

West Vancouver:
Toward a Holistic Approach for Soft Shorelines

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Abstract

The global mean sea level has been rising steadily since accurate records began to be kept in the late 19th-century, and recent data provided by satellite technology suggests that this trend is accelerating rapidly. Historically, popular coastal management strategies have been mitigation based, and sought to reflect wave-action with hard shorelines composed mostly of impervious, concrete surfaces. Fortunately, agreement has since been reached surrounding the erosion-enhancing effects that obstructive barriers can have, forcing managers to rethink their once-standard approach. Efforts are underway at present in the District of West Vancouver to ameliorate their heavily degraded shore and finally create a sustainable waterfront for their community. Soft shorelines attempt to resolve erosive processes by instead mimicking the self-balancing natural environment. They promise to resolve ecological issues associated with intensive coastal development, and eliminate future threats from sea-level rise. If West Vancouver hopes to achieve their long-held goal of an environmentally sound amenity for generations to enjoy, managers must evaluate the local history of land use, planning policy, and coastal morphology when implementing soft shorelines. Understanding the the past will always be the best way possible to avoid repeating mistakes. A lesson of commonality can be learned from mistakes whose evidence remains clearly visible upon the shore, and remains a testament to the well-intended yet misguided aspirations of this residential community. This will be necessary for change to take hold in a meaningful way.

Introduction

The District of West Vancouver is a residential suburb which has over 30 kilometers of shoreline to its name. The area has undergone a unique evolution with development focused mostly in large private plots along the highly sensitive waterfront. As the population rose over the past century, individual efforts to protect expensive property from wave driven erosion have lead to worsening problems along this communal strip of land. Such intense, fragmented growth has damaged the overall stability and productivity of the coast and created a need for major re-naturalization efforts— currently taking place under the Shoreline Protection Plan.¹ In order to achieve a truly sustainable shoreline, managers must adopt a holistic approach that encompasses not only the needs of residents, ecosystems, and physical processes, but one which considers local history as well. Soft shorelines require a nuanced approach involving all that is known from the past,² allowing for a temporal understanding of processes specific to West Vancouver so that remediation can be applied most appropriately. Without a cohesive strategy for managing such a complex environment, the shore will remain in a state of perpetual misuse, its health in decline.

Ecological Commons in West Vancouver

The majority of research into the effects of sea-level rise thus far has sought to predict maximum tidal height to ensure that the shore is built-up high enough to protect

¹ West Vancouver Shoreline Preservation Society website. Ambleside - Dundarave Long Term Shoreline Planning Framework, 2005. Published by The Corporation of the District of West Vancouver.

² Switzer, A.D., Yu, F., Gouramanis, C., Soria, J.L.A. and Pham, D.T., 2014. Integrating different records to assess coastal hazards at multicentury timescales. *Journal of Coastal Research* , (70), p.723-729.

assets from inundation.³ In West Vancouver this has taken place in the form of sea-walls, groynes and wave-breaks in front of valuable infrastructure. Unfortunately, the dynamics of fluid processes do not accommodate for hard lines in their profile, which unbalance the coastal sediment budget and can actually increase rates of erosion in areas surrounding the protected zone.⁴ Mark Fiege has come up with a term that perfectly encapsulates the issue of shoreline management: ecological commons. He argues that it is not only social and economic pressures which influence the creation of space, but also ecological relationships.⁵ Where these fluid relationships overlap invisible, man-made boundaries, such divisions must be dispatched with to allow for mutual stewardship. This concept is exasperated in West Vancouver where many residents have crowded close to the shore, vying for a private piece of paradise. Once-invisible property lines were fortified and extended seaward with timber and masonry, drawing deeper lines in the sand and presenting a real obstacle to both waves and cohesion between stakeholders. These individual acts of shoreline armoring caused sections of the coast to compete for stability rather than working together, and obscured the overall goals of the community. Following Fiege, progress must take place on a common ground, free from the burden of ownership, and devoid of unnatural constraints.

