

Appendix II Annotated Bibliography: Highly to Moderately Relevant Citations

- 1 AquaEnergy, Ltd. (2006). *Makah Bay Offshore Wave Energy Pilot Project: FERC Docket No. D102-3-002: Preliminary Draft Environmental Assessment*. U.S. Federal Regulatory Energy Commission, . 179 pp. Available from http://www.oreg.ca/docs/environmental_assessment_Makah_Bay.pdf

The Preliminary Draft Environmental Assessment of the pilot deployment of four AquaBuOYs (total 1MW) in Makah Bay, Washington resulted in a finding of “no significant impact.” Consequently, the draft is in essence the FEIS. The offshore area proposed is 60’ by 240’ with an accompanying terrestrial area. The assessment discusses siting and potential impacts on the environment and users. This siting was affected by its proximity to a national marine sanctuary, a national wildlife refuge, and tribal lands and resources. The offshore portion was mainly used for tribal and recreational fishing, recreational boating, and general marine recreation. Much of the potential conflict was mitigated by siting the offshore and onshore project components in the least sensitive areas in consultation with the tribe and other users. The document states that an exclusion zone for fishing and navigation would need to be established to protect the project and to maintain human safety.

- 2 Ban, Natalie C., Alidina, Hussein M., & Ardron, Jeff A. (In Press (2010)). Cumulative impact mapping: Advances, relevance and limitations to marine management and conservation, using Canada’s Pacific waters as a Project/Case Study. *Marine Policy*

The authors expand methods for analysis of cumulative human impacts on the marine environment at a regional scale. The study’s results suggest percentages for attributing impacts to different sectors. It notes recent advances but remaining limitations in mapping cumulative impacts.

- 3 Barbier, Edward B. (2009). Ecosystem Services Trade-offs. In Karen L. McLeod & Heather Leslie (Eds.), *Ecosystem-Based Management for the Oceans* (pp. 129-145). Washington, D.C.: Island Press. Available from <http://bit.ly/dc8nwr>

Using the context of marine ecosystems, Barbier explains the utility of valuing ecosystem services when using them or making policy or legislative decisions regarding their use. (Ecosystem services refer to effects or uses resulting from physical, biological and chemical functions and processes. Examples of these services are flood control or water supplies.) The development of an accurate accounting framework would reveal which values may be lost when ecosystems are impaired or destroyed. The process of assigning meaningful or accurate values to ecosystem services is difficult. Yet, this challenge must be addressed in order to allow economic valuation to contribute to ecosystem based management. Barbier proposes a multiservice production function model to help understand and describe

the interactions of various services and the benefits they convey. An integrated mangrove-coral reef-sea grass ecosystem is presented as an example.

4 Bean, Martha, Fisher, Larry, & Eng, Mike (2007). Assessment in Environmental and Public Policy Conflict Resolution: Emerging Theory, Patterns of Practice, and a Conceptual Framework. *Conflict Resolution Quarterly*, 24(4), 447-468

The authors argue for a comprehensive but flexible conceptual framework for assessment of environmental conflict resolution. In analysis of highly sought after best practices for conducting environmental conflict resolution, this piece is most useful for history and critiques of so-called "best practices."

5 Beaumont, N.J., Austen, M.C., Atkins, J.P., Burdon, D., Degraer, S., Dentinho, T.P., et al. (2007). Identification, definition and quantification of goods and services provided by marine biodiversity: Implications for the ecosystem approach. *Marine Pollution Bulletin*, 54, 253-265. Available from <http://www.vliz.be/imisdocs/publications/118829.pdf>

The authors provide and demonstrate an analytical framework for assessing the values of biologically diverse ecosystem goods and services in the marine environment. They argue that the values are directly dependent on the health of the entire system. Assigning values before and after a human use is difficult. That combined with the short time horizon of human policy decisions and a lack of sufficient data about marine systems leads the authors to conclude that realistic and consistent quantification and comparison of ecosystem goods and services is not possible at this time. They call for continued development of cohesive approaches to valuation, and creation of a database of marine case studies to aid comparison of services. These actions would increase the viability of using ecosystem service quantification and valuation in decision-making.

6 Beck, Michael W., Ferdaña, Z., Kachmar, J., Morrison, K.K., & Taylor, P. (2009). *Best Practices for Marine Spatial Planning*. Arlington, VA.: The Nature Conservancy. 32 pp. Available from www.nature.org/initiatives/marine/files/msp_best_practices.pdf

In 2009, The Nature Conservancy convened a workshop on marine spatial planning at the University of California, Santa Cruz attended by 20 practitioners with marine spatial planning experience in more than 20 regions of the United States, Canada, and other nations. The session's goal was to provide advice on best practices for marine spatial planning around key issues based on the experience of the participants. The focus was not on a comprehensive list of steps but on certain critical points in the marine planning process. The advice is divided into sections on

geographic planning boundaries, planning scale and resolution, data collection and management, multi-objective planning and interactive decision support.

7 Berkenhagen, Jörg, Döring, Ralf, Fock, Heino O., Kloppmann, Matthias H. F., Pedersen, Søren A., & Schulze, Torsten (2010). Decision bias in marine spatial planning of offshore wind farms: Problems of singular versus cumulative assessments of economic impacts on fisheries. *Marine Policy*, 34(3), 733-736

The current approval procedure for wind farm proposals in the German EEZ only considers site specific conflict analysis between the wind farm and fisheries. Due to the relatively small spatial coverage of the sites, potential opportunity losses to the fisheries are considered low or negligible. Cumulative effects on fisheries that will occur once all proposed wind farms are in place are not considered adequately but are thought to be quite substantial. In particular, opportunities to catch such valuable species as flatfish will be considerably reduced. The authors include an analysis of conflict potential. The authors note that 500 meters are added on to the perimeter of the proposed wind farm for security reasons; this significantly enlarges the closed area. The authors argue that piecemeal decision-making fails to take into account the aggregate impact of the final project on other uses or the environment.

8 Bess, Randall, & Rallapudi, Ramana (2007). Spatial Conflicts in New Zealand Fisheries: The Rights of Fishers and Protection of the Marine Environment. *Marine Policy*, 31, 719-729

The authors indicate the need for greater effort to harmonize and balance space allocations with protection of the marine environment and existing use by fisheries resources. They question whether the New Zealand Ocean Plan's dedication of 10 percent of ocean space to indigenous fishers will effectively address the conflicts between fishermen while resolving the government's missions both to protect the environment and promote fishing.

9 Biodiversity Committee. OSPAR Commission (2005). *Guidance on Assessments of the Environmental Impacts of, and Best Environmental Practice for, Offshore Wind-Farms in Relation to Location* (Report). London: OSPAR Commission. Available from <http://www.tematea.org/?q=node/3548&PHPSESSID=4e1b4ab1a169b0d84d441c49d70bb734>

The OSPAR Commission is the body interpreting and enforcing the Convention for the Protection of the Marine Environment of the North-East Atlantic. These guidelines cover a broad range of possible conflicts. The focus is on environmental effects, so protected areas and those of special biological value are of particular

interest. However, effects of wind farms on other uses are considered. These include marine transportation, military operations, fishing, aesthetics, cables and pipelines, dredging and archaeology. The guidelines include resolution and mitigation strategies such as avoidance of sensitive areas or existing uses (i.e., shipping lanes), phased planning and selection of appropriate areas.

10 Blæsbjerg, Mette, Pawlak, Janet, Sørensen, Thomas Kirk , & Ole, Vestergaard. (2009). *Marine Spatial Planning in the Nordic region - Principles, Perspectives and Opportunities*. Copenhagen. 98 pp. Available from <http://bit.ly/bNo3hb>

This introduction and discussion of Nordic marine spatial planning is intended for planners and managers in local, national and regional administrations, policy-makers, interest groups and actors across different maritime sectors, as well as researchers and students. The authors argue that new approaches and commitments for sustainability are needed in light of increasing demands and activities in the marine area that threaten the area's future use and viability. The authors consider marine spatial planning as an integrated approach to managing the multiple and potentially conflicting uses of the sea. They describe efforts to address a set of key questions relating to marine spatial planning in a Nordic context. The resulting effort integrates, synthesizes and disseminates knowledge from recent and developing Nordic activities.

11 Boyd, James, & Banzhaf, Spencer (2007). What are ecosystem services: The need for standardized environmental accounting units. *Ecological Economics*, 63, 616-626. Available from <http://www.epa.gov/nhr/sup1/arm/streameco/docs/BoydBanzhaf07.pdf>

Boyd and Banzhaf argue that the ecosystem services approach is too ad hoc to be of practical use and that units applicable to welfare accounting have not been developed. Using economic principles, they devise a system of ecosystem service units that allow these services to be compared with conventional goods and services found in the GDP and other national frameworks. The authors propose that their unit system could be employed for environmental performance measurement by governments and institutions, and in environmental markets.

12 Brody, Samuel D., Highfield, Wes, Arlikatti, Sudha, Bierling, David H., & Ismailova, Roubabah M. (2004). Conflict on the Coast: Using Geographic Information Systems to Map Potential Environmental Disputes in Matagorda Bay, Texas. *Environmental Management*, 34(1), 11-25

These authors employ geographic information systems to map potentially competing stakeholder interests associated with establishing protected areas in Matagorda Bay, Texas. Their strategy is proactive, taking place in the planning phase

before a conflict arises. The range of tools for assessing stakeholder preferences includes Multiple Criteria Decision Analysis, Spatial Decision Support Systems, and GIS. The authors explain the strategy of pinpointing and mapping spatial areas where conflict between existing users would likely develop. Therefore, this strategy is one of conflict avoidance and is akin to marine spatial planning in advance of designing a marine protected area.

13 Brown, Colin, & Stanley, J.M. (2005). *MCA / RAF wind farm trials March 2005: Report of the trials undertaken on March 22nd 2005 by the Maritime and Coastguard Agency and C Flight 22 Squadron Royal Air Force, RAF Valley, Anglesey.U.K.* Maritime and Coastguard Agency, and Royal Air Force. 32 pp. Available from http://www.windstop.org/images/helicopter_wind_farm_sar_trials-2.pdf

Those involved with military operations including search and rescue have concerns with adverse effects on marine shore-based radar systems. This study examines how wind farms may affect search and rescue efforts using helicopters. The results indicate that radio communications from and to the aircraft operate satisfactorily, as does their VHF homing system. Vessels, turbines and personnel in the wind farm are clearly identifiable on the aircraft's thermal imaging system when operating in dry weather conditions. No compass deviations are experienced. However, there could be limitations on the use of helicopters in off-shore wind farms that would have an impact on search and rescue operations around wind farms. There are significant radar side lobe returns from structures limiting target detection when vessels are near the turbines. Some wind farms operators are unable to remotely lock turbine blades in rotation and in yaw. There are limitations in approach distances from turbines in clear weather. Restricted visibility makes surface rescues within wind farms impossible. Helicopters as radar search platforms are limited if the wind farm is large and has irregularly spaced turbines. Thermal imaging in conditions of mist or precipitation is limited. Radar tracking of helicopter movements within wind farms is generally poor. Aircraft power requirements increase down-wind of the wind farm.

