APPENDIX A: PUBLIC ENGAGEMENT REPORTS

Courtenay
Integrated Flood Management Study
Draft Recommendations Survey

welcome

Flooding is a historic concern in the Courtenay and lower Puntledge and Tsolum River areas. The City is updating its floodplain mapping and comparing mitigation options in an Integrated Flood Management Study.

Please provide your input in this survey.

The study will identify flood mitigation strategies, both for today and for projected climate change scenarios at Year 2100 and 2200 accounting for potential sea level rise. The goal is to ensure gradual improvements to the waterfront and floodplain are based on a long-term understanding.

This response form is intended to gather community input on the draft recommendations and identify areas of further study.

Please complete your response no later than
Friday, February 15, 2013.

Would you rather complete this survey online?

Please go to:
www.courtenay.ca

Courtenay
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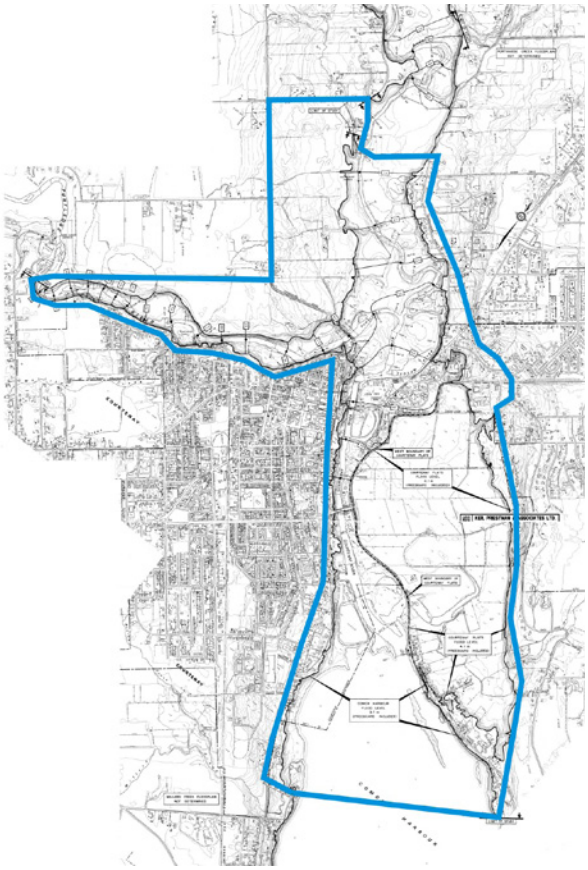
about the floodplain

The Courtenay/Comox floodplain is central to First Nation, agriculture and more recent urban settlement in Comox Valley. The rich soils in the estuary and agricultural parts of the floodplain are a result of interaction between glacier and river waters and the sea. Just as natural systems do, agriculture and human settlements must adapt to the regular flooding of low areas. What adaptations to current and future climate and flood risk are optimum? How can improvements maintain or increase values for habitat, recreation and resilience?

where is the current plan area?

The study area is outlined on the map below - including the significant floodplain and adjacent upland areas of the lower Tsolum, Puntledge and Courtenay Rivers adjacent to the Comox Estuary.



the site today

Flood events have occurred regularly in the study area. This photo is from November 2009.

Courtenay
Integrated Flood Management Study
Draft Recommendations Survey

A. demographics

1. **Which best describes where you live?**
   - ☐ On property within the study area (received a direct mail invite)
   - ☐ Within City of Courtenay, but not in the study area
   - ☐ Within K'omoks First Nation housing
   - ☐ Other (please specify) _____

2. **In which age group are you?**
   - ☐ Under 19
   - ☐ 19 to 34
   - ☐ 35 to 49
   - ☐ 50 to 74
   - ☐ 75 or More

3. **What gender are you?**
   - ☐ Male
   - ☐ Female

4. **Have you attended any of the Previous Integrated Flood Management Study workshops? (Please select all that apply).**
   - ☐ Introductory Event - June 28, 2012
   - ☐ Regulators Workshop - June 28, 2012
   - ☐ Options Workshop - November 15, 2012
   - ☐ K'omoks FN Outreach - December 14, 2012

Courtenay
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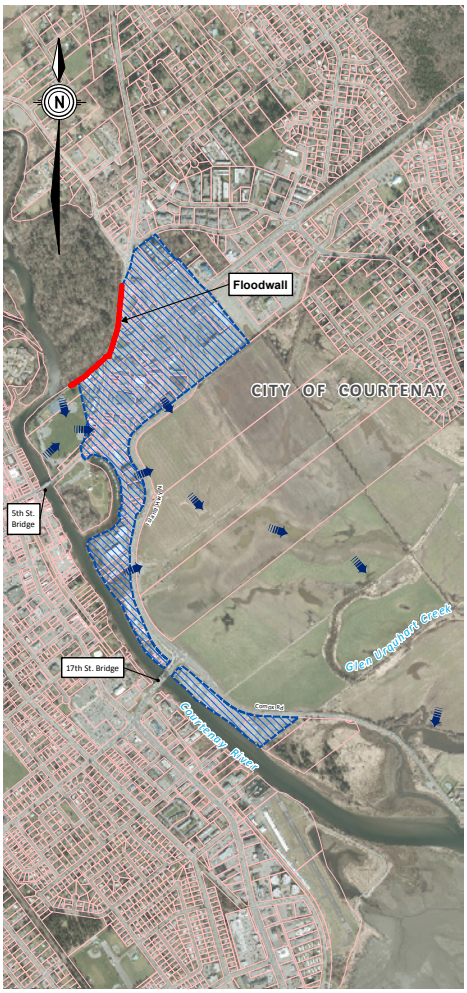
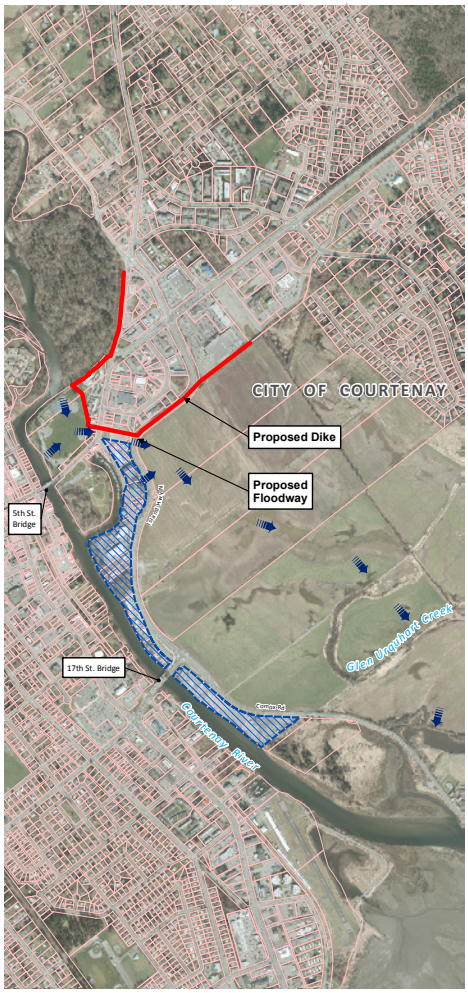
flood management options

The 3 Flood Management Options below were outlined at the final public event and will be referred to in the Draft Recommendations on the following pages.



OPTION 1 - Floodwall Option

OPTION 2 - Ring Dike Option



OPTION 3 - Partial Ring Dike and Floodway Option

Legend

Area of Managed Retreat or Flood Proofing

Overland Flood Route

Courtenay
Integrated Flood Management Study
Draft Recommendations Survey

B. Draft Recommendations

5. **Do you support further study and costing of the following Draft Recommendations, or do you have better ideas or related comments?**

i) Managed Retreat: Continue to protect the majority of the floodplain in compatible uses that will accommodate floods

- Avoid new dikes along the Courtenay River where existing natural environment remains.
- Adapt, but do not raise, the Comox Dike in recognition that is will be overtopped in large events, as is the existing situation.
- Discourage dikes on the Puntledge and Tsolum Rivers as well.
- Encourage continued agriculture/ wildlife/ recreation management uses in the majority of the floodplain. Work with such landowners to recognize the need for any related structures to be designed to withstand occasional flooding.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

ii) Proceed with the installation of a floodwall (option 1 - see pg.4)

- To reduce flooding extents in <50 Year events.
- To employ existing cost-sharing.
- Subject to satisfactory environmental review and permitting.
- With careful attention to the visual appearance of the wall.
- To keep possible future integration of larger flood protection dikes with the floodwall.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

B. Draft Recommendations Cont'd...

iii) Review Emergency Plans for today, Year 2100 and 2200

- Review key emergency routes, to analyze how these routes might need to be raised to avoid flooding in today's climate, Year 2100 and Year 2200 potential flood levels, and to identify potential land requirements and cost.
- Make recommendations to Council to refine emergency routes and related adaptation / evacuation strategies.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

iv) Identify where and when additional diking might be warranted for consideration

- Option 2 and 3 (see pg. 4) have been identified for potential dikes – identify other localized areas that might be considered for diking eventually e.g. Komoks FN built-up area, Millard Road area.
- Identify where emergency access improvements already protect some of these areas.
- Compare plans, and compile a final set of options for diking, and the year that such diking might be required.
- Analyze under Step v) prior to decisions to invest in diking.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

Courtenay
Integrated Flood Management Study
Draft Recommendations Survey

B. Draft Recommendations Cont'd...

v) Evaluate diking options including financial and cost sharing analysis

- Investigate scale, land requirements, habitat compensation and capital cost required for diking beyond emergency routes – consider climate change implications on future investment required.

- Summarize joint funding opportunities, including a mix of senior government, property owner (development cost charge or special levy) and local government finance.

- Review the public benefit:cost of each option considering all of the above, as well as the relative current and build-out assessed value of the area protected for each option.

- Undergo public review and make recommendations to Council, which might include a mix of selected dike areas, building floodproofing and managed retreat.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

vi) Update guidance for Flood Construction Levels (FCL) and floodproofing of buildings

- The Floodplain Maps give Flood Construction Levels (FCLs) to guide the minimum elevation of habitable portions of buildings.

- For today's climate, the existing (1990) FCLs are generally adequate.

- As Provincial Policy solidifies, adjust local flood management bylaws to require new buildings to respect FCLs at the END of their likely building life (e.g. Year 2100).