³ Picketts, I.M., Werner, A.T., Murdock, T.Q., Curry, J., Déry, S.J. and Dyer, D., 2012. Planning for climate change adaptation: lessons learned from a community-based workshop. *Environmental Science & Policy*, 17, pp.82-93.

⁴ Twu, S.W. and Liao, W.M., 1999. Effects of seawall slopes on scour depth. *Journal of coastal research*, pp.985-990.

⁵ Fiege, M., 2003. Private property and the ecological commons in the American West. *Everyday America: Cultural Landscape Studies after JB Jackson*. University of California Press, Berkeley, pp.219-231.

Literature Review

Puget Sound, Washington, USA

There is a significant lack of available secondary sources concerning West Vancouver, however, case studies conducted in similar environments have shed an enormous amount of light on the possibilities for softening hard shorelines in urban areas, and will provide needed insight for planners. Puget Sound, for example, is located just south of Vancouver, experiences similar oceanic processes, and has followed a near-parallel progression of coastal development over the past century. One key difference in the case of Puget Sound is the existence of significant industrial activity along the water, as well as large portions of privately-held foreshore rights.⁶

This has led to the establishment of The Puget Sound Partnership in 2005, an advisory panel which acts in cooperation with hundreds of interest groups to inform shoreline management decisions throughout the region.⁷ The Partnership recommended a new management structure which would bring-together representatives from different levels of governance to collaborate on complex coastal issues and included continued input from experts in the field (Figure 1). Combining knowledgeable scientific input with over a century of significant national coastal surveys it has sought

⁶ Morley, S.A., Toft, J.D. and Hanson, K.M., 2012. Ecological effects of shoreline armoring on intertidal habitats of a Puget Sound urban estuary. *Estuaries and coasts*, 35(3), pp.774-784.

⁷ Puget Sound Partnership Website (<http://www.psp.wa.gov/puget-sound-partnership.php>). Last accessed 2016-05-09

to unite the goals of the State and everyone living there, and will be vital to their success in achieving coastal longevity.⁸

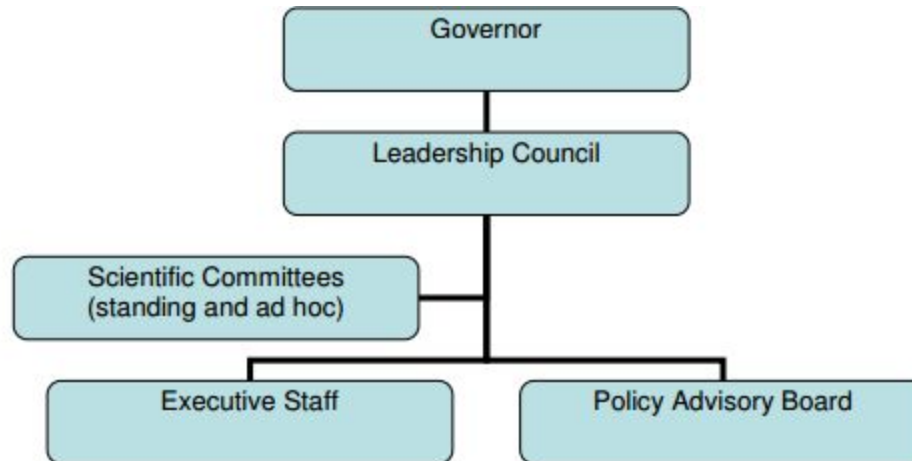


Figure 1 : Puget Sound Partnership Original Proposed Governance Structure⁹

One major question that managers must continue to ask themselves in such a case is: how will they encourage landowners to initiate the shoreline restoration process on their own property? Opportunities are often taken during private construction projects, with specific guidelines in place regarding the form of future infrastructure which include the removal of existing violations.¹⁰ Still, a lack of incentive for coastal residents and industries to address these issues for the benefit of others has slowed progress significantly and created a discontinuous system of remedies as they evolve on a case-to-case basis, dependant on private interest and economic risk.

