STATE OF THE

WATERFRONT

Georgia Strait Alliance

Caring for Our Coastal Waters

W A T E R F R O N T

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Georgia Strait Alliance

Caring for Our Coastal Waters

A B O U T T H E

W A T E R F R O N T I N I T A T I V E

The Waterfront Initiative has been an exercise in facilitating broad stakeholder conversation with one common goal - to create a comprehensive waterfront plan in the City of Vancouver to address the growing tension on how to manage the interface between land and sea. The work began in 2013, and to date has focused on relationship building and getting the right people to the table from across sectors. We also focussed on what areas of the waterfront should be examined in order to build a resilient and healthy waterfront.
We've been inspired by the New York City comprehensive waterfront plan and other cities. We believe for the City of Vancouver to be globally competitive it needs to think comprehensively about its waterfront and its potential for healthy living, as well as thriving tourism, business, and ecological systems,

E X E C U T I V E

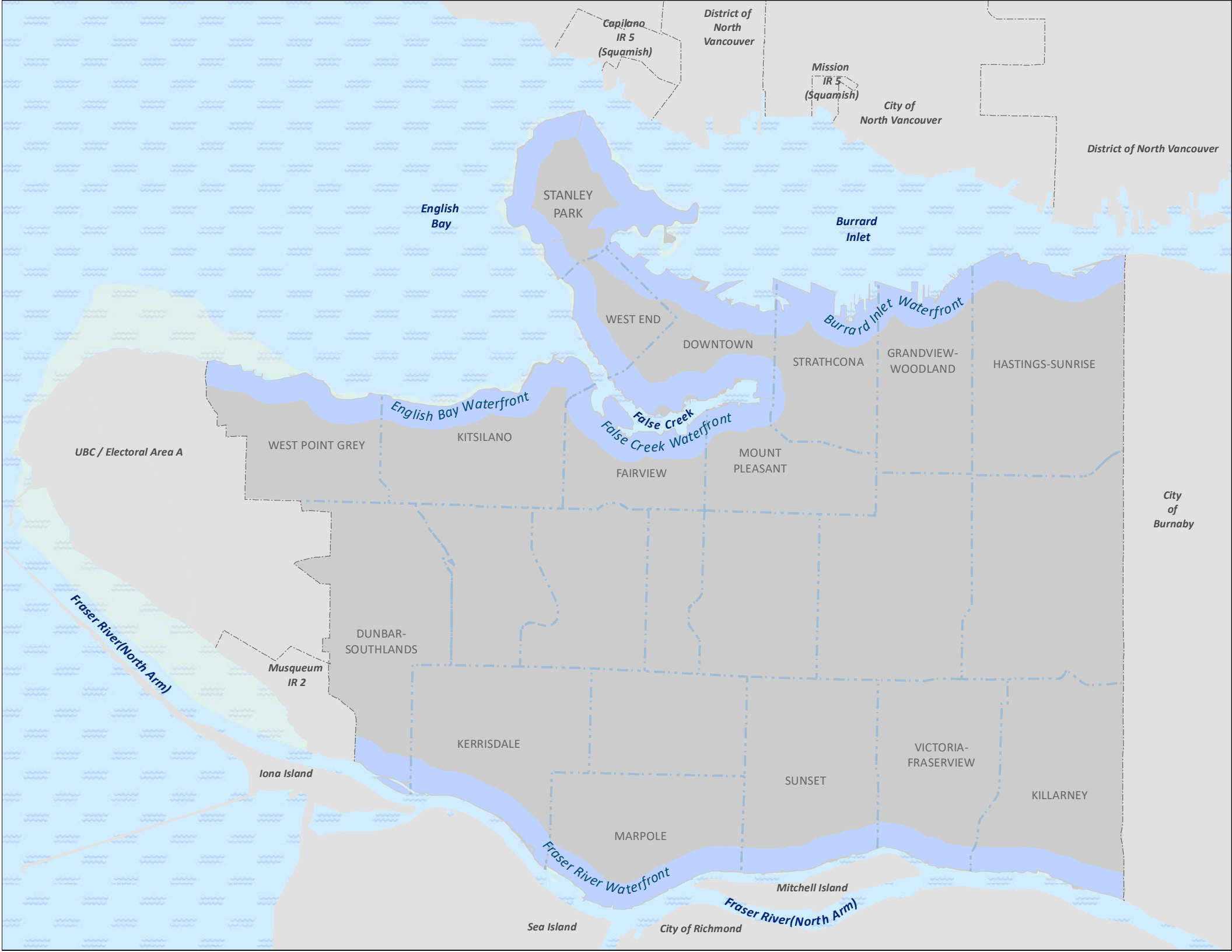
S U M M A R Y

Throughout the process of working together, our stakeholders recognized a need to capture the waterfront in question - before we were to determine where the City should head in its planning, we needed to know where we were. The State of the Waterfront Report represents a big picture view of Vancouver's waterfront focussing on five key themes chosen by the stakeholders — working, living, access to nature, ecosystems, and transportation. Within each of these themes they also selected a few key indicators to focus on. This first ever comprehensive report is a snapshot of where the City is at so we can move into the next chapter - imagining what a thriving Vancouver waterfront *should* be.

All land within 400 metres of the water's edge is classified as "waterfront" for the purpose of this report. This distance is generally agreed upon by city planners as how far an average person can walk in 5 minutes, defining the waterfront zone in a human-scale.

In this report you will find a goal, target, discussion around the indicator's meaning and significance, and map illustrating the findings. Some of the key findings include the tensions between working lands and real estate and the extent of potential damage to the city's residents and economy in event of flooding — a very real threat.

Finally, we end with proposed next steps for this work to take the Waterfront Initiative into its next chapter - turning these findings into meaningful and rich policy recommendations as we continue to work with both external stakeholders (listed at the back of this document) and the City of Vancouver to protect our incredible waterfront.


Capilano IR 5 (Squamish)
District of North Vancouver
Mission IR 5 (Squamish)
City of North Vancouver
District of North Vancouver
English Bay
STANLEY PARK
Burrard Inlet
Burrard Inlet Waterfront
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
English Bay Waterfront
False Creek
False Creek Waterfront
UBC / Electoral Area A
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
Fraser River(North Arm)
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Fraser River Waterfront
Mitchell Island
Fraser River(North Arm)
Sea Island
City of Richmond

S U M M A R Y O F

F I N D I N G S

Including Stanley Park, Vancouver's waterfront is:

PARKS AREAS

WORKING LANDS

(Port, Commercial, Industrial and Agricultural)

RESIDENTIAL

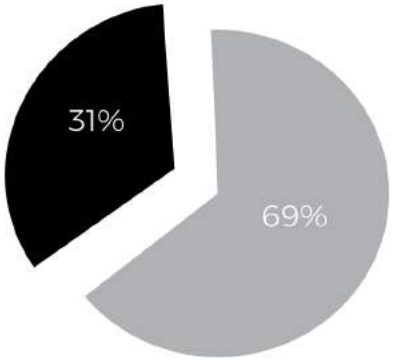
(Single Detached & Duplex, Townhouse, Low Rise, High Rise, Mixed-Use)

ROADS

5% undeveloped lands. Aside from Parks and Roads, the next largest land use type is Industrial lands at 9%

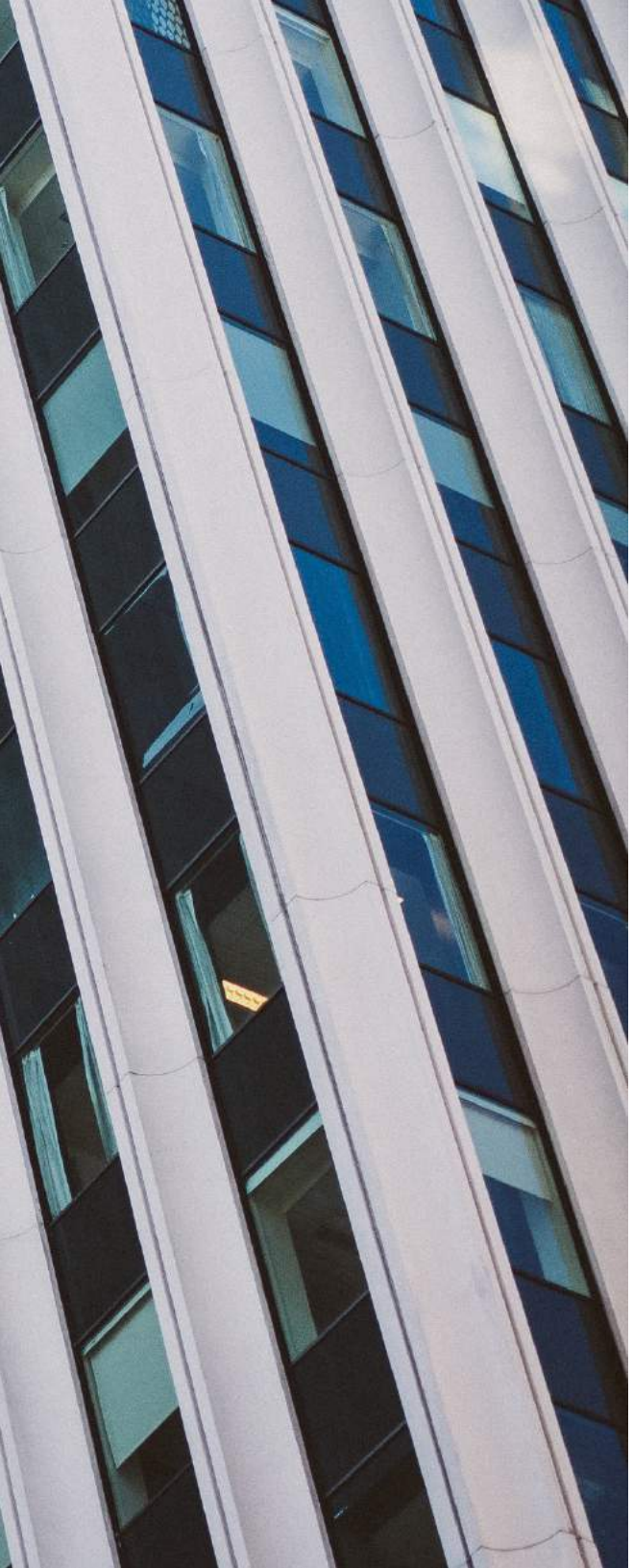
W A T E R F R O N T

W O R K I N G



Of the approximately 315,000 private sector jobs in Vancouver, 96,500 (about 31%) are located on the waterfront (compared to only 16% of the populace living along the waterfront).

Top Five Leading employment classes are Commercial Offices (21%), followed by Restaurant, Food & Beverage Industry (15%), Financial Services (8%), Storefront Retail (7%) and Trades, and Contractor or Construction (6%).

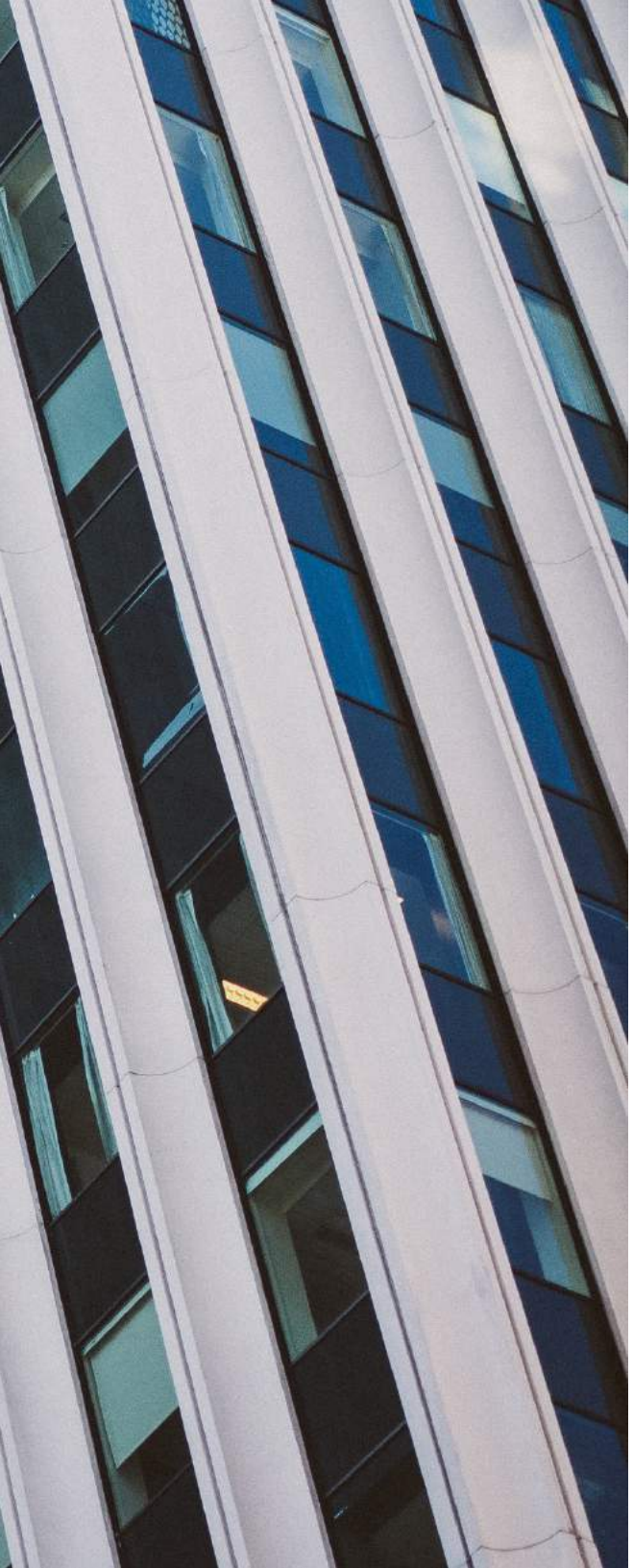


WATERFRONT

WORKING

2X

Private employment density on the waterfront is roughly double that of the rest of city at 52 jobs/hectare (ha) versus 22 jobs/hectare in the rest of the city. 66% of waterfront employment is in the downtown neighbourhoods.



W O R K I N G

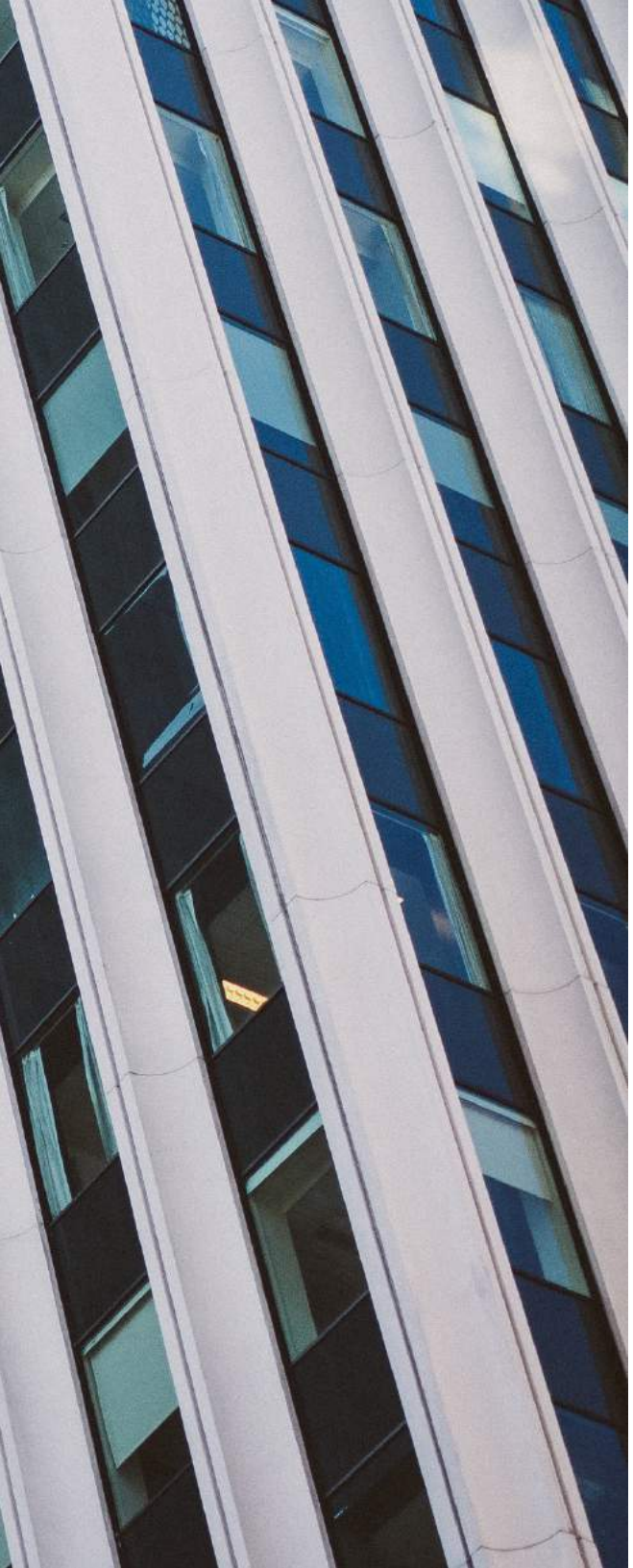
WORKING LANDS

Between 1990-2016, 15% of lands zoned exclusively for industrial uses along the waterfront were rezoned to residential or mixed-uses. These rezoned lands are primarily in the Olympic Village and Science World neighbourhoods as well the East Fraser Lands. Additionally, the waterfront has lost almost 3 ha (6% of 1990 levels) of Commercially zoned areas which are primarily in the Davie/Denman neighbourhood, and almost 0.5 ha of agricultural land (3% of 1990 levels). Offsetting these losses is an increase of over 82 ha (22%) of areas zoned for Comprehensive Development which is primarily residential with some commercial mixed uses in nature.

Loss of Industrial lands was largest between 1990-2001 (50.88 ha, 10% 1990 levels) compared to 2001-2016 (23.14 ha, 5% of 2001 levels).

Overall there was a 22% increase in Comprehensive Development lands, the majority of which are designated for residential uses with some commercial mixed-uses, (1990-2001 was 48.79 ha vs 2001-2016 was 33.39 ha for a total of 82.18 ha)

In 2005 and 2012 two areas zoned as Limited Agriculture were rezoned for residential development for a total of 3% of all Limited Agriculture land within 400m of the waterfront.



