftnet fishing for tuna in the North-East Atlantic.⁸⁷ In this instance, the French applicant contended, amongst other matters, that the EU prohibition of driftnets of more than 2.5 kilometres long was not justified on scientific grounds. Accordingly, the Court had to decide if it was possible for the Council to ignore arbitrarily the only scientific advice available to it when it adopted the prohibition, namely: the report of the Standing Committee for Research and Statistics of the International Commission for the Conservation of Atlantic Tunas; and an IFREMER/IEO report, which stated that driftnet fishing did not pose a

⁸⁴ Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC, OJ L 354/22, 28.12.2013.

⁸⁵ Case C-331/88, *Fedesa* [1990] ECR I-4023, para. 8.

⁸⁶ Article 263(2) of the TFEU.

⁸⁷ Case C-405/92 *Mondiet v Armement Islais* [1993] ECR I-6133.

problem relating to tuna resources or to other species in the marine environment (including a by-catch of dolphins).

The Court pointed out that the scientific advice was advisory in nature and that:

...the measures for the conservation of fishery resources need not be completely consistent with the scientific advice and the absence of such advice or the fact that it is inconclusive cannot prevent the Council from adopting such measures as it deems necessary for achieving the objectives of the common fisheries policy.⁸⁸

The Court concluded that the Council had not exceeded the limits of its discretion, and that it was complying with a "widely held international opinion that the use of large-scale driftnets is an indiscriminate fishing method, which results in substantial by-catches that threaten the survival of species other than the target species."⁸⁹ The Court cited several international instruments that were both legally and non-legally binding to support this conclusion including the United Nations Resolution 44/225, the Wellington Convention, and the Berne Convention.

The driftnet case is indicative of the fine line that the Court must observe when adjudicating on the exercise of discretion by the European institutions concerning the use of scientific advice and information for the purpose of legislation and administrative decision-making regarding the use of natural resources and the protection of the marine environment. In general, the Court has shown an unwillingness to review the scientific basis of decision-making, as well as the methods used, or to substitute its assessment of the facts for that of the EU institutions. On the other hand, as seen above, it has upheld the application of the precautionary principle in instances where there is scientific uncertainty.⁹⁰ In other words, the conservation obligations that are set down in EU law and international agreements that are binding on the EU and the Member States are well capable of trumping the absence of definitive scientific evidence when it comes to regulating a particular fishing activity that is under the scope of the common fisheries policy.

Unhappy bedfellows: science and law in the EU policy process

European fisheries law is subject to a process of continuous consolidation and reform. Much like the incoming tide, this whole process tends to flood and ebb with political imperatives within the European institutions in general and the European Parliament in particular. This process can be seen if one takes a cursory look at the protracted

⁸⁸ Case C-331/88, para. 31.

⁸⁹ *Ibid.*, paras. 36 and 44.

⁹⁰ Case T-13/99 *Pfizer Animal Health v Council* [2002] ECR II-3305 at paras. 139-140. See Case C-180/96 *United Kingdom v Commission* [1998] ECR I-2265, para. 99, Case C-157/96 *National Farmers' Union and Others* [1998] ECR I-2211 at para. 63, and the judgment at first instance in Case T-199/96 *Bergaderm and Goupil v Commission* [1998] ECR II-2805, para. 66.

deliberations concerning the most recent reform process, which ran from 2011 to 2013. During this period, many issues were flagged regarding the application of science and technology to the numerous tasks undertaken under the rubric of fisheries management.

Regrettably, the new Basic Fisheries Management Regulation does not address the fundamental weaknesses in the regulatory framework regarding the use of scientific advice in decision-making. This shortfall heretofore has undermined the effectiveness of the policy.⁹¹ Despite this shortcoming, Part VI of the Basic Regulation has some positive features that provide a legal plinth for the delivery of scientific advice and the use of technology for the purpose of fishery management. In the legislative process, for instance, the European Commission is compelled to consult with the relevant scientific advisory bodies when preparing proposals for legislation.⁹² Interestingly, this approach includes advice on matters pertaining to the "management of living marine resources, including biological, economic, environmental, social and technical considerations."⁹³ Moreover, the use of best available scientific advice is set down as one of the principles of good governance in fisheries management.⁹⁴

In theory, EU fisheries management under the revised policy is to be based upon sound scientific advice and the application of the ecosystem and precautionary approach. The "ecosystem-based approach to fisheries management" is defined as:

...an integrated approach to managing fisheries within ecologically meaningful boundaries, which seeks to manage the use of natural resources, taking account of fishing and other human activities, while preserving both the biological wealth and the biological processes necessary to safeguard the composition, structure and functioning of the habitats of the ecosystem affected, by taking into account the knowledge and uncertainties regarding biotic, abiotic and human components of ecosystems.⁹⁵

Delivering this objective in practice may well be undermined by a serious if not fatal omission in the legislative provisions applicable to the European institutions, which do not set down any mandatory requirement on these bodies to heed or act upon the scientific advice that they receive from ICES, or indeed their own internal scientific committees such as the STECF. Indeed, a strict reading of the text of the Basic Regulation reveals that conservation measures are to be adopted "taking into account" available scientific,

⁹¹ Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC, OJ L 354/22, 28 December 2013.

⁹² Articles 6(2) and 26 of the Basic Regulation.

⁹³ *Ibid.*, Article 26.

⁹⁴ *Ibid.*, Article 3(c).

⁹⁵ *Ibid.*, Article 4(1)(9).

technical and economic advice.⁹⁶ In other words, the EU law-making institutions retain their political discretion to accept or reject scientific and technical data for the purpose of fishery management. *Plus ça change, plus c'est la même chose.*

We can see elements of discretion in the provisions on the use of the precautionary approach for the purpose of fishery management. The latter is defined by reference to the UN Fish Stocks Agreement as meaning: "an approach according to which the absence of adequate scientific information should not justify postponing or failing to take management measures to conserve target species, associated or dependent species and non-target species and their environment."⁹⁷ The precautionary approach is to be applied under the CFP with a view to ensuring that the exploitation of "living marine biological resources restores and maintains populations of harvested species above levels, which can produce MSY."⁹⁸ This requirement appears, however, to be somewhat diluted by some other substantive provisions in the text of the regulation. In order to restore and maintain fish stocks, for instance, MSY is to be achieved by 2015 *where possible* and at the latest by 2020 for all stocks.⁹⁹

The preamble of the Basic Regulation notes on a similar vein, "where scientific information is insufficient to determine the MSY, approximate parameters *may be considered* in order to achieve this target by 2020."¹⁰⁰ This provision accords with the targets set down by the World Summit on Sustainable Development at Johannesburg in 2002. Again, however, the discretionary nature of this obligation and the absence of legal certainty may well undermine the application of proxy standards in fisheries management. On the other hand, the regulation provides expressly that management plans for specific fisheries must be adopted on the basis of the precautionary approach when there is inadequate scientific data to determine MSY.¹⁰¹

There are many other positive features in the new regulatory scheme such as the legal obligation placed on the Member States to "collect data on fleets and their fishing activities, in particular biological data on catches, including discards, survey information on fish stocks and on the potential environmental impact of fishing activities on the marine ecosystem."¹⁰² The EU will support financially this aspect of the policy and this is good for the future of European fisheries science in states and agencies in times of economic recession in many of the member States such as Portugal, Spain and Italy.¹⁰³ The underlying principles governing the collection, management and use of scientific data are clearly stated to be focused on improving accuracy, transparency and accessibility.¹⁰⁴ Failure by a Member

⁹⁶ See, for example, *ibid.*, Articles 1(5), 4(1)((9), 6(2), 9(3)(b), 10(2)(a), 11(3), and 22(1).

⁹⁷ *Ibid.*, Article 4(8).

⁹⁸ *Ibid.*, Article 2(1).

⁹⁹ *Ibid.*, Article 2(2).

¹⁰⁰ *Ibid.*, Recital 7, Preamble.

¹⁰¹ *Ibid.*, Article 9(2).

¹⁰² *Ibid.*, Article 25(1).

¹⁰³ *Ibid.*, Recital 46.

¹⁰⁴ *Ibid.*, Article 25(2).

State to collect or to provide scientific data in a timely manner may result in the cancellation or suspension of financial assistance from the EU to that Member State.¹⁰⁵

One particular highlight of the new regulatory regime is the express prohibition on the wasteful industry practice of discarding unwanted catch back into the marine environment to avoid unwanted species or due to quota restrictions. In principle, under the new approach all captured fish will have to be retained on board and subsequently landed in port by fishing vessels. This long overdue change to the CFP is going to be implemented gradually taking into account the best available scientific advice.¹⁰⁶ Other innovative features include the use of impact assessments as appropriate in fisheries management, as well as the possibility of using *ex-post* evaluations of fishery management plans to take into account the inevitable changes in the scientific advice during the lifetime of such plans.¹⁰⁷ There is also scope for Member States to submit new scientific evidence to the European Commission in relation to the status of fishing stocks when they are seeking to adjust fishing opportunities.¹⁰⁸ Again, the standard of "best scientific advice" is expressly mentioned in relation to the adoption of management measures to reduce fishing effort.¹⁰⁹

One of the innovative features is the new Basic Regulation aims to foster enhanced cooperation between the fishing industry and the scientific community. Furthermore, it calls upon the EU to adopt a leadership role in the work of regional and international organizations and in the battle to address the scourge of illegal, unreported and unregulated fishing. The EU approach is to be informed by "best available science" and a similar standard is applied to the conclusion by the EU of external fisheries partnership agreements with third countries. The latter can only be concluded by the EU in future on the basis of access to the surplus of the resource in accordance with Article 62(2) and (3) of the 1982 Convention.¹¹⁰ In this context, the "surplus" is defined restrictively to mean that "part of the allowable catch which a coastal State does not harvest, resulting in an overall exploitation rate for individual stocks that remains below levels at which stocks are capable of restoring themselves and maintaining populations of harvested species above desired levels based on the best available scientific advice."¹¹¹ A similar approach is evident in relation to straddling or highly migratory fish stocks that are managed by Regional Fisheries Management Organizations (RFMOs). In such instances, EU access to fishery resources must be based on the best available scientific advice so as to ensure that fishery resources are managed sustainably.¹¹² The Union is also compelled to support the work of RFMOs in collecting data and preparing scientific advice for management decisions.¹¹³ Again, this is

¹⁰⁵ Ibid., Article 25(7).

