

12-2023

Coastal Communications: Teaching Civic Scientific Literacy in English and Environmental Science and Resource Management Classes

Stacey Anderson

California State University Channel Islands, stacey.anderson@csuci.edu

Kiki Patsch

California State University Channel Islands, Camarillo, CA, kiki.patsch@csuci.edu

Follow this and additional works at: <https://trace.tennessee.edu/jaepl>



Part of the [Creative Writing Commons](#), [Curriculum and Instruction Commons](#), [Curriculum and Social Inquiry Commons](#), [Disability and Equity in Education Commons](#), [Educational Methods Commons](#), [Educational Psychology Commons](#), [English Language and Literature Commons](#), [Instructional Media Design Commons](#), [Liberal Studies Commons](#), [Other Education Commons](#), [Special Education and Teaching Commons](#), and the [Teacher Education and Professional Development Commons](#)

Recommended Citation

Anderson, Stacey and Patsch, Kiki (2023) "Coastal Communications: Teaching Civic Scientific Literacy in English and Environmental Science and Resource Management Classes," *The Journal of the Assembly for Expanded Perspectives on Learning*: Vol. 28 , Article 11.

<https://doi.org/10.7290/jaepl286FC6>

Available at: <https://trace.tennessee.edu/jaepl/vol28/iss1/11>

This article is brought to you freely and openly by Volunteer, Open-access, Library-hosted Journals (VOL Journals), published in partnership with The University of Tennessee (UT) University Libraries. This article has been accepted for inclusion in The Journal of the Assembly for Expanded Perspectives on Learning by an authorized editor. For more information, please visit <https://trace.tennessee.edu/jaepl>.

Coastal Communications: Teaching Civic Scientific Literacy in English and Environmental Science and Resource Management Classes

Stacey Stanfield Anderson and Kiki Patsch

Abstract: *Named after the national park that lies just off of our Ventura County shores, California State University Channel Islands draws faculty who are committed to integrating the coast into their teaching and research. This context has inspired our interdisciplinary collaboration as teacher-scholars who hail from separate departments (English and Environmental Science and Resource Management). Our work together is designed to amplify civic scientific literacy in our classrooms as a means of elevating discourse on the growing challenges that threaten our coastal communities.*

Introduction

This article explores our collaborative, interdisciplinary approach to amplifying civic scientific literacy for undergraduates across disciplines as a means of elevating scientific communication on issues relevant to the California Coast. We hail from separate departments—Stacey Anderson from English, Kiki Patsch from Environmental Science and Resource Management—at California State University Channel Islands (CSUCI) in Camarillo, California. Founded in 2002, CSUCI is the newest campus in the country's largest state university system and a Hispanic Serving Institution, with a student population that is 60 percent Latinx. Almost 60 percent of students are the first in their families to attend college ("Spring Enrollment Snapshot"). Many CSUCI students are second-generation Americans whose families work the agricultural fields that connect our Ventura County campus to the coastal shores that lie just five miles away.

Both our university and respective departments encourage interdisciplinary collaboration in teaching, scholarship, and service. As the name of our campus suggests, CSU Channel Islands also draws faculty who are committed to integrating the coast into their teaching and research. While California State University campuses are typically named after the cities or counties in which they are located, we are named after the National Park that is visible from our shores and just a short boat ride away. This institutional and geographic context inspired us to merge our respective areas of expertise as teacher-scholars who are committed to empowering students to communicate how and why we value our coast across disciplines and to articulate and address the growing challenges that threaten its preservation and public access.

Our work together prioritizes civic scientific literacy and communication as essential not just for aspiring STEM (Science, Technology, Engineering, and Mathematics) practitioners and educators, but for an engaged citizenry that will be increasingly faced with navigating civic scientific pathways. We approach our collaborative efforts through a framework of "civic scientific literacy" that empowers students to engage in public sci-

entific discourse (Johnson 371; Miller 29). Science education expert Wendy R. Johnson recognizes that not all students will choose STEM careers, but “all citizens of our society need the skills to continue to learn about science outside of school and the ability to apply their understanding to make personal decisions and engage in public discussion of socio-scientific issues” (371). Research scientist Jon D. Miller goes further, considering civic scientific literacy as crucial to safeguarding democracy in the United States (33). Miller, a lifelong advocate for civic scientific literacy, underscores the urgency of a basic level of literacy to at least be able to “read the science section of the Tuesday *New York Times* or to watch an episode of *Nova* on public television” (32).

