

Tidelands Management: Implementation of the Massachusetts Public Waterfront Act

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ABSTRACT *The Massachusetts Waterways Regulation Program (WRP) regulates the use of tidelands throughout the state's 1500 miles of coastline. The main goals of the program are the protection of public access and the promotion of water-dependent uses on tidelands. Although many states throughout the USA have similar regulations, the Massachusetts program is the oldest and one of the most developed. Despite its essential purpose, the long history of its enabling statute and extensive regulations, the WRP faces some obstacles, including an implementation deficit. Evolutionary and functional problems impact its effectiveness and are aggravated by the need to maintain costly compliance and enforcement efforts in the face of limited fiscal resources. This paper summarizes a research effort aimed at characterizing current challenges. The framework for discussion of the WRP challenges and case analysis draws on policy development studies and implementation research. Ways to strengthen the program are outlined that could benefit tidelands management programs with similar challenges.*

KEY WORDS: Public trust, public access, regulation, enforcement, tidelands, implementation deficit

Introduction

Historically, much of the Massachusetts sea coast was either undeveloped or designated for marine uses that served fishing, trading or transportation purposes. In recent years, working waterfronts have become available for new residential and commercial uses, while pressure continues to mount for private development of previously unused tideland areas. As a result, over the past two decades Massachusetts law and its accompanying regulations that aim to protect public use of the waterfront and access to tidelands have expanded considerably; responsibilities resting with regulators have become greater and the Massachusetts' tidelands management program has become more complex.

The Public Waterfront Act of 1866, Massachusetts General Law Chapter 91 (hereafter Chapter 91), is the principal tool used for tidelands management in

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the state.¹ It is based on the historic Public Trust Doctrine that evolved from Roman civil law and English common law. Two major principles form the basis of this doctrine: (a) the public has fundamental rights and interest in natural resources such as the air, the sea and the shore; and (b) the state, as trustee of the public interest, has a duty to preserve and enhance these natural resources and to protect the public's right to use them (Massachusetts Coastal Zone Management, 1995). Regulations administered by the Massachusetts Department of Environmental Protection (DEP) through its Waterways Regulation Program provide control over the use of tidelands. The program's main objectives are: (a) to protect and promote tidelands for water-dependent uses for which proximity to the water is either essential or of great advantage; and (b) to ensure that adequate areas are available for public use and enjoyment. Waterfront access areas and working waterfronts are essential elements of the coastal environment. Their protection is necessary to maintain public rights in the face of increasing pressure for private development and exploitation of resources of the sea and shores that are clearly of the public domain.

As part of a research effort conducted on environmental policy implementation pertaining to public trust issues, this paper summarizes the current challenges facing the Commonwealth of Massachusetts Waterways Regulation Program (WRP). These challenges have a far-reaching effect on the state's traditional public trust protection of tidelands. Without this program, private development would further impact public access to waterways and, in many cases, render these lands unavailable to the public. However, as will be shown, some aspects of the WRP are ineffective, and its implementation becomes more difficult as fiscal resources are limited, development pressures increase and the program expands.

A thorough understanding of Chapter 91 goals and its effectiveness is especially important in view of the state's recent interest in governance of state waters and coastal policies. The Massachusetts Ocean Management Task Force, established in 2003 by the state's Secretary of Environmental Affairs, recently concluded a report outlining principles for the use of state waters and ocean resources with specific recommendations concerning the Chapter 91 regulatory program (Massachusetts Ocean Management Task Force, 2004).

The main objective of this article is to inform about the Chapter 91 program and analyze its implementation. The first part of the paper provides historical background. While not a legal treatise, this background section aims to clarify how the program developed into what it is today. The next section describes procedural aspects of the WRP and is followed by a characterization of program challenges that emphasize the gap between regulatory intent and implementation. A case study illustrates difficulties that affect program outcomes. Aspects of policy development and compliance theory grounded in implementation research provide a framework for discussion. Other tidelands management programs based on the public trust doctrine which may have similarly characterized difficulties, can benefit from this analysis, discussion and summary recommendations.

Historical Background

Soon after colonists arrived in what is now New England, they applied British laws and commodification of natural resources began. Titles to tidelands originally held by the English Crown in trust for the general public were soon

granted to private owners of adjacent lands to encourage private wharf building. Following American independence, as states joined the Union, they acquired the same jurisdiction as the original 13 states² which had already inherited all sovereign rights of the Crown. Although coastal states began with equal sovereign jurisdiction over public trust areas, implementation of the public trust in tidelands was left to the judicial and public policy decisions of each state, with different programs resulting.

The Massachusetts case reflects the evolution of a public trust program based on significant judicial, legislative and regulatory history. Chapter 91, enacted in 1866, is the oldest law of its kind in the nation (Massachusetts Office of Coastal Zone Management, 1994). However, it is worth noting that although the public interest in tidelands has been protected since the earliest day of the Massachusetts Bay Colony,³ it is only within the past two decades that the legal base for the doctrine has been coherently restructured with the aim of improving effectiveness (Archer *et al.*, 1994). Also, over the years since its inception, Chapter 91 program jurisdiction has broadened significantly.