⁸ Aldous, Don. 2007. Governance for Integrated Coastal Ocean Management (ICOM) Planning for the Minas Basin, Bay of Fundy, Canada. *Masters in Marine Management Project*. Unpublished MA thesis, Dalhousie University. Pp. 59-60 (http://ccns.chebucto.org/Aldous_MMM.pdf)

⁹ Aldous, Don. 2007. Governance for Integrated Coast.(pp. 60)

¹⁰ Lipsky, R.S. and Ryan, C.M., 2011. Nearshore restoration in Puget sound: understanding stakeholder values and potential coalitions. *Coastal Management*, 39(6), pp.577-597.

The Great Lakes, Ontario, Canada

Looking farther afield but rather within Canada, the Great Lakes district has experienced development to an even greater extent than British Columbia, and their attempts to rectify past mistakes can provide insight for planners anywhere. While lakes are under a very different sediment regime than oceans, the seasonal rise and fall of water levels may serve as an indicator for the impacts of sea-level rise upon communities. Beginning around 1985 a serious drive was made to control flooding and storm damage which plagued the extensive shoreline.¹¹ Provincial policy was established mandating a comprehensive coastal management plan which included a project mapping of the entire basin for 100-year flood boundaries and the creation of a centralized agency to coordinate local efforts.

Despite a heavy emphasis on holding accountability to local municipalities, a more recent review of soft shoreline progress here concluded that “plans continue to reflect a narrow technocratic and engineering approach to shoreline management.”¹² In addition, despite the governance of such sensitive areas being touched upon heavily at the outset, “no central agency support underlies the program and the development of plans, and therefore limited consistency and no evaluation of completed plans has occurred” even many years later.¹³ While there have been a number of thoughtful steps taken in The Great Lakes, and shoreline health is more actively discussed than ever

¹¹ Lawrence, Patrick L., and Gordon Nelson, J., 1994. "Flooding and erosion hazards on the Ontario Great Lakes shoreline: a human ecological approach to planning and management." *Journal of Environmental Planning and Management* 37, (3): 289-303.

¹² Lawrence, P.L., 1995. Development of Great Lakes shoreline management plans by Ontario conservation authorities. *Ocean & coastal management*, 26(3), pp.205-223. (pp. 218)

¹³ Lawrence, P.L., 1995. Development of Great Lakes. (pp. 218)

before, the greatest obstacles for managers remain. Cooperation must be achieved throughout the region and could be made possible by a dedicated panel of experts providing accurate and knowledgeable advice.

District of West Vancouver, British Columbia, Canada

West Vancouver represents an opportunity for planners to go further and establish a complete soft shoreline. Historical land-use restrictions have prevented industrial growth in the area and the government is fortunate enough to have secured a provincial water lease which extends 1000ft from shore. This is important because the factors influencing sediment budgets extend far beyond the scale of a mere private beach. Consideration must be made for not only the whole shoreline, but also for the drainage basins which feed these shores; these have been largely buried under subdivisions making them impervious to rainfall and increasing storm runoff. By maintaining a unified, adaptive land-border along the entirety of West Vancouver, the requisite naturalness of soft shorelines could be achieved, resulting in huge environmental and socio-economic benefits. In order to obtain this level of success careful attention must be paid to the activity of governments, both past and present, from all around the globe. Important progress has been made over the past century which must be understood to properly manage the district's own shoreline.

Historical Case Study: West Vancouver

Preliminary Land Survey of 1894

West Vancouver stretches from the Capilano River 30 kilometers west to Horseshoe Bay, and even before it had been settled the focus was upon its shoreline. In 1894 the first official survey of the region was performed by G.H. Dawson and T.H. Calland who wrote: "I have no hesitation in saying this waterfront is one of the best investments in the district with a chance of large speculative profits."¹⁴ Indeed, it seems that this was the conclusion of many Vancouverites and over the next few decades the area experienced rapid growth. Hollyburn Pier (now known as Dundarave Pier) was established in 1910 and the ferry there provided easy access for many who saw West Vancouver as the perfect escape to an increasingly hectic city life. Incorporation followed soon after in 1912, however, the majority of development during this time was in the form of beach 'shacks' which acted as semi- permanent summer getaways and did not influence the land in a significant way. This was until 1926 when The Town Planning Act was created to put a stop to this seasonal fluctuation and seal the districts fate as a residential community.

