

District of West Kelowna

# WATERFRONT PLAN

## Appendices



THE FUTURE OF WEST KELOWNA'S WATERFRONT



October 6<sup>th</sup>, 2011



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# A GLOSSARY OF TERMS

## ACRONYMS

**AHI** – Aquatic Habitat Index

**ALR** – Agricultural Land Reserve

**BMP** – Best Management Practice

**DCC** – Development Cost Charge

**DFO** – Department of Fisheries and Oceans Canada

**DWK** – District of West Kelowna

**GMD** – Growth Management Designation

**FIM** – Foreshore Inventory and Mapping

**IR#9** – Westbank First Nation Tsinstikeptum Indian Reserve #9

**IR#10** – Westbank First Nation Tsinstikeptum Indian Reserve #10

**ILMB** – Integrated Land Management Bureau

**MNRO** – Ministry of Natural Resources Operations

**OCP** – Official Community Plan

**RAR** – Riparian Areas Regulation

**RDCO** – Regional District of the Central Okanagan

**SHIM** – Sensitive Habitat Inventory and Mapping

**WKYC** – West Kelowna Yacht Club

## DEFINITIONS

**Accretion** – The gradual accumulation of land out of the lake. Accretion occurs by alluvial processes, where sand and soil wash up and form firm ground on shore or by dereliction, where the water retreats below the usual high water mark.

**Adfluvial fish species** – Fish that live in lakes and migrate into rivers or streams to spawn.

**Action** – An action is a specific achievement that a municipality will do within a limited time frame to achieve the intent of a policy. Actions are implementation-focused.

**Aesthetic** – Having attractive or pleasing qualities.

**Agricultural Land Reserve (ALR)** – Lands designated pursuant to the Agricultural Land Commission Act to be preserved for agricultural uses or uses compatible with agricultural purposes. The Land Commission decides on requests for exclusion, inclusion, subdivision and non-farm use of land in the ALR.

**Allochthonous inputs** – Organic material (e.g., leaf litter) reaching an aquatic community from a terrestrial community.

**Alluvial Fan (Stream Mouth/Confluence)** – Areas where a watercourse meets a water body and has the potential to have a direct active influence (e.g., sediment deposition or channel alignment changes) on the lake.

**Anthropogenic** – Involving the impact (usually negative) of humans on the environment.

**Aquatic Ecosystem Development Permit** – A DWK development permit designation that specifies lands within the boundary as an important location adjacent to aquatic areas on which flood issues, erosion control and protection of environmental and habitat values of watercourses and their adjacent riparian areas is required. Lands within these areas are subject to the objectives and guidelines of the development permit.

**Aquatic Habitat Index (AHI)** – A ranking system based upon the biophysical attributes of different shoreline types. The index consists of parameters such as shore type, substrate type, presence of retaining walls, marinas, etc. to determine the relative habitat value based upon a mathematical relationship between the parameters.

**At Risk** – Species or ecosystems that have the potential to come extinct.

**Attenuation** – The temporary storage of water (surface water, storm water) in a watercourse or chamber.

**Best Management Practice (BMP)** – A method or means by which natural resources are protected during development or construction. For example, the Ministry of Environment has been recently creating documents containing guidelines for work in and around water.

**Biodiversity** – The degree of variation of life forms within a given ecosystem. Biodiversity is a measure of health of ecosystems. Greater biodiversity implies greater health.

**Biofiltration** – The use of living material to capture and biologically process pollutants from watercourses.

**Buffer** – An area or zone that creates a physical or perceptual separation and is thought to reduce the impact between potentially conflicting uses, entities or areas.

**Community Amenity** – An item of benefit to the community that is determined through the development approvals process, and may include park land, infrastructure, special housing, parking areas, streetscape improvements, community facilities and cash-in-lieu.

**Comprehensive Development Area** – This designation applies to lands which have not been thoroughly assessed for development potential or where significant constraints have been identified which may affect the potential development of the site (e.g. infrastructure, servicing, access, topography, visual impact or environmentally sensitive areas). For these reasons, these areas must be planned on a comprehensive basis.

**Confluence** – The meeting of two or more bodies of water.

**Delta** – A depositional feature found at a river mouth due to an energy loss and sediment deposition.

**Development Cost Charge (DCC)** – One time charges that local governments can levy on all new subdivision and building at the time of approval. DCCs shift financial responsibility for providing capital costs for off-site infrastructure, including sewer, water, storm drainage, roads and park land, from the general tax base to the developers of new growth requiring the infrastructure. DCCs cannot be used to pay for ongoing maintenance and operating costs for new infrastructure. Local governments are authorized to collect DCCs under the Local Government Act.

**Development Permit Areas** – Areas designated in the OCP to safeguard community goals for architectural and site form and character; protection of the natural environment; protection of development from hazardous conditions; revitalization of commercial areas; water and energy conservation; and/or the reduction of greenhouse gas emissions.

**Disturbance** – A separate and distinct action or force that causes considerable change in structure or composition through human caused events such as cutting trees, driving vehicles off-road, grazing of domestic animals, etc.

**Dock Density** – The number of docks located within a certain segment of Okanagan Lake. The segments are based on the Foreshore and Inventory Mapping Report, 2005.

**Ecosystem** – A functional unit consisting of all of the living organisms and abiotic (non-living) factors of a unit or portion of the landscape, together with the processes that link them including nutrient cycling and energy flow. An ecosystem can be any size, but here we define them as a portion of the landscape with relatively uniform vegetation and soils.

**Emergent Vegetation** – Species such as cattails, bulrushes and varied sedges that occur in marshes and on floodplains. Emergent vegetation is most commonly associated with wetlands, but also occurs on rocky or gravel shores.

**Encroachment** – Intrusion, usually resulting in disturbance, into an area that was previously undisturbed or not developed.

**Environmentally Sensitive Ecosystems** – Relatively unmodified rare and fragile ecosystem remnants critical to the survival of the species they support.

**Ephemeral** – In reference to a watercourse, flowing seasonally or occasionally in response to increased water availability following precipitation or snowmelt.

**Erosion** – The loosening and removal of soil by running water, wind, construction, development and disturbance.

**Fish Habitat** – Spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

**Foreshore** – The area that occurs between the high and low water marks on a lake.

**Foreshore Inventory Mapping (FIM)** – The methodology used to collect and document fish and riparian habitats lake corridors performed by the Regional District of Central Okanagan and partners. A full discussion of this mapping can be found at Regional District of Central Okanagan website.

**Growth Management Designation (GMD)** – West Kelowna’s OCP utilizes Growth Management Designations to summarize and graphically or conceptually illustrate DWK’s growth management policies and priorities. In particular, the GMDs identify growth priority areas and their broad attributes and characteristics in line with the Community Vision.

**Groyne** – A protective structure of wood, rock, concrete or other materials that is used to stop sediments from shifting along a beach. Groynes are generally constructed perpendicular to the shoreline.

**Habitat** – The natural environment of a plant or animal.

**Habitat Potential** – In watercourse evaluation, a relative score assigned to each watercourse based on its intrinsic ecological value. Factors such as fish habitat, riparian condition (natural, anthropogenic modifications), stream magnitude, level of impairment and flows are used to assign a rating on a spectrum between 0 and 1; with Low Habitat Value receiving a 0 and Very High Habitat Value up to a 1. Respective habitat ratings are assigned based on information compiled during field surveys and analysis and data compilation.

**Hydrological** – Water-related features and processes.

**Impervious surface** – Artificial structures, including pavements (roads, sidewalks, driveways and parking lots), rooftops and other surfaces that are covered by impenetrable materials such as asphalt, concrete, brick or stone.

**Infill** – Development occurring in established areas of the community. Infill can occur on vacant lots or on land with dilapidated buildings, or can involve changing the land use of a property from a less to a more intensive one—i.e. from a parking lot to an office building.

**Instream Features** – Construction of something below the high water mark. Instream features may include docks, groynes, marinas, etc.

**Intermittant** – In reference to a watercourse, flowing most of the time but seasonally or occasionally decreasing in response to decreased water availability (e.g. increased evapotranspiration or bed seepage).

**Invasive species** – Flora and fauna that are non-native to an area that adversely affect the habitats they invade. They disrupt existing natural systems by dominating an area.

**Land Title Act** – The Land Title Act provides the legal framework for the BC land registry system and is a modified version of the Torrens System which establishes security and simplicity of legal title through registration of conveyancing documentation in a public register.

**Large Woody Debris (LWD)** – The logs, sticks, branches and other wood that falls into streams and rivers. The presence of LWD is important in the formation of pools which serve as fish habitat.

**Leavestrip** – An area adjacent to a water feature intended to preserve the biodiversity of the riparian ecosystem, protect and buffer that ecosystem from surrounding activities, maintain and enhance biodiversity by protecting the diverse riparian ecosystems and maintain and enhance corridors between ecosystems thus supporting the diverse needs of various species. This area of land and vegetation should remain undisturbed throughout and after development processes.

**Level of Impact** – In watercourse evaluation, it is the modification of shorelines on both sides of a watercourse.

**Littoral** – The littoral zone is the near shore area where sunlight penetrates all the way to the substrate and allows aquatic plants to grow.

**Official Community Plan (OCP)** – A guiding document that provides a long-term vision for a community. Under the Local Government Act section 875, an OCP is a statement of objectives and policies to guide decisions on planning and land use management, within the area covered by the plan, respecting the purposes of local government.

**Policy** – A statement that commits the municipality to taking a consistent course of action over the short, medium and long term.

**Principle** – A fundamental truth that serves as the foundation for a chain of reasoning.

**Retaining Wall** – A retaining wall is any structure that is used to retain fill material. Retaining walls are commonly used along shorelines for erosion protection and are constructed using a variety of materials. Bioengineered retaining walls that consist of plantings and armouring materials and are strongly preferred over vertical, concrete walls. Retaining walls that occur below the Mean Annual High Water Level pose a significant challenge, as fill has been placed into the aquatic environment to construct these walls.

**Riparian/Riparian area/Riparian fringe** – The terrestrial areas adjacent to the banks of a stream or any other water body that links aquatic and terrestrial ecosystems.

**Riparian Areas Regulation (RAR)** – A Provincial program that requires local governments to protect riparian areas during development by ensuring that proposed activities are subject to a science-based assessment conducted by a Qualified Environmental Professional.

**Riparian setback** – A buffer zone along a riparian area that provides an area where disturbance or development cannot occur, typically based on a RAR Assessment.

**Rip rap** – Rock or other material used to protect shorelines, streambeds, bridge abutments, pilings (or other structures contained within a watercourse) against scour or erosion.

**Sediment deposition** – Laying down of material carried by wind, water or ice due to a loss of energy.

**Sensitive ecosystem** – Natural terrestrial ecosystems, which are considered fragile or rare in a Sensitive Ecosystem Study area: wetlands, riparian, old forest, grassland, broadleaf woodland, coniferous woodland and sparsely vegetated ecosystems are identified sensitive ecosystems in the Okanagan.

**Sensitive Habitat Inventory Mapping (SHIM)** – The SHIM methodology is used to map fish habitat and modifications in streams.

**Shore zone** – The shore zone is considered to be all the upland properties that front a lake, the foreshore and all the area below high water mark.

**Stormwater** – Water that originates during precipitation events. It may also apply to water that originates with snowmelt or runoff water from overwatering that enters the stormwater system. Stormwater that does not soak into the ground becomes surface runoff, which either flows into surface waterways or is channeled into storm sewers.

**Stream Mouth (Confluence/Alluvial Fan)** – Areas where a watercourse meets a water body and has the potential to have a direct active influence (e.g., sediment deposition or channel alignment changes) on the lake.

**Streetscape** – The interrelationship of development, landscape and open space in a street. Streetscapes are an important component of the public realm (public spaces where people often interact), which help define a community’s transport conditions, activities, aesthetic quality and identity.

**Submergent Vegetation** – Submergent vegetation consists of all native vegetation that only occurs within the water column. This vegetation is typically found in the littoral zone, where light penetration occurs to the bottom of the lake. Eurasian milfoil is not typically considered submergent vegetation as it is non-native and invasive.

**Substrate** – An earthy material that exists along the foreshore or bed of a watercourse, usually consisting of fines, gravels, cobbles, boulders or bedrock.

**Upland** – Land lying adjacent above the foreshore.

**Vision** – A guiding statement that sets the tone for long-term planning and development. It is intentionally broad in scope to have longevity and provide a frame of reference and reminder of the spirit and intent of a plan.

**Watercourse** – Any natural depression with visible banks, or wetland with or without visible banks, which contains water at some time; and includes any lake, river, stream, creek, spring, swamp, gulch or surface source of water whether containing fish or not. It includes intermittent streams and surface drainage works which are inhabited by or provide habitat for fish.

**Wetland** – Land that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that normally does support, vegetation. The vegetation is typically adapted for life in saturated soil conditions.

**Wildlife** – Animals, such as invertebrates, amphibians, reptiles, birds and mammals.

**Zoning Bylaw** – A bylaw that specifies permitted land uses, as well as the form, siting, height and density of all development within the boundaries of the community to provide for the orderly development of the community and to avoid conflicts between incompatible uses.



## B PLANNING CONTEXT SUMMARY

### District of West Kelowna Strategic Plans

#### West Kelowna Official Community Plan Bylaw 2011 No. 0100

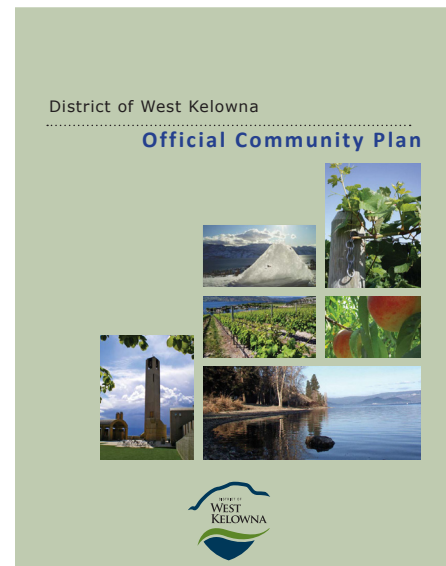
The District of West Kelowna created a new Official Community Plan (OCP) in 2011. The OCP sets broad policy direction with regard to key community issues and priorities and is the guiding document for decision-making on community planning and land management issues by Council, staff and public.

The OCP identifies the waterfront as a Growth Management Designation (GMD) area to ensure that environmental protection of the lake and lakefront is prioritized during development. The objectives of the waterfront GMD are to:

1. Increase public waterfront access opportunities in DWK.
2. Over the long term, identify, plan and strive to complete a continuous public access waterfront trail. A combination of public and private lands will be required to complete this trail and development of this trail will be coordinated with Westbank First Nation.
3. Balance residential, commercial and recreational use of the waterfront with the protection and enhancement of areas of natural foreshore habitat for fish and other aquatic life.
4. Promote tourist commercial uses at specified locations.

The OCP Waterfront policies guide these GMD objectives and include:

1. Retain land currently in public ownership located next to water (streams, lakes and reservoirs), or alternately maintain the same amount of land on the water via land swap, consolidation or other means.
2. Support foreshore leases for uses such as docks when they are ancillary to an upland use, are designed to maintain or enhance natural function of the foreshore and do not impede public access along the foreshore.
3. Work in concert with provincial legislation to regulate the location, size and operation of marinas and other commercial uses proposed for the foreshore.



4. Support and implement the recommendations of watercourse specific management plans such as the Okanagan Lake Foreshore Plan (2007) and the Central Okanagan Lake Foreshore Inventory and Mapping Report (2005).

The Waterfront Plan is designed to align with the OCP's waterfront objectives and policies, as well as the overall vision, principles and policies of the plan.



### 2011 Strategic Priorities

District of West Kelowna's 2011 Strategic Priorities document establishes the following three key areas of focus for the District:

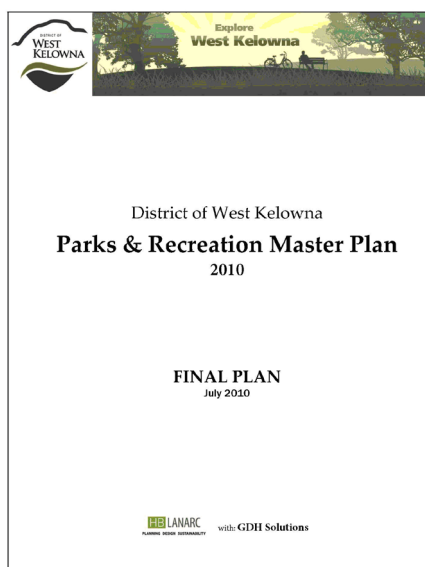
- Economic Development
- Community Enhancement
- Infrastructure

Amongst the 2011 priorities for Community Enhancement is the completion of the Waterfront Plan and examination of the suggested initiatives resulting from the planning process, with specific focus on enhancement of lake accesses.