In the years before 1866 and through the program's early history, policy makers were interested in granting private ownership of tidelands to encourage waterfront development. This led to the distinction between "private tidelands", designated as that portion of the flowed tidelands lying between the mean high-water mark and mean low-water mark, and "Commonwealth tidelands", designated as submerged lands seaward of the mean low-water mark. The former can be owned privately but are subject to easement rights of the public; the latter are owned by the Commonwealth and held in trust for public use. In private tidelands existing in the inter-tidal zone, land ownership in fee title is separate from 'use' ownership. In areas that are owned privately the public maintains some use rights, most commonly for access and defined specifically in the Massachusetts statute as rights for "fishing, fowling and navigating". The two ownership domains are referred to as *jus privatum* and *jus publicum*. In the inter-tidal area within Chapter 91 jurisdiction, the state conveys *jus privatum* to private owners that is subservient to the *jus publicum* (Massachusetts Coastal Zone Management, 1995).

During its first hundred years, Chapter 91 allowed authorization of piers and wharves for a myriad of uses in both private and Commonwealth tidelands. The filling of tidelands was frequently the subject of licensing, especially in and around the state's capital city of Boston. Regulation focused on navigational impacts and engineering matters. Uses and/or structural alterations over filled tidelands and flowed tidelands were not a concern (Ducsik, 2000).

In 1979, following a landmark court case,⁴ the Massachusetts Supreme Judicial Court declared that public trust rights survive even in filled tidelands which may be held by private parties but remain subject to an implied condition that they must continue to serve a public purpose. Following this determination, the courts, the legislature, and various administrative bodies began refocusing on the nature of and interests protected by the public trust doctrine. This process led to significant revisions of the tidelands licensing system (Archer *et al.*, 1994). Today, DEP rarely authorizes the filling of tidelands due to the significant environmental impacts it entails. However many licenses, particularly in the Boston area, regulate uses on former private and Commonwealth tidelands filled years ago.

The 1983 amendments to Chapter 91 were enacted to promote more fully the public's rights in filled lands as well as lands subject to the ebb and flow of tides

after the 1979 court ruling (Commonwealth of Massachusetts, 1990). Since 1984, Chapter 91 jurisdiction on filled areas includes land seaward of the historic high tide line as it existed prior to human alteration but excludes “landlocked” tidelands, which are those filled tidelands which on 1 January 1984 were entirely separated from any flowed tidelands by a public way.⁵

The state legislature significantly amended Chapter 91 again in 1990. At that time, DEP adopted the Waterways Regulations (310 Commonwealth of Massachusetts Regulations 9.00) and became their administrating agency. The regulations of 1990 provided guidance and standards for water-dependent projects, and authorized DEP to license the development of nonwater-dependent projects, including offices, retail uses, hotels and residences on filled tidelands, subject to strict requirements for open space, setbacks, height and active ground-level uses aimed at attracting the public to the waterfront, called Facilities of Public Accommodation (FPAs). These nonwater-dependent uses are not allowed over flowed tidelands, seaward of the high mean water line, unless previously authorized.⁶ In 1996, revisions of the regulations were promulgated that simplified and shortened the licensing process for residential docks and piers. Revisions in 2000 simplified the licensing process for some types of low-impact projects and further clarified standards.

More recently the Massachusetts Ocean Management Task Force renewed focus on the WRP. The state’s Executive Office of Environmental Affairs established the Task Force in June 2003 to examine Massachusetts’ coastal policies and the adequacy of the legal framework for ocean governance, with particular attention to how to best meet statewide interests. Task Force membership include ocean policy experts, members of the public, stakeholder groups and agency representatives. Its final report to the Secretary of the Environmental Affairs includes non-binding recommendations for legislative changes. In regards to the WRP, the Task Force recommends a restructuring of program license fees so that they apply to uses of public trust resources in offshore areas. The Task Force also recommends earmarking funds generated by license fees for the benefit of WRP operations and to advance Chapter 91 goals (Massachusetts Ocean Management Task Force, 2004).

Although the Task Force acknowledged the importance of Chapter 91 in maintaining the public trust, its review of the existing program lacks an empirical analysis of program implementation. Also, because the Task Force’s prescribed scope of work restricted it to consideration of issues related to offshore uses of the ocean, its recommendations regarding WRP are limited. In any case, given this renewed interest in ocean management, further review of WRP program effectiveness is currently needed.