14 Buck, Bela H., Krause, Gesche, & Rosenthal, Harald (2004). Extensive Open Ocean Aquaculture Development Within Wind Farms in Germany: The Prospect of Offshore Co-Management and Legal Constraints. *Ocean & Coastal Management*, 47, 95-122

Increased use of the German coastal and EEZ waters leads to larger areas dedicated for specific, often exclusive uses thus multiplying conflicts among interest groups. The example of offshore wind farms and open ocean aquaculture is used to analyze the multifunctional use of space. Following presentation of a case study, the authors state that any attempt to establish sustainable multifunctional utilization of offshore must be preceded by efforts to build an integrated regulatory framework given the unique set of rights and duties. Existing frameworks are not set up to support new

management techniques or the variety of conflicts and constraints in the marine environment.

15 Capitini, Claudia, Tissot, Brian, Carroll, Matthew S., Walsh, William J., & Peck, Sara (2004). Competing Perspectives in Resource Protection: The Case of Marine Protected Areas in West Hawaii. *Society and Natural Resources*, 17(9), 763-778

The protection of coral reefs from aquarium fish collecting along the coast of western Hawaii involve several parties included aquarium fish collectors, dive tour operators, Hawaii Division of Aquatic Resources, reef protection advocates, and state actors. An attempt was made to resolve the controversy through legislation, environmental dispute resolution and negotiated agreements based on the best available scientific information. The authors suggest that scientific perspectives framed and dominated the resolution process to the perceived detriment or underrepresentation of some community perspectives. The resulting agreement established reef protection in the form of marine protected areas, but negotiated enforcement procedures were reversed, revealing that not all stakeholders were supportive of the agreement. The authors argue that this reversal resulted in fewer effective enforcement provisions and marginalization of the broader community's role in resource management.

16 Centaur Associates Inc. (1981). *Assessment of space and use conflicts between oil and gas industry and commercial and recreational fishermen*. Springfield, VA: U.S. Department of the Interior, Bureau of Land Management, New York OCS Office. 5 volumes .

This study in the Gulf of Mexico, Atlantic, and California OCS lease sale regions reviews historical, ongoing and potential conflicts between OCS oil and fishing industries. It develops a predictive catch loss model due to space loss by OCS oil structures. It also assesses the ability of particular harbors to accommodate oil support vessels and staging operations. The gear seen as most likely to conflict with oil structures are otter trawls, bottom dredges, and purse seines. Submerged wellheads, pipelines, and other sub-sea structures are the most hazardous for these gear types. Structure-related debris and activities cause more problems to fishermen than the actual oil structures. Most significant projected catch losses are related to otter trawl fisheries in the North Atlantic, Mid-Atlantic, and Eastern Gulf of Mexico regions. Fishery expansion is not expected to be significant in most areas.

17 Christie, Donna R., & Hildreth, Richard G. (2007). *Coastal and Ocean Management Law in a Nutshell* (Third ed.): Thomson West. 446 pp.

This standard and succinct ocean and coastal law reference volume in conjunction with the text by Kalo et al. (2007) provides basic background for marine and coastal

issues and brief explanations of the public trust doctrine and relevant U.S. ocean and coastal laws.

18 Cicin-Sain, Biliana, & Tiddens, Art (1989). Private and public approaches to solving oil/fishing conflicts offshore California. *Ocean Shoreline Management*, 12(3), 233-251

The authors surveyed commercial fishermen to assess the impacts of oil operations in California. They report impacts including expected area displacement effects typical in other oil/fishing conflict cases, as well as the unleashing of a chain of events which also affects fishermen working in other locations and fish processors whose supply sources and markets may be disrupted. Efforts to mitigate negative effects on the fishing industry have been made in both the private and public realms with mixed results. The authors conclude that in conflict cases involving publicly owned resources and pitting contestants of unequal power, private mediation should not become a replacement for, but only a supplement to, public decision-making.

19 Connelly, Stephen (2006). Looking inside public involvement: how is it made so ineffective and can we change this? *Community Development Journal*, 41(1), 13-24

Connelly approaches public involvement in decision making as both a product and a process. He observes that the government entity cannot control public involvement where stakeholders have conflicting perspectives and agendas. However, the complex process can be managed better. The author suggests that effective public involvement needs to be strategic, involve alliances with conveners, and work to influence both the public involvement processes and the policy development processes.

20 Cormick, Gerald W., & Knaster, Alana (1986). Oil and Fishing Industries Negotiate Mediation and Scientific Issues. *Environment*, 28(10), 6-30

Cormick and Orr consider if the success of mediation as an approach to conflict resolution is appropriate when scientific and environmental issues are involved. Mediated negotiations and similar processes have increasingly been used during the past decade to resolve a variety of disputes over such public policy issues as the use and allocation of natural resources. As of 1986, the total number of disputes mediated was relatively small, yet many issues had been successfully settled. Consequently, mediation is a widely accepted public policy option. The authors suggest caution when mediating environmental conflicts and remind those involved that the technique has its origins in a very different realm – labor-management disputes.

21 County of Santa Barbara. Planning & Development Department. Energy Division (2008). *Santa Barbara County Coastal Resource Enhancement Fund Guidelines*. County of Santa Barbara. 17 pp. Available from <http://www.countyofsb.org/energy/documents/mitigation/GUIDE2-12-08.pdf>

In 1987 Santa Barbara County established the Coastal Resource Enhancement Fund in response to increasing oil and gas facility development in coastal waters (specifically, Exxon's Santa Ynez Unit Project, Plain's Point Arguello Project, Equilon's Gaviota Terminal, and Torch's Point Peernales Project). The fund is designed to provide financial support for project-specific impact mitigation and cumulative impacts to users of affected coastal resources. In assigning impact values, the following factors are considered: area affected by impact; duration of impact; frequency of impact; extent to which impact exceeds impact significance criteria; number of project components contributing to the impact; number of people affected; quality of resource prior to impact; and priority given to impacted resource in the Local Coastal Program and other elements of the County's Comprehensive Plan. The guidelines provide an example of a structured assessment of impact and a process for assigning support.

22 Cowling, Richard W., Egoh, Benis, Knight, Andrew T., O'Farrell, Patrick J., Reyers, Belinda, Rouget, Mathieu, et al. (2008). An operational model for mainstreaming ecosystem services for implementation. *Proceedings of the National Academy of Science (PNAS)*, 105, 9483-9488. Available from <http://www.pnas.org/cgi/doi/10.1073/pnas.0706559105>

The authors propose a pragmatic operational model for achieving the safeguarding of ecosystem services. The model comprises three phases: assessment, planning, and management. The authors state that following the phases would empower stakeholders to implement effective on-the-ground management that would safeguard ecosystem services while achieving resilience of the corresponding social-ecological systems.

23 Crowder, Larry, & Norse, Elliott (2008). Essential ecological insights for marine ecosystem-based management and marine spatial planning. *Marine Policy*, 32, 772-778. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

Given the complexity of marine ecosystems, Crowder and Norse posit that preventing systemic stress is a better management strategy than fixing degraded systems. They argue that successful place-based management must align governance objectives with stakeholder incentives. Marine spatial planning must

integrate socio-economic and governance concerns to adequately protect ecosystems and promote sustainable use of marine resources.

24 Douvere, Fanny (2008). The importance of marine spatial planning in advancing ecosystem-based sea use management. *Marine Policy*, 32(5), 762-771. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

Douvere provides a brief history of the use of marine spatial planning from its early use in developing marine protected areas, e.g., the Great Barrier Reef Marine Park. More recently, marine spatial planning has been implemented as a tool for managing the multiple use of marine space, especially in areas such as the North Sea that feature conflicts between ocean users. The author finds that the scope of marine spatial planning is not clear and terms such as integrated management, marine spatial management, and ocean zoning are used inconsistently. This lack of consistency impedes the progress of marine spatial planning's adoption at higher levels of policy and decision-making in most countries. Douvere describes the core objectives of the approach and why it is an essential step to achieve ecosystem-based ocean use management, and how it can better defined. She concludes with an analysis of its international use and achievements.

25 Downs, Michael A., Coughlin, Eric, & Kea Environmental Inc. (2000). *Using Commercial Fishing and Marine Environmental Data in Assessing the Differential Distribution of Social Impacts of Marine Conservation and Development*. Paper presented at the 2000 ESRI User Conference Proceedings. online. Available from <http://proceedings.esri.com/library/userconf/proc00/professional/papers/pap805/p805.htm>

The authors discuss the use of geographic information in anticipating social impacts associated with fisheries management. Two case studies are used, one focusing on resource protection planning in the U.S. Virgin Islands and one on underwater fiber optic cable development in Southern California's coastal waters. Their work is useful as a technical discussion on the use of GIS to identify the geographic distribution of potential impacts to commercial fishing activity. Its main limitation is its focus on the identification and description of potential conflict, rather than its resolution or mitigation.

26 Drew, Stephen C., & Hopper, Alan G. (2009). *Fishing and Submarine Cables: Working Together*. Lymington: International Cable Protection Committee. 54 pp. Available from http://www.iscpc.org/information/Only%20Published%20Members%20Area%20Items/ICPC_Fishing_Booklet_Rev_2.pdf

This booklet is intended to help fishermen avoid accidentally catching submarine cables. It provides information on what fishermen should do if their gear becomes snagged in a cable area. Improved communication is highlighted as a means to avoid conflict between cable installations and commercial fishing, particularly the availability and utility of cable awareness charts.

27 Dukes, E. Franklin (2004). What We Know About Environmental Conflict Resolution: An Analysis Based on Research. *Conflict Resolution Quarterly*, 22(1-2), 191-220

Duke reviews various forms of environmental conflict resolution and their success. The focus is on the U.S. and includes federal agencies such as Department of the Interior, Environmental Protection Agency and Federal Energy Regulatory Commission. The author provides a useful summary of legal cases and the state of environmental conflict resolution in the U.S., though the paper does not address the marine and coastal areas.

28 Ecotrust (2009). *Marine Fisheries Uses and Values Project In support of the Oregon Territorial Sea Plan Revision*. Portland. 15 pp. Available from http://www.ecotrust.org/tsp/TSP_values_project.pdf

Ecotrust, a non-government organization focusing on economic opportunity, social equity and environmental well-being, worked with commercial fishermen to bring their expert knowledge directly to bear on marine planning processes. The organization is compiling comprehensive maps that illustrate the commercial and consumptive recreational fishing use patterns and values along the Oregon coast. Fishermen share their knowledge of their fishing grounds and have a forum in which to express their values. The project engages stakeholders, provides better information to the planning process, and integrates the human dimension into marine spatial planning.

29 Ehler, Charles (2008). Conclusions: Benefits, lessons learned, and future challenges of marine spatial planning. *Marine Policy*, 32(5), 840-843. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

Ehler summarizes the principal conclusions from papers presented in a special issue of *Marine Policy* on marine spatial planning. In general, the paper identifies potential economic, ecological, and administrative costs and benefits that might be realized from the implementation of MSP, summarizes lessons learned, and identifies future challenges and directions for MSP, including the development of international guidelines for its implementation.

