# Ocean Science and Public Policy

**SEA 3201 (3 credits)**

**Course Contact Hours**: 45.

**Instructor**: Professor Jeff Wescott: jwescott@sea.edu

**Course Footprint:**

| Component | Duration | Location |
|---|---|---|
| Shore | Sep 28 – Nov 17 | Woods Hole, MA |
| Sea | Nov 17 – Dec 20 | SSV *Corwith Cramer* with port stops in US Virgin Islands, Dominica, and St. Kitts & Nevis |

**Course Philosophy and Approach:**

In this course, students will explore how science, political systems, economics, and culture all shape marine and climate policy and decision-making. We will investigate current issues at the intersection of ocean science and international, national, and local environmental decision-making, and consider the opportunities and challenges of protecting marine ecosystems and species from climate change impacts.

**Learning Objectives:**

1. Explore multiple strategies for designing and implementing climate and coastal policy.
2. Recognize and resolve policy decisions that lead to ineffective, inequitable, and poorly designed ocean resource management.
3. Identify key opportunities and limitations in the design and implementation of blue carbon projects.

**Evaluation:**

| | |
|---|---|
| Future Coasts Presentation | 40% |
| Blue Carbon Policy Brief | 40% |
| Participation | 20% |

**Assignments:**

Future Coasts Presentation

The goals of this assignment are (1) to anticipate future human interactions with the world's oceans from the perspectives of marine and climate scientists, and (2) to identify these interactions as problems requiring policy and management decisions. Teams will identify specific problems—current and projected—in coastal environments and suggest pathways to resolving or mitigating them. Types of coastal environment include but are not limited to

estuaries, wetlands, beaches and dunes, salt marshes, intertidal zones, coastal islands, and harbors. Examples of human interactions include but are not limited to energy production, foodways, biodiversity, land and sea tenure, commercial and infrastructural development, and storm protection.

Projects will focus on the Caribbean, although teams are encouraged to provide a general introduction before turning to regionally specific data.

Each team will present their results to the class in ways that are informative and interactive. They will provide pathways to solutions based on available scientific and social-scientific data and effective governance strategies.

The project rubric is as follows:

- Identify and anticipate issues relating to a specified coastal environment type.
- Research and present relevant supporting data.
- Offer ideas for management and policy solutions, merging or contrasting with existing policy where possible.
- Deliver a presentation to the class, 15 to 20 minutes in length, with equal participation among teammates. PowerPoint is strongly encouraged, but feel free to interact with your audience in other ways as well.

This assignment is due on the day of presentation: Thursday, October 29.

<u>Blue Carbon Policy Brief</u>
During the blue carbon module of this course (weeks 5 through 7), we will examine several issues, approaches, and methods involved in the design and implementation of blue carbon projects, with an emphasis on island communities. As we move forward, we will assemble research teams to explore the opportunities and limitations of current and proposed blue carbon projects in the Caribbean. The result will be a policy brief aimed at a non-expert audience.

Papers will be assessed based on the following:
The final product will be a co-authored policy brief, white paper, or other text-based format that identifies a blue carbon-related issue. Teams will explain how their research may inform policy decision-making with respect to actions taken to protect high priority environments, including but not limited to salt marshes, mangroves, and seagrasses. The final paper will illustrate how your team's research guides blue carbon project planning, stakeholder involvement, and goal assessment. Important note: All projects will be guided by the needs of blue carbon project leaders and participants in port stop communities, with the value of all research for this course determined by these communities, to whom you will share your results. Our goal is knowledge co-production, not extraction.

This assignment requires learning as you go – collecting data and then discussing policy and management implications with experts and research teammates. For this reason, teams need

only submit a final paper. I will gladly read drafts at any stage of development, from a basic outline to a full first draft.

The final paper will be 10 pages of text, double-spaced, plus any images, figures, etc.
Please submit the assignment by Saturday, December 19.