Interdisciplinary Collaboration

We have developed an interdisciplinary scholarly and creative collaboration centered on civic scientific literacy of the California Coast that works in reciprocity with our classroom teaching and community outreach (Curtis et al. 3; Gunawardena et al. 214). Our collaborative efforts in both scholarship and teaching underscore that advocating to the general public for the protection and preservation of California’s coast includes conveying complex scientific data through compelling and innovative vehicles to reach both hearts and minds (Lemarie 5; Schwab 47). We approach our work with an interdisciplinary mindset and a shared understanding that natural sciences often intimidate the general public, particularly those who feel uneducated or insecure with their knowledge base in the sciences (Schwartz 275). This article delineates the framework of this pedagogical and scholarly collaboration and underscores the value of making such partnerships visible on campus and in the community to model the collective, interdisciplinary approach to wrestling with the increasing strains placed upon our coastal communities.

Our efforts rely on a shared understanding that California’s beaches can be valued through diverse yet intersecting disciplinary lenses that collectively highlight how much relies on the preservation of California’s coast. Economically, sandy beaches generate over \$5 billion a year in direct revenue to the state (King and Symes 3). Wide beaches and dune complexes serve as natural buffers to storm surge, protecting back beaches and low-lying ecosystems as well as human development and hardscape (Griggs et al. 46). Ecologically, beaches are integral to nutrient cycling in terrestrial and marine systems; function as natural biological filters; serve as habitat for imperiled and endemic species; and support the breeding, migrating, and wintering of many other creatures (James 506; King et al. 45-46; Lafferty 1949-50; Schlacher et al. 557-58). Recreational and commercial fishing also depend on beaches as habitat and an essential component of the food web. Psychologically, beaches encourage outdoor recreation and improve mental health and well-being (Nichols; Pilkey and Cooper xi-xii). Culturally, California’s beaches have inexorably shaped trends and genres in music, art, fashion, dance, and recreation to create what we characterize as the “California imaginary.” Our teaching and scholarship strive to cultivate civic scientific literacy of this prismatic array of disciplinary lenses that is integral to engaging in informed discourse among everyday citizens and policymakers on the issues facing California’s beaches and what is at stake if we fail to address them.

Our interdisciplinary collaboration is rooted in curriculum development. In the spring of 2017, Kiki taught for the first time an upper-division, interdisciplinary, writ-

ing-intensive course proposed by the Environmental Science and Resource Management Department, *ESRM 335: The Beach*, an “[i]nterdisciplinary course that explores the sociocultural importance of sandy beaches in Southern California, integrates diverse perspectives on California’s beach culture and society, and focuses on issues pertaining to coastal development and sustainability” (“2023-2024 University Catalog”). This class fulfills the upper-division general education requirement for scientific inquiry and reasoning and is populated by students across nearly all majors. Between 2017 and 2023, the enrollment of the class grew from one section of thirty students to two sections totaling over 200. Kiki’s expertise is in coastal geomorphology, processes, and hazards as they relate to coastal resilience in the face of climate-induced sea level rise. This general education class, however, sought to unpack the significance of California’s sandy beaches beyond buffering houses and infrastructure from storm surge and sea level rise or providing a space to throw down one’s towel and lie in the sun.

Interdisciplinary Teaching, Take One

In preparing for *The Beach* class, Kiki recognized that people view and value the beach through a variety of lenses, including those delineated above. Empowering students in *ESRM 335* as scientific communicators would entail cultivating both a baseline literacy of scientific processes and policies regarding California’s coastal zone as well as an appreciation of the diverse lenses through which stakeholders could be engaged in issues concerning its protection and preservation. Ecologists see the sandy beach as a complex ecosystem that depends on the rise and fall of the tides and the movement of sand along the coast to provide habitat and nutrients for critters that live in the sand and form the bottom tiers of the ocean food web. Economists perceive the sandy beach as an important economic driver, generating necessary dollars from tourism for localities. Dance and music historians observe the influence of California’s beaches on the fluid movements of evolving dance styles and on the surf music often associated with California culture. Families enjoy the beach as a place to play and make memories splashing in the waves, building sandcastles, and digging for crabs. Amateur athletes and everyday exercisers seek out the beach as a place for solo and social activities such as surfing, skateboarding, and volleyball. Those craving mental wellness flock to the beach for the restorative sensory experience of crashing waves and ocean breezes. Reflecting on this range of lenses, Kiki realized that communicating the value of the sandy beach went far beyond her own geological lens of how sand arrives at the beach and is influenced by the waves.