W O R K I N G

WORKING LANDS

Indicator: Distribution and Potential of Waterfront Working Lands

Goal: Protect and enhance adequate space for working lands along Vancouver's Waterfront

Targets: Maintain the 2011 proportion of working lands along the waterfront (26%) and continue to diversify working lands.

Indicator Measurement:

Vancouver's working waterfront lands account for 26% (489h) of total waterfront area

Specific Working Lands Areas Are:

- Industrial Lands - 163 ha (33% of waterfront working lands)
- Port Metro Vancouver Lands – 128 ha (26% of waterfront working lands)
- Commercial – 100 ha (20% of waterfront working lands)
- Rail, Transportation & Utilities – 74 ha (15% of working waterfront lands)
- Agricultural Lands – 23 ha (5% of working waterfront lands)
- 43% of the City's total working lands are along the Waterfront

Why it's important

Waterfront and maritime industries are integral to Vancouver's economic and social well-being. As an important centre for trade, technology, processing and home to Canada's largest port, Vancouver's waterfront provides jobs and a broad range of economic opportunities close to where people live in the Lower Mainland.

With a limited land base and stiff competition for available land by various users, Vancouver's working and industrial waterfront lands are under significant pressure to be converted to alternative uses due to increasing land values, gentrification and deindustrialization. If working lands and industrial lands in particular are not protected, job growth may slow and businesses could become discouraged to locate in the City.

Put more succinctly, working waterfront lands are critical to the urban metabolism of this coastal city. As questions and concerns with regards to affordability permeate discussions around urban livability, an effort to maintain a land bank of working lands should ensure that residents of Vancouver can have reasonable access to a diverse range of high- quality employment opportunities which may offset increasingly high costs of living in the City.

What the measurement means

Working lands, for the purposes of this project, refers to Industrial, Port, Commercial, Utility and Agricultural lands along the waterfront (within 400m of the City of Vancouver's 2002 demarcated shoreline) that may support waterfront-related employment. Using Metro Vancouver 2011 Land use data, it is possible to assess the distribution of working lands and their relative percentages of the waterfront as well as the City as a whole.

Of a total waterfront area of 2,616 hectares, approximately 26% can be considered as working lands. These lands are primarily distributed around Vancouver's harbour and along the remaining industrial areas on the Fraser River (Saw Mill Row). Conversely commercial lands are located primarily in the Downtown and False Creek areas, as befitting from their relative-to-completely deindustrialized natures. As the process of deindustrialization continues in the City, it will be instructive to note the changes from industrial lands to commercial or even post-industrial lands (such as the False Creek Flats high-tech zones and Emily Carr University). While, these working lands may become increasingly unlinked from their previous incarnations of maritime industry, it is highly likely that their contribution to the employment fabric of the city will continue. The greater point is that their loss is indicative of the bigger problem - a lack of a comprehensive plan for Vancouver's waterfront industries.

How to measure this indicator in the future

When 2016 Metro Vancouver Land Use data becomes available, it will be critical to remeasure this indicator to assess the rate of change. Measurement can be completed by rerunning the intersection of the shoreline study area and the updated 2016 Metro Vancouver Land use layer.

Supporting information or background

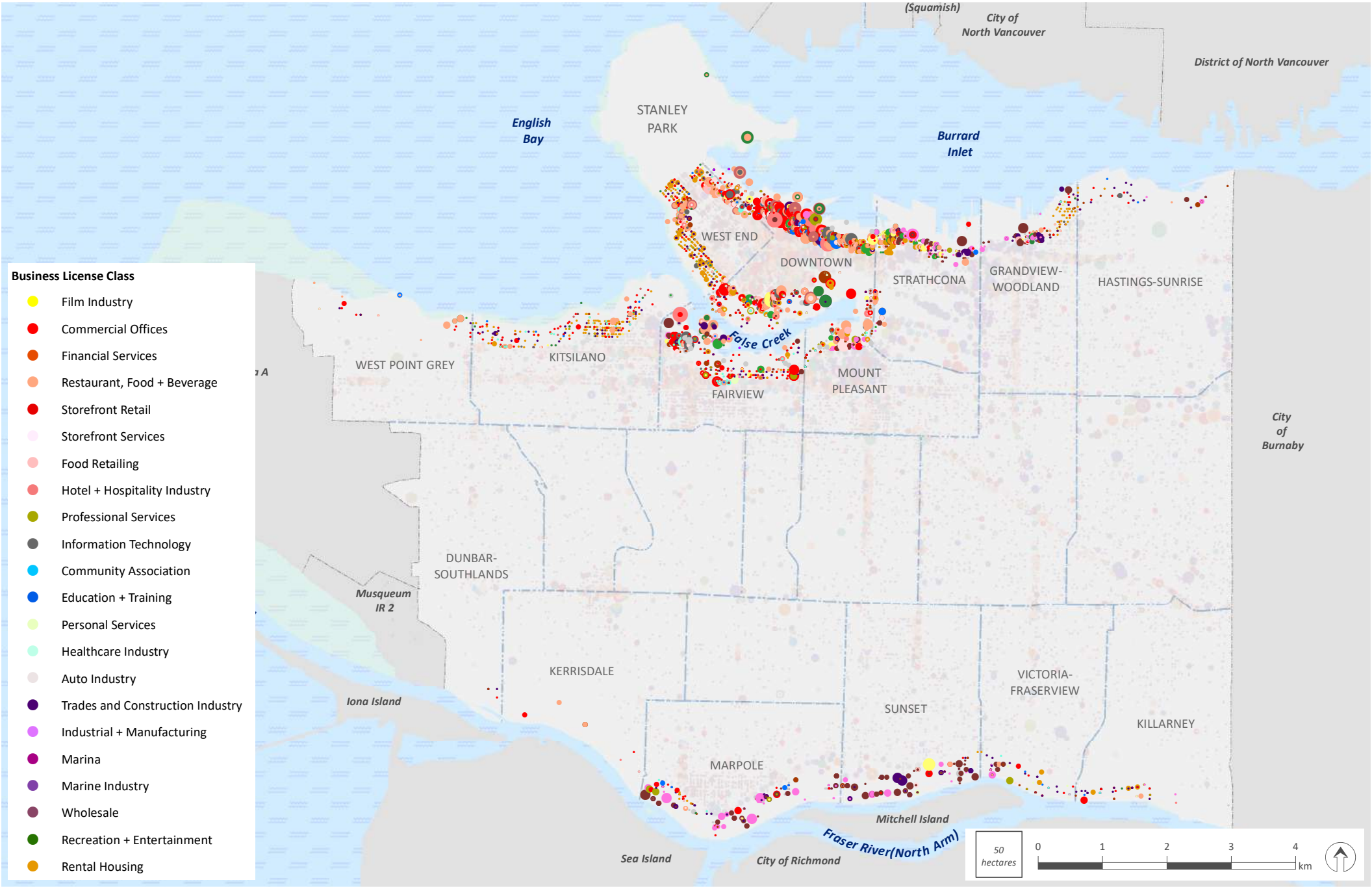
43% of the City's working lands are along the Waterfront including:

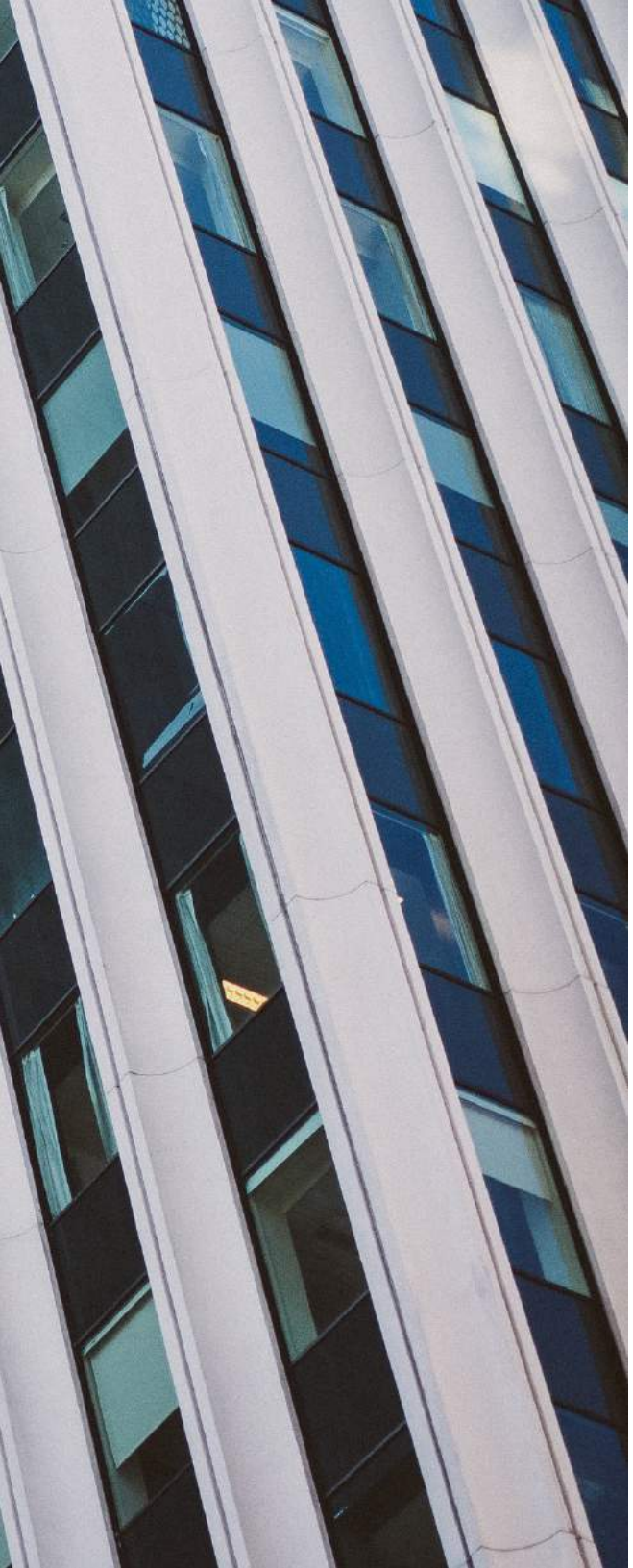
- 50% of the City's Industrial Lands
- 99% of Port Metro Vancouver Lands
- 22% of Commercial Lands
- 43% of Rail Transportation + Utility Lands
- 35% of Agricultural Lands

Other considerations

Land use does not indicate intensity of use, however, the employment indicator in the next section does address this consideration.

Data source: Land Use (Metro Vancouver 2011 Land use data – Please note that 2016 Land use data is currently not available)


Business License Class
Film Industry
Commercial Offices
Financial Services
Restaurant, Food + Beverage
Storefront Retail
Storefront Services
Food Retailing
Hotel + Hospitality Industry
Professional Services
Information Technology
Community Association
Education + Training
Personal Services
Healthcare Industry
Auto Industry
Trades and Construction Industry
Industrial + Manufacturing
Marina
Marine Industry
Wholesale
Recreation + Entertainment
Rental Housing
(Squamish)
City of North Vancouver
District of North Vancouver
English Bay
STANLEY PARK
Burrard Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island
Fraser River(North Arm)
Sea Island
City of Richmond
50 hectares
0
1
2
3
4
km

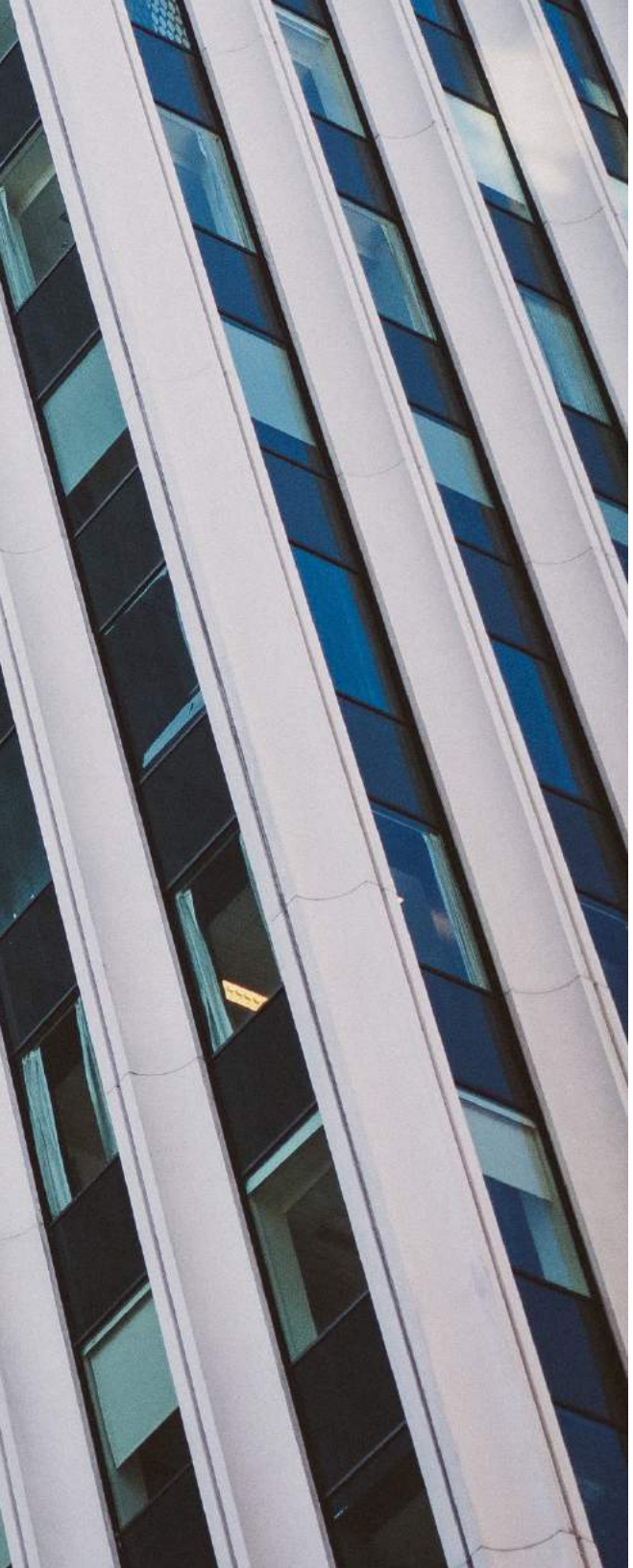


W O R K I N G

B U S I N E S S

Along the waterfront there has been a dramatic increase in Information Technology workers with approximately 2,000 more jobs (or a 38% increase) over 2011. Additionally there have been large increases for trades, contractor, or construction industries with approximately 600 more employees (or 22% increase) over 2011. There have also been large employment increases in the Healthcare Industry with approximately 350 employees (or a 51% increase) over 2011.

Conversely, the following industries have seen losses along the Waterfront between 2011-2016: the Industrial and Manufacturing sector has lost 300 jobs (9% decrease), Retail positions have dropped by 200 (7% decrease), and the number of employees in the Wholesale sector has decreased by 200 (5%).



W O R K I N G

B U S I N E S S

Indicator: Number and Type of Waterfront Businesses

Goal: Recognize and promote the diversity and quantity of employment opportunities along Vancouver's Waterfront, maintaining access for maritime industries

Targets: Maintain the 2017 proportion of waterfront employment (33% of all private sector jobs). Maintain a diverse mix of employment types, including: Professional Services Industries; Service and Retail sectors; Construction, Manufacturing and Skilled Trades; and Education, Health Care and Social Assistance fields

.

Indicator Measurement:

- Of the approximately 315,000 private sector jobs in the City of Vancouver, 96,500 (about 33%) are located on the waterfront (compared to only 16% of the populace).
- According to the four geographic regions along the waterfront (Burrard Inlet, English Bay, False Creek, and Fraser River), the Burrard Inlet has the highest percentage of those working on the waterfront at 64%. The second-next highest is False Creek with 25%, followed by Fraser River with 8%, and English Bay with 4%.

Why it's important

As people come to Vancouver to either visit, work or live along the waterfront, it is important to understand which types of employment are supporting the services and resources of the area to meet a diverse array of needs. While a primary driver for waterfront employment is marine and light-to-heavy industry, these employment sectors by no means exist in a vacuum. Indeed, integrated and supporting services allow for a truly vibrant waterfront. For example, this can be seen by restaurants that provide dining experiences for manufacturing and information technology workers in False Creek, commercial office space for logistics companies that do business through the Port, financial institutions that support banking needs for all waterfront businesses and finally hospitality and retail services that provide for residents, workers and visitors alike.

A diverse array of employment types can support a variety of residents in their search for employment, therefore supporting a more diversified range of residents potentially working and living along the waterfront. Monitoring the change among job types could indicate a change in who is accessing the waterfront and its associated activities such that the policy-makers can respond to changing requirements for employment lands and services.

What the measurement means

The most common types of employment along Vancouver's waterfront are Commercial Offices (29%) and Restaurant, Food + Beverage (14%), Financial Services (11%), Information Technology

Commercial Offices have the highest concentration along Burrard Inlet (35% of all employment in this area is estimated to be in Commercial Offices) and False Creek (21%).

Restaurant, Food + Beverage employment is highest along English Bay (33%) and second highest in False Creek (20%).

Financial Services jobs are second most prevalent in Burrard Inlet (16%) and are not in the top four for any of the other regions.

With regards to employment, the Fraser River area is an outlier compared to the other regions considering the top three employment fields:

- Wholesale (29%)
- Industrial + Manufacturing (23%)
- Trades and Construction (14%).

From the above breakdown, the Burrard Inlet zone, encompasses the financial core of Vancouver and is focused on commercial and financial areas whereas English Bay is more of an entertainment and recreational area due to the high number of restaurants in this area. False Creek is a mix of traditional office employment with service industries, whereas Fraser River is focused on technical/industrial employment.

How to measure this indicator in the future

To legally operate a business in the City of Vancouver, a business license must be obtained. This includes home-based businesses, trades, construction, commercial, and industrial business. Annually, the City of Vancouver keeps tracks of every business license that has been approved in the City of Vancouver. These data are compiled into a database, which includes the business name, business type, number of employees, address, and location coordinates. This database can then be interpreted geographically to represent employment by location.

To measure this indicator in the future, compare future City of Vancouver Business License Data from 2017 information within 400m of the waterfront. Effort should be made to validate employment estimates with secondary information from statistics Canada whenever possible.

