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Dynamic Coastal Shoreland Zoning: Adapting Fastland Zoning for Naturally Shifting Coastal Shores

By Richard K. Norton

Sea level rise (SLR) is shifting ocean coastal shore*lines*—and thus coastal shore*lands* (beaches, foredunes, dunes, and bluffs that are actively influenced by waves and sediment movement) landward, placing them at increased risk from high-energy waves and inundation (Siders 2019). Similarly, the shorelines and shorelands of the Laurentian Great Lakes have long been shifting landward because of erosion, especially during periods of high water (Norton et al. 2018). These coastal challenges are heightened by increasingly frequent and fierce storms.

The processes yielding landward shifts in any given place and time are not the result of proximate human acts, such as a private landowner's decision to bulldoze a dune or a government's decision to permit the same. Rather, those landward shifts are fundamentally natural (i.e., acknowledging that global climate change is accelerating SLR and erosion).

Because coastal shorelines are subject to such powerful and remorseless natural forces, human attempts to arrest them with armoring structures like seawalls ultimately fail as those structures break apart under relentless assault from high-energy waves (Cooper and Pilkey 2012). Armoring also encumbers property owners and taxpayers with great expense, both from initial construction and then ongoing repair, and it degrades coastal resources by destroying habitat and littering the shore with debris. In short, installing hardened armor to "protect" the shoreline prioritizes the beach house over the beach, a decision that invariably proves destructive, expensive, and futile (Kittinger and Ayers 2010).

States and localities cannot address these challenges through zoning alone, but zoning has an important role to play. To be effective and fair, however, it needs to be adapted to incorporate our current knowledge of shoreline dynamics and to respond to contemporary challenges from climate change. This article makes the case for doing so, presents initial ideas on how to do so, discusses likely legal challenges, and identifies issues both for consideration in implementation and for further study.

MANAGING RETREAT THROUGH POLICY AND LAW

There are legal doctrines that acknowledge the tensions between natural shoreline dynamics, on one hand, and human desires for policy and legal certainty on the other, as well as recognizing public trust interests in coastal resources that warrant public regulation of private shoreland properties. These include the doctrines of erosion, accretion, inundation, and reliction, the concept of rolling easements, and the state-specific public trust doctrines of the ocean and Great Lake states (Norton and Welsh 2019).

A variety of federal and state authorities and programs also address coastal shoreland resource conservation and hazard mitigation, such as the federal Coastal Zone Management Program, the National Flood Insurance Program, and related federal and state programs (Beatley et al. 2002). Nonetheless, zoning is the primary legal mechanism used by states and localities to strike a balance between private property rights and public interests in land use. Moreover, the wide array of federal and state programs that exist today for coastal management ultimately rely on local governments to make most of the meaningful and enforceable public management decisions that shape shoreland use.

Yet while zoning was designed from the start to account for change over time, it has always done so with a focus on change resulting from private actions or public policy decisions; it has never accounted very well for naturally occurring changes in landscapes. Because of climate change and relentless coastal development pressures, that obtuseness to nature is contributing to growing conflicts between private shoreland owners' expectations vis-a-vis the public's interests in managing shoreland use.

Academics and practitioners have taken stock of looming natural, property, and fiscal crises as coastal shorelines shift landward, especially given climate change, and they increasingly call for "managed retreat" of the built environment as the most sensible public policy response. Managed retreat entails moving development landward as coastal shores naturally move landward, rather than hardening the shore or paying repeatedly for post-storm recovery and restoration (Siders 2019). It also implicates zoning as a key means to achieve that goal. But how best to get there?

My starting premises are, first, that preserving natural coastal systems where they still exist, or restoring and conserving them over time where they are already developed, makes the most sense ecologically, fiscally, and legally, and that doing so ought to be the preferred and default long-term goal of coastal localities and states. Second, managed retreat of the built environment away from shifting coastal shorelands offers the best way to preserve and restore coastal resources effectively. Third, retreat from dynamic coastal shores needs to be structured so as to be effective, but also engaged in a way that provides fairness to coastal shoreland property owners. Fourth, localities will continue to play a predominant role in achieving managed retreat, and zoning will continue to be their primary regulatory mechanism for doing so. Finally, zoning as currently conceived needs to be adapted to better and more fairly advance the policy of managed retreat.