Participation

This course features several in-class exercises, each of which requires completing the assigned readings and contributing as a team member in the planning and completion of the exercises. The participation grade, which counts for 20% of your total course grade, is based on (1) your attendance, (2) your contributions to the exercises, and (3) the support and positive feedback you provide to your fellow students. Your instructor understands that there are many different ways to contribute, and will work with you and your teammates to identify the roles that best match your own particular skills and interests. If you anticipate that you will be unable to attend class or contribute to class work, please let the instructor know as soon as possible.

**Academic Integrity:**

SEA expects all students to actively participate in program discussions and activities. Punctual attendance is required at every class meeting and watch session. **Late assignment submissions are not accepted** – please speak with your instructor in advance if you anticipate a concern.

The policy on academic accuracy below will be strictly followed in this class. The assignments that you submit in this course are expected to be your original work. You must take care to distinguish your own ideas and knowledge from wording or substantive information that you derive from one of your sources. The term "sources" includes not only published primary and secondary material, but also information and opinions gained directly from other people and text that you cut and paste from any site on the Internet.

The responsibility for learning the proper forms of citation lies with you. Quotations must be placed properly within quotation marks and must be cited fully. In addition, all paraphrased material must be acknowledged completely. Whenever ideas or facts are derived from your reading and research, the sources must be indicated.

**Inclusivity and Classroom Culture:**

Our SEA community embraces diversity of age, background, beliefs, ethnicity, gender, gender identity, gender expression, national origin, religious affiliation, sexual orientation, and other visible and nonvisible categories. We expect each one of you (and you should expect the same from us) to contribute to a respectful, welcoming. and inclusive environment. If you feel that you are not being welcomed, included, or accepted here, please reach out to one of your teachers or one of the deans at SEA to share your concern.

**Land and cultural heritage acknowledgement:**

We in Falmouth are on the traditional homeland of the Wampanoag people who live and continue to thrive here for thousands of years. We acknowledge the painful history of

colonization that has enacted forced assimilation, enslavement, genocide, and efforts by many to eliminate Indigenous cultures. We respect and honor the Indigenous people and the descendants of forced migrants still connected to these lands and are eager to learn from their ways of life. We also recognize these words are not enough and need to be followed with action steps.

**Course Readings:**

Bonan, G.B., and S.C. Donen. 2018. Climate, ecosystems, and planetary futures. *Science* 359, eaam8328, DOI: 10.1126/science.aam8328.

CANARI (Caribbean Natural Resources Institute) 2018. *The National Climate Change Adaptation Strategy for Saint Christopher and Nevis*. 72 pp. https://www.preventionweb.net/publication/saint-kitts-and-nevis-national-climate-change-adaptation-strategy

Dorsch, M.J., and C. Flachsland. 2017. A polycentric approach to global climate governance. *Global Environmental Politics* 17(2), doi:10.1162/GLEP_a_00400.

Forest Trends' Ecosystem Marketplace. 2024. *State of the Blue Carbon Market 2024*. Washington DC: Forest Trends Association.

Government of the Commonwealth of Dominica. n.d. The National Resilience Development Strategy. 156 pp.

Hill, Rosemary, et al. 2020. Knowledge co-production for Indigenous adaptation pathways: transform post-colonial articulation complexes to empower local decision-making. *Global Environmental Change* 65: https://doi.org/10.1016/j.gloenvcha.2020.102161

Hilmi, Nathalie, et al. 2023. Tropical blue carbon: solutions and perspectives for valuations of carbon sequestration. *Frontiers in Climate* doi.org/10.3389/fclim.2023.1169663

IUCN and World Commission on Protected Areas (WCPA). 2017. *IUCN Green List of Protected and Conserved Areas: Standard, Version 1.1.* Gland, Switzerland: IUCN.