Figure 2 depicts the shoreline which remained relatively untouched at this time, awash with sediment-holding debris which dampened the erosive effects of wave

¹⁴ Report of G.H. Dawson Principal Land Surveyor and T.H. Calland 1894) as found in Appendix B – Phyllis Sarah Walden. (1947). A History of West Vancouver, unpublished MA thesis, Dept of History, University of British Columbia, Vancouver.

action. This stands in stark contrast to the present day where the Centennial Seawalk now stands here (as shown in Figure 3 on pg. 12).



Figure 2: Waterfront view west of Ambleside, West Vancouver, B.C. Photograph by F.W. Rivers. (1920s)¹⁵

The Town Planning Act - 1926

Seeking to retain a quiet atmosphere and avoid falling victim to the same fate as the nearby city centre, West Vancouver enacted the first of what would become many attempts to contain development and aspire toward becoming a vibrant, sustainable suburb.¹⁶ The act completely outlawed all industry, which had so-far been reluctant to

¹⁵ West Vancouver Archives. West Vancouver Archives Collection. 0276.WVA.PHO Waterfront view west of Ambleside, West Vancouver, B.C. Photograph by F.W. Rivers. (192-?)

¹⁶ West Vancouver Zoning By-Law No. 308, 1926. West Vancouver Archives.

move into the region's rough terrain, banned beach shacks, and implemented a minimum lot size three times greater than that of Vancouver proper. Eliminating seasonal residents and officially outlawing industrial development meant that the district could place an emphasis on planning for its people, whom it hoped would put down deep roots and contribute to the community for generations. In the years that followed, development transitioned into permanent homes which grew quickly along the waterfront and slowly extended up into the hills. With The Town Planning Act officials promised to grow the district with the desires of residents as their primary motive. Unfortunately, this meant there were few restrictions, and private development in environmentally sensitive areas flourished as everyone clamoured for a premium, water-access location.

Preliminary Parks and Recreation Survey - 1946

Following the completion of the Lions Gate Bridge in 1938, the permanent population of West Vancouver exploded, and officials once again became acutely aware of the need to manage their growth. The Preliminary Parks and Recreation Survey of 1946 was one of the first proper evaluations of the district's public space, and highlighted the need for a future consolidation of the now-dissected waterfront. It was noted within the study that many "individually desirable" waterfront areas existed, but most were so small that they could "hardly be classified as parks."¹⁷ Nevertheless, the majority of these places were considered to be very valuable as they "form[ed] the basis for future expansion."¹⁸ It is clear that the significance of having a cohesive waterfront

¹⁷ A preliminary report upon parks and recreation, 1946. West Vancouver Archives. (pp. 16)

¹⁸ A preliminary report upon parks and recreation. (pp 16)

was not lost upon the municipality, and the study outlined a number of land acquisitions to change this. However, no mention is made of the serious long-term problems which are now associated with coastal infrastructure, and right-of-way was cited as the only concern. And so the district failed to establish a regiment of restrictions for waterfront development, precluding sustainability for the foreseeable future.

Perhaps the most damaging step against shoreline health was taken in 1954 with the finishing of the Cleveland Dam on the upper Capilano River, although it would still be many years before its total impacts came to light. The dam created a reservoir to supply the burgeoning population of West Vancouver with water, but had major detrimental effects on the shoreline and local ecosystems. It was clear that further assessment of the district's own resources with a wide lens would be needed to ensure healthy growth for the community.