### Parks and Recreation Master Plan 2010

The District of West Kelowna's Parks and Recreation Master Plan (2010) identified the waterfront as a key component of West Kelowna's character and a parks and recreation priority for the community. A number of recommendations in the plan relate to the District's Waterfront recreation areas, including:

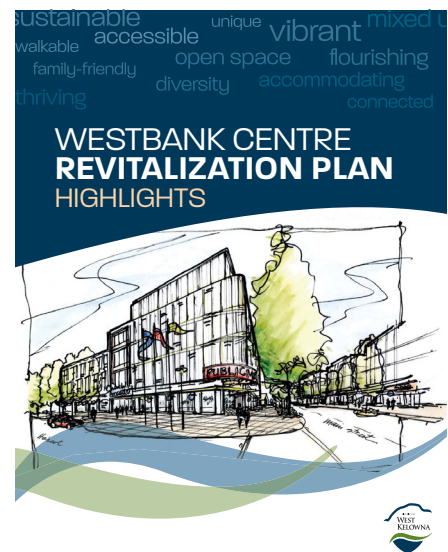
- Develop Gellatly Bay Waterfront as a significant recreation area.
- Increase public lake access through the development of existing road accesses (lake accesses).
- Develop a trail that completes a connection along the District of West Kelowna's lakeside from Bennett Bridge to Peachland.
- Upgrade and add new playgrounds to facilitate access to play for all members of the community

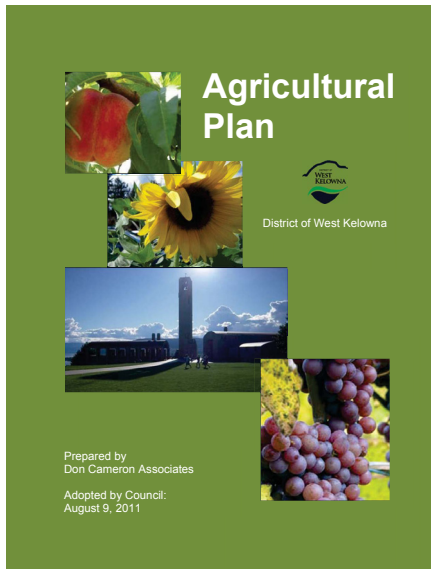


- Develop a connected network of greenways and trail connections throughout the District of West Kelowna.
- Create a pedestrian link between Westbank Centre and Gellatly Bay.
- Designate additional off-leash dog areas in West Kelowna.
- Secure and develop park land to provide trailhead access points into major recreation destinations.
- Seek opportunities to preserve Goat's Peak for its significant natural and recreational values.
- Seek opportunities to preserve Glen Canyon for its natural and recreational values.
- Consider water stewardship when planning parks and recreation projects.
- Develop swimming and watercraft instructional programs in Gellatly Bay.

### Westbank Centre Revitalization Plan

In 2011, the District developed a Revitalization Plan for Westbank Centre. The Westbank Centre Revitalization Plan provides a long-term vision for Westbank Centre supported by action-oriented policies and guidelines for implementation. The plan is broadly premised on expanding the economic base, improving the quality of both private and public realm development and enhancing the cultural and heritage aspects that are engrained within the community. One of the key recommendations in this plan is the creation of a strong pedestrian link between Westbank Centre and Gellatly Bay. It will be important that the recommendations for these two West Kelowna destinations are complementary and not competitive.





### Agricultural Plan

Like the waterfront, the District's agricultural lands are an important part of the social, cultural and economic fabric of West Kelowna. In addition, there are a number of agricultural parcels within the Waterfront Plan study area. While not addressing the waterfront explicitly, the report indicates that there may be potential common concerns and recommendations, especially those dealing with opportunities for showcasing and celebrating local agricultural culture and products.

### Master Transportation Plan (Draft)

The Master Transportation Plan, currently in development, will guide management and improvements to the District's transportation systems for all modes of travel, including walking, cycling, driving and transit.

### Storm Water Management Plan (Draft)

The Storm Water Management Plan will provide a clear picture of how to apply land use management tools and best management practices to protect property and aquatic habitat, while accommodating land development and population growth. The Storm Water Management Plan and the Waterfront Plan are directly linked through the watercourses and lake that both plans must address. It will be vital that the objectives and projects proposed in each plan work in harmony and are implemented concurrently.

## Other Related Plans

In addition to District of West Kelowna's strategic documents, the Waterfront Plan considers recommendations from other related studies.

### Regional District of Central Okanagan – Major Lakes Recreational Marine Facilities Study 2008

The Recreational Marine Facilities Study commissioned by the RDCO in 2008 identified a number of key issues relating to the provision of marine facilities in the Central Okanagan (including West Kelowna, Peachland, Kelowna, Lake Country and surrounding Electoral Area. Of particular interest to the Waterfront Plan are the following summarized concepts:

- Marina slips are consistently at capacity and cannot accommodate the current demand for boat moorage. There are 500 names on waiting lists in the Central Okanagan (primarily at yacht clubs) which indicates an under-supply, today, of about 33%, based on the current supply of 1,560 public slips.
- The current number and capacity of boat launches is inadequate for peak summer use. At least five additional launches and significant improvements to the main launch sites are recommended within the next 20 years for the Central Okanagan.
- There is demand for places to go on the lakes to eat, use restrooms and enjoy land-based recreational and shopping activities. The lack of destinations on the lakes discourages boaters from more frequent outings which negatively impacts tourism and economic benefits.
- Storage of motorized boats in areas that are readily accessible from the lakes would reduce the need for trailer parking and would result in more "older adult" and tourist friendly boat launching.
- There is also a need for storage for non-motorized boats in proximity to the foreshore.
- There is considerable unmet demand for mooring buoys for both day and overnight use. Public mooring buoys typically are provided and maintained by yacht clubs. Buoys should be placed offshore from public lands, but should not interfere with swimming areas at beaches.
- There is a severe shortage of pump-outs within the Central Okanagan. Boats are dumping grey water directly into the lakes due to the lack of convenient facilities.

### **Central Okanagan Foreshore Plan – Update (2007)**

This plan outlines the objectives and policies laid out by the local community and water resource agencies for the management, development and use of Okanagan Lake shoreline within the RDCO. The plan provides multiple policies applicable to Okanagan Lake foreshores, related to public access, protection, approval requirements, development considerations and environmental protection. This plan endeavours to work within these policies.

### **Gellatly Waterfront Masterplan (2003)**

The objective of this plan was to determine a clear and enduring vision for the group of park spaces and trails collectively known as the Gellatly Waterfront. The plan helped to inspire some of the upgrades completed in this area to date. Upon review, it appears that several of the ideas within this plan continue to be relevant today and these ideas are incorporated and built upon in the Waterfront Plan.





## C PROJECT PROCESS

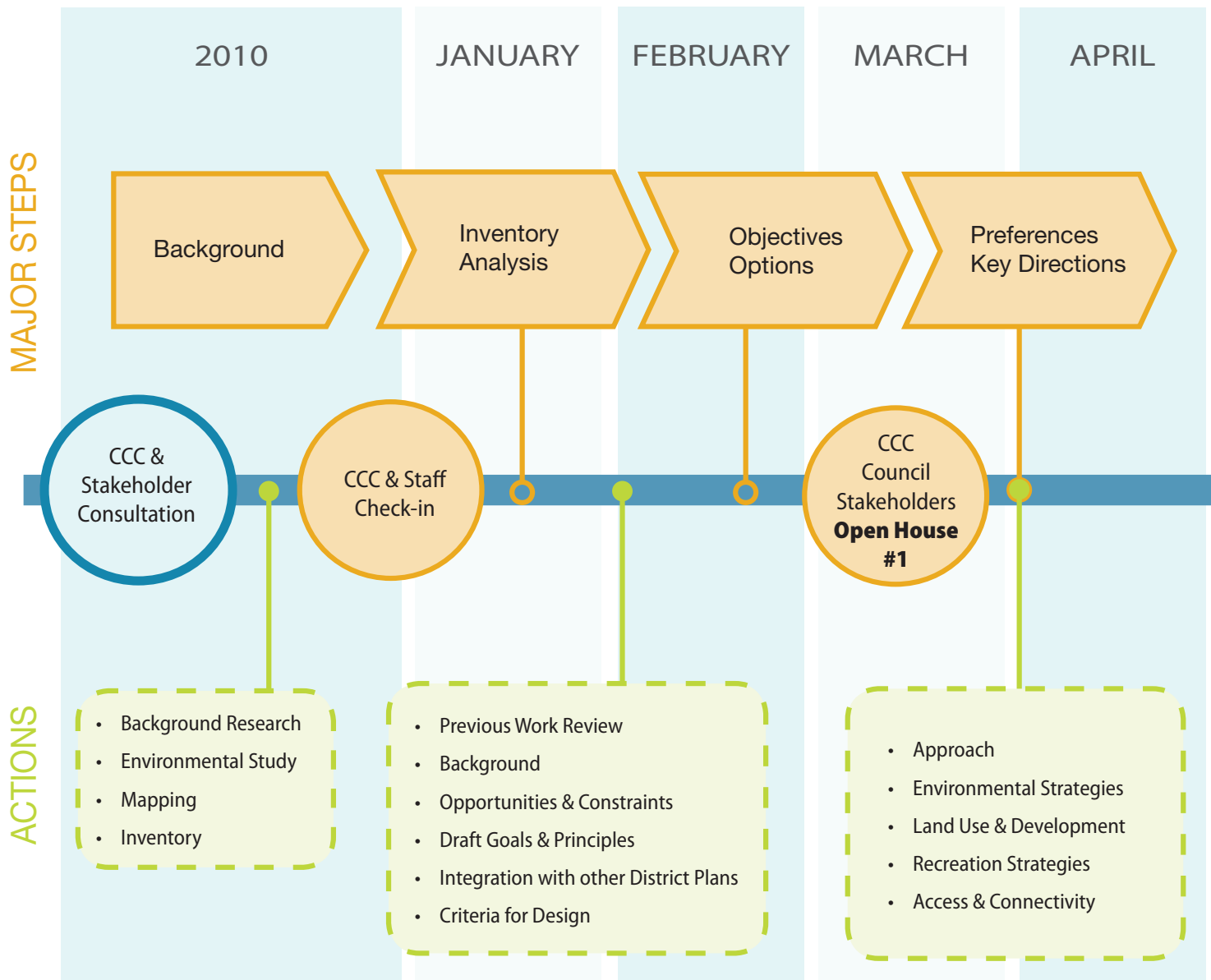
The Waterfront Plan has been completed over a period of 12 months, from the project initiation and early meetings up to anticipated Council adoption in October 2011. The project process is outlined in the *Figure C.1* on the following page.

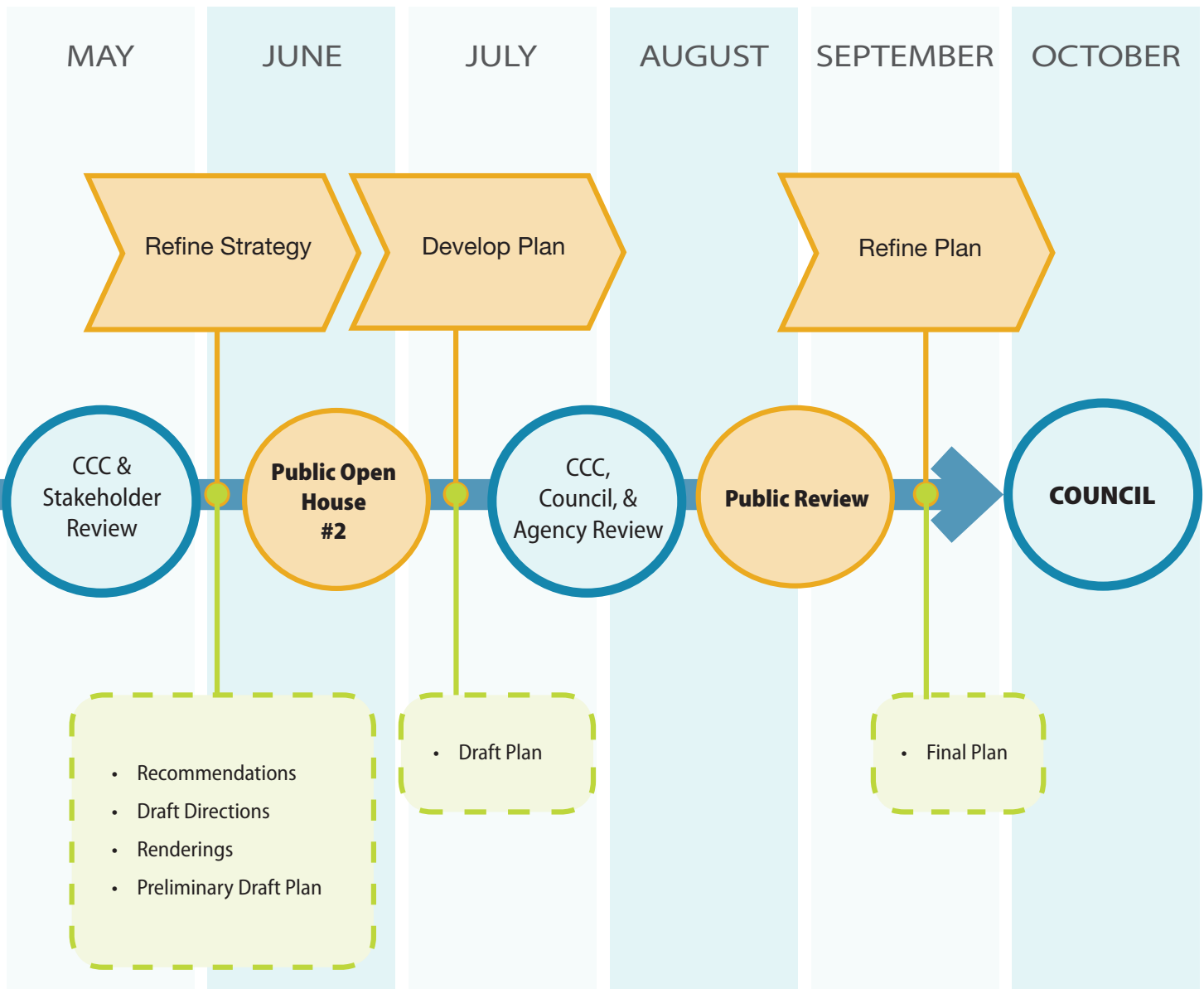
The process of developing the Waterfront Plan:

- Offered opportunities for meaningful dialogue and engagement with the public, key stakeholders and Community Consultation Committee (CCC);
- Increased the capacity of all those involved to understand and address the waterfront's relationships and priorities; and
- Began building support and consensus among the various stakeholders for priority actions.

Council, staff, Community Consultation Committee, stakeholder and public reviews have informed the process and priorities, to help ensure the plan meets the needs of the community.

Figure C.1: Process Diagram







## D FEEDBACK SUMMARY

### Open House #1 Feedback - March 2011

#### Board Feedback

##### Possible Goat's Peak Directions

Possible Directions	Response Count
Environmental Protection	14
Trail Connections	11
Waterfront Village	7
Accessible Public Waterfront	2
Heritage Interpretation	2

##### Possible Powers Creek/Gellatly Bay Directions

Possible Directions	Response Count
Environmental Protection	10
Trail Connections	10
Waterfront Village	7
Accessible Public Waterfront	6
Formalized Dog Park	4
Beach	4
Moorage Solutions	3
Heritage Interpretation	3
Public Pier/Dock	3
Non-Motorized Boat Launch	2
Public Realm Enhancements	2
Event Venue	1
Playground	1
Trailhead	1

##### Possible Lakeview/Sunnyside Directions

Possible Directions	Response Count
Environmental Protection	5
Trail Connections	5
Accessible Public Waterfront	4
Formalized Dog Park	4
Public Day Moorage	3

Beach	3
Non-motorized Boat Launch	2
Playground	1
Motorized Boat Launch	1
Public Realm	1

## Possible Casa Loma Directions

Possible Directions	Response Count
Accessible Public Waterfront	3
Trail Connections	2
Motorized Boat Launch	2
Public Day Moorage	2
Beach	2
Environmental Protection	1
Formalized Dog Park	1
Public Realm	1

## Possible Sailview/Raymer Bay Directions

Possible Directions	Response Count
Beach	6
Trail Connections	3
Public Day Moorage	2
Heritage Interpretation	2
Motorized Boat Launch	1
Swim Bay	1

## Summarized Comments

### Trails Comments

- Upgrade website to include a searchable data base of all public waterfront properties.
- Parks like Tobermory in Ontario - great idea!
- What about underwater scuba trails?
- “Urban” and “Suburban” Trails ie. to walk
- Enforce the bylaws and strictly fine dog owners that don't clean up after their dogs.
- Build raised boardwalk above water on Gellatly Bay.
- Public access and walking routes along the whole of the beach.
- Lake frontage should be established and publicly confirmed.
- Disagree with public access and walking routes along the whole of the beach (not waterfront owner).
- Pave the walking trails.
- Disagree with paving walking trails (x2).
- One residential lot separating a potential extended beach front. In Green Bay. Pritchard.
- Green Bay is unique and should be kept as natural as possible.
- Ensure wherever possible cycling paths are physically separated from motor vehicles – to invite young cyclists.
- Reconfigure Gellatly Road walk and cycle path so that cyclists are separated physically from motor vehicles – very dangerous as is and unsuitable for young cyclists.
- We need more areas adjacent to the lake that include bike paths.
- Cycling paths physically separated from motor vehicles.
- Cycling – Wherever possible have cycle paths physically separated from motor vehicles.

### Waterfront Development - form, character and viability

- No development over 5 storeys.
- Informal markets allowed.
- Make it pretty and for the public in design.
- What about an arts centre?? The Westside would be greatly enhanced.