Jurisdiction and License Review

One of the difficulties for state programs that strive to maintain public rights in tidelands is that of determining program jurisdiction. In Massachusetts, jurisdiction is determined by the type of action and by the geographical location of the property on a case-by-case basis through a license application process.⁷ Actions subject to licensing are the placement of structures and fill, and changes in use of existing structures and changes in use on land created by filling. Geographic areas in jurisdiction include tidelands, former (filled) tidelands, the shores of great ponds,⁸ and some rivers and streams.⁹

Once Chapter 91 jurisdiction has been confirmed by the type of activity, and/or by the geographic location of the site, the review process begins. This is a process that entails at a minimum: filing an initial application, determination of water dependency or non-water dependency, public notice, agency review for consistency with standards, determination of special license conditions, and recording of the license with the chain of property title (the deed). When conducting license review, WRP staff follow a series of standards to ensure that projects do not unreasonably interfere with navigation, are structurally sound, provide proper public purposes, do not significantly interfere with public rights or the rights of adjacent waterfront property owners, will not adversely affect natural resources, and will provide adequate water-related public benefits to outweigh detriments. Once the licensee has completed the project according to license specifications he/she must request a Certificate of Compliance.

The license review process and applicable standards depend on whether the project requires a waterside location. If the project is categorized as “water-dependent”,¹⁰ it is presumed to serve a proper public purpose on tidelands. Projects that do not rely on being near the water are classified “nonwater-dependent”. The licensing process for non-water-dependent projects is more rigorous, and requires the provision of public benefits. Once DEP determines that a project is non-water-dependent, a significant additional step—that of a public hearing—becomes mandatory. For controversial projects, a public hearing can substantially lengthen the review. Also, standards for projects that are nonwater-dependent are extensive. They are aimed at maintaining public access to tidelands and preserving public enjoyment of these areas. The regulations require nonwater-dependent projects to include public benefits—such as public walkways, public boat ramps, public sailing programs, transient dockage that is open to the public, and other such amenities—that provide compensation for use of tidelands held in the public trust. Also, two types of fees, Tidewater Displacement Fees and/or Commonwealth Tidelands Occupation Fees, may be charged by the state.¹¹

Challenges

Challenges that face the program can be put into three general categories providing some insight into their root causes. The first category includes *evolutionary* difficulties that are the result of changes to the program over its long-standing history. The second category is based on how the program currently works—its *functional* difficulties. The last category of problems stems from *resource allocation* issues. These categories are not mutually exclusive and a single problem may have a number of causes from any of the three categories.

Evolutionary Difficulties

Some changes made in the waterways regulations over the years have been designed to streamline or simplify requirements and focus the efforts of the Waterways Regulation Program to better achieve the goals of Chapter 91. Other changes have been aimed at applying stricter controls as demands increase on limited waterfront property. Over time, more activities have been targeted for regulation, and more area falls in jurisdiction. Also more and more properties are being built on as development becomes increasingly profitable.

As mentioned before, until 1984 licenses were issued only for filling and building structures on private or Commonwealth tidelands, and the particular uses did not matter. Today, licenses are required for any structures over flowed private or Commonwealth tidelands, or on filled tidelands, and DEP can authorize only certain uses. Changes in structures and uses over time require either issuance of new licenses or amendments to existing licenses. The tracking of changes in use demands greater monitoring of sites, especially as property is sold and ownership transferred.

Growing licensing needs and development pressures have increased staff responsibilities and the sheer volume of work. In the first century, following passage of the Public Waterfront Act, relatively few license applications were processed. During the years 1866–1916, approximately 4000 licenses were issued. From 1975 to the present, more than 11 000 licenses have been issued. Monitoring is necessary not only to keep track of changes on licensed properties, but also to ensure that owners of property in jurisdiction are actually applying for licenses.

Related difficulties have to do with the nature of the resource regulated. The state has extensive areas in jurisdiction, including 1500 miles of coastline, over 900 great ponds (Department of Environmental Management, 1983) and many miles of navigable rivers. Approximately two-thirds of the properties with coastal frontage throughout the state are in private hands and, in some areas, the percentage is much higher (Executive Office of Environmental Affairs, 2000). Tides change over time, making determination of jurisdiction (using high-water marks, low-water marks, historic high-water marks, etc.) difficult and time consuming.¹² Impending sea-level rise may further impact the difficulty involved in determining jurisdiction. The real estate market is fluid as well. Whereas in the past waterfronts attracted mostly port-related and water-related uses, now in many areas high-end residential, office and commercial uses have become the norm, burdening the licensing process with many more complicated non-water-dependent project proposals.

Consequently, one of the most basic challenges currently facing the program stems from the inconsistency of licensing. While thousands of licenses have been issued since 1866, an unknown number of properties throughout the Commonwealth that are within Chapter 91 jurisdiction remain unlicensed. The result is that the program works almost as an unintentional audit system. The full burden of compliance rests with the property owner or project proponent. Property owners risk having enforcement conducted against them that could result in a substantial penalty. However, where property values are high, proponents may see chance enforcement conducting against them for not having a license as worth the risk because penalties are small compared to total project cost. Violators also assume that it is highly unlikely that they will be ordered to remove an unlicensed structure.