More precisely, zoning needs to be adapted so that it responds to dynamic natural coastal shorelands, not just by managing

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers repairs a breached levee in Montoloking, New Jersey, following Hurricane Sandy.

development within identified coastal hazards zones but also by recognizing that those zones themselves naturally move landward across the landscape. That recognition, along with processes for responding systematically to natural shifts in coastal zones fairly and effectively, needs to be baked into zoning itself, not just addressed as an add-on to standard zoning practice or undertaken in ad hoc ways.

THE PROBLEM OF USING 'FASTLAND' ZONING WHERE LANDS AREN'T FAST

In concept and application, conventional zoning is "fastland" zoning, a regulation that presumes that the landscape underlying any given district is unchanging, even if natural events might occur upon that landscape that could cause harm, such as forest fires or ephemeral floods. Early proponents envisioned that zoning should be applied according to the suitability of the land for development, and they also clearly envisioned the need to accommodate change (see, e.g., the State Standard Zoning Enabling Act).

Nonetheless, "suitability" is addressed primarily in terms of the potential for conflicts in neighboring land uses, or to *un*suitability given relatively fixed landscape conditions like the presence of steep slopes. Moreover, the notion of change has related more to changes in private land use, or to changes in public policy regarding land management stemming in turn from changes in demographics, market demands, public imperatives, and so on. Thus, contemporary fastland zoning focuses on suitability and change within established and fixed zoning districts, including primarily social change.

Planners today commonly advocate for the adoption of robust building standards within high-hazard areas, the use of development buffers or setbacks, limits on landscape modifications, limits on or standards for infrastructure development, the use of vegetation cover requirements, and so on (Beatley et al. 2002; Siders 2019; DeAngelis 2018). These requirements can be applied through a number of mechanisms, such as specified coastal districts, overlay coastal districts, or general standards that apply in all districts.

While these approaches recognize coastal dynamics, standard practice has been to establish districts or setbacks that identify and isolate important environmental features within them, including dynamic floodplains, but without inherently recognizing that the landscape underlying the regulatory lines drawn on maps may itself be moving over time, or providing a mechanism for ensuring that zoning districts themselves correspondingly move in response.

Establishing special high-hazards coastal districts and setbacks will be vital for effecting managed retreat, but equally vital will be doing so in a way that makes clear to all that those districts and setbacks will continue to advance landward. Rather than employing fastland zoning for coastal shoreland areas, it would be better to employ dynamic coastal shoreland zoning.

DYNAMIC COASTAL SHORELAND ZONING

My goal is to suggest in a clear-eyed way what it will take to make managed retreat through zoning truly effective, in two key ways: first by incorporating principles, mechanisms, and procedures that recognize and accommodate naturally shifting coastal shorelands; and second by *not* incorporating variances or other exceptions for shoreland development that would—despite best intents—fruitlessly prioritize the beach house at the expense of the beach.

In effect, dynamic coastal shoreland zones, as they address state and local regulation of private land use, should shift "automatically" in response to natural shifts in shorelines, much as rolling easements address ambulatory title interests between the state and shoreland property owners.

I have not been able to find a single state or local zoning program that offers a comprehensive model. Even so, I draw from the extensive coastal shoreland management literature on policies and approaches for hazard mitigation and managed retreat, adapting them to work in a zoning context. I focus on zoning itself and do not address buyouts or other state or federal hazard mitigation programs, simply noting that those programs may overlap with the

zoning reforms described here. I also do not address how to encourage localities to undertake managed retreat in the first place, focusing instead on helping localities already so motivated.

Baseline Principles

The first step to effectively manage retreat is to develop and substantiate at least three sets of baseline principles that support dynamic coastal zoning, ideally through a comprehensive planning effort and then through recitation in the zoning code itself.

First, an initial set of principles should clearly acknowledge fundamental physical processes and realities of coastal dynamics, in concert with corresponding policy principles and legal doctrines, such as the following.

- Where coastal shorelands are moving landward naturally, corresponding changes in title interests or changes in overlapping public and private interests along the shore are the result of natural processes akin to (or legally accepted as) Acts of God, not the result of—or attributable to—direct and immediate public regulatory or other policy decisions. This recognition is important legally, politically, and rhetorically, lest the public be compelled to indemnify private shoreland property owners from the decisions they made to acquire naturally diminishing property or build too close to the shore's edge.
- Attempts to arrest naturally shifting shorelines through hardened structural armoring will ultimately prove futile, and they will likely exacerbate the erosional processes they are designed to arrest, ultimately degrading further both private and public natural coastal resources like beaches and dunes.
- Given the inevitable costs and failures of structural shoreline protection, granting exceptions to allow for construction of structures—including armoring structures—in high-hazard costal zones, or the reconstruction of such structures, will ultimately undermine effective managed retreat to the benefit of no one and at the expense of everyone—including shoreland property owners themselves.