- No high buildings on the water's edge with no pedestrian walkways.
- Consider free shuttle bus connecting town centre to Gellatly Bay. CoC sponsor?
- Require developers to provide green space including community garden space.
- Much of the shoreline is being reviewed for economic development. We need more emphasis on conservation.
- Rather than adding to a development cost when rezoning in this area, provide an incentive to make it happen.
- Think about pedestrian ferry access (see False Creek in Vancouver) between DWK & Kelowna sites.
- Need residential mass to support commercial sustainability.
- 2 storey parkade because of water table. 4 storey frame on top and mixed use in front of parkade.
- Amenities that allow and promote a day long visit for residents and visitors.
- Floating infrastructure leave beaches for people.
- Better swimming locations, more infrastructure.
- Mobile vendors.
- Move kids park to one of the waterfront lots then turn area around boat launch to floating restaurant and gas bar for boats. And other boat related needs.
- Floating restaurant.
- Provide for edible landscaping.
- Nothing over 5 storeys please.
- More development in Gellatly Bay will make a congested area even worse. What can be done to get people to spread out and use different areas?
- There is a large parcel of land at the packing house. Make sure parking is adequate for whatever size of development is done.
- Creek clean up is paramount to any future use of waterfront areas.
- Do new extensive road plan for the area – crossing passage etc... very dangerous now!
- Development OK as long as it does not interfere with already existing swimming areas.
- Gellatly Road already has too much traffic using it.

### Road Ends (Lake Accesses) Comments

- All beach access must be preserved.
- Please do not sell or trade off any beach access. Especially quiet locations for peace of mind.
- What is a Road End? – “a beach access”
- How does someone obtain access to their property through Road Ends? – “What does this mean?”
- Allow informal/seasonal business that benefits the community.
- Community gardening.
- Any beach access without restrooms does create problem for fecal matters down the road. It is always better to have at least some sort of restroom.
- Local artist work space.
- Adopt a road end.
- Option 3 – infrastructure like: café, restaurant, art gallery, public gathering, etc . . . (float ‘n go).
- How about approaching sponsors to pay for amenities in exchange for naming rights.
- Xeriscape?
- Some could be a motorized boat launch – Pritchard has one
- Let’s have less asphalt and more gravel lanes, worms and insects die under the asphalt.
- Less grass, more Okanagan plants – educate the public – xeriscape and play.
- Plant more native plants and grasses.
- Improve signage at public beach accesses.
- Keep the parks (road ends) we already have. We need to keep them all.
- Beach accesses are not ours to give away! We need to maintain them for future generations.
- Don’t over develop all beach accesses. Leave some as secluded spots.
- Keep our beach areas large enough to be useful for the general public.
- What is your interpretation of “significant” infrastructure and recreational function?

- Do not swap any publicly owned property. We want all of our beach access to eventually be developed into usable parks.
- Spend any public money on a real park not a road end.
- Budget to develop one road end a year.

### Ecology Comments

- Disallow discharge valves on boats.
- Sewer pumps should be regulatory to use.
- Why would we concentrate more public traffic to an area (Marina Park) that is already know to have “poor” water quality and is in a Kokanee red zone?

### Recreation Comments

- Need an indoor community gathering place year round.
- Waterfront Plan must deal with parking issues.
- Need public transit for families to access amenities.
- Dog beach is in a convenient place.
- May need parking to support non- motorized boats.
- Kalamoir Park already has swimming area and dog beach.
- Parking for motorized boats.

### Implementation & Funding Comments

- Taxation – Yes  
Parks Decommissioning and disposition – No  
Parks Dedication at Subdivision – Yes  
Development Cost Charges – Yes
- Consider a Land/Park acquisition levy in taxes for present & future acquisition.
- Property acquisition – Consider land conservancy style where property owners donate land but retain right of residence until death.
- Do we have any corporate sponsors in DWK to help financially with developing parks that are not being utilized?
- Absolutely must include park land dedication – specifically waterfront when subdividing (agree x2).
- Keep it simple.
- Sponsoring for naming rights.
- Charging fees for use I.e.: Parking.
- Making way for humans to walk does not mean pavement. Alternative, passive circulation for feet.

### Goat's Peak Comments

- The development above directly will affect the preserved area – NO!
- A large portion of Goat's Peak should become a park. Especially on the lake front beaches and shoreline.
- Most of Goat's Peak is extremely ecologically valuable and sensitive.
- Development there would be very intrusive and expensive.
- The most easily developed beaches above the lake are red-listed ecotype.
- PRESERVE AS PARK!
- Off-leash dog walking trail.
- What's the idea of connecting water boardwalk all the way to Peachland or at least the beginning of the structure.
- The rock face lake front can be multiple high rises for a small town in West Kelowna. We need revenue.
- Should be terraced with development for a tax base.
- Not keen on dog park here.
- How about underwater SCUBA trail?
- Trails & lookout points on G.P. Heights – also lakefront connecting trail to Peachland.

### Powers Creek/Gellatly Bay Comments

- Where is the parking?
- Leave this access (Whitworth road) as natural as possible – for the secluded beach access experience many appear to value.
- Non-motorized boat launch.
- Yacht Club should be considered as frontage. By expansion it becomes even more community inclusive. The Yacht Club is the most affordable club on the lake. Membership is open to anyone local.
- Ensure alternate methods of moorage.
- The phrase "Yacht Club relocation" is far too leading. Better to discuss things like improvement or expansion.
- Move road higher making room for more parking along beach.
- Consider Yacht Club expansion – utilizing Marina Park.
- Negotiate Long Term lease with Westbank First Nation for beach front from pump house to trailer court.

- Clearly identify all parks, road ends, public beach accesses on the website – with an easily searchable component – include photos.
- Make beach access with lift station into dog beach.
- Restore the mouth of Powers Creek to a natural area, recognizing its ecological significance. Make long term plans to move the boat launch to achieve this.
- Don't move swim platform.
- DWK should aggressively pursue obtaining the rights to waterfront such as the Yacht Club so the lease is paid to DWK rather than the province.
- Floating public amenities!
- Boat launch parking fees pay for parking (agree).
- Sewer pumps for the boats should be made available and mandatory (agree).
- Signage at Cindy & Harding to direct walkers either way to Beach Road.
- Although the Public access in front of the Cove is "nice" – I think we need to do better!
- Speed limit should be 30 or 40 kph on Gellatly between curve on road at Powers Creek & Boucherie intersection.
- Let WK Yacht Club take public and private property to the west and develop a proper moorage situation. Upgrade.
- Buy the old Westbank packinghouse site. It gives much needed public amenities and a meeting area or park.
- Need to open up beach access to public. Also Pebble Beach area.
- Improve shoreline access along Whitworth Rd.
- Do not expand Marina Park. 1. Overcrowded already. 2. Next to sewer pump station.
- Walking trail from #97 to Gellatly. Clean up hydro ROW between Harding & Angus.
- Forward Thinking! New Concepts "Green" Planning simple and effective.
- Re: Hygiene – Move doggy beach.
- Beaches by the lake don't need fancy playgrounds (agree).
- Informal market. Encourage small, local businesses please.

- Market DWK as “Most Waterfront Parks Municipality” to build community pride in waterfront.
- Consider reducing personal vehicle traffic & increasing local small vehicle public transit.
- Consider – acquire waterfront so this set of principles can be met (agree).
- Consider linkage by water (see Victoria Inner Harbour/ Vancouver False Creek ) pedestrian ferries.
- IDEA! The water itself...floating infrastructure.

### McDougall Creek/Green Bay Comments

- Potential Village. Properties either side of Westbay Road – beach access.
- Park Growth. Property Acquisition \*Acquire House @ Pritchard park (agree x2).
- Look closely at potential to acquire all parts of these properties.
- No development over 5 storeys.
- NB Boat launch.

### Lakeview/Sunnyside Comments

- Playground equipment.
- Look at cooperation with Regional District to extend park middle of Kalamoir.
- North End & South End of Kalamoir.
- Kalamoir Park deserves N-M Boat launch.
- Walkway between parks. Discuss with owners 20/20.
- Acquire additional lands for Kalamoir Park (agree).
- West perimeter – fence to identify this as a public beach.

### Casa Loma Comments

- Parking issues @ boat launch and all beach access sites. Dog beach.
- Non motorized boat launch.
- Dog beach access.

### Sailview/Raymer Bay Comments

- With potential development N of Westbank First Nation. Require N-Mot boat launch.
- Non motorized boat launch.

### General Comments

- Please don't ignore the natural challenges (lake currents, stagnant bays, rocky frontages).
- Build boardwalk over water with benches & several fingers (docks for small boats /canoes).
- Primary focus – continue to acquire waterfront.
- Parking.
- Kayak/Canoe launch.
- Without involving emotions, the common sense solution to the current beach access swap is to swap. More beach front is what we want.
- Waterfront is public keep it so! Below high water is not sufficient at high water times.
- No public (i.e.: DWK owned) indoor gathering space.
- We own the beach, why do we walk behind beach houses?
- Land swap just makes so much sense. We are not losing any and actually gaining lakeshore frontage. Large park with amenities makes more sense. Wonderful to have variety with so many road end beach access but land swap good idea.
- Problem: Private docks that block (impede) public access to walk along the beach.
- More non-paved trails, more dog beaches, cycling trails.
- Place sign at boat launch showing boaters correct way to get to launch (through WKYC parking lot).
- If you take parking away close to the beach area then you force the public to use commercial parking and that is not in the public interest – that would support commercial interest.
- Dog beaches don't belong in populated areas. Many owners are irresponsible and should take their dogs to remote areas/lakes – not here on the DWK shoreline.
- Have bus runs from malls to beach (July – August) ask mall stores to contribute to cost!!
- Need adequate space to hold sporting event i.e.: Triathlon, running race.
- Move dog park from beside Rotary Beach to a road end access. Put sand on existing dog beach make it for people.
- Relocate Rotary Beach to a beach access on Whitworth – Middle/Lift Stn.

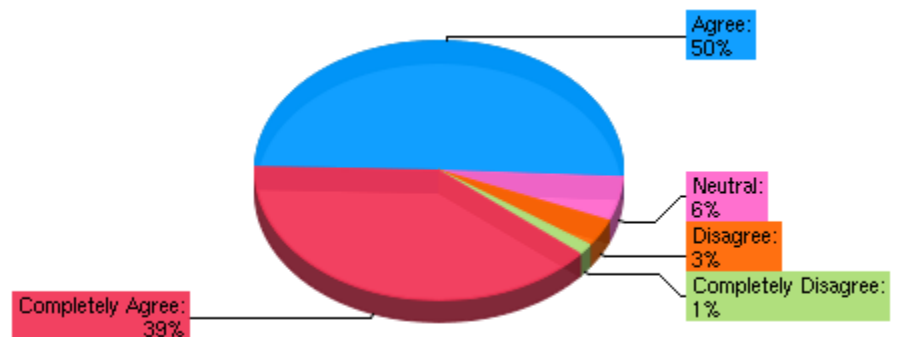
- I like the concept of smaller character parks connected through some kind of trail and road network.
- Build boardwalk over water between beach and doggy beach – small docks, etc for canoes.
- My understanding of waterfront is that anyone has access to the surveyed high water line, is this true? If not, why not?
- Parking for cars/trucks with boat trailers should be there (more) the parking lots can be further away from the waterfront.
- George Court non-motorized boat launch (disagree – wrong one).
- Please do not enlarge Marina Park because the road in there is already too congested!! Very dangerous area with so many children there.
- Before agreeing to a boat storage opposite Marina Park please consider the current situation. Traffic congestion is now maxed out.
- Larger piece of lake front property that can provide amenities and entertainment for all age groups.
- More volleyball courts.
- Floating Infrastructure/Informal markets.

**Public Survey Feedback on Draft Directions (Open House #2)  
– June 2011**

**Do you agree with the Draft Vision?**

In 50 years, West Kelowna’s waterfront will be a destination for residents and visitors. People will be attracted by a range of high quality waterfront activities including outdoor recreation, community festivals and events. Commercial amenities such as boutique shops, restaurants, pubs, cafes and tourist accommodation well add to the attractiveness and amenity of the waterfront and encourage people to play and stay in the waterfront area. A continuous waterfront trail will link recreation and commercial destinations, encouraging people to walk, run and ride from place to place. The natural lakeshore environment will be thriving – with riparian vegetation, fish and bird habitat and wildlife corridors.

Strategic public investments phased and integrated with incremental, sustained private development, will create infinite possibilities for West Kelowna’s Waterfront.



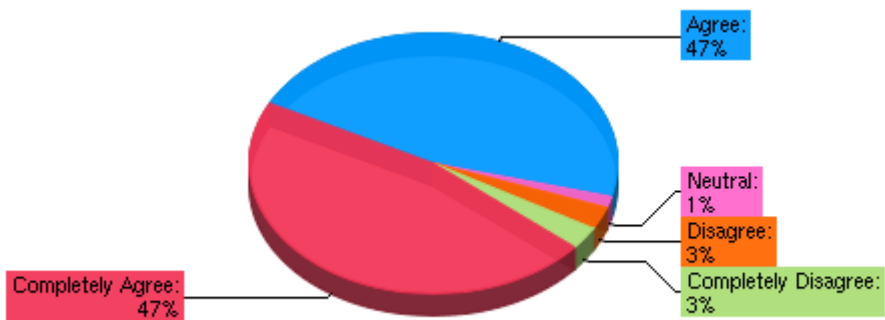
Value	Count	Percent %
Completely Agree	57	39.3%
Agree	73	50.3%
Neutral	8	5.5%
Disagree	5	3.4%
Completely Disagree	2	1.4%

Statistics	
Total Responses	145

**Principle 1: Community Connectivity**

The West Kelowna waterfront will be a place for people from all corners of the community. Increasing and improving public waterfront use and access for all residents will be a priority. Pedestrian-scale access will be promoted by establishing connections between the waterfront and the greater West Kelowna community and by creating linear connections along the waterfront. Missing links will be connected in the short-term, so that long-term continuity may be achieved.

Do you agree with Principle #1?



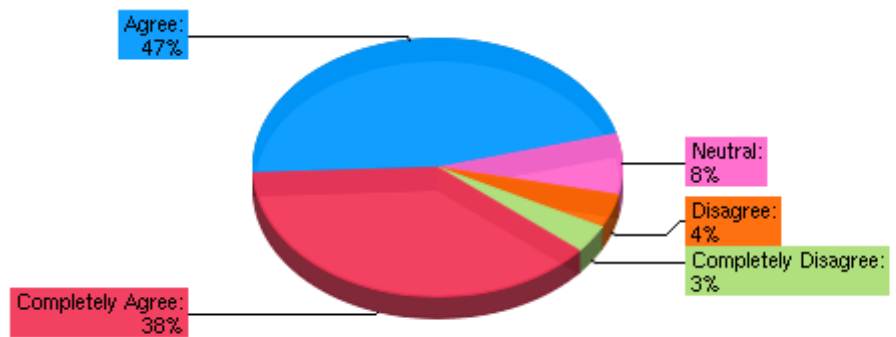
Value	Count	Percent %
Completely Agree	67	46.5%
Agree	67	46.5%
Neutral	2	1.4%
Disagree	4	2.8%
Completely Disagree	4	2.8%

Statistics	
Total Responses	144

### Principle 2: Ecological Net Gain

Waterfront improvements will respect shoreline ecological processes. Undisturbed shoreline segments identified as having high sensitivity will be protected and locations identified as high-value ecology areas will be restored. Balanced development will be permitted along the shoreline, but where negative ecological impacts occur, mitigation and compensation will ensure ecological net gain prevails.

Do you agree with Principle #2?



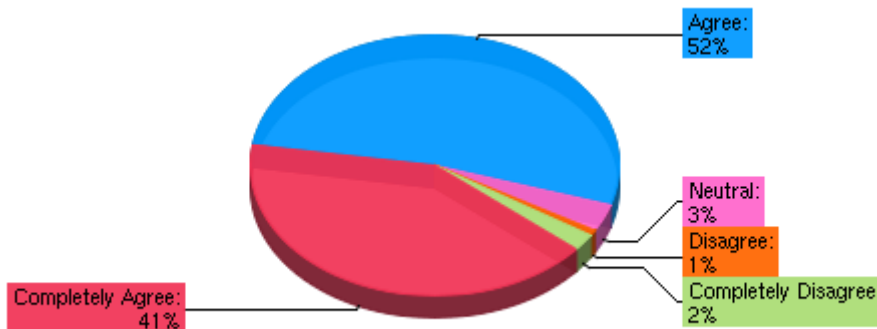
Value	Count	Percent %
Completely Agree	55	38.2%
Agree	67	46.5%
Neutral	11	7.6%
Disagree	6	4.2%
Completely Disagree	5	3.5%

Statistics	
Total Responses	144

**Principle 3: Sense of Place**

West Kelowna’s waterfront will remain a significant recreation destination for the community. The waterfront’s unique quality of place will be enhanced by improvements that respect and build upon the existing character. The distinct identity of the West Kelowna waterfront will make it a destination that draws people from the community and beyond. A diverse range of land uses, existing and proposed, will work harmoniously to support public enjoyment of the waterfront.

Do you agree with Principle #3?



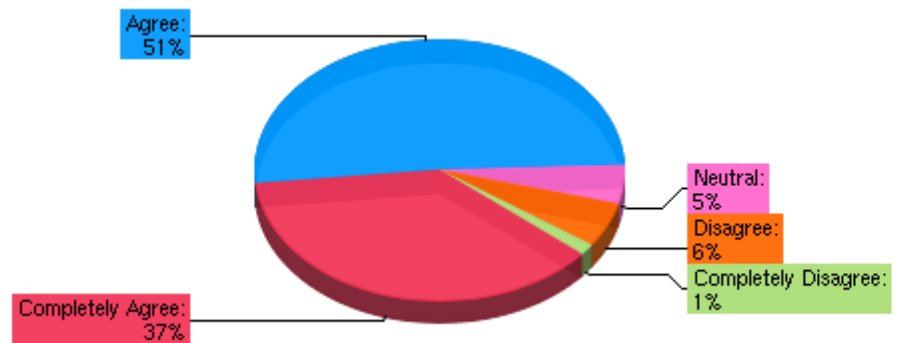
Value	Count	Percent %
Completely Agree	60	41.4%
Agree	76	52.4%
Neutral	5	3.4%
Disagree	1	0.7%
Completely Disagree	3	2.1%

Statistics	
Total Responses	145

**Principle 4: Economic Vitality**

Appropriate waterfront development that generates economic vigour throughout the entire West Kelowna community will be supported and encouraged. Development throughout the community will respect and support the creation of an improved waterfront. Local, appropriately-scaled development will be the focus for the waterfront and will contribute to enhanced public spaces.