Functional Difficulties

Difficulties stem from the character of the licenses themselves and staff operations. Review of license applications is a lengthy, labor-intensive process with much negotiation occurring between developers (applicants), public advocates, abutters, representatives of other regulatory agencies and DEP. As explained further below, licenses have become very detailed to meet more stringent, “clarified” performance standards, particularly for non-water-dependent projects. The resulting

complexity of individual licenses is problematic when coupled with the subjectivity of individual reviewers, monitoring staff and stakeholders. On these points, there has been conflicting critique of program operations.

Originally, licenses authorized the building of a structure outlined in a hand-drawn plan and described in a short document, usually up to three pages in length. In recent years, in addition to approval of a structure's dimensions, uses, materials, and accessories (such as parking), licenses include "Special Conditions" that describe how public benefits are to be constructed and maintained. Today's licenses have a full page of ten "Standard Waterways License Conditions" and non-water-dependent licenses have at least an additional two pages of Special Conditions that regulate such specifics as building heights, materials, signage, width of public access walkways, location of benches, aesthetics, etc.

In contrast, a typical license issued during the first years of the program (dated March 9, 1887), authorized the licensee to "extend their several wharves by solid filling in and over the tide waters of Merrimac River, City of Newburyport". The license simply authorizes "to construct said extensions by filling solid the areas marked 'Dock A' and 'Dock B' on the accompanying plan no. 980 and on and within lines described as follows: . . ." (Harbors and Lands Commission, 1887). The entire license is two pages in length.

Current regulations require meeting qualitative standards that are open to interpretation over time. On the one hand, detailed specifications are necessary for purposes of clarity, and they are often advocated by the parties involved—sometimes by project proponents, sometimes by opponents and sometimes by public agency staff. On the other hand, many detailed conditions complicate compliance, tend to micro-manage site construction and maintenance and, despite their detail, ultimately remain open to interpretation. Implementation of license conditions still ends up being subject to abilities, resources and experience of subsequent license reviewers, monitoring staff, and may even depend on the level of stakeholder involvement in a particular case.

The interpretive aspect of licenses aggravates compliance and enforcement efforts. Monitoring compliance with license conditions over time requires research into the history of the site, information from DEP staff who originally formulated the license and information from the local authority as to whether or not unobservable aspects are in compliance. For example, research may be necessary to determine whether the licensee has paid off-site compensation as is sometimes required by licenses. In accordance with the regulations and current DEP practice, license terms are generally 30 years. However, the Department may issue a license for a term of up to 99 years under certain circumstances. This is a long time to monitor compliance of some conditions, especially if they are subject to varying interpretations. Given these difficulties, even in the short term, many license conditions end up being overlooked.

From time to time, some members of the regulated community have criticized the current WRP program regulations' prescriptive standards and lengthy review process while some have felt that they are not rigorous enough. Some in the regulatory community describe the Chapter 91 regulations and review as cumbersome, overly time consuming and inflexible (Bialecki, 2001; Kuehn, 2001). They see the regulations as too stringent. Others from the coastal conservation community, commenting on the recent Massachusetts Ocean Management Task Force Draft Principles and Recommendations, claim that the current regulations are "inadequate" and advocate for strengthening them (Salem Sound Coastwatch, 2004).

Resource Allocation Difficulties

As is often true of coastal management programs (Bradly, 2000), WRP fares poorly when competing for financial resources against other environmental protection concerns. It has frequently been under-funded and under-staffed. As a result, enforcement efforts are limited, and some steps in the regulatory licensing process have not been fully implemented. When state budgets are tight, as they have been since the mid-1990s, personnel is limited, and the first priority for the WRP is review of license applications. Compliance and enforcement has been neglected during these periods.¹³

An example of a regulatory requirement that has not been implemented fully is that requiring licensees to request a Certificate of Compliance within sixty days of the completion of a licensed project. DEP has issued relatively few such certificates, and does not routinely conduct enforcement for failure to comply with this requirement. Another requirement is that property owners record their Waterways license with the local Registry of Deeds within 60 days of the license issuance, and notify the WRP of this recording. Hundreds of licensees have failed either to record, or to notify the program of the recordation.

One reason tidelands management programs may be a low priority compared with other environmental programs is because they regulate land uses, and do not directly address environmental quality standards. Risk assessment, often used to justify other environmental regulatory policies and programs that affect public health, is not applicable for WRP because there are no apparent public health impacts as a result of noncompliance. By contrast, violations of the Drinking Water Program, also in the Bureau of Resource Protection at DEP, would result in urgent threats to public health, and would demand immediate attention. Under current budgetary constraints, managers may feel that the WRP can be relegated to a lower priority because violations do not pose immediate threats to public health and effects on environmental health are indirect.