Supporting information or background

Vancouver's Economic Action Strategy from 2011 highlights one of Vancouver's advantages for economic success as its ability to attract skilled and talented human capital due to its reputation as a livable and safe community with access to high-quality resources and services. For this reason, it is important to consider employment opportunities along the waterfront as part of Vancouver's economic asset, as options for employees to relocate here or decide to stay and grow here are integral in growing the talent pool and attracting similar businesses.

The Economic Action Strategy also points out that it is important to have mixed use, vibrant neighbourhoods with efficient transportation points and connections to retain as well as attract both businesses and talented employees.

One of the tactics the Economic Action Strategy outlined is developing strategic zones to engage citizens and business leaders to enhance what are they termed as "green enterprise zones" and "smart neighbourhoods".

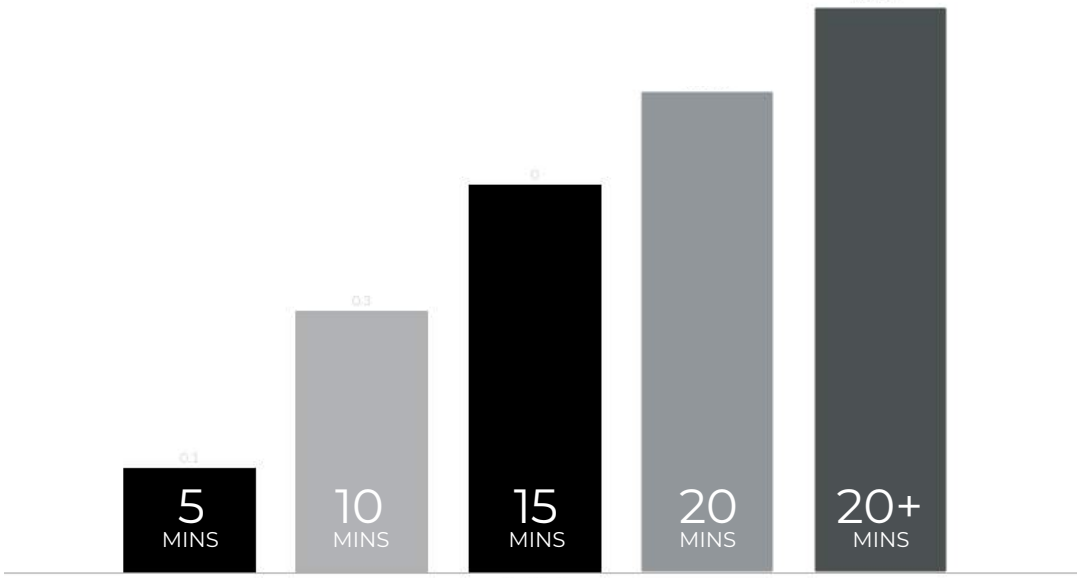
Other considerations

The ability for residents working along the waterfront to be able to access the waterfront during lunch or before or after work is also a strong reason why a variety of employment types should be located along the waterfront, as access to outdoor spaces can reduce stress among employees and increase overall health and activity.

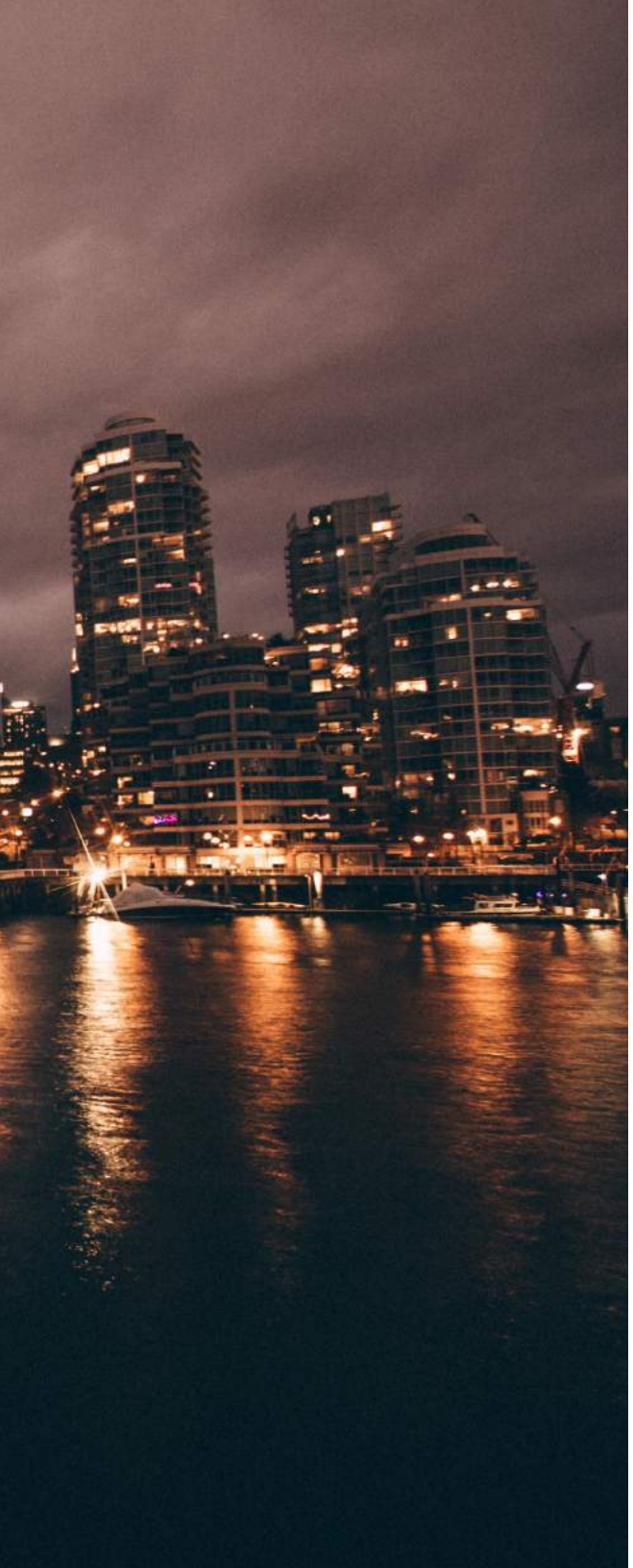
Data source: City of Vancouver Business Licenses 2017 Employment Estimates

WATERFRONT

LIVING



Of the approximately 631,500 people living in the City of Vancouver, about 10% or 65,500 live within a 5-minute walk of publicly accessible waterfront. 25% of Vancouver's population or 162,000 people live within a 10 minute walk of the city's publicly accessible waterfront. 37% can walk to the public waterfront in 15 minutes and 46% of the population can access the waterfront in 20 minutes. 54% of Vancouver's population lives further than 20 minute walk from publicly accessible waterfront.



W A T E R F R O N T

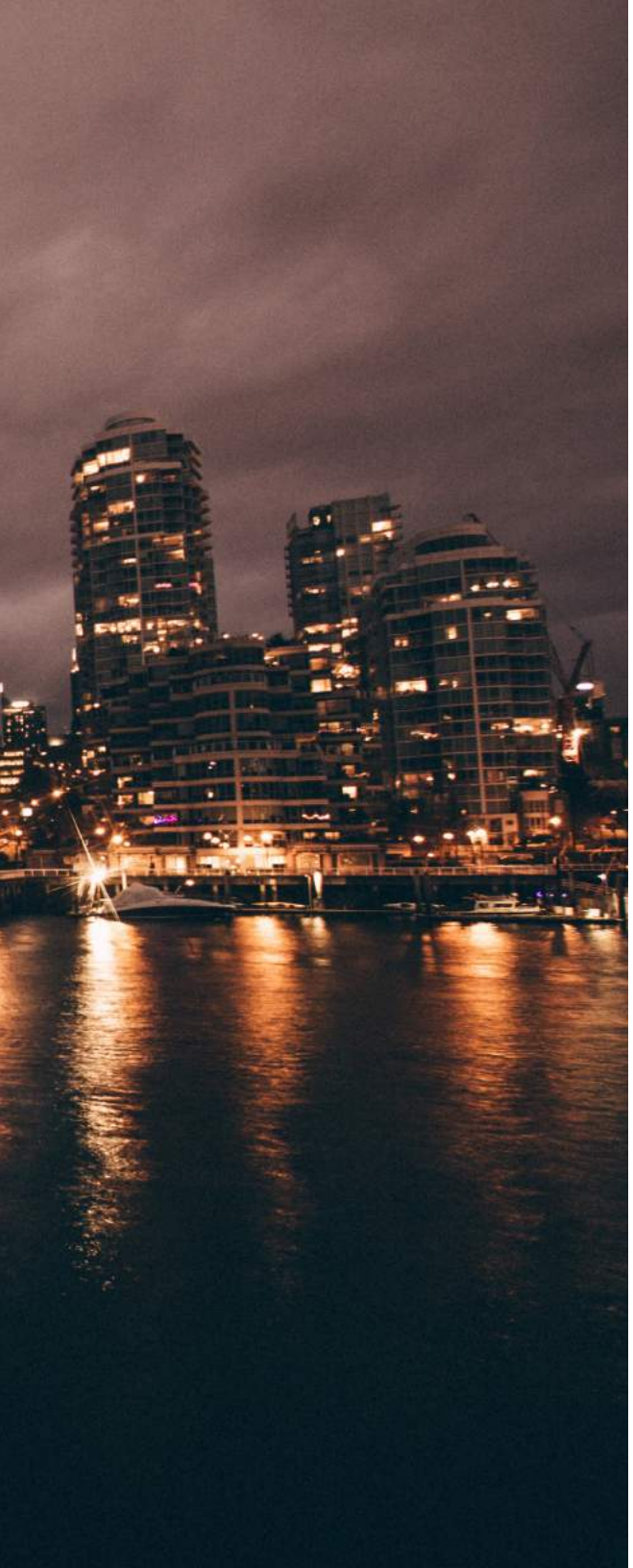
L I V I N G

Overall, Vancouver's waterfront is 84% multi-family dwellings, with 53% of homes being inhabited by renters. 39% of households along the waterfront can be considered in core housing need according to the standard Canada Mortgage and Housing Corporation definition (A household is said to be in core housing need if its housing falls below at least one of the adequacy, affordability or suitability, standards and it would have to spend 30% or more of its total before-tax income to pay the median rent of alternative local housing that is acceptable). 7% of all waterfront lands is singled-detached and duplex, 3.5% is low-rise, 3% is high rise and 1.47% is townhouse. The largest populations living along the waterfront live in: Downtown (35%), West End (22%), and Fairview (11%).

24% of those living along the waterfront are 25-34 years old.

39% of those living along the waterfront are immigrants.

Of those living along the waterfront 20% qualify as low income and 34% are spending 30% or more of their after-tax family income on shelter.



L I V I N G

A C C E S S T O S H O R E L I N E

Indicator: Physical Access to the Public Shoreline

Goal: Increase the level of access to Vancouver's Waterfront for all of the City's residents.

Targets: Reduce, where appropriate, gaps in shoreline access to increase the number of residents who can access the shoreline within a ten minute walk

.

Indicator Measurement:

- City Wide Access Statistics:

  10% of residents live within a 5-minute walk of publicly accessible waterfront.

  25% of residents live within a 10-minute walk of the publicly accessible waterfront.

  37% of residents live within a 15-minute walk of the publicly accessible waterfront.

  46% of residents live within a 20-minute walk of the publicly accessible waterfront.

  54% of Vancouver's population lives further than a 20-minute walk from publicly accessible waterfront.

- English Bay has 12.5 km of publicly accessible shoreline which is 100% of its total length.
- False Creek has 12 km of publicly accessible shoreline which is 96% of its total length.
- Burrard Inlet has 9 km of publicly accessible shoreline which is 39% of its total length.
- Fraser River has 7 km of publicly accessible shoreline which is 34% of its total length.

Why it's important

Including residents' access to Vancouver's waterfront as an indicator is important as it is a way to connect people to nature, both through the water, sea life, birds and other animals as well as through beaches and green spaces. The more people have knowledge and love for nature, the more they will strive to protect it. Accessing blue and green space is known to reduce stress and increase health among those who access it regularly, so to create a fair and equitable city, it is important to review who has access to the waterfront and how far one must go to reach the waterfront.

According to the City of Vancouver's webpage "Beaches", the waterfront is the most precious asset of the City and since the 1920s park commissioners began acquiring beachfront property that had been snapped-up for hotel and private residential development. As part of this movement to increase access for all residents of the city, we must continue to move towards reducing gaps in public access and thus increasing access along the waterfront.

What the measurement means

The measurement is a calculation of walking distance in minutes to publicly accessible shoreline (park or path) and indicates the number of residents within either a 5, 10, 15, or 20-minute walk of the shoreline. Reviewing access to the shoreline in this manner highlights gaps along the waterfront where access could be improved, or areas where although there might not be publicly accessible shoreline, residents along the waterfront still have adequate access to the waterfront, even if it might not be the most direct. Some of the best examples of this are along the Fraser River where the waterfront may be indicated to be within a 5 or 10-minute walk, however the access point is usually not on the direct path to the waterfront.

It is important to highlight areas that might be underserved by access to the waterfront and review possible causes for this beyond being industrial lands (for example: the Burrard or Kent Ave. Industrial Areas) to understand if there are other inequalities occurring such as poor pedestrian infrastructure or barriers due to private green spaces. In either of those cases, inequalities are at play but for different reasons: in areas of weak pedestrian infrastructure there might be a lack of community interest or incentive to build access points if there is resulting lack of advocacy for it. With regards to private green areas it might be private residences with large acreages blocking possible access points and therefore limiting access to the shoreline.

How to measure this indicator in the future

To measure this indicator in the future, comparable future demographic data should be analyzed along with updates to shoreline access data to calculate average walk times. Future calculations could also include public transportation, bike, or other modes of transportation as well as supplementary demographic information such as income brackets, tenure or age classifications.

Supporting information or background

Vancouver's Access to Nature target for the Greenest City Action Plan states that the goal is to "Ensure that every person lives within a 5-minute walk of a park, greenway, or other green space by 2020."

All lands below the high tide line in British Columbia are considered as crown lands (owned by the Province) and are therefore accessible for public use.

Other considerations

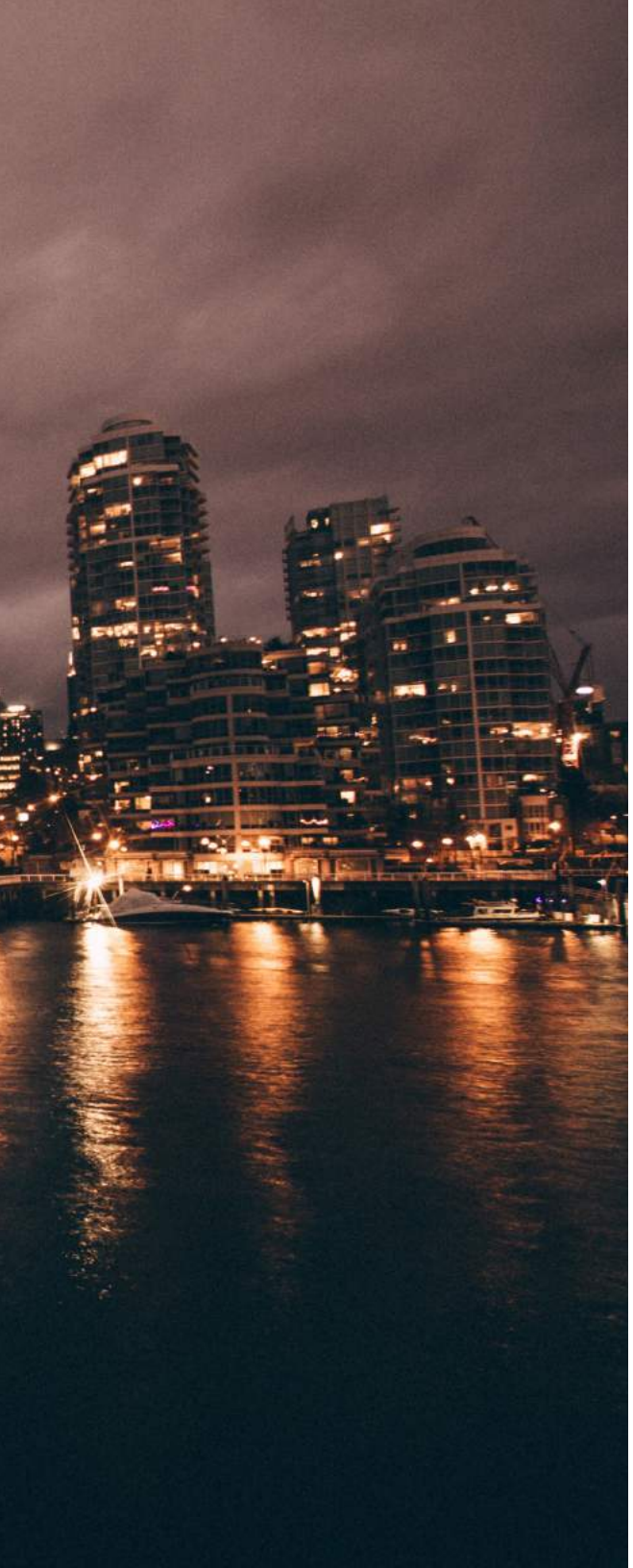
The Burrard Industrial Area creates a 10km gap in publicly accessible shoreline (including structure such as piers and jetties which increase length considerably).

Kent Ave. Industrial Area along Burrard Inlet creates a 1.6 km gap in publicly accessible shoreline.

The newly created East Fraserlands Park in Southeast Vancouver offers 1.5 km of public access.

Stanley Park has a total of 9.7 km of publicly accessible shoreline.

Data source: City of Vancouver 2002 Shoreline, 2016 Canada Census of Population



L I V I N G

D E M O G R A P H I C S

Indicator: Demographics of Residents Living along the Waterfront

Goal: Establish and maintain a high level of diversity (of age, income, background, and education) among residents living along the waterfront.