As valued as beaches are, they are still under attack due to climate-induced sea level rise. The US Geological Survey predicts that up to 67% of southern California’s beaches will disappear by 2100 (Vitousek et al. 782). Coastal armoring (e.g., seawalls and jetties) and replenishing the supply of sand to the beaches with outside sources are widely perceived to offer a solution to beach erosion, but these short-term solutions further exacerbate the issue through environmental degradation and other problems (Defeo et al. 3; Dugan et al. 193; Griggs 13; Griggs and Patsch 1061; Griggs et al. 72; Runyan and Griggs 336). In *The Beach* class, Kiki aimed to convey to students the importance of managing the coastal zone in a way that prioritizes the protection and preservation of sandy beaches and the importance of engaging the public in this process. This meant

exploring the beach through a variety of lenses to ideally touch on those that would resonate with students. Most students in this class grew up near the coast yet did not fully grasp the interdisciplinary ways we can study and explore the beach. The goal was thus to allow the students to reclaim their relationship with the natural world by taking the familiar location of the beach and exploring the many ways we can understand its dynamism and value. By personalizing and broadening the understanding of this known and loved place through multiple disciplinary lenses and then using that as a springboard to discuss the complex issues of policy and management in the face of climate-induced threats, students learn to engage with a “comfortable” scientific topic while understanding the viewpoints of a multitude of stakeholders. Understanding the complexity of an issue from the perspective of different stakeholders is a valuable tool to teach students effective civic scientific literacy. Kiki knew that she could not be the “sage on the stage” for every topic in this course, so she invited guest speakers to share their disciplinary perspective in relation to California’s beaches. Kiki’s goal for the class was to create an active learning environment where students would be inspired to care about beach protection and cultivate their civic scientific literacy. The semester was divided into four overarching sections: *The Physical Environment and Processes of the Sandy Beach*; *The Ecological Functioning of the Sandy Beach*; *The Cultural Importance of the Beach as it relates to the “California Imaginary”*; and *Threats to California’s Sandy Beaches*. Exposing students to each aspect of the beach would allow them to develop their own perspective of what is at stake with climate change and sea level rise, empower them to broadly communicate such threats to the public using course assignments, and reveal to them that they all have a stake in the protection of California’s beaches.

Each week of *The Beach* class included a documentary, reading, and guest speaker to convey the significance of the beach from diverse disciplinary perspectives and through a range of sensory experiences. For example, Javier Gonzales, musician and CSUCI global languages professor, integrated songs associated with or inspired by the “California sound” to explore the influence of the beach on music worldwide. Dancer and CSUCI performing arts professor Heather Castillo pulled students out of their seats to engage them in the physicality of how the beach and ocean shaped modern American dance. Philip King, an economics professor from San Francisco State University, discussed the importance of the beach to local and state economies. Ethan Estess, an environmental advocate, marine scientist, and artist, revealed how he uses art to communicate environmental threats to our beaches and oceans. Kiki’s fellow CSUCI ESRM professors demonstrated the diversity of lenses that could be explored even in the same academic department: Dan Reineman discussed beach access equity and the future of California’s beaches, Clare Steele emphasized the importance of the sandy beach ecosystem, and Sean Anderson homed in on public perceptions, threats, and stressors to the beach.

Every week, students were asked to think critically about the sandy beach from the “disciplinary lens of the week” and reflect on this perspective through discussion boards and/or blog posts. The goal was to build civic scientific literacy and communication by using a setting that students were already familiar with and comfortable exploring. Public-facing blog assignments required that students visit a beach and discuss the significance of that location using the disciplinary lenses discussed in class. This assign-

ment encouraged students to think critically about their environment and expand their communication skills to a public forum. Science students were engaging with the arts and art students were now looking at the beach as an ecologist or geologist and communicating their observations with the general public through their writing. The alternate, or previously unexplored disciplinary lenses, were truly eye-opening to students. Asking students to experience the beach through different disciplinary lenses required a level of critical thinking expected in an upper division course. Students were presented with disciplinary topics and asked to assimilate information gleaned from readings, documentaries, and lectures on how this topic, or lens, could be applied to the beach.