- Clarify the bylaw policy that habitable parts of buildings inside dikes needs to be above the FCL.

- Update guidance and best practices on floodproofing of buildings outside dikes.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

B. Draft Recommendations Cont'd...

vii) Undertake long-term Climate Change Adaptation Planning in coordination with senior governments

- Establish Sea Level Rise (SLR) Planning Areas using the floodplain mapping provided.

- Apply for senior government assistance for updating public information, guidelines, and planning approaches within SLR Planning Areas.

- Incorporate policy changes into regular Official Community Plan and Zoning Bylaw reviews, as well as infrastructure and asset management.

- Consider long-term financial approaches to manage climate adaptation, in coordination with senior governments and private landowners.

☐ Support

☐ Support with Refinements

☐ Don't Support

Refinements or Comments: _____

_____

_____

6. Do you have any other comments you would like to share about flooding in Courtenay and the study area?

Courtenay
Integrated Flood Management Study
Draft Recommendations Survey

thank you!

Thank you for taking the time to complete this survey. Your responses, along with those of fellow community members, will help guide the development of floodplain management recommendations for Courtenay and the study area.

To return your paper survey:

- ***Drop it off*** or ***mail*** it to the City of Courtenay offices:

  Attn: Eva Harding
  Administration Coordinator, Operational Services Dept
  City of Courtenay
  830 Cliffe Ave., Courtenay BC V9N 2J7

- ***Fax it*** to the City of Courtenay at: **250 703 4864**
- ***Scan and e-mail*** to: **engineering@courtenay.ca**

Do you know anyone else who would be interested in filling out this survey?

Please direct them to: www.courtenay.ca

how to stay informed

The Courtenay Integrated Flood Management Study will be completed over the next few months. To remain involved:

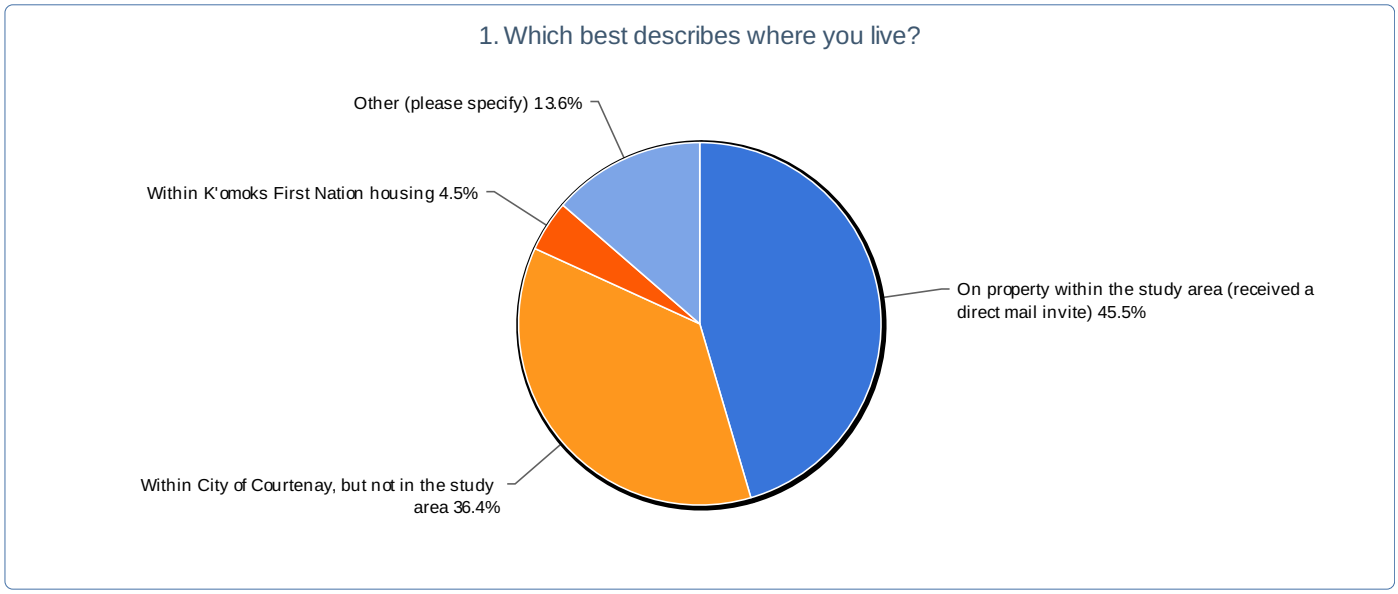
- Check the website at www.courtenay.ca where we will report on the feedback to date and share info, options and ideas for flood management.

- If you have questions or comments about this process, please email:

  engineering@courtenay.ca

Summary Report - Feb 19, 2013

Survey: Courtenay Integrated Flood Management Study - Draft Recommendations Survey

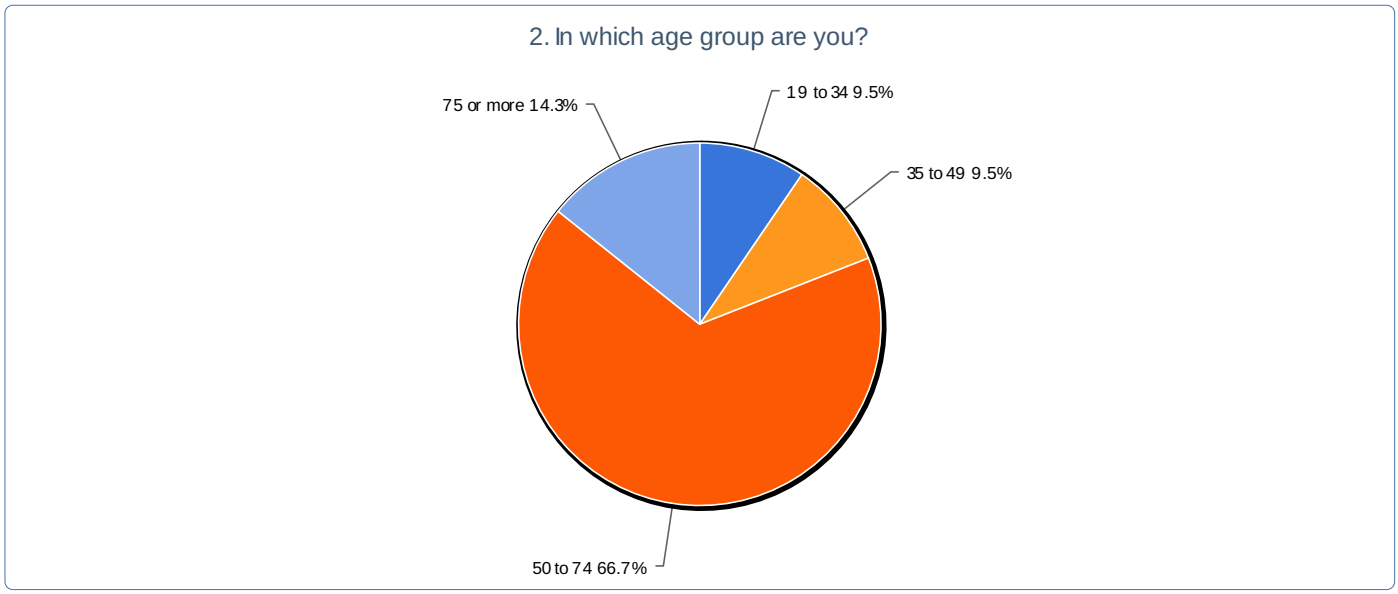


1. Which best describes where you live?

Value	Count	Percent %
On property within the study area (received a direct mail invite)	10	45.5%
Within City of Courtenay, but not in the study area	8	36.4%
Within K'omoks First Nation housing	1	4.6%
Other (please specify)	3	13.6%

Statistics	
Total Responses	22

Open-Text Response Breakdown for "Other (please specify)"	Count
Business within study area	1
Comox	1
I own commercial property at 250 Island Highway (Finneron Hyundai)	1



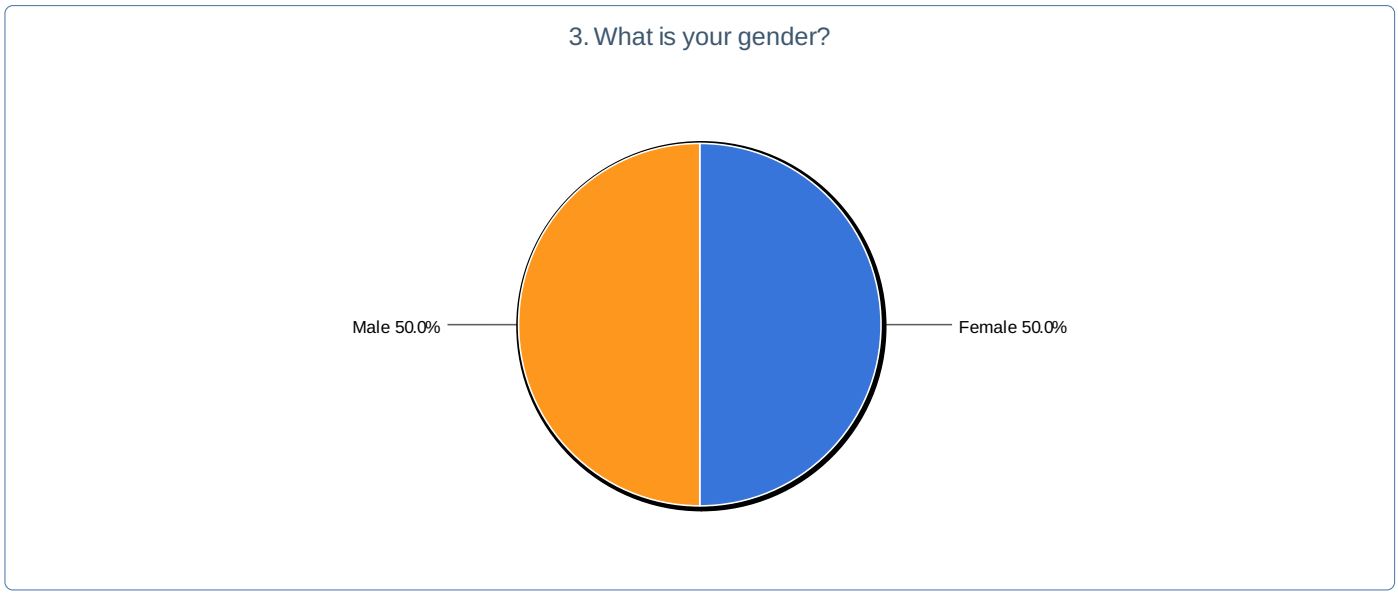
2. In which age group are you?