Indicator Measurement:

- Of Vancouver's 22 neighbourhoods identified by the City of Vancouver, 15 have some portion of their neighbourhood boundary within 400m of Vancouver's waterfront and 16% of Vancouver's population lives within 400m of the waterfront.
- The largest age bracket in Vancouver's waterfront are persons aged 25-34 (20%) followed by working adults 35-44 and 45-54 (both 15% of the waterfront's population). 23% of waterfront residents bridge three age groups (0-5, 6-18, and 19-24) and are aged 24 or younger.
- 20% of Vancouver's waterfront is classified as low income compared to the city average which is 18% and the national average from 2011 which is 9%.
- Sunset (62%), Marpole (51%), and Downtown (46%) have the highest percentage of immigrants, while Grandview-Woodland (21%), and Kitsilano (26%) have the lowest percentage of immigrants. The Canadian average is 19%.

Why it's important

Diversity across ages, incomes, backgrounds, and education is key to building a healthy and vibrant community through active participation and interaction along streets and in neighbourhoods. A diverse neighbourhood may also point to adequate variety in housing, employment, and activities and indicate fair and equitable access to a desirable neighbourhood such as living along the waterfront or close to parks. This can also activate civic participation, sense of belonging, economic activity, entrepreneurial inspiration and more. This diversity can also increase economic development whereas homogeneity slows it down.

What the measurement means

The measurements indicate the spread of ages across the city and where there are concentrations of specific age groups. This analysis can then highlight areas where policies might be implemented to promote an increase in age diversity.

How to measure this indicator in the future

Compare future Statistics Canada Demographic Data to the data from 2016.

Supporting information or background

Jane Jacobs famously wrote about diversity across much of her published work and often promoted diversity as a way to have people accessing the streets at various times: first you have the commuters, then you have the parents with children in the park, then maybe seniors strolling around for their afternoon exercise or errands, then the commuters again, and then the young adults going out to enjoy drinks, friends, and dinner and possibly evening entertainment. It is this diversity that brings a city to life and makes the city feel alive throughout the day. More specifically, neighbourhoods that become desolate at a specific time of day are "not only inefficient but have detrimental impacts on community cohesiveness and prosperity" (from The Life and Death of Great American Cities).

Other considerations

Mount Pleasant is most popular among the 25-34 year olds with the highest concentration of any age bracket (38%) and 35-44 year olds (21%) for a total between the two of 59%.

The waterfront area of Hastings-Sunrise has the largest number of children under 5 years old (7% of the population in that neighbourhood).

Strathcona has the most 45-54 and 55-64 year olds with a total of 39%.

65-74 year olds live in roughly similarly high numbers in Dunbar-Southlands (13%), Fairview (14%), West Point Grey (16%), and Kerrisdale (14%). Least popular for this age bracket are Mount Pleasant (5%), Killarney (7%), Downtown (8%), and Hastings-Sunrise (8%).

Data source: Statistics Canada Demographics Data (2016)

L I V I N G

H O U S I N G

Indicator: Safe, Secure and Affordable Housing

Goal: Establish and maintain diversity across housing types, tenures and qualities for all households along the waterfront.

Targets: Reduce the number of households living in core need from 37% to under 25% (based on 2016 census data and Canadian Mortgage and Housing Corporation data).

Indicator Measurement:

- Core housing need along Vancouver's waterfront is estimated to be at 37% of residents.
- Where core is a household that falls below at least one of the adequacy, affordability or suitability standards

- Overall, Vancouver's waterfront is:

  84% multifamily dwellings

  53% of homes being inhabited by renters

  39% of individuals living along the waterfront are immigrants

  20% qualify as low income (according to the low-income measure Statistics Canada calculates) and;

  34% are spending 30% or more of their after-tax family income on shelter

Why it's important

The waterfront is experiencing increasing competition among waterfront users, and demand for waterfront land is limited due to already built structures, park space, and the nature of the waterfront being a mostly fixed attribute. Coupling this with the city's upward demand for housing means the cost of the very limited residential waterfront properties is on the rise. Therefore, it is important that residential lands be managed well to maximize space and provide accommodation opportunities within the reach of all community members, regardless of income. For instance, veering away from single-use development and toward mixed-use development enables various uses to be incorporated on the same piece of land.

Core housing need estimates identify groups in the City that are most in need of housing assistance, and inform housing and poverty strategies and housing program proposals.

According to a 2011 Canada Mortgage Housing Corporation Report, BC has a core housing need rate of 15% while Vancouver is 18%, both of which are higher than the Canadian rate of 12%. While the difference between Canadian averages and Vancouver values are more likely attributable to costs of living in a city, what is interesting is the difference between Vancouver average core housing need and Waterfront values (18% vs 38%). This can mostly be attributed to the high cost of waterfront living compared to residents' income as 34% of residents are spending 30% or more of their after-tax family income on shelter.

What the measurement means

A household is in core housing need if its housing does not meet one or more of the adequacy, suitability or affordability standards, and it would have to spend 30% or more of its before-tax income to access acceptable local housing.

Acceptable housing is adequate in condition, suitable in size, and affordable. Adequate housing does not require any major repairs, according to residents. Suitable housing has enough bedrooms for the size and makeup of resident households, according to National Occupancy Standard (NOS) requirements. Affordable housing costs less than 30% of before-tax household income.

Based on the municipal benchmark of 18%, a waterfront average of 38% of households in core housing need reflects a significant issue that requires detailed study to assess strategies and actions that can improve this indicator in the future.

How to measure this indicator in the future

Compare future housing data with 2016 data.

Supporting information or background

Overall, 16% of Vancouver's population lives along the waterfront with the largest portions of population at 35% who live in the Downtown, 22% in the West End, and 11% in Fairview.

8 out of 12 neighbourhoods along the waterfront are made up of more than 90% multi-family dwellings with Downtown at the top, with 100% of the population. These multi-family dwelling neighbourhoods include Downtown, Fairview, Grandview-Woodland, Killarney, Kitsilano, Mount Pleasant, Strathcona, and the West End.

Hastings-Sunrise and West Point Grey have the smallest percentage of multi-family dwellings along the waterfront, with 52% and 60%, respectively.

7.4% of households along the waterfront live in dwellings that require major repairs; and

7.5% of households along the waterfront live in dwellings that do not have enough bedrooms for the size and makeup of resident households, according to National Occupancy Standard (NOS) requirements

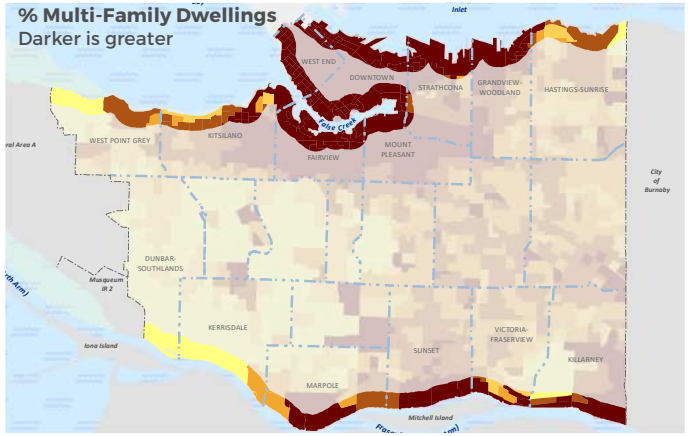
Other considerations

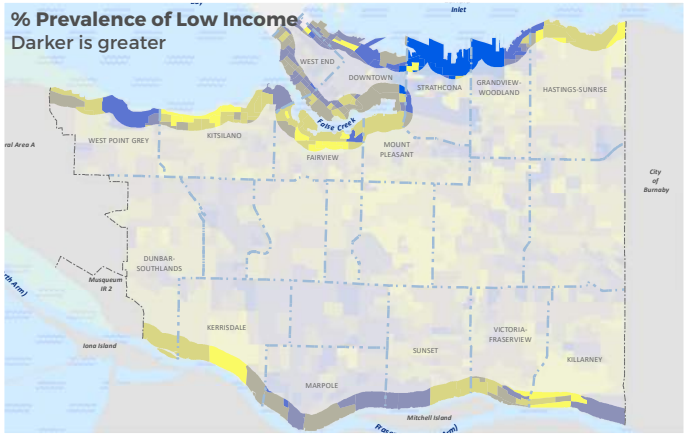
Both Downtown and Mount Pleasant have the highest monthly costs for both rented and owned units; however, Mount Pleasant is slightly more expensive to own by $27 ($1,956 vs $1,929) and Downtown to rent by $12 ($1,807 vs $1,795). Of note: Kerrisdale has an average monthly cost of owned dwellings of $2,162, however, it was omitted for this comparison because it is 0.41% of the entire waterfront population.

Waterfront residents in Strathcona have:

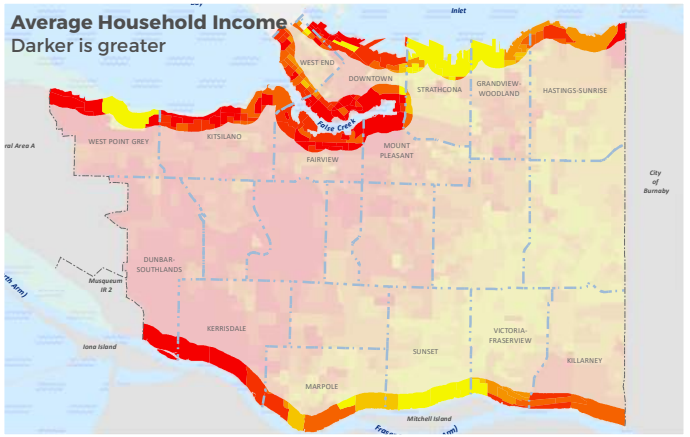
- lowest annual income ($32,860 compared to a city average of $103,382);
- lowest average monthly costs for renting ($669 vs city average of $1,240) as well as owning ($1,021 vs city average of $1,601);
- highest percentage of renters (84% vs city average of 52%) as well as low income residents (41% vs 19% city average); however
- it meets the city average of people who are spending 30% or more of their income on housing because of the low cost of housing in that area which is 34%.

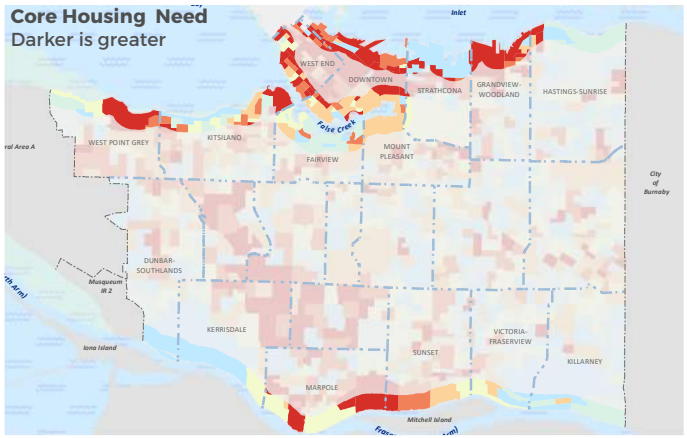
Data source: Census of Canada (2016), Canada Mortgage and Housing Corporation (2017)

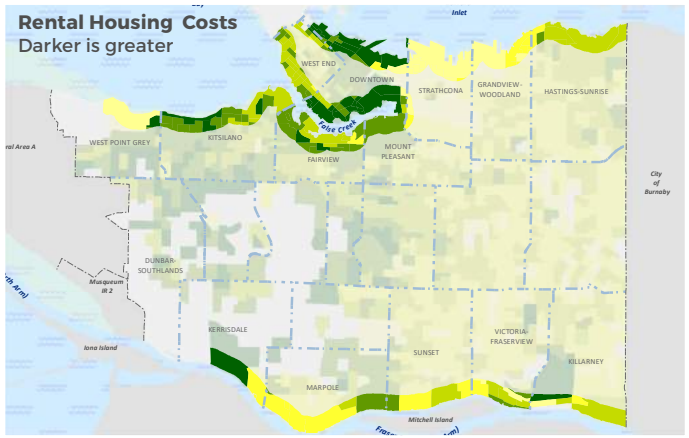

% Multi-Family Dwellings
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island

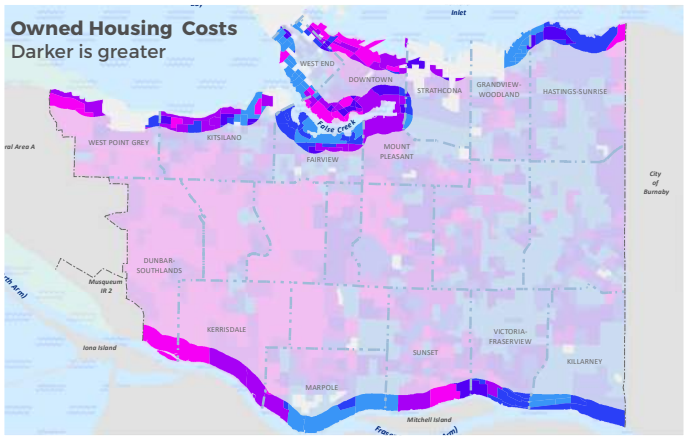

% Prevalence of Low Income
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island

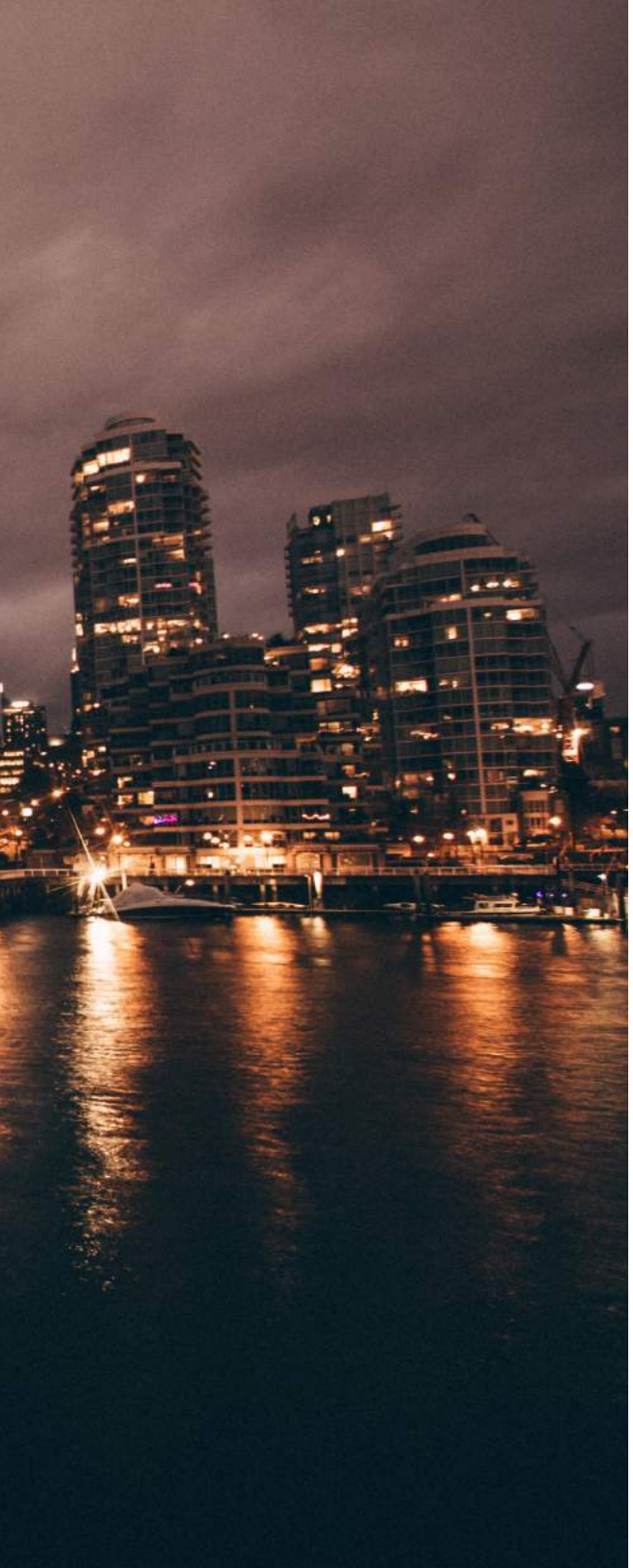

% Renter Households
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island


Average Household Income
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island


Core Housing Need
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island


Rental Housing Costs
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island


Owned Housing Costs
Darker is greater
Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
False Creek
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
DUNBAR-SOUTHLANDS
Musqueam IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island



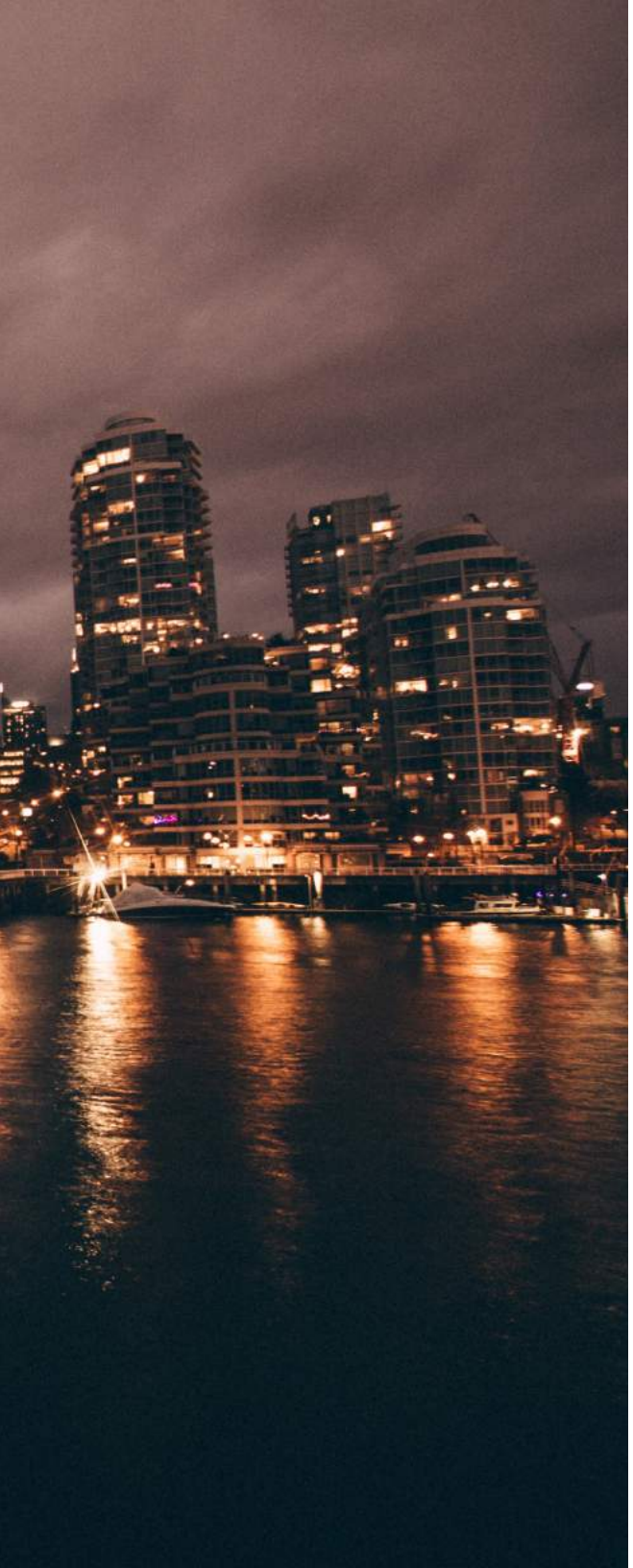
L I V I N G

C R I M E

Non-violent crime rates have increased from 45.8 to 71.9 reported crimes per 1,000 people from 2011 to 2016 – an increase of 57% which compares to a city-wide increase of 22% in the same period. This could be due to a change in reporting numbers or in actual crimes committed.

