

**APPLICATION FOR 2014-2016 NOAA COASTAL SERVICES CENTER  
COASTAL MANAGEMENT FELLOWSHIP**

**CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION  
OFFICE OF LONG ISLAND SOUND PROGRAMS**



**SEAWALL COMPENSATION: REGULATORY OPTIONS DEVELOPMENT  
(SCROD)**

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PROJECT CONTACT:

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## BACKGROUND/INTRODUCTION

Shoreline protection has recently become a top priority for coastal management in Connecticut. Whether the approach is “hard”—seawalls, bulkheads, revetments—or “soft”—living shorelines, beach nourishment, retreat—shoreline protection issues are front and center as the state continues to rebuild after Storms Irene and Sandy. Coastal residents, towns, and legislators are all eager to rebuild storm-damaged homes and infrastructure, and they are largely convinced that shoreline armoring is necessary to protect valuable coastal property. This prevailing attitude poses a major challenge for the Office of Long Island Sound Programs (OLISP), which operates Connecticut’s coastal management program and regulates in-water coastal structures. It will become increasingly difficult to balance resource protection against private property protection when all of the pressure comes from one side.

Pressures to rebuild are undoubtedly common to all storm-damaged coastal states; however, the context is somewhat different in Connecticut. Unlike our neighboring states, fellow victims of Irene and Sandy, we do not have long stretches of barrier beaches or uniform coastal geography. Connecticut’s geomorphology has been described as unusually complex, with many rocky promontories delineating small inlets and sub-estuaries that may be marshy, sandy or rocky. For instance, only 8% of Connecticut’s total shoreline is classified as sandy beach. This heterogeneous environment inhibits a broad-based response to climate adaptation and storm recovery issues, and requires attention to smaller-scale or even site-specific problems. Added to our environmental complexity is the socioeconomic context, in which 69% of Connecticut’s total shoreline is privately owned, most of which is high-value residential real estate.

At the state level, with the possible exception of two or three Corps of Engineers projects, there is no money, impetus or authority for a comprehensive, large-scale (town- or neighborhood-wide) shoreline management response to storm hazards and sea level rise. As a result, for the foreseeable future, shoreline management decisions will largely be driven by individual residential property owners. This situation makes shoreline armoring much more likely, since a seawall or revetment offers greater assurance that an individual site will survive storms and sea level rise during the short term, and few waterfront property owners are likely to sacrifice their immediate needs for protection in favor of an indefinite public benefit of resource protection. If current trends continue, we expect to see accelerated individual armoring projects on residential properties, which will cumulatively inhibit adaptation and encourage the long-term loss of coastal resources, especially tidal wetlands and beaches. A 2010 report to the EPA concluded that “Shore protection is almost certain for approximately 80 percent of the coastal zone of Connecticut, a higher percentage than for any other state along the Atlantic Coast.”

<http://risingsea.net/ERL/CT.html>

In the next few years, we expect continued pressure to relax shoreline structures policies in individual cases. While on a broader level the Corps is conducting its regional post-Sandy North Atlantic Coast Comprehensive Study, and DEEP and UConn are attempting to start up a Center for Coasts/Climate Resiliency Center, <http://www.cga.ct.gov/2013/ACT/SA/2013SA-00009->

[R00SB-01013-SA.htm](#) , the big picture doesn't seem to translate down to the permit applications where decisions are made. At this level, there are few if any voices calling for shoreline protection through adaptation and non-structural treatments. Elected officials, while they may recognize, in the abstract, the adverse cumulative effects of hard structures on coastal resources, can be counted on to promote the particular interests of a constituent over the long-term statewide policy espoused by the coastal management program. Environmental groups are certainly aware of climate change, resiliency and sea level rise issues, but there is no organized constituency fighting shoreline armoring, even under the banner of preserving wetlands and public access in the face of sea level rise. As a result, it is increasingly difficult for OLISP to maintain its longstanding statutory policy promoting non-structural shorelines in the face of specific, immediate demands for protective structures on individual properties. If we attempt to hang tough, we risk a political backlash resulting in a further weakening of statutory standards. On the other hand, if we relax our interpretation of the standard, we only facilitate the cumulative, permanent hardening of Connecticut's shoreline. For all practical purposes, once a wall or revetment is built, it remains forever and ever. Even for unauthorized structures, timely enforcement actions rarely are able to re-naturalize a shoreline.

The theory of compensation may offer us a way out of this dilemma, serving as something of a safety valve. At present, each new stretch of hardened shoreline represents a fixed boundary beyond which the public trust, and the resources it supports—both natural resources and public access—may never pass. When the prospect of sea level rise is added, each new stretch of hardened shoreline represents an incipient purpresture, an uncompensated taking of public property for private use. In a phrase we've been trying unsuccessfully to popularize, Seawalls for All means Beaches for None. But on the other hand, if each new increment of hardening is balanced by an equal (or greater) and opposite increment of re-naturalization, we can at least preserve the existing possibilities for landward migration of tidal wetlands and intertidal public access corridors.