Value	Count	Percent %

Statistics

Under 19	0	0.0%
19 to 34	2	9.5%
35 to 49	2	9.5%
50 to 74	14	66.7%
75 or more	3	14.3%

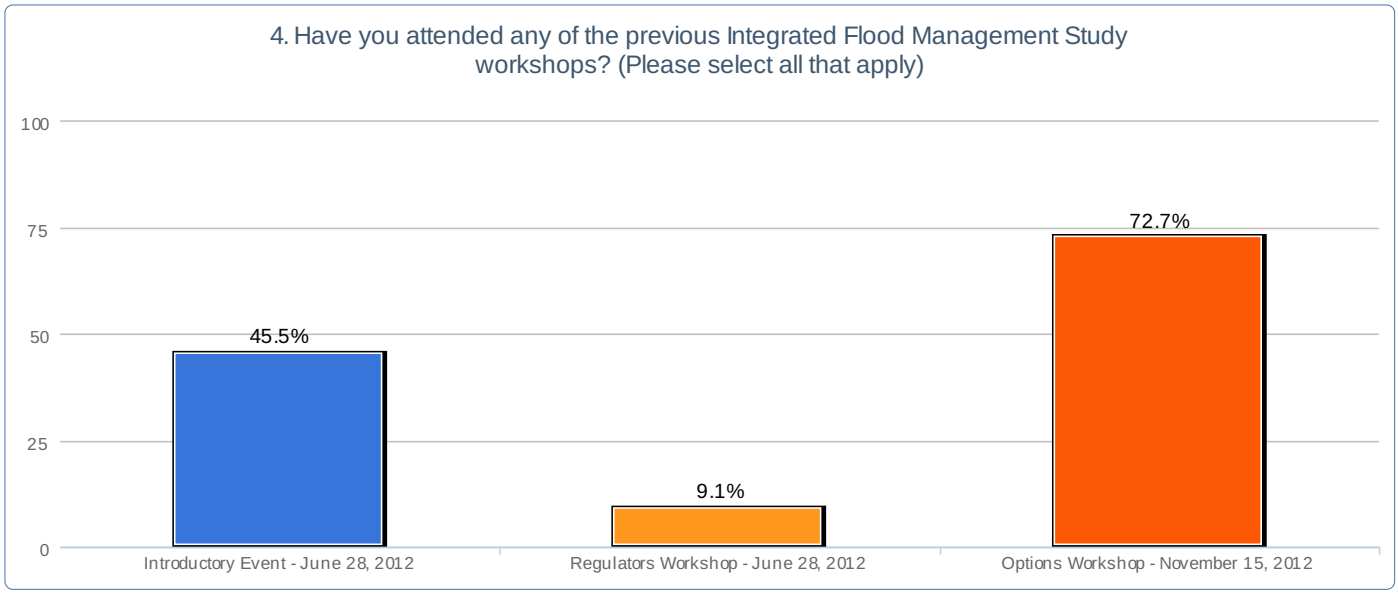
Total Responses	21
Sum	333.0
Avg.	47.6
StdDev	24.5
Max	75.0



3. What is your gender?

Value	Count	Percent %
Female	11	50.0%
Male	11	50.0%

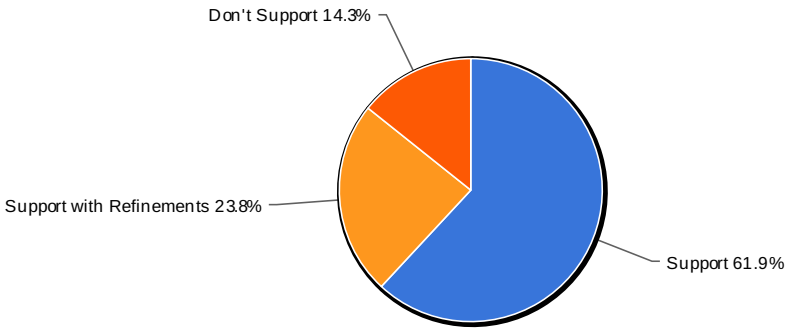
Statistics	
Total Responses	22



4. Have you attended any of the previous Integrated Flood Management Study workshops? (Please select all that apply)

Value	Count	Percent %
Introductory Event - June 28, 2012	5	45.5%
Regulators Workshop - June 28, 2012	1	9.1%
Options Workshop - November 15, 2012	8	72.7%
K'omoks FN Outreach - December 14, 2012	0	0.0%

Statistics	
Total Responses	11



i) Managed Retreat: Continue to protect the majority of the floodplain in compatible uses that will accommodate floods- Avoid new dikes along the Courtenay River where existing natural environment remains.- Adapt, but do not raise, the Comox Dike in recognition that is will be overtopped in large events, as is the existing situation.- Discourage dikes on the Puntledge and Tsolum Rivers as well.- Encourage continued agriculture/ wildlife/ recreation management uses in the majority of the floodplain. Work with such landowners to recognize the need for any related structures to be designed to withstand occasional flooding.

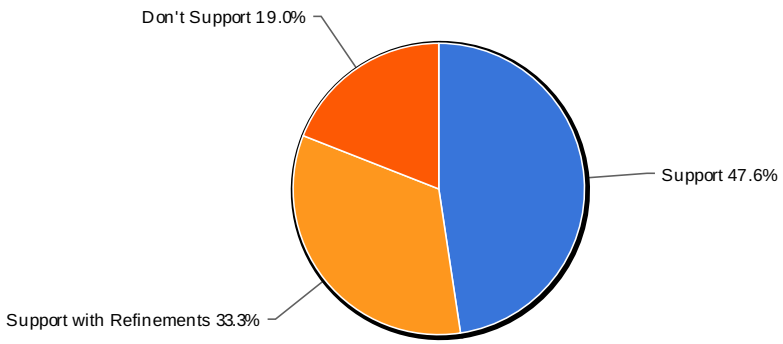
Value	Count	Percent %
Support	13	61.9%
Support with Refinements	5	23.8%
Don't Support	3	14.3%

Statistics	
Total Responses	21

Comments

Count	Response
1	Avoid/discourage dikes along the Courtenay River.
1	These are poorly wonded questions
1	Strongly support an integrated approach that is environmentally sensitive because it makes economic and ecological sense.
1	prefer natural systems of flooding to floodplain and beyond, allow minor roads to carry flooding and floodplains to inundate
1	allow/facilitate flooding to historic floodplain through traditional, natural courses ..... utilize existing minor roads, raise and bridge/culvert major arterial routes .....
1	agree with all except - discourage dikes on Puntledge... Buld river dyking from CRA pool bunker and concrete flooding wall to Coopers corner (at comox valley) refrigeration shop
1	If you assume a two metre rise in sea level, then a dyke system for the estuary is vital for success of flood control by whatever means.

ii) Proceed with the installation of a floodwall (option 1 - see below)- To reduce flooding extents in <50 Year events.- To employ existing cost-sharing.- Subject to satisfactory environmental review and permitting.- With careful attention to the visual appearance of the wall.- To keep possible future integration of larger flood protection dikes with the floodwall.



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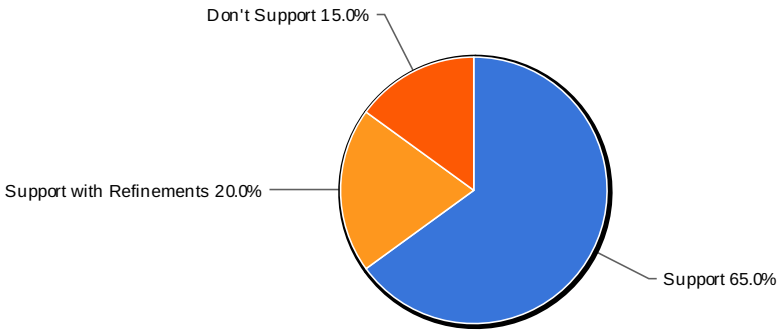
Value	Count	Percent %
Support	10	47.6%
Support with Refinements	7	33.3%
Don't Support	4	19.1%

Statistics	
Total Responses	21

Comments

Count	Response
1	Shifts flood burden upsteam to Maple Pool and Puntledge IR.
1	ensure any structures are able to integrate with future strategies that employ the use of natural flooding patterns
1	Teh floodwall needs to be integrated with annual tide levels, migratory species patterns; rainfall levels; and development. In other words, it is a static solution that would be placed within an ever changing physical environment. Nature is the superiour force - use it rather than fight it.
1	ensure construction will be compatible with naturally re-established flows and SLR projects as outlined in Bi Managed Retreat .....
1	Really I think its a waste - will never be enough as sea level Rises. Don't Bother - Mostly Old/Derect, unnecessary (Vallue + car lots) In 20 yrs we won't even have car lots

iii) Review Emergency Plans for today, Year 2100 and 2200 - Review key emergency routes, to analyze how these routes might need to be raised to avoid flooding in today's climate, Year 2100 and Year 2200 potential flood levels, and to identify potential land requirements and cost.- Make recommendations to Council to refine emergency routes and related adaptation / evacuation strategies.