¹⁰⁶ Ibid., Articles 14 and 15.

¹⁰⁷ Ibid., Article 10(3).

¹⁰⁸ Ibid., Article 16(3).

¹⁰⁹ Ibid., Article 22(1).

¹¹⁰ Ibid., Article 31(4).

¹¹¹ Ibid., Article 4(33).

¹¹² Ibid., Article 29(2).

¹¹³ Ibid., Article 29(4).

foursquare with the approach advanced by the 1995 United Nations Fish Stocks Agreement, as well as related instruments.

Closing the compliance deficit with technology

Technology has many applications in law enforcement and compliance systems underpinning the management of fisheries, most notably for monitoring and controlling the activities of vessels at sea and in port.

The European Union has pioneered the use of satellite-based vessel monitoring systems (VMS) and such equipment must be installed on all EU vessels over 12 meters in length, irrespective of their position or activity, both within and beyond sea areas under the sovereignty and jurisdiction of the Member States.¹¹⁴ Common specifications for the system have been adopted an EU level addressing matters such as: the responsibilities of the flag State, coastal State and port State; the technical characteristics of the devices (the blue box); the system architecture and information flows; details on the transmission of position data and other information; as well as the rules that apply in the case of a technical failure or the non-functioning of a device fitted on board a fishing vessel.¹¹⁵

In addition to the aforementioned requirements, all fishing vessels over 15 meters must also be fitted with automatic identification system (AIS) in line with the IMO specifications and standards pertaining to vessel safety.¹¹⁶ Significantly, where there are cost benefits, Member States must match the positions derived by remotely sensed images sent to earth by satellites or other equivalent systems with the data received by VMS or AIS.¹¹⁷ They also must transmit surveillance data to EU Agencies and other Member States for a broad range of purposes including "maritime safety and security, border control, protection of the marine environment and general law enforcement."¹¹⁸ There is also a legal basis in the regulation for the use electronic monitoring devices and traceability tools such as genetic analysis for the purpose of law enforcement.¹¹⁹ The majority of the administrative requirements associated with commercial-sea fisheries (fishing logbook, trans-shipment declarations, landing notification) can be undertaken electronically and this

¹¹⁴ Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, OJ L 343, 22 December 2009.

¹¹⁵ Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy, OJ L112/1, 30 April 2011.

¹¹⁶ Council Regulation (EC) No 1224/2009, Article 11. Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system, OJ L 208, 5.8.2002: 10. The IMO requirements are set down in Chapter V, Regulation 19, section 2.4.5 of the 1974 SOLAS Convention.

¹¹⁷ Council Regulation (EC) No 1224/2009, Article 11.

¹¹⁸ *Ibid.*, Article 12.

¹¹⁹ *Ibid.*, Article 13.

reduces the burden imposed on fishers, as well as on the law enforcement agencies on shore and at sea.

Information derived from VMS and other electronic sources has obvious probative value in criminal, administrative, and judicial review proceedings in the Member States, as well as in civil actions. In line with the separation of powers in civil and criminal matters, however, the EU has not adopted any rules on the use of VMS data as direct evidence in such proceedings. Accordingly, as a matter of practice, the rules on the admissibility of satellite or remote sensing evidence vary considerably in the Member States. Certainly, in common law jurisdictions such as the UK and Ireland, questions may be raised in criminal proceedings regarding the admissibility, authenticity and reliability of such evidence, as well as its collaborative value. That said, the law appears to be evolving pretty rapidly on the probity of evidence derived from information and communication technologies for fishery law enforcement purposes.

Instructively, there have been some notable successes regarding the use of technology and VMS evidence including the successful prosecution of two Spanish fishing companies in the UK in July 2012. In this particular instance, the vessel owners were fined £1.6 million for allowing two of their vessels to fish in Ireland and Scotland contrary to EU fish quota conservation and management measures.¹²⁰ The specific charges related to false entries in fisheries logbooks and failing to record trans-shipments of catch at sea. Elsewhere in the EU, the types of fishery cases in which VMS data has been tendered include: unlawful entry into a restricted area; failure to update a logbook; illegal fishing; tampering with VMS equipment; and the provision of false information.¹²¹

The successful prosecution of vessels through the use of technology by EU Member States is all the more significant because the FAO estimates that over 60 countries and 15 international organizations have established legally binding requirements regarding the use of VMS for fishery enforcement purposes.¹²² The experience in the EU regarding the use of such technologies has been quite progressive and sets an international benchmark in some respects. Compliance by the Member States with their obligations appears to be good with only one case in the Court of Justice concerning the failure by a Member State to implement the EU rules on VMS within the prescribed deadlines for the establishment of the system.¹²³ Previously, the European Court of Auditors reported, however, that Member States were

¹²⁰ ITV, "Spanish Fishing Firms Fined," 26 July 2012, <http://www.itv.com/news/westcountry/story/2012-07-26/spanish-fishing-firms-fined/>.

¹²¹ See B. O'Shea and S. Thompson, *The Innovative Application of Vessel Monitoring Systems for the Effective Fisheries Monitoring Control and Surveillance* (Copenhagen: ICES, 2006).

¹²² FAO, Fishing Vessel Monitoring Systems. VMS Worldwide programmes. VMS Programme Factsheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated . [Cited 22 October 2014]. <http://www.fao.org/fishery/topic/18072/en>

¹²³ Case C-22/04, *Commission V Greece* (Judgment of 14 April 2005, unpublished).

slow to establish systems to verify VMS data with other sources of electronic and paper information.¹²⁴

This oversight has now been addressed by the new Basic Regulation, which provides for the systematic and automated crosschecking of all sources of information, including data that can be used to address the problems associated with IUU fishing.¹²⁵ Furthermore, it mandates the Commission and the Member States to carry out pilot projects on new control technologies and systems for data management at a pan-European level.¹²⁶ There is a sting in the tail however in so far as it also provides for the imposition of the operational costs of the EU fishery enforcement system and data collection on the fishing industry.¹²⁷

Finally, it is clearly evident that we live in a digital world and much of the fishery enforcement information is used for many purposes and it is unsurprising to see the rolling-out of a "Common Information Sharing Environment" for the surveillance of all activities in the EU maritime domain. We shall return to this system in the next section as it has many uses in assisting various maritime law enforcement agencies in the Member States in dealing with some of the problems associated with irregular human migration across the Mediterranean Sea.

Part II - Addressing Irregular Migration by Sea

Tragedy of "boat people" entering the EU

The first and foremost use of the ocean is for trade, communication and navigation. Thus it is entirely foreseeable that "considerations of humanity must apply in the law of the sea, as they do in other areas of international law," as pointed out by the International Tribunal for the Law of the Sea in the *Saiga 2* case.¹²⁸ In reviewing the role of science, technology and modern challenges to ocean law, we should not therefore divorce the problems encountered in managing the natural environment from other contemporary challenges that have a human rights dimension. The significance of this dimension is reflected in the core values of the EU as set out in the foundation treaties, which are "respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities."¹²⁹ Indeed if we are to be true to the New Haven Approach to international law and policy-orientated legal study, then we must accept that law in general is a process of decision-making that pursues shared values, most

¹²⁴ European Court of Auditors Special Report No 7/2007, OJ C 317/1, 28.12.2007, available at <http://eca.europa.eu/portal/pls/portal/docs/1/673627.PDF>.

¹²⁵ Article 36 of the Basic Regulation.

¹²⁶ Article 38 of the Basic Regulation.

¹²⁷ *Ibid.*, Article 39.

¹²⁸ 38 International Legal Materials 38 (1999), 1355, para. 151.

¹²⁹ Article 2 of the TEU.

notably human dignity, in a free society.¹³⁰

The EU has struggled in the battle to uphold the fundamental rights of non-EU citizens and in addressing public order matters relating to the ocean. In some instances, the genesis of these difficulties may be traced back to the provisions in the European treaties that establish a single market as an area without internal frontiers and thereby guaranteeing the free movement of persons, goods and services between Member States.¹³¹ These free movement provisions do not apply to third-country nationals entering Europe who do not satisfy the rigorous visa requirements. As a direct consequence of these restrictions, one of the most pressing law-enforcement problems facing the EU stems from the extensive maritime borders of the 23 coastal Member States, which are intrinsically difficult to patrol and police with a view to controlling the flows of people that are migrating to the EU from Africa and the Middle East. This challenge is particularly the case in relation to Italy, which has a coastline of 5,000 kilometers in length, and remains the destination of choice for many of those attempting to enter Europe by clandestine means.

In this discussion, considerable care needs to be taken with the term "migrant," which describes persons arriving by sea in an irregular manner, who are in need of legal protection of their fundamental rights under European and international law.¹³² *Strictu sensu*, under EU law on immigration, borders and asylum,¹³³ such persons are third-country nationals who do not meet the conditions for entry, presence or residence in the territory of one of the Member States. Apart from a limited number of circumstances that are prescribed by law, the policy in the EU and in all of the Member States is to return such persons to their country of origin. There is nothing unusual in this approach in so far as it is no different from the approach taken by the majority if not by all developed States worldwide.

EU policy on returning migrants to their countries of origin has not, however, deterred many from attempting to cross the Mediterranean Sea and the Atlantic Ocean. The tragic nature of this practice was brought home to many Europeans with the loss of several hundred Somali and Eritrean migrants near the remote Italian island of Lampedusa in 2013. In one such incident, press reports indicated that their vessels sank within sight of the shore after migrants set fire to a blanket to attract the attention of local fishermen.¹³⁴ In another instance, a group of Eritreans perished when ordered by an unscrupulous captain to

¹³⁰ See, *inter alia*: Myres S. McDougal, "Law as a Process of Decision: A Policy-Oriented Approach to Legal Study," Faculty Scholarship Series Paper 2464 (1956); Harold Lasswell and Myres McDougal, *Jurisprudence for a Free Society: Studies in Law, Science and Policy* (1992); Harold Lasswell, Myres McDougal, and Michael Reisman, "Theories About International Law: prologue to a configurative jurisprudence," *Virginia Journal of International Law* 8 (1968), 168; and M. Reisman, S. Wiessner and A. Willard, "The New Haven School: A Brief Introduction," *Yale Journal of International Law* 32 (2007), 575.

¹³¹ Articles 26-196, Part III of the TFEU.

¹³² These persons must be distinguished from migrant persons that have the nationality of a member State of the EU and have legally binding rights under the European treaties.