Do you agree with Principle #4?



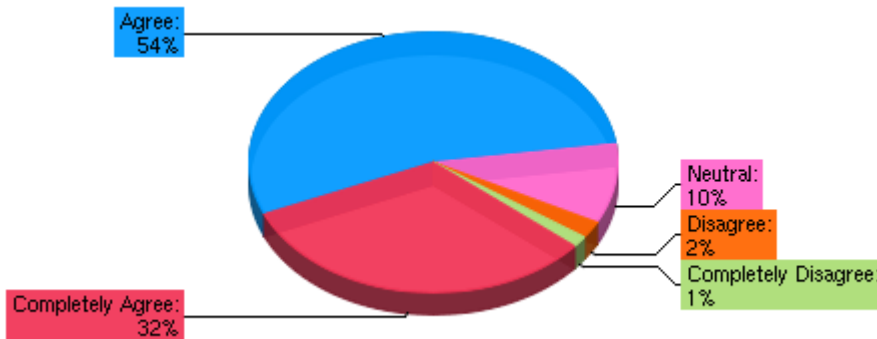
Value	Count	Percent %
Completely Agree	54	37.2%
Agree	74	51%
Neutral	7	4.8%
Disagree	8	5.5%
Completely Disagree	2	1.4%

Statistics	
Total Responses	145

**Principle 5: Achievability**

Recognizing that the West Kelowna community has many capital priorities, projects with highest and best potential will be selected for short-term implementation on the waterfront. Catalyst projects that are achievable and will provide high value returns will be identified and completed. These improvements will stimulate appropriate new waterfront development, will contribute to an improved waterfront experience and will support the fulfillment of the 50-year vision.

Do you agree with Principle #5?



Value	Count	Percent %
Completely Agree	46	32.4%
Agree	77	54.2%
Neutral	14	9.9%
Disagree	3	2.1%
Completely Disagree	2	1.4%

Statistics	
Total Responses	142

**Do you agree with the following Proposed General Directions for Land Use & Development?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Development on Agricultural Land Reserve within the Waterfront Plan Area is not recommended as per the District's objectives related to use of Agricultural Land	<b>49.0%</b> 71	<b>20.7%</b> 30	<b>13.8%</b> 20	<b>11.7%</b> 17	<b>4.8%</b> 7	<b>100%</b> 145
Generally, proposed new land uses, namely multi-family residential and mixed commercial/residential uses, are recommended to be focused on the Gellatly Bay/Powers Creek Area	<b>23.4%</b> 33	<b>49.6%</b> 70	<b>14.2%</b> 20	<b>5.7%</b> 8	<b>7.1%</b> 10	<b>100%</b> 141
Temporary, mobile food vendors should be encouraged to provide food and beverage services along the waterfront at key public activity nodes such as parks, beaches and docks, where permanent food and beverage services are not available	<b>34.2%</b> 50	<b>48.6%</b> 71	<b>11.6%</b> 17	<b>4.1%</b> 6	<b>1.4%</b> 2	<b>100%</b> 146
Small scale tourist-commercial developments within key public space destinations (e.g. parks and docks) should be considered	<b>32.6%</b> 47	<b>53.5%</b> 77	<b>9.0%</b> 13	<b>3.5%</b> 5	<b>1.4%</b> 2	<b>100%</b> 144
Small scale residential infill and intensification within existing Single Family Residential neighbourhoods will be encouraged where appropriate, as recommended in the Draft West Kelowna OCP	<b>20.1%</b> 29	<b>34.0%</b> 49	<b>12.5%</b> 18	<b>13.9%</b> 20	<b>19.4%</b> 28	<b>100%</b> 144

**Do you agree with the following Proposed Directions for Gellatly Bay?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Gellatly Bay is envisioned to evolve into a small scale "Waterfront Village" to create a heart and focal point for West Kelowna's Waterfront, containing a range of recreational activities, amenities and services including cafes, restaurants and/or small boutique shops and services with housing located above	<b>63.0%</b> 92	<b>28.8%</b> 42	<b>3.4%</b> 5	<b>2.1%</b> 3	<b>2.7%</b> 4	<b>100%</b> 146
Small scale waterfront village uses including clustered residential development and compatible mixed-use development are recommended	<b>43.8%</b> 63	<b>38.2%</b> 55	<b>7.6%</b> 11	<b>6.3%</b> 9	<b>4.2%</b> 6	<b>100%</b> 144
Commercial frontage is required in new mixed-use development fronting Gellatly Road. Commercial uses are envisioned to be publicly-oriented uses such as cafés, restaurants and/or small shops and services oriented towards waterfront public open spaces	<b>58.3%</b> 84	<b>31.3%</b> 45	<b>4.9%</b> 7	<b>2.8%</b> 4	<b>2.8%</b> 4	<b>100%</b> 144
Mixed-use residential is to be located above commercial frontages and includes housing and/or tourist accommodation uses (i.e., hotel, time shares)	<b>48.3%</b> 69	<b>33.6%</b> 48	<b>5.6%</b> 8	<b>7.0%</b> 10	<b>5.6%</b> 8	<b>100%</b> 143
Residential building height is to be a maximum of 4 storeys	<b>45.1%</b> 65	<b>27.1%</b> 39	<b>13.2%</b> 19	<b>10.4%</b> 15	<b>4.2%</b> 6	<b>100%</b> 144
Mixed-use commercial/residential building height is to be a maximum of 5 storeys	<b>34.5%</b> 49	<b>26.1%</b> 37	<b>14.8%</b> 21	<b>15.5%</b> 22	<b>9.2%</b> 13	<b>100%</b> 142
Temporary, mobile food vendors should be encouraged until private cafes/restaurants are developed	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>100%</b> 0

**Do you agree with the Draft proposed directions for Goat's Peak?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Development directly adjacent to Goat's Peak shoreline will not be permitted	<b>39.9%</b> 57	<b>32.9%</b> 47	<b>18.9%</b> 27	<b>4.9%</b> 7	<b>3.5%</b> 5	<b>100%</b> 143
Upland development proposals will be evaluated through a Comprehensive Development Area process to identify and protect environmentally sensitive and recreational features	<b>34.8%</b> 48	<b>48.6%</b> 67	<b>11.6%</b> 16	<b>2.9%</b> 4	<b>2.2%</b> 3	<b>100%</b> 138

**Do you agree with the Draft proposed directions for McDougall Creek?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Permit development geared towards tourists and residents such as condos, tourist accommodation or small commercial enterprises	<b>14.6%</b> 20	<b>53.3%</b> 73	<b>23.4%</b> 32	<b>4.4%</b> 6	<b>4.4%</b> 6	<b>100%</b> 137
Ensure that all new developments in this area include public waterfront provision	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>0.0%</b> 0	<b>100%</b> 0

**Do you agree with the following targets for increasing park land in the Waterfront Plan Area?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
By 2016 = 63.0 ha (12%)	<b>54.3%</b> 75	<b>31.9%</b> 44	<b>9.4%</b> 13	<b>2.2%</b> 3	<b>2.2%</b> 3	<b>100%</b> 138
By 2021 = 75.8 ha (14%)	<b>54.0%</b> 74	<b>29.9%</b> 41	<b>10.2%</b> 14	<b>3.6%</b> 5	<b>2.2%</b> 3	<b>100%</b> 137
By 2031 = 105.0 ha (20%)	<b>54.7%</b> 75	<b>26.3%</b> 36	<b>8.8%</b> 12	<b>7.3%</b> 10	<b>2.9%</b> 4	<b>100%</b> 137

**Do you agree with the following park acquisition priorities?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Linear park land that supports waterfront trail connections	<b>53.2%</b> 75	<b>39.7%</b> 56	<b>5.7%</b> 8	<b>0.0%</b> 0	<b>1.4%</b> 2	<b>100%</b> 141
Properties adjacent to existing recreation destinations that would expand current park services	<b>56.8%</b> 79	<b>25.9%</b> 36	<b>8.6%</b> 12	<b>4.3%</b> 6	<b>4.3%</b> 6	<b>100%</b> 139
Environmentally sensitive areas	<b>38.0%</b> 52	<b>38.0%</b> 52	<b>18.2%</b> 25	<b>2.9%</b> 4	<b>2.9%</b> 4	<b>100%</b> 137
Large or contiguous parcels that have capacity to support waterfront event space or programs	<b>54.7%</b> 76	<b>26.6%</b> 37	<b>14.4%</b> 20	<b>2.9%</b> 4	<b>1.4%</b> 2	<b>100%</b> 139
Parks in areas that are currently underserved	<b>37.6%</b> 53	<b>50.4%</b> 71	<b>9.2%</b> 13	<b>2.1%</b> 3	<b>0.7%</b> 1	<b>100%</b> 141

**Do you agree with the following funding sources for acquisition of waterfront park land?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Parks DCCs	<b>45.4%</b> 59	<b>37.7%</b> 49	<b>14.6%</b> 19	<b>1.5%</b> 2	<b>0.8%</b> 1	<b>100%</b> 130
Reserve Funds	<b>25.0%</b> 33	<b>52.3%</b> 69	<b>18.2%</b> 24	<b>3.0%</b> 4	<b>1.5%</b> 2	<b>100%</b> 132
Cash-in-Lieu	<b>17.2%</b> 23	<b>53.7%</b> 72	<b>20.9%</b> 28	<b>5.2%</b> 7	<b>3.0%</b> 4	<b>100%</b> 134
General Revenue (taxes)	<b>23.8%</b> 31	<b>33.1%</b> 43	<b>31.5%</b> 41	<b>6.9%</b> 9	<b>4.6%</b> 6	<b>100%</b> 130
Rezoning Contributions	<b>29.2%</b> 38	<b>50.0%</b> 65	<b>15.4%</b> 20	<b>3.8%</b> 5	<b>1.5%</b> 2	<b>100%</b> 130
Disposition of Underused Parkland	<b>47.0%</b> 62	<b>22.7%</b> 30	<b>11.4%</b> 15	<b>5.3%</b> 7	<b>13.6%</b> 18	<b>100%</b> 132

**Do you agree with the following Proposed General Directions for non-motorized boat launching?**

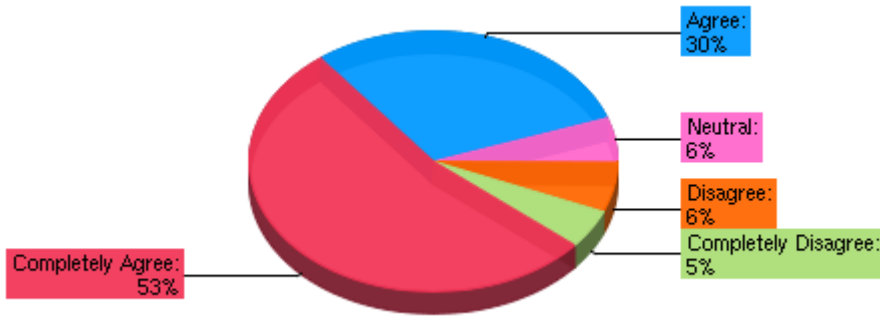
	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Plan to develop 2 formal non-motorized boat launches within the next 5 years	<b>49.3%</b> 72	<b>40.4%</b> 59	<b>6.8%</b> 10	<b>2.7%</b> 4	<b>0.7%</b> 1	<b>100%</b> 146
Work cooperatively with non-motorized boating organizations, individuals and/or businesses to develop public launch sites	<b>46.9%</b> 68	<b>46.9%</b> 68	<b>4.1%</b> 6	<b>1.4%</b> 2	<b>0.7%</b> 1	<b>100%</b> 145
Utilize the following criteria when selecting priority sites for non-motorized boating facility development:						
<ul style="list-style-type: none"> <li>• equal distribution along the waterfront;</li> <li>• sufficient existing parking or space for future parking;</li> <li>• safe access to the water;</li> <li>• minimal negative impacts to adjacent land uses; and</li> <li>• potential for boat storage or club use</li> </ul>	<b>59.0%</b> 85	<b>29.9%</b> 43	<b>7.6%</b> 11	<b>2.8%</b> 4	<b>0.7%</b> 1	<b>100%</b> 144

**Do you agree with the following sites for potential non-motorized boat launches?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Pebble Beach	<b>54.2%</b> 77	<b>26.8%</b> 38	<b>11.3%</b> 16	<b>3.5%</b> 5	<b>4.2%</b> 6	<b>100%</b> 142
Rotary Beach	<b>53.5%</b> 76	<b>26.1%</b> 37	<b>10.6%</b> 15	<b>6.3%</b> 9	<b>3.5%</b> 5	<b>100%</b> 142
Pritchard Utility Lot (Lake Access adjacent to Marjorie Pritchard Park)	<b>49.6%</b> 70	<b>32.6%</b> 46	<b>9.9%</b> 14	<b>5.7%</b> 8	<b>2.1%</b> 3	<b>100%</b> 141
Casa Loma Dock	<b>46.2%</b> 66	<b>28.7%</b> 41	<b>18.2%</b> 26	<b>2.8%</b> 4	<b>4.2%</b> 6	<b>100%</b> 143
Sailview Bay (New Park Location)	<b>49.0%</b> 70	<b>29.4%</b> 42	<b>16.8%</b> 24	<b>2.8%</b> 4	<b>2.1%</b> 3	<b>100%</b> 143

**Do you agree with the following directions for Gellatly Boat Launch?**

- Actively seek short-term opportunities to develop new launch facilities away from Gellatly Bay to reduce traffic congestion and environmental conflicts and enhance the development viability of the area.
- Secure a short-term parking solution for the existing launch, recognizing the medium-term plan is to relocate the launch.
- Remove the existing boat launch only when other facilities have been developed elsewhere in the area

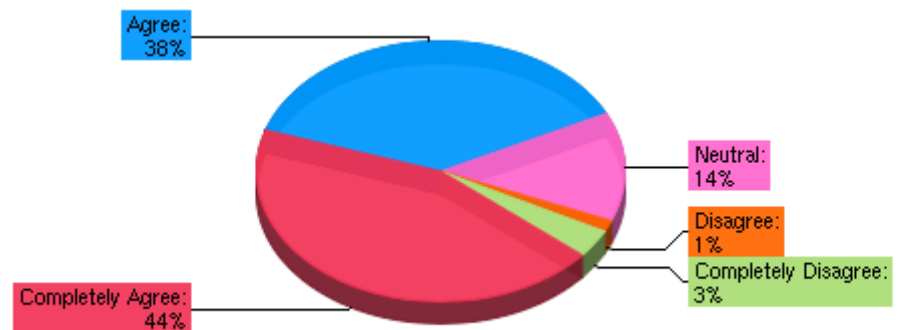


Value	Count	Percent %
Completely Agree	78	53.4%
Agree	44	30.1%
Neutral	8	5.5%
Disagree	9	6.2%
Completely Disagree	7	4.8%

Statistics	
Total Responses	146

**Do you agree with the following directions for Casa Loma Boat Launch?**

- Retain the existing boat launch
- Complete ongoing upgrades and maintenance to ensure the launch site remains functional
- Seek to secure off-street nearby boat trailer parking



Value	Count	Percent %
Completely Agree	62	44%
Agree	53	37.6%
Neutral	19	13.5%
Disagree	2	1.4%
Completely Disagree	5	3.5%

Statistics	
Total Responses	141

**Do you agree with the following proposed general directions for lake access development?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Where unpermitted encroachments are identified in lake accesses, work with property owner to remove	<b>53.6%</b> 81	<b>35.1%</b> 53	<b>7.3%</b> 11	<b>2.6%</b> 4	<b>1.3%</b> 2	<b>100%</b> 151
Do not approve future private use applications for lake accesses that would compromise public recreation use	<b>52.3%</b> 79	<b>17.2%</b> 26	<b>4.0%</b> 6	<b>4.0%</b> 6	<b>22.5%</b> 34	<b>100%</b> 151
Plan to develop at least 1 undeveloped lake access every 2 years for the next 10 years	<b>41.7%</b> 63	<b>41.7%</b> 63	<b>11.3%</b> 17	<b>2.0%</b> 3	<b>3.3%</b> 5	<b>100%</b> 151
Where lake accesses are developed, endeavour to provide buffers between private and public uses	<b>50.3%</b> 75	<b>28.9%</b> 43	<b>12.1%</b> 18	<b>6.0%</b> 9	<b>2.7%</b> 4	<b>100%</b> 149

**Lake accesses will be developed based on the following typologies and typical facilities (it should be noted that not all listed facilities would be developed on each site):**