Parks and Recreation Report - 1963

Trouble along the shoreline was only emphasized in the years that followed and, while the shoreline remained in prominence as the focal point of the neighbourhood, only minimal work had been done to secure its longevity. The Parks and Recreation Annual Report of 1963 outlines an expensive project which had been undertaken a few years earlier to attract sand and hold it at Ambleside Beach, the largest and most popular waterfront-parks of the district. According to the report all of the sand that was introduced to the beach had already been washed away— “due to the attention focused on the increasing problem of erosion.”¹⁹ Again the need for further land acquisition in

¹⁹ Annual report, 1963. West Vancouver Archives. (pp 1)

order to establish a more coherent parks system is mentioned consistently, however there is little connection drawn between this lack of shoreline consistency and the increasingly apparent problems being experienced along the shore. While manual nourishment may have appeared as easy solution, this superficial approach has little staying power and no place in nature.

The Centennial Seawalk was constructed in 1969 to commemorate the centennial, and to supply residents with a pleasant promenade between Ambleside and Dundarave. Below (Figure 3) is a photo taken looking toward Dundarave Pier following a storm event soon after this section was completed. The rugged-yet-stable shore of the 1920s has been bolstered with a seawall and boulders but remains substantially inadequate.



Figure 3: Centennial Seawalk after storm: path has been completely obstructed by large woody debris²⁰

²⁰ West Vancouver Archives. Corporation of the District of West Vancouver Fonds. 11 02 DTW DUN. Centennial Seawalk after storm. Photographer unknown. (After 1967)

This rip-rap armouring now reflects wave-action and presents nature with a clearly defined elevation at which point the path will flood. Compared to its natural state the seawall may indeed be a more pleasant walk, but the extreme circumstances emerging from such an ecosystem are both harder to control and carry much more risk.

Waterfront Survey : Access & Encroachment - 1972

Concerns surrounding the state of the shoreline were not meaningfully addressed until nearly a decade later when the first comprehensive survey of the district's shore was complete, identifying a huge number of violations across the district (Figure 4).

From the report:

With few exceptions every buildable waterfront lot is occupied and cultivated to the very limit of its boundaries... The friendly beaches in some places are now narrow shelves of noxious sand ... squeezed between tide and concrete retaining walls, sometimes 16' high. [These] divide the shoreline and prohibit the traverse from one beach to another without trespass upon private property; and indeed inhibit the actual use of the beach itself except at the lower stages of the tide.²¹

Surprisingly, there were no recommendations made to address these important issues except where it would be convenient, or for economic gain, and most property owners could carry on expanding toward the water at their leisure. Yet the heart-wrenching tone with which the introductory note is written implies an overwhelming objection to the results of the survey. Literature still focused on public access as the main point of contention, but erosion has finally been identified as a major concern. At

²¹ Waterfront survey: access and encroachment, 1972. West Vancouver Archives (pp. 2)

this point in time further refinement of planning policy is required to remove so many encroachments, and goals of the district must shift so that the needs of the many outweigh the desires of the few.

<u>Encroachments and Encumbrances</u>			
	<u>No.</u>	<u>Located East or West of West Bay</u>	
Launching Ramps	33	18	15
Private Buoys	54	16	38
Floats	8	1	7
Wharves & Floats attached to shore	41	3	38
Groins & Breakwaters	9	1	8
Concrete, Masonry & Timber Seawalls	157	72	85
Rip-Rap Seawalls	19	3	16
Government & Commercial Breakwaters			
Permanent	2	2	
Floating	4		4
	327		

Figure 4: Total number of waterfront encroachments in West Vancouver (1972)²²

Task Force Inquiry into Drainage Policies & Problems - 1977

A major success came in 1977 when a task force finally concluded that development around waterways, including the paving-over and piping of streams was indeed a bad thing for the district, and may worsen in years to come.²³ An increase in the percentage of impervious surfaces covering the district was leading to enhanced runoff (Figure 5), over-steepening slopes, and loss of land at the water's edge.

²² Waterfront survey: access and encroachment, 1972. West Vancouver Archives (pp. 3)

²³ Task force inquiry into drainage policies and problems, 1977. West Vancouver Archives.