¹³³ Articles 77-80 of the TFEU.

¹³⁴ *Financial Times*, 5 October 2013.

swim ashore to the Sicilian coast after paying \$1,500 per person to a gang engaged in smuggling across the Mediterranean Sea.¹³⁵

These are not isolated events, as human trafficking has escalated over the past decade with large numbers of migrants taking to the ocean in unseaworthy craft in Africa and the Middle East and seeking to enter the EU. The reasons for this tide of human tragedy are many, with some migrants fleeing war, persecution, religious and ethnic discrimination, political repression, famine and poverty.¹³⁶ Women and children are often trafficked for exploitation, and many others travel voluntarily. The majority of migrants are seeking a better future for themselves and their families in Italy, Germany, France and the United Kingdom.¹³⁷

Although the precise numbers of migrants attempting to enter the EU illegally by sea is unknown, the figures appear to have reached a new high with the overthrow of the Gadhafi regime in Libya and as a result of the Jasmine Revolution in Tunisia. In 2011, for example, the United Nations High Commissioner for Refugees (UNHCR) estimated that 70,000 migrants sought to cross the Mediterranean Sea with disastrous consequences for many, including 1,500 people who perished at sea prior to reaching Europe.¹³⁸ Many of the migrants are from sub-Saharan Africa.¹³⁹ The task of the Italian Coast Guard has progressively become more difficult with the conflict in Syria.¹⁴⁰ Over a ten-year period, the European Agency for Fundamental Rights has reported that the number of people missing and dead in the Sicily Channel has risen exponentially, as is evident from the figures shown in Table 1 below. Similar tragic incidents have occurred in West Africa and the Adriatic Sea but have not attracted the same media attention or publicity. The International Organization for Migration estimates that over 20,000 people have lost their lives at sea over the past two decades while attempting to enter the EU illegally.¹⁴¹

¹³⁵ Ibid.

¹³⁶ International Organization Migration Publications, International Migration Law No. 25, *Glossary on Migration* (Geneva: IOM, 2d ed., 2011).

¹³⁷ European Agency for Fundamental Rights, *Fundamental rights at Europe's southern sea borders* (Vienna: EUIADR, 2013).

¹³⁸ UNHCR, *A year of crises: UNHCR Global trends 2011* (Geneva: UNHCR, 2012). UNHCR, "More than 1,500 drown or go missing trying to cross the Mediterranean in 2011," 31 January 2012, <http://www.unhcr.org/4f2803949.html>

¹³⁹ For an overview of the figures, see European Agency for Fundamental Rights, *Summary Report, Fundamental rights at Europe's southern sea borders* (2013), available at http://fra.europa.eu/sites/default/files/summary-fundamental-rights-southern-sea-borders_en.pdf.

¹⁴⁰ Ibid.

¹⁴¹ International Organization for Migration, *International Migration Law and Policies: Responding to Migration Challenges in Western and Northern Africa*, Round Table, 8-9 December 2009, Dakar, Geneva.

Table 1: Missing and dead migrants in the Sicily Channel, civil society estimates, from 2002 through mid-2011.¹⁴²

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*	Total
Deaths	236	413	206	437	302	556	1,274	425	20	1,822	5,691

* January-July

When considering this human tragedy, it ought to be noted that the advent of “boat people” is not a new or indeed a unique European experience.¹⁴³ In some respects, its origins can be traced back to a whole generation of Irish immigrants arriving in America, embarked upon coffin ships during and after the Great Famine in the late 1840s.¹⁴⁴ More recently, similar incidents were evident in the South China Sea in the 1970s during the Vietnam War, and in several other geographical regions associated with political and economic turmoil including: the Strait of Aden as a result of instability and famine in the Horn of Africa; the eastern Indian Ocean with the migration of many Asians across the Indonesian archipelago and the adjacent exclusive economic zone (EEZ); and much closer to the United States in the perilous Miami Strait with many fleeing the Castro régime in Cuba. These regional incidents are part of a far larger trend concerning the migration of humans worldwide. This is borne out by the remarks delivered by the Secretary-General of the United Nations, Ban Ki-moon, to the Global Forum on Migration and Development, when he noted the continued rise in the number of migrants to 232 million annually.¹⁴⁵ He emphasized the collective responsibility of the international community in addressing this issue and proposed a broad eight-point agenda to “make migration work for all: migrants, societies of origin and societies of destination alike.”¹⁴⁶ This agenda provides a useful global backdrop with which to frame and view the various law and policy measures adopted by the EU to tackle illegal migration by sea.

EU law and policy on “boat people”: An embryonic and complex paradigm

The EU response to boat people has been piecemeal, and it lacks firm leadership and a strong political focus within the European institutions. Some of the difficulty has come

¹⁴² Fortress Europe, “Nel Canale di Sicilia 6.166 tra morti e dispersi dal 1994 dei quali 1.822 soltanto nel 2011,” 17 March 2012, available at: <http://fortresseurope.blogspot.com/2006/02/nel-canale-di-sicilia.html>. Reproduced in European Agency for Fundamental Rights, *Fundamental rights at Europe’s southern sea borders*, at 30.

¹⁴³ Barbara Miltner, “Human Security and Protection from Refoulement in the Maritime Context”, in *Human Security and Non-Citizens: Law, Policy and International Affairs*, eds. A. Edwards and C. Ferstman (Cambridge: Cambridge University Press, 2010).

¹⁴⁴ See, for example, William Henry, *Coffin Ship* (Dublin: Mercier Press, 2009), which recounts the experience on board the famine ship, the St. John, in Massachusetts Bay in 1849.

¹⁴⁵ Secretary-General's remarks to High-Level Dialogue on International Migration and Development, New York, 3 October 2013, available at <http://www.un.org/esa/population/migration/index.html>.

¹⁴⁶ *Ibid.*

about as a result of the division of competence between the Member States and the EU on security matters with a maritime dimension, where the problems may be addressed by both the EU method of regulation on issues such as immigration, or by means of inter-governmental agreement between the EU, the Member States, and third countries. This somewhat convoluted regulatory environment has led to the adoption of measures on a number of fronts including: within the framework of EU law on immigration; on the basis of national measures in the Member States on security and border control; as well as by means of international and regional treaties that are applicable to safety at sea and the rights of migrants in general, including those that are trafficked illegally by maritime means.¹⁴⁷

Responsibility for the control and surveillance of maritime frontiers rests with the Member States. The obligations in relation to saving lives at sea (including the lives of migrants) are absolutely clear and well established under both international treaty and customary law. It is well established by State practice that these obligations apply *erga omnes*.¹⁴⁸ The treaty framework sets down many affirmative duties. Briefly stated, the 1982 Convention requires every coastal State to establish, operate and maintain an effective search and rescue service and to cooperate with neighbouring States for this purpose.¹⁴⁹ EU Member States are bound by many international agreements aimed at protecting lives at sea including the International Convention for the Safety of Life at Sea (SOLAS) and its 1988 Protocol,¹⁵⁰ and the 1979 International Convention on Maritime Search and Rescue (SAR).¹⁵¹ The latter requires Contracting Parties to respond to a "distress phase," which is described as "a situation wherein there is a reasonable certainty that a vessel or person is threatened by grave and imminent danger and requires immediate assistance."¹⁵² This duty to render assistance applies to the master of ships flying the flag of a Contracting Party, and it also extends to persons and ships in distress in sea areas both within and beyond areas of national jurisdiction.¹⁵³

Similarly, under provisions contained in the 2004 amendments of SOLAS and the SAR Conventions there is an obligation to provide assistance, regardless of nationality or status of persons in distress, or the circumstances in which they are found.¹⁵⁴ In other words, ships

¹⁴⁷ European Union Agency for Fundamental Rights, *The Handbook on European law relating to asylum, borders and immigration* (Luxembourg: Publications Office of the European Union, 2013), *passim*.

¹⁴⁸ M. Davies, "Obligations and implications for ships encountering persons in need of assistance at sea," *Pacific Rim Law and Policy Journal* 12 (2003), 109; Michael White QC, "M/V Tampa Incident and Australia's Obligations," *Maritime Studies* 122 (2002), 7.

¹⁴⁹ UNCLOS, Article 98(2).

¹⁵⁰ 1184 UNTS 278 (entered into force 25 May 1980); 17 *International Legal Materials* (1978), 579 (entered into force 1 May 1980).

¹⁵¹ 1405 UNTS 97 (entered into force 27 April 1979).

¹⁵² Annex Chapter 1.3.11.

¹⁵³ UNCLOS, Article 98(1).

¹⁵⁴ SOLAS, Chapter V, Regulation 33. Amendment to the International Convention on Maritime Search and Rescue 2004, IMO Resolution 155(78), adopted 20 May 2004.

flying the flag of the Member States must rescue migrants at sea, irrespective of EU law and policy on immigration or otherwise. The obligations set down in relevant international instruments are binding on all EU Member States. In this respect, one should keep in mind that as a regional integration organization, the EU itself is not party to the SOLAS or the SAR Conventions and search and rescue at sea is predominantly a Member State competence under EU law.

Further complexity arises from the extensive array of multilateral and regional treaties pertaining to international criminal law, and human rights and humanitarian law, that have a bearing on the matter of irregular migration by sea. These include the United Nations Convention against Transnational Organized Crime, its Protocol against the Smuggling of Migrants by Land, Sea and Air, and its Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children;¹⁵⁵ the Convention relating to the Status of Refugees;¹⁵⁶ and the European Convention for the Protection of Human Rights and Fundamental Freedoms,¹⁵⁷ to name some of the principal instruments. Indicatively, none of the EU Member States have ratified the International Convention on the Rights of Migrant Workers and their Families.¹⁵⁸ Consequently, EU States are unwilling to uphold the rights and the correlative duties established by this pretty rudimentary framework, which sets down basic principles concerning the treatment of migrant workers and family members.