30 Ehler, Charles, & Douvere, Fanny (2009). *Marine Spatial Planning: a step-by-step approach toward ecosystem-based management* (Vol. 53). Paris: UNESCO. 99 pp. Available from http://www.unesco-ioc-marinesp.be/msp_guide

UNESCO's Marine Spatial Planning guide describes how marine spatial planning can be developed and implemented. Most steps are illustrated with relevant examples from the real world. The guide is primarily intended for professionals responsible for planning and managing marine areas and their resources. Most managers have strong scientific or technical backgrounds, but few have been trained as professional planners or managers. The guide attempts to fill this gap by using a step-by-step approach for developing and implementing marine spatial planning. It gives an understanding of the different tasks, skills and expertise needed to develop and maintain marine spatial planning efforts. It also discusses issues such as obtaining financial resources, organizing stakeholders, or monitoring and evaluating performance.

31 Ekeboom, Jan , Jäänheimo, Jenni , Reker, Johnny, Kindström, Merit, Lindblad, Cecilia, Mattisson, Annelie, et al. (2008). *Towards Marine Spatial Planning in the Baltic Sea*. Copenhagen: Baltic Sea Management – Nature Conservation and Sustainable Development of the Ecosystem through Spatial Planning (BALANCE). 137 pp. Available from <http://balance-eu.org/xpdf/balance-technical-summary-report-no-4-4.pdf>

This effort seeks to present a holistic approach to marine spatial planning within the multinational context of the Baltic Sea Region. The approach combines ecological health, multiple human uses, a spatial planning template, and a zoning classification system that allows for all human uses while minimizing the impact on the marine environment. The zoning classification consists of four zones - the General Use Zone, the Targeted Management Zone, the Exclusive Use Zone, and the Restricted Access Zone. The document provides a set of GIS tools including GIS data layers that can be used in marine spatial planning and guidelines for how to communicate with stakeholders. The document is a general planning guide and, as such, does not include specific examples of conflict resolution or mitigation, but rather methods for conflict avoidance and minimization. Its methodology and recommendations build upon internationally developed templates, and are thoughtful and thorough.

32 Elcock, D., & U.S. Department of the Interior, Minerals Management Service (2006). *Potential Alternative Energy Technologies on the Outer Continental Shelf*. Argonne National Laboratory, Environmental Science Division. 68 pp. Available from http://ocsenergy.anl.gov/documents/docs/ANL_EVS_TM_06-5.pdf

This memorandum describes the technology requirements for offshore wave, wind and current projects on the U.S. Outer Continental Shelf. For each of the

technologies, the authors present an overview and a description of the technology requirements for four development phases: site monitoring and testing, construction, operation, and decommissioning. Although all of these technologies continue to develop, this remains a solid reference for explanations of each.

33 English, Mary R., Gibson, Amy K., Feldman, David L., & Tonn, Bruce E. (1993). *Stakeholder Involvement: Open Processes for Reaching Decisions about the Future Uses of Contaminated Sites: Final Report*. Knoxville: Waste Management Research and Education Institute. 110 pp. Available from <http://eerc.ra.utk.edu/publications/staff-reports/stake.pdf>

The authors detail a set of recommendations on engaging stakeholders in a land-use decision making setting. They describe the sequence of actions leading up to a decision, including mechanisms and techniques for stakeholder involvement. They briefly review the basic elements of an open process including goal determination, design of the process, and the way in which the issue at hand is to be analyzed. They note the importance of expressing values early in the process before objectives or alternatives are posited. They explain how different mechanisms can have different purposes, and how mechanisms can be used in a complementary fashion at various points in the total process.

34 Executive Office of Energy and Environmental Affairs (2010). Final Massachusetts Ocean Management Plan. Boston: Commonwealth of Massachusetts. Available from <http://bit.ly/8Zid03>

The 2008 Massachusetts Oceans Act directs the Secretary of Energy and Environmental Affairs to develop a comprehensive ocean management plan by December 31, 2009. The final plan along with the draft plan and technical reports, and information on the ocean planning process provide insight into the complexity of planning at the state level. It is one example of state level planning that establishes measures to minimize conflict among users.

35 Fisher, Brendan, Turner, R.Kerry, & Morling, Paul (2009). *Defining and classifying ecosystem services for decision making*. Norwich: Centre for Social and Economic Research on the Global Environment. 19 pp. Available from http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2007_04.pdf

Fisher, Turner and Morling present a definition and classification scheme for ecosystem services. They offer an operational definition of ecosystem. They argue that any attempt to classify ecosystem services should be based on the characteristics of the ecosystems of interest and the decision context being used. Ecosystem variability dictates that no single classification scheme is adequate for

the many contexts in which ecosystem service research may be utilized. The authors provide examples for a decision-making context.

36 Flannery, Wesley, & Cinnéide, Micheál Ó. (2008). Marine spatial planning from the perspective of a small seaside community in Ireland. *Marine Policy*, 32(6), 980-987

The authors describe how and why local coastal communities in small town situated on the southwest coast of Ireland decided to participate in marine spatial planning. The community in question has marine-based tourism and other relatively new uses of the sea alongside traditional fishing activities. There is significant discussion of conflict, but the authors do not focus on conflict. Rather, they explore the use of marine spatial planning at the local level. They found positive acceptance of planning that incorporated meaningful local involvement.

37 Fletcher-Tomenius, Paul, & Forrest, Craig (2000). Historic Wreck in International Waters: Conflict or Consensus? *Marine Policy*, 24, 1-10

There is little reporting of conflicts over cultural and historic conservation in the marine environment. The authors illustrate the importance of understanding the parties' motives, values, and interpretations of important terms in order to begin to address the conflicts between the parties. The authors describe the failure of UNESCO to propose methods to resolve conflict.

38 Foley, Tony (2007). Environmental Conflict Resolution: Relational and Environmental Attentiveness as Measures of Success. *Conflict Resolution Quarterly*, 24(4), 485-504

Foley's article is an example of a critical evaluation of techniques for environmental conflict resolution. It is a literature review of measures of success, and does include brief discussions of two terrestrial case studies. The author concludes that any measures of success of environmental dispute resolution are incomplete unless they fully take environmental conditions and transformation of stakeholders into account.

39 Gilliland, Paul M., & Laffoley, Dan (2008). Key elements and steps in the process of developing ecosystem-based marine spatial planning. *Marine Policy*, 32, 787-796. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

Gilliland and Laffoley report on a workshop session that focused on the process of marine spatial planning. They state that marine spatial planning should be based on

a clear set of principles with a sustainable development purpose drawn from terrestrial land use planning. It should include appropriate planning activity at different spatial scales. Care must be taken when these scales do not align. The timeframe for plans is tending to increase from around 10 to 20+ years. This lengthening requires periodic reviews that enable a balance between stability and relevance. Workshop participants found that planning processes that address conflicts effectively have certain characteristics such as understandable legislation, clear objectives, strong principles and guidance, 'driving' priorities, and strong stakeholder engagement. Conflict is specifically discussed in two brief examples and the use of a goals achievement matrix. The authors recommend that stakeholder involvement start at the beginning of the planning process, and not be ad hoc as each new offshore project is planned.

40 Gleason, Mary, McCreary, Scott, Miller-Henson, Melissa, Ugoretz, John, Fox, Evan, Merrifield, Matt, et al. (2010). Science-based and stakeholder-driven Marine Protected Areas network planning: A successful Project/Case Study from north central California. *Ocean & Coastal Management*, 53(2), 52-68

California's Marine Life Protection Act proposes a statewide network of marine protected areas for sustained ecosystem. The authors describe factors that contribute to a successful regional planning process. These include a legislative mandate, political will, and adequate capacity and funding. They identify strategic principles that guided the design of a transparent public planning process which meet science guidelines and achieve a high level of support among stakeholders. Elements such as spatial data, planning tools, and scientific evaluation are essential for designing, evaluating, and refining alternative marine protected areas. The authors suggested approach to conflict mitigation is allowing stakeholders to select from among alternative proposals rather than simply debating one choice.

41 Gonzalez, Elena, & Interior, U.S. Department of the (2004). *Survey of Federal Departments and Agencies on Use of Environmental Conflict Resolution: DOI Response to Survey*. U.S. Department of the Interior. 14 pp.

The survey was intended to help determine to what extent US agencies are using environmental conflict resolution and what the barriers are to its use within each agency. This response of the Department of Interior indicates that individual projects are funded but that it is up to each department to find the funding. The survey responses provide information on the perceived disincentives to using the method within the agency. The disincentives included a shortage of funding for programs and capacity building for agency personnel and stakeholders, shortage of time, and senior staff commitment for long term projects, some resistance to the method, difficulty collecting and evaluating data on its efficacy, and a perceived lack of rewards for engaging in environmental conflict resolution projects.

42 Gray, Tim, Haggett, Claire, & Bell, Derek (2005). Offshore Wind Farms and Commercial Fishing in the UK: A Study in Stakeholder Consultation. *Ethics, Place and Environment*, 8(2), 127-140

The authors explore the development of wind farms in the U.K. from two industrial perspectives – the developers and commercial fishermen. The core issues of conflict include the adequacy of stakeholder consultation processes, the right to compensation for loss of livelihood, and the lack of adequate data. They analyze the question of compensation to the fishermen and how compensation is viewed by the different parties.

43 Halcrow Group Limited (2006). *Wave Hub Environmental Statement*. South West of England Regional Development Agency. 278 pp. Available from <http://bit.ly/becSvW>

The South West of England Regional Development Agency proposed the Wave Hub project to provide the electrical infrastructure necessary to support and encourage developers of wave energy converters. The project supported a new regional energy policy that included a 60 percent reduction in carbon emissions by 2050 and the South West region's commitment to contribute to the region's renewable energy target of 11 - 15 percent of electricity production by 2010. Possible impacts to commercial, fishing, navigational and various other uses are discussed including possible mitigation through exclusion areas.

44 Hanna, Susan S. (1999). Strengthening Governance of Ocean Fishery Resources. *Ecological Economics*, 31, 275-286

Hanna examines the internal workings of fishery governance and their links to fishery outcomes. She suggests that there are fundamental weaknesses in the way fishery governance works that contribute to sustainability problems. The weak scope and structure of ocean fisheries governance varies with each fishery and with geopolitical regions. However, the substance of the weakness is common across all regions. The author thoroughly discusses transaction costs, and argues that in situations where resource users experience uncertainty caused by governance changes they act to intensify their own use or to act in disregard for the future.

45 Hein, Lars, van Koppen, Kris, de Groot, Rudolf S., & van Ierland, Ekko C. (2006). Spatial Scales, Stakeholders, and the Valuation of Ecosystem Services. *Ecological Economics*, 57, 209-228. Available from <http://bit.ly/bXfyKn>

The authors analyze the spatial scales of ecosystem services, and examine how stakeholders at different spatial scales attach different values to ecosystem services.

They argue that finding a reliable value is possible for some types of services involving production, recreation, and nature conservation. They conclude that when valuing services for management purposes, ecosystem scales must be taken into account. Management plans based on stakeholders' interest at scale are probably not going to be acceptable from the perspective of stakeholders at other scales.

46 Hildreth, Richard G. (1989). *The public trust doctrine and conflict resolution in coastal waters: west coast developments*. Paper presented at the Proceedings of the Sixth Symposium on Coastal and Ocean Management. pp. 2604-2619.

Hildreth argues the public trust doctrine, the principal that certain resources are for the public use and the government should maintain that use, is not of great help in resolving submerged lands use conflicts. The law does not assign priorities among the permissible public trust uses of submerged lands, so other conflict resolution strategies are needed. These include planning to identify potential conflicts, separating exploration and development rights to remove legal impediments to conflict avoidance, using activity schedules, corridors, and buffer zones to avoid conflicts, coordinating federal and state planning and permit processes to reduce conflicts, and providing compensation for unavoidable conflicts.