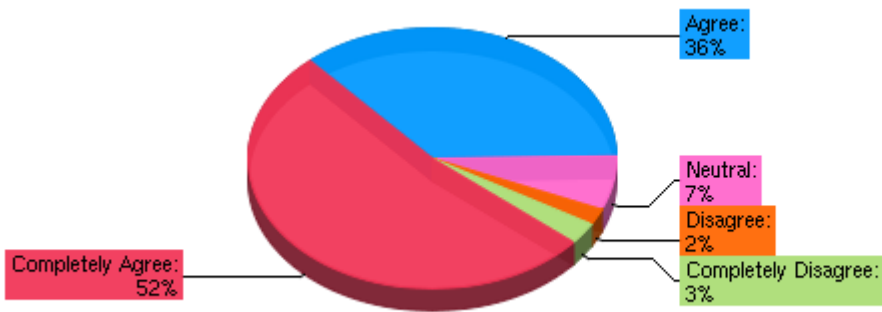
- Level 1: Naturalized - Beach, trail, selective clearing, native planting, seating, waste receptacles
- Level 2: Moderate - Picnic area, playground, garden space, lawn, dog beach, seating, trailhead amenities, parking
- Level 3: Active - Dock, non-motorized boat launch, washrooms, parking

**Do you agree with the following priority sites for lake access development and the typology suggested for each?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Whitworth Road #1 Level 1: Naturalized	<b>29.4%</b> 42	<b>51.0%</b> 73	<b>14.0%</b> 20	<b>2.8%</b> 4	<b>2.8%</b> 4	<b>100%</b> 143
Jennens Road Level 1: Naturalized	<b>25.2%</b> 35	<b>49.6%</b> 69	<b>18.0%</b> 25	<b>4.3%</b> 6	<b>2.9%</b> 4	<b>100%</b> 139
Hitchner Road Level 1: Naturalized	<b>23.4%</b> 32	<b>51.1%</b> 70	<b>18.2%</b> 25	<b>4.4%</b> 6	<b>2.9%</b> 4	<b>100%</b> 137
Pritchard Drive #1 Level 2: Moderate	<b>30.1%</b> 41	<b>47.1%</b> 64	<b>17.6%</b> 24	<b>3.7%</b> 5	<b>1.5%</b> 2	<b>100%</b> 136
Pritchard Drive #2 Level 1: Naturalized	<b>23.2%</b> 32	<b>52.2%</b> 72	<b>18.1%</b> 25	<b>4.3%</b> 6	<b>2.2%</b> 3	<b>100%</b> 138
Pritchard Utility Lot Level 3: Active	<b>29.2%</b> 40	<b>50.4%</b> 69	<b>16.1%</b> 22	<b>2.2%</b> 3	<b>2.2%</b> 3	<b>100%</b> 137
Green Bay #2 Level 1: Naturalized	<b>27.2%</b> 37	<b>50.7%</b> 69	<b>14.7%</b> 20	<b>5.1%</b> 7	<b>2.2%</b> 3	<b>100%</b> 136
Green Bay #5 Level 2: Moderate	<b>24.3%</b> 33	<b>57.4%</b> 78	<b>12.5%</b> 17	<b>2.9%</b> 4	<b>2.9%</b> 4	<b>100%</b> 136
Sunnyside Road Level 2: Moderate	<b>24.1%</b> 33	<b>53.3%</b> 73	<b>17.5%</b> 24	<b>2.9%</b> 4	<b>2.2%</b> 3	<b>100%</b> 137

**Do you agree with the proposed directions for Pebble Beach?**

- New sand volleyball courts (to replace the one proposed for removal at Powers Point Park)
- Non-motorized boat launching dock
- Additional furnishings
- Permanent washrooms
- Increased and formalized parking
- Vegetation buffers

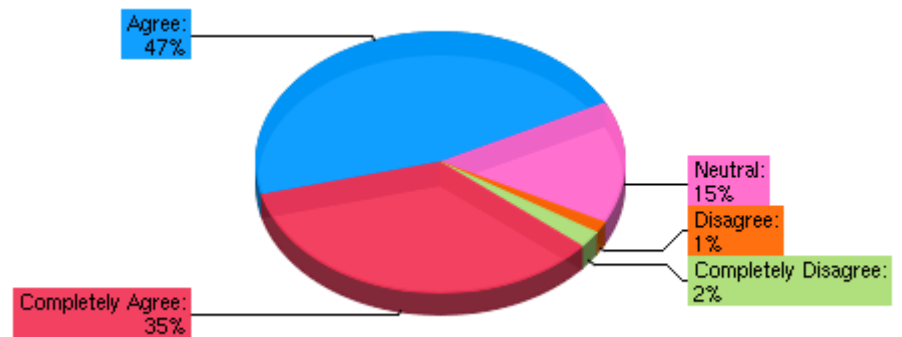


Value	Count	Percent %
Completely Agree	78	52.3%
Agree	54	36.2%
Neutral	10	6.7%
Disagree	3	2%
Completely Disagree	4	2.7%

Statistics	
Total Responses	149

**Do you agree with the proposed directions for Marina Park?**

- Current functions and amenities
- Additional programming, especially during low-use seasons

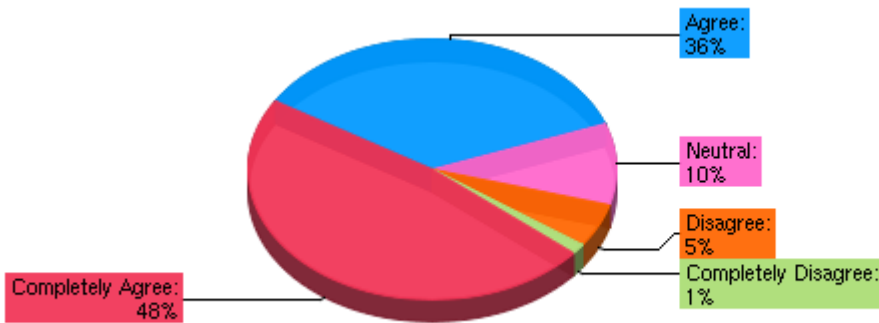


Value	Count	Percent %
Completely Agree	51	34.9%
Agree	68	46.6%
Neutral	22	15.1%
Disagree	2	1.4%
Completely Disagree	3	2.1%

Statistics	
Total Responses	146

**Do you agree with the proposed directions for Powers Point Park/Powers Creek?**

- Typical riparian delta community mosaic to enhance and restore fish and wildlife values (once an alternate boat launch has been developed)
- Interpretive boardwalk over the creek with a seating area and viewing platform
- Public art that celebrates the natural shoreline character

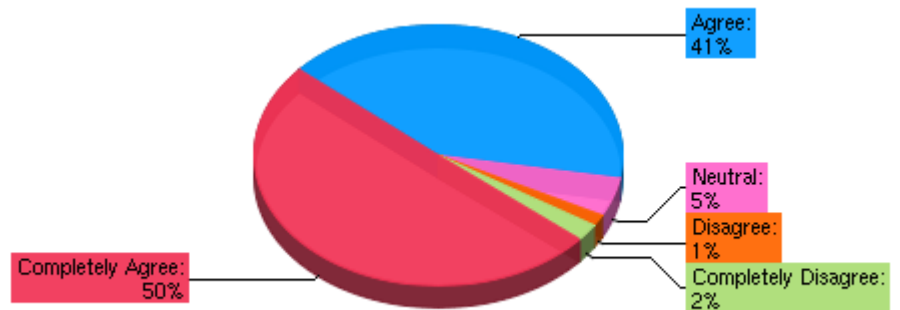


Value	Count	Percent %
Completely Agree	71	47.7%
Agree	53	35.6%
Neutral	15	10.1%
Disagree	8	5.4%
Completely Disagree	2	1.3%

Statistics	
Total Responses	149

**Do you agree with the proposed directions for Willow Beach?**

- Public pier with facilities for day moorage, seating areas and swim bay features
- Beach amenity area that includes improved public washrooms, concession area/vendor space and picnic seating
- Protected swimming bay
- Marked pedestrian crossing over Gellatly Road to connect Willow Beach with Kent Park and adjacent future commercial areas
- Small-scale tourism commercial zone within the pier to permit development of tourist services (e.g. water equipment rentals, tours provision, snack stand, etc.)

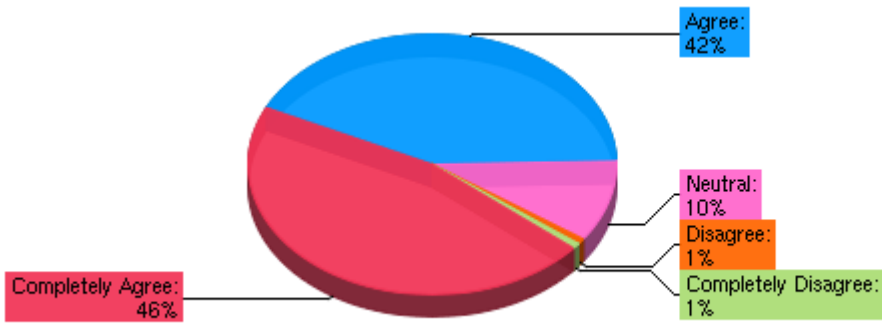


Value	Count	Percent %
Completely Agree	73	50.3%
Agree	60	41.4%
Neutral	7	4.8%
Disagree	2	1.4%
Completely Disagree	3	2.1%

Statistics	
Total Responses	145

**Do you agree with the proposed directions for Kent Park?**

- Improved pedestrian connection to Willow Beach
- Picnic shelter and/or barbecue area to accommodate large gatherings

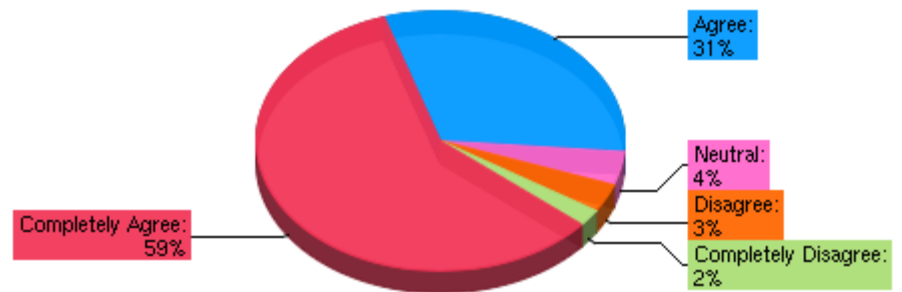


Value	Count	Percent %
Completely Agree	64	46%
Agree	59	42.4%
Neutral	14	10.1%
Disagree	1	0.7%
Completely Disagree	1	0.7%

Statistics	
Total Responses	139

**Do you agree with the proposed directions for CNR Wharf?**

- Reorganized parking plaza and improved streetscape
- Risk assessment of existing wharf and upgrades or replacement for safety
- Expanded dock area including day moorage
- Historical interpretive information
- Existing/improved diving dock and addition of other recreation amenities such as slides or swing ropes
- Lighting for security
- Public art that celebrates historical significance or agriculture
- Small-scale tourism commercial zone within the dock to permit development of tourist services (e.g. restaurant or pub)

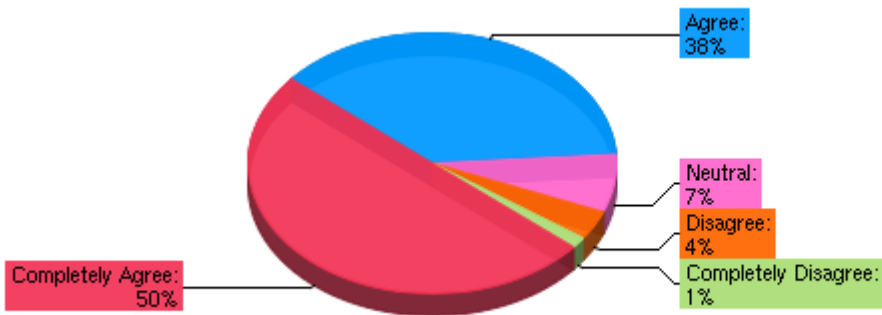


Value	Count	Percent %
Completely Agree	85	59%
Agree	45	31.3%
Neutral	6	4.2%
Disagree	5	3.5%
Completely Disagree	3	2.1%

Statistics	
Total Responses	144

**Do you agree with the proposed directions for Smith Creek?**

- Typical riparian delta community mosaic to enhance and restore fish and wildlife values
- Bridge/boardwalk pedestrian connection and plaza area over the creek
- Public art that celebrates the lake
- Gateway signage for Gellatly Bay

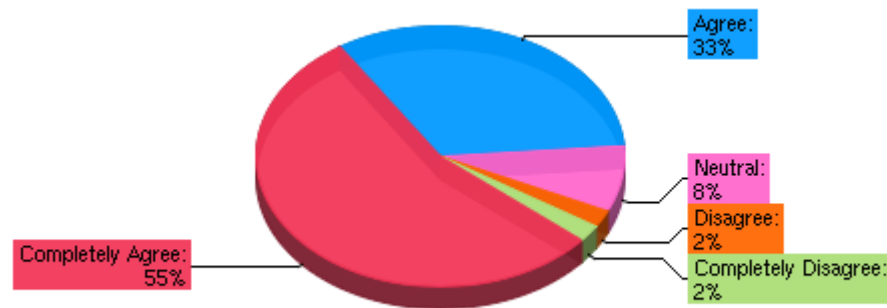


Value	Count	Percent %
Completely Agree	69	50%
Agree	52	37.7%
Neutral	10	7.2%
Disagree	5	3.6%
Completely Disagree	2	1.4%

Statistics	
Total Responses	138

**Do you agree with the proposed directions for Rotary Park?**

- Formalized dog beach at the north end of the park, away from the mouth of Smith Creek
- Non-motorized boat launch with a dock and paved ramp for transporting boats from the existing parking area to the beach
- Consideration for a non-motorized boat facility building in partnership with private enterprise or service group
- New washrooms

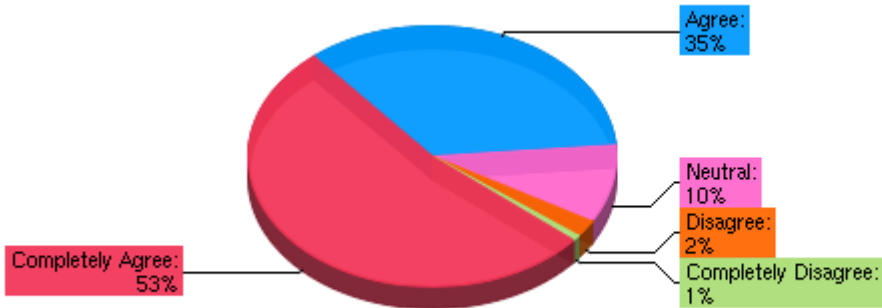


Value	Count	Percent %
Completely Agree	80	54.8%
Agree	48	32.9%
Neutral	12	8.2%
Disagree	3	2.1%
Completely Disagree	3	2.1%

Statistics	
Total Responses	146

**Do you agree with the proposed directions for Marjorie Pritchard Park?**

- Upgraded playground equipment
- Improved retaining to mitigate shoreline erosion and provide seating and interest
- Non-motorized boat launching dock (potentially on the adjacent utility lot)
- Expanded parking area
- New washrooms

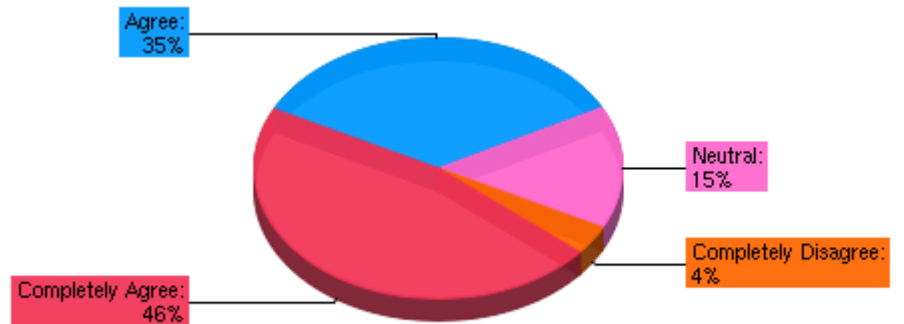


Value	Count	Percent %
Completely Agree	76	52.8%
Agree	50	34.7%
Neutral	14	9.7%
Disagree	3	2.1%
Completely Disagree	1	0.7%

Statistics	
Total Responses	144

**Do you agree with the proposed directions for Casa Loma Dock?**

- Formalized parking
- Landscaping
- Dock upgrades to widen and provide an entry point for non-motorized boat launching
- Day moorage
- Seating and picnic facilities

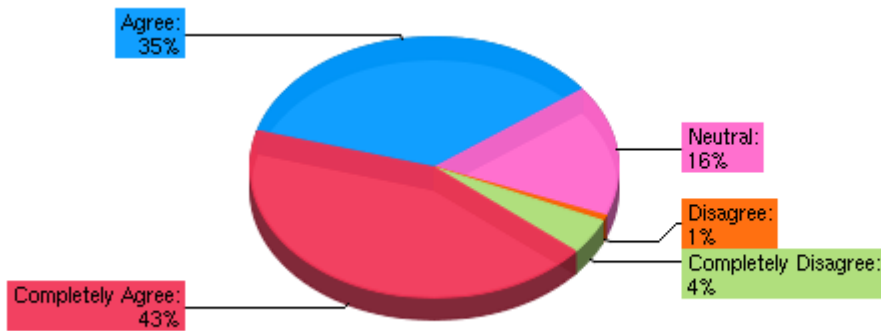


Value	Count	Percent %
Completely Agree	64	46.4%
Agree	48	34.8%
Neutral	21	15.2%
Completely Disagree	5	3.6%

Statistics	
Total Responses	138

**Do you agree with the proposed directions for Casa Loma Park?**

- Covered seating structure and picnic facilities
- New public washroom
- Shade trees