McNamara, Dylan E., et al. 2023. Human-coastal coupled systems: ten questions. *Cambridge Prisms: Coastal Futures* 1(e20): 1–8. doi.org/10.1017/cft.2023.8

McNulty, V.P., et al. 2025. The Blue Carbon Explorer: a Google Earth Engine tool for mangrove restoration. *Frontiers in Environmental Science* 13:1641301.doi: 10.3389/fenvs.2025.1641301

Pradhan, Sisir Kanta. 2025. Is it possible to balance climate action, equity, and social justice in blue carbon governance? *current conservation* 19(2). https://www.currentconservation.org/is-it-possible-to-balance-climate-action-equity-and-social-justice-in-blue-carbon-governance/

Spencer, Tom, et al 2023. Coastal futures: New framings, many questions, some ways forward. *Cambridge Prisms: Coastal Futures* 1(e32): 1–5. doi.org/10.1017/cft.2023.22

**Course Calendar:**

| Topic | Readings/Assignments Due |
|---|---|
| **Week 1 (On shore in Woods Hole)** | |
| **Tue, Sep 29:** Program introduction<br><br>**Thu, Oct 1:** Course introduction | |
| **Week 2** | |
| **Tue, Oct 6:** Protecting coasts<br><br>**Thu, Oct 8:** Climate stakeholders, climate governance | **Read for Tue:** IUCN Green List 2017 (read pp. 5-14; 39-42).<br><br>**Read for Thu**: Dorsch and Flachsland 2017. A polycentric approach to climate governance (read pp. 50-59). |
| **Week 3** | |
| **Tue, Oct 13:** Blue carbon 1: Introduction<br><br>**Thu, Oct 15:** Blue carbon 2: Identifying priority areas | **Read for Tue**: Hilmi et al 2023. Valuations of carbon sequestration.<br><br>**Read for Thu**: McNulty et al 2025. The Blue Carbon Explorer. |
| **Week 4** | |
| **Tue, Oct 20:** Blue carbon 3: Carbon markets and finance<br><br>**Thu, Oct 22:** Blue carbon 4: Safeguarding stakeholder rights and wellbeing | **Read for Tue**: Forest Trends 2024. State of the blue carbon market.<br><br>**Read for Thu**: Pradhan 2025. Is it possible to balance climate action, equity, and social justice in blue carbon governance? |
| **Week 5** | |
| **Tue, Oct 27:** Blue carbon 5: The Caribbean picture<br><br>**Thu, Oct 29:** Future Coasts presentations | **Read for Tue**: TBD<br><br>**Due Thu, Oct 29**: Future Coasts presentations (submit pdf) |
| **Week 6** | |
| **Tue, Nov 3:** Systems approaches to climate change | **Read for Tue**: Spencer et al 2023. Coastal futures. |

| | |
|---|---|
| **Thu, Nov 5:** Action Plan deep dive: Dominica | McNamara et al 2023. Human-coastal coupled systems.<br><br>Recommended: Bonan and Doney 2018. Climate, ecosystems, and planetary futures.<br><br>**Read for Thu**: Commonwealth of Dominica n.d. National Resilience Development Strategy. |
| **Week 7** | |
| **Tue, Nov 10:** Knowledge co-production and climate resilience<br><br>**Thu, Nov 12:** Action Plan deep dive: St. Kitts and Nevis | **Read for Tue**: Hill et al 2020. Knowledge co-production for Indigenous adaptation pathways.<br><br>**Read for Thu**: CANARI 2018. National Climate Change Adaptation for St. Kitts and Nevis. |
| **Week 8 (At Sea)** | |
| Travel week | No assignments or readings |
| **Week 9** | |
| Project data collection and writing | **Read** for watch group discussion: TBD. |
| **Week 10** | |
| Project data collection and writing | No assignments or readings |
| **Week 11** | |
| Project data collection and writing | **Read** for watch group discussion: TBD. |
| **Week 12** | |
| Policy brief presentations | **Due Sun, Dec 20:** Blue carbon policy brief |