Patently, what is missing from this fragmented tableau is a solid and effective treaty architecture for dealing with migrants at a global level that addresses not only maritime security issues, but also protects the legal and human rights interests of migrants, including their economic rights. Moreover, within Europe, there appears to be an inherent tension between the interests of the Member States regarding their sovereignty and the pursuit of regional or global solutions to illicit migration across both internal and external EU frontiers. This tension has its origins in the Treaty on the Functioning of the European Union, which provides a legal basis for the adoption of a common immigration policy and allows for the adoption by the Member States of so-called enhanced measures to combat illegal immigration and the trafficking in human beings.¹⁵⁹ Additionally, the EU has common rules for dealing with humanitarian and rescue tasks in emergency situations, referred to as the "Petersberg Tasks," as part of its common foreign and security policy.¹⁶⁰ As a result, at an internal level within the EU, the political response to the tragedy in the Mediterranean Sea

¹⁵⁵ 2225 UNTS 209 (into force 29 September 2003). As of June 2012, 149 countries had ratified the 2000 Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children, while 130 countries had ratified the 2000 Protocol against the Smuggling of Migrants by Land, Sea and Air.

¹⁵⁶ 189 UNTS 150 (entered into force 22 April 1954).

¹⁵⁷ 213 UNTS 222 (entered into force 3 September 1953), as amended by Protocols Nos 3, 5, 8, and 11 (entered into force 21 September 1970).

¹⁵⁸ 2220 UNTS 3. UN Doc A/RES/45/158 (adopted 18 December 1990, entered into force 1 July 2003).

¹⁵⁹ Article 79 of the TFEU.

¹⁶⁰ Article 43(1) of the TEU. See G. von Kielmansedde "The Meaning of Petersberg: Some consideration on the Legal Scope of ESDP operations," *CMLRev.* 44 (2007), 629.

has largely been taken within the framework of the common rules on immigration and with a view to returning migrants to their countries of origin.

At an operational level, much practical work in coordinating Member State action and responses at sea is undertaken under the good offices of a specialist agency, the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (FRONTEX). The European Council adopted common rules for the management and operational coordination of border surveillance activities in 2010.¹⁶¹ Considerable resources are devoted to the coordination of operations at sea including the establishment of the European Patrols Network, which includes a permanent regional border security network for the southern maritime borders of the EU. There have been several other EU legal and policy initiatives including proposals to establish a European Border Surveillance System (EUROSUR) and a push within the European institutions to give FRONTEX more powers and financial resources. The EU has also taken a number of significant steps to address the wider issues causing migration including the conclusion of a Mobility Partnership Agreement with Morocco, which may be followed by a similar agreement with Tunisia.¹⁶²

The key to resolving many of the operational matters in relation to rescues at sea is contingent upon the success and effectiveness of EUROSUR. The European Commission has taken the lead within the European institutions by tabling a draft legislative proposal with a view to putting EUROSUR on a firm regulatory footing.¹⁶³ The draft regulation is aimed at establishing a common framework for the exchange of information and cooperation between Member States and FRONTEX. In particular, it aims to strengthen the external borders of the Schengen area, which applies to all Member States apart from Ireland and the United Kingdom, but includes four third-countries—Norway, Iceland, Switzerland and Liechtenstein.

Vitality in the context of the urgent nature of the law enforcement tasks currently encountered in the Mediterranean Sea, the framework will provide for the exchange of operational information for three purposes, namely: (1) to reduce the loss of lives at sea; (2) to lessen the number of irregular immigrants entering the EU undetected; (3) to increase internal security by preventing cross-border crimes such as trafficking in human beings and

¹⁶¹ Council decision of 26 April 2010 supplementing the Schengen Borders Code as regards the surveillance of the sea external borders in the context of operational cooperation coordinated by the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union, OJ L 111/20, 4 May 2010.

¹⁶² General Secretariat of the Council, Joint declaration establishing a Mobility Partnership between the Kingdom of Morocco and the European Union and its Member States, Brussels, 3 June 2013, available at http://ec.europa.eu/dgs/home-affairs/what-is-new/news/news/2013/docs/20130607_declaration_conjointe-maroc_eu_version_3_6_13_en.pdf.

¹⁶³ Proposal for a Regulation Establishing the European Border Surveillance System (EUROSUR), COM(2011) 873 final, Brussels, 12 December 2011. See also, Communication Examining the creation of a European Border Surveillance System (EUROSUR), COM(2008) 68 final, Brussels, 13 February 2008.

the smuggling of drugs.¹⁶⁴ When fully established, EUROSUR will enable the law enforcement bodies in the Member States to track and rescue small vessels at sea by facilitating greater coordination between national authorities and through the use of improved surveillance technology. The tragic loss of so many lives at Lampedusa is expected to give additional impetus to the establishment of EUROSUR at national level in the Member States.

The importance of this initiative should not be underestimated because when fully established and operational, EUROSUR will contribute to the development of the EU's Common Information Sharing Environment, and this in turn will facilitate the exchange of surveillance data by using advanced technologies for the purpose of marine environmental protection, fisheries conservation, and with a view to addressing maritime security operational matters including the migration and smuggling of people by sea.¹⁶⁵ Improvement in the control and surveillance of external maritime borders for all of the latter purposes is now one of the objectives of the EU's integrated maritime policy.

Undoubtedly, technology can play a crucial role in improving the performance of the search and rescue services and in enhancing the effective delivery of the law enforcement functions of the various maritime agencies in the Member States. Less well known, perhaps, is that the application of new technologies and the development of common rules for the sharing of information at a pan-European level can also be used to help to protect the fundamental rights of migrants that are rescued or intercepted at sea. This aspect of European law and policy merits further consideration here.

Protecting the rights of "boat people"

As seen above, the surge of migrants attempting to cross the Mediterranean Sea, the Gulf of Aden, and the dangerous passage between West Africa and the Canary islands, in unseaworthy and grossly overcrowded craft has gone on for well over a decade. Despite the on-going and escalating nature of the problem, the precise interface between international law of the sea, human rights law, EU law, and the application of modern technology to protect the rights of boat people, remained somewhat blurred up until relatively recently. In response to the high incidence of tragedies on Europe's southern borders, we are beginning to see, however, a gradual convergence of these distinctive fields of law with a view to protecting and vindicating the fundamental rights of third country nationals who are rescued at sea, or who have reached the safety of the territory of the Member States, but do not have the necessary visa or documentation to enter the EU.

¹⁶⁴ *Ibid.*, at 1.

¹⁶⁵ European Commission (2009b), Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain, COM(2009)538 final, Brussels, 15 October 2009.

This relatively noteworthy development in EU law, as with the 1982 Convention, contains little guidance on the rights of private individuals once they are rescued at sea.¹⁶⁶ That said, international bodies such as the UNHCR and the IMO have taken the lead regarding the principles and practices that ought to be applied to migrants and refugees rescued at sea, most notably, through the 2004 amendments of the SOLAS and SAR Conventions.¹⁶⁷ Additional clarity on the rights and duties of various parties are set down in the IMO Interim Measures for Combating Unsafe Practices Associated with Trafficking or Transport of Migrants by Sea.¹⁶⁸ Enhanced transparency about the effectiveness of the latter measures is achieved through the publication of an extremely revealing annual report by the IMO on unsafe practices associated with the trafficking or transport of illegal migrants by sea.¹⁶⁹

In parallel with progress at a multilateral level within the sphere of maritime shipping law, it is important to note that fundamental rights such as the right to life, the right to asylum, and the right to protection in the event of removal or expulsion, are all codified as general principles of EU law under the Lisbon Treaty. Moreover, the EU is compelled by the Treaty on European Union to promote such rights as one of the objectives of the EU's external policy.¹⁷⁰ This approach is bolstered by the Charter of Fundamental Rights, which underscores within the European legal order, the importance of the protection of the fundamental rights of third country nationals attempting to enter the EU. Unambiguously, the Charter prohibits torture and inhuman or degrading treatment or punishment, and bars the return of persons to countries where they will be subject to human rights abuses.¹⁷¹ The EU is also party in its own right to the [European] Convention on Human Rights, and along with the Member States, must respect both the letter and the spirit of the Charter and the Convention in all of their actions when implementing EU law as it pertains to migrants rescued or apprehended at sea.

Indeed, the general principles of Union law and secondary legislation place an express obligation on Member States to ensure that measures undertaken during the course of surveillance operations should fully respect fundamental rights and the rights of

¹⁶⁶ See I. Papanicolopulu, "The Law of the Sea Convention: No Place for Persons?," *International Journal of Marine and Coastal Law* 27.4 (2012), 867.

¹⁶⁷ Including: IMO (2004a), Guidelines on the Treatment of Persons Rescued at Sea, IMO, Maritime Safety Committee resolution IMO Doc. MSC. 167(78), 20 May 2004. IMO Doc. (2004b), Resolution MSC. 153(78), Annex 3 adopted on 20 May 2004 (amending SOLAS) and Resolution IMO Doc. MSC. 155(78), Annex 5 adopted on 20 May 2004 (amending SAR); IMO Doc. (2009), Principles relating to administrative procedures for disembarking persons rescued at sea, Circular FAL.3/Circ.194, 22 January 2009; IMO Doc. (2010), IAMSAR manual vol. II, IMO, 1 June 2010.

¹⁶⁸ IMO Doc. MSC/Circ.896/Rev.1, 21 June 2001.

¹⁶⁹ See Doc. IMO MSC.3/Circ.20, 16 December 2011.

¹⁷⁰ Articles 2 and 3(5) of the TEU.

¹⁷¹ Articles 4 and 19, in line with case law developed by the European Court of Human Rights (ECHR) under Article 3, ECHR.

refugees and asylum seekers, including, in particular, the prohibition of *refoulement*.¹⁷² The weight and relevance of the latter principle cannot be overemphasised in the context of migration across the Mediterranean Sea as it forbids the return of a refugee to his or her country of origin, but also to other countries where there is a risk of onward movement to the country of origin, where their life or freedom would be threatened on account of race, religion, nationality, membership of a particular social group or political opinion.¹⁷³ The principle sits directly at the interface of EU law, law of the sea and human rights law. Decisively, the application of the principle has been upheld by the European Court of Human Rights in the context of migrants attempting to enter the EU by seaborne means.¹⁷⁴

The landing, reception, screening and processing of migrants rescued at sea is an area of EU law that is subject to considerable tension and discord. There is a long-overdue attempt underway to grapple with the key issues by tidying up the regulatory code. Specifically, at the time of writing, the EU is in the process of reforming the Directive laying down minimum standards for the reception of asylum seekers (referred to as the Reception Directive) with a view to harmonizing legal systems in the Member States through the implementation of a Common European Asylum System.¹⁷⁵ Moreover, a sister instrument referred to as the "Return Directive" incorporates the principle of *non-refoulement* and subject to a number of safeguards allows for the readmission of migrants to their country of

¹⁷² Article 3 of Regulation (EC) No 562/2006 of the European Parliament and of the Council of 15 March 2006 establishing a Community Code on the rules governing the movement of persons across borders (Schengen Borders Code), OJ L 105/1, 13 April 2006.