Overall theft from vehicle is the most reported type of crime across the entire waterfront and the average rose from 2011-2016 by 135%.

Comparatively the average of all reported crimes increased by 157% which can be because of a change in reporting amounts more than increased crime.



L I V I N G

C R I M E

Indicator: Reported Non-Violent Crime Types

Goal: Reduce non-violent crime along the Waterfront by targeting areas with a high number of reports per 1,000 persons.

Targets: Reverse the trend of increasing crime rates along the waterfront (there was a 56% increase from 2011-2016).

.

Indicator Measurement:

- In the waterfront study area, reported non-violent crime rates have increased from 45.8 to 71.9 reported crimes per 1,000 people from 2011 to 2016 – an increase of 57% which compares to a city-wide increase of 22% in the same period.
- 55% of all reported crimes along the waterfront in 2016 were related to either thefts from vehicles (43%) and thefts of bicycles (12%). In the period from 2011 to 2016 reports of these crimes increased by 80%.

Why it's important

To create a safe and welcoming waterfront, it is essential to reverse the crime rate that increased from 2011-2016 for reported crimes. High rates of crime can contribute to areas being cast as undesirable places to live, work, and play and can lead to urban flight particularly of families and highly educated households. That being said, current trends towards gentrification and urban retrenchment are extremely significant along the waterfront and more likely outcomes of increasing non-violent crime rates (especially thefts), would create further nuisances for residents and businesses, as well as the creation of wealth in grey markets (economic activity based on stolen property) which in turn may add fuel to the City's drug epidemic. Continued efforts to address the root causes of mental health and addiction issues should have a demonstrable impact on crime rates when this indicator is remeasured in coming years.

As areas of high crime are linked to areas of increased poverty and of "concentrated disadvantage", it is important to include crime rates in an assessment of the waterfront to better understand the inequality across the waterfront and how crimes of opportunity might be concentrated in regions with perceived lower socio-economic status.

As competition for land along certain areas of the waterfront reshapes populations and employment, new residents' experiences with criminal activity in these areas will shape and influence civic policy with regards to enforcement. To avoid negative outcomes, (for instance the growth of private security forces and zones of exclusion), developing a more robust understanding of the root causes of crime and crime trends (rather than just their physical expressions) may aid the integration of new and existing populations.

What the measurement means

With an increase of 57%, reported criminal activity along the waterfront grew at a rapid pace in the five-year period between 2011 and 2016. Confoundingly the population along the waterfront grew by only 12% suggesting that the growth in reported crimes far exceeds that of population. This could be due to a change in reporting numbers, an increase in enforcement or in total actual crimes committed. However, when compared to a city benchmark of an increase of 22%, all things being equal there is likely significant increase in non-violent crime along the waterfront.

In detail:

- The Burrard Inlet area has both the highest rate of criminal activity in the study areas (162.5 crimes per 1,000 persons) as well as the highest increase in reported crimes from 2011-2016 with an increase of 88%. In this time period the population of the Burrard Inlet study area increased by 6.9%.
- Conversely, the Fraser River study area has both the lowest rate of criminal activity in the study areas (26.6 crimes per 1,000 persons as well as the lowest increase in reported crimes from 2011-2016 with an increase of -10%.
- The most common type of reported non-violent crime across the four regions is theft from a vehicle.
- Second most common in English Bay and False Creek is theft of bicycle, while second most common along the Fraser River and Burrard Inlet is mischief.

How to measure this indicator in the future

Compare future crime data with 2016 data.

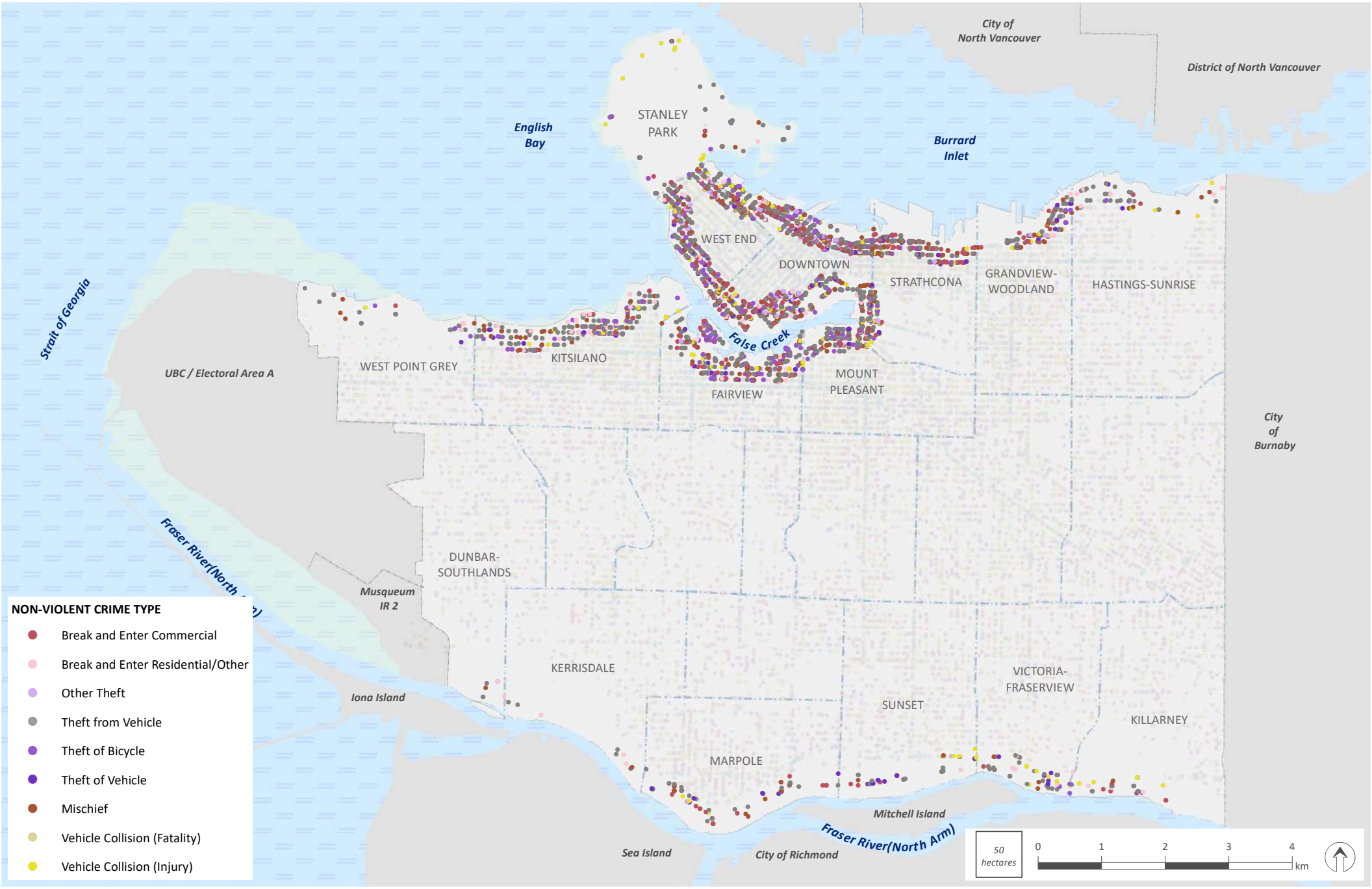
Supporting information or background

Vancouver Police Department's Strategic Plan for 2017-2021 set one of its goals to combat property crime and its drivers. In their plan they write that "recent increases in property crime will be countered by working with the community and partner agencies to engage in proactive and innovative strategies." Particularly they are focusing on repeat offenders and crimes of opportunity.

Other considerations

Locations of non-violent crimes represent reported crimes. Under- or over-reporting of criminal activity will influence the mapping and analysis.

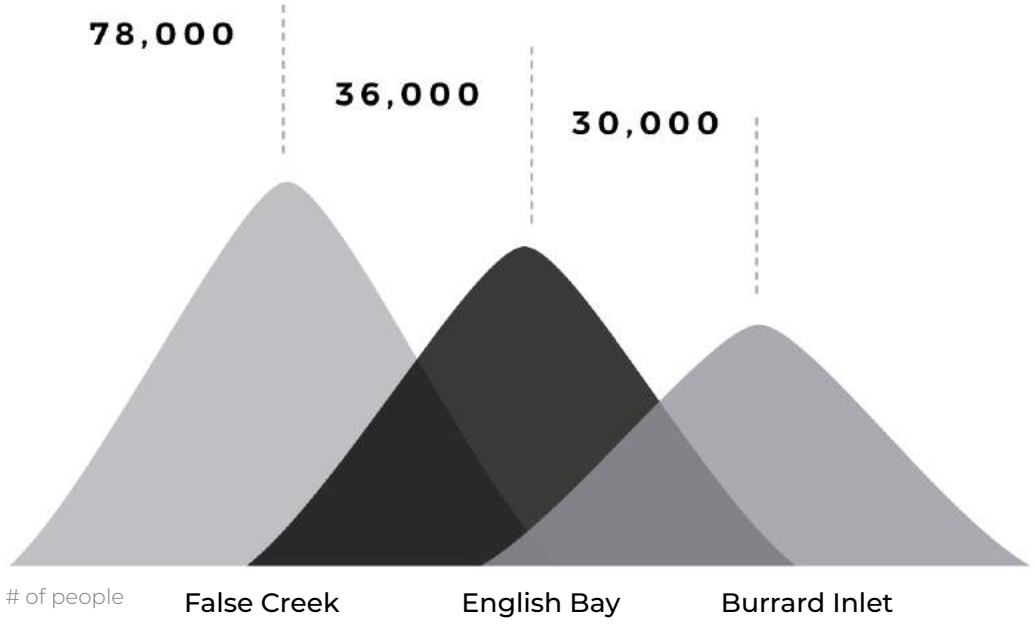
Data source: City of Vancouver Crime Data 2011-2016


City of North Vancouver
District of North Vancouver
English Bay
Burrard Inlet
STANLEY PARK
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
Strait of Georgia
False Creek
UBC / Electoral Area A
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
Fraser River(North Arm)
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island
Sea Island
City of Richmond
NON-VIOLENT CRIME TYPE
Break and Enter Commercial
Break and Enter Residential/Other
Other Theft
Theft from Vehicle
Theft of Bicycle
Theft of Vehicle
Mischief
Vehicle Collision (Fatality)
Vehicle Collision (Injury)
50 hectares
0
1
2
3
4
km

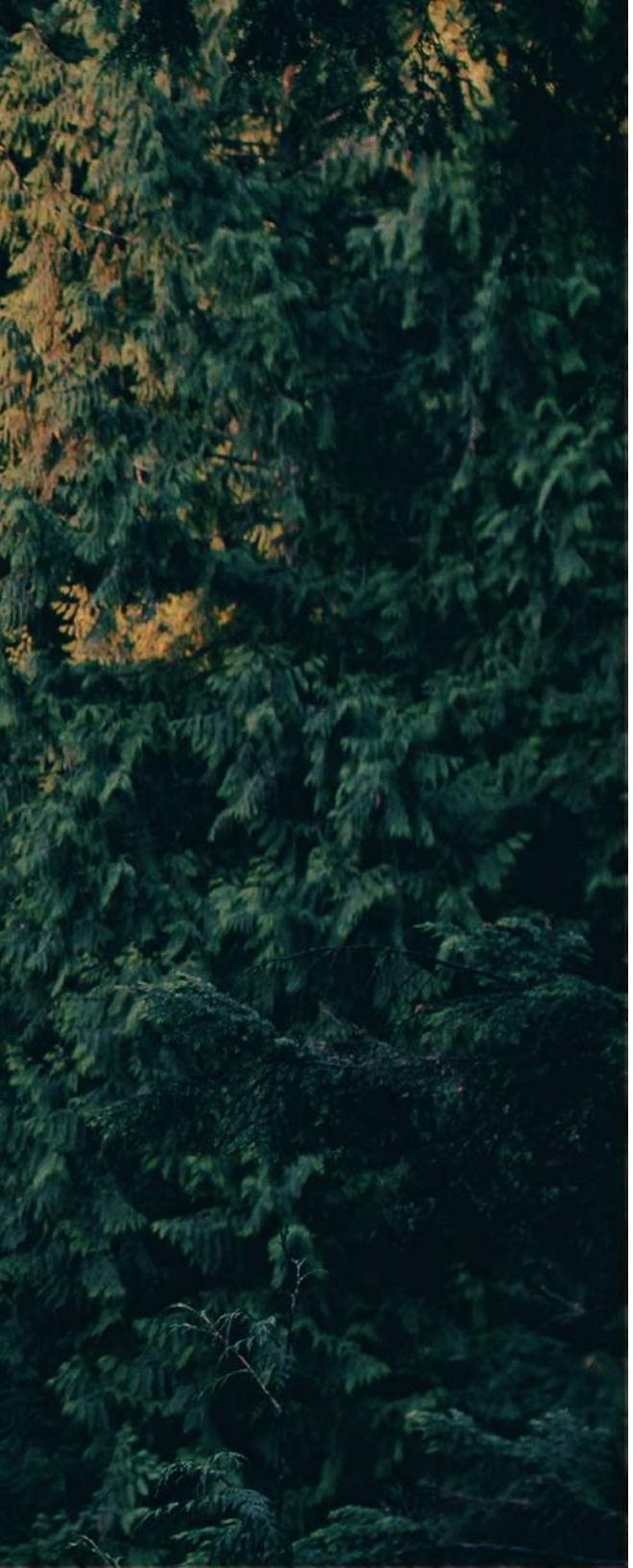
W A T E R F R O N T

A C C E S S T O N A T U R E

Vancouver has 63 km of Shoreline of which 29.7% can be considered as natural areas. Stanley Park accounts for 13% of all waterfront lands.



The most highly accessible stretch of waterfront in Vancouver is False Creek, followed by English Bay and Burrard Inlet. The most highly accessible access point is David Lam Park which is the closest shoreline access point for 17,500 people at the 10 minute walk distance threshold.



W A T E R F R O N T

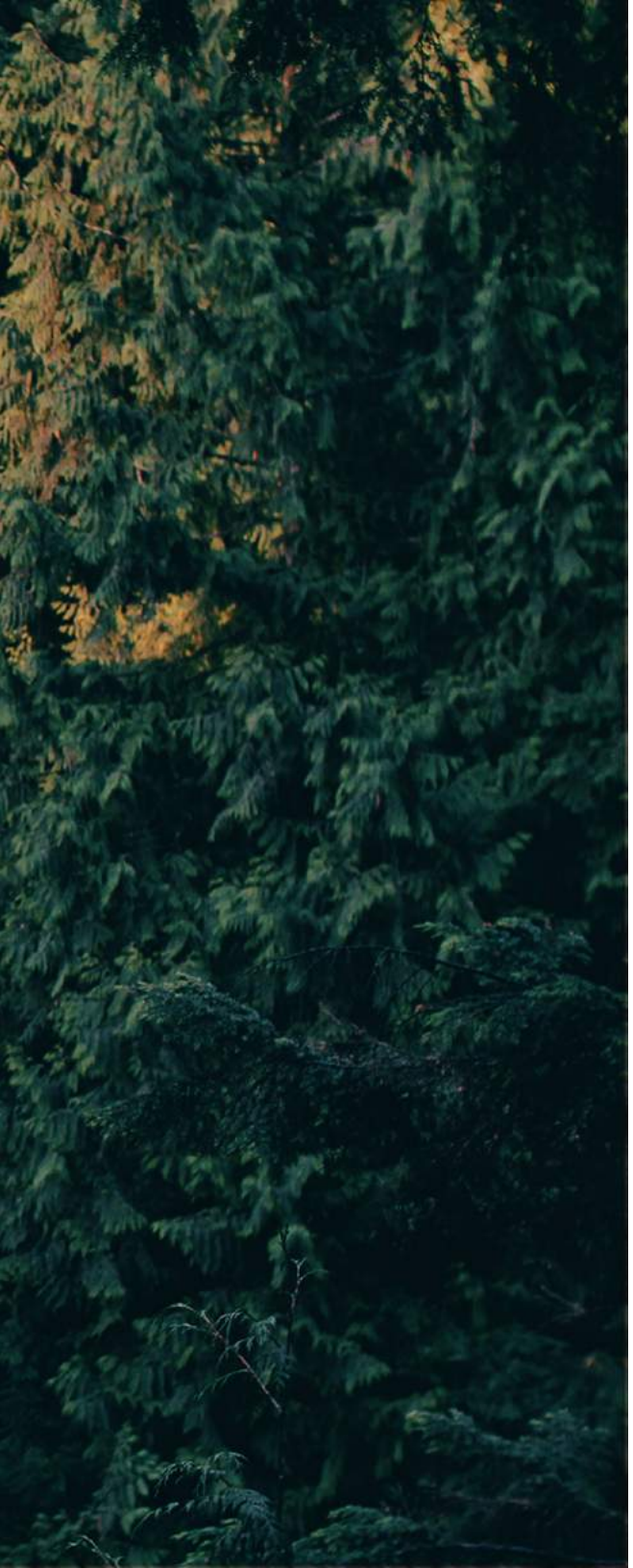
ACCESS TO NATURE

WEST SIDE

EAST SIDE

Reflecting the more residential nature of this area, the most common land use type (excluding roads) on the West Side is parks at 41% followed by single detached housing at 7%.