Second, building on those propositions, a locality should address head-on the difficult question of what policy and legal fairness means for shoreland property owners in dynamic coastal settings, such as the following.

- The acquisition of private property interests in coastal shorelands necessarily *cannot*, either legally or in reality, include a reasonable expectation that those shorelands will continue to exist in perpetuity (i.e., as opposed to transitioning naturally in physical form and title to the ocean or Great Lake). Nor can it include the right to take extraordinary measures intended to protect that shoreland from erosion or inundation, particularly when those measures destroy public trust resources or impose extraordinary public expense.
- Given the circumscribed property rights that come with shifting coastal shoreland property ownership, fairness to shoreland property owners—both as a policy matter and legally—encompasses two key elements: 1) allowing the reasonable use of the property so long as it naturally exists; and 2) providing adequate notice that the time will come when vulnerable structures need be removed, as well as adequate notice when that time has come.

Third, the code should state the general purposes for which dynamic coastal shoreland zoning is being used, such as: promoting effective hazard mitigation by minimizing the presence of structures in high-risk settings; promoting effective post-storm response and recovery by minimizing the costs of those efforts, and by properly attributing costs as between shoreland property owners and the public; promoting effective resource conservation and pollution control, such as by conserving coastal wetlands; promoting the preservation of coastal aesthetics; and ensuring adequate public access to coastal resources.

'Advancing Coastal Shoreland' Districts and Setbacks

Having adopted those baseline principles, the next step is to adopt coastal districts and/or setbacks that do several things. They should: signal clearly to property owners, as well as to other members of the public, their dynamic nature; provide for a transition in allowable uses over space and time moving landward; and, as much as possible, be self-implementing as shorelands naturally move.

Multiple approaches to benchmarking coastal district boundaries and/or setbacks are commonly used (e.g., using the water's edge, an "ordinary high-water mark," etc.). Those same methods could be used for dynamic shoreland zoning as well, taking account of the specific features of a given shoreline, such as the height and slope of the beach, the presence of dunes and bluffs, lot sizes and dimensions of existing lots and structures, the presence of roadways or other features, and so on. The key here is to convey that those boundaries or setbacks, once initially set, are not permanently fixed.

Consistent with the notion of managed "retreat," a coastal shoreland district might be labeled, for example, an "Advancing Coastal Shoreland District." Other labels such as "dynamic," "migrating," or "progressing" might also be used to immediately and clearly convey that the district itself is naturally moving landward over time. Similarly, setbacks from the coastal shoreline might be labeled something like an "Advancing Coastal Shoreline Setback."

Depending on the rate at which shoreland movement is happening, the code might also specify multiple zones or subzones that transition in intensity of allowable use from the shore landward, and that convey to more landward property owners the transition to come. Such a transition might include from shoreline landward, for example, an "Advancing/No-Build" zone, an "Advancing/Future Retreat" zone, an "Advancing/Long-term Retreat" zone, and so on.

Finally, the code should clearly establish a return period for which the district boundaries and/or setbacks will be adjusted given long-term shoreland movement. Ideally, that movement should be automated, based on, for example, the long-term recession rate for a given stretch of shoreland, with provision for delaying or adjusting that shift as appropriate. Thus, a code might automatically adjust a setback landward by one foot per year annually for a stretch of

shore known to be eroding by one foot per year on average.

Depending on the particulars of a given state's zoning enabling law, it may be possible to specify automatically shifting setbacks, but not "automatically" adjusting district boundaries (i.e., boundary shifts that would be recognized as rezonings). If so, the same effect might be achieved through a regularly programmed but case-specific district boundary amendment process, for example, or through appropriate amendment of state zoning enabling laws. It might also be achieved more indirectly by making all uses within a designated coastal shoreland district special exception uses that require permitting, and then establishing appropriate moving setbacks as part of the standards specified for issuing permits.

In any event, the code should clearly establish a relatively short and regular period for revisiting advancing boundaries and/or setbacks, and then adjust them as appropriate. The locality should also resist the temptation to shift a boundary or setback lakeward or seaward given vicissitudes in the natural dynamics of a coastal shore, although it might delay its landward progression as appropriate. This is especially true along Great Lakes shores, where standing lake water levels drop periodically over time—making it appear that shorelines are moving lakeward—but then inevitably rise and move shores landward yet again (Norton et al. 2018).