¹⁷³ Article 33 of the 1951 Geneva Convention relating to the Status of Refugees. Ratified by all EU Member States and incorporated into EU primary law through Article 78 of the Treaty on the Functioning of the European Union (TFEU) and Article 18 of the EU Charter for Fundamental Rights. In its Note on International Protection of 13 September 2001 (A/AC.96/951, § 16), the UNHCR, which has the task of monitoring the manner in which the States Parties apply the Geneva Convention, indicated that the principle of "non-refoulement" laid down in Article 33, amounted to the following:

... a cardinal protection principle enshrined in the Convention, to which no reservations are permitted. In many ways, the principle is the logical complement to the right to seek asylum recognized in the Universal Declaration of Human Rights. It has come to be considered a rule of customary international law binding on all States. In addition, international human rights law has established *non-refoulement* as a fundamental component of the absolute prohibition of torture and cruel, inhuman or degrading treatment or punishment. The duty not to *refouler* is also recognized as applying to refugees irrespective of their formal recognition, thus obviously including asylum-seekers whose status has not yet been determined. It encompasses any measure attributable to a State that could have the effect of returning an asylum-seeker or refugee to the frontiers of territories where his or her life or freedom would be threatened, or where he or she would risk persecution. This includes rejection at the frontier, interception and indirect *refoulement*, whether of an individual seeking asylum or in situations of mass influx.

¹⁷⁴ ECHR, *Soering v. the United Kingdom*, No. 14038/88, 7 July 1989, paras. 90–91; ECHR, *Hirsi Jamaa and Others v. Italy* [GC], No. 27765/09, 23 February 2012, para. 114.

¹⁷⁵ COM(2008) 815 final, Brussels, 3 December 2008.

departure through a simplified procedure.¹⁷⁶ Significantly, the EU's Justice and Home Affairs Council has not adopted common rules on the application of the principle of *non-refoulement*,¹⁷⁷ but has focused much of its political efforts on achieving agreement on several operational measures including some that are aimed at improving joint coast guard/ naval patrols with third countries in North and West Africa.¹⁷⁸ Rather clearly, any such operational arrangements do not discharge the various law enforcement bodies in the Member States from their obligations to respect the fundamental rights of migrants including their duty not to *refoule*. Specifically, Member States remain bound by the Charter of Fundamental Rights when implementing EU law and must respect the various rights and duties that arise under the European Convention on Human Rights. Furthermore, as will be seen next, technology has the potential to play a vital role in monitoring how the Member States discharge their fundamental rights treaty obligations.

Applying technology to improve compliance with human rights

Technology is one of tools that can be used to improve compliance by law enforcement agencies with the various obligations that arise under international and European law in relation to controlling irregular migration by sea. Accordingly, a number of capacity building initiatives warrant a mention here. Foremost, it needs to be pointed out that the EU gives considerable fiscal support to cover the costs associated with the maritime security efforts of the Member States through the Asylum and Migration Fund, and the Internal Security Fund.¹⁷⁹ Both funds provide for the establishment of Information and Communications Technology (ICT) systems that can be used for the integrated management of migration flows between third-countries and the EU, including the return of migrants to their countries of origin. Moreover, a similar practical response to capacity-building is evident in the work of FRONTEX, which has adopted a proactive three-strand approach to improving the skills of the law enforcement agencies: firstly, by setting out the fundamental rights duties of law enforcement officers in the documents governing operational activities; secondly, by improving training in human rights law for those engaged in field work; and thirdly by setting down a mandatory requirement for officers to report human rights violations. ICT is clearly applicable and complementary to these initiatives.¹⁸⁰

¹⁷⁶ Directive 2008/115/EC of 16 December 2008 on common standards and procedures in Member States for returning illegally staying third-country nationals, OJ L 348/98, 24 December 2008.

¹⁷⁷ Some guidance had been developed by the EU for Frontex operations through Council Decision 252/2010/EU, such decision has been annulled by the CJEU on formal grounds Court of Justice of the European Union (CJEU), Case C-355/10 [2012], *European Parliament v. Council of the European Union*, 5 September 2012.

¹⁷⁸ February 2011, the EU's Justice and Home Affairs Council adopted 29 measures.

¹⁷⁹ Proposal for a Regulation of the European Parliament and of the Council establishing the Asylum and Migration Fund, COM(2011) 751 final, Brussels, 15 November 2011.

¹⁸⁰ European Agency for Fundamental Rights, *Fundamental rights at Europe's southern sea borders* (EAFR, 2013).

New technologies have many other applications that enhance regional operational mechanisms with third countries. A good example is the "Seahorse Network" between Portugal, Spain and several African countries.¹⁸¹ Intelligence on migrant movements at sea is shared among the various law enforcement agencies through this network. This approach also has a number of features that could be used for the purpose of advancing the protection of human rights of migrants. For instance, the European Agency for Fundamental Rights has suggested that the law enforcement authorities in these third countries could use the information derived from the network to initiate appropriate responses where there are human rights violations of those apprehended at sea.¹⁸² Moreover, ICT is an obvious tool that is capable of monitoring effectively and independently that Member States and third countries are upholding the principle of *non-refoulement*. Furthermore, it could also be used on a daily basis to ensure that migrants are given access to appropriate procedures as soon as they are apprehended or rescued.

For obvious reasons, the EAFR recommends that only personal data on returnees that are strictly necessary for the readmission should be forwarded to the country of origin and transit country.¹⁸³ This is particularly important in relation to asylum-related information, which could be used subsequently to persecute migrants on their re-admission to their countries of origin. Adopting somewhat of a tone of admonishment, the Agency notes that the EU and its Member States should not conclude readmission agreements that cover citizens of a third country with States that have a record of persistent and serious human rights violations.¹⁸⁴ At the time of writing, such agreements are in place with Turkey, Russia, Pakistan and China, which is clearly at odds with the basic tenor of the EU Charter on Fundamental Rights.¹⁸⁵

Reforming the EU's approach to irregular migration by sea

Many of the legal problems encountered by the EU in addressing illegal migration at sea stems from the fact that the European common foreign and security policy did not have an effective and distinctive maritime strand prior to the adoption of a maritime Security Strategy by the Council in 2014.¹⁸⁶ As a consequence, the EU regulatory and policy response to irregular migration by sea has been pedestrian, diffuse and pedantic at best. Moreover, the regional crises in the Mediterranean are expected to deteriorate unless the EU and all of the Member States discharge their legal obligations to protect the human rights of migrants,

¹⁸¹ More information on this network is available at <http://ec.europa.eu>.

¹⁸² EAFR, *Fundamental rights*, *supra* note 180..

¹⁸³ *Ibid.*

¹⁸⁴ *Ibid.*

¹⁸⁵ See Communication Evaluation of EU Readmission Agreements, COM(2011) 76 final, Brussels, 23 February 2011.

¹⁸⁶ European Union Maritime Security Strategy adopted by the Council (General Affairs) on 24 June 2014. Available at: <http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2011205%202014%20INIT> (Accessed: 24 October 2014)

in particular to ensure the safety of lives at sea, and to agree on an approach to the implementation of a common immigration policy. In this respect, the tragic events associated with the island of Lampedusa may act as a badly needed catalyst for EU law reform.

How should the EU and the Member States respond to this challenge? At an operational level, there needs to be a coordinated response, which aims to stop the trafficking of humans across the ocean. At the very least, appropriate resources must be committed to enhancing the capability of the various maritime agencies that work in the Mediterranean Sea. In many ways, the UN Secretary-General is far more pragmatic with his suggestion that every migrant vessel in the Mediterranean Sea should be considered to be potentially in distress and thus requiring rescue.¹⁸⁷ Most importantly of all, EU Member States need to give full effect to human rights instruments including the protocols against human trafficking and migrant smuggling, relevant ILO agreements applicable to migrants, as well as the Convention relating to the Status of Refugees. In essence, the EU and Member State regulatory response must be firm and grounded in a rights-based-approach whereby all migrants rescued or apprehended at sea are protected by virtue of their human dignity.

Apart from reforming the law concerning the treatment and rescue of persons in distress at sea, the application of new technologies can help protect the fundamental rights of migrants fleeing war, persecution, humane and degrading treatment in their countries of origin, particularly in the Middle East and Africa. In this regard, EU initiatives such as the one promoting the establishment of a Common Information Sharing Environment, as well as integrated maritime surveillance systems, must be welcomed, as they can improve law enforcement efficiency, cut surveillance costs, and provide more timely responses to incidents at sea. This approach will not only improve maritime safety and security but is also aimed at enhancing the protection of the EU's external frontiers, the marine environment, as well as trade and shipping. Similarly at an external level, the EU's Operation Atalanta in the Indian Ocean and the program on Critical Maritime Routes in the Gulf of Guinea, provide training for coastguards and establish an electronic system for information sharing at a regional level in Africa. As noted by European Commissioner Damanaki, such an approach will make the EU a more "visible, credible and forceful" maritime actor on the world stage.¹⁸⁸

Ironically, climate change is one of the contributory factors to irregular migration, so it is entirely appropriate to conclude this chapter with a very brief analysis of how science and technology are shaping the regulatory and policy response in Europe pertaining to the maritime sectors, as well as the manner in which they are influencing some practical aspects of ocean law.

¹⁸⁷ Report of the Secretary-General, International Migration and Development, UN A/68/190, 23 July 2013.

¹⁸⁸ See speech delivered by European Commissioner Damanaki, "Challenges and Opportunities in Maritime Security for Effective Governance and Innovation in the EU's Maritime Domain," Dublin, 8 April 2013, available at http://ec.europa.eu/commission_2010-2014/damanaki/headlines/speeches/2013/04/20130408_speech_en.htm.

