



Lesson: Marine Spatial Planning for Sustainability: An Example of a Semi-Qualitative Synthesis Approach

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Overview:

Sustainability and socio-environmental researchers use a variety of methods to synthesize knowledge to address a problem. One such approach is to qualitatively or quantitatively synthesize findings from published studies. This lesson illustrates the use of a semi-qualitative synthesis approach that combines a modified systematic review, expert opinion, and a critical interpretation of literature to study Marine Spatial Planning (MSP)—a process for allocating access to marine resources. MSP seeks to meet social, economic, and environmental goals using an open, deliberate, and equitable process. It recognizes how to predict trends of development and exploitation and seeks to manage those trends while preserving economic gains. As the use of MSP has spread worldwide, there is a need to determine if these plans are achieving their intended results. The study used in this lesson presents a framework to help stakeholders and natural resource managers evaluate and improve MSPs for equitable and sustainable socio-environmental outcomes.

Assumed Prior Knowledge:

This lesson is appropriate for learners of all levels.

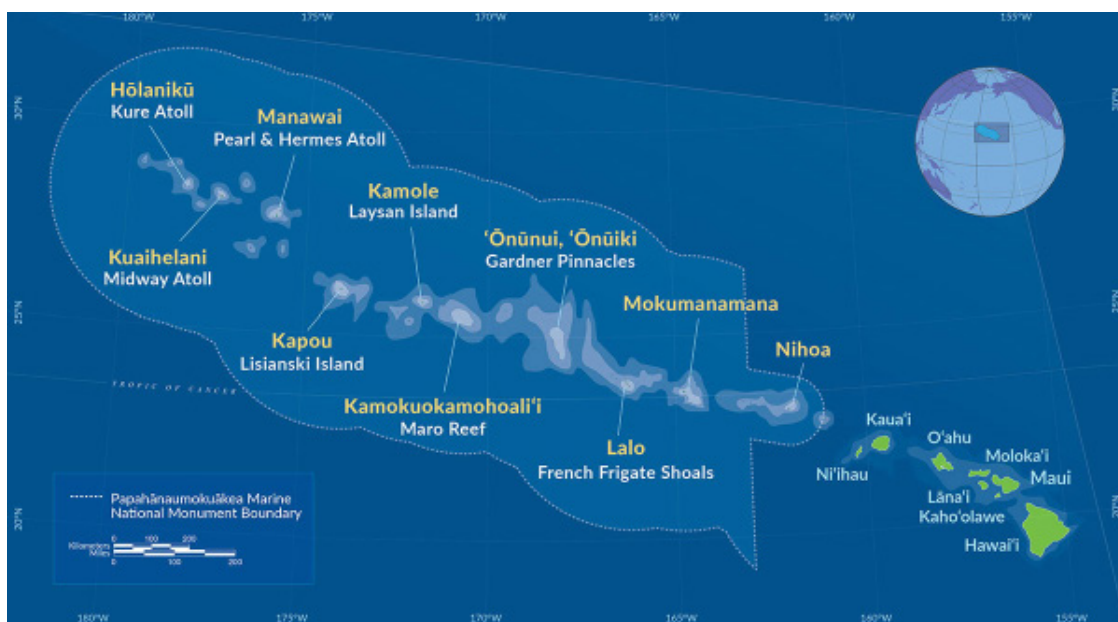
Learning Objectives:

- Learn how researchers can use different synthesis approaches to develop guidelines for governing marine natural resources that achieve both social and environmental goals.
- Learn evaluation techniques to identify marine spatial plans that represent various stakeholders and have room for updates and specialization for specific marine environments and social situations.

Key Terms and Concepts:

qualitative analysis; quantitative analysis; systematic review; expert knowledge reviews; critical narrative reviews; marine spatial planning; sustainable development; fisheries; international agreements; adaptive management; ecosystem-based MSP

The “Hook” (suggestions for quickly engaging students):



Map of *Papahānaumokuākea Marine National Monument* (2016) courtesy of the National Oceanic and Atmospheric Administration. Public Domain via Wikimedia Commons.

Marine ecologists generally support measures to protect ocean ecosystems by designating marine protected areas and reserves, such as the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands. The U.S. government and the state of Hawaii manage the Monument, describing it this way: “The Monument, a vast, remote, and largely uninhabited marine region, encompasses an area of approximately 139,793 square miles of Pacific Ocean in the northwestern extent of the Hawaiian Archipelago. Covering a distance of 1,200 miles, the 100-mile wide Monument is dotted with small islands, islets, and atolls and a complex array of marine and terrestrial ecosystems. This region and its natural and historic resources hold great cultural and religious significance to Native Hawaiians. It is also home to a variety of post-Western-contact historic resources, such as those associated with the Battle of Midway. As such, the Monument has been identified as a national priority for permanent protection as a Monument for its unique and significant confluence of conservation, ecological, historical, scientific, educational, and Native Hawaiian cultural qualities.” ([Monument Management Plan, Executive Summary](#)).

For about five minutes, have learners list stakeholders who may have an interest in the Monument's designation and protection and those who may feel left out by this designation.

Have learners also list what knowledge would be useful in determining if a natural resource site should be designated for protection and what methods they could use to obtain that knowledge/information.

Teaching Assignments:

Before class, have the participants read the following, which will be used as two parts of a 50-minute learning session.