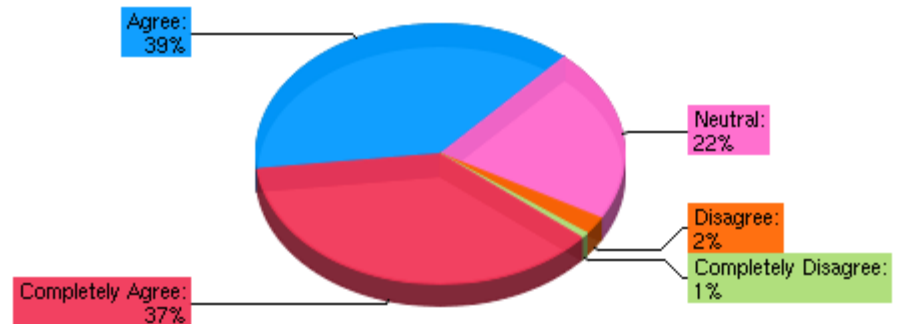


Value	Count	Percent %
Completely Agree	59	43.4%
Agree	48	35.3%
Neutral	22	16.2%
Disagree	1	0.7%
Completely Disagree	6	4.4%

Statistics	
Total Responses	136

**Do you agree with the proposed directions for Casa Rio Park?**

- Upgraded and expanded playground



Value	Count	Percent %
Completely Agree	50	37%
Agree	52	38.5%
Neutral	29	21.5%
Disagree	3	2.2%
Completely Disagree	1	0.7%

Statistics	
Total Responses	135

**Do you agree with the following proposed general directions for environmental protection and improvement?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Discourage new shoreline development in areas with high sensitivity and natural values	<b>44.8%</b> 64	<b>29.4%</b> 42	<b>18.2%</b> 26	<b>5.6%</b> 8	<b>2.1%</b> 3	<b>100%</b> 143
Use mitigation and compensation strategies to maintain or increase the overall existing ecological balance, while allowing opportunities for development	<b>25.2%</b> 35	<b>40.3%</b> 56	<b>25.2%</b> 35	<b>7.9%</b> 11	<b>1.4%</b> 2	<b>100%</b> 139
Use native or adaptive plant species in public spaces adjacent to the waterfront and watercourses	<b>37.4%</b> 52	<b>36.7%</b> 51	<b>21.6%</b> 30	<b>2.9%</b> 4	<b>1.4%</b> 2	<b>100%</b> 139
Consider periodic water skimming in high-use areas to rid the surface of debris, oil and gas slicks	<b>34.3%</b> 48	<b>35.7%</b> 50	<b>25.7%</b> 36	<b>3.6%</b> 5	<b>0.7%</b> 1	<b>100%</b> 140
Develop a water quality monitoring program for high-use shoreline areas and watercourses	<b>39.9%</b> 55	<b>35.5%</b> 49	<b>22.5%</b> 31	<b>1.4%</b> 2	<b>0.7%</b> 1	<b>100%</b> 138
Encourage removal of unpermitted retaining walls and avoid the use of new retaining walls, recognizing this will not be feasible in all locations	<b>42.4%</b> 59	<b>18.7%</b> 26	<b>18.0%</b> 25	<b>18.0%</b> 25	<b>2.9%</b> 4	<b>100%</b> 139
Develop best management practice educational materials for landowners living and working adjacent to creeks and shorelines	<b>39.7%</b> 56	<b>30.5%</b> 43	<b>24.1%</b> 34	<b>5.0%</b> 7	<b>0.7%</b> 1	<b>100%</b> 141
Seek opportunities for upstream day-lighting and riparian enhancements to buffer watercourses	<b>32.4%</b> 44	<b>32.4%</b> 44	<b>33.8%</b> 46	<b>0.0%</b> 0	<b>1.5%</b> 2	<b>100%</b> 136

### Do you agree with the proposed environmental improvement projects for the waterfront?

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Reinstate typical riparian delta communities at the mouths of Powers and Smith Creeks. Use these areas for compensation to offset development in other areas	<b>23.7%</b> 31	<b>35.9%</b> 47	<b>34.4%</b> 45	<b>5.3%</b> 7	<b>0.8%</b> 1	<b>100%</b> 131
Develop a functional wetland on municipal park land adjacent to Majoros Road to improve water quality in Smith Creek	<b>28.0%</b> 37	<b>41.7%</b> 55	<b>28.0%</b> 37	<b>2.3%</b> 3	<b>0.0%</b> 0	<b>100%</b> 132
Reconstruct the Smith Creek stream channel adjacent to Gellatly Road to eliminate downcutting and erosion	<b>31.3%</b> 41	<b>38.9%</b> 51	<b>27.5%</b> 36	<b>1.5%</b> 2	<b>0.8%</b> 1	<b>100%</b> 131
Revegetate the banks of McDougall Creek along Hitchner Road and install rock weirs and spawning gravels	<b>27.7%</b> 36	<b>40.0%</b> 52	<b>30.0%</b> 39	<b>2.3%</b> 3	<b>0.0%</b> 0	<b>100%</b> 130
Protect Green Bay Wetland by requiring all adjacent development to strictly adhere to Aquatic Ecosystem Development Permit guidelines	<b>39.5%</b> 51	<b>34.1%</b> 44	<b>22.5%</b> 29	<b>2.3%</b> 3	<b>1.6%</b> 2	<b>100%</b> 129
Collaborate with the owners of the park at Bowen Creek to enhance the riparian area	<b>22.3%</b> 29	<b>39.2%</b> 51	<b>35.4%</b> 46	<b>3.1%</b> 4	<b>0.0%</b> 0	<b>100%</b> 130
Develop wetlands and riparian enhancement around Casa Loma Spring	<b>24.4%</b> 32	<b>39.7%</b> 52	<b>33.6%</b> 44	<b>1.5%</b> 2	<b>0.8%</b> 1	<b>100%</b> 131

**Do you agree with the following proposed directions for trails?**

	Com- pletely Agree	Agree	Neutral	Disagree	Com- pletely Disagree	Total
Pursue the development of a continuous trail connection from Bennett Bridge to Peachland within the next 10 years. Wherever possible, align the trail on the shoreline	<b>55.3%</b> 83	<b>17.3%</b> 26	<b>24.0%</b> 36	<b>1.3%</b> 2	<b>2.0%</b> 3	<b>100%</b> 150
Develop a pedestrian link between Westbank Centre and Gellatly Bay	<b>53.7%</b> 80	<b>40.3%</b> 60	<b>4.7%</b> 7	<b>0.7%</b> 1	<b>0.7%</b> 1	<b>100%</b> 149
Negotiate and partner with private and public land owners, including Westbank First Nation, Regional District of Central Okanagan and developers to create linked trails	<b>53.7%</b> 80	<b>23.5%</b> 35	<b>20.1%</b> 30	<b>2.0%</b> 3	<b>0.7%</b> 1	<b>100%</b> 149
Pursue the long-term goal of a minimum 10 m trail right-of-way for public access along the shoreline. Require all future rezoning and subdivisions to provide this amenity	<b>53.4%</b> 79	<b>18.2%</b> 27	<b>2.0%</b> 3	<b>13.5%</b> 20	<b>12.8%</b> 19	<b>100%</b> 148
Where critical linkages for this 10 m right-of-way cannot be acquired through dedication, consider compensation such as increased density, density transfer, grants-in-aid, tax exemptions or land trade	<b>31.8%</b> 47	<b>26.4%</b> 39	<b>12.2%</b> 18	<b>16.9%</b> 25	<b>12.8%</b> 19	<b>100%</b> 148
Where it is unlikely a less expensive means of acquiring critical linkages of this 10 m right-of-way is possible, consider purchase of all or a portion of property. Where land is purchased for this purpose, offset costs by severing and reselling portions of land not required for linear connections	<b>36.6%</b> 53	<b>23.4%</b> 34	<b>11.7%</b> 17	<b>15.9%</b> 23	<b>12.4%</b> 18	<b>100%</b> 145

Incorporate bicycle parking at key destinations	<b>40.0%</b> 60	<b>40.0%</b> 60	<b>18.0%</b> 27	<b>1.3%</b> 2	<b>0.7%</b> 1	<b>100%</b> 150
Incorporate universal design strategies where feasible	<b>34.0%</b> 49	<b>23.6%</b> 34	<b>40.3%</b> 58	<b>1.4%</b> 2	<b>0.7%</b> 1	<b>100%</b> 144
Discourage renewal of license agreements for docks that impede public foreshore access below the high-water mark	<b>46.6%</b> 69	<b>17.6%</b> 26	<b>9.5%</b> 14	<b>3.4%</b> 5	<b>23.0%</b> 34	<b>100%</b> 148
Work with property owners to remove or modify identified barriers to public foreshore access	<b>51.4%</b> 76	<b>16.9%</b> 25	<b>27.0%</b> 40	<b>2.7%</b> 4	<b>2.0%</b> 3	<b>100%</b> 148
Develop public information on public and private foreshore rights	<b>51.0%</b> 75	<b>25.2%</b> 37	<b>22.4%</b> 33	<b>1.4%</b> 2	<b>0.0%</b> 0	<b>100%</b> 147

**Do you agree with the following general directions for vehicle access?**

	Com-pletely Agree	Agree	Neutral	Disagree	Com-pletely Disagree	Total
Include pedestrian and cyclist routes during waterfront road improvements	<b>52.0%</b> 78	<b>44.0%</b> 66	<b>2.7%</b> 4	<b>0.7%</b> 1	<b>0.7%</b> 1	<b>100%</b> 150
Where possible, separate pedestrian and cyclist uses from vehicle traffic using curbs and landscape	<b>52.0%</b> 77	<b>41.2%</b> 61	<b>5.4%</b> 8	<b>0.7%</b> 1	<b>0.7%</b> 1	<b>100%</b> 148
Introduce traffic-calming measures and reduced speed limits in areas with high pedestrian use	<b>46.7%</b> 70	<b>26.0%</b> 39	<b>6.7%</b> 10	<b>18.0%</b> 27	<b>2.7%</b> 4	<b>100%</b> 150
Collaborate with BC Transit to develop more frequent seasonal public transit connections and improved amenities	<b>36.7%</b> 54	<b>31.3%</b> 46	<b>27.2%</b> 40	<b>2.7%</b> 4	<b>2.0%</b> 3	<b>100%</b> 147
Support feasible private or partnership projects to increase waterfront connectivity through a water taxi system between Okanagan communities and/or ground-oriented shuttles between community destinations	<b>29.5%</b> 43	<b>29.5%</b> 43	<b>31.5%</b> 46	<b>6.8%</b> 10	<b>2.7%</b> 4	<b>100%</b> 146
Consider the development of a direct transit or shuttle connection between Westbank Centre and Gellatly Bay during high-use seasons	<b>31.5%</b> 46	<b>34.2%</b> 50	<b>24.0%</b> 35	<b>8.2%</b> 12	<b>2.1%</b> 3	<b>100%</b> 146
Consider requiring parking and traffic impact projections for future waterfront developments and consider undertaking a detailed parking analysis for Gellatly Bay and other areas identified	<b>38.8%</b> 57	<b>32.0%</b> 47	<b>7.5%</b> 11	<b>21.8%</b> 32	<b>0.0%</b> 0	<b>100%</b> 147
Seek to secure public parking as a development amenity in high-demand areas	<b>40.4%</b> 59	<b>28.8%</b> 42	<b>28.1%</b> 41	<b>2.1%</b> 3	<b>0.7%</b> 1	<b>100%</b> 146

In previously disturbed shoreline areas, consider moving shoreline stabilization to expand road surface for parking. Environmental compensation would be required	<b>28.4%</b> 42	<b>25.7%</b> 38	<b>18.2%</b> 27	<b>26.4%</b> 39	<b>1.4%</b> 2	<b>100%</b> 148
Implement wayfinding systems to waterfront recreation areas	<b>29.1%</b> 43	<b>27.0%</b> 40	<b>42.6%</b> 63	<b>0.7%</b> 1	<b>0.7%</b> 1	<b>100%</b> 148





## E FORESHORE INVENTORY & MAPPING – METHODOLOGY

Shoreline segments were based upon mapping standards developed for Sensitive Habitat Inventory and Mapping (SHIM) (Mason and Knight, 2001) and Coastal Shoreline Inventory and Mapping (CSIM) (Mason and Booth, 2004). The development of mapping initiatives such as SHIM, FIM and CSIM is an integral part of ecologically sensitive community planning.

The following is a summary of the Foreshore Inventory and Field Mapping Detailed Methodology.<sup>1</sup>

### Field Surveys

Field surveys along the West Kelowna shoreline were conducted from September 15 through 18, and October 13, 2009.

Field surveyors were each assigned data to collect during the surveys. Field assessors used 11x17 inch (Tabloid), scaled colour air photos with cadastral and topographic information to assist with field data collection. Two TRIMBLE GPS units with SHIM Lake v. 2.6 (FIM Data dictionary name) were carried and a hurricane antennae was also used. Finally, digital photographs, with a GPS stamp, were collected.

Other field surveys conducted included the GPS digital video, completed by Fisheries and Oceans Canada staff. The specifics of the GPS digital video are discussed in the FIM methodology.

The principle objectives of these video and photographic surveys were to:

- Photo document the shoreline for the main areas of development; and
- Record data relating to the presence or absence of development such as retaining walls and boat launches.

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<sup>1</sup> The complete methodology can be found under separate cover: *Schleppe, J., 2010. Okanagan Lake Foreshore Inventory and Mapping. Ecoscape Environmental Consultants Ltd. Project File: 10-596. 2011. Prepared for: Okanagan Collaborative Conservation Program.*

Weather during the surveys was generally overcast and no significant storm events occurred. Weather is an important consideration, particularly during the photo and video documentation portions of the assessment. Good photo documentation is vital because data analysis following data collection can be hindered by poor photography.

### **Methodology**

All of the methods outlined above for Foreshore Inventory and Mapping projects were carried out for this assessment. Daily information collected was downloaded to a laptop as a backup. Once downloaded, the entire database was reviewed for accuracy and corrections were made as necessary. Ecoscape

has attempted to ensure the data is as accurate as possible. However, due to the large size of the dataset, small errors may be encountered. These errors, if found, should be identified and actions initiated to resolve the error.

The following additional information was collected during field surveys:

1. The spatial extent of emergent grasses on flood benches, and areas of submergent and floating vegetation were mapped and photographed, to determine the approximate area where aquatic vegetation occurs. Aquatic vegetation includes any plants growing below the high water level of the lake. These areas are important fish habitat. Also, areas of extensive overhanging vegetation (from the high water level) were also mapped. Not all aquatic vegetation areas could be mapped due to the late timing of surveys and significant size of the foreshore in many areas. For these reasons, additional areas of vegetation may also occur that have not been identified within this assessment. Finally, high resolution air photos were only available for a portions of the shoreline; therefore, air photo interpretation accuracy is not as good within lower resolution air photo areas and information has been prepared as accurately as possible with data available. It should be noted that on larger littoral areas, vegetation mapping may not have captured all occurrences.
2. Small stream confluences, seepage areas and other features were also recorded.
3. Attempts were made to map the locations of boat launches, boat mooring zones / haul outs, extensive riparian areas and other features of interest. Not all locations of these features could be mapped due to the quality of air photos available at the time of survey.

### **Aquatic Vegetation Mapping and Classification**

Aquatic vegetation mapping was carried out for the entire shoreline, with focus on foreshore areas. For the purposes of this assessment, aquatic vegetation includes any plant life occurring below the high water level of the lake (including flood benches). Although some of the plants are not truly aquatic,

all are hydrophilic (water loving) and contribute to fish habitat. Vegetation mapping was completed by digitizing vegetation polygons from field observations recorded on air photos. Aquatic vegetation polygons are similar to Zones of Sensitivity identified within the Kelowna Shorezone Assessment. Vegetation communities were classified using Wetlands of British Columbia – A Guide to identification (Mackenzie and Moran, 2004) as follows:

### ***Marsh (Wm)***

A marsh is a shallowly flooded mineral wetland dominated by emergent grass-like vegetation. A fluctuating water table is typical in marshes, with early-season high water tables dropping throughout the growing season. Exposure of the substrates in late season or during dry years is common. The substrate is usually mineral, but may have a well-decomposed organic veneer derived primarily from marsh emergent. Nutrient availability is high (eutrophic to hyper-eutrophic) due to circum-neutral pH, water movement and aeration of the substrate.

### ***Low Bench Flood Ecosystems (Fl)***

Low bench ecosystems occur on sites that are flooded for moderate periods (< 40 days) of the growing season, conditions that limit the canopy to tall shrubs, especially willows and alders. Annual erosion and deposition of sediment generally limit understory and humus development.

### ***Mid Bench Flood Ecosystems (Fm)***

Middle bench ecosystems occur on sites briefly flooded (10-25 days) during freshet, allowing tree growth but limiting tree species to only flood-tolerant broadleaf species such as black cottonwood and red alder.

### ***Swamp***

A swamp is a forested, treed or tall-shrub, mineral wetland dominated by trees and broadleaf shrubs on sites with a flowing or fluctuating, semi-permanent, near-surface water table. Swamps occur on slope breaks, peatland margins, inactive

floodplain back-channels, back-levee depressions, lake margins and gullies. Tall-shrub swamps are dense thickets, while forested swamps have large trees occurring on elevated microsites and lower cover of tall deciduous shrubs.