Students were then challenged with not only understanding the topic as it related to California's beaches, but to apply that understanding to a specific California beach as well as an international one. The culminating project required either an in-class or recorded presentation on the Coastal Imaginary of a location outside the continental US. Working in groups, students drew upon their weekly writings to explore threats to their selected country's beaches using multiple disciplinary perspectives in order to convey the importance of the sandy beach environment and the effects of management choices on this important, vanishing ecosystem. They were charged with essentially creating a public service announcement to engage and communicate with classmates about our global coasts in crisis, with an ultimate goal of conveying to the general public the plight of the world's beaches.

Interdisciplinary and Collaborative Scholarly and Creative Activities

The success of *ESRM 335: The Beach* opened our eyes to the potential of forging an interdisciplinary collaboration centered on fostering informed discourse on the issues facing the California Coast. We applied for and received an internal interdisciplinary Research, Scholarship, and Creative Activities (RSCA) grant for the summer of 2017 aimed at facilitating collaboration between faculty in STEM and Arts and Humanities. Drawing upon our respective backgrounds in coastal science (Kiki) and composition and rhetoric (Stacey), we launched *Beaches on the Edge*, a website dedicated to exploring and communicating the significance of California's beaches. This project included conducting video interviews on location at Point Mugu State Beach with members of the campus and local community about the significance of the coast and its influence on music, dance, culture, and our identity as Californians. Interviewees included CSUCI faculty Javier Gonzalez (on music) and Heather Castillo (on dance) as well as California State Parks Lifeguards Stephanie Crane and Colin Simon, who shared their insights on issues facing California beaches, from environmental challenges to recreational usage.

The perspectives of the lifeguards were particularly revealing regarding the potential of civic scientific literacy in engaging the public on coastal issues. These lifeguards have witnessed firsthand how the beach functions as the outdoor playground and gathering place for inland, urban residents who do not have yards of their own or crave the sea breezes in the heat of summer. Indeed, it appeared that the increasing periods of excessive heat associated with climate change yielded increased demand for the coastal locations that are also threatened by climate change and the resulting sea level rise (Patsch and Anderson). Engaging in conversations such as this underscored the potential to

draw upon the current moment and this collective affection for California's beaches to speak directly to the challenges they face and promote advocacy for addressing them.

Interdisciplinary Teaching, Take Two

Taking our interdisciplinary collaboration a step further, in the fall of 2017, Stacey adapted the topics explored in *The Beach* class and in *Beaches on the Edge* when she taught an online version of *English 330: Interdisciplinary Writing* for the first time. This class focused on "[i]ndividual and collaborative writing that integrates research from a variety of disciplines. Students will work on projects that incorporate various forms of research, including electronic, and which result in both oral presentations and academic papers. Each section will be based on a theme appropriate for interdisciplinary research and writing" ("2023-2024 University Catalog"). Anderson built this course around the theme of "The California Coast." Students engaged in a variety of reading, research, and writing activities that asked them to delve into the multiple disciplinary lenses through which the coast can be viewed and valued, including completing collaborative and multimedia projects. As with Kiki's *The Beach* class, Stacey found that a framework of civic scientific literacy within the context of an interdisciplinary writing course spoke to students across disciplines as they prepared to negotiate evolving political, cultural, economic, and media terrain that inevitably shape public discourse on issues of scientific relevance.

David Helvarg's *The Golden Shore: California's Love Affair with the Sea*, one of several texts Kiki drew upon in *The Beach* class, served as the primary text in English 330. The book examines California's coast through a range of disciplinary perspectives. Written in a style that is accessible and personal yet still informative and persuasive, Helvarg's book appealed to the wide array of students the English 330 course served, including those majoring in English, business, and liberal studies. The course began by asking students to compose weekly journal entries on Helvarg's text, which included exploring the intertwining natural and human-induced influences that have shaped the California Coast, analyzing the diverse lenses through which the California Coast is perceived by various stakeholders, and evaluating the benefits the California Coast provides and the challenges it faces.