The more industrial East Side is 21% comprised of Port Metro Vancouver lands followed by Industrial Lands at 17% (again, excluding roads).

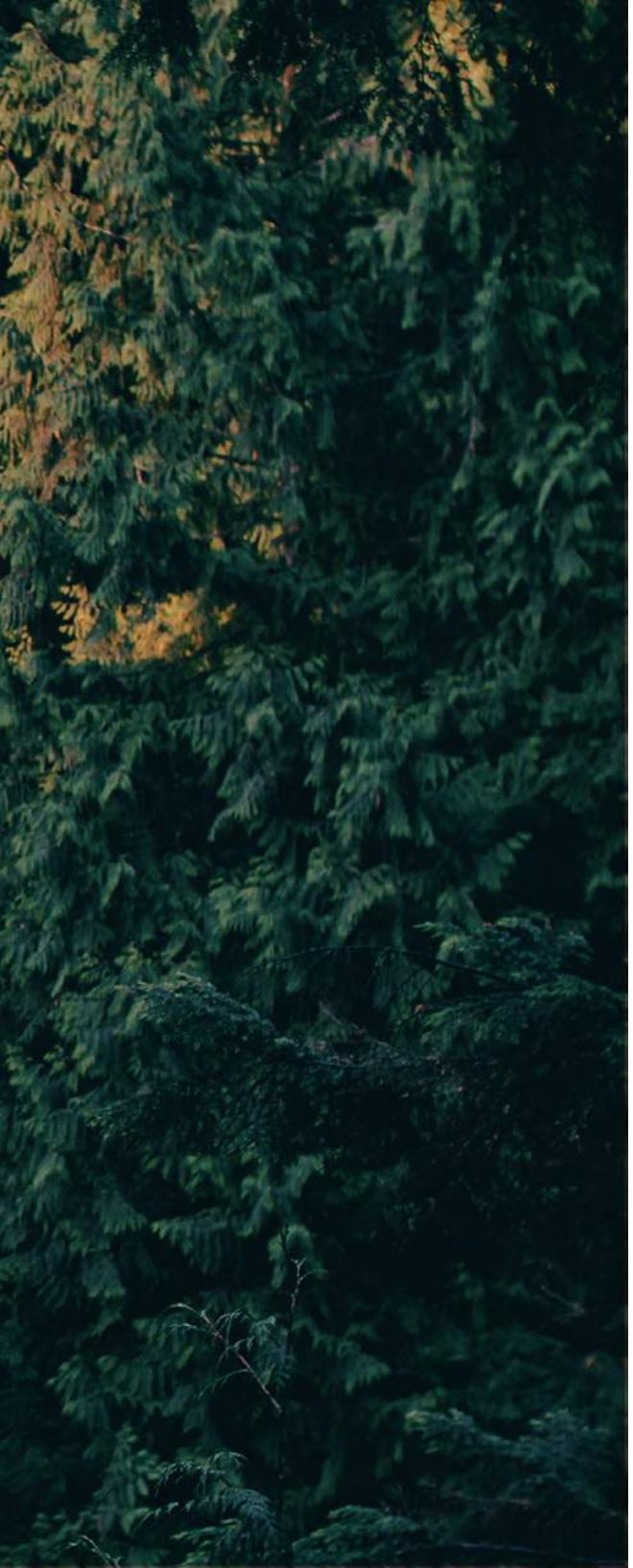


A C C E S S T O N A T U R E

C O A S T A L R E S I L I E N C E

Populations living in potentially floodable areas increased from 4,860 in 2006 to 8,128 in 2016. This represents an increase of 67% and compares to a 24% increase in population in the greater shoreline study area.

False Creek has seen the largest increase in population (109%) of the potentially floodable zones identified for this analysis (Burrard Inlet, English Bay, False Creek, and Fraser River) between 2006-2016, and Fraser River has the second largest (63%).



A C C E S S T O N A T U R E

C O A S T A L R E S I L I E N C E

Indicator: Coastal Resilience – Mapping sea level rise and a 1 in 500-year event

Goal: Develop and implement a coastal resiliency strategy that allows for a robust adaptation to changing climate norms, meeting a triple bottom line.

Targets: Allow for no more than 33% of the waterfront area to be flooded to a depth greater than 50 cms during a 1 in 500-year event and accounting for moderate sea level rise (+1m).

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Indicator Measurement:

- Assuming a 1m sea level rise by 2100 during a 1 in 500-year event, approximately 33% of the waterfront area would be flooded to a depth greater than 50 cms.

Why it's important

With the anticipated effect of climate change on sea level and intensity of storms, it is essential that a coastal city such as Vancouver assess the implications for the city on infrastructure, personal property, and danger to residents. From such analysis, flood precautions can be planned for and infrastructure built to mitigate proposed damages. A City of Vancouver Coastal Flood report from 2015 estimates the financial impact of a 1m sea level rise to be $7Bn.

What the measurement means

If a 1m sea level rise were to occur as it is anticipated, an extreme weather event could flood 33% of Vancouver's waterfront. Of that, 38% is Parks/Open Areas, 18% is industrial, 11% is Undeveloped, 9% is roads, 7% is Rail Transportation and Utility, and 4% is Port Metro Vancouver.

How to measure this indicator in the future

Research flood impact actions that have been undertaken along with flood risk assessment data and land use data.

Supporting information or background

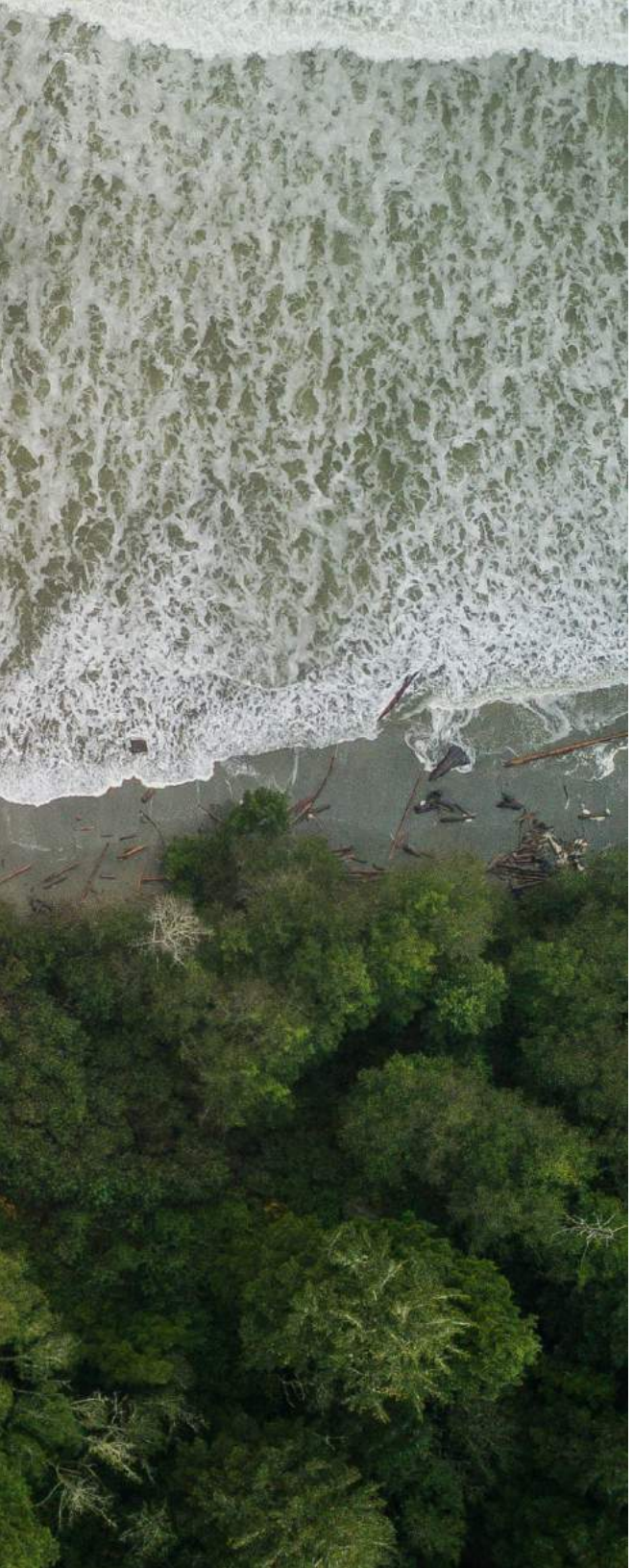
The Coastal Flood report states that "Vancouver developed over a time where sea levels were stationary, and risk tolerances and related standards were different than today. Our existing flood mitigation strategies will not work into the future, and as such, the City has recognized the need to adapt and plan for future sea level conditions."

Other considerations

The Fraser River (20%) has the highest percentage of waterfront that could be flooded across the four geographic regions, of which 29% is industrial lands. The other three regions are substantially diked and as such are anticipated to experience considerably less flooding: English Bay (5.2%), Burrard Inlet (3.3%), and False Creek (3%).

Data source: City of Vancouver Coastal Flood Risk Assessment (2015), Metro Vancouver Land Use (2011)


City of North Vancouver
District of North Vancouver
English Bay
Burrard Inlet
STANLEY PARK
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
Strait of Georgia
False Creek
UBC / Electoral Area A
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
Fraser River(North Arm)
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island
Fraser River(North Arm)
Sea Island
City of Richmond
Shoreline Study Area
Maximum flood extent
Maximum flooded extent of shoreline
50 hectares
0
1
2
3
4
km



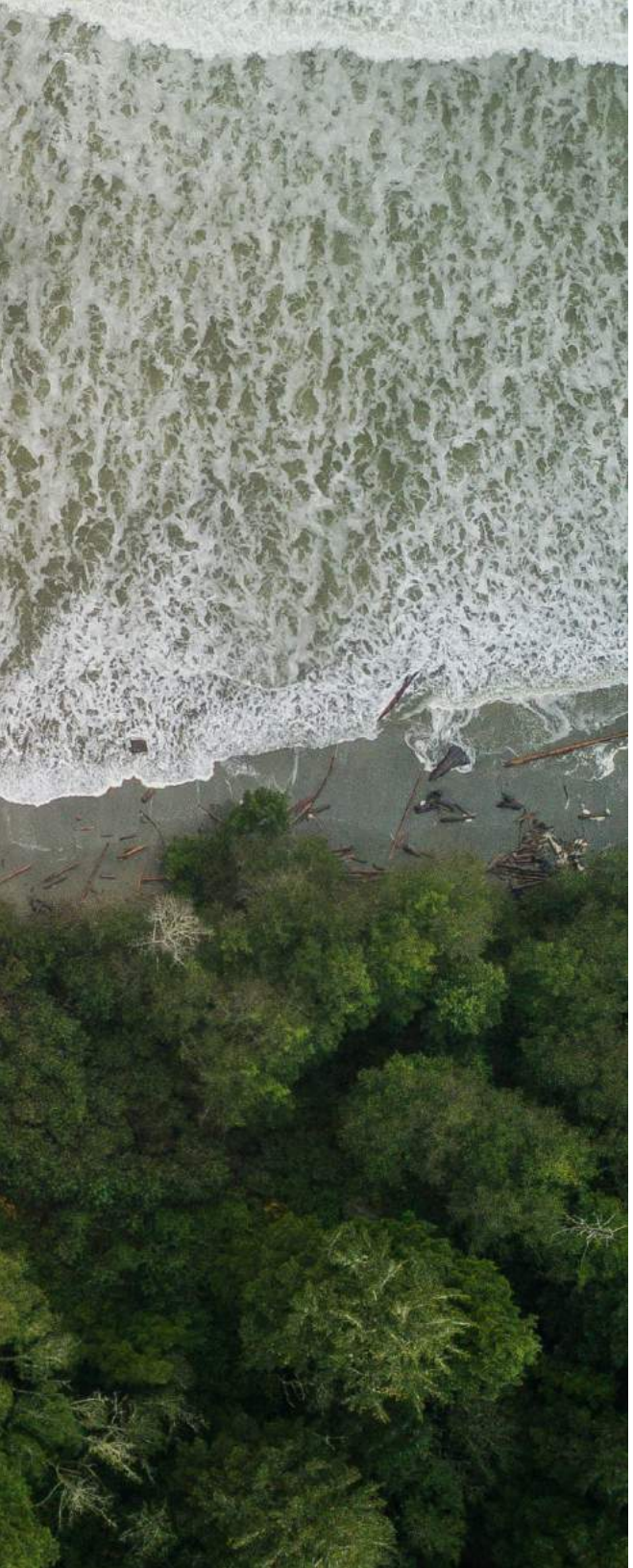
W A T E R F R O N T

E C O S Y S T E M S

Overall, 30% of the shoreline area can be considered as part of a natural shoreline (non-heavily-human modified environment).

Approximately 37% of the Fraser shoreline can be considered as natural shoreline.

Approximately 35% of the Burrard Inlet shoreline can be considered as natural shoreline.



E C O S Y S T E M S

T E R R E S T R I A L A Q U A T I C

Indicator: Terrestrial and Aquatic Shoreline Habitat Types

Goal: Maintain current natural areas and enhance other areas to promote biological productivity.

Targets: Increase the percentage of natural areas along the waterfront from 30% to 40%.

Increase the percentage of aquatic natural areas along the waterfront from 38% to 45%.

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Indicator Measurement:

- In terms of natural terrestrial area along the waterfront:
    - Overall, 29.7% of the shoreline area can be considered as part of a natural ecosystem.
    - Vancouver's Waterfront consists of 70% non-natural areas with False Creek (89%) and Burrard Inlet (74%) having the highest percentage across the four regions. English Bay has the least non-natural area at 56%.
    - Regions with the highest percentage of "regenerating natural areas" are Burrard Inlet (4%) and English Bay (11%).

Indicator Measurement Continued:

In terms of natural aquatic shoreline:

Of the total 18.4 km identified in the Burrard Inlet Environmental Action Program data (which covers Burrard Inlet, English Bay, False Creek, and Vancouver Harbour), 36% of intertidal areas can be considered as natural or semi-natural shoreline. English Bay (90%) has the highest percentage of natural or semi-natural shoreline, Burrard Inlet (23%) has the second most and False Creek (2%) the least. In these areas, there are 51.2 ha of intertidal vegetation consisting mainly of fucus, sea lettuce and bull kelp.

Of the total 17km for Fraser River Estuary Management Program data (which is the north arm of the Fraser River), there is 2.1 ha of restored marsh area and 0.35 ha of restored riparian shoreline. 38% of shoreline along the Fraser River is classified as high productivity, 31% moderate productivity and 31% as low productivity.

Why it's important

Ocean, estuarine, and river ecosystems are an important part of the natural environment and host a variety of habitats which are home to both land and water species. However, human activities, including development, waste disposal, and transportation, place stress on these ecosystems and can threaten the sustainability of these areas without proper oversight, management, and planning. Maintaining the diversity of animal and plant life in our natural shoreline areas and enhancing other shoreline areas is an integral part of promoting biological productivity and the overall health of the water and enjoyment of the waterfront and the health of our waterfront and intertidal zones plays a critical role in the health of the entire Strait of Georgia.

Monitoring shoreline change provides an indication of the amount of suitable habitat that is capable of supporting diversity of plant and animal life on the waterfront and allows for effective actions to be implemented and better planning to be undertaken to protect these important habitats.

What the measurement means

With regard to terrestrial biodiversity, areas with less impact are considered as more likely locations to support biodiversity. That being said, all green space in the City has ecological value which supports our urban flora and fauna.

Natural terrestrial shoreline along Vancouver's waterfront is isolated primarily to Stanley Park with some notable patches of "regenerating semi-natural areas" along the Fraser River and in West Point Grey. Aside from those measures, the majority of Vancouver's waterfront is either moderately or highly impacted semi-natural areas which could require some creative planning in order to properly promote biological diversity.

With regards to aquatic biodiversity, areas that are comprised of natural shorelines (in the case of the Burrard Inlet, False Creek, and English Bay), and areas with high productivity values (in the case of the Fraser River Side) are considered as locations that can support biodiversity. As with terrestrial ecosystems, all intertidal lands in the City have ecological value.
Numerous restoration projects have been undertaken in the last two decades on both the Fraser and Burrard Inlet sides of the City's waterfront. These locations are currently being monitored for biodiversity impacts and initial results suggest recovering natural environments.

How to measure this indicator in the future

Compare future Citywide Vegetation Inventory to the data from 2012.

Supporting information or background

Consideration of biodiversity and habitat along a water's edge are important when planning for the future of a city's waterfront. Not only does a healthy habitat for a variety of water based plants and animals appeal to humans and their enjoyment of parks and escapes to nature, but it is also key to a thriving ecosystem and its overall impact on the surrounding environment. Nature Trust British Columbia writes that diversity in our ecosystems is desirable as "different organisms are responsible for controlling invasive or pest species, maintaining soil fertility, pollinating and thereby maintaining diverse vegetation, purifying air and water, detoxifying and decomposing wastes, and regulating climate."

It is with this understanding of the importance biodiversity has in the health of the City and its residents that the City of Vancouver has created the Biodiversity Strategy, along with an Urban Forest Strategy, the Rewilding Action Plan, and the Bird Strategy. The Park Board Chair in 2016 stated that the Biodiversity Strategy "lays the foundation for the sustained ecological health of our city" and includes goals for increasing the size and quality of natural areas within the city as well as expanding habitat for pollinators, birds, urban salmon and herring, and wildlife such as beavers and otters. For this reason, it is important to understand the current state of Vancouver's waterfront to better target the initiatives.
Port of Vancouver oversees four Habitat Enhancement sites in and around Vancouver: New Brighton Park Shoreline (2.5 ha), Gladstone Park Tidal Marsh (0.52 ha), Riverfront Park Tidal Marsh (0.36 ha), Point Grey Tidal Marsh (41.1 ha) which is currently in the designs, permitting and approvals phase. For a total of 44.48 ha.
A City of Vancouver Biodiversity Strategy Report from 2016 lists the following successes:

- Since 2010, 13 ha of forests have been restored in Stanley Park, Musqueam, Jericho, and Everett Crowley parks, as well as in Fraserview and Langara Golf Courses.
- Hinge Park and Southeast False Creek Habitat Island has created a variety of habitats including freshwater wetland and rocky intertidal and shoreline forest.
- The restoration on Renfrew Creek via the Creekway Park between Hastings Park and New Brighton Park.
- Restoration of the Jericho Park Shoreline which consists of 185m of shoreline and was certified as one BC's first Green Shores projects.