### ***Aquatic Vegetation***

Sites not described by the current nomenclature developed by Mackenzie and Moran (2004) were stratified into the following biophysical groups:

1. Emergent Vegetation (EV) generally refers to grasses, Equisetum spp. (i.e., horsetails), sedges or other plants tolerant of flooding. Coverages within polygons needed to be consistent and well established to be classified as EV. These areas were generally not dominated by true aquatic macrophytes and tended to occur in steeper sloping areas.
2. Sparse Emergent Vegetation (SEV) refers to the same vegetation types as emergent vegetation, but in these areas coverage was generally not very dense or was very patchy. This vegetation was often patchy, due to the association with rocky beaches or due to intensive beach grooming.
3. Overhanging Vegetation (OV) consists typically of broadleaf vegetation that is growing over the lake, shading the near shore littoral zone. Overhanging vegetation was mapped where it was observed. Overhanging vegetation also occurred with Emergent Vegetation (EVOV) and with Sparse Emergent Vegetation (SVOV).
4. Submergent Vegetation (SUB) areas generally consisted of native Potamogeton spp. and is considered aquatic vegetation that does not break the water surface for most of the growing season. These areas were uncommon and only occurred in a few shallow bay areas.
5. Floating Vegetation (FLO) areas generally consisted of species such as native Potamogeton, pond lilies and other types of vegetation that has vegetative parts that floats.

### GIS and FIM Database Management

Data management for this project generally involved the following steps:

- Data and photos were backed up to a computer/laptop on a daily basis.
- A GPS camera that stamps photos and creates GIS shapefiles, and GPS video were used to facilitate data review and interpretation.
- Air photo interpretation was completed using high resolution air photos that were acquired during various flights by numerous agencies. All mapping was completed on the most recent and highest quality photos we could obtain.
- During data analysis, numerous checks were completed to ensure that all data was analyzed and accounted for.
- A spatial elevation model was run using GIS software, in combination with air photo interpretation and TRIM shoreline files to accurately determine the high water level of the lake. It is believed that for the length of the shoreline, the high water level used is within 5 m of the mean annual high water level for at least 50% of the lake. The HWL assessment for Okanagan Lake could be improved with higher resolution air photos when they become available and better digital elevation modeling. A site specific survey must be conducted to accurately determine the high water level for any site specific considerations and the line presented in this assessment should not be considered a surveyed HWL. For this assessment, the 343 contour elevation was considered the HWL. It is acknowledged that the mean annual high water level of the lake is approximately 342.6 m above sea level.

The following data fields were added to the FIM data dictionary:

1. Several fisheries fields were added. These fisheries fields are similar to the Zones of Sensitivity that were developed for the City of Kelowna Shorezone assessment (Schleppe and Arseneault, 2006). The following describes fisheries fields added and the original data source for the fields:
  - a) **Juvenile Rearing Shoreline Habitat Value** – High, Moderate and Low scores were prepared by Ecoscape for this project. Since shoreline utilization data is unavailable, juvenile rearing was based upon known rearing habitat requirements (e.g., proximity to spawning streams, littoral area, field observations, etc.).

- b) Migration** – Probable juvenile and adult fish migration routes (Yes or No) are important migration corridors used by resident fish at some point in their life cycle. These routes were prepared for this project and are based upon areas where fish will concentrate during significant spawning or out migrations from streams. Ecoscape prepared spatial files identifying areas of key migration and these areas were reviewed by Ministry of Environment biologists for confirmation. To develop these migration areas, key habitat characteristics were used and included adjacency to spawning rivers, outmigration considerations and review of fish life history characteristics. The limited data available for migration corridors on this lake has resulted in some assumptions. Further research is recommended to better understand the spatial extents of key migration corridors.
- c) Salmon Spawning Stream** – A Yes / No flag for this field was added. This field was added for the Juvenile Rearing Habitat value assessment and describes the shoreline segments where known salmon spawning streams occur. The spatial extent of this criterion is very similar to the “Staging” field.
- d) Staging** – A Yes / No field to describe salmon staging areas was added. Staging areas occur where fish will concentrate or congregate prior to migrations. Staging areas were created based upon liaison with Ministry of Environment and DFO staff through the course of field work on this assessment and based upon professional opinion of the author. Areas where fish were known to stage or hold prior to migrations and shore areas where migrations are likely present were identified (Yes or No). In general, these areas are loosely defined and vary over space and time. The information presented is limited to the confluences of known salmon spawning streams, where fish are known to congregate before migrations. Information is limited and it may not entirely reflect all locations or spatial extents of staging areas. Further, this field has generally not considered shore spawning kokanee migration areas. Future surveys should be used to better understand where mature adults hold during migrations.

- e) **Mussels** – The Western Ridged Mussel is the most important mussel species in the lake and listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as “endangered”. There is limited survey work for this species to identify key habitat areas for all life stages. Further, some of the host species are still unknown. For these reasons, Ecoscape used cautionary principles to apply this feature to the FIM dataset. The Red and Yellow Zones prepared by the Ministry of Environment identify known locations or highly suitable locations for adult stages. Shoreline segments that were in proximity to clusters, were considered to be suitable adult mussel habitat for the index. These areas may not identify all key habitat areas for all stages of the mussel. More detailed surveys should be completed and further work on understanding the life history should be undertaken to confirm and better identify the spatial extent of key habitat areas for all life stages of this species.
- f) **Kokanee Shore Spawning Zones** – The database contains a summary of the percentage and total shore length for the Black (Per\_Black, Bl\_Shore\_Length), Red (Per\_Red, Re\_Shore\_Length), Yellow (Per\_Yel, Yel\_Shore\_Length) and No Colour Zones (Per\_No\_Colour, No\_Colour\_Shore\_Length) identified within the Okanagan Large Lakes Protocol. These areas have been identified as the key habitat areas for spawning adults.
2. Western Grebe suitable nesting areas in the North Arm were identified. Suitable areas were based upon a significant presence of emergent bulrush vegetation. Suitability rather than known nesting locations were used due to the limited breeding area available or provided to us. Given that breeding grounds are limited, all suitable areas should be considered important.
  3. A rare plant species layer was added, using data from the OLLP. Only a few sites had rare plants identified, and a Yes / No flag was added to the database indicating the presence of rare plant species. Due to the limited survey information, this database field is not considered inclusive of all occurrences and others may exist.

4. Sensitive Ecosystem Inventory is available for most of the shoreline of Okanagan Lake. To include this sensitive terrestrial information within the AHI, the intersects between Wildlife Corridors, Core Conservation Areas, Other Areas of Importance and Not Applicable Areas polygons and shoreline segments was completed. For each segment, the total length of these different categories was used. For areas where SEI has not yet been completed, or areas where only Terrestrial Ecosystem Mapping was available, segments were manually classified by Ecoscape using similar criteria to the SEI. The following descriptions, taken directly from the Core Conservation Analysis and Updated Ecosystem Mapping for Central Okanagan Valley (Haney and Iverson, 2009) have been included for reference:
- a) **Core Conservation Areas** – Areas with a large concentration of high and some moderate conservation values were identified as core conservation areas. Ideally, activities would be primarily directed towards maintaining ecological and wildlife habitat values in these areas. There may be small areas within the core areas that could be accessed and developed without compromising core values (e.g., by fragmentation); further larger scale mapping and wildlife inventory would be needed to identify these areas. Core areas are high priorities for acquisition by land trusts, conservation organizations, Regional District and should be zoned for environmental purposes.
  - b) **Buffers** – Areas that are adjacent to sensitive areas and provide protection between natural and anthropogenic uses.

- c) **Wildlife Corridors** – Wildlife corridors provide animals with an opportunity to move freely between two or more habitat patches or habitat types in an otherwise fragmented landscape. This movement is essential to provide genetic links between populations and prevent inbreeding, and to compensate for temporary population declines in one of the habitat patches. The habitat needs of all priority species should be incorporated into the design of the corridor. Corridors must be suitably wide, with appropriate habitat features to provide security cover during movement. Corridors usually consist of linear habitats such as gully or streamside riparian areas; they are often composed of two or more ecosystem types to provide complexity to the corridor. Development and roads should avoid these zones, and mitigation will be required where roads and other developments transect the corridor. Wildlife corridors were identified to connect core areas to each other and to outside the study area. In some cases, important corridors have already been fragmented by roads or other disturbances, and connections need to be restored. Although challenging, it is imperative to restore connections through Ellison and the western portion of West Kelowna in particular. Larger scale mapping and additional wildlife inventory might identify some small areas that could be developed without compromising connectivity and other corridor values. This would depend upon the type and configuration of development and site-specific issues.
- d) **Other Important Conservation Areas** – Areas with a concentration of moderate conservation values, or small and isolated areas of high values, were identified as other important conservation areas. Activities would be directed towards maintaining ecological and wildlife habitat values. There would be areas within that could be accessed and developed without compromising some ecological values; further larger scale mapping and wildlife inventory would be needed to identify these areas.
5. An Aquatic Habitat Index results field was (AHI\_CUR) added. This field reflects the results of the AHI discussed below.

6. An Aquatic Restoration potential analysis (AHI\_POT) which was completed by removing instream features from the AHI results was also incorporated into the database. This analysis provides a summary of potential locations where habitat improvements are possible along the shoreline. This analysis does not consider improvements to riparian vegetation. A more detailed analysis of habitat restoration opportunities, including riparian restoration is advised in the future.



## F FORESHORE INVENTORY & MAPPING – SUMMARY OF RESULTS

The following section provides detailed descriptions of the each of the shoreline segments in the waterfront plan area. Refer to **Map 4.1: 2010 Foreshore Inventory & Mapping Segments** in the main report for segment locations.

### Area 1: Seclusion Bay/Goat's Peak

#### Segment #264 – Seclusion Bay

- *Length:* 501 m
- *Description:* 80% commercial and 20% rural, with disturbance occurring over 95% of the shoreline.
- *Shore Type:* Predominantly sand beach, with substrates consisting of 75% fines and 25% gravel. The mixed forest riparian area is utilized for recreation and is groomed with sparse cover (<5%). The littoral zone is moderate, with an average width of 22 m.
- *Modifications:* Retaining walls were documented as being continuous throughout the segment.
- *AHI Rating:* Low

#### Segment #263 – Goat's Peak

- *Length:* 1,658 m
- *Description:* Predominantly rural parcels, with 99% of the foreshore remaining in a natural state. The shoreline along Goat's Peak is the only location along the West Kelowna shoreline where kokanee shore-spawning occurs. In addition, the largely intact and natural ecosystems are known to be inhabited by wildlife species At Risk, as well as, the Goat's Peak ecosystems themselves are At Risk and of conservation concern.
- *Shore Type:* Primarily cliff bluff and substrates described as 70% bedrock, 20% boulder and 10% gravel. The natural riparian area is a narrow fringe and generally consists of sparsely vegetated rock, with some deciduous vegetation within gravel coves. The littoral zone is moderate with an average width of 20 m.
- *Modifications:* Docks, at a density of 0.6/km, and groynes at 5.1/km.
- *AHI Rating:* Very High

## Area 2: Gellatly Bay/Powers Creek

### Segment #262 – Whitworth Road

- *Length:* 1,378 m
- *Description:* Urban residential area, with approximately 95% of the segment exhibiting anthropogenic disturbance.
- *Shore Type:* Gravel beach with substrates described as 100% gravel. Beach grooming throughout this segment has been continuous and the broadleaf riparian category generally consists of a groomed understory with an overstory of non-native tree species. The littoral zone width is around 40 m throughout.
- *AHI Rating:* Moderate

### Segment #261 – The Cove Resort

- *Length:* 170 m
- *Description:* Multi-family development that has resulted in 100% of the shoreline being disturbed.
- *Shore Type:* A retaining wall fragments the lake and foreshore from adjacent upland for over 70% of the segment. Forshore and littoral substrates are predominantly gravel with an association of sand and cobble and about 5% armoured with rip rap.
- *AHI Rating:* Low

### Segment #260 – Gellatly Road (Cove Resort to the West Kelowna Yacht Club)

- *Length:* 298 m
- *Description:* Urban residential with 100% of the shoreline disturbed.<sup>1</sup>
- *Shore Type:* Gravel beach, consisting of 60% gravel and 40% sand, with the riparian area throughout the segment consisting of groomed landscaping with sparse shore cover (<5%).
- *Modifications:* Dock density of 30.2 docks/km.
- *AHI Rating:* Moderate

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<sup>1</sup> Magnan and Cashin 2005.

#### Segment #259 – Marina Park & West Kelowna Yacht Club

- *Length:* 132 m
- *Description:* The primary land use is park, although it also contains the yacht club marina. The segment has been disturbed to some degree over 100% of the shoreline.
- *Shore Type:* Sand beach and substrates consist of 100% fines. The riparian area class is herbs and grasses with a recreation qualifier, with sparse (<5%) shore cover. The littoral zone is moderate with an average width of 15 m.
- *Modifications:* Retaining walls and a marina.
- *AHI Rating:* Moderate

#### Segment #258 – Powers Creek Alluvial Fan

- *Length:* 602 m
- *Description:* Confluence of Powers Creek with Okanagan Lake. The segment has been disturbed to some degree over 100% of the shoreline.
- *Modifications:* Continuous retaining walls, a boat launch, dock and groyne.
- *AHI Rating:* Very High

#### Segment #257 – Gellatly Bay

- *Length:* 866 m
- *Description:* Park with disturbance occurring over 100% of the shoreline.
- *Shore Type:* Gravel beach with substrates consisting of 70% gravel and 30% fines. Riparian vegetation consists of groomed grasses, with riparian vegetation removal throughout the segment. The littoral zone is moderate with an average width of 15 m.
- *Modifications:* Retaining walls are continuous throughout the shoreline, with rip rap occurring below the high water mark.
- *AHI Rating:* Moderate

#### Segment #256 – Smith Creek Confluence

- *Length:* 172 m
- *Description:* This segment includes the mouth of Smith Creek, where a small number of kokanee have been documented to spawn, with staging occurring in the bay.
- *Shore Type:* Gravel beach with substrates consisting of 70% gravel and 30% fines. Riparian vegetation consists of groomed grasses, with riparian vegetation removal throughout the segment. The littoral zone is moderate with an average width of 15 m.
- *AHI Rating:* High

#### Segment #255 – Rotary Park

- *Length:* 402 m
- *Description:* Park with disturbance occurring over 100% of the shoreline.
- *Shore Type:* Gravel beach with substrates consisting of 70% gravel and 30% fines. Riparian vegetation consists of groomed grasses, with riparian vegetation removal throughout the segment. The littoral zone is moderate with an average width of 15 m.
- *Modifications:* Retaining walls are continuous throughout the shoreline, with rip rap occurring below the high water mark.
- *AHI Rating:* Moderate

### Area 3: McDougall Creek

#### Segment #254 – South of McDougall Creek (to Westbank First Nation)

- *Length:* 210 m
- *Description:* Single family residential.
- *Shore Type:* Substrates are 45% sand and 55% gravel. The riparian area exhibits abundant (>50%) shrub cover and emergent aquatic vegetation was documented along 10% of the segment. The littoral zone is wide, with an average width of 55 m.
- *AHI Rating:* Moderate

#### Segment #253 – McDougall Creek Confluence

- *Length:* 196 m
- *Description:* Single family land use, with approximately 40% of the shoreline disturbed.
- *Shore Type:* Substrates are 45% sand and 55% gravel. The riparian area exhibits abundant (>50%) shrub cover and emergent aquatic vegetation was documented along 10% of the segment. The littoral zone is wide, with an average width of 55 m.
- *AHI Rating:* Very High

#### Segment #252 – Barona Bay

- *Length:* 378 m
- *Description:* Disturbed over 100% of the shore length, including a large marina (Barona Beach). Land use is primarily high density multi-family with associated landscaped riparian area.
- *Shore Type:* Gravel beach, with substrates consisting of 45% sand and 55% gravel. Landscaped riparian area. The littoral zone is moderate, with an average width of 30 m.
- *Modifications:* 2 marinas, docks at a density of 11 per km; 8 groynes per km; and 10% of the shore length has retaining walls. Substrate modification has occurred over 100% of the segment length.
- *AHI Rating:* Moderate

#### Segment #251 – Pritchard Drive

- *Length:* 1,154 m
- *Description:* Disturbed over 100% of the segment length. Land use is single family throughout.
- *Shore Type:* Gravel beach with substrates of 45% fines and 55% gravel. Landscaped riparian area with patchy distribution of trees and shrubs. Riparian vegetation has largely been replaced with non-native species and turf. The littoral zone is moderate, with an average width of 50 m.
- *Modifications:* Docks and retaining walls are prevalent, with 90% of the segment containing retaining walls and docks at a density of 26 per km. Modifications also include groynes at a density of 8 per km, 3 boat launches and 100% modification of natural substrates.
- *AHI Rating:* Low

#### Segment #250 – Green Bay Bible Camp

- *Length:* 796 m
- *Description:* Anthropogenic disturbance over 100% of the shoreline. The predominant land use is single family residential, with elements of multifamily and institutional land uses.
- *Shore Type:* Gravel beach and substrates consisting of 50% sand and 50% gravel. The riparian area is heavily modified with landscaping and includes patchy distribution of trees and shrubs. The littoral zone width is wide, at an average of 75 m.
- *Modifications:* Small, private marinas (6-20 slips), substrate modification over 100% of the segment, docks at a density of 11 per km, 3 boat launches, 5 groynes per km and 15% of the shore length modified with retaining walls.
- *AHI Rating:* Low

#### Segment #249 – Green Bay

- *Length:* 1,049 m
- *Description:* Primary land use is single family residential. Anthropogenic disturbance has occurred over 100% of the segment.
- *Shore Type:* Gravel beach and lake substrates described as 20% sand, 60% gravel, 15% cobble and 5% boulder. Landscaped riparian area, with moderate (10-50%) coverage of trees and shrubs, patchily distributed between private properties. Approximately 30% of the shore length was noted to have emergent aquatic vegetation. The littoral zone is moderate with an average width of 40 m.
- *Modifications:* Retaining walls along 95% of the foreshore, docks at a density of 32 per km, groynes at a density of 13 per km, 1 marina rail and 100% substrate modification.
- *AHI Rating:* Moderate

#### Segment #248 – Green Bay Marsh

- *Length:* 612 m
- *Description:* Agricultural land use occurs throughout the segment, with 70% of the shoreline remaining in a relatively natural state.
- *Shore Type:* Wetland shore type, with 49% of the segment consisting of gravel beach.
- *AHI Rating:* Very High

## Area 4: Lakeview/Sunnyside

### Segment #247 – Sunnyside Road

- *Length:* 1,270 m
- *Description:* Primary land use is urban residential, with anthropogenic disturbance occurring in approximately 99% of the segment. Reported disturbance during the FIM survey consisted of continuous beach grooming.<sup>2</sup>
- *Shore Type:* Gravel beach, with the littoral zone encompassing an approximately 30 m width. Substrates in the nearshore area are described as being predominantly gravel (50%), with lesser amounts of fines (40%) and boulder (10%).<sup>3</sup>
- *AHI Rating:* Moderate

### Segment #246 – Kalamoir Park

- *Length:* 1,943 m
- *Description:* This park has high natural values containing intact vegetated shorelines with pockets of cliff-bluff reaching to the lake. Upland from the lake natural grassland, pine savanna, and sparsely vegetated cliffs, bedrock outcrops and talus features occur.
- *AHI Rating:* High

## Area 5: Casa Loma

### Segment #245 – Casa Loma Single-Family Residential

- *Length:* 1,522 m
- *Description:* 100% of the shore is altered. About 95% of the shoreline is single family urban with the balance occupied by multi-family/resort development.
- *Shore Type:* Substrates are predominantly gravel and gravel with coarser substrates associated with exposed points and occurring as a narrow band along the wave wash zone. The littoral zone width is moderate, ranging from about 20 m to 50 m.
- *Modifications:* Retaining walls are prevalent and are estimated to account for about 90% of the shoreline. 38 docks occur along this segment amounting to a density of about 25 docks/km. In addition, there are 2 marinas (i.e., commercial or strata multi-slip moorages) along this segment.
- *AHI Rating:* Low

<sup>2</sup> Magnan and Cashin 2005.