- SESYNC Explainer: "[Qualitative Synthesis Methods: Critical Interpretive Reviews, Narrative Reviews, Expert Opinions](#)"
- Section on Systematic Reviews in: "[Quantitative Synthesis Methods: Systematic Reviews, Meta-Analyses, Expert Elicitations](#)"
- Enabling conditions for effective marine spatial planning by Zuercher et al. 2022. Undergraduates may be assigned the highlighted parts of the paper to read, and graduate students and above may be assigned the full article.

[Zuercher et al. 2022 Marine Spatial Planning paper - with highlights SP paper.pdf](#)

1. Introduction to Methods for Synthesizing and Interpreting Findings from Published Studies (20 min.)

- In the following PowerPoint, use these slides to lead a class discussion:
 - **1** as the title slide with a few notes
 - **3** on systematic reviews but omit line 7 on meta-analysis
 - **5** on the use of expert opinions in reviews
 - **8** on critical interpretive reviews.

[A Short Overview of Synthesis Methods.pptx](#)

- As the instructor moves through the slides, questions to elicit discussion by participants are provided in the "**Notes to instructor**" associated with each slide.

2. Marine Spatial Planning: Explore an example of the use of synthesis methods to develop and debate balanced approaches to achieve equitable and sustainable marine management. (20 min.)

- Divide the participants into four groups representing each of the four categories in the Zuercher paper:
 - Plan Attributes
 - Legal Context
 - Plan Development and Social Context
 - Integration

- Give each group time to review the sub-categories within their focus area. They should read the narrative account within the paper, and also the qualitative to quantitative rubric shown in Appendix B.

[Zuercher - Appendix B.pdf](#)

As each group meets, they should:

- Discuss the challenge of translating qualitative narratives to numerical scores and highlight the specific language crucial to this work. For example, under the heading “adaptability,” students should note the phrases that specify certain outcomes and conditions, like “legal authority,” “stakeholder involvement,” and “mandated timeline.”
 - Note the terms that might be abused or misconstrued in the absence of more specific goal-defining, such as “sustainable development.”
- Bring all the groups together and have a representative of each group give 2 minutes of input on what they found most notable in their group work.

Ask all of the participants to respond to the following questions as a group, collating responses:

- Who designed the framework for evaluating marine spatial plans (for instructor: a research team of “experts”) and who made the decision on what enabled, or not, plans to be more robust (for instructor: the same “experts”)?
- What groups that not involved who may be affected if the framework is applied?
- How might the composition of the group influence such a process?

Background Information for the Instructor:

1. Introduction to Systematic Review

- This chapter, made freely available on the author’s [ResearchGate site](#), covers the basics of what constitutes a systematic review and its relation to evidence-based decision making.
- Khan, S. (2020). Introduction to Systematic Review. In *Meta-Analysis, Methods for Health and Experimental Studies* (pp.3-13). Springer Nature. http://dx.doi.org/10.1007/978-981-15-5032-4_1

2. Reviewing literature in bioethics research: increasing rigor in non-systematic reviews

- This article describes the method of critical interpretive literature reviews. It uses bioethics examples but is equally relevant to socio-ecological and sustainability work.
- McDougall, R. (2015). Reviewing literature in bioethics research: increasing rigor in non-systematic reviews. *Bioethics* 29, 523-528. <https://dx.doi.org/10.1111/bioe.12149>

3. Distinguishing opinion from evidence in guidelines

- This is an interesting article and could be the basis for a nice group discussion of what constitutes expert opinion vs. expert evidence. As with much of the literature on synthesis methods, this is written from a biomedical perspective but is equally applicable to sustainability research.
- Schünemann, H.J., Zhang, Y., & Oxman A.D. (2019). Distinguishing opinion from evidence in guidelines. *BMJ*, 366. <https://doi.org/10.1136/bmj.l4606>

4. What is Marine Spatial Planning (MSP)?

- This provides a brief overview and useful set of basic principles for introducing MSP.
- Marine Planning. (n.d.). “What is Marine Spatial Planning?” The Nature Conservancy. https://marineplanning.org/overview/tnc_approach/what-is-marine-spatial-planning-msp/

5. Marine Spatial Planning

- This is a book chapter made available through the author’s [ResearchGate site](#). It provides a comprehensive review of the global history of MSP, with maps of current (2019) global MSP initiatives that explore the many challenges to integrating MSP into national and international planning.
- Santos, C.F., Crowder, L.B., Orbach, M., & Andrade, F. (2019). Marine Spatial Planning. In *World Seas: An Environmental Evaluation, Volume III: Ecological Issues and Environmental Impacts* (pp. 571-592). Elsevier. <http://dx.doi.org/10.1016/B978-0-12-805052-1.00033-4>

Related SESYNC Content:

- Palmer, M.A., & Hondula, K. (2022, August 26). *Quantitative Synthesis Methods for Sustainability: Data Integration*. SESYNC. <https://www.sesync.org/resources/quantitative-synthesis-methods-sustainability-data-integration>
- SESYNC. (2020, Nov. 11). *No One Size Fits All to Effectively Protect Fish Populations in Marine Protected Areas in the Face of Climate Change*. <https://www.sesync.org/news-events/no-one-size-fits-all-effectively-protect-fish-populations-marine-protected-areas-face>
- Gill, D., Oxenford, H.A., Turner, R.A., & Schuhmann, P.W. (2017). Making the most of data-poor fisheries: Low cost mapping of small island fisheries to inform policy. *Marine Policy*, 101, 198-207. <https://doi.org/10.1016/j.marpol.2017.10.040>
- Swanwick, R. (2021, March 25). *Closing the Gap Between the Science and Management of Cold-Water Refuges*. SESYNC. <https://www.sesync.org/news-events/closing-gap-between-science-and-management-cold-water-refuges>