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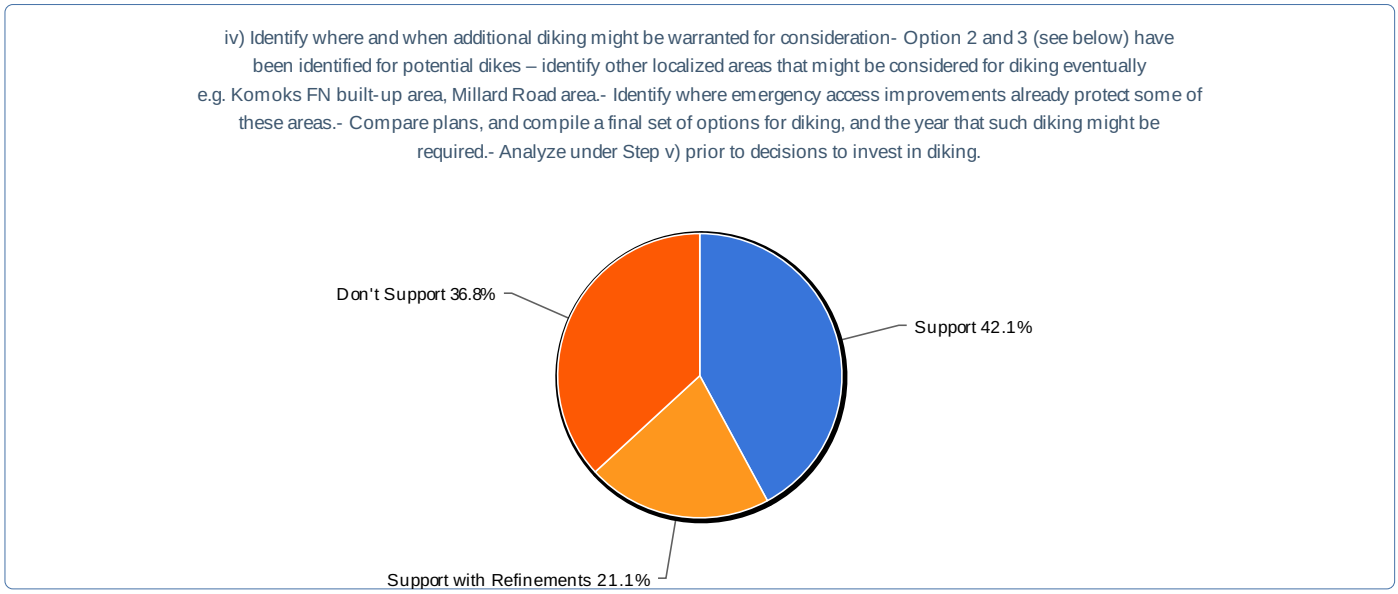
Value	Count	Percent %
Support	13	65.0%
Support with Refinements	4	20.0%
Don't Support	3	15.0%

Statistics	
Total Responses	20

Comments

Count	Response
1	Move the Hospital site Now
1	Only if raised routes provide flood relief and don't acts as dikes.
1	consult with CV EP Coordinator on Disaster Response Routes (which has apparently not been done)
1	to include the year 2050 in the planning review
1	Educate all river residents including businesses so they know how to respond during a crisis. Grandfather existing development. Insist upon high standards for new projects, whether residential, commerical, or public services.
1	ensure collaboration with the CV Emergency Program Coordinator re: Disaster response Routes as this has not yet been done



iv) Identify where and when additional diking might be warranted for consideration- Option 2 and 3 (see below) have been identified for potential dikes – identify other localized areas that might be considered for diking eventually e.g. Komoks FN built-up area, Millard Road area.- Identify where emergency access improvements already protect some of these areas.- Compare plans, and compile a final set of options for diking, and the year that such diking might be required.- Analyze under Step v) prior to decisions to invest in diking.

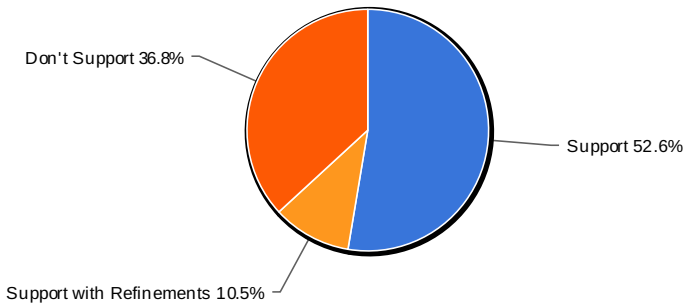
Value	Count	Percent %
Support	8	42.1%
Support with Refinements	4	21.1%
Don't Support	7	36.8%

Statistics	
Total Responses	19

Comments

Count	Response
1	Investigate flood relief before any diking is considered.
1	Dikes are band-aids. They are hard surfaces that won't encourage biological diversity in good times and could be wshed otu or overwhlemed during crises. To be used sparingly and as a last resort where irreparable damage already has been done. Better investment is absorbent green shorelines and lagoons.These will be attractive to residents and tourists and wildlife and provide a natural sponge during a flood. For example, Hollyhock Flats don't flood Dyke Road during the current rainy season but Fields Sawmill site does.
1	extensive diking is not a sustainable solution .... return to natural, historic flows as much as is now possible (see Bi)
1	don't support diking - use natural flow patterns, adapt infrastructure and utilize "managed retreat"
1	Do not dike to protect property Building valves only - Let existing buildings move out gradually + Do not allow more construction
1	Prefer Option 3 with the flood control swale that runs from the old Courtenay Hotel site to about opposite the river from the N. end of the Courtenay Airport.
1	do you mean "the year that the next flood is expected"?? I assume you mean "the year that diking would be completed."

v) Evaluate diking options including financial and cost sharing analysis- Investigate scale, land requirements, habitat compensation and capital cost required for diking beyond emergency routes – consider climate change implications on future investment required.- Summarize joint funding opportunities, including a mix of senior government, property owner (development cost charge or special levy) and local government finance.- Review the public benefit:cost of each option considering all of the above, as well as the relative current and build-out assessed value of the area protected for each option.- Undergo public review and make recommendations to Council, which might include a mix of selected dike areas, building floodproofing and managed retreat.



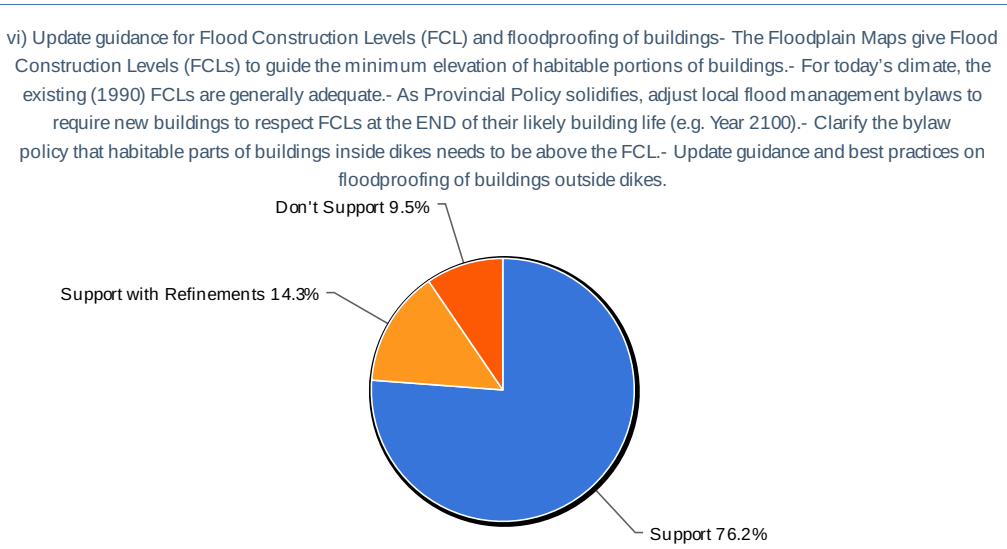
v) Evaluate diking options including financial and cost sharing analysis- Investigate scale, land requirements, habitat compensation and capital cost required for diking beyond emergency routes – consider climate change implications on future investment required.- Summarize joint funding opportunities, including a mix of senior government, property owner (development cost charge or special levy) and local government finance.- Review the public benefit:cost of each option considering all of the above, as well as the relative current and build-out assessed value of the area protected for each option.- Undergo public review and make recommendations to Council, which might include a mix of selected dike areas, building floodproofing and managed retreat.

Value	Count	Percent %
Support	10	52.6%
Support with Refinements	2	10.5%
Don't Support	7	36.8%

Statistics	
Total Responses	19

Comments

Count	Response
1	Still no investigation of flood relief at the level of the original Old Island Highway level.
1	other than the diking component the issues stated warrant pursuing
1	More cooperation amongst the many levels of governance, inclding the 5 local groups would be cost saving and mroe effective for everyone involved. This is one estuary area and one unique large watershed with glacier fresh water and Pacific salt water available within a relatively small geographical area.
1	Don't spend money on dikes to protect private property. Many buildings in that area are near end of life. Recently built building built with Knowlge of flood risk. Use funding to buyout owners instead of dikes.
1	too many issues lumped under V ..... diking not supported, other "bullets" have some meritorious components .....



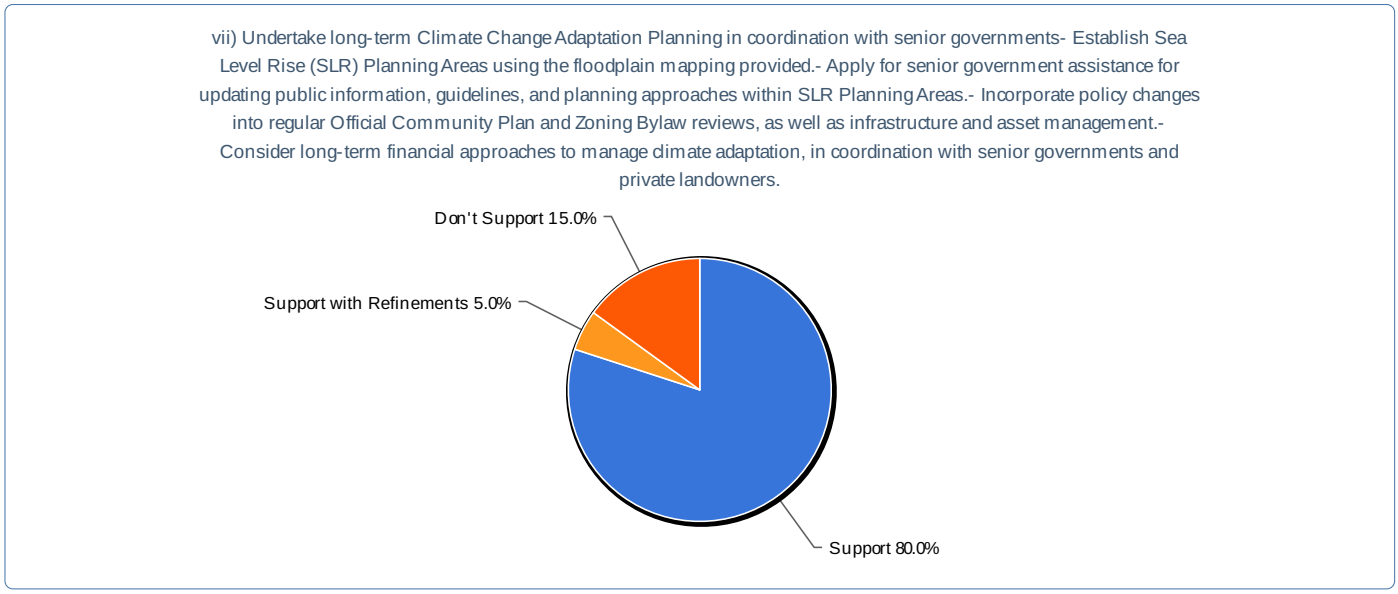
vi) Update guidance for Flood Construction Levels (FCL) and floodproofing of buildings- The Floodplain Maps give Flood Construction Levels (FCLs) to guide the minimum elevation of habitable portions of buildings.- For today's climate, the existing (1990) FCLs are generally adequate.- As Provincial Policy solidifies, adjust local flood management bylaws to require new buildings to respect FCLs at the END of their likely building life (e.g. Year 2100).- Clarify the bylaw policy that habitable parts of buildings inside dikes needs to be above the FCL.- Update guidance and best practices on floodproofing of buildings outside dikes.