<sup>3</sup> Magnan and Cashin 2005.

#### Segment #244 – Campbell Road Low Development

- *Length:* 362 m
- *Description:* This segment occurs north of the Casa Loma subdivision. A narrow riparian fringe occurs along the south portion of the segment accounting for about 30% of the shore length. The balance of the shoreline is altered by agricultural and rural practices.
- *Shore Type:* Substrates are predominantly a mix of sand and gravel with coarser substrates associated with the shoreline prominence.
- *Modifications:* Retaining structures that account for about 30% of the shore length. Just 1 dock occurs along this segment.
- *AHI Rating:* Moderate

#### Segment #243 – Campbell Road Rural Residential

- *Length:* 308 m
- *Description:* A series of urban, single family waterfront lots. About 90% of the segment has been modified by development. The balance (10%) is less altered due to incomplete build out and increased building setbacks (in the north) associated with topographic constraints, restricting development of the shoreline.
- *Shore Type:* Substrates are predominantly gravels with an association of sand.
- *Modifications:* Shoreline retaining structures account for about 80% of the segment. 7 docks presently amount to a density of about 23/km.
- *AHI Rating:* Moderate

#### Segment #242 – Campbell Road Undeveloped

- *Length:* 318 m
- *Description:* Agricultural lands, with a steeper bank that defines the limit of cultivated field resulting in a more intact riparian fringe (90% of segment length) and tall rush shore marsh.
- *Shore Type:* The shore marsh, predominated by bulrush species (*Scirpus* sp.), occurs on mineral substrates predominated by a mix of sand and gravel. This narrow community is generally continuous over the segment length. The more intact riparian fringe and shore marsh communities combine to yield a high habitat index rating associated with increased fish and wildlife and biodiversity values along the shoreline.
- *AHI Rating:* High

#### Area 6: Sailview

#### Segment #238 – Sailview Bay

- *Length:* 744 m
- *Description:* Agricultural lands used for orchard crops. However, a steeper bank defines the limit of cultivated field resulting in a more intact riparian fringe (80% of segment length). The riparian fringe is a mature broadleaf (predominantly black cottonwood) community that occurs along the lower steep slope and lakeshore bench. A well-developed tall shrub understory and abundance of snags persist throughout this fringe community and the littoral habitats remain generally undisturbed. This generally intact riparian fringe and foreshore yields a high habitat index rating associated with increased fish and wildlife and biodiversity values along the shoreline.
- *AHI Rating:* High



## G WATERCOURSE EVALUATION – METHODOLOGY

Using existing Sensitive Habitat Inventory and Mapping Data (SHIM), Ecoscape assigned a Level of Impact Rating and Habitat Score to all creeks occurring in the West Kelowna waterfront area. Using this methodology, main watercourse segments were evaluated for Level of Impact (modification of shoreline on both sides of creek) and for Habitat Potential (intrinsic value of watercourse for supporting habitat). This rating system was designed with the intent of providing a more measurable parameter in evaluating the watercourse condition and monitoring and evaluating habitat changes on local watercourses and associated riparian and floodplain communities.

### Methodology for Level of Impact Score

Individual reach scores for watercourses were assigned based on the criteria outlined in Table F.1.

Stream Impact Criteria <sup>1</sup>	Combined Segment Score
Nil-Nil (Nil impacts on both banks)	6
Nil-Low	5
Nil-Mod	4
Nil-High	3
Low-Low	4
Low-Mod	3
Low-High	2
Mod-Mod	2
Mod-High	1
High-High (High impacts on both banks)	0

<sup>1</sup> Numeric Bank Impact Scores: Nil=3 Low=2 Mod=1 High=0

Weighted scores for respective impact ratings were obtained by dividing the cumulative length of segments receiving the same SHIM impact rating by the total SHIM stream length to obtain a fractional abundance (% of SHIM stream length). This value was then multiplied by the respective SHIM Score (0-6) equaling the weighted score. A zero (0) to six (6) rating system was developed to evaluate respective stream segments in terms of degree of disturbance, where a stream segment not being recently modified (natural) received a score of 6 (nil), and a stream segment being highly modified on both banks (channelized, ditched, etc.) received a score of 0 (both banks high). The sum of weighted scores was divided by the maximum attainable score (6)<sup>1</sup> and transformed into a percentage value to yield a stream condition score.

### Methodology for Habitat Potential Score

A habitat value score was assigned to each watercourse based on its intrinsic value. Factors such as fish habitat, riparian condition (natural, anthropogenic modifications), stream magnitude, level of impairment and flows were used to assign a rating between 0 and 1; with Low Habitat Value receiving a 0 and Very High Habitat Value up to a 1. Respective habitat ratings were assigned based on information compiled during the various field surveys and analysis and data compilation. The following ratings were adapted from the fish passage protocol<sup>2</sup> to consider potential capability based on channel morphology and hydrology – also recognizing that many of the watercourses have been altered by anthropogenic factors:

- **Very High Habitat Rating (0.76 - 1.0)** was assigned to streams where high-value spawning or rearing habitats were recorded or have the potential to occur with appropriate restoration (e.g. Locations with abundance of suitably sized gravel, deep pools, undercut banks, stable large woody debris and well-vegetated, natural riparian area).

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<sup>1</sup> A combined weighted score of 6 would be attained if all segments were natural with no discernible human disturbance on either the right or left bank. Note this evaluation does not factor in impacts upstream of the District of West Kelowna municipal boundary limit, which could still impact on water quality and habitat values.

<sup>2</sup> BC MOE, 2008.

- **High Habitat Rating (0.51 - 0.75)** was assigned to watercourses with suitable spawning habitat and a moderate rearing potential for fish species present. These systems may also have higher gradients (limiting the availability of higher quality spawning and production capacity) in conjunction with smaller catchment areas.
- **Moderate Habitat Rating (0.26 - 0.50)** was assigned to watercourses without suitable spawning habitat and having low rearing potential (e.g. Locations with highly modified banks, lacking in fish habitat features). A Moderate habitat rating may have been assigned to watercourses, which remain in a relatively natural state with limited anthropogenic impacts, although fisheries value may be limited due to ephemeral drainage.
- **Low Habitat Rating (0 - 0.25)** was assigned to ephemeral, intermittent and discontinuous watercourses/drainages. A Low rating may also be assigned to streams that have been intensively modified.

The above habitat ratings are based primarily on aquatic habitat values. However, while some watercourses may receive a relatively low habitat rating, their intrinsic value should not be overlooked. Many ephemeral riparian gullies support or have potential to support high biodiversity values in urban and suburban contexts. Recognizing this, efforts should continue to protect and restore riparian, transitional and wetland sites along these watercourses regardless of aquatic habitat values.



# H MODEL FOR QUANTIFYING RELATIVE HABITAT VALUE & COMPENSATION

## Shoreline Protection & Enhancement

The waterfront has a variety of functions and this plan proposes a balanced approach to shoreline protection and development. In this scenario, the quality of the water becomes critical in maintaining and upgrading the variety and scale of experiences offered on the waterfront. Existing ecosystems should be protected through the preservation of high sensitivity shoreline segments and the restoration of high quality shoreline areas. Where shoreline improvements are proposed that would reduce the overall balance of shoreline environmental quality, mitigation and compensation measures will be required to ensure no net loss of West Kelowna's overall shoreline quality occurs.

### Model for Quantifying Relative Habitat Value

The *Aquatic Habitat Index*<sup>1</sup> has assigned *AHI* ratings to each linear segment of shoreline homogeneous in character (identified as a FIM segment). The *Foreshore Inventory Mapping (FIM)* that informed the *Aquatic Habitat Index* forms the basis from which more detailed habitat stratification is completed.

Evaluating net change of waterfront design improvement projects will be based on quantifying the current productivity (P<sub>now</sub>); defined as the sum of relative habitat values (Table 4.3) for all subareas occurring within a defined area (e.g. Gellatly Bay shoreline from Powers Creek to Smith Creek). Stratification of the shoreline and nearshore areas into discreet polygons (based on categories below defined in the table) and scoring each polygon based on the Relative Habitat Value shown in the table will yield a current productivity (P<sub>now</sub>) rating for shoreline areas based on weighted scores relative to the maximum potential productivity (P<sub>max</sub>). Deriving a P<sub>now</sub> score for the all potential capital project areas will permit the evaluation of projects in both a one-off and cumulative approach – helping to direct sustainable and ecological responsive design, ensure a net ecological gain and to streamline respective project approvals with senior regulatory agencies (i.e., MNRO and DFO). Evaluating projects and informing design requirements will use the net change equation:<sup>2</sup>

1 Ecoscape, 2011.

2 Minns, 1997,

Net Change Equation:

$$\Delta P_{now} = \Sigma[(P_{mod_{sa}} - P_{now_{sa}}) * A_{mod_{sa}}] - \Sigma(P_{max_{sa}} * A_{loss_{sa}})$$

Where

- $P_{now_{sa}}$  = the relative current habitat value of the sub area/habitat unit
- $P_{mod_{sa}}$  = the relative habitat value of the modified sub area/habitat unit
- $A_{mod_{sa}}$  = the area (m<sup>2</sup>) of modified sub area/habitat unit (change from current spatial extents)
- $P_{max_{sa}}$  = the maximum relative habitat value of the sub area
- $A_{loss_{sa}}$  = area of sub area lost/removed

The above equation will be informed by a habitat balance table using the relative habitat values for each habitat unit (subarea). Estimating the compensation ratios will use the formula:

$$A_{mod}/A_{loss} = 1/(P_{mod}-P_{now}).$$

These equations imply quantitative conservation targets overall and loss-offsetting equivalencies in modified habitat areas (i.e., waterfront parks and restored/enhanced riparian and stream mouth areas).

Table H.1: Relative habitat value ratings and recommended compensation ratios for respective riparian and foreshore subareas (polygons of homogeneous structural and biophysical composition).

Group	Qualifier	Comment	Relative Habitat Value <sup>3</sup>	Unit	Compens. Ratio (for loss)
Building	Urban		0	m <sup>2</sup>	
Road	Urban	Paved road	0	m <sup>2</sup>	
Retaining wall	Modified		0	l.m.	
Trail/path	Urban	Semi-pervious	0.1	m <sup>2</sup>	
Exposed soil	Disturbed		0.1	m <sup>2</sup>	
Shoreline armouring	Modified	e.g. rip rap	0.2	l.m.	
Turf	Urban	grass/herb lawns	0.2	m <sup>2</sup>	

Group	Qualifier	Comment	Relative Habitat Value <sup>3</sup>	Unit	Compens. Ratio (for loss)
Landscape - shrub	Urban	Non-native horticultural varieties/ landscaping	0.2	m <sup>2</sup>	
Beach	Urban	Groomed recreational swimming beach	0.2	m <sup>2</sup>	
Pasture/Field	Agriculture	Hayfield/horse pasture	0.25	m <sup>2</sup>	
Row Crops	Agriculture	Orchard/vineyard	0.3	m <sup>2</sup>	
Landscape - treed	Urban	Native understory strata generally absent consisting of turn and landscaping	0.4	m <sup>2</sup>	1:1
Over Water Structures - Littoral (m <sup>2</sup> )	Dock/ Wharf/ Marina	Overwater structures that result in minimal loss of productive capacity (i.e. piling footprint) but modify aquatic habitats and production	0.5	m <sup>2</sup>	
Shoreline armouring and bioengineering	Modified	Rock with large woody debris and revegetation	0.5	l.m.	
Marsh	Disturbed		0.6		
Low Shrub	Natural	Native shrub communities (e.g. big sage, rabbit bush, rose, snowberry)	0.7	m <sup>2</sup>	2:1
Over Water Structures - Deep Water (m <sup>2</sup> )	Dock/ Wharf/ Marina	Overwater structures that result in minimal loss of productive capacity (i.e. piling footprint) but modify aquatic habitats and production	0.75	m <sup>2</sup>	
Marsh	Natural	Tall rush communities - cattail/bulrush	0.8	m <sup>2</sup>	1.5:1
Treed (coniferous/ mixed)	Natural	Native understorey consisting of shrub and herb strata	0.9	m <sup>2</sup>	3:1
Tall shrub	Natural	Native shrub communities (e.g. red osier dogwood, willow, douglas maple)	0.9	m <sup>2</sup>	2.5:1
Treed riparian	Natural	Cottonwood riparian ecosystem associated with riparian shrub communities (i.e., red osier dogwood, willow sp., douglas maple, sedges)	1	m <sup>2</sup>	3:1
Shallow open water	Natural	Non beach area that contains submerged macrophytes and structural cover	1	m <sup>2</sup>	1:1

### Example Habitat Balance Equation

Applying the Relative Habitat Values from Table G.1, Table G.2 (below) provides an example Habitat Balance for Powers Creek. The calculations are based on the conceptual improvements proposed for Powers Creek in the Waterfront Plan (see p.94 in the main report).

Table G.2. Example Habitat Balance Table using existing sub area relative habitat scores for Powers Creek and potential attainable values adapting the concept plans illustrated in the Waterfront Plan

<b>Current Relative Habitat Value of the Powers Creek Confluence (<math>P_{now}</math>)</b>			
<b>Sub Area</b>	<b>Area (m<sup>2</sup>)</b>	<b>Relative Habitat Value</b>	<b>Sub Area Score</b>
Turf	1528	0.2	0.05673
Retaining Wall	94	0	0.00000
Exposed Soil	20	0.1	0.00037
Treed Riparian	194	1	0.03601
River	861	1	0.15983
Treed Riparian	192	1	0.03564
Tall Shrub	255	0.9	0.04260
Low Shrub	194	0.7	0.02521
Low Shrub	72	0.7	0.00936
Exposed Soil	224	0.1	0.00416
Turf	845	0.2	0.03137
Road	908	0	0.00000
<b>Total</b>	<b>5,387</b> <b>(<math>A_{now}</math>)</b>		<b>0.40128</b> <b>(<math>P_{now}</math>)</b>

<b>Modified Relative Habitat Value (based on conceptual improvements identified in the Waterfront Plan) of the Powers Creek Confluence (<math>P_{mod}</math>)</b>			
Sub Area	Area (m <sup>2</sup> )	Relative Habitat Value	Sub Area Score
Marsh	589	0.8	0.03525
Low Shrub	210	0.7	0.01100
Marsh	439	0.8	0.02627
Treed Riparian	1001	1.0	0.07487
Marsh	953	0.8	0.05703
Tall Shrub	264	0.9	0.01777
Marsh	823	0.8	0.04925
River	1546	1.0	0.11564
Side Channel	289	1.0	0.02162
Treed Riparian	936	1.0	0.07001
Marsh	555	0.8	0.03321
Shallow Open Water	2699	1.0	0.20188
Treed Riparian	2710	1.0	0.20271
Tall Shrub	355	0.9	0.02390
<b>Total</b>	<b>13,369</b> ( $A_{mod}$ )		<b>0.94040</b> ( $P_{mod}$ )

**Area net change ( $A_{mod} - A_{now}$ ) = +7,982 m<sup>2</sup>**

**Net Change Score ( $A_{mod} * P_{mod}$ ) - ( $A_{now} * P_{now}$ ) = 10,410.6**

The positive Net Change Score represents potential credits that could be used to offset ecological losses related to other developments in the waterfront area. Credits should be developed and banked for all waterfront projects to ensure continued Ecological Net Gain occurs.