Students proceeded to create presentations on the theme of "What the Coast Means to Me." This assignment asked students to draw upon what they had learned through reading and writing in response to Helvarg's *The Golden Shore* as they visited the coastal site of their choice and reflected on the various disciplinary lenses through which they were perceiving it. Students captured their perceptions through photographs and notes and used those to build a slide deck. They then uploaded that slide deck to VoiceThread, a digital platform embedded in our Learning Management System that enables users to create interactive, multimedia presentations to promote asynchronous discussion among presenters and viewers via recorded audio or video responses. Presenters narrated their own VoiceThread slides to communicate what the coast meant to them as understood through the perspectives they had selected, which could include psychological, economic, political, educational, environmental, musical, cultural, ethnic, literary, artistic, biological, commercial, international, multicultural, community-oriented, cinematic,

intellectual, emotional, familial, and so on. Classmates then viewed and responded to the presentations in VoiceThread via audio and video comments, building conversations based on what the presenter had shared and/or previous comments from other classmates. In this manner, presenters developed experience in articulating with their peers why the coast matters to them and fostering dialogue on why it is worth protecting and preserving, and audience members learned to see the coast through the eyes of others and to communicate their own perceptions in response.

This led to the next multimedia project, “Coastal Perspectives,” which asked students to conduct video interviews to discern the perspectives of others on the value of the coast. While VoiceThread presentations gave students the chance to communicate their understanding of the coast with their classmates, these videos were posted publicly to YouTube, expanding potential audience reach. This assignment built upon students’ prior experience with the ubiquitous YouTube platform that had played a formative role in shaping how their generation accesses and interacts with content relevant to their personal interests and academic needs. At the same time, the assignment challenged students technically and stylistically, as they came to recognize the complexities of communicating in this medium in a manner that is polished, professional, and engaging for the intended audience. This assignment asked students to share what they had learned in the class with potential interviewees, record interviews that discussed the value of the coast as viewed through any of the lenses we had been exploring, and edit their material for a video to be published on YouTube (see Figure 1). While students understood that YouTube videos were powerful ways to communicate with and impact viewers, they also learned that creating an effective video to interest an audience beyond their own class was not as easy as simply whipping out their smartphones and hitting Record. Many submitted videos did not meet students’ own expectations for quality, and the instructiveness of the assignment came from reflecting on the nuances of communicating in this medium that they had taken for granted in all of their own years of YouTube binging. While video quality varied, students appreciated the opportunity to create using a platform they had only engaged with as consumers in the past. Students also watched and responded to one another’s videos via the discussion board, broadening their exposure to a range of perspectives and approaches to communicating their insights. Students were then asked to reflect on what they learned that they would take with them when producing a video in the future. They recognized the value of location (with a preference for coastal sites that aligned with the theme, as in Figure 1), relevant coastal images (as in Figure 2), clear and audible sound, and integrating a range of lenses and interview subjects. Students were particularly affected by interviews that exposed them to new knowledge (such as a Ventura County resident who had a passion for photographing bioluminescence) or novel perspectives (including an 84-year-old grandmother who attributed her longevity to living by the coast). All recognized that producing a video that could authentically reach its target audience was far more demanding than they had anticipated.



Figure 1: A screenshot of the Seal Beach pier from a student [YouTube video](#) for ENGL 330 (Velasco). Successful videos were filmed on location at coastal sites along the Southern California Bight, either as background during the interview or as B-roll footage.



Figure 2: A screenshot from a student [YouTube video](#) for ENGL 330 (Willingham). The video transitioned to this photo of the interview subject bodyboarding in front of an iconic Ventura County coastal site (Mugu Rock) after the subject had shared how much this beach activity means to him.

The class concluded with a collaborative interdisciplinary project on “The Value of the California Coast.” Students formed groups after watching and responding to each other’s YouTube videos and identifying potential partners. Groups then collaborated to produce three research-based texts in different genres and for distinct audiences focused on a particular issue or topic of mutual interest regarding the value of the California Coast. These texts included an op-ed aimed at Ventura County residents, a blog entry directed at California readers, and a letter to the California Coastal Commission, a state body that “plans and regulates the use of land and water in the coastal zone,” including beach access, development, and habitat protection (“Our Mission”). Each group worked in a shared Google Drive folder to facilitate asynchronous, remote collaboration in this online class. The module included guidelines and resources for approaching each communication scenario and crafting each text for its targeted audience. This project required groups to build their own civic scientific literacy on their chosen topics—urban runoff, oil spills, pollution, and wetland restoration—and to compose texts that integrated resources relevant to each rhetorical situation. The op-eds used very spare, direct, argumentative language and communicated in the limited space allotted by submission guidelines, while the blog posts traded in images, web design, and more personal, inviting language and tones. The letters to the California Coastal Commission were written on letterhead and followed the stringent guidelines for *ex parte* communications set forth by the Commission. Each of these genres offered unique opportunities for groups to write persuasively to specific audiences, to communicate what they had learned about their chosen topics, and to advocate for attention and action on these issues. Students also worked independently to compose a reflective essay that synthesized what they had learned throughout the semester about the value of the California Coast. This gave students the chance to cite their own contributions to the class to communicate their own civic scientific literacy journeys. These reflective essays were composed in a Google Doc that included both newly written reflections as well as text, images, and multimedia content from their previous assignments, either embedded directly or hyperlinked in the essay. The intended audience for this piece was the English Composition Faculty, who read and evaluated each project through a blind, holistic assessment process. This further expanded the readership of student work to an audience that is trained in rhetoric and writing and attuned to the conventions and expectations of the diverse genres.