When violators are penalized for noncompliance, WRP can impose substantial fines. Within the last four years, penalties have been raised for Chapter 91 violations. The state does not earmark these penalties for the program, or even for DEP. In any case, for these penalties to contribute significantly to the program, a well-established, systematic compliance and enforcement strategy component would have to be in place and functioning well.

Case Study—*The Pilot House*

The case of the Pilot House Extension (Waterways License #5776) demonstrates the difficulties of program implementation related to evolutionary, functional and resource allocation challenges as described above. The Pilot House was a highly controversial case, and in this way not typical of the majority of properties licensed by WRP. Nevertheless, it illustrates some of the difficulties associated with non-water-dependent properties, difficulties that frequently arise in high-profile locations and enforcement of complex license conditions, especially on sites with more than one license. Of note is that this property abuts Lewis Wharf, the site of the landmark Boston waterfront case mentioned previously (*Boston Waterfront Development Corporation v. Commonwealth*, 1979). Also, public advocacy groups charged at the time the license was issued that it included some deviations from WRP standards resulting from a “sweetheart deal”

between the city, the state and the private developer (Kindleberger, 1996; Mashburg, 1996).

License #5776 was issued to the Pilot House Associates in November 1996. This is the second license for the Pilot House, a six-storey office building constructed in the 1800s on filled private and Commonwealth tidelands in the Boston Harbor. The first license (#4691) was issued in 1995. The second license on the property authorized construction and maintenance of a two-storey building addition (the Pilot House Extension), a vehicular access ramp and underground parking garage, walkways and landscaped areas.

In 2001, WRP conducted lower level enforcement¹⁴ against the licensee. This action focused on getting the licensee to comply with license conditions, and it did not involve a penalty. DEP issued a Notice of Noncompliance. Then, following over a year and a half of negotiations, the violator returned to compliance with one condition of the License of the four deemed out of compliance, one that orders the licensee to place and maintain specific signage indicating a public access way leading down to the waterfront. Noncompliance with other conditions remained unresolved. Most of the other Special Conditions in this license are not readily enforceable because conditions have changed on the site such that owners/operators/actors are not the same parties as those referred to in the license. A Chapter 91 license holds to the property, and not to its owners. However, in this license some special conditions referenced the owner and/or tenant by name.

For example, Special Condition #1 in license #5776 reserves the building's Facility of Public Accommodation (FPA) as required by the regulations. New England Cable News (NECN) was interested in leasing the area at the time the owner of the property submitted the license application. To comply with standards for public use, NECN was required by the license to provide a studio open to the public for viewing newscasts. However, following license issuance, NECN did not rent the space. According to Special Condition #2, the Licensee would be released from the requirement to lease only to FPA uses if the Licensee could prove that "reasonable efforts" were made to find an FPA use and, despite doing so, no tenant was found. Reasonable efforts are defined in this license as evidenced through retention of a commercial real estate agent for an initial period of 12 months, who has tried to find a lessee who would maintain an FPA use.

From an enforcement perspective, several dilemmas arise. While uses considered to be FPAs are defined by the regulations, what happens if a first lessee puts in a FPA, but subsequent lessees do not? This requires constant monitoring or a reliance on the licensee to constantly report on tenants and uses or activities of a real estate agent, plus dedicating resources to monitor these reports at DEP. Some self-regulation mechanism would be helpful, and would work best if explicit policy guidance were in place for reviewers to follow in this regard when developing licenses.

Another difficulty concerns Special Condition #4. The ground floor and the upper patio are allowed to be used for "semi-private purposes" during the period of ownership of the building by Continental Cablevision, a telecommunications company which at the time was the company using much of the Pilot House office space. First of all, "semi-private purposes" is not defined in the regulations. Uses are either Facilities of Private Tenancy or Facilities of Public Accommodation. One can only assume that the use will more closely resemble a Facility of Private Tenancy, although this type of use is restricted over private tidelands. Another problem here is that the use is allowed only for this specifically

named company, Continental Cablevision, for a maximum period of 20 years. The company has since ceased to exist, yet the individual who was the Chief Executive Officer of Continental Cablevision now operates the current tenant company. It has become a complicated legal question whether or not the licensee complies with this condition. The issue can only be pursued through extensive investment of agency staff time and resources.

How do these intricacies match up with the overall goals of the waterways program? Is public access to the waterfront adequately protected, and are water-dependent uses preserved by the license terms? The Waterways Regulations aim to become more precise over time with each revision. However, they also allow for significant freedom in determining license conditions on a site-by-site basis. WRP reviewers have discretion in formulating Special Conditions. Sometimes, this results in compliance being left open to interpretation and violations that are difficult to remedy. In the Pilot House example, license conditions attempt to address the specific character of the site, but at the same time they fail to take into account the dynamic nature of land uses and ownership. Today, despite its prime Boston Harbor location, the Pilot House provides limited public amenities. On the whole, it does not appear to be much different than an inland office building.