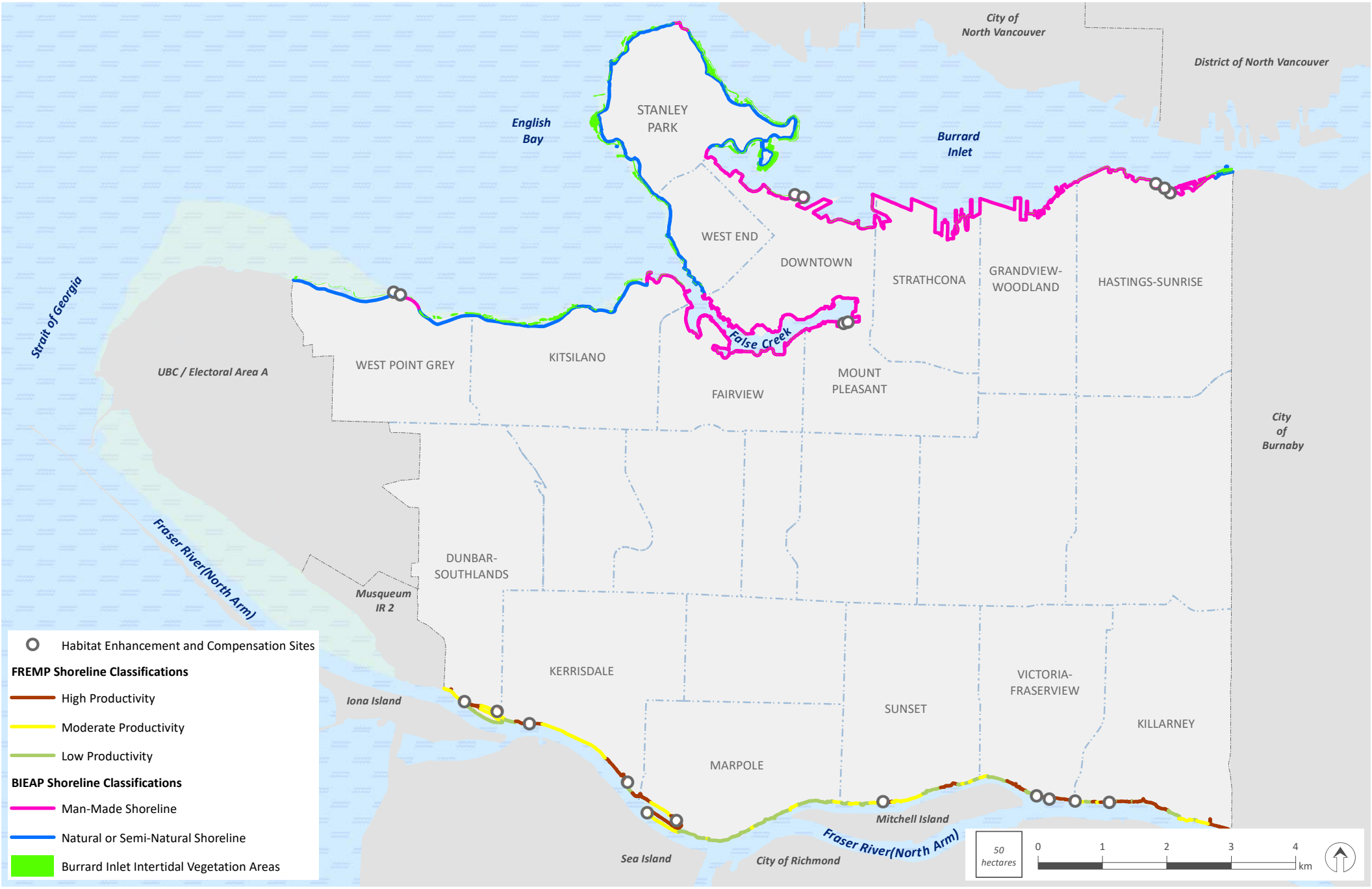
The creation of a 4.5 ha green roof on the Vancouver Convention Centre offers an intertidal “habitat skirt” as well as undulating meadows of native grasses and wildflowers for native bees, honey bees and birds.

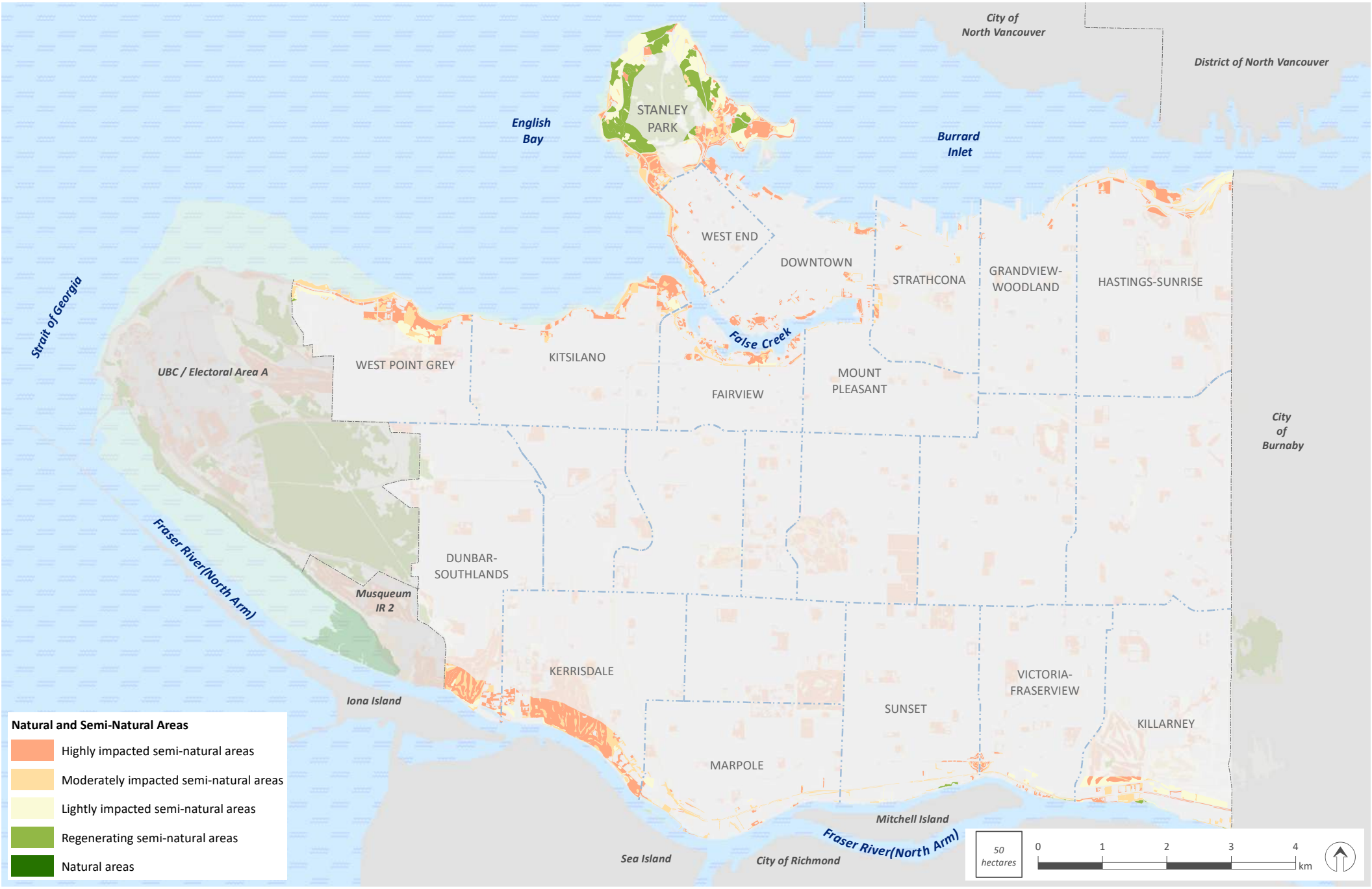
Other considerations

While overall, 29.7% of the shoreline area can be considered as part of a natural ecosystem, in reality a minute portion (4%) can be considered as locations that may support high levels of biodiversity.

For shoreline aquatic data, BIEAP and FREMP data were collected separately and areas have been classified differently – FREMP data covers the Fraser River and reviews the shoreline in regards to productivity, whereas the BIEAP data covers the entire Burrard Inlet (False Creek, English Bay, and Vancouver Harbour) and measures shoreline in terms of natural, semi natural and man-made.

Data source: 2012 Citywide Vegetation Inventory


City of North Vancouver
District of North Vancouver
English Bay
STANLEY PARK
Burrard Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
Strait of Georgia
False Creek
UBC / Electoral Area A
WEST POINT GREY
KITSILANO
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
Fraser River(North Arm)
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Mitchell Island
Sea Island
City of Richmond
Fraser River(North Arm)
Habitat Enhancement and Compensation Sites
FREMP Shoreline Classifications
High Productivity
Moderate Productivity
Low Productivity
BIEAP Shoreline Classifications
Man-Made Shoreline
Natural or Semi-Natural Shoreline
Burrard Inlet Intertidal Vegetation Areas
50 hectares
0
1
2
3
4
km


City of North Vancouver
District of North Vancouver
English Bay
STANLEY PARK
Burrard Inlet
WEST END
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
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DUNBAR-SOUTHLANDS
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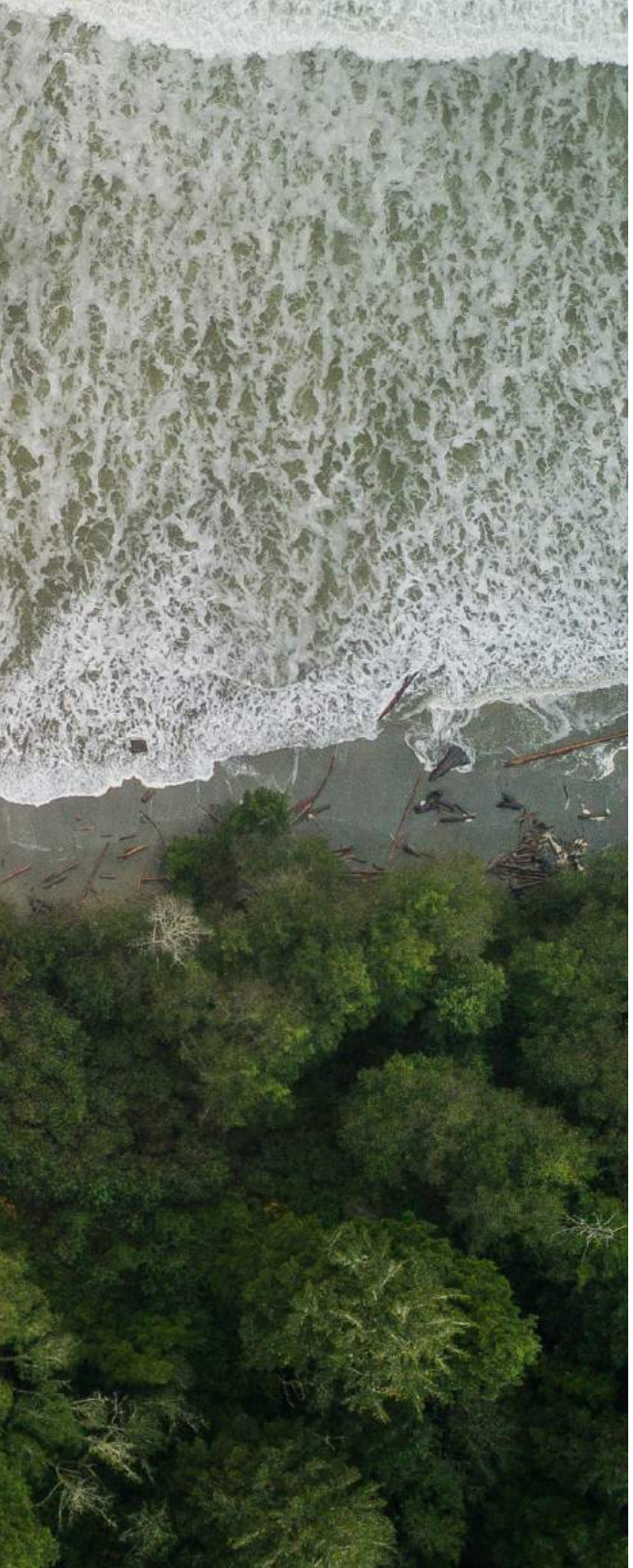
VICTORIA-FRASERVIEW
Iona Island
SUNSET
KILLARNEY
MARPOLE
Mitchell Island
Fraser River(North Arm)
Sea Island
City of Richmond
Natural and Semi-Natural Areas
Highly impacted semi-natural areas
Moderately impacted semi-natural areas
Lightly impacted semi-natural areas
Regenerating semi-natural areas
Natural areas
50 hectares
0
1
2
3
4
km



E C O S Y S T E M S

W A T E R Q U A L I T Y

Indicator: Water and Sediment Quality

Goal: Minimize the impact that industry, residences, and recreation have on water quality and sediment to ensure the cleanliness of Vancouver's waters and health of the fish, birds and other animals that live in, on, and around it.

Targets: Meet provisional provincial objectives for all water and sediment quality measurements.

.

Indicator Measurement:

- The Burrard Inlet Action Plan - a leadership and coordinating document meant to identify priorities and help focus the region around a shared, strategic environmental stewardship agenda for Burrard Inlet, led by the Tsleil-Waututh Nation - identifies water quality and contaminant concerns as one of the important stressors of the Burrard Inlet Ecosystem. The plan highlights that samples from the Inlet have:
- met provincial objectives for turbidity, pH and levels of suspended solids;
- generally met provincial objectives for E.Coli except around First Narrows and the Inner Harbour (Clark Drive, Coal Harbour, and Vancouver Wharves).
- met fecal coliform provincial objectives except for at Clark Drive which is also the location of an occasional combined sewer overflow;
- heavy metals continue to be of concern Burrard Inlet, with the most problematic being copper and nickel in the water column and cadmium, copper, lead, mercury and zinc in the sediments. However, Arsenic, chromium, and nickel all meet objectives.

Why it's important

As Vancouver grows in population and becomes more dense it is important to monitor the effluent and outflows from boats, ships, and industry along the waterfront. As well, Vancouver's stormwater drains are also a concern and it is important to monitor what is being pumped from the city's streets into the water, particularly as there are several outflows to monitor along the waterfront:

> The Burrard Inlet Environmental Action Program from 2010 identifies 14 Combined Sewer Outflows, four which belong to the City of Vancouver and 8 belong to Metro Vancouver.
>
> Overall, Vancouver has 48 stormwater and sewer outflows: 13 into False Creek, 6 into English bay, 18 into the upper arm of the Fraser River and 11 into the inner harbour of Burrard Inlet.

What the measurement means

The measurement of level of pollutants in the water against established water quality objectives may indicate where harm may result to habitats and humans enjoying the waterfront. These objectives indicate an amount that is technically acceptable in water samples according to existing standards (though it is important to note these standards are currently under review) and don't need to be addressed, compared to a level that requires remediation, investigation, and/or improved policy.

How to measure this indicator in the future

Following up on the research referred to in this analysis may be difficult as the reports do not appear to be conducted regularly and in fact referred to sampling from different years.

Additionally, it would be beneficial to have water quality data from the Fraser River. That said, the data sources we used were helpful.

Supporting information or background

The Engineering Department is remedying sewer infrastructure across the city, including those that lead to False Creek East. Specifically, the City is in the process of separating aged combined sewer outfalls which are at risk of discharging sewage into receiving waters during weather events.

Additional sources of poor water quality in both False Creek and Burrard Inlet were identified as boats dumping their untreated waste water (City of Vancouver Administrative Report "Update on Protecting Vancouver's Recreational Water Quality" (2017)), storm water discharge (City of Vancouver Integrated Storm-water Management Plan (2015)), fuel oil releases, and climate change which may increase the regularity and severity of sewage outfall discharge events (City of Vancouver Climate Adaptation Strategy (2012)). Additionally, airborne pollutants were identified as they can deposit as fallout from smog.

In March 2017, the City administered a survey of boaters in False Creek to better understand behaviours.

Four pollution source hot spots were identified, two in False Creek and two in the inner harbour, one of which is port at Clark Drive, and the other by Coal Harbour.

Other considerations

After unusually high E. coli levels measured in False Creek in August 2014 and from April to mid-July 2015, the City struck a work group concerned with water quality in False Creek. According to the Burrard Inlet Action Plan, levels of E.Coli in summer 2014 were 26 times above recommended guidelines for primary contact recreation (swimming).

Data source: Reports from City Staff to Council (2017), Burrard Inlet Action Plan 2017, Burrard Inlet Discharge Inventory from the BC Ministry of the Environment (2010)

E C O S Y S T E M S

WATER BIRD

Indicator: Waterbird Abundance and Diversity

Goal: Protect existing bird populations and increase bird habitat overall.

Indicator Measurement:

- According to the Vancouver Bird Strategy, over 250 species of resident, migratory and over-wintering birds are regularly observed in Metro Vancouver.
- A winter waterbird survey conducted by Stanley Park from 2001-2002 identified 40 bird species. Of those waterbirds, the ones with the largest populations were Surf Scoters (33%) and Barrow's Goldeneye (36%), both in the Swans, Geese and Ducks family.
- According to a Stanley Park Ecology Society 2017 report regarding the Great Blue Heron Colony around the Aquarium and Second Beach, there were 84 active nests out of a total of 104 total nests with an estimated 72 fledglings. The 2016 report identified that there was a total of 83 active nests, out of a total of 128, and produced 138 fledglings. The decrease in 2017 is attributed to frequent Bald Eagle attacks which were observed both during site monitoring and via the heron web cam.

Why it's important

As the Metro Vancouver Region is situated along the Pacific Flyway—a major north south migratory path for birds that extends from Alaska to Patagonia— Vancouver's role in providing a resting stop for the estimated billions of birds that traverse the flyway plays a large part in the focus of this strategy. and the importance of using this indicator to measure ecosystem health.