Recent amendments to the Connecticut Coastal Management Act in 2012 gave us the legal foundation for a program of mitigation through compensation, opening the door to a policy of no-net-increase in armoring.<sup>1</sup> However, until OLISP can leverage additional staffing resources, the concept of compensation for shoreline hardening will remain only an idea. We need a SCROD Fellow to bring it to life!

#### GOALS AND OBJECTIVES

The SCROD Fellow will be tasked with assessing and creating a system of compensation for the loss of natural shorelines caused by additional armoring with hard structures. The SCROD project is designed to meet the following objectives:

- (1) Research the nature and extent of shoreline armoring in Connecticut.

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<sup>1</sup> CGS §22a-92(e), [http://www.cga.ct.gov/current/pub/chap\\_444.htm#sec\\_22a-92](http://www.cga.ct.gov/current/pub/chap_444.htm#sec_22a-92)

- (2) Research and assess the theory and practice of in-kind shoreline compensation, reviewing the literature and experiences of other states and agencies, if any.
- (3) Develop the principles of no-net-increase in hardened shorelines, including possible goals for re-naturalizing certain priority areas.
- (4) Determine the extent of shoreline resources that can be re-naturalized, focusing first on state-owned properties but also investigating the possibilities for municipal or privately-owned shorelines.
- (5) Investigate the possibilities of a structural mitigation banking program, including the potential for third-party participation as brokers or “bankers.”
- (6) Investigate the parameters and possibilities of an in-lieu fee program as mitigation for shoreline hardening.
- (7) Design and pilot a compensation program for new shoreline structures requiring state permits.
- (8) Develop the essentials of a municipal level compensation program.
- (9) Prepare guidance documents and other outreach materials for permit applicants, municipalities, applicants and the public on how the compensation program will operate or can be instituted.

#### MILESTONES AND OUTCOMES

The SCROD Fellowship will not have a strict timetable or sequence; the dates listed are not firm completion deadlines, and we expect that many stages in the project will overlap.

August 2014-December 2015: Become familiar with Connecticut regulatory processes and shoreline management issues, participate in regulatory review and planning processes: Research phase, Objectives 1, 2 and 3.

January 2015-May 2015: Research other types of compensation schemes at state and local level, develop means to create inventories of structures subject to removal, create framework for state compensation program: Conceptual Framework and Program Development phase, Objectives 4, 5 and 6.

June 2015-December 2015: Test the methodology and train OLISP permit staff: Implementation phase, Objective 7.

January 2016-July 2016: Conduct outreach and workshops with municipal commissions and staff as appropriate; conduct outreach to consultants and regulated community; finalize guidance documents: Outreach phase, Objectives 8 and 9.

#### PROJECT DESCRIPTION

The SCROD project will move forward in four stages: Research, Conceptual Outline, Implementation, and Outreach.

##### *Research*

As far as we know, a shoreline armoring compensation program of this type has never been done before, so many questions will need to be answered as we proceed. As a result, the SCROD project will commence with a research component. The Fellow will research and assess the theory and practice of in-kind shoreline compensation, reviewing the literature and experiences of other states and agencies, if any, and exploring the analogy to wetland compensation.

Closer to the ground, the Fellow will also research the nature and extent of shoreline armoring in Connecticut, in the context of our coast's economic, ecological and resource values. In addition to acquiring background information, this phase will specifically involve coordinating with the UConn Resiliency Center to integrate its work on an inventory of shoreline structures and characteristics with other existing data sources into a more concise, accessible format. This shoreline characterization aspect of the project would likely provide considerable ancillary cross-cutting benefits that extend beyond the SCROD project to other aspects of coastal management.

Next, the research focus will turn from the context to the practicalities. Based on an understanding of the state's shoreline characteristics, the Fellow will determine the possible extent of compensation opportunities. The project will determine the extent of shoreline resources that can be re-naturalized, focusing first on state-owned properties but also evaluating the possibilities for unhardening municipal or privately-owned armored shorelines. This inquiry will also include the extent of work necessary to stabilize the shoreline after the structure is removed. Given the density of development in coastal Connecticut, in many locations it may be impractical or even harmful to coastal resources to destabilize existing shoreline configurations. Thus, the Fellow must assess the extent to which there are sufficient potential un-armoring sites available to support an ongoing program of compensation. One promising line of inquiry will likely involve areas of potential landward migration of tidal wetlands, which are already being researched.