Another factor affecting achievement of Chapter 91 goals through both licensing and enforcement is political pressure. It is not surprising that the Pilot House Extension project was highly controversial from a Chapter 91 perspective at the time it was planned and constructed (Collins, 1998). The Pilot House is at a key location in one of Boston's most historic waterfront neighborhoods—The North End. Certainly political influence came to bear during license application review. Pilot House proponents undoubtedly preferred either vague conditions or very specific ones that would be difficult, or impossible, to monitor over time.

Following a review period that included much public comment, conflicting views were reported in the press when the Chapter 91 license was signed by the Governor. The director of the city's planning arm, The Boston Redevelopment Authority, touted the project as a step in restoring a decaying waterfront, a new source of jobs and revenue and even "a boon to everyone who loves to walk along our waterfront" (Kindleberger, 1996). Waterfront watchdog groups, particularly Save the Harbor/Save the Bay, decried it as disappointing, and characterized the license as falling considerably short of meeting Chapter 91 requirements for the provision of compensatory public amenities (Mashburg, 1996). The Commissioner of DEP, while defending the approved project in the press, conceded that the license conditions were "a compromise", albeit a fair one (Kindleberger, 1996).

While the Pilot House licensing process perhaps shows an unusual case of developer/city/state negotiations, many licenses that go through a review process that is much less politicized and controversial often involve similar difficulties and challenges. On many sites, challenges to the goals and objectives of Chapter 91 will involve one license condition rather than several, or compromised standards will get little or no attention due to lack of public interest. Original license conditions may provide more than adequate public access, but changes over time on a property or ambiguous, convoluted wording can render conditions ineffective by causing monitoring difficulties and confusion about what compliance entails years after license issuance. Furthermore, follow-up enforcement needs remain unanswered due to greater program priorities.

Discussion

The framework for this discussion draws on policy development studies and implementation research. Evolutionary problems pointed out in the previous section relate to regulatory policy development issues, particularly the need to recognize the high cost associated with implementation of extensive regulation. Scholarship on compliance and implementation, including scholarship on compliance and enforcement models is relevant to functional and resource allocation problems of the program.

Academic attention was first paid to compliance research in the 1980s and much of it was based on empirical studies conducted on environmental regulatory programs of the US Environmental Protection Agency (Harrington, 1988; Heyes & Rickman, 1999). In the 1990s, the European Union (EU) acknowledged a significant implementation deficit when it became clear that many states failed to comply with EU-level directives. Research on this subject has focused largely on the implementation of environmental legislation by individual countries (Bursens, 2002; Jordan, 1999; Lampinen & Uusikyla, 1998; Mastenbroek, 2005). Literature from both these periods can shed some light on how best to serve the goals of the WRP and improve implementation. What follows is a review of relevant policy development issues and a discussion of applicable compliance and enforcement models.

To understand the implementation deficit of the WRP, policy development issues must be addressed. Regulations or 'official rules' are typically relied on in policy making. Few would disagree with the fundamental need to use such rules to govern the rights to such a limited resources as the Massachusetts shore. Yet, analysis of the WRP suggests that the overall goal of protecting the public trust is overshadowed by the program's intricate, extensive and, at times, confusing regulation. Many citizens are unaware of the state's obligation to protect the public trust in coastal lands, waters and resources (Department of Environmental Protection, 2005). Some view Chapter 91 as a permitting scheme designed to maintain a building code for waterfront development. The public is supportive of the public trust principles promoted by C. 91 as evidenced in public comments to the Ocean Management Task Force Draft Principles (Massachusetts Ocean Management Task Force, 2003) yet, at times, less supportive of the specific, extensive regulations used for implementation.

Clearly, the program exhibits some of the pitfalls that Stone (1998) describes in her book on the intricacies of policy development: "The most important problem in the design of rules is the tension between precision and flexibility". Waterways regulations have become increasingly precise over the years as more standards have been added to guide waterfront development. Precision aims at predictability—achieving like treatment to like cases. At the same time flexibility is needed to deal with diverse projects.

A similar balance is needed for implementation of EU environmental directives. Bursens (2002) refers to problems of clarity and consistency that hamper the transposition of the EU-level directives into country-level programs. On the one hand, there is a high degree of technicality in the directives and the requirement for consistency across member states. On the other hand, like site-specific regulated entities, each country has its own institutional conditions that require adaptability (Bursens, 2002; Mastenbroek, 2005).

The use of rules, or directives, that are both precise and flexible requires agencies—for the WRP, centralized state government—to supply costly goods and services, mainly extensive compliance and enforcement capacity (Stone, 1998). Compliance and enforcement require comprehensive and consistent permitting procedures, active surveillance, patrolling, apprehension of violators, and their processing through an administrative justice system, making institutional capacity essential. So how much administrative effort is needed to implement precise, flexible rules and reduce the implementation deficit?