Future Directions

As we teach additional iterations of these upper-division, general education ESRM and English courses, we continue to draw upon our shared knowledge and commitment to cultivate civic scientific literacy and engagement in our students and empower them to communicate clearly and confidently on the issues facing the coast that is so integral to our identity as a campus and as a community. The importance of clear scientific communication, interdisciplinary collaboration, and multimedia engagement has only become more palpable since we began our work together, and particularly over the course of the COVID-19 pandemic that placed online, digital platforms at the center of how we engage with each other, both inside and outside academia. The multimodal dimensions of *The Beach* class enabled the course to evolve and adapt as the course cap rose to serve

the growing number of students who were drawn both to the coastal orientation of the course and the fact that it was a highly accessible and relevant way for them to fulfill their upper-division, general education requirement in the area of scientific inquiry. These aspects also eased the shift to teaching the class online and asynchronously, a modality that will continue even as other courses at our campus have returned to in-person instruction. Similarly, the initial foray of teaching ENGL 330 online and asynchronously, and the focus on an array of digital and visual texts in a variety of genres and contexts, presaged the direction of this and other writing courses, which have continued to empower students to engage with real-world issues of scientific relevance and to communicate the significance of those issues in ways that will reach audiences far beyond the classroom. Again, this is the power of a general education, interdisciplinary, writing intensive course that reinforces and rewards the significance of collaboration, dialogue, and consensus building.

As we continue to engage with this work, we have come to understand that feelings of insecurity and “imposter syndrome” permeate our underserved student population at CSUCI when it comes to both civic scientific literacy and communication. The familiar and evocative setting of California’s beaches offers us a chance to engage students with science and with writing in a way that speaks authentically to their perspectives and experiences and connects them to the natural world. This, in turn, empowers students to share what they have learned with their own families and communities and to engage more directly with the “wicked problems” such as climate change and sea level rise that can otherwise seem so far out of their grasp and beyond their control. Our interdisciplinary collaboration serves as a model for how we can begin to chip away at these seemingly intractable challenges and the importance of accessible, evidence-based means of communicating these challenges and fostering buy-in from the general public so that they too can serve as instruments of outreach and advocacy (Curtis 183; Curtis et al. 3).

Works Cited

- “2023-2024 University Catalog.” California State University Channel Islands. <https://catalog.csuci.edu/>.
- Curtis, David J. “Creating Inspiration: The Role of the Arts in Creating Empathy for Ecological Restoration.” *Ecological Management & Restoration*, vol. 10, no. 3, 2009, pp. 174-84.
- Curtis, David J, Nick Reid, and Guy Ballard. “Communicating Ecology through Art: What Scientists Think.” *Ecology and Society*, vol. 17, no. 2, 2012.
- Defeo, Omar et al. “Threats to Sandy Beach Ecosystems: A Review.” *Estuarine, Coastal and Shelf Science*, vol. 81, no. 1, 2009, pp. 1-12.
- Dugan, J. E. et al. “Generalizing Ecological Effects of Shoreline Armoring across Soft Sediment Environments.” *Estuaries and Coasts*, vol. 41, no. S1, 2017, pp. 180-96.
- Griggs, Gary. “The Impacts of Coastal Armoring.” *Shore and Beach*, vol. 73, no. 1, 2005, pp. 13-22.
- Griggs, Gary and Kiki Patsch. “The Protection/Hardening of California’s Coast: Times Are Changing.” *Journal of Coastal Research*, vol. 35, no. 5, 2019, pp. 1051-61.