47 Howard, Martin, & Brown, Colin (2004). *Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle wind farm by QinetiQ and the Maritime and Coastguard Agency*. Southampton: Maritime and Coastguard Agency. 84 pp. Available from http://www.mcga.gov.uk/c4mca/effects_of_offshore_wind_farms_on_marine_systems-2.pdf

The Maritime and Coastguard Agency has responsibility for navigation safety, for the direction and co-ordination of search and rescue operation, and for marine pollution prevention. In this context, the Agency assessed all foreseeable marine safety risks associated with the development of wind farms. The assessment covers scientific and practical operational data on various navigation and communications systems performance within and in the vicinity of offshore wind farms. The investigation includes effects of wind farms on Global Positioning System (GPS); magnetic compasses; Loran C; VHF and other communications; the Automatic Identification System (AIS) ; small vessel radar performance; shore based radar performance; and radar and automatic radar plotting aids (ARPA) carried on larger vessels. The Agency found no significant affects to navigational efficiency or safety. Radar is the one exception.

48 Impact Assessment Inc., Petterson, John S., & Glazier, E.W. (2004). *A Study of the Drift Net Gillnet Fishery and Oil/Gas Industry Interactions and Mitigation*

Possibilities in the Cook Inlet 111 pp. Available from
<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3401.pdf>

This report describes the nature of the gillnet fishery's historic and potential future interactions with offshore oil and gas industry activities. It identifies and assesses appropriate means and venues for mitigating problems that might occur should the fishery and offshore industry eventually interact on the Outer Continental Shelf (OCS) of Cook Inlet. Such mitigation could benefit both forms of enterprise. Findings suggest that the navigational challenges of operating drift gillnet fishing vessels on Cook Inlet can test even the most skilled mariners. Placing stationary object such as a drilling platform in the swift currents of the fishing grounds could increase the challenges and present the possibility for spatial conflict. The research suggests that navigational challenges and spatial conflicts may be avoided through strategic planning and many problems for the drift gillnet fleet can be mitigated. Finally, the research indicates that while oil and gas industry activity on the OCS could affect fishery operations in certain ways, the issue is overshadowed by a host of economic and other challenges.

49 Inger, Richard, Attrill, Martin J., Bearhop, Stuart, Broderick, Annette C., Grecian, W. James, Hodgson, David J., et al. (2009). Marine Renewable Energy: Potential Benefits to Biodiversity? An Urgent Call for Research. *Journal of Applied Ecology*, 46, 1145-1153

Concerns over the potential negative environmental effects of marine renewable energy installations include habitat loss, collision risks, noise and electromagnetic fields. The authors suggest that if appropriately managed and designed, installations may increase local biodiversity and potentially benefit the wider marine environment. They may act as artificial reefs and fish aggregation devices, which have been used previously to facilitate restoration of damaged ecosystems. Installations become de facto marine-protected areas, which have shown some success in enhancing both biodiversity and fisheries. Conflicts over installation could be minimized by involving stakeholders with their planning and implementation. Clear evidence of their potential environmental benefits would help. The authors stress the need for research on the possible environmental benefits to assist policy makers in making key siting decisions that maximize benefits and minimize impacts.

50 Interagency Ocean Policy Task Force (2009a). *Interim Framework for Effective Coastal and Marine Spatial Planning*. The White House Council on Environmental Quality. 35 pp. Available from
<http://www.whitehouse.gov/sites/default/files/microsites/091209-Interim-CMSP-Framework-Task-Force.pdf>

51 Interagency Ocean Policy Task Force (2009b). *Interim Report of the Interagency Ocean Policy Task Force*. The White House Council on Environmental Quality. 38 pp. Available from http://www.whitehouse.gov/assets/documents/09_17_09_Interim_Report_of_Task_Force_FINAL2.pdf

The Interagency Ocean Policy Task Force was charged with developing recommendations for a national policy to protect, maintain, and restore the health of ocean, coastal, and Great Lakes ecosystems and resources. This includes a framework for policy coordination, an implementation strategy that identifies and prioritizes objectives, and a framework for ecosystem-based coastal and marine spatial planning. One goal is to address conservation, economic activity, user conflict, and sustainable use of the ocean, coastal, and Great Lakes resources. The Task Force report states that the US policies, programs, and activities that may have an impact on ocean or coastal ecosystems, or that use ocean or coastal resources, should be developed within an integrated planning framework that addresses potential use conflicts. Marine spatial planning is one of the nine priority objectives proposed. The Task Force provides a definition of marine spatial planning, identifies the reasons for planning, and describes its geographic scope. National planning goals and guiding principles are articulated. The framework described is regional in scope and developed cooperatively among all stakeholders.

52 Jago, P, & Taylor, N (2002). *Wind Turbines and Aviation Interests: European Experience and Practice* 95 pp. Available from <http://www.bwea.com/pdf/European-Experience-and-Practice.pdf>

Jago and Taylor review the ways European countries approach conflict resolution between wind farms and aviation. Issues are navigable airspace, radar systems, low flying military aircraft and search and rescue operations. The latter are considered extremely hazardous within wind farms. They discuss day marking and night-time illumination of turbines. Conflicts are addressed by proper siting at a distance from airports and radar installations, ensuring wind farms are accurately denoted on aeronautical charts, and illuminating the turbines.

53 Kalo, Joseph J., Hildreth, Richard G., Rieser, Alison, & Christie, Donna R. (2007). *Coastal and Ocean Law Cases and Materials* (Third ed.). St. Paul: Thomson West. 748 pp.

This is the third edition of the original text book on coastal and ocean law by four of its leading authorities. It covers the common law and statutory history of the ocean jurisdictions and provides relevant case excerpts and discussion of concepts.

54 Kearney, John, Berkes, Fikret, Anthony, Charles, Pinkerton, Evelyn, & Wiber, Melanie (2007). The Role of Participatory Governance and Community-Based Management in Integrated Coastal and Ocean Management in Canada. *Coastal Management*, 35, 79-104

The authors demonstrate compelling evidence that participatory governance helps address complex problems of managing the marine environment for multiple values and outcomes. Canadian ocean policies strive to achieve both ecological sustainability and economic development. They provide a strong basis for participatory governance and community based management of coastal and large ocean resources. The authors recommend nine initiatives to realize the goals of the Canadian policies : (1) shifting paradigms, (2) overcoming turf protection, (3) ensuring compatibility of goals, (4) ensuring sufficiency of information, (5) dealing with internal community stratification, (6) creating cross-scale linkages, (7) creating a participatory policy environment, (8) building community capacity, and (9) monitoring and assessment of local-level initiatives.

55 Klein, C.J., Chan, A., Kircher, L., Cundiff, A.J., Gardner, N., Hrovat, Y., et al. (2008). Striking a Balance Between Biodiversity Conservation and Socioeconomic Viability in the Design of Marine Protected Areas. *Conservation Biology*, 22(3). 691-700 Available from http://www.uq.edu.au/spatialecology/docs/Publications/2008_Klein_etal_StrikingABalance.pdf

The authors provide a useful example of planning that considers socioeconomic and environmental factors for the most productive siting of marine protected areas off the California coast. They develop multiple scenarios and compare area, compactness, impact on fishing effort, biodiversity, and other factors. The planning model could be translated into an effective siting model for offshore renewable energy facilities.

56 Kumar, Manasi, & Kumar, Pushpam (2008). Valuation of ecosystem services: A psycho-cultural perspective. *Ecological Economics*, 64, 808-819

Kumar and Kumar consider social and individual connections to the environment when constructing a method of valuation of ecosystems services. They suggest that the ecological identity of individuals is revealed at various levels of the decision-making hierarchy from local to regional to global. They use insights from psychoanalytic and environmental-psychology to redefine concepts such as ecological identity, self-other dichotomy, and the fostering of identification with nature. These conflicts must be embraced in the valuation of ecosystem services.

57 Ladenburg, Jacob, & Dubgaard, Alex (2009). Preferences of coastal zone user groups regarding the siting of offshore wind farms. *Ocean & Coastal Management*, 52, 233-242

The authors investigate the preference for reducing visual impacts from offshore wind farms using a survey of Danes. The results strongly indicate that users of the coastal zone perceive the visual impacts much more negatively than people who do not use the coastal area for recreation or habitation. Respondents who frequent the beach also have stronger preferences for reducing the visual impact when compared to less frequent visitors. The authors conclude that the optimal location of offshore wind farms would vary from closer to the coast in areas with little recreational activities to further out in coastal areas with a higher level of recreational activities.

58 Langan, Richard (2009). *Co-location of offshore energy and seafood production: potential synergies, compatibilities and conflicts*. Paper presented at the The Ecology of Marine Wind Farms: Perspectives on Impact Mitigation, Siting, and Future Uses: 8th Annual Ronald C. Baird Sea Grant Science Symposium. pp. 5. Available from <http://seagrants.gso.uri.edu/baird/2009/abstracts/langan.pdf>

Langan introduces the idea of co-locating wind turbines and fish and shellfish farms, a strategy that would reduce the overall footprint of human uses in ocean. Potential sites must be favorable for both uses as both benefit from reasonable proximity to shoreside infrastructure. The combined uses might pose conflict with uses that the other does not such as mussel lines strung between towers that might entangle marine mammals or vessel use patterns for aquaculture that might pose risks to turbines.

59 Limburg, Karie E., O'Neil, Robert V., Costanza, Robert, & Farber, Syephen (2002). Complex systems and valuation. *Ecological Economics*, 41, 409-420. Available from http://www.uvm.edu:8889/~gundiee/publications/Limburg_et_al.pdf

The authors review some of the relevant characteristics of complex systems finding that while ecosystems and economic systems share many properties, valuation has typically been driven by short-term human preferences. They conclude that as the force of humanity increases on the planet, ecosystem service valuation will need to switch from choosing among resources to valuing the avoidance of catastrophic change.

60 Lynam, T., de Jong, W., Sheil, S., Kusumoto, T., & Evans, K. (2007). A review of incorporating community knowledge, preferences and values into decision making in natural resources management. *Ecology and Society*, 2(1), online. Available from <http://www.ecologyandsociety.org/vol12/iss1/art5/>

The authors painstakingly review methods available for engaging in collaborative management with stakeholders. The methods assessed are Bayesian belief networks, system dynamic modeling tools, discourse-based valuation, the 4Rs framework, participatory mapping, scoring or the Pebble Distribution Method, future scenarios, spidergrams, Venn diagrams, and Who Counts Matrices. The authors are careful to point out that the context, the length of time the collaborators have worked together, the combination of tools used and the robustness of the implementation design determine the success of collaboration.

61 Mackinson, S., Curtis, H., Brown, R., McTaggart, K., Taylor, N., Neville, S., et al. (2006). *A report on the perceptions of the fishing industry into the potential socioeconomic impacts of offshore wind energy developments on their work patterns and income* (no. 133). Lowestoft: CEFAS. 62 pp. Available from <http://www.cefas.co.uk/publications/techrep/tech133.pdf>

The authors gathered the views of the fishing industry on wind farms development in the U.K. During recent years, European fisheries management has encouraged cooperation providing opportunities for managers, scientists and fishermen to work more closely on common problems. Many of the uncertainties highlighted by the authors are being addressed by this approach, and by the joint identification of studies that could be undertaken in future planning. It is vital to include fishermen as collaborating partners to help specify research priorities and to help design and conduct field studies. The authors urge the Fisheries Liaison with Offshore Wind group to continue to focus on this role.