Compliance models have been described as either instrumentalist or normative. The instrumentalist approach assumes that the regulated community is composed of calculated actors. In this category, the classic enforcement model maintains that deterrence is based on the probability of detection and severity of the penalty versus the potential for illegal gains (Crawford *et al.*, 2004).

Departing from the classic enforcement model, yet reinforcing the instrumentalist approach, some researchers have studied non-regulatory costs to explain high compliance rates. One of the first authors to deal with environmental regulation, Harrington (1988) develops a paradoxical theory based on his examination of enforcement of standards by the US Environmental Protection Agency (EPA). Despite the EPA usually failing to pursue known violators and penalties being low relative to the cost of compliance, Harrington found that firms were compliant a significant portion of the time. Decker & Pope (2005) try to explain this paradox by suggesting that firms choose their level of compliance strategically and in relation to others. By conducting an empirical analysis of four heavily regulated industries, they found that compliance rates of regulated entities have a positive and significant effect on their rivals' compliance behavior.

Presenting a normative model, Kuperan & Sutinen (1998) develop a comprehensive socio-economic theory of compliance. They argue that moral obligation and social influence can improve compliance and reduce the need for centralized enforcement. These factors involve the perception of legitimacy of the enforcement institution and its rules. Similarly, Beach (2005) examine governmental compliance with European Court of Justice rulings and concludes that the normative costs of non-compliance tipped the calculation of actors towards compliance.

Beach (2005) advocates using an integrative compliance model that incorporates both instrumental and normative perspectives. The integrative approach acknowledges that actors are willful agents that act rationally in complying with higher authorities; however, they do not exist independently from their social environment. For this approach compliance calculations are based upon both instrumental and normative interests (Beach, 2005). Such an integrative approach seems suitable for the Chapter 91 program. It would require raising enforcement capacity while also working to increase the legitimacy of the program in the eyes of the public.

From DEP's perspective, an instrumentalist approach would entail carefully setting priorities so that the threat of enforcement would bring about some level of proactive compliance. As this article explains, full compliance with Chapter 91 is often hard to determine and would make an efficient allocation of resources needed to bring about strategic compliance between members of the regulated universe difficult to determine through empirical research. Simultaneously addressing normative concerns would complement an instrumentalist approach. To do so, sectors of the public affected by Chapter 91 should be made aware of

public trust principles that are the foundations of the law. This could increase currently lagging support for centralized, state-sponsored compliance and enforcement efforts so essential for extensive regulatory programs.

Any waterfront management program, like any environmental policy, is of limited value if not well designed and implemented. Implementation of Chapter 91 is grounded in authority based on the public trust doctrine. As a common law doctrine, the public trust has ample capacity to evolve in response to changing societal needs, interests and conditions (Mague, 1999). These changes can be reflected in regulations (rules) but they must be sensitive to institutional limitations affecting their implementation, including evolutionary program challenges, functional capabilities and available resources.

Conclusions

This article draws from theories of policy development and implementation and compliance models to analyze and discuss the evolutionary, functional and resource allocation challenges facing the Waterways Regulations Program. While solving the challenges of the program is beyond the scope of this article, some specific steps are recommended based on the previous analysis and discussion.

Policy makers should ensure existing regulations are implemented before expanding either regulations or laws. As in other cases (Bursens, 2002), priorities should be redirected from issuing more legislation toward improved monitoring of already existing regulation. Responsibilities of WRP staff have increased both because of the growth in waterfront development and because of greater pressures on limited available tidelands. When resources do not expand commensurately with the addition of responsibility, the setting of priorities is key. To keep informal rules from replacing formal rules (i.e. legislation and regulations) with a myriad of shortcomings to follow, careful attention and acknowledgement of an implementation deficit is needed and then careful attention directed to priority setting.

Policy makers at the legislative level traditionally determine policies, such as those determining the use of public resources, but by enforcing or failing to enforce, tidelands management policy is inadvertently set. Closer legislative involvement might help match implementation to original and evolving program goals, but short of such involvement DEP can take charge. "Although legislation and legislature-approved budgetary authority determine the broad outlines of an agency's mission, considerable latitude remains in the attention and resources that an agency devotes to particular problem areas" (Dekay *et al.*, 2001).

The Waterways Regulation Program should adopt an integrative approach to compliance and enforcement that makes use of both the instrumentalist and normative models. Greater visible enforcement is necessary because perceived lack of enforcement may promote noncompliance and is therefore related to the program's implementation deficit. By being more consistent and systematic in enforcement efforts, state regulators could achieve greater deterrence, thus requiring less enforcement efforts overall. The extent to which the threat of enforcement will bring about proactive compliance with programs such as WRP is a worthy subject for further research. Finally, raising public awareness of underlying principles of the Chapter 91 program will help establish legitimacy for the regulations, tap external resources for enforcement and help promote proactive

compliance. All these recommendations will help deal with resources allocation problems and limited budgets in the long term.