Value	Count	Percent %
Support	16	76.2%
Support with Refinements	3	14.3%
Don't Support	2	9.5%

Statistics	
Total Responses	21

Comments

Count	Response
1	No raising of flood plain allowed. (ie: buildings raised but not the land).
1	When the earth qake hits + the day breaks, will the flood wall protect flooding. Please incorporate improved walking + cylcing options in the stretch from Lewis Park alone to headquarters Rd. H possible open river side walk along to Fairgrounds.
1	Our Strata meets current requirements for earthquake and flood levels. We would need tax incentives and support to upgrade> Also strata insurance costs are rapidly increasing and some companies will nto cover any VAncouver Island property. Probably older single family residences, older strata buildings, commercial and public sites are not up to current standards. Consider getting federal support for all coastal Cdn communities ie some sort of public insurance.
1	use managed retreat principals connected to allowing traditional floodplain routes when required .....



vii) Undertake long-term Climate Change Adaptation Planning in coordination with senior governments- Establish Sea Level Rise (SLR) Planning Areas using the floodplain mapping provided.- Apply for senior government assistance for updating public information, guidelines, and planning approaches within SLR Planning Areas.- Incorporate policy changes into regular Official Community Plan and Zoning Bylaw reviews, as well as infrastructure and asset management.- Consider long-term financial approaches to manage climate adaptation, in coordination with senior governments and private landowners.

Value	Count	Percent %
Support	16	80.0%
Support with Refinements	1	5.0%
Don't Support	3	15.0%

Statistics	
Total Responses	20

Comments

Count	Response
1	Proactive is less expensive than reactive. Law suits are very expensive for everyone involved and there are few winners.
1	My home is in the SLR area just south of the juntion of the Tsolum and Puntledge Rivers, near Condensory Bridge. I hope to live out my life there, before the homes have to be relocated to hoigher ground.

Do you have any other comments or ideas you would like to share about flooding in Courtenay and the study area?

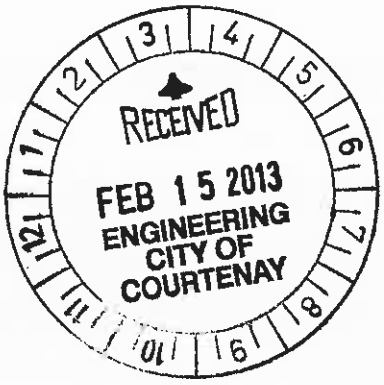
Count	Response
1	Development and buildings within the flood plain should be removed.
1	To not be working with provincial partners on the reforestation plans to mitigate the source of the flooding would be a grevious oversite. We have the data to visualize a 200 yr flood, but what will Courtenay look like in the year 2113 - think population pressures, think technological advances... think Courtenay planners in the year 1913!
1	PLEASE ATTEMPT IN ALL POSSIBLE CASES TO WORK WITH THE NATURAL SYSTEMS RATHER THAN IN OPPOSITION TO THEM.
1	I attended the June 28th meeting and this one (Jan 30). I was under the impression we were dealing mainly with the present but also looking ahead. I came away from the meeting with the feeling that immediate solutions were of no interest. The whole exercise is about 50 to 200 years out. The work done seems very comprehensive and at huge cost to the tax payer. I hope decisions will be made and action taken and that this exercise is not just another thing we can study to death. Thanks, Mike Finneron
1	Natural is more effective than built environments because nature absorbs while hard surfaces resist and require

	ongoing maintenance. It is time to consider a national coastal shoreline insurance policy for many of the same reasons we have health care and employment insurance: Everyone shares the costs and no one loses all they have, thus becoming dependent upon the public purse. At the very least, we should have Vancouver Island insurance or provincial level protection.
1	The old Farquarson Farm lands were once a natural floodplain for the Tsolum and Courtenay Rivers. Maybe they could be returned to that use again in the future. Also we need emergency transportation routes connecting east and west Courtenay, crossing the Courtenay River in extreme flood conditions. Maybe these two functions could be blended together in the future.
1	While I agree mitigation needs to be looked at and planned for, it also tends to make people complacent. We should be doing the work, and funding that work, on how to get off our fossil fuel fix, We are merely treating the symptoms and not the disease. Glad to see, through this survey and public meetings, that our opinions are being sought.
1	I am pleased to see that the City of Courtenay is taking climate change and possible sea level rise into their calculations and planning. Climate change adaptation is going to be an increasing part of life for everyone on the planet. I am unclear about the difference between a flood wall and a dike as outlined in the scenarios.
1	I'm happy to see recommendations that seem to favour softer approaches to flood management. While flooding has often been seen as a disaster, I think it helps to remember all of the benefits that flooding can offer. What are some ways the city can celebrate the fluctuating waters instead of attempting to control them? I would be interested to find more information on other cities that are dealing with similar issues.
1	BC Hydro needs to get its act together to ensure no flooding is assisted. We desperately need to update our water license for the new population as well.We live by the ocean-lets work with it not against it nor waste time and money on it.
1	I applaud the City of Courtenay for facing up to reality. When buildings reach the end of their productive life in the review area, there should be no building of multi-family homes, no matter what mitigating measures may be taken.
1	All options explored push flood effects up river and actually use the existing flood plain less (ie: lower flood levels in agricultural areas after all diking options)
1	1. Get rid of Courtenay River Bridge (saving City half-million $ - sandblasting bridge, painting bridge, future expensive repairs 2. Widen bridge foundations and expand by 20-30' on each side of water pinching effect. 3. Get translink contractors to make 3 or 4 pre-stressed concrete bridge beams and incorporate wood covered bridge on one side (bike lane) and sidewalk on upper bridge and have 2 lane car/ truck lanes in centre. 4. Construct flood plain wall from CRA to Coopers corner (Valley Restoration). 5. Construct flood channel from city river at 7/11 - Finnerons to Ryan Rd, to ABC Painting and Regional Pumphouse - under city bypass and along inside of bypass to just past White Bros machine shop -under road and empty into city river downstrean of bridge - Example Las Angeles flood channels. 6. Section dredge river from Puntledge to a depth of 4-6' to FN Residential property. As we lower the river bottom, we lower the river top and make space for the water to pass under the bridge.
1	That funding be made available to further test the model in additional scenerios as in widening he 5th street bridge supports, increasing flood control on the Tsolumn
1	Strongly recommend utilizing natural, historical water movement patterns rather than fighting "Mother Nature" which can never be sustainable.
1	There is no evidence to support the idea that sea level will rise two metres i nthe next 200 years. The geological, geomorphological and archaeological evidence indicates that the Comox Valley is slowly rising relative to sea level for the historical past, due most likely to isostatic rebound from weight of glacial ice fields. It is presumtive on the part of your engineers not to take this into account. Vancouver island is also rising due to buckling above major faults. Earthquakes?

IFMD

PROJECT WATERSHED

Comox Valley Project Watershed Society Box 3007, Courtenay, BC, V9N 5N3
Phone: (250) 703-2871 Fax: 703-2872 Email: projectwatershed@gmail.com
www.projectwatershed.ca



Derek Richmond
Manager of Engineering
City of Courtenay
Courtenay, BC

February 15, 2013

Dear Derek

Re. City of Courtenay's Integrated Flood Management Study Draft Recommendations, January 30, 2013

In November of last year we wrote you regarding various scenarios proposed for managing flooding stemming from sever storms, high tides, storm surges and rising sea level. We stressed that we believed that the best approach to dealing with flooding is to work with the natural processes that have governed the rivers and streams flowing into the K'omoks Estuary over hundreds if not thousands of years. The streams and channels used to flow into the estuary unimpeded by manmade structures. The advantage of working with natural processes which utilize the flood plain are many fold; providing relief from rising waters, reinstituting and wetting channels in the flood plain that provide habitat for fish, adding nutrients to the fields that spread out across the estuary, and keeping costs to a minimum now and into the next century. This approach provides release for rising water rather than emphasizing barriers to protect specific locales.

Our request to have a flood relief option modeled for consideration seems to have been wrapped into the current Option 3 along with a floodwall, floodway and dike. We would have liked to have seen an analysis of a standalone flood relief option as a first step in any infrastructure project. This approach would utilize the ecosystem services provided by the floodplain and we believe both provide a more effective relief of flood waters and be less costly in the long run than hard infrastructure like dikes and walls.

All the options currently proposed, whether walls or dikes, take less advantage of the flood dispersion capability of the lower estuary (all the models show that flood level in the farm fields would be lower) and push flooding upstream onto K'omoks First Nation lands and the Maple Pool Campsite. All the models predict between 2 and 20 cm higher floods at Maple Pool but the models have only been calibrated on the basis of one event, the 2009 flood. 2009 flooding may not represent historic flooding. The approach laid out in the three options favours protection of properties in the Puntledge Road/Tsolum Road/Lewis Park area over the K'omoks First Nation lands and the Maple Pool Campsite. The natural flood relief function of the K'omoks estuary can provide part of the solution without this trade off of one set of properties over another.

When the Tsolum and Puntledge Rivers used to spill their banks they would flow over the Old Island Highway near the Seven Eleven corner, down Rye Road and onto the farm fields. When Highway 19a and the 17th Street Bridge were built, the road fill cut off the farm fields and forced the river back into its narrow channel causing a rise in the flood level in the Lewis Park/Puntledge Road area and other areas upstream.