62 MARICO Marine, & The British Wind Energy Association (BWEA) (2007). *Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Wind Farm* (Report No. BWEA_Radar.pdf). London: British Wind Energy Association. 57 pp. Available from http://www.bwea.com/pdf/radar/BWEA_Radar.pdf

This document describes detailed data on the reported effects observed on ship radar displays close to offshore wind farm structures. It is context specific to this trial, i.e., collision avoidance in pilotage waters from about 1 nm outside a single small wind farm. It does not draw conclusions about general navigation close to or within other anticipated wind farm developments. The observations are summarized and both general and specific mitigation are suggested.

63 Masalu, Desiderius C.P. (2000). Coastal and Marine Resource Use Conflicts and Sustainable Development in Tanzania. *Ocean and Coastal Management*, 43, 475-494

Tanzania's coast is rich in resources, which has led to rapid population growth and a rise in conflicts over natural resources. Masalu surveys the conflicts and proposes a management scheme to deal with them. Conflicts include those revolving around agriculture and industrial uses in the uplands, marine transportation, tourism, urbanization, threats to mangroves and coral reefs. He suggests a multi-sectoral approach to national planning and establishment of well-defined principles and procedures for conflict resolution. The interdependence of uses of the coastal zone requires planning and managing across sectors rather than piecemeal. The author points out that collaborative management would strengthen the success of the government's emphasis on environmental concerns.

64 Massachusetts Ocean Partnership (2009). *Appendix 2 - Compatibility Assessment/ Data Screening*. 9 pp. Available from http://commpres.env.state.ma.us/mop/draft_plan/v1/draft-v1-app2.pdf

The Partnership's work assesses various marine uses for potential conflicts with other uses and impacts on the environment. Offshore uses covered are wind, tidal and wave energy, sand mining, cables and pipelines, and deep-water, non-tidal aquaculture. It provides siting criteria for each use indicating requirements based on current technology, physical restrictions for such uses, and other considerations.

65 Massachusetts Technology Collaborative (2002). *Cape & Winds Offshore Wind Public Outreach Initiative Progress Report*. 57 pp. Available from to access links in the Highlights Document: <http://www.masstech.org/offshore/highlights.htm>

The Cape Wind project proposed for offshore Massachusetts has generated considerable support and opposition. Based on numerous interviews with key stakeholders, the Massachusetts Technology Collaborative determined a need for contextual and project specific information to be presented in a neutral setting. The resulting initiative aimed to support a transparent regulatory review process for the Cape Wind Project, to provide stakeholders and key decision makers with credible technical information, and to initiate a broader discussion of the energy system and renewable energy development in New England. This 2002 report reveals how the public outreach for Cape Wind was approached. More information (full summaries of the meetings and background materials) is available at www.raabassociates.org, the company that facilitated the effort.

66 McCreary, Scott, Gamman, John, Brooks, Bennett, Whitman, Lisa, Bryson, Rebecca, Fuller, Boyd, et al. (2001). Applying a Mediated Negotiation Framework to Integrated Coastal Zone Management. *Coastal Management*, 29, 183-216

The authors reiterate the intrinsic nature of conflict in the coastal zone. They observe that relatively few peer-reviewed studies have examined how coastal

managers might apply conflict resolution processes in this zone's management context. They believe that many of these disputes can be addressed by using a structured mediation model that involves face-to-face negotiation with a broad range of stakeholders to build consensus-based agreements for integrated coastal zone management.

67 McGrath, Kelly (2004). The Feasibility of Using Zoning to Reduce Conflicts in the Exclusive Economic Zone. *Buffalo Environmental Law Journal*, 11, 183-213

McGrath suggests using marine protected areas as a framework for ocean zoning, using the example of the Florida Keys National Marine Sanctuary. Given potential for conflict among ocean users, the public and other stakeholders, agencies should map existing uses in the EEZ. The author advocates a consultation among the federal agencies similar to the process in place for determination of Essential Fish Habitat. Developing a comprehensive plan for the EEZ is desirable though barriers to zoning exist.

68 Michel, Jaqueline, Dunagan, Heidi, Boring, Christine, Healy, Erin, Evans, Williams, Dean, John M., et al. (2007). *Worldwide Synthesis and Analysis of Existing Information Regarding Environmental Effects of Alternative Energy Uses on the Outer Continental Shelf*. Government Printing Office. 254 pp. Available from <http://www.mms.gov/itd/pubs/2007/2007-038.pdf>

Section 388 of the 2005 Energy Policy Act authorized the Mineral Management Service to develop a research program supporting marine renewable energy. This review synthesizes existing information and data on environmental effects of alternative energy uses and identifies information needs. Topics covered include current offshore energy technologies, public reaction to existing projects, potential direct, indirect, and cumulative environmental impacts of offshore energy technologies, previously used mitigation measures, current physical and numerical models designed to determine environmental impacts, and information gaps in our current understanding of environmental impacts.

69 Michler-Cieluch, Tanja, & Krause, Gesche (2008). Perceived Concerns and Possible Management Strategies for Governing Wind Farm-Mariculture Integration. *Marine Policy*, 32(6), 1013-1022

Increased use of offshore waters of the German North Sea by multiple stakeholders leads to conflicting claims and possible exclusions. Due to legal constraint, wind farms exclude uses by other sectors such as commercial fisheries. In this context, integrating marine aquaculture with designated wind farm areas might provide chances to combine two industries in the frame of a multiple-use concept. The authors introduce the concept of combining offshore uses in a novel but mutually

beneficial way in order to reduce the amount of space allocated offshore. They discuss the scientific, technical and other requirements of such an effort.

70 Millennium Ecosystem Assessment (2005). *Ecosystems and human well-being: Synthesis*. Washington, D.C.: Island Press. 137 pp. Available from <http://www.millenniumassessment.org/documents/document.356.aspx.pdf>

The Millennium Ecosystem Assessment examines the consequences of ecosystem change for the quality and sustainability of human life. The project involved the work of more than 1,360 experts worldwide. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in global ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably. This report presents a synthesis and integration of the findings of the four working groups along with more detailed findings for selected ecosystem services concerning condition, trends and scenarios, and response options.

71 National Research Council (U.S.). Committee on Assessing and Valuing the Services of Aquatic and Related Terrestrial Ecosystems (2005). *Valuing ecosystem services: Toward better environmental decision-making*. Washington, D.C.: National Academies Press. 277 pp. Available from http://www.nap.edu/openbook.php?record_id=11139&page=1

Ecosystem functions are seldom experienced directly by users of the natural resource. Rather, it is the services provided by ecosystems, such as flood risk reduction and water supply, together with ecosystem goods, that create value for human users. This report describes those services and synthesizes the state of current knowledge.

72 Ocean Policy Advisory Council (2009). Use of the Territorial Sea for the Development of Renewable Energy Facilities or Other Related Structures, Equipment or Facilities *Oregon Territorial Sea*. 19 pp. Portland: State of Oregon. Available from http://www.oregon.gov/LCD/OCMP/docs/Ocean/otsp_5.pdf

This addition to the state's 1994 Territorial Sea Plan, a section of the state comprehensive plan, describes the process for making decisions concerning the development of marine renewable energy facilities and specifies the areas where that development may be sited. The requirements are intended to protect areas important to renewable marine resources, ecosystem integrity, marine habitat and areas important to fisheries from the potential adverse effects of renewable energy facility siting, development, operation, and decommissioning. It provides guidelines for identifying appropriate locations for development that minimizes the potential adverse impacts to existing ocean resource users and coastal communities.

73 OEER (Offshore Energy Environmental Research) Association (2008). *Fundy Tidal Energy Strategic Environmental Assessment: Final Report* 92 pp. Available from http://www.oreg.ca/docs/Fundy_SEA.pdf

The Bay of Fundy has the largest tidal range in the world. The development of new tidal energy technologies has resulted in renewed and more urgent interest in harnessing tidal power. Throughout this report, OEER stresses the necessity of meaningful stakeholder engagement through future environmental assessment processes, the creation of a Stakeholder Advisory Board to build on consultation with fishermen, other marine resource users, and communities at every stage of tidal development. OEER recommends ongoing engagement with First Nations communities by requiring proponents to facilitate discussion and information sharing at the earliest stages. There is some discussion of how exclusion zones would affect users but no details as the exclusion zones would vary based on the technology used and the scale of projects.

74 Offshore Windenergy Europe (2008). Conflicts of Interest. *Expert Guide: Environment* Available from http://www.offshorewindenergy.org/txt2html.php?textfile=expert_guides/Environment#15

This industry report provides an overview of environmental and human use conflicts associated with offshore wind development. It includes a section on several European countries environmental assessment programs. The findings suggest some areas may definitively be excluded from consideration for use for offshore wind power. These are major ship lanes, areas close to airports, oil and gas pipelines, cable routes, raw material deposits, military restricted areas. It provides a summary description of the nature of the conflicts between wind development and marine transportation, air traffic, military operations, commercial fishing, mineral and sediment deposits, and marine archaeology sites. Mitigation measures are mentioned in passing.

75 Orr, Patricia J. (2006). *ECR Performance Evaluation: An inventory of indicators*. Tucson: U.S. Institute for Environmental Conflict Resolution. 26 pp. Available from www.ecr.gov/pdf/INV20061010.pdf

Orr updates MacFarlane's and Mayer's 2004 literature review of environmental conflict resolution. She puts the literature into perspective for users to evaluate the utility of environmental conflict resolution as well as how to improve it in practice. The review's organization assists users to identify when it is appropriate, how to use it effectively and what outcomes can be expected.

76 Orr, Patricia J., Emerson, Kirk, & Keyes, Dale L. (2008). Environmental Conflict Resolution Practice and Performance: An Evaluation Framework. *Conflict Resolution Quarterly*, 25(3), 283-301

A group of federal and state agencies developed an environmental conflict resolution evaluation framework to make a strong case for use of the method. Orr describes the evolution, structure, associated instrumentation, and current applications of this method's evaluation framework. Se argues that the possibility of costly litigation, planning delays, and contentious stakeholder relations suggest a need for improved environmental governance. The need for improvement does not, however, in and of itself make a case for alternatives that engage diverse interests collaboratively in environmental decision making. Hence the need for an environmental conflict resolution framework.

77 OSPAR Commission (2008). *Guidance on Environmental Considerations for Offshore Wind Farm Development* Copenhagen: OSPAR Commission. 19 pp. Available from http://www.ospar.org/v_measures/get_page.asp?v0=08-03e_Consolidated%20Guidance%20for%20Offshore%20Windfarms.doc&v1=5.

OSPAR's guidelines address development of offshore wind farms in terms of minimizing environmental impact and conflict. The audience is government agencies, developers, consultants, and other interested parties. These are not a definitive set of instructions but provide context for developments. The list of potential impacts discussed is not exhaustive. Every location will have a unique set of impacts and potential conflicts. The guidelines are structured around the main development stages of an offshore wind farm: siting, licensing, monitoring, construction and operation, and decommissioning.