Vulnerable Uses and Structures

The earliest proponents of zoning recognized that adopting or amending a code could make existing uses or structures unlawful that were lawful on the day the code was adopted. Out of fairness to the owners, those uses or structures become "nonconforming," generally allowed to continue in perpetuity unless substantially modified or damaged beyond reasonable repair.

In a seemingly parallel way, land uses or structures adjacent to shifting coastal shoreland districts or setbacks will inevitably become subject to shoreland management provisions as the district or setback moves. In contrast to nonconforming uses, however, uses and structures that come under shoreland code provisions do not do so as a result of a change in regulatory policy, but rather because the landscape itself has naturally changed beneath them.

As such, it might make more sense to conceptualize and treat uses and structures that become subject to an advancing coastal shoreland district or setback as "vulnerable" rather than "nonconforming" (as feasible given the particulars of state zoning enabling law). Uses and structures would technically still be in conformance with the code and might be permitted to continue indefinitely (like nonconforming uses or structures), but they would also become subject to the requirement that they be removed if, for example, they end up within an "Advancing Setback/No-Build" area by the natural landward shift of shoreline and setback and are subsequently threatened, damaged, or destroyed by erosion or a storm event.

Key Provisions within Advancing Districts and Setbacks

To truly advance a policy of managed retreat, the most important provision to adopt within an advancing coastal shoreland district or setback is the prohibition of hardened armoring structures designed to arrest erosional processes. Such prohibitions should include, ideally, limits on the placement of temporary or "soft" hardened structures like sandbags as well.

While adopting such prohibitions will undoubtedly prove frustrating to property owners and contentious politically, there is simply no engineering solution yet devised that is capable of stopping natural erosional processes without also destroying the natural integrity of the beach, as well as imposing extraordinary and ongoing costs upon both shoreland property owners and the general public (Cooper & Pilkey 2012).

Beyond armoring prohibitions, other provisions to consider adopting within coastal shoreland districts might include, for example, structural requirements (e.g., elevating structures, and/or ensuring that they are truly moveable), limitations on the removal of natural vegetation or other features like dunes, and periodic notification to residents within those districts of their status as such and the provisions that apply to their properties (Ruppert 2011).

In addition, depending on state enabling law, it might also be possible to require owners of structures situated within the most hazardous areas (e.g., no-build areas) to post performance or guarantee bonds, or obtain insurance otherwise, to ensure that adequate funds will be available to move those structures when the time comes, or to remove debris following a storm.

Burdens of Analysis, Proof, Risk, and Result

An unavoidable reality of planning and zoning effectively for shoreland management, especially given the effects of climate change, is that discerning precisely where and when shorelands will shift is a complex endeavor, such that the level of analysis needed for justifying regulation can be correspondingly demanding and expensive (Spirandelli et al. 2016).

It is also the case that many coastal localities are quite small or have very limited capacity to undertake such efforts (Norton et al. 2018).

Even so, the courts have not demanded that the analysis underlying reasonable zoning regulations for purposes like coastal management be anywhere close to perfect, especially when those regulatory decisions are discretionary (Ruppert and Grimm 2013), and it is possible to engage in credible planning analyses for effective coastal management that are within the reach of even low-capacity jurisdictions (Norton et al. 2019).

Coastal localities need not and should not, therefore, let demands for scientific certainty stand in the way of effective managed retreat—even (or especially) for the sake of accommodating shoreland property owners' plight. Nature does not care about demands for fairness, nor for engineering promises too good to be true. Choosing to futilely fight rather than retreat in the face of credible evidence of an advancing coastal shoreland will inevitably yield more harm than good.

That said, managing retreat through zoning implicates difficult choices on where to place the burden of analysis and proof for doing things like drawing lines on maps. It also requires uncomfortable assessment of how risk averse to be, knowing that coastal shorelands will surely move landward but not knowing for certain where or how aggressively they will do so. Finally, it

requires difficult decisions about where to truly retreat, and where instead to allow and maintain structural armoring because of the nature or extent of developed shoreland at risk. These decisions will necessarily be case and locality specific.

LIKELY LEGAL AND POLITICAL CHALLENGES

As with any innovative zoning reform, likely key legal challenges will include questions about whether it has been duly enabled or might conflict with federal or state programs such as coastal zone management programs, and whether it might prompt constitutional due process or regulatory takings challenges. Enabling and conflict challenges will necessarily be state specific, and I cannot address them in more detail here. However, most of what I propose here should be viable within conventional zoning schemes and coastal management programs, or certainly could be made viable through statutory amendments as needed.