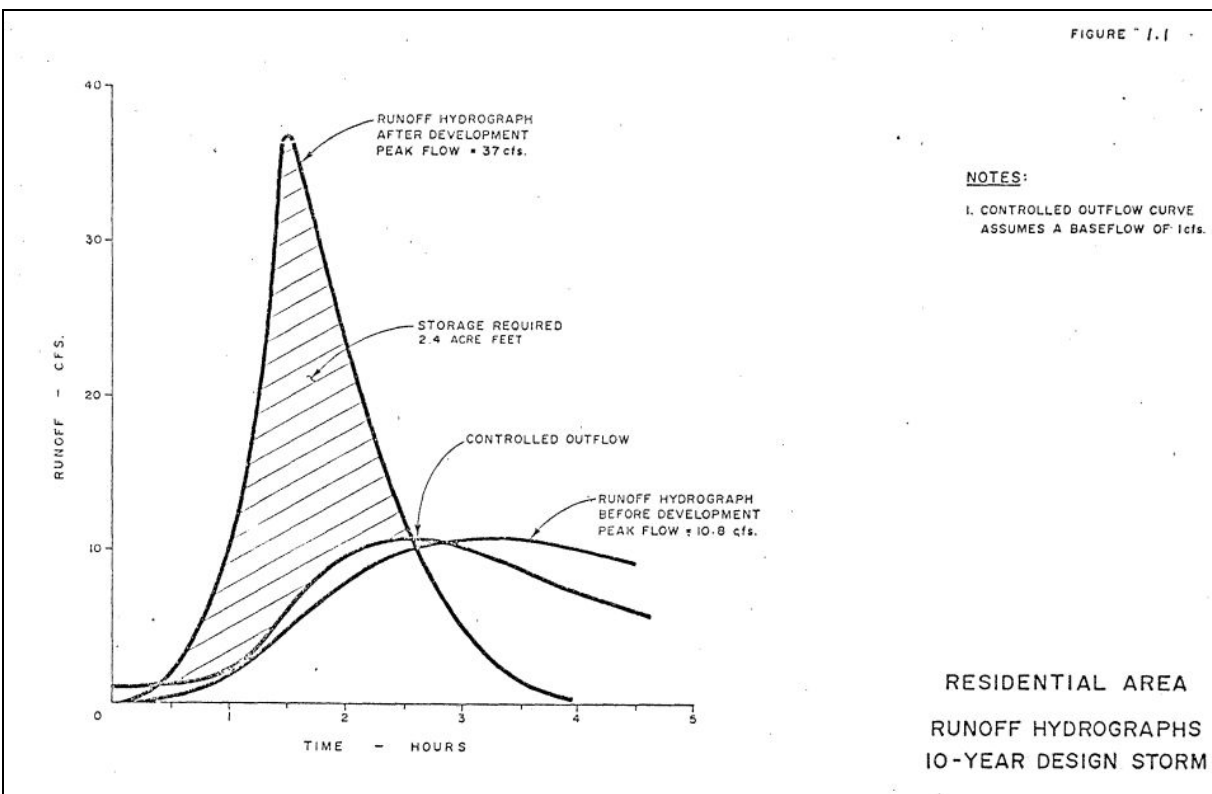


Figure 5: Hydrograph comparing changes to runoff before and after development²⁴

The Cleveland Dam is the most sizeable project from the area, obstructing the flow of the large Capilano River and leading to a decrease of ocean sediment supply, and habitat loss. As the rest of the district developed, the remaining tributaries were experiencing similar degradation meaning that something would have to be done. Relationships over what seem to be a large distance can often be overlooked, as evidenced by the late hour of this drainage-based revelation, but that makes their recognition all the more significant. This was a major accomplishment along the road toward a holistic, sustainable shoreline in West Vancouver, however it was still a

²⁴ Task force inquiry into drainage policies and problems, 1977. West Vancouver Archives.(pp. 6)

number of years before these many consultations and reviews were finally consolidated into a single planning document.