##### *Conceptual framework and program development*

The centerpiece of the project is, of course, the actual creation of a shoreline armoring compensation program that can be implemented by OLISP's permitting program. Once the

research stage is well along, the Fellow will begin to develop the principles of no-net-increase in hardened shorelines, including possible goals for re-naturalizing certain priority areas.

This stage, in turn, will require resolution of a number of conceptual issues concerning how a compensation program would actually work, particularly the basis on which compensation is calculated and the circumstances in which it is required. Do only new shoreline flood and erosion control structures require compensation, or would the policy also apply to modifications to an existing structure? Will there be priority areas for re-naturalization that are given more weight as compensation sites, or areas where greater resource impacts call for greater compensation (such as structures impeding wetland migration), or both? How will the valuation of ecosystem services be incorporated into the assessment of the armoring compared to the compensation sites?

A conceptually simpler approach, suggested by the new statutory language, would be a simple ratio of at least one-to-one per linear foot of compensatory re-naturalization for new armoring. But how would even a simple ratio be measured? Are vertical face seawalls to be considered equivalent to riprap revetments, or timber bulkheads? Do we take into account the height of the structures? Should mitigation credit be given for shoreline softening short of complete re-naturalization; e.g., replacement of a vertical face seawall with sloped riprap toe protection? A further set of questions involves groins and other perpendicular structures that do not simply harden the water-land interface and thus cannot be equated in a linear fashion. Because groins and jetties are intended to interrupt littoral sediment transport, and can have both positive and negative impacts on adjacent properties, their removal or modification may create broader unintended consequences on- and off-site. Finally, on all compensation sites, even when there is a linear equivalence as the statute contemplates, how should we account for the site-specific technical elements of the post-structural restoration of the site?

Once the conceptual questions are answered, the Fellow will undertake the analysis and resolution of a number of challenges in program development. Should there be an exchange brokered by the state or local regulating agency, or should each applicant be responsible for finding a compensation site? If private properties are involved, will the owners of compensation properties need additional financial incentives? It seems likely that OLISP would want to create a registry or catalog of sites that can be re-naturalized, perhaps categorized by type of ownership (state, municipal, private) and resource priority. Such a registry might also serve as the basis for a form of mitigation bank. We expect that the SCROD project will devote considerable attention to the parameters and possibilities of a shoreline structures mitigation banking program, including the potential for third-party participation as brokers or "bankers." Non-profit organizations such as environmental groups or land trusts, if they have the interest and expertise, may well be able to play a more effective role than a regulatory state agency in this context.

Moreover, if there were to be a mitigation bank, the logical next step would be an in-lieu fee paid to the "banker." As part of the development of the program, the Fellow will also need to consider the possibilities offered by an in-lieu fee program, as is more commonly used in wetland

regulation.<sup>2</sup> In the shoreline armoring context, presumably a seawall applicant would pay an additional fee to the Department—or to a third-party broker—into a fund which would be used to finance shoreline restoration and re-naturalization. This scenario then raises other questions, such as whether applicants might attempt to “buy” permits for otherwise inconsistent projects, and whether additional legal authority might be needed, recognizing the risks of attempting to amend shoreline structures statutes in light of recent history. All this will come within the SCROD purview.

### *Implementation*

Once the Fellow has conceived and developed a compensation program, we must find out if it works. The SCROD will pilot, or beta-test a compensation program for new shoreline structures requiring state permits, including a feedback loop to make changes as necessary. This will mean trying out the project on one or more live applications and most likely, negotiating with permit applicants and consultants to make the initial compensation trials work. By this point in the project, the Fellow will have sufficient familiarity with OLISP's permitting program that he/she will be able to take a lead role in selecting both potential compensation sites and the appropriate applications to provide the compensation. We cannot predict how many opportunities we may have to promote the compensation policy, but the Fellow will undertake as many as possible. Based on this experience, the SCROD Fellow will need to create guidance documents for staff and for applicants.

While the focus of the SCROD project will be on the state level for programmatic reasons, for maximum effectiveness a compensation program should also operate at the municipal level. Many, if not most shoreline flood and erosion control structures exist landward of the state coastal jurisdiction line within municipal jurisdiction. Because applications to erect such structures require a mandatory referral to OLISP for comments, and because they often pose dilemmas pitting private property interests against statutory consistency, coastal municipalities often depend on OLISP for guidance. The Fellow will be responsible for developing such guidance for towns that are interested in undertaking their own compensation initiatives or, more likely, working with OLISP as a broker and facilitator for off-site compensation.