What the measurement means

The measurement indicates the variety of birds that frequent the city, as well as birds that are at risk or have healthier populations. These are important populations to monitor and protect, as birds play a critical role in the health of the ecosystem in which they live and are a indicator of overall habitat health in the region.

How to measure this indicator in the future

As it can be difficult for one group to evaluate all of Vancouver's bird populations, populations contacting a variety of data curators, such as Stanley Park for their waterbird survey report, BC Conservation Data Centre data, and the BC Species at Risk website, as well as the Ministry of Environment for GeoBC bird data.

Supporting information or background

As Vancouver works to be a responsible steward of the land and the environment as part of the Greenest City 2020 Action Plan, the city has adopted a bird strategy with the goal to be a world leader in supporting a "rich diverse group of native birds year-round." This strategy was established in an effort to attract visitors from around the world to birdwatch and to make bird sightings a regular occurrence across all of Vancouver's neighbourhoods as a way to create a physical and emotional link with the natural environment, as well as enhancing biodiversity. Birds are an important part in ecosystems as they assist in seed distribution, pest control, pollination, and habitat health.

BC's conservation data centre has identified two species at risk of endangerment along Vancouver's waterfront:

Green Heron, Jericho Beach

Great Blue Heron, Stanley Park

There are also two federally-identified species at risk: the olive sided fly catcher and marbled murrelet. According to the BC Species at Risk webpage, 13 bird species in Metro Vancouver are at risk, however, it is unclear in the data where these birds dwell in the region. The species are: Red Knot (endangered), Short-tailed Albatross (threatened), Pink-footed Shearwarer (threatened), Band-tailed Pigeon (special concern), Olive-sided Flycatcher (threatened), Barn Swallow (threatened), Common Nighthawk (threatened), Western Screech Owl (threatened), Short-eared Owl (special concern), Peregrine Falcon (special concern), Marbled Murrelet (threatened), Great Blue Heron (special concern), Barn Owl (threatened).

Other considerations

GeoBC data has identified bird colonies by Lion's Gate Bridge (1 nest of gulls), Prospect Point and Siwash rock (1 nest of gulls and 1 of alcids), Second Narrows Bridge (3 Cormorant nests), and Burrard Bridge (1 Gull nest) (Coastal Resource Information Management System).

Data source: Stanley Park waterbird survey report (2001-2002), BC CDC data, and the BC Species at Risk website (accessed 2017), BC Ministry of Environment for GeoBC bird data (Various dates).

W A T E R F R O N T

T R A N S P O R T A T I O N

Transportation of people and goods in and along, within and over Vancouver's waterfront is a multi-faceted and multi-modal activity that falls under both federal and municipal jurisdictions and can be categorized into three major modes:

Water-based transportation (3 ferry services, 2 cruise ship terminals, 2 major container terminals, and numerous other port facilities);

Land-based transportation (8 bridges over the waterfront); and

Air-based transportation (Canada's busiest floatplane terminal as well as a helicopter terminal).

False creek ferries and Aquabus are very busy in False Creek with over:

144,000 passes a year under Burrard Street Bridge (municipal passing to federal waters)., over 79,000 under Granville Street bridge and 75,000 under the Cambie Street Bridge.

TRANSPORTATION

2007-2016 (From BC Ministry of Transportation)

Lions Gate Traffic has decreased by 3% in 10 years (2007-2016). -2,000 cars/day however Second Narrows traffic has increased by 8% in 10 years (2007-2016). +10,000 cars/day

Oak Street traffic has increased by 3% in 10 years (2007-2016). +2,000 cars/day

2004-2011 (From Translink Screenline Survey)

While traffic volume on bridges around Vancouver has overall decreased (by 5% across the Burrard Inlet, by 13% across False Creek, and by 0.9% across the north arm of the Fraser River) from 2004-2011, these decreases are not equal across all bridges. For instance, while Cambie Bridge saw an increase of 70% in traffic volume, Burrard and Granville both saw decreases of 16% and 20% respectively.

The Port forecasts growth of TEU (Twenty-Foot Equivalent Unit) per annum to be at 60% between 2015-2025 which is a difference of 1.8 million TEUs. This is based on the expected continued growth of Asian imports and locally-sourced exports, as well as the ability to transport goods from the port to more distant land-based locations.

W A T E R F R O N T

T R A N S P O R T A T I O N

Vancouver Bridges

LIONS GATE

63,000
CARS / TRUCKS

500
PEDESTRIANS

998
BIKES

BURRARD

57,000
CARS / TRUCKS

1,403
PEDESTRIANS

10,500
BIKES

CAMBIE

52,000
CARS / TRUCKS

1,320
PEDESTRIANS

18,000
BIKES

GRANVILLE

57,000
CARS / TRUCKS

624
PEDESTRIANS

1,850
BIKES

Average Daily

W A T E R F R O N T

T R A N S P O R T A T I O N

Vancouver Bridges

IRONWORKER
127,000 CARS / TRUCKS

KNIGHT
96,000 CARS / TRUCKS

Average Daily

L I V I N G

T R A N S P O R T A T I O N

Indicator: Water-based Transportation

Goal: Minimize the impact that waterfront transportation activities have on the natural environment, recreational activities, and human enjoyment.

Targets: Shift the modal split on all crossings towards transit and non-vehicular forms of transportation.

.

Indicator Measurement:

- To the North, the Burrard Inlet (which is federal waters) has a variety of large vessels that cross its waters, including:
    - 2,000 container ships a year;
    - 250 cruise ships a year
    - 47,000 SeaBus crossing times a year, transporting over 4.6 million people during peak times (6am-9am, 11am-1pm, 3pm-7pm).
    - over 24,000 sea-plane and over 13,000 Helijet trips a year

Indicator Measurement Continued:

The Burrard and Cambie bridges have more than three times the number of pedestrians and 6-10 times more bike traffic than the Granville bridge at peak times in 2011.

Pedestrians:

Burrard: 1,403

Cambie: 1,320

Granville: 624

Bikes:

Burrard: 10,500

Cambie: 18,000

Granville: 1,850

According to a May 2014 air photo assessment, False Creek had approximately 1,300 boats moored in its waters. Of those, 98% of those were moored at marinas and 2% were in open moorage.

Why it's important

Vancouver is a port city and there is an almost constant movement of goods and people across bridges and water via ships, boats, and planes. This makes the waterfront an important consideration when planning the infrastructure to support the movement of goods and people in a way that minimally impacts both the recreational use of the water, as well as the environmental habitats along the shorefront.

Vancouver's waters, including the Burrard Inlet, False Creek, English Bay and the Fraser River are some of the most heavily trafficked waterways in North America. These waters are split into two broad jurisdictional categories: Federal waters which include sections of the Burrard Inlet and Fraser River that are under Vancouver Fraser Port Authority navigational jurisdiction and municipal waters which are all marine lands East of the Burrard Street Bridge.

What the measurement means

Transportation of people and goods in and along, within and over Vancouver's waterfront is a multi-faceted and multi-modal activity that can be categorized into three major modes: water-based transportation; land-based transportation; and air-based transportation

Vancouver's waters are variously filled with live-aboard vessels, recreational boats, water-based buses and taxis, cruise ships and large bulk cargo and container vessels. All of these vessels must adhere to a diverse array of regulations and requirements depending on jurisdiction and type of vessel.

Increased levels of marine traffic in these waters may affect residents near the waterfront as well as marine flora and fauna through increased noise, light and air pollution.

As well, traffic crossing the waterfront on these structures is heavy and may impact residents and natural systems through air and noise pollution as well as potential run-off from these structures during weather events

How to measure this indicator in the future

A variety of data sources were compiled this analysis: Translink SeaBus schedule, AquaBus, False Creek Ferry, and Bowen Island taxi schedules, Metro Vancouver Screenline Survey report, cruise ship and cargo ship schedules, Helijet and Seaplane schedules, and reports to City Council.

Supporting information or background

False creek ferries and Aquabus are very busy in False Creek (municipal waters) with over:

144,000 passes a year under Burrard Street Bridge (municipal passing to federal waters)

over 79,000 under Granville Street bridge

75,000 under Cambie Street Bridge

Bowen Island water taxi makes over 1,500 trips a year as a workday commuter vessel (municipal passing to federal waters).


Lion's Gate Bridge
City of North Vancouver
District of North Vancouver
English Bay
STANLEY PARK
SeaBus
Burrard Inlet
Ironworkers Bridge
WEST END
False Creek Ferry and Aqua Bus
DOWNTOWN
STRATHCONA
GRANDVIEW-WOODLAND
HASTINGS-SUNRISE
Strait of Georgia
Burrard Street Bridge
False Creek
Granville Street Bridge
Cambie Street Bridge
KITSILANO
WEST POINT GREY
UBC / Electoral Area A
FAIRVIEW
MOUNT PLEASANT
City of Burnaby
Fraser River(North Arm)
DUNBAR-SOUTHLANDS
Musqueum IR 2
KERRISDALE
Iona Island
SUNSET
VICTORIA-FRASERVIEW
KILLARNEY
MARPOLE
Knight Street Bridge
Mitchell Island
Oak Street Bridge
Arthur Laing Bridge
Sea Island
City of Richmond
Fraser River(North Arm)
Transportation Infrastructure
Bikeways
Bridges
Ferry
Rail
Highway
Primary Road
Secondary Road
Municipal Waters
50 hectares
0
1
2
3
4
km

SUMMARY OF RELATED

EXISTING CITY POLICIES

Greenest City Action Plan:
The City's flagship urban sustainability plan that aims to make Vancouver the greenest city in the world by 2020.

False Creek Water Quality Working Group:
A multi-agency group within the City of Vancouver that is looking at ways to improve the water quality of False Creek, with the long term goal of False Creek being swimmable for people.

Vancouver's Waterway Recreation Strategy:
A draft strategy by the City to look at ways to improve non-motorized boating access and opportunities across the waterfront with a focus on understanding what Vancouverites need and value.

Renewable City Strategy:
The City of Vancouver's plan to transition to 100% renewable energy by the year 2050 in a way that promotes green economic opportunities.

Industrial Lands Policy:
Provides a policy framework to guide future decisions on the use of industrial land opportunities.

The Biodiversity Strategy:
The goal is to increase the amount of and ecological quality of Vancouver natural areas to support biodiversity in the city.

Rainwater Management Plan and Green Infrastructure Strategy:
Provides a longterm strategy to protect and improve water quality in the waterbodies surrounding Vancouver.

The Park Board Strategic Framework:
The focus is to provide parks and recreation for all and to be a leader in "greening" and excel in resource management.

The Northeast False Creek Area Plan:
Will establish a high standard for habitat creation and enhancement of biodiversity from the marine and intertidal zones of False Creek to the urban fabric of City neighbourhoods.

Vancouver Bird Strategy:
A strategy to provide conditions for native birds to thrive in Vancouver, providing greater ecological benefits and greater access to nature for Vancouverites.

Urban Forest Strategy:
The plan for growing and maintaining healthy and abundant trees in the City of Vancouver providing cleaner air, rainwater absorption,

RESEARCH SUMMARY

The most successful waterfront initiatives globally have all been human-centred, people-first working waterfronts. This includes traditional port cities like Cape Town, South Africa, who aimed to make the Victoria and Albert Waterfront “a very special place for all Capetonians” and newer cities like Auckland, New Zealand, who aimed to create “a world-class destination that excites the senses and celebrates our sea-loving Pacific culture and maritime history.” What makes Vancouver’s waterfront special is that it still has stretches of relatively natural landscape that Vancouverites value highly - people flock to see the beauty of the Pacific Northwest, which contributes to the character of our waterfront and city.

Recognizing that most waterfronts around the world are already developed, with industries and residents coexisting, many waterfront initiatives lead with a design-first approach aiming, like Malmo, Sweden, to be attractive, sustainable and innovative.

All involved leadership of these cities or city councils, provided expedited planning and permitting, or were able to change the permitting landscape to allow new/innovative designs and land use ideas, allowing the waterfront to be a sustainability lab.

Some utilized public-private partnerships, especially where the working port was already privatized and a strong working relationship with the port was key. Each city chose different leverage points depending on their strengths. New York focused on leading edge design and development scorecards, while Boston focused on the continuing role of the working port in their heritage and future economic success.

Each city had interagency/advisory groups that played a key role in making sure all stakeholders were informed, involved, and bought in to the goals of the project. This is a key learning for the City of Vancouver and is an important leverage point for the Georgia Strait Alliance to both influence a waterfront plan and play a lead role as a convener of varied interests.

W A T E R F R O N T

F I R S T N A T I O N S

This report was created within and about the unceded territories of the Musqueam, Squamish, and Tsleil-Waututh First Nations. The Georgia Strait Alliance continues to engage with First Nations governments on this work, and view this project through the lens of truth and reconciliation that is so vital to repairing our relationships and ecosystems.

NEXT STEPS

While this report is an important step in the progress towards improving our waterfront, much more still needs to be done. Prior to the full report's release, we convened with a group of 20 key stakeholders, most of whom played an important role as a member of the initiative's advisory committee or worked for the City in a department responsible for some aspect of this work. As a group, we discussed the high level findings and what we should do to further this work; the summary of this discussion is identified in this checklist.

The critical next step is to turn our goals into specific suggestions, with the leadership of the City, and work with the stakeholders around these themes. We also need to continue to learn from the leadership of other municipalities around the region, country and world. We will now turn our attention to identify projects and initiatives that can be implemented quickly and can be accomplished in the next couple of years which will have a positive impact on our waterfront. We will also be calling on the city to think bigger on some of the key pieces. But most of all, we will use this report to demonstrate a larger point - that the City of Vancouver needs to think comprehensively about its greatest asset in order to protect and enhance it for now and years to come.

- Identifying data trends.
- Stakeholder engagement for setting
- Identifying tensions between themes.
- Growing stakeholder outreach related to key themes.
- Doing further policy research from other waterfront cities.
- Identifying "quick start areas" the City could act on in the next 1-2 years.
- Thinking big on a few key pieces to set Vancouver apart globally.

STAKEHOLDER GROUPS

We wish to extend our thanks to the many organizations and individuals who contributed actively in the Waterfront Initiative and creation of this report. There are many other groups who have come to meetings, who have demonstrated interest and participated in other ways who we are also grateful for and look forward to enriching the work of the Waterfront Initiative.

BC Ministry of Environment
BCIT Rivers Institute
Bird Studies Canada
British Columbia Ministry of Forests, Lands and Natural Resource Operations
Bullitt Foundation
Canada Mortgage and Housing Corporation Granville Island
City of Vancouver
City Studio
Downtown Waterfront Working Group
Evergreen BC
False Creek Harbour Authority
Fraser Basin Council
Fraser Riverkeeper
HCMA Architecture and Design
Hemmera
IBI/HB Architects
International Longshore and Warehouse Union
International Rivers Foundation
Kerr Wood Leidal Associates
Light House Sustainable Building Centre
Metro Vancouver
Modus Planning Design and Engagement
Musqueam First Nation
Ocean Concrete/Leigh Hanson
Port of Vancouver
Projects in Place Society
PWL Partnership Landscape Architect Inc
Quadra Architecture
Real Estate Foundation Of BC
Rivershed Society of British Columbia
Science World
Simon Fraser University
Smit Marine Canada
South Coast Conservation Program
Spacing Vancouver
Squamish Nation
Stewardship Centre for BC
Strathcona Business Improvement Association
Surfrider Foundation
T Buck Suzuki Environmental Foundation
The Aquabus
The Jericho Sailing Centre Assoc
Tides Canada Foundation
Tourism Vancouver
TransLink
Transport Canada Marine Safety
Tsleil-Waututh Nation
University Of British Columbia
Urban Forum Associates
Vancouver Aquarium
Vancouver Foundation
Vancouver Maritime Museum
Vancouver Park Board
Vancouver Public Space Network
Village Vancouver
Wakefield Construction Inc.
West Coast Environmental Law
Western Log Sort and Salvage Co-Operative

W A T E R F R O N T

A C K N O W L D E G M E N T S

This paper is the result of four years of work with multiple stakeholders and researchers. The final result is a product of Licker Geospatial Consulting Co. and we would like to thank Aaron Licker for his fantastic work pulling together the final product. We would also like to acknowledge Peter Hall, Sean Markey and Mark Roseland, with their students, for beginning this work in 2017 and the Mitacs program. The report is richer for the many contributions that make it a true reflection of the community of Vancouver.

CITATIONS

SECTION	DATA	SOURCE
Working Lands	Zoning	Metro Vancouver
Working Lands	Zoning	City of Vancouver
Waterfront Business	Businesses	City of Vancouver
Access to Amenities & Demographics	Census Population	Statistics Canada
Living, diverse economy	Living	www.nber.org/papers/w17640.pdf
Housing	Housing affordability	Canada Mortgage Housing Corporation
Crime	Crime	City of Vancouver
Coastal Resilience	Flooding	City of Vancouver
Coastal Resilience	Zoning	Metro Vancouver
Shoreline Habitat	Habitat Data	Port of Vancouver
Shoreline Habitat	Environment Goals	City of Vancouver
Shoreline Habitat	Habitat Data	City of Vancouver
Water and sediment quality	Water Quality	City of Vancouver
Water and sediment quality	Burrard Inlet Action Plan	Tsleil-Waututh Nation
Water and sediment quality	Discharge inventory	BC Ministry of the Environment
Water bird abundance and diversity	Bird counts	SPES
Water bird abundance and diversity	Endangered species	CDC

CITATIONS

SECTION	DATA	SOURCE
Water bird abundance and diversity	Bird reports	City of Vancouver
Water bird abundance and diversity	Bird species	GeoBC
Transportation	Container ships	Pacific Pilotage Authority of Canada
Transportation	Cruise and Container ships	Port of Vancouver
Transportation	Ferry Traffic	AquaBus
Transportation	Ferry Traffic	False Creek Ferries
Transportation	Ferry Traffic	Bowen Land and Sea Taxi
Transportation	Transportation schedule	Translink
Transportation	Bridge Traffic	Translink
Transportation	Seaplane traffic	Harbour Air
Transportation	Seaplane traffic	Helijet
Transportation	Seaplane traffic	YVR
Transportation	Seaplane traffic	Seair Seaplanes
Transportation	False Creek Moorage Count	City of Vancouver

T H A N K Y O U

O U R F U N D E R S

GREENEST CITY FUND

CITY OF VANCOUVER | vancouver foundation

sitka foundation

BULLITT FOUNDATION

The McLean Foundation

real estate foundation BRITISH COLUMBIA