To address evolutionary problems related to the sheer volume of work and corresponding limited human resources, economic incentives or disincentives could be applied in conjunction with a well-designed enforcement strategy. DEP could lower or cancel application fees, while at the same time raising penalties for noncompliance. Penalties could be scaled to reflect project costs more closely and could be earmarked for the program or at least for DEP. Another option would be a system of self-regulation for property owners modeled after existing programs in the area of pollution prevention.¹⁵

To address functional difficulties related to the interpretation of license conditions for determining compliance, staff development is important. Staff development efforts should include rotating responsibilities of enforcement with those of license application review. Once having worked on compliance and enforcement as reviewers, staff would be more aware of the need for clear and concise license conditions that can be readily monitored over time. If reviewers were to develop licenses with future needs in mind, some of the 'functional' difficulties mentioned above could be avoided and resources saved as less time would be lost on retroactive interpretation of what was meant by original license language.

Greater program outreach that enlists help from external entities both public and private would help for enforcement, proactive compliance and legitimacy. These entities include conservation commissions, local town officials such as harbor masters, watershed groups and concerned citizens. On the federal level, the Coast Guard and other permitting agencies, such as the Army Corps of Engineers, could help. Lending institutions are private entities that have an interest in compliance with Chapter 91. If aware of the program, they will require that their clients obtain licenses and maintain license conditions rather than risk complications. These 'external' entities could help draw attention to the need for license applications, and assist in monitoring compliance. Furthermore, by enlisting support of external resources and the regulated community, DEP would bring about better understanding and awareness of public trust principles and promote regulatory legitimacy and support.

This is a limited study focusing on one particular state tidelands management program and one case. However, it is clear that the Massachusetts Waterways Regulation Program faces difficulties that are by no means unexpected for a program that relies so heavily on extensive regulation. Difficulties in implementation of the program ultimately raise the question of whether or not command and control regulation is the best way—or the only way—to protect the public trust. Given some of the above conclusions, tideland managers should be encouraged to explore broad, innovative ways to reduce the implementation gap and increase protection of the public trust.

Notes

1. All US coastal states have authority over uses in their waters that extend (with very few exceptions) up to 3 nautical miles from shore. From 3 nautical miles to 200 nautical miles, the US federal government has jurisdiction over uses.
2. At the time of its independence from England in 1776, the United States of America consisted of only 13 states.

3. Most notably through the Colonial Ordinances of 1641–1647. The Colonial Ordinances codified the ‘Public Trust Doctrine’, a legal principle that dates back nearly 2000 years, which holds that the air, the sea and the shore belong not to any one person, but rather to the public at large.
4. *Boston Waterfront Development Corporation v. Commonwealth of Massachusetts* (1979).
5. With some exceptions, namely, those portions of filled tidelands presently located within 250 feet of the high-water mark.
6. In the early years of the program, piers and wharves were encouraged as a means of improving navigation and maintaining access to waterways for commerce, an important public use. Many such structures were authorized, especially in the Boston Inner Harbor, either through license or by special legislative order.
7. Other states, such as California, have attempted to proactively map the location and extent of ungranted public trust tidelands. The California effort, which began in 1975, was discontinued before its completion in 1980 (Archer *et al.*, 1994).
8. Inland bodies of water that contained more than 10 acres in their original state.
9. Criteria for determining jurisdiction in non-tidal rivers and streams are whether or not they are navigable during any season. Some rivers are mentioned by name in the regulations 310 CMR 9.04(1).
10. The Department determines a project to be water dependent if “its uses require direct access to, or a location in, tidal or inland waters and therefore can not be located away from said waters” (310 CMR 9.12(2)). Otherwise, the project is “nonwater-dependent”. If a project includes both water-dependent and nonwater-dependent uses, then it is considered nonwater-dependent.
11. Displacement fees are paid prior to issuance of a license for any fill or structures that will displace tidewaters below the high-water mark. Occupation fees are paid by the licensee as compensation for any activity requiring a Chapter 91 license in, on, or over any Commonwealth tidelands for the rights granted in such areas.
12. Coastal shorelines change constantly in response to wind, waves, tides, sea-level fluctuation, seasonal and climatic variation, human alteration, and other factors that influence the movement of sand and material within a shoreline system. The loss (erosion) and gain (accretion) of coastal land is a well-known result of the way shorelines are reshaped (Massachusetts Office of Coastal Zone Management, 2002).
13. In 2006, DEP dedicated only one-half full-time employee (FTE) out of 8.5 FTEs exclusively to compliance and enforcement.
14. DEP’s “higher-level” enforcement is for violations considered more egregious, such as failure to apply for a license, and construction and maintenance of categorically restricted uses and structures without Chapter 91 authorization.
15. Modelled after, for example, the Massachusetts DEP Environmental Results Program. This is a unique environmental performance initiative that uses three innovative tools to enhance and measure environmental performance: self-certification, compliance assistance and performance measurement to track results.

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