78 Pendleton, Linwood, Atiiyah, Perla, & Moorthy, Aravind (2007). Is the non-market literature adequate to support coastal and marine management? *Ocean & Coastal Management*, 50(5-6), 363-378

The authors find that the existing literature on estimating of the non-market value of coastal and marine resources is inadequate. They examine the comprehensiveness, timeliness, geographical completeness, and methodological breadth of the peer-reviewed literature on non-market valuation studies for coastal and ocean resources in the United States. Studies of beaches and recreational fishing are generally sufficient to support effective policy-making. However, most resources have not been well studied and values for many have not been estimated in recent years, the geographical coverage is incomplete, and the application of methodologies is uneven. The authors offer recommendations to improve the policy usefulness of valuation literature.

79 Pew Oceans Commission (2003). *America's living oceans : charting a course for sea change : a report to the nation : recommendations for a new ocean policy* Arlington, VA. 144 pp. Available from http://www.pewtrusts.org/our_work_report_detail.aspx?id=30009&category=130

The comprehensive report of the Pew Oceans Commission outlines a national agenda for protecting and restoring America's oceans. The Pew report should be read in conjunction with the United States Ocean Commission report released in 2004 as both reports were carried out in parallel. The current location for the ongoing work of both commissions is the U.S. Joint Ocean Commissions Initiative (see U.S. Commission on Ocean Policy, 2004). Before the seminal reports of the Pew and U.S. ocean commissions, the last time the nation had examined its marine resources was in the historic Stratton Commission Report of 1966 (<http://www.archive.org/download/ournationseaplan00unit/ournationseaplan00unit.pdf>).

80 Pomeroy, Robert, & Douvere, Fanny (2008). The engagement of stakeholders in the marine spatial planning process. *Marine Policy*, 32(5), 816-822. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

Pomeroy and Douvere advocate a comprehensive method for involving people in marine spatial planning through stakeholder analysis and mapping. They describe various types and stages of stakeholder participation and illustrate how to conduct a stakeholder analysis that meaningfully involves stakeholders.

81 Portman, Michelle (2009). Involving the public in the impact assessment of Offshore Renewable Energy facilities. *Marine Policy*, 33(2), 332-338. Available from

Portman's research expands the discussion of public involvement in decisions about marine resource use by examining public participation in environmental impact assessment for marine renewable energy projects. The author's review of the empirical and theoretical research is summarized in a framework for involvement. The framework consists of five main features: effective communication, broad-based inclusion, prioritization, early three-way learning, and alternatives analysis. Portman explores the relevance of such a framework and indicates possible applications.

82 Portman, Michelle E., Duff, John A., Köppel, Johann, Reisert, Jessica, & Higgins, Megan E. (2009). Offshore wind energy development in the exclusive economic zone: Legal and policy supports and impediments in Germany and the US. *Energy Policy*, 37, 3596-3607

The authors assess the federal role of two coastal nations, German and the U.S., in regards to their domestic legal and policy frameworks in the siting of marine renewable energy facilities. Germany has approved many offshore sites while recent US proposals have for the most part stalled. Based on a review of legal and policy documents, laws and regulations, academic literature, and interviews, these authors identify and compare factors that figure most prominently for the development of marine renewable energy policies. Comparisons are organized under four categories: the regulatory framework, the public's role in siting, targeted economic mechanisms, and indirect mechanisms. The authors conclude that U.S. regulatory framework, more open public process and lack of coordinated marine spatial planning make for more difficult development of wind farms.

83 R.I. Coastal Resources Management Council (2010). Rhode Island Ocean Spatial Management PlanL OCEANSAMP Available from <http://seagrant.gso.uri.edu/oceansamp/>

The Rhode Island Ocean Special Area Management Plan, or Ocean SAMP, is conceived to be a federally recognized coastal management and regulatory tool. Using the best available science, the Ocean SAMP seeks to provide a balanced approach to the development and protection of Rhode Island's ocean-based resources. The draft plan does not yet include a discussion of conflict mitigation. The Plan is currently proceeding through an eight-step review process prior to adoption. As it develops and becomes finalized, this will be one effort to monitor as a possible state level model.

84 Ramsey, Kevin (2009). GIS, Modeling, and Politics: On the Tensions of Collaborative Decision Support. *Journal of Environmental Management*, 90(6), 1972-1980

Ramsey discusses the tension between using geographic information systems (GIS) to solve problems rather than understanding them. GIS applications designed for problem solving often pre-define the spatial aspects of the issue by structuring the kind of information that can be considered or the way in which the problem is conceptualized. This inherently privileges particular perspectives and understandings of the problem while marginalizing others. As a result, true understanding of the problem is undermined. Ramsey provides a set of recommendations to those seeking to balance problem solving with issue understanding so the use of GIS in the context of contentious environmental and natural resource decisions improves. Although from a terrestrial case study, the results and conclusions could be highly applicable to marine situations.

85 Rayns, Nick, MacDonald, Tracey, & Read, Andrew (2006). *Protected Commercial Fishing Areas (PCFAs) - A Concept for Improving Equity in Resource*

Allocation Between Aquatic Resource Users. Paper presented at the Sharing the Fish 2006. 16 pp. Available from <http://www.fish.wa.gov.au/docs/events/ShareFish/papers/pdf/papers/TraceyMacDonald.pdf>

This paper discusses the use of Protected Commercial Fishing Areas (PCFAs) for achieving equity for space allocations. Current protection strategies for commercial fishing in Australia include potential design and regulatory improvements, and the establishment of PCFAs with reference to existing national and international protection measures, recreational fishing, and marine protected areas. The authors provide a thoughtful discussion of the relationship between a fishery's ecological characteristics, its commercial harvesters, and current trends in marine spatial planning. With respect to competing use conflict resolution and mitigation, the discussion is limited as it does not address one particular conflict, but rather the cumulative effect of conflicting spatial rights on commercial fishing. In addition, specific discussion of conflicts with recreational fishing and marine protected areas are not very valuable. The idea of PCFAs is inventive and unique, however, and would be of interest to a planner.

86 Royal Yachting Association (2005). *RYA and a Proposed Marine Bill: Opportunities and Concerns as seen by the RYA concerning a Marine Bill*. Southampton. 13 pp. Available from <http://bit.ly/bOlbj1>

The Royal Yachting Association (RYA) is the national body for all forms of recreational boating, under power and sail, on inland and tidal waters, with 100,000 personal members and 1500 affiliated clubs. The RYA represents the interests of an estimated 2 million recreational boaters and watercraft enthusiasts. This report presents its views of the opportunities and concerns in the proposed Marine Bill. Concerns include boating exclusion areas.

87 Sagarin, Raphael D., & Crowder, Larry B. (2008). Breaking Through the Crisis in Marine Conservation and Management: Insights from the Philosophies of Ed Ricketts. *Conservation Biology*, 23(1), 24-30

Sagarin and Crowder use the backdrop of the two major U.S. commissions on ocean policy to reiterate that ocean ecosystems are in crisis and that current policies are inadequate to prevent further ecological damage. Ecosystem-based management is viewed as an approach to address conservation issues in the oceans, but managers remain uncertain as to how to implement ecosystem-based approaches in the real world. The authors present a thoughtful and promising contribution on marine conflict that describes an approach for stakeholders to proceed in open discussions and negotiation without feeling coerced.

88 Salcido, Rachel E. (2009). Rough Seas Ahead: Confronting Challenges to Jump-start Wave Energy. *Environmental Law*, 39, 1073-1108

Sacido examines the challenge of increasing wave energy development within a sustainable development framework. She recommends addressing this by establishing the role of ocean renewables within the larger energy policy, funding research that will prove the value of wave energy, and moving forward with ecosystem-based zoning to facilitate restoration and sustainable long-term management of the oceans. She urges recognition that increasing intensity of all offshore uses is unsustainable. Her recommendations illuminate the trade-offs of wave energy production with other competing uses of the oceans. Salcido argues that hard choices are necessary to facilitate responsible stewardship of the oceans as a current and future public resource.

89 Scholz, Astrid, Steinback, Charles, & Mertens, Mike (2006). *Commercial Fishing grounds and their relative importance off the Central Coast of California: Report to the California Marine Life Protection Act Initiative In partial fulfillment of Contract No. 2005-0067M*. Portland: Ecotrust. 39 pp. Available from http://www.ecotrust.org/mlpa/report_review_final.pdf

This Ecotrust publication contains results of work conducted in California to develop and implement an effective tool to gather and present information from commercial fishermen. The authors created an interactive interview instrument to collect geo-referenced information about the extent and relative importance of central coast commercial fisheries. The data were compiled in a geographic information system that was integrated into a central geodatabase housed at the University of California at Santa Barbara. The authors analyzed the collected data and additional data provided by the California Department of Fish and Game to estimate potential impacts of proposed marine protected area networks developed in the Marine Life Protected Areas process.

90 Sheehy, Daniel (2009). *Constructed Reefs for Mitigation and Fishery Enhancement In Marine Wind Farm Development*. Paper presented at the The Ecology of Marine Wind Farms: Perspectives on Impact Mitigation, Siting, and Future Uses. 5 pp. Available from <http://seagrant.gso.uri.edu/baird/2009/abstracts/sheehy.pdf>

Sheehy proposed that using constructed reefs to enhance the marine habitat within or near areas with marine renewable energy structures offers a way to offset possible negative impacts to fishery economies. These possible negative impacts to fisheries are gear restrictions and exclusion zones. An integrated approach will have greater potential if there is advanced planning to ensure optimal integration and economic advantage. The right habitat enhancement technologies for specific

locations must be selected. There should be close coordination and proactive communication with regional fisheries and coastal zone management efforts.

91 Shull, Carol, and National Park Service U.S. Department of the Interior, (2010). Determination of Eligibility Notification. National Park Service, Washington, D.C. 9 pp. Available from <http://www.nps.gov/nr/publications/guidance/NantucketSoundDOE.pdf>

The Keeper of the National Register of Historic Places determined that Nantucket Sound is eligible for listing in the National Register as a traditional cultural property and as an historic and archeological property. This is the proposed site of the Cape Wind project. The Park Service states that the property has important information about the Native American exploration and settlement of Cape Cod and the Islands with the potential for more. Listing in the National Register assures that the values that make the area significant are considered in the planning of projects in which the Federal Government is involved.

92 Sørensen, Hans Chr., Hansen, Lars Kjeld, Hansen, Rune, Hammarlund, Karin, Thorpe, Tom, & McCullen, Pat (2003). Social Planning and Environmental Impact *WaveNet: Results from the work of the European Thematic Network on Wave Energy* (pp. 305-377): Energy, Environment and Sustainable Development Programme. Available from http://www.emu-consult.dk/includes/networkreport_section_e.pdf Full Report: http://www.spok.dk/consult/wave_network_e.shtml

This document provides an overview to the barriers to large-scale development of wave energy arising from competing uses of the resources, such as areas required for marine transportation, military operation, pipelines and cables, recreational uses and commercial fishing. The information was collated through interviews with developers and regulators as well as a review of the literature. Barriers resulting from conflicting uses are not expected to constitute major barriers for the large-scale development of wave energy. Recommendations to reduce conflict vary but most depend on thorough, open planning. Compensation is useful in some situations but problematic with commercial fishing. Communication of site specific solutions would be useful.