Part III – Tackling Climate Change

Doing nothing is not an option

In the EU, science and law converge and overlap in the policy response to the phenomenon of climate change. Indeed, the complex interface of European law, international law, science and technology is at times nothing short of exasperating for those that are pushing for a more robust response to mitigate the impacts of climate change on the oceans. Such impacts are increasingly manifest in everyday life in the form of sea-level rise, ocean acidification, and extreme weather events such as Typhoon Haiyan in the Philippines, as well as the inundation of whole areas of the United Kingdom and continental Europe as a result of tempestuous Atlantic storms during the summers of 2012 and 2013. The effects of climate change on the oceans is now the focus of a considerable body of specialist literature and some scientists have concluded that the impacts of warming are magnified by the effects of other human impacts, such as pollution, eutrophication and overfishing.¹⁸⁹ This scientific consensus, in turn, also accepts that there is a continuous influence by climate change on the composition, structure and functions of marine ecosystems.¹⁹⁰

In relation to the law and policy response in Europe, perhaps it is best to start by pointing out that the adoption of the 1982 Convention pre-dates the inter-governmental debate on climate change and the negotiation of the UN Framework Convention on Climate Change (UNFCCC) by a number of decades.¹⁹¹ Similar to other international agreements, however, the 1982 Convention must be viewed in light of the subsequent development of international law on climate change.¹⁹² Furthermore, significant changes to ocean law have come about, in the intervening years, by means of both treaty and customary law on matters such as the conservation of fisheries and the application of new normative tools such as ecosystem-based approach in the tasks associated with marine environmental management, all of which have a bearing on the policy and legal response to climate change.¹⁹³ The dynamic and progressive nature of international law is emphasized by many scholars including Professor Alan Boyle, who has counseled that the 1982 Convention and related instruments must be interpreted and applied within the framework of the entire legal system that now prevails in international law and in light of present day conditions, environmental and otherwise.¹⁹⁴

An ambulatory approach to treaty interpretation and application appears to be the

¹⁸⁹ See, for example, Jelle Bijma, Hans-O. Pörtner, Chris Yesson, and Alex D. Rogers, "Climate change and the oceans – What does the future hold?," *Marine Pollution Bulletin* 74.2 (2013), 495-505.

¹⁹⁰ *Ibid.*

¹⁹¹ UNFCC 31 *ILM* 849.

¹⁹² On the dynamic nature of international law, see *Namibia Advisory Opinion* 1971 I.C.J. Rep., at 16, 31.

¹⁹³ *Op cit, supra* note 1.

¹⁹⁴ See Alan Boyle, "Law of the Sea perspective on Climate Change," *International Journal of Marine and Coastal Law* 27.4 (2012), 711-721.

only sensible course of action when one takes into consideration the ominous scientific findings of the Intergovernmental Panel on Climate Change, published in September 2013.¹⁹⁵ Apart from deducing that human anthropogenic impacts are the "dominant" influence on climate change since the mid 20th century and that the evidence of global warming is unequivocal (emphasis added), the first part of the Fifth Assessment Report of the Panel makes sobering reading in relation to global warming and its effects on the ocean.¹⁹⁶ In particular, the Report concludes that ocean warming dominates the increase of energy in the climate system and that this process is set to continue by causing ocean temperatures to rise, as well as a faster rise in global mean sea level. The ocean is estimated to absorb 90 percent of the energy generated by global warming. Worryingly, the Report points out that the effects of climate change will persist for many centuries, even if greenhouse gas emissions abate completely.¹⁹⁷ The authors of the Report conclude that limiting the effects of climate change will require "substantial and sustained reductions" of such emissions.¹⁹⁸

These findings are disturbing for the EU, where several Member States such as the Netherlands, Ireland, the United Kingdom and Denmark, as well as some of Europe's great cities such as Venice, are threatened physically by sea level rise and the effects of climate change. The health of the regional seas is particularly prone to temperature variations and to the destruction of marine ecosystems and the species that they support. In Europe, the media response to *Climate Change 2013* focused on the oceans. An editorial in the *Irish Times*, for example, highlighted that we as humans are "directly implicated in warming the atmosphere and oceans, melting glaciers, declining arctic summer sea ice, rising sea levels and changes in some climate extremes."¹⁹⁹ Furthermore, the editorial warns that temperate countries may well face an influx of "climate refugees," as the warming trend persists.²⁰⁰ This concern appears to be supported by the increased flows of migrants from Africa and Asia to Europe as highlighted above.

Apart from concerns about human migration, the EU has been active in many other specialist policy areas and has adopted a comprehensive package of measures in the fields of energy and climate change.²⁰¹ Notably, these measures are aimed at meeting the so-called 2020 policy targets, namely: 20 percent energy from renewable sources; 20 percent energy efficiency and 20 percent reduction in greenhouse gas emissions below the 2005

¹⁹⁵ See IPCC, *Technical Summary, Climate Change 2013: The Physical Science Basis, Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC, 2013), available at http://www.climatechange2013.org/images/report/WG1AR5_TS_FINAL.pdf.

¹⁹⁶ *Ibid.*, at 47, 52-53.

¹⁹⁷ The six greenhouse gases controlled by the Kyoto Protocol are carbon dioxide (CO₂), methane (CH₄), nitrous oxide ((NO₂), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₂).

¹⁹⁸ See IPCC, *Climate Change 2013: Headline Statements from the Summary for Policymakers* (IPCC, 2013), at 2, available at: http://www.ipcc.ch/news_and_events/docs/ar5/ar5_wg1_headlines.pdf.

¹⁹⁹ *Irish Times*, 30 September 2013, at 15.

²⁰⁰ *Ibid.*

²⁰¹ Ronán Long "Offshore wind energy," *supra* note 29, 15-52.

levels, all by the year 2020.²⁰² The European Commission sets down even more ambitious objectives in their *European Energy Roadmap 2050*, which calls for 80 percent reduction in carbon emissions and the production of 55 percent of energy from renewable sources by 2050.²⁰³

Briefly stated, there are four elements in the EU legislative package that are aimed at achieving the 2020 targets. Firstly, the establishment of a trading and auction system for greenhouse gas emissions at EU level, referred to as Emission Trading System (ETS), which applies a uniform price for all emissions from power plants, industrial installations, as well as the airline industry.²⁰⁴ Secondly, legal binding targets implemented at national level in the Member States for sectors that are not subject to the ETS such as transport and shipping, the latter is referred to as the Effort Sharing Decision.²⁰⁵ Thirdly, the Renewable Energy Directive, which sets down the amount of energy that must be produced from renewable sources.²⁰⁶ Fourthly, a European Directive setting down standards applicable to carbon capture and storage including geological storage under the seabed.²⁰⁷ Importantly, the monitoring and measurement of emissions are built into the marine strategies adopted by the Member States under the Marine Strategy Framework Directive, which aims to achieve good environmental status for all EU's marine waters by 2020.²⁰⁸

These aforementioned measures are proactive in substance and ambit and are generally consistent with the "commitments" set down by the Kyoto Protocol to the UNFCCC, as well as the Copenhagen, Cancun, Durban, Warsaw Accords. They also implement the treaty principles on precaution, that the polluter-should-pay, and that decision-making in relation to the environment is informed by the use of best available science and technology (described above).²⁰⁹ Within the climate change conundrum, regulators in the EU and the Member States are seeking to balance the illusive goals of

²⁰² Ibid.

²⁰³ Ibid.

²⁰⁴ Directive 2003/87/EC of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, OJ L 275, 25.10.2003, at 32; and Commission Regulation (EU) No 1031/2010 of 12 November 2010 on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances pursuant to Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowances trading within the Community, OJ L 302, 18 November 2010, at 1.

²⁰⁵ Commission Decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council, OJ L 90/106, 28 March 2013.

²⁰⁶ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ L 140, 5 June 2009, at 16.

²⁰⁷ Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide, OJ L 140, 5.6.2009, at 114.

²⁰⁸ Angel Borja, *et al.*, "Good Environmental Status of marine ecosystems: What is it and how do we know when we have attained it?," *Marine Pollution Bulletin* 76.1 (2013), 16-27.

²⁰⁹ Article 191 of the TFEU.

sustainable economic development with the protection of the environment. To illustrate some of the difficulties encountered in achieving a satisfactory equilibrium regarding the attainment of these objectives, this chapter now mentions three aspects of the EU's legislative and policy response to climate change that impinges upon modern oceans law; specifically, shipping, offshore wind energy, carbon capture and storage. In this regard, it is evident that EU policy requires a diverse response across a wide range of maritime sectors and draws together a number of legislative strands pertaining to international, regional and national law.

Unfinished business: EU regulation of shipping and climate change

The European shipping industry is applying new technologies to improve maritime safety, to protect the marine environment, as well as to reduce the overall costs associated with maritime transport. This development explains in some ways why the industry remains globally competitive and ensures the free flow of trade both within and beyond the EU. Moreover, shipping allows the EU to play a key role in the global economy and this in turn fosters regional prosperity.

EU regulatory measures have focused on two strategic topics, namely: combating the impact of shipping on climate change and reducing pollution by shipping.²¹⁰ The latter policy has been driven forward by concerns stemming from the catastrophic loss of the *Erika* and the *Prestige* and the irresponsible pollution of France, Spain and Portugal, as well as great swathes of the Bay of Biscay. In response, the EU adopted a comprehensive code of legislative measures that is aimed at mitigating vessel source pollution, reducing the incidence of substandard shipping, and addressing longstanding concerns regarding maritime safety. The most recent intervention, referred to as the Third Maritime Safety Package, is made-up of two Regulations and six Directives setting down legally binding standards regarding: compliance with flag State and port State requirements; the functioning of classification societies; traffic monitoring and accident investigation; the liability of carriers under the Athens Convention; as well as the compulsory requirement for shipping to have insurance when entering sea areas under the sovereignty and jurisdiction of the Member States.²¹¹

²¹⁰ Veronica Frank, *The European Community and Marine Environmental Protection in the International Law of the Sea: Implementing Global Obligations at the Regional Level* (Leiden/Boston: Martinus Nijhoff, 2007), *passim*.

²¹¹ For a history of EU shipping safety measures, see Henrik Ringbom, *European Union Maritime Safety Policy and International Law* (Leiden/Boston: Martinus Nijhoff, 2008), *passim*. The package is made-up of the following instruments: Dir. 2009/21/EC on compliance with flag State requirements, OJ L 131/132, 28 May 2009; Reg. No. 391/2009 on common rules and standards for ship inspection and survey, organizations, OJ L131/11, 28 May 2009; Dir. 2009/15/EC on common rules and standards for ship inspection and survey organizations and for the relevant activities of maritime administrations, OJ L131/47, 28 May 2009; Dir. 2009/16/EC on port State control, OJ L131/57, 28 May 2009; Dir. 2009/17/EC amending Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system, OJ L131/101, 28 May 2009; Dir.