We would propose using the available funding to provide a floodway (ie: low profile bridge or a series of box culverts) through the bed of Highway 19A at the lowest natural elevation in the adjacent fields. The whole idea is to allow the flood to spill freely onto the fields at the historic elevation thereby fully utilizing the flood relief provided by nature. This is the option we would like to see pursued even if it doesn't provide the whole solution, it would reduce the size of any future infrastructure.

Speaking to the emergency route issue, the City may lose the use of Dike Road near the Dike Slough tide gates but could maintain a road connection along Highway 19A, which could be raised if necessary since flood relief would be provided by the works we propose.

Further, the EWG recommends that `green shores' be the standard for shore line protection when adaptation work is being done on Comox dike. This is especially critical where the road is exposed to major wave action. Indigenous vegetation and sloping shores would dissipate much of the power of incoming waves.

The EWG would like to add our support to the two ideas which received the greatest support from the public during the November survey:

1. Avoid further flooding risks by discouraging development in the floodplain, and
2. Create a Sea Level Rise Planning Area and plan for a managed retreat.

We note that support for the flood wall is very soft and depends on which way the "support with refinements" is counted. We would like to see a complete list of the refinements recommended by the public if that is available.

We would appreciate a coordinated site visit with yourself and any appropriate consulting engineers to discuss these issues further. We look forward to continuing collaboration on future initiatives you may take to protect and restore the estuary.

Sincerely

Don Castleden
Chair, Estuary Working Group
Comox Valley Project Watershed Society

THE CORPORATION OF THE CITY OF COURTENAY

Operational Services Department
Engineering Division
830 Cliffe Ave.,
Courtenay, B. C. V9N 2J7

Phone: (250) 334-4441
Fax: (250) 703-4864
E-Mail: engineering @courtenay.ca
Web Site: www.courtenay.ca

File No: 5225-04 Integrated Flood Management Study (IFMS)

February 25, 2013

Don Castleden
Comox Valley Project Watershed Society
Box 3007
Courtenay, BC
V9N 5N3

Dear Sir,

Re: City of Courtenay's Integrated Flood Management Study Draft Recommendations

Thank you for your letter of February 15, 2013 on the City of Courtenay's Integrated Flood Management Study.

You raise a number of interesting points and questions which we have forwarded to the consultant for further consideration and possible inclusion in the Study. We will, in the meantime, arrange for a coordinated site visit with yourself and others, to look at the areas in question.

Yours sincerely,

Craig Armstrong, EIT
for

Derek Richmond, M.Eng., P.Eng., FCIWEM
Manager of Engineering

CC: Mark DeGagne, P.Eng

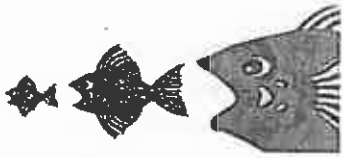
Craig Armstrong, E.I.T, Project Engineer

IFMS

COMOX VALLEY ENVIRONMENTAL COUNCIL

Representing over 2300 individuals in 20 environmentally concerned community organizations.

P.O. Box 3356, Courtenay BC, V9N 5N5



lacelle1@telus.net Dave Lacelle, Chair.

sasha1955@gmail.com Fran Kwiecien, Secretary

February 15, 2013

D. Richmond,
Manager of Engineering,
City of Courtenay,
Courtenay BC

Dear Mr. Richmond

I am writing to you in order to confirm CVEC's opinion on the proposed Courtenay Integrated Flood Management Study.

CVEC would prefer a 'soft shore' approach to flood management, that is to say a minimum of diking and channelizing, and a retaining (or creation?) of natural shorelines with local vegetation. I have reviewed the options, and agree with Project Watershed's (Estuary Working Group) that option 3 is the best, however this option should in some way be modified to take into account the significant capability of the lower estuary to provide flood relief. The E.W.G group referred to above has some valuable suggestions in this regard.

Sincerely,

D. Lacelle, BES,
Chair
Comox Valley Environmental Council

THE CORPORATION OF THE CITY OF COURTENAY

Operational Services Department
Engineering Division
830 Cliffe Ave.,
Courtenay, B. C. V9N 2J7

Phone: (250) 334-4441
Fax: (250) 703-4864
E-Mail: engineering @courtenay.ca
Web Site: www.courtenay.ca

File No: 5225-04 Integrated Flood Management Study (IFMS)

February 25, 2013

Dave Lacelle
Comox Valley Environmental Council
PO Box 3356
Courtenay, BC
V9N 5N5

Dear Sir,

Re: CVEC's Opinion on the Courtenay Integrated Flood Management Study

Thank you for your comments related to the Integrated Flood Management Study. Your comments have been forwarded to the consultant for their consideration. We have also been in touch with the EWG Group and have taken their suggestions on the same subject under consideration.

Thank you for your important contribution to this project.

Yours sincerely,

Craig Armstrong, EIT for
Derek Richmond, M.Eng., P.Eng., FCIWEM
Manager of Engineering

CC: Mark DeGagne, P.Eng

Craig Armstrong, E.I.T, Project Engineer

K’omoks First Nation Meeting

On December 14, 2012, a meeting was held between the K’omoks First Nation representatives and team members of the Courtenay Integrated Flood Management Study.

Attending were:

Alanna Mitchell, Comprehensive Community Planner, KFN
Ken Price GIS, KFN
Pam Shaw, Planning Consultant to KFN
Mark DeGagne, McElhanney Engineering, for City of Courtenay
David Reid, Planner, for HB Lanarc – Golder
Heather Pratt, Archaeologist / FN Specialist, Golder

After introductions, the Courtenay team reviewed the process, input to date, flooding history, river modelling and calibration to date, and potential adaptation approaches for further study.

The KFN were encouraged to have input on this information, with particular attention to the types of adaptation alternatives that should be further pursued. A copy of the response form was provided to the KFN, as a guide to the kinds of questions for which we would like input at this time. Ideally this input would arrive by first thing in the New Year, so that it will be considered when going through the next steps in the study process.

Initial comments (informally), were to encourage an aesthetic treatment of the proposed flood wall, to consider fish and environmental values in any adaptation alternatives, and to look for the alternative with the least overall impact.

The KFN are well advanced in a Comprehensive Community Plan, and this information is timely to help inform that plan. The KFN will make formal request through Mark for GIS and mapping information sharing if that would be acceptable to the City of Courtenay.

As next steps, it is hoped that we will receive a response form or letter (or whatever other communication deemed appropriate) from the KFN to record their comments. And the KFN were invited to attend and comment at the final public event in this study, which will be advertised and held likely in late January 2013. Direct notice to Alanna will be given of the date and time.

Courtenay
Integrated Flood Management Study
Options Survey

welcome

Flooding is a historic concern in the Courtenay and lower Puntledge and Tsolum River areas. The City is updating its floodplain mapping and comparing mitigation options in an Integrated Flood Management Study.

Please provide your input in this survey.

The study will model flood levels, both for today and for projected climate change scenarios at Year 2100 and 2200 accounting for potential sea level rise. The goal is to ensure gradual improvements to the waterfront and floodplain are based on a long-term understanding.

The planning is mid-way and this survey is intended to gather community input on which options should be studied further.

Please complete your response no later than
Friday, November 30, 2012.

Would you rather complete this survey online?

Please go to:
www.courtenay.ca

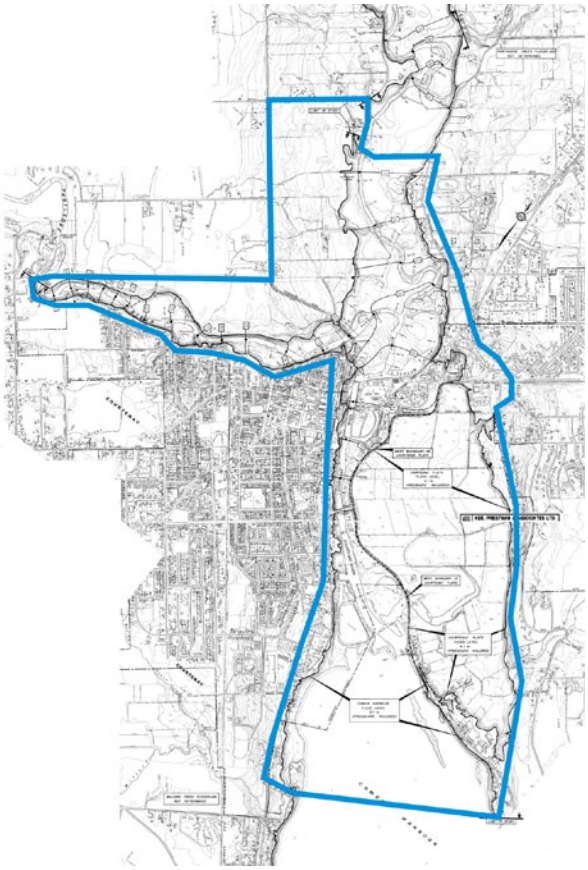
Courtenay
Integrated Flood Management Study
Options Survey

about the floodplain

The Courtenay/Comox floodplain is central to First Nation, agriculture and more recent urban settlement in Comox Valley. The rich soils in the estuary and agricultural parts of the floodplain are a result of interaction between glacier and river waters and the sea. Just as natural systems do, agriculture and human settlements must adapt to the regular flooding of low areas. What adaptations to current and future climate and flood risk are optimum? How can improvements maintain or increase values for habitat, recreation and resilience?

where is the current plan area?

The study area is outlined on the map below - including the significant floodplain and adjacent upland areas of the lower Tsolum, Puntledge and Courtenay Rivers adjacent to the Comox Estuary.



the site today

Flood events have occurred regularly in the study area. This photo is from November 2009.