93 SPIDR Environment/Public Disputes Sector Critical Issues Committee (1997). *Best Practices for Government Agencies: Guidelines for Using Collaborative Agreement-Seeking Processes: Report and Recommendations of the SPIDR Environment/Public Disputes Sector Critical Issues Committee*. Reston: Association for Conflict Resolution. 27 pp. Available from <http://law.gsu.edu/cncr/pdf/papers/BestPracticesforGovtAgenices.pdf>

The Report's recommendations were developed through a joint effort of the Society of Professionals in Dispute Resolution, Environmental/Public Disputes Sector and the Consortium on Negotiation and Conflict Resolution in Atlanta, Georgia, supported by the William and Flora Hewlett Foundation. The report focuses on best practices for government agencies and other users in the United States and Canada for successful use of collaborative decision making processes.

94 St. Martin, Kevin, & Hall-Arber, Madeleine (2008). The missing layer: Geo-technologies, communities, and implications for marine spatial planning. *Marine Policy*, 32, 770-786. Available from http://www.unesco-ioc-marinesp.be/publications/marine_policy_special_issue?lkz=1#item_div_48

St. Martin and Hall-Arber recognize that the assessment and management of marine resources is dependent upon spatial technologies, such as geographic information systems. The diverse layers of spatial information are focused on biophysical processes. The social landscape of the marine environment is undocumented and consequently is missing a data layer. Consequently, the resource areas important to stakeholders and communities are not well integrated into planning processes reliant on spatial technologies. The authors describe a participatory method to map the presence of fishing communities offshore. They suggest that spatial representation of these communities informs fisheries and incorporates the human dimensions of the marine environment in assessment and planning.

95 Stephenne, Nathalie, Burnley, Clementine, & Ehrlich, Danielle (2009). Analyzing Spatial Drivers in Quantitative Conflict Studies: The Potential and Challenges of Geographic Information Systems. *International Studies Review*, 11, 502-522

The authors attempt to understand how geographical information systems can help analyze spatial drivers of conflict. While the geographic drivers of territorial conflicts have been extensively described by a number of political studies, the quantitative analysis of these drivers is quite new. The authors focus on large conflicts (i.e., wars), although they also discuss smaller scale conflicts. This work serves as a literature review on the topic, and includes citations dealing with natural resource availability.

96 Susskind, Lawrence, & McCreary, Scott (1985). Techniques for resolving coastal resource management disputes through negotiation. *Journal of the American Planning Association*, 51(3), 365-374

These authors walk the reader through some seminal cases of coastal conflict and dispute resolution from the 1950s through the 1980s. Following analyses and discussion of the case studies, they draw major conclusions that can be interpreted

as recommendations. All involved parties can 'win' if they are willing to meet face to face in negotiation. Consensus decision making depends on a proper process of identifying interests, generating alternatives, spelling out commitments, jointly evaluating uncertainty and the available scientific evidence, and framing written agreements.

97 The British Wind Energy Association (BWEA) (2002). *Best Practice Guidelines: Consultation for Offshore Wind Energy Developments*. London. 32 pp. Available from <http://www.bwea.com/pdf/bwea-bpg-offshore.pdf>

These guidelines encourage good planning and communication around the development of offshore wind energy. Their audience is developers, planners, government departments, local communities and stakeholders. These guidelines encourage identifying all the relevant stakeholders and providing them with the information they need in language they can understand. They suggest being open and honest about what an individual project involves. Engaging with stakeholders in a variety of different ways enables everybody to have their opinions heard and their ideas taken seriously. Following the guidelines will facilitate planning and implementation of wind energy projects.

98 The British Wind Energy Association (BWEA) (2004). *BWEA Recommendations for Fisheries Liaison*. London. 36 pp. Available from <http://www.bwea.com/pdf/FisheriesBP.pdf>

These recommendations were written by the British Wind Energy Association working in close cooperation with various fisheries groups such as the National Federation of Fishermen's Organisations, Scottish Fishermen's Federation, and Sea Fisheries Inspectorate. They are intended as guidelines for developers of offshore wind and the fishing community. They are based on best practices developed through the experience of the UK's fishing community, and the offshore oil and gas and cable industries. The proposed measures would avoid, minimize and mitigate potential conflict with commercial fishing. The recommendations apply to all activities associated with constructing and servicing wind farms.

99 The British Wind Energy Association (BWEA) (2006). *Framework for dialogue between the fishing and wind farm industries on how to assess the value of fishing activities and any disruption or displacement caused to them by wind farm developments*. London. 4 pp. Available from http://www.bwea.com/pdf/offshore/fisheries_framework.pdf

The Fisheries Liaison with Offshore Wind (FLOW) working group supported this effort by the BWEA to facilitate discussion between the industries in the context of specific development proposals. This work supplements the existing guidelines

prepared by FLOW on best practice in liaison between the two industries (see BWEA 2009). It does not provide a methodology for calculating compensation nor assume that compensation will be a relevant consideration for every project. Developers will still need a detailed impact assessments and consultations to prepare their permit application. Working with the fishing industry is only one of many aspects of the process.

100 Tomlinson, B.N., Petterson, J.S., Glazier, E. W., Lewis, J., Selby, I., Nairn, R., et al. (2007). *Investigation of Dredging Impacts on Commercial and Recreational Fisheries and Analysis of Available Mitigation Measures to Protect and Preserve Resources*. Minerals Management Service, US Department of the Interior. 233 pp. Available from <http://www.mms.gov/SandAndGravel/PDF/FloridaStudyReport/Studies/2006-065.pdf>

The authors look at dredging impacts in the U.S. and internationally. Specific conflicts between dredging and the brown crab fishing fleet are discussed including illustrations of the major stages of the conflict. Key issues are seabed disturbance and sediment plumes. Mitigation measures include compensation, seasonal restrictions, zoning, reduction in sediment plumes, formal liaison and consulting relationships.

101 Tomson, Susie, Osborn, Ted, Cruising Association, & Royal Yachting Association (2004). *'Sharing the Wind' Recreational Boating in the Offshore Wind Farm Strategic Areas: Identification of recreational boating interests in the Thames Estuary, Greater Wash and North West (Liverpool Bay)*. Southampton. 42 pp. Available from <http://www.rya.org.uk/sitecollectiondocuments/legal/Web%20Documents/Environment/Sharing%20the%20Wind%20compressed.pdf>

The Royal Yachting Association and the Cruising Association support the Government's efforts for developing renewable energy. However they want to ensure that the safety of recreational boaters is not compromised and that sites do not impinge directly on important recreational boating areas. The authors provide an analysis of RYA's specific concerns about offshore wind farms and recreational boating.

102 Tomson, Susie, & Royal Yachting Association (2009). Consultation on UK Offshore Energy Strategic Environmental Assessment. Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage - Environmental Report, January 2009. In U.K. Department of Energy and Climate Change Offshore Energy SEA Consultation. 5 pp.

The Royal Yachting Association is a UK body representing all forms of recreational and competitive boating. These are comments on the UK's Offshore Energy Strategic Environmental Assessment. They identify conflicts and issues with potential offshore wind energy from the boating perspective. These include collision risk, need for marking and lighting, effects on small craft navigational and communication equipment, loss of cruising routes, competition with commercial routes, effects on sailing and racing areas, and potential visual intrusion and noise. The report supports development beyond 12nm, in areas lightly used by recreational boating and marine transportation.

103 U.K. Department for Business Enterprise & Regulatory Reform (2008). *Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Recommendations for Fisheries Liason: Best practice guidance for offshore renewables developers*. U.K. Department for Business Enterprise & Regulatory Reform. 34 pp. Available from <http://www.berr.gov.uk/files/file46366.pdf>

The Department provides guidelines for developers involved in the offshore renewables energy sector when dealing with fishing and fisheries. The marine renewable energy sector and fisheries should coexist to the advantage of both parties. These guidelines and the Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) aims to facilitate that process through encouraging effective liaison with the fishing industry and the production of industry-wide standards for fisheries liaison.

104 U.K. Department for Business Enterprise & Regulatory Reform, Royal Haskoning, & BOMEL Ltd (2008). *Review of Cabling Techniques and Environmental Effects Applicable to the Offshore Wind Farm Industry*. U.K. Department for Business Enterprise & Regulatory Reform. 164 pp. Available from <http://www.berr.gov.uk/files/file43527.pdf>

The Department addresses one element of the formal environmental impact assessment, cabling. The intended audience is wind farm developers, consultants and regulators. The review is an information resource on the range of cable installation techniques available, their likely environmental effects and potential mitigation. It draws on current wind farm and other marine industry practices and experiences. While not formal guidelines, the report will assist government agencies, developers, stakeholders and regulators during the formal review by indicating the types of information needed for the assessment.

105 U.K. Department of Trade and Industry, U.K. Maritime and Coastguard Agency, & U.K. Department for Transport (2005). *Guidance on the Assessment of the Impact of Offshore Wind Farms: Methodology for Assessing the Marine Navigational*

Safety Risks of Offshore Wind Farms. HMSO. 160 pp. Available from <http://www.berr.gov.uk/files/file22888.pdf>

The Department recognizes the need for a methodology to assess the marine navigational safety risks of offshore wind farms. The resulting guidelines evolved with the close co-operation of developers, government agencies, and other stakeholders in conjunction with British Maritime Technology Renewables Ltd. Extensive consultation and research was done to ensure that the methodology is robust, verified, auditable and accountable in various contexts. The guidelines present a template to be used by developers in preparing their navigation risk assessments, and for government departments to help in the assessment of these. The methodology focuses on risk controls and the feedback from risk controls into risk assessment. It requires developers to show that sufficient risk controls are, or will be, in place before the assessed risk would be considered as broadly acceptable or tolerable with possible further controls or actions.

106 U.K. Energy Research Centre (2009). *UKERC Spatial Planning for Marine Renewable Energy Arrays Workshops* Paper presented at the [Workshop on] Marine Planning for Arrays: Social, economic and environmental issues and implications, [and Workshop on] Marine spatial planning for the deployment of arrays, Edinburgh. 58 pp. Available from http://www.ukerc.ac.uk/support/tiki-download_file.php?fileId=279

Detailed guidelines are presented concerning interactions between marine renewable energy installations and navigation. They include information on the visibility and appearance of wind farms, the effects of wind turbines on routing options, suggested spacing of turbine, potential impact on the seabed, effects on communications and navigation systems, and possible rotor effects. Guidelines for installations include methods for fixing these to the seabed and possible impacts on mariners. There is also discussion about safety zones or exclusion zones around marine renewable energy installations.

107 U.K. Maritime and Coastguard Agency (2008a). *Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues*. U.K. Department for Transport. 17 pp. Available from <http://www.mcga.gov.uk/c4mca/mgn371-2.pdf>

“This guidance note highlights issues that need to be taken into consideration when assessing the impact on navigational safety from Offshore Renewable Energy developments, proposed for United Kingdom internal waters, territorial sea or in a Renewable Energy Zone, when established, beyond the territorial sea. Key Points: The recommendations in this guidance note should be used, primarily, by Offshore Renewable Energy installation developers, seeking consent to undertake marine works.” (adapted from the document) This is a detailed guidance about Offshore

Renewable Energy installations (OREIs) and navigation issues. Contains five annexes addressing: considerations on site position, structures and safety zones; navigation, collision avoidance and communications; an MCA template for assessing distances between wind farm boundaries and shipping routes; safety and mitigation measures recommended for OREI during construction, operation and decommissioning; and standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around an OREI.