These régimes comprise a comprehensive maritime code in its own right. Predictably, there are specific measures within the Third Package that are aimed at mitigating the adverse effects of the sector on climate change by reducing air pollution in general from ships and greenhouse gas emissions more specifically. The importance of these measures may be appreciated when one considers that greenhouse gas emissions from international maritime transport currently represent around 3 percent of total emissions worldwide. Moreover, the EU has forecasted that this contribution will grow due to the expanding nature of world trade and the corresponding demand for shipping.²¹² Despite the implementation of specific operational programs and new abatement technologies, there are some EU estimates that suggest that this growth will amount to a 51 percent increase in emissions by 2050 compared to 2010 levels.²¹³ This will render nugatory mitigation and adaptation measures in other sectors and again this highlights the adverse environmental footprint of shipping.

Against this background, the EU has sought to reduce emissions from maritime transport by 40 percent by 2050. In parallel, the IMO has also adopted measures that make mandatory improvements in energy efficiency standards for all new ships. This was achieved by the amendment of Annex VI of the MARPOL Convention to cater for the introduction of the Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan.²¹⁴ This amendment did not cover CO₂ emissions and there has been no agreement at a global level on the use of market-based measures to reduce emissions such as an Emissions Trading Scheme, a Greenhouse Gas Fund,²¹⁵ a Port State Levy, an Efficiency Incentive Scheme, or a Ship Efficiency and Trading Scheme.²¹⁶ The IMO has concluded that technical and operational efficiency measures can provide significant improvements but will not in the longer-term be able to provide real reductions if the demand for shipping and the expansion of global trade continues. Surely, these are real concerns and can only be addressed by the adoption of pragmatic and innovative solutions that apply across the entire shipping sector.

The aforementioned explains what the EU has pushed for a global approach under the auspices of the IMO to resolve this matter. Moreover, despite the slow progress at the multilateral level, the EU included existing ships within its 20 percent commitment to

2009/18/EC establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council, OJ L 131/114, 28 May 2009; Reg. No 392/2009 on the liability of carriers of passengers by sea in the event of accidents, OJ L 131/24, 28 May 2009; Dir. 2009/20/EC on the insurance of ship owners for maritime claims, OJ L 131/128, 28 May 2009.

²¹² See European Commission, Integrating maritime transport emissions in the EU's greenhouse gas reduction policies, COM(2013) 479 final, Brussels, 28 June 2013, which cites Study carried out by Lloyd's Register and DNV for the IMO in 2011 and 4th IPCC Assessment Report.

²¹³ *Ibid.*, at 2.

²¹⁴ In force since 1 July 2010. Prohibits ODS in line with the Montreal Protocol, regulates exhaust gas and cargo vapours from tankers

²¹⁵ Proposed by Cyprus, Denmark, the Marshall Islands, Nigeria and IMPA at the IMO Marine Environment Protection Committee (MEPC) 60/4/8.

²¹⁶ Proposed by the United States at MEPC 60/4/12.

reduce greenhouse gas emissions in 2012.²¹⁷ Significantly, however, international maritime transport remains the only transport sector not included in the EU's commitment to reduce greenhouse gases. Nevertheless, the diplomatic efforts persist with the EU working with the US, Japan, Australia, Canada, Russia, Korea and others towards the introduction of a global market-based scheme to supplement existing technological and operational measures. In these negotiations, it has advocated strongly for the introduction of a robust monitoring, reporting and verifying (MRV) scheme.

Moving from words to action, in a unilateral move aimed at expediting the establishment of an international system, a draft regulation has been tabled by the European Commission within the European institutions, which establishes a MRV scheme for CO₂ emissions from all vessels in excess of 5,000 gross registered tons in size once they use ports that are under the jurisdiction of the Member States.²¹⁸ These measures will apply to all vessels, irrespective of their flag or port of registration. Under the proposed scheme, vessels owners will be compelled to monitor and report on the amount of CO₂ emitted by ships on passage to and from EU ports. They will also be obliged to provide information on the vessel's energy efficiency. Clearly, one of the principal objectives of the draft regulation is to close the scientific knowledge deficit concerning the amount of greenhouse gases emitted by EU vessels. Moreover, the EU scheme is ultimately expected to speed-up the introduction of similar measures by the IMO. In addition, several European maritime agencies working in conjunction with the IMO have commenced a number of technical projects to monitor emissions from ships and the results of these initiatives will inform the legislative programme of the European institutions over the coming decade.

The sluggishness of the EU and the Member States in adopting legal measures to give effect to the climate change policy in relation to shipping may be compared and contrasted with the dynamic pace of change in the European offshore renewable energy sector.

Offshore energy: Winds of change

Many northern European countries have favorable environments for the development of renewable energy infrastructure and offshore wind energy in particular. Thus, it is unsurprising to note that offshore wind energy development is one of the primary technological solutions rolled-out in the Member States to meet the ambitious targets set down in the climate change and energy policies highlighted above.²¹⁹ Due to the constraints of space, only a few points are made here about the rapid growth of this new industry, which poses a new challenge regarding the implementation of ocean law in some of

²¹⁷ Directive 2009/29/EC and Decision 406/2009/EC.

²¹⁸ Proposal for a Regulation on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013, COM(2013) 480 final, Brussels, 28 June 2013.

²¹⁹ Ronán Long, "Offshore wind energy," *supra* note 29, 15-52.

Europe's busiest regional seas.²²⁰

At a pan-European level, current trends in the development of the offshore sector are impressive with 55 offshore wind farms up and running in nine Member States by the end of 2013. These have a combined installed capacity of 5,000 MW made up of 1,600 turbines, with the United Kingdom and Denmark leading the race towards the expansion of the industry in the offshore environment. Incredibly, Germany proposes to locate 8,000 turbines in the relatively small parts of the North Sea and Baltic Sea that are under its sovereignty and jurisdiction.²²¹ The combined cost of these developments has exceeded €4.5 billion and is expected to increase by twenty-fold over the coming decade. This will be the largest industrial project undertaken in Europe since the rebuilding of key infrastructure in the aftermath of the Second World War.

Apart from greater social acceptance, offshore wind farms have a number of technical and regulatory advantages over similar infrastructural development in the terrestrial environment. Wind speeds tend to be higher offshore and there is more scope for larger infrastructure development in the form of higher towers and more powerful turbines with larger rotors. The quality of the wind energy resource and the availability of maritime space are major considerations that have influenced the development of this nascent industry by both Germany and the United Kingdom. In both jurisdictions, the terrestrial environment is both congested and urbanized, which makes it far more difficult to obtain the appropriate consents for onshore wind farm developments under the constraints imposed by planning and environmental legislation. There are many other factors, which are influencing this vibrant offshore industry, including the price of fossil fuels and the insatiable demand for energy in Europe's energy intensive economies. Moreover, there is legal provision at an EU level for State-aid in the form of fiscal and market support to offset the cost of producing energy from renewable sources. The principal impediments are the cost of offshore infrastructure (at least twice as expensive as onshore), distance from the energy market, and the availability of vessels and ports to support the construction phase of the new industry.

Pointedly, EU legislative measures have acted as a catalyst in shaping the practice of the Member States. In particular, the EU regulatory regime in the form of the Renewable Energy Directive and national programmes appear to be well settled and very much geared towards the growth of the industry.²²² The European Wind Energy Association has published estimates that suggest 30 percent of all wind energy turbines in Europe will be located offshore by 2020, with this figure increasing to 60 percent by 2030. This in itself poses a major marine environmental challenge and it will be interesting to see how the Member

²²⁰ For further detail, see Ronán Long, "Harnessing Offshore Wind Energy: Legal Constraints and Policy Conundrums in the European Union" 29 (2014) *International Journal of Marine and Coastal Law* 1-26.

²²¹ Ronán Long, "Offshore wind energy development in Germany: Actors, legal instruments and decision-making procedures," in *Climate Change And Environmental Hazards Related To Shipping: An International Legal Framework*, eds. Hans-Joachim Koch, Doris König, Joachim Sanden, and Roda Verheyen (Leiden/Boston: Martin Nijhoff, 2012), 227-240.

²²² Directive 2009/28/EC, OJ L 140, 5 June 2009, at 16-62.

States continue to meet the requirements set down by international and European regulatory instruments as they continue to roll out the new industry. On the plus side, the national programmes for the development of the industry come within the scope of the EU Directive on Strategic Environmental Assessment, and individual farms are subject to project-based environmental impact assessment (EIA).

More problematic still is the interface between energy projects and EU nature conservation instruments that aim to protect habitats, as well as fauna, flora, and bird species. This is a discrete and complex area of EU and national law, which requires Member States to adopt appropriate conservation measures to ensure that habitats and species are maintained and restored to their natural range within the European network of nature protection areas (referred to as Natura 2000). Accordingly, wind farm development must undergo appropriate assessment to ensure conformity with the scheme set down by the Directives. Should they receive a negative assessment, Member States are compelled to take appropriate compensatory measures to ensure the overall coherence of the Natura 2000 network. This whole process of assessment is science driven and there are many novel electronic tools and sensors under development in Europe that will facilitate remote sensing and the monitoring of marine habitats and species.²²³ In addition, the Marine Strategy Framework Directive requires Member States to develop a program of measures designed to achieve or maintain good environmental status of all marine waters by 2020.²²⁴ This will obviously influence the scope for the future development of the offshore wind energy development in maritime spaces where there is legal protection afforded to biodiversity.

EU regulatory measures on carbon capture and storage

One of the areas where we can see the EU taking the lead within the international community regarding the use of new technologies relates to the manner in which it has developed an innovative and precautionary approach to the law and policies on carbon capture and storage (CCS). The package of regulatory measures, which permits the use of the seabed for such a purpose, has its origin in the 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter of 29 December 1972 (the London Convention).²²⁵ As is well known, the capture, transport and ultimate storage of greenhouse gases (mainly CO₂) in geological formations are industrial processes that rely heavily on the application of new technologies, which when fully tested and proven may well help in mitigating the effects of climate change. For this reason they are sometimes referred to as "mitigation technologies" in the specialist European literature

²²³ See, for example, the development of sensors by Smart Bay in Ireland. Further information is available at <http://smartbay.ie>.

²²⁴ Directive 2008/56/EC, OJ L 164, 25 June 2008, at 19-40.