### *Outreach*

Finally, the SCROD project includes a considerable outreach component, which will take place both during and after development of the program. It will probably be desirable to brief town planners, land conservation groups, consultants, and even applicants on the theory and practice of compensation, and many of these stakeholders can be expected to be skeptical. Following the project, the SCROD legacy will conclude with guidance documents and other outreach materials

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<sup>2</sup> The U.S. Army Corps of Engineers recently entered an agreement with the National Audubon Society to operate a wetlands mitigation banking program in Connecticut, although it is not clear how this will affect state wetland regulation. On the state level, tidal wetlands are regulated by OLISP, which has historically been skeptical of mitigation banking under our Tidal Wetlands Act, while inland wetlands are largely regulated by municipalities.

for permit applicants, municipalities, applicants and the public on how the compensation program will operate or can be instituted.

#### SCROD FELLOW MENTORING

While the lead mentors for the SCROD project will be David Blatt, supervisor of the Coastal Planning section, and Brian Golembiewski, supervisor of the Permitting and Enforcement section, the Fellow will work closely with all three sections of the office. Coastal Planning deals with legislative and municipal liaison matters, so the Fellow can become experienced with municipal challenges and opportunities in implementing State shoreline structures policies; the Permitting and Enforcement section administers OLISP's direct regulatory process, which mainly affects in-water structures; and the Technical Services section provides scientific analysis of a number of topics, including coastal geology and living shorelines. Staff in each section of the office will advise and accompany the Fellow in activities such as attending state and municipal legislative/policy meetings, numerous site visits to the coast, meetings with town staff, academic and NGO partners, applicants and consultants, and possibly staff from various Federal agencies and neighboring states. Because some aspects of the SCROD project dovetail with ongoing OLISP efforts on topics such as climate adaptation and living shorelines, we expect that the Fellow will assist with other projects such as a coastal structures Best Practices manual, municipal adaptation training and the UConn Climate Resiliency Center.

Finally, in order to assist the Fellow in developing a working knowledge of Connecticut's coastal management program, after an appropriate amount of general training throughout the Office, the Fellow will be added to OLISP's "du jour" rotation. Once a month, each staff person is assigned "du jour" duty, and that person receives and responds to information requests (primarily telephone calls) of a general programmatic nature. As needed, the "du jour" person will seek the assistance of other program specialists to help respond to the more challenging questions, which has proved to be an effective way for staff to become familiar with all aspects of OLISP's coastal management programs.

#### PROJECT PARTNERS

Outside of the Department, partners in the SCROD project may include the following:

Connecticut Sea Grant—CT Sea Grant undertakes a number of research, guidance and outreach projects in climate adaptation and resilient communities:

<http://seagrant.uconn.edu/whatwedo/climate/index.php> . The Fellow will attend and participate in workshops and training programs focusing on municipal climate change adaptation.

UConn Climate Resilience Center/Center for Coasts—As the UConn Center is established, the Fellow will work cooperatively with faculty and staff to implement the steps called for in the

forthcoming February 2014 report to the legislature. In general, the Fellow may assist with Center projects and help it to provide technical support to regulatory and management agencies.

**Environmental NGOs**—Several environmental organizations in Connecticut are interested in climate change adaptation issues, and may be interested in partnering with the Fellow in training and outreach efforts.

**Municipal planners**—The Fellow will work closely with staff in any towns that are interested in creating a compensation scheme at the municipal level.

#### COST SHARE DESCRIPTION

The DEEP will provide \$15,000 (\$7,500/year) in required matching funds from state general funds, SEP compliance funds or state permit application fee funds, as appropriate. Details for this arrangement will be worked out with the Coastal Services Center.

For the duration of the Fellowship, DEEP will provide the Fellow with:

- office space equipped with a VOIP telephone and voice mail system, desktop PC with high-speed internet and e-mail access and laptops for field visits/presentations;
- standard office software such as MS Word, Excel, Access, and PowerPoint. Access to specialized software required conducting the proposed work tasks will also be provided, including ESRI ArcGIS software for supporting data analysis;
- transportation costs for project-related travel.

The Fellow will also have full access to all professional training courses available to DEEP staff, including OSHA health and safety, software use, personal development and wellness, etc.

#### STRATEGIC FOCUS AREA

The SCROD project will advance objectives associated with all three of CSC's Strategic Focus Areas. We will promote the objectives of Healthy Coastal Ecosystems through a research-based compensation program that seeks to preserve the ecosystem services provided by natural shoreline dynamics in the face of cumulative losses to shoreline hardening. Because natural systems such as tidal wetlands and beaches and dunes provide more sustainable and practical protection from coastal hazards, the project will also promote more Resilient Coastal Communities, building capacity to implement a strategy of compensatory mitigation. Developing a compensation program will also enhance Vibrant and Sustainable Coastal Economies by lessening the cumulative adverse impacts of shoreline protection and creating the potential for less contentious and more efficient decisionmaking regarding proposals for shoreline armoring.