- Griggs, Gary, Kiki Patsch, and Lauret Savoy. *Living with the Changing California Coast*. University of California Press, 2005.
- Gunawardena, Sidath, Rosina Weber, and Denise Agosto. "Finding That Special Someone: Interdisciplinary Collaboration in an Academic Context." *Journal of Education for Library and Information Science*, vol. 51, no. 4, 2010, pp. 210-21.
- Helvarg, David. *The Golden Shore: California's Love Affair with the Sea*. Reprint edition ed., New World Library, 2016.
- James, Rodney J. "From Beaches to Beach Environments: Linking the Ecology, Human-Use and Management of Beaches in Australia." *Ocean & Coastal Management*, vol. 43, 2000, pp. 495-514.
- Johnson, W. R. "Why Engaging in the Practices of Science Is Not Enough to Achieve Scientific Literacy." *The American Biology Teacher*, vol. 78, no. 5, 2016, pp. 370-75.
- King, Philip G. et al. "Valuing Beach Ecosystems in an Age of Retreat." *Shore & Beach*, vol. 84, no. 4, 2018, pp. 45-59.
- King, Philip and Douglas Symes. "The Potential Loss in Gross National Product and Gross State Product from a Failure to Maintain California's Beaches." A Report for the Department of Boating and Waterways, 2004. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=e0c48384cc8d44471b1cf1e872b930dc137838f9>
- Lafferty, Kevin. "Birds at a Southern California Beach: Seasonality, Habitat Use and Disturbance by Human Activity." *Biodiversity and Conservation*, vol. 10, 2001, pp. 1949-62.
- Lemarie, Jeremy. "Rhythms and Cycles in Surf City USA®: Commercializing Surfing in Southern California." *Academia.com*, 2015.
- Miller, J.D. "What Colleges and Universities Need to Do to Advance Civic Scientific Literacy and Preserve American Democracy." *Liberal Education*, vol. 94, no. 4, 2012.
- Nichols, Wallace J. "A Conversation with Dr. Wallace J. Nichols." Interview by Kiki Patsch, Environmental Science and Resource Management, 2021, https://youtu.be/pwja3n_fG-E.
- "Our Mission." California Coastal Commission. <https://www.coastal.ca.gov/whoweare.html>.
- Patsch, Kiki and Stacey S. Anderson. "Guardians of the Shore." *Beaches on the Edge*. <https://beachesontheedge.sandshed.org/>.
- Pilkey, Orrin H. and J. Andrew G. Cooper. *The Last Beach*. Duke University Press, 2014.
- Runyan, Kiki and Gary B. Griggs. "The Effects of Armoring Seacliffs on the Natural Sand Supply to the Beaches of California." *Journal of Coastal Research*, vol. 19, no. 2, 2003, pp. 336-47.
- Schlacher, Thomas A. et al. "Sandy Beaches at the Brink." *Diversity and Distributions*, vol. 13, no. 5, 2007, pp. 556-60, doi:10.1111/j.1472-4642.2007.00363.x.
- Schwab, Gabriele. *Imaginary Ethnographies: Literature, Culture, and Subjectivity*. Columbia University, 2012.
- Schwartz, Brian. "Communicating Science through the Performing Arts." *Interdisciplinary Science Reviews*, vol. 39, no. 3, 2014, pp. 275-89.
- "Spring Enrollment Snapshot." California State University Channel Islands. <https://oneci.csuci.edu/t/IRPEGuest/views/FallEnrollmentpublic/EnrollmentDashboard?%3Aiid=1&%3AisGuestRedirectFromVizportal=y&%3Aembed=y>.

- Velasco, Giovanni. "Coastal Perspectives: Engl 330: Interdisciplinary Writing Fall 2017." *You Tube*, 27 October 2017, https://youtu.be/Xy0v0I_q7v4.
- Vitousek, Sean, Patrick L. Barnard, Patrick Limber, Li Erikson, and Blake Cole. "A Model Integrating Longshore and Cross-Shore Processes for Predicting Long-Term Shoreline Response to Climate Change." *Journal of Geophysical Research: Earth Surface*, vol. 122, no. 4, 2017, pp. 782-806.
- Willingham, Christine. "Reasons Why Our Coast Is Special." *You Tube*, 29 October 2017, <https://youtu.be/RwK0lnj5j7s>.