²²⁵ 1046 UNTS 120, 11 *ILM* 1294 (1972); 36 *ILM* 1. See Louise De La Fayette, "The London Convention 1972: Preparing for the Future," *International Journal of Marine and Coastal Law* 13 (1998), 515.

dealing with climate change.²²⁶ The use of such technologies has provoked considerable debate and opposition both within and outside of the EU and has been the focus of much work by multilateral and regional bodies that deal with law of the sea matters including the OSPAR Commission. The latter has highlighted two difficulties if such technologies are to be applied successfully in Europe, namely: the management of the environmental risks associated with the use of such technologies, and secondly, the removal of commercial barriers to the deployment of CCS.²²⁷

Despite these difficulties, the EU is committed to supporting the use of CCS and has provided finance for the establishment of a dozen demonstration projects to test and prove such technologies by 2015.²²⁸ In parallel, it has adopted several regulatory and policy initiatives to advance the use of the related technologies at a pan-European level. Most notably, the EU adopted a Directive on the storage of CO₂ at geological sites for the purposes of permanent storage in 2009.²²⁹ This instrument applies to the marine environment and thus provides a legal framework for the storage of CO₂ at sites in the seabed of the EEZ and in the continental shelves of the Member States.²³⁰ The Directive is enabling or permissive in so far as it does not mandate the use of such technologies but leaves it up to individual Member States to exercise their discretion in relation to such matters.

This instrument is supplemented by a number of guidance documents addressing matters such as risk assessment, monitoring, the role and responsibilities of the competent authorities in the Member States, as well as financial security.²³¹ Despite the drive towards the harmonization of EU measures on CCS, the approach of the Member States to this subject differs considerably with some Member States, such as Ireland, adopting a risk adverse approach and prohibiting storage in the continental shelf until the technology is fully established and the potential risks of pollution of the marine environment are fully known and abated.²³² Other Member States, such as the Netherlands, have authorized, with the approval of the Commission, permanent storage of CO₂ in the Dutch EEZ.

In March 2013, the European Commission published a consultative paper on CCS in Europe in order to stimulate debate on how best to promote its future development and

²²⁶ Ronán Long, "Irish practice on the Law of the Sea 2011," *Irish Yearbook of International Law 2011* (Oxford: Hart Publishing, 2013), 103-126, especially at 108-111.

²²⁷ OSPAR Commission, Assessment of climate change, mitigation and adaptation, (London, OSPAR, 2009) at 16.

²²⁸ European Commission Communication on the Future of Carbon Capture and Storage in Europe, COM(2013) 180 final, Brussels, 27 March 2013.

²²⁹ Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide, OJ L 140/114, 5 June 2009.

²³⁰ Article 2 of Directive 2009/31/EC.

²³¹ Available at: http://ec.europa.eu/clima/policies/lowcarbon/ccs/implementation/documentation_en.htm.

²³² Ronán Long, "Irish practice on the Law of the Sea 2011," *supra* note 226.

application as a robust climate change mitigation tool.²³³ One of the key findings reported in this paper is that CCS will require considerable public subvention if it is to prove commercially viable as a mitigation technology. Instructively, the only example of commercial success of this technology in Europe (admittedly outside of the EU) has arisen out of the fiscal measures that are applied under the Norwegian tax code to the gas and oil producers on the continental shelf, which has led to the commercial development of CCS at Snøhvit and Sleipner.²³⁴ Elsewhere, the EU demonstration CCS projects appear to have run into planning law and financial difficulties in several Member States.²³⁵ Moreover, such difficulties are compounded by the EU emissions trading system, which has not delivered on original expectations, and this, according to the European Commission, is one of the reasons why commercial entities have been slow to invest in the new technologies. In spite of these setbacks, the European Commission continues to support the development and application of CCS technologies as a key component of its climate change and energy policy up to and beyond 2030.²³⁶

Does the EU marine environmental approach to climate change reflect international best practice?

The answer to this question appears to be in the affirmative in so far as the EU approach is consistent with contemporary developments in international law concerning the implementation of the precautionary principle and the principle that the polluter should pay. Furthermore, the aforementioned measures appear to be in full compliance with the 1982 Convention, which provides the overarching framework for addressing climate change mitigation and adaptation measures pertaining to the ocean, in so far as it regulates nearly all maritime activities and prohibits expressly pollution.²³⁷ The latter term is defined expansively therein to include the introduction of substances and 'energy' resulting in deleterious effects to the marine environment and this definition thus extends to cover greenhouse gas emissions.²³⁸ Furthermore, the EU, as a Party to the 1982 Convention and many related international agreements, must control and regulate pollution by means of a panoply of complementing measures, including due diligence, environmental impact assessment, and the use of best available technology, as well as by the application the

²³³ European Commission Communication on the Future of Carbon Capture and Storage in Europe, COM(2013) 180 final, Brussels, 27 March 2013.

²³⁴ *Ibid.*, at 23.

²³⁵ *Ibid.*

²³⁶ Green Paper, A 2030 framework for climate and energy policies, COM(2013) 169 final, Brussels, 27 March 2013.

²³⁷ UNCLOS, Part XII and Articles 194, 207 and 212.

²³⁸ *Ibid.*, Article 1(1)(4).

precautionary approach and "best environmental practices."²³⁹ Significantly, due diligence has been described by ITLOS in the *Advisory Opinion* as a "variable concept" that "may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge."²⁴⁰ This conforms closely with the findings of the ICJ in the *Pulp Mills* case that due diligence entails amongst other matters, the adoption of appropriate rules and measures, vigilance in their enforcement, "careful consideration of the technology to be used,"²⁴¹ as well as EIA.²⁴²

The fact that there was no evidence to support the claim of Argentina that the mill in the *Pulp Mills* case was not "best available technology-compliant," in terms of the discharges of effluent for the pulp produced, had a major bearing on the outcome of that particular case.²⁴³ In their Advisory Opinion, ITLOS also upheld the ICJ's invocation of the precautionary approach in the *Pulp Mills* case and its applicability to seabed mining. Similar to the obligation placed on States Parties, the EU must therefore apply a precautionary approach as an integral part of its due diligence obligations "in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there are plausible indications of potential risks." In relation to EIA, the Tribunal concluded that it was "a direct obligation under the [1982] Convention and a general obligation under customary international law."²⁴⁴ This strongly suggests that the EU climate change policy as it applies to the marine is consistent with international best practice on key aspects including the need for a precautionary approach, due diligence, and EIA.

Conclusions

How does one conclude? If one starts with primary sources of law, then it is patently evident that the European treaties set down clear obligations on the EU regarding the advancement of science and technology as core objectives that are central to European integration.²⁴⁵ The EU is also required to adopt appropriate measures for the protection and preservation of the marine environment.²⁴⁶ In doing so, the EU is compelled to take account

²³⁹ Seabed Disputes Chamber of the International Tribunal for the Law of the Sea, Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Advisory Opinion, (1 February 2011).

²⁴⁰ ITLOS Advisory Opinion, para. 135.

²⁴¹ Case Concerning Pulp Mills on the River Uruguay (Argentina v Uruguay) (Judgment) ICJ Reports 2010, para. 223.

²⁴² For one perspective on these points, see Alan Boyle, "Pulp Mills Case: A Commentary," presented at the BIICL, at 4, available at www.biicl.org/files/5167_pulp_mills_case.pdf.

²⁴³ Case Concerning Pulp Mills, para. 225.

²⁴⁴ ITLOS Advisory Opinion, para. 145.

²⁴⁵ Article 3(3) of the TEU.

²⁴⁶ Articles 191-193 of the TFEU.

of available scientific and technical data in preparing its policy on the environment. Disappointingly, the Member States have not adopted a harmonized approach to the implementation of the provisions in Part XIII of the 1982 Convention on marine scientific research.²⁴⁷ On the other hand, there is an elaborate range of marine environmental secondary legislation that is science-based in orientation and substance including the Marine Strategy Framework Directive, the Water Framework Directive, and the Habitats and Birds Directive.

As seen above, however, despite the diverse and sophisticated nature of this new generation of legal instruments, there remains considerable scope in the EU for conflict between users of the marine environment, such as shipping and fishing industries, as well as the energy sector. This challenge is exacerbated by the trans-boundary nature of some of these conflicts and the absence of effective management systems underpinned by the rule of law at local, national and regional levels. In this context, one contemporary development in EU law, which must be both flagged and welcomed, is the new Directive on maritime spatial planning.²⁴⁸ This instrument, when adopted by the EU legislature, will not detract from the powers of the Member States, who continue to retain full discretion regarding the types of development to be undertaken in the marine environment, the location and financing of industrial and commercial activities, as well as other related spatial planning matters. Nevertheless, worth noting from the point of view of this chapter, the implementation of marine spatial planning and integrated coastal management is to be based upon best available scientific knowledge.²⁴⁹

Assuming that these trends are set to continue, the integration of scientific knowledge into policy choices and the application of new technologies, will continue to pose many legal and practical problems for the EU, as well for public and private entities in the Member States. These problems are most acute in relation to the management of fisheries and in the various regulatory and policy attempts to address the human tragedy of irregular migration by sea. In some respects, we are living in both the spring of hope and the winter of despair,²⁵⁰ where science and technology are striving continuously to define the scope and nature of EU law with a view to securing the goals of economic prosperity, the upholding of human rights, the advancement of the European social-democratic governance model, as well as protecting the natural environment.²⁵¹

Undoubtedly, in these ephemeral times, science and technology are influencing all aspects of human interactions with the ocean. Thus, it may be appropriate to finish with a few lines from the poet William Butler Yeats, some of whose poems touch upon the fragility and relentless nature of the passage of time and life, with many references to the sea,

²⁴⁷ Long, *supra* note 7.

²⁴⁸ Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning OJ L 257, 28.8.2014, 135–145.

²⁴⁹ *Ibid.*, Recital 18.

²⁵⁰ C. Dickens, *A Tale of Two Cities* (1859), Book 1, at 1.

²⁵¹ Article 3 of the TEU.

including the epic: *Cuchulain's Fight with the Sea*. Here is one of my favorites from a later collection, which dwells upon the transient nature of life:

To a Child Dancing in the Wind

*Dance there upon the shore;
What need have you to care,
For wind or water's roar?
And tumble out your hair
That the salt drops have wet;
Being young you have not known
The fool's triumph, nor yet
Love lost as soon as won,
Nor the best labourer dead
And all the sheaves to bind.
What need have you to dread
The monstrous crying of the wind?*