108 U.K. Maritime and Coastguard Agency (2008b). *Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs*. U.K. Department for Transport. 12 pp. Available from <http://www.mcga.gov.uk/c4mca/mgn372.pdf>

These guidelines highlight issues that need to be taken into consideration when assessing the impact on navigational safety from marine renewable energy developments. The recommendations are directed at developers. Emphasis is on siting, structures from safety and navigation perspectives and communications. A template for assessing distances between wind farm boundaries and shipping routes is described. Safety and mitigation measures are recommended for the construction, operation and decommissioning process. Standards and procedures for generator shutdown and other operational requirements are outlined in the event of a search and rescue operations or a pollution or salvage incident.

109 U.S. Coast Guard (2009). *U.S. Coast Guard Assessment of Potential Impacts to Marine Radar as it relates to Marine Navigation Safety from the Nantucket Sound Wind Farm as Proposed by Cape Wind, LLC*. U.S. Coast Guard. 16 pp. Available from <http://www.mms.gov/offshore/RenewableEnergy/PDFs/USCGRADARfindingsandrecommendationsFINAL.pdf>

The US Coast Guard's assessment found that the proposed Cape Wind project would have a moderate impact on navigation safety, but sufficient mitigation measures are available to reduce risk to acceptable levels. It also observed that the project would have a negligible or no adverse impact on Coast Guard missions, and may in some circumstances actually facilitate the prosecution of certain missions. This document addresses a number of concerns identified by boaters who use Nantucket Sound including competition with commercial fishing and marine transportation.

110 U.S. Commission on Ocean Policy (2004). *An ocean blueprint for the 21st century : final report*. Washington, D.C. 8 volumes. Available from http://oceancommission.gov/documents/full_color_rpt/welcome.html

Thirty-five years ago, the Stratton Commission comprehensively reviewed the U.S. management of the oceans, coasts, and Great Lakes. In that time, significant changes have occurred in uses of marine assets and general understanding of the consequences of these uses. This report provides a blueprint for change in the 21st century, with recommendations for creation of an effective national ocean policy that ensures sustainable use and protection of our oceans, coasts, and Great Lakes for today and far into the future. It should be read in conjunction with the Pew Commission Report (Pew 2003).

111 U.S. Department of the Interior, Minerals Management Service (2009). *Cape Wind Energy Project: Final Environmental Impact Statement*. U.S. Department of the Interior. 800 pp. Available from <http://www.mms.gov/offshore/AlternativeEnergy/PDFs/FEIS/Cape%20Wind%20Energy%20Project%20FEIS.pdf>

The proposed Cape Wind project is a wind energy facility with a maximum electric output of 468 megawatts in Nantucket sound off the coast of Massachusetts that can interconnect with and deliver electricity to the New England Power Pool. The FEIS presents the characteristics of the environment in the project area and analyzes the effects of the construction, operation and maintenance, and decommissioning of the project, consistent with the requirements of the Outer Continental Shelf Lands Act and the National Environmental Policy Act. The FEIS identified potential conflicting uses during the operational phase include commercial fishing, submarine cables, navigation dredging, vessel anchoring, sand mining, marine radar, recreational fishing and boating, air navigation and marine transportation. Mitigation for impacts is proposed.

112 U.S. Department of the Interior. Minerals Management Service. Renewable Energy and Alternate Use Program (2006a). *Technology White Paper on Ocean Current Energy Potential on the U.S. Outer Continental Shelf*. U.S. Department of the Interior. 7 pp. Available from http://ocsenergy.anl.gov/documents/docs/OCS_EIS_WhitePaper_Current.pdf

The Minerals Management Service prepared a series of white papers on marine renewable energy technologies to prepare its alternative energy use program and rules. The focus of this paper is the resource potential, technologies, associated environmental impacts and use conflicts, and economics of ocean current energy on the OCS. The document recommends that the siting of submerged current-driven turbines should consider shipping routes and present and anticipated commercial and recreational fishing and recreational diving. Possible mitigation would include fishery exclusion zones.

113 U.S. Department of the Interior. Minerals Management Service. Renewable Energy and Alternate Use Program (2006b). *Technology White Paper on Wave Energy Potential on the U.S. Outer Continental Shelf*. U.S. Department of the Interior. 12 pp. Available from

http://ocsenergy.anl.gov/documents/docs/OCS_EIS_WhitePaper_Wave.pdf

The Minerals Management Service prepared a series of white papers on marine renewable energy technologies to prepare its alternative energy use program and rules. The focus of this paper is the resource potential, technologies, associated environmental impacts and use conflicts, and economics of wave energy on the OCS. Wave technologies with high freeboards may be a navigation hazard requiring lights, sound, radar reflectors. Potential conflicts with commercial shipping and fishing and recreational boating. Wave energy converters may have near field effects on wave heights that may conflict with recreational uses such as surfing.

114 U.S. Department of the Interior. Minerals Management Service. Renewable Energy and Alternate Use Program (2006c). *Technology White Paper on Wind Energy Potential on the U.S. Outer Continental Shelf*. U.S. Department of the Interior. 16 pp. Available from

http://ocsenergy.anl.gov/documents/docs/OCS_EIS_WhitePaper_Wind.pdf

The Minerals Management Service prepared a series of white papers on marine renewable energy technologies to prepare its alternative energy use program and rules. The focuses of this paper is on the resource potential, technologies, associated environmental impacts and use conflicts, and economics of wind energy on the OCS. This paper includes a list of siting constraints where existing uses of the ocean will need to be considered in selecting OCS wind facility locations.

115 U.S. Government Accountability Office (2008). *Report to the Chairman, Subcommittee on Public Lands and Forests, Committee on Energy and Natural Resources, U.S. Senate: Natural Resource Management: Opportunities Exist to Enhance Federal Participation in Collaborative Efforts to Reduce Conflicts and Improve Natural Resource Conditions*. GAO. 139 pp. Available from

<http://mits.doi.gov/cadr/main/GAO08262NaturalResourceManagement.pdf>

This review presents positive perspectives on the use of collaborative resource management involving public and private stakeholders in natural resource decisions. Benefits include reduced conflict and litigation and improved natural resource conditions. A number of collaborative practices, such as seeking inclusive representation, establishing leadership, and identifying a common goal among the participants are crucial to successful efforts. Success is often judged by whether they increase participation and cooperation or improve natural resource conditions. Many experts also note that there are limitations to the approach, such as the time

and resources it takes to bring people together to work on a problem and reach a decision.

116 U.S. Institute for Environmental Conflict Resolution (2005). *Final Report of the National Environmental Conflict Resolution Advisory Committee*: U.S. Institute for Environmental Conflict Resolution of the Morris K. Udall Foundation. 186 pp. Available from <http://www.ecr.gov/Resources/NEPAECR.aspx>

In 2000, a bipartisan group of U.S. Senators asked the Institute to examine strategies for using collaboration, consensus building, and dispute resolution to achieve the goals of the National Environmental Policy Act of 1969 and to assist with resolution of environmental policy issues. This report extensively documents various conflict resolution initiatives and programs, opportunities, barriers and lessons learned.

117 UMass Boston Planning Frameworks Team, & Massachusetts Ocean Partnership (2009). *Compatibility Determination: Considerations for Siting Coastal and Ocean Uses (DRAFT)*. Boston. 33 pp. Available from http://commpres.env.state.ma.us/mop/draft_plan/tech_reports/compatibility_determination.pdf

This draft report is one of several to support the Massachusetts Executive Office of Energy and Environmental Affairs in its development of the integrated coastal ocean management plan mandated by the Massachusetts Oceans Act of 2008. It is anticipated that the plan will identify appropriate locations and siting consideration for uses of the ocean and coastal zones. The draft report employs a matrix system to organize and help evaluate compatibility of different ocean and coastal uses. The matrix headings include spatial and temporal considerations, and examples of siting standards and compensation/mitigation conditions. While the draft report is not focused on conflict, the information contained in it is an excellent resource for planning facility siting to avoid or constructively address potential conflicts. (See Massachusetts Ocean Partnership 2009 and Executive Office of Energy and Environmental Affairs 2010.)

118 Wainger, Lisa A., & Boyd, James W. (2009). Valuing Ecosystem Services. In Karen L. McLeod & H. Leslie (Eds.), *Ecosystem-Based Management for the Oceans* (pp. 92-114). Washington, D.C.: Island Press. Available from <http://bit.ly/dc8nwr>

Wainger and Boyd state that the concept of ecosystem service accounting is not a panacea to achieving ecosystem based management. They suggest its utility to bring together technical and social information to move beyond cost-benefit accounting. Ecosystem service accounting provides a context for disparate stakeholders to focus on shared goals and work at cross jurisdictional scales to achieve ecosystem based management. They analyze the criteria for the complex task of developing a

comprehensive economic accounting framework for valuing ecosystem services. They conclude that the lack of this valuation limits public policy analysis of ecosystem. Economics can help identify, prioritize, and choose actions if the consequences are recognized. The authors urge consideration of causal connections between use and policy choices and ecosystem services.

119 Weiss, John C., Boehlert, Brent B., & Unsworth, Robert E. (2007). *Assessing the Costs and Benefits of Electricity Generation Using Alternative Energy Resources on the Outer Continental Shelf: Final report*. U.S. Department of the Interior, Minerals Management Service. 67 pp. Available from http://ocsenergy.anl.gov/documents/docs/final_synthesis_report.pdf

The authors present an analysis of the benefits and costs of offshore marine renewable energy projects. Categorized benefits and costs focus on those that are market "externalities," i.e., those with a benefit or cost to society but that is not part of the pricing of electricity. These include socioeconomic externalities such as impacts on tourism and recreational opportunities, commercial fishing, and visual impacts.

120 West Coast Governors (2009). West Coast Governors' Agreement on Ocean Health. Available from <http://westcoastoceans.gov/>

In 2006 the Governors of California, Oregon and Washington announced the West Coast Governors' Agreement on Ocean Health. The Agreement launches a new, proactive regional collaboration to protect and manage the ocean and coastal resources along the entire west coast of the lower U.S. as called for in the recommendations of the U.S. Commission on Ocean Policy and the Pew Oceans Commission. The Agreement seeks to advance the following goals: clean coastal waters and beaches, healthy ocean and coastal habitats, effective ecosystem-based management, reduced impacts of offshore development, increased ocean awareness and literacy among the region's citizens, expanded ocean and coastal scientific information, research, and monitoring, sustainable economic development of coastal communities.

121 Ziza, Iva (2008). Siting of Renewable Energy Facilities and Adversarial Legalism: Lessons from Cape Cod. [law review]. *New England Law Review*, 42, 591-629

Ziza analyzes administrative and judicial challenges and opposition to the Cape Wind project proposed for construction in federal waters close to Massachusetts' Cape Cod and the islands of Martha's Vineyard and Nantucket. This is an analysis of the Cape Wind controversy from a legal perspective. The author discusses the role of environmental nonprofits, access to the courts, level of organization of

stakeholders, role of property owners, aesthetics, legal or institutional frameworks and analyses, and the NIMBY phenomenon.