Courtenay
Integrated Flood Management Study
Options Survey

A. demographics

1. **Which best describes where you live?**
   - ☐ On property within the study area (received a direct mail invite)
   - ☐ Within City of Courtenay, but not in the study area
   - ☐ Within K'omoks First Nation housing
   - ☐ Other (please specify) _____

2. **In which age group are you?**
   - ☐ Under 19
   - ☐ 19 to 34
   - ☐ 35 to 49
   - ☐ 50 to 74
   - ☐ 75 or More

3. **What gender are you?**
   - ☐ Male
   - ☐ Female

4. **Which statement(s) describes you best? (Please select all that apply.)**
   When I visit the study area, I like to:
   - ☐ Pass through in a car or other motorized vehicle
   - ☐ Use the Riverway trails or public parks
   - ☐ Fly from the Courtenay Airpark
   - ☐ Enjoy my home there
   - ☐ Patronize the businesses within the study area
   - ☐ Work at a retail, office or industry within the study area
   - ☐ Work in agriculture or fisheries based in the study area
   - ☐ Other (please specify) _____

Courtenay
Integrated Flood Management Study
Options Survey

B. Flood Mitigation Preferences

5. ***Floodwall Short-term Improvement:*** **Do you support further study and costing of the elements below, or do you have better ideas or related comments?**

a) Construct Floodwall to provide protection for smaller more frequent events (20 year). Ryan Road area will continue to flood during extreme (200 year) events.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

6. ***Full Dike Long-term Improvement:*** **Do you support further study and costing of the elements below, or do you have better ideas or related comments?**

a) Construct Dike along both sides of Courtenay/Lower Tsolum Rivers, by raising Old Island Highway, Comox Road, and riverside dikes to 200 Year Levels.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

7. ***Ring Dike / Floodproofing Long-term Improvement:*** **Do you support further study and costing of the elements below, or do you have better ideas or related comments?**

a) Construct Dike Ring by raising Old Island Highway and Hwy 19A to improve flood protection to Ryan Road area.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

Courtenay
Integrated Flood Management Study
Options Survey

B. Flood Mitigation Preferences

b) Requiring floodproofing by raising the habitable floor level of new buildings outside dikes upon redevelopment. Site works like parking, driveways and landscape would remain floodable if not raised.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

c) Pursue 'managed retreat' from public lands (existing or purchased) in the floodplain outside dikes by removing uses that cannot be adapted to flooding.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

d) Avoiding further flooding risks by discouraging further up-zoning or subdivision in the floodplain outside dikes that would result in increased need for flood protection of that new use.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

Courtenay Integrated Flood Management Study

Options Survey

C. Sea Level Rise Adaptation

8. ***Sea Level Rise:*** **is predicted to gradually raise the level of mean and high tides - approximatley 50 cm by Year 2050 and 1m by Year 2100. These changes in tides will be reflected in gradually higher flood levels in the Estuary Floodplain. Do you support further study and costing of the elements below, or do you have better ideas or related comments?**

a) Create Sea Level Rise (SLR) Planning Areas for Year 2100 and Year 2200 that includes all lands that would potentially face inundation due to the combination of rising seas and river flood levels.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

b) Review land use applications and public capital works in SLR Planning Areas to ensure the proposals anticipate how to adapt to the potential changes in flood levels. Avoid projects that are not adaptable with reasonable benefit:cost.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

c) For land uses that warrant flood mitigation, organize long-term adaptation programs to adjust to SLR, including period raising of dikes, minimum flood construction levels for habitable buildings, and strategic 'managed retreat'.

- ☐ Don't Support
- ☐ Support with Refinements
- ☐ Support

Refinements or Comments: _____

_____

_____

D. comments?

9. **Do you have any other comments you would like to share about flooding in Courtenay and the study area?**

Courtenay
Integrated Flood Management Study
Options Survey

thank you!

Thank you for taking the time to complete this survey. Your responses, along with those of fellow community members, will help guide the development of floodplain management approaches for Courtenay and the study area.

To return your paper survey:

- ***Drop it off*** or ***mail*** it to the City of Courtenay offices:

  Attn: Eva Harding
  Administration Coordinator, Operational Services Dept
  City of Courtenay
  830 Cliffe Ave., Courtenay BC V9N 2J7

- ***Fax it*** to the City of Courtenay at: **250 703 4864**
- ***Scan and e-mail*** to: **engineering@courtenay.ca**

Do you know anyone else who would be interested in filling out this survey?

Please direct them to: www.courtenay.ca

how to stay informed

The Courtenay Integrated Watershed Management Study will be completed over the next few months. To remain involved:

- Check the website at www.courtenay.ca where we will report on the feedback to date and share info, options and ideas for flood management.
- Provide us with your **e-mail** or **phone number** if you would like a reminder about any future related events

  E-mail _____

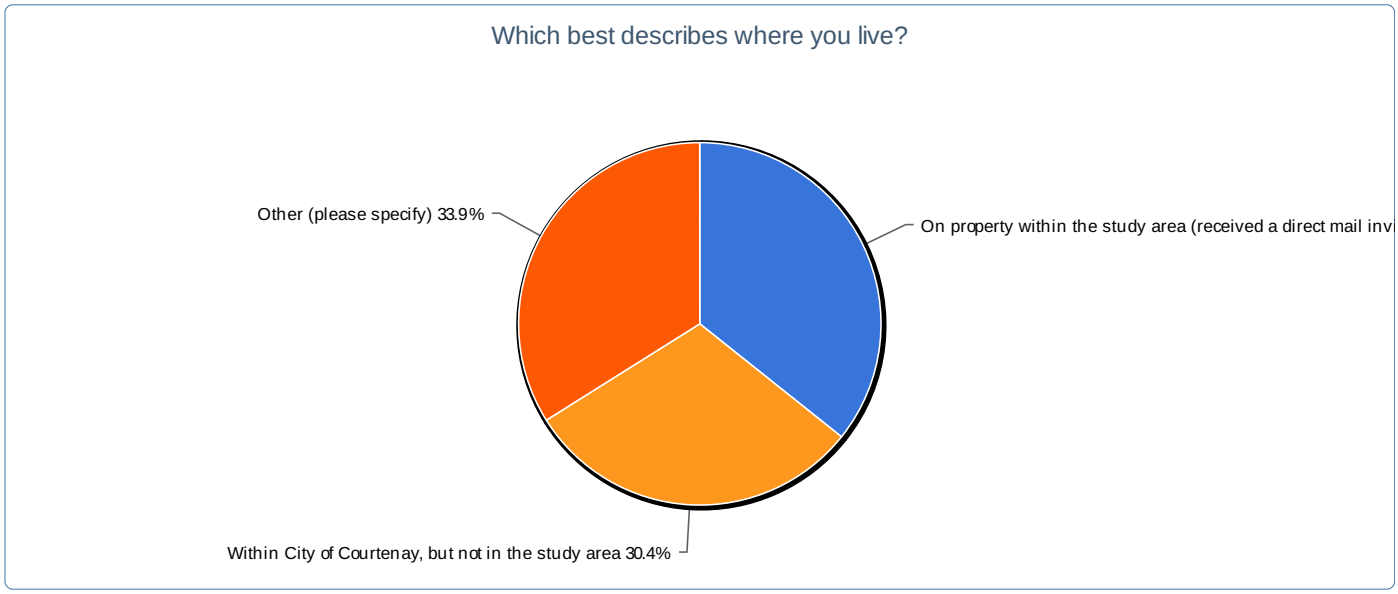
  Phone Number _____

- If you have questions or comments about this process, please email:

  info@courtenay.ca

Summary Report - Dec 11, 2012

Survey: Courtenay Integrated Flood Management Study - Options Survey

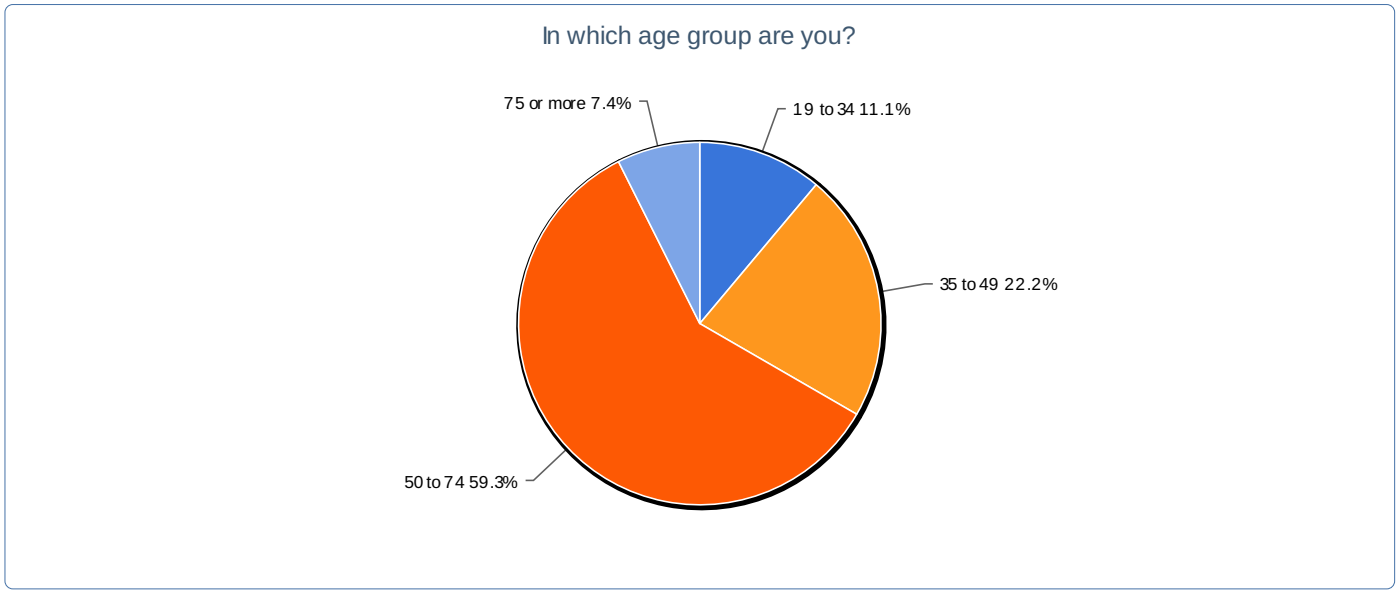


1. Which best describes where you live?

Value	Count	Percent %
On property within the study area (received a direct mail invite)	20	35.7%
Within City of Courtenay, but not in the study area	17	30.4%
Within K'omoks First Nation housing	0	0.0%
Other (please specify)	19	33.9%