West Vancouver Community Plan - 1980

This plan included all of the previously-established goals of the district: slow growth, their beloved 'park-like' atmosphere, and a promise to consult a variety of opinions from across the district. It also put management of both the shoreline and creeks in plain text, beginning thusly:

The Community Plan is the result of one of the widest-ranging citizen participation efforts ever undertaken. The contributions of pioneers, Municipal Councils, residents who have contributed through their involvement, recommendations in neighbourhood meetings, recommendations at Public Hearings, have all been blended together to produce this Plan.²⁵

Here we have a document perhaps inspired by the original Town Planning Act of 1926, but with an important shift in language. Development is no longer a right to be exercised freely by residents, rather it must progress on the grounds of community well-being with everybody's wishes in mind. This was one of the biggest leaps made by West Vancouver in its long, convoluted history of shoreline management, however it would again be many years before significant changes were made to last.

Engineering Advisory Committee (EAC) - 2005

In 2005 a panel of engineers was assembled to examine shoreline practice in West Vancouver. It found that despite what was now going on 30 years of accurate coastal assessment and recommendation from many qualified individuals, there was not

²⁵ West Vancouver community plan, 1980. West Vancouver Archives. (Acknowledgement)

yet any municipal body that was directly responsible for preserving the shore.²⁶

Identified was the urgent need for yet another dedicated plan of action with both connectivity and accountability being stressed. How could there still be so little sustainable progress being made when there could be no doubt that officials were acutely aware of their situation? This inability to act speaks volumes to the inhibiting effect which property boundaries can have upon managing the fluidity of nature.

Without a single party to unite the values of the whole community and wield unfettered power over the shoreline, it would remain unable to heal— each property a displaced fracture.

Shoreline Protection Plan: 2012-2015

Shoreline restoration has since taken a front seat in the action plan of West Vancouver. Following the EAC, a cohesive timeline has been established which includes a number of case-studies and pilot projects— each an important step toward a cohesive, sustainable shoreline. Some of the most ecologically degraded segments of the coast have been addressed more than adequately, with concessions being made especially for the most publicly valued parks. Materials are locally sourced, and a concerted effort is made to artfully sculpt the existing terrain into a seamless, ecologically sound land-ocean interface. While progress along most of the shore has been very well-received, the municipality should not rest even for a moment until the

²⁶ Ambleside - Dundarave Long Term Shoreline Planning Framework, 2005. Available as of 04/11/2016: [westvanshoreline.ca/2005EACReporttext.pdf]

entirety of their shoreline has been naturalized. Until this happens there will always be trouble caused by the remaining hard obstructions.

Summary and Considerations

As evidenced in coastal communities around the world, sustainable outcomes are unattainable so long as private citizens are granted unlimited access to the shoreline. Giving priority to the aspirations of residents may be a noble cause indeed, but policy needs to be enacted in a way which protects the rights of both the community and environment. Narrowly focused development a danger to society, and without the complete cooperation of residents, developers, and other relevant interest groups, implementation of continuously naturalized shorelines will be impossible.

This report has outlined the important role to be played by local history in the management of natural resources, especially along the shoreline. The lesson from the past of West Vancouver cannot be ignored: it is not enough to merely acknowledge the inadequacies of current policy. Despite the impression that planning publications, and so-called 'master plans' tend to give of having ubiquitous control over the situation, they do not come close to actually resolving issues on their own. In fact these may be more likely to perpetuate a myth of progress wherein the goals of the district are never realized. Instead a bottom-up approach must be taken which ensures accountability at every step and ensures participation from even the most reluctant individuals (from the public and in office) with proper incentive and awareness.

This is not to say that progress achieved thus far is not something to be proud of. An awareness of sustainable practice has developed significantly as anthropogenic

climate change has become more widely agreed upon, and this means that most restoration projects are still in their infancy. With a chance for long-term, sustainable outcomes, progression toward the original goals of a unified West Vancouver is now being made in earnest, and the great achievements made by district officials in the past few years are a testament to such timeless values. Maintaining a holistic consideration for local history as well as other notable case studies will be vital to the longevity of this community and of the waterfront it relies so heavily upon.

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