Property owners often raise due process challenges when they are unhappy with regulatory constraints placed upon them, especially for the sake of environmental protection. But neither federal nor state due process protections have ever been construed to absolutely limit the government's ability to act when public protection and welfare needs are compelling. Rather, due process serves to ensure that governmental actions are reasonable and fairly applied (Freyfogle 2003).

Acknowledging the physical realities of dynamic coasts, engaging credible planning analyses to address those dynamics, basing dynamic zoning provisions on those analyses, and providing timely and adequate notice to property owners all serve to ensure that the regulations applied are reasonable and fair. Due process claims will surely be raised, but they will not as likely prevail.

More challenging both legally and politically will be regulatory takings claims, where property owners assert that the public decision to allow nature to run its course—or conversely *not* to let property owners destroy public trust coastal resources in quixotic if understandable attempts to arrest remorseless coastal processes—warrants compensation. The regulatory takings doctrine is now best understood as a check to ensure that government does not force "'some alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole'" (*Lingle v. Chevron U.S.A. Inc.*, 544 US 528, 537 (2005), quoting *Armstrong v. U.S.*, 364 US 40, 49 (1960)). It is not a requirement that property owners be compensated whenever their property aspirations are frustrated.

The key here is to recognize that coastal dynamics that transform upland shore property into submerged bottomland are natural processes akin to "Acts of God"—not the outcome of a tangible and proximate public policy decision for which human agents are to blame. It may not be fair—and hence compensation may be warranted—when a government regulation compels a fastland property owner to bear all of the burden of turning her property into a public park because of the public's desire for open space. But it is hardly clear why the public should be compelled to indemnify a shoreland property owner who purchased naturally dynamic shoreland, or built too close to a naturally eroding shore, when nature finally calls.

Beyond that, if ever there were traditional background principles of state property and nuisance law that should prevail over regulatory takings claims, ancient state public trust doctrines and the recognition of the "moveable freehold" interests that shoreline property owners own, as well as long-established public nuisance doctrines, surely must qualify (Craig 2011; Ruppert 2011; Norton and Welsh 2019). Frustrated shoreland property owners will bring regulatory takings claims against dynamic coastal shoreland zoning regulation, but those claims are less likely to prevail than arise, and their effect will be more political than legal—especially as the overwhelming force of nature becomes clear to all.

Finally, other legal issues will likely arise and are worth noting, but they are beyond the scope of what I can address here, including most notably questions on the effect, continued viability, and appropriate application of doctrines such as avulsion, vested rights, and duties to maintain infrastructure (Dyckman and Wood 2013; Ruppert and Grimm 2013). All merit further study.

CONCLUSION

Adopting dynamic coastal shoreland zoning will necessarily require place-, community-, and state-specific endeavors. States and localities looking to tailor and deploy it will need to address a number of questions in implementation, such as how to integrate dynamic coastal zones with rolling easements; whether and how to require bonds, insurance, or performance guarantees for property teetering on the edge; how best to structure and apply notice requirements; how best to address the effect of nonconforming (or "vulnerable") use status on property values, insurance rates, and the local tax base; and whether or how to regulate parcel configurations along coastal shores to facilitate moving structures landward.

All of these questions in implementation also represent questions for further study, and they make clear that the needed reforms to conventional fastland zoning will be neither straightforward nor easy. Beyond implementation and legal challenges, promoting such reforms will also raise the specter of state legislatures preempting effective management in response to political demands by powerful shoreland property owners, or possibly judicial intervention that yields the same effect through expansive application of the due process and regulatory takings doctrines.

Yet in the end, what choice do we have? The irrepressible desire to build on the water's edge will surely not abate. But that desire will also increasingly come in tension with the realities of shifting coastal shorelands, especially in light of global climate change. And that growing tension in turn will almost certainly compel the courts to revisit the reach and limits of due process, regulatory takings, public trust, and related doctrine in ways that reflect the realities of nature (Wolf 2018).

The best way to prepare for that eventuality is for localities to adapt their coastal shoreland zoning to be dynamic, to effectively promote a policy of managed retreat in response to natural shoreline dynamics, and to fairly allow shoreland property owners to use their properties reasonably while those properties exist, but also notify them early and often that they will eventually need to watch that property transition to the lake or sea.

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IS YOUR ZONING ADAPTABLE TO DYNAMIC SHORELANDS?

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