Statistics	
Total Responses	56

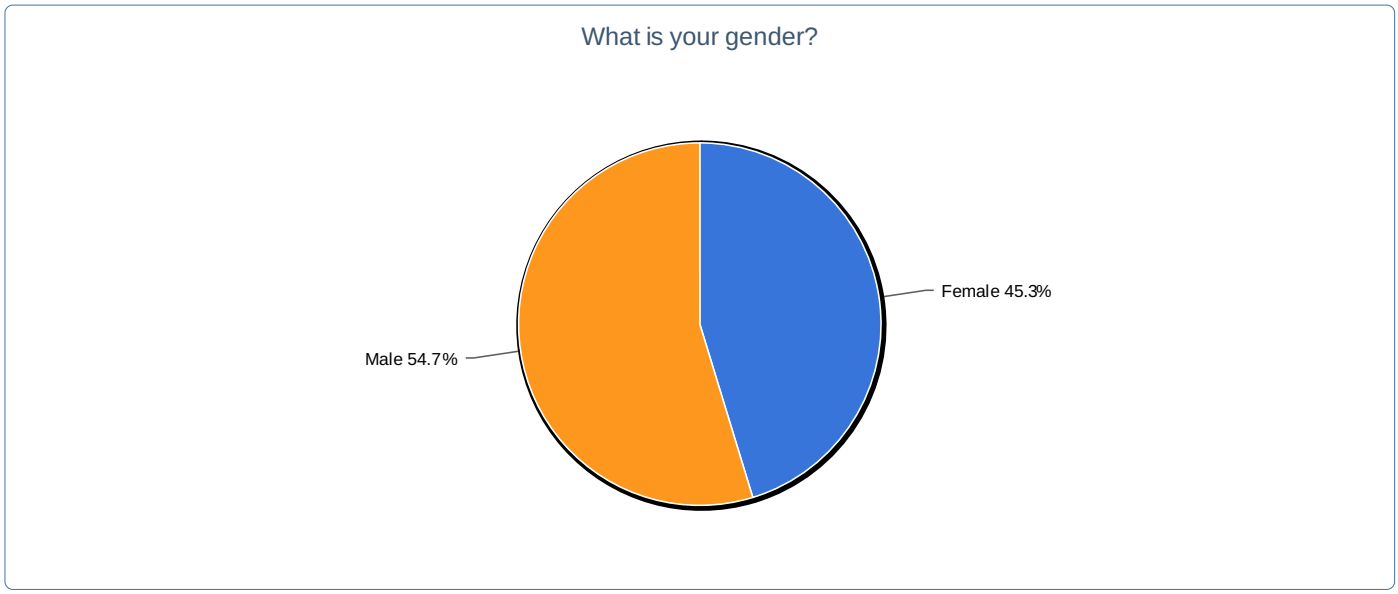
Open-Text Response Breakdown for "Other (please specify)"	Count
Left Blank	1
Area B Lazo	1
Area C	1
Business within the City, within the floodplain, did not receive a direct mail invite.	1
Commercial Strata within study area	1
Comox	3
East Courtenay, not in study area	1
Liitle River	1
Little River	1
Merville. Along Tsolum River	2
Minto - Electoral Area A	1
Nanaimo	1
Please go directly to the final page. This is a PS to a previous submission	1
Railway Avenue, Merville area near upper Tsolum River	1
Regional District-River Ave North on the Tsloum River	1
comox	1



2. In which age group are you?

Value	Count	Percent %
Under 19	0	0.0%
19 to 34	6	11.1%
35 to 49	12	22.2%
50 to 74	32	59.3%
75 or more	4	7.4%

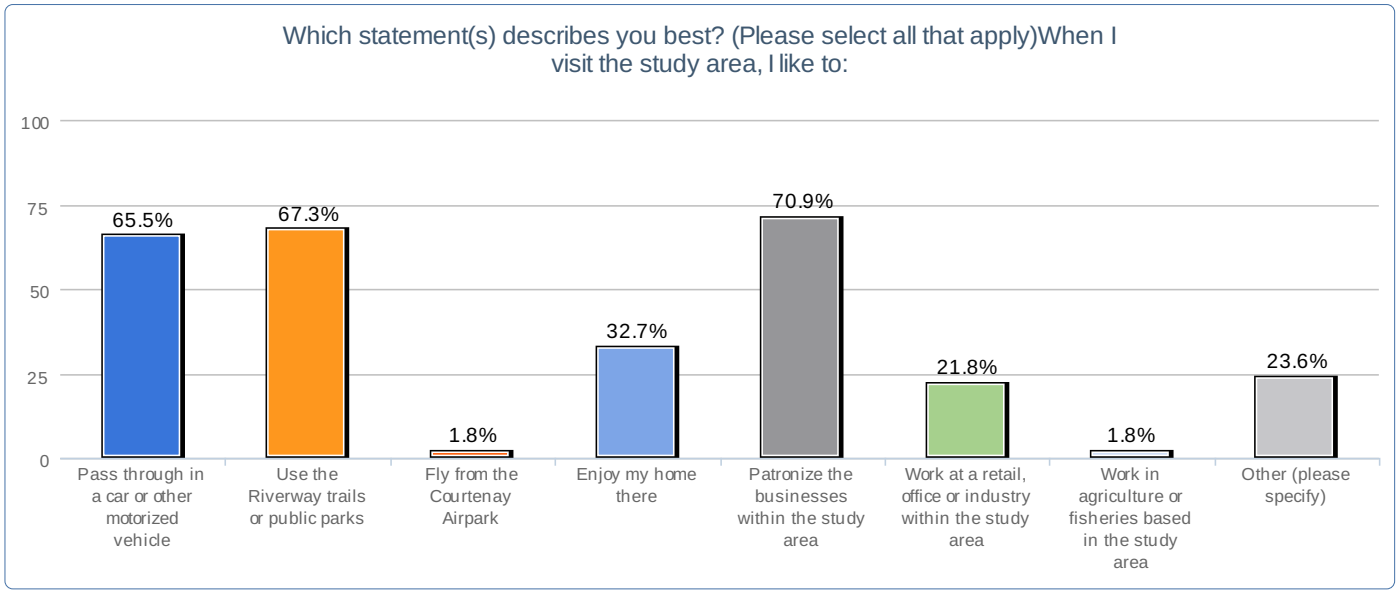
Statistics	
Total Responses	54
Sum	834.0
Avg.	37.9
StdDev	18.8
Max	75.0



3. What is your gender?

Value	Count	Percent %
Female	24	45.3%
Male	29	54.7%

Statistics	
Total Responses	53

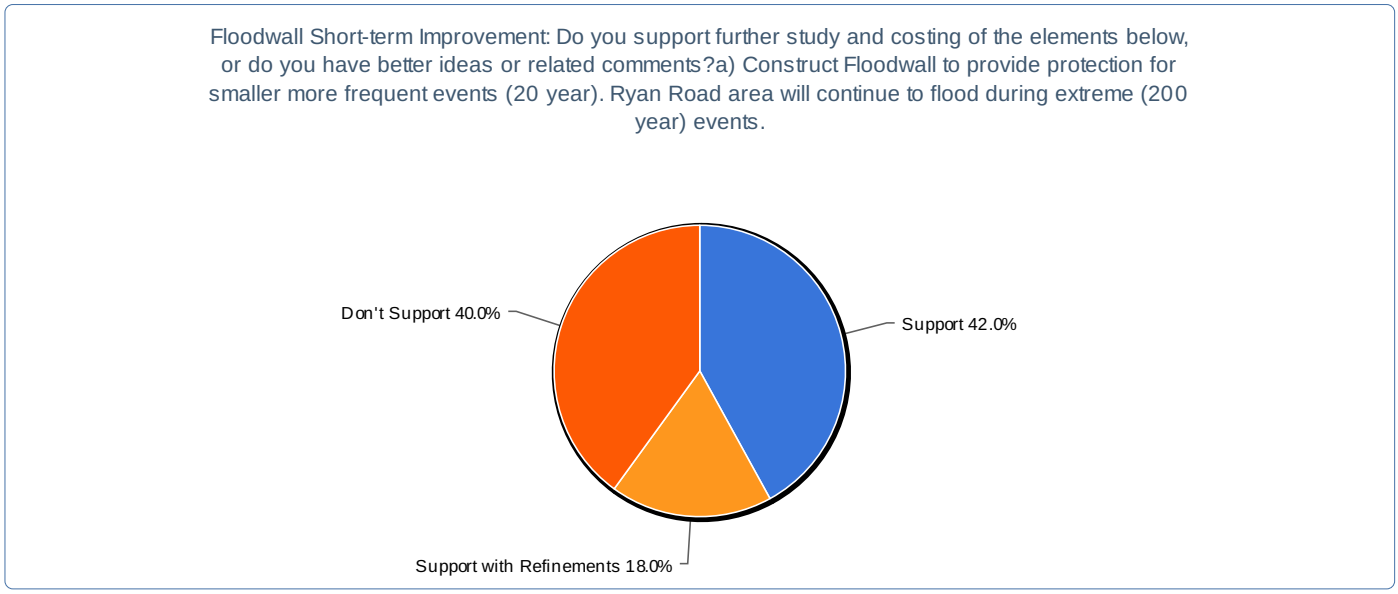


4. Which statement(s) describes you best? (Please select all that apply)When I visit the study area, I like to:

Value	Count	Percent %
Pass through in a car or other motorized vehicle	36	65.5%
Use the Riverway trails or public parks	37	67.3%
Fly from the Courtenay Airpark	1	1.8%
Enjoy my home there	18	32.7%
Patronize the businesses within the study area	39	70.9%
Work at a retail, office or industry within the study area	12	21.8%
Work in agriculture or fisheries based in the study area	1	1.8%
Other (please specify)	13	23.6%

Statistics	
Total Responses	55

Open-Text Response Breakdown for "Other (please specify)"	Count
Am stranded on my property when the upper Tsolum River floods	1
I pass through mainly on my bike	1
I work with several watershed groups including the Estuary Working Group	1
Own buildings and business within flood plain area in city.	1
Police	1
Shop local private shops	1
Visit Recreation Facilities	1
Visit family	1
bike riding along riverway	1
canoe and kayak the river and estuary	1
cycle through area	1
owner - strata 684 Puntledge Rd	1
transit through the area on bike or on foot and use recreational facilities in the area	1



5. Floodwall Short-term Improvement: Do you support further study and costing of the elements below, or do you have better ideas or related comments?a) Construct Floodwall to provide protection for smaller more frequent events (20 year). Ryan Road area will continue to flood during extreme (200 year) events.

Value	Count	Percent %
Support	21	42.0%
Support with Refinements	9	18.0%
Don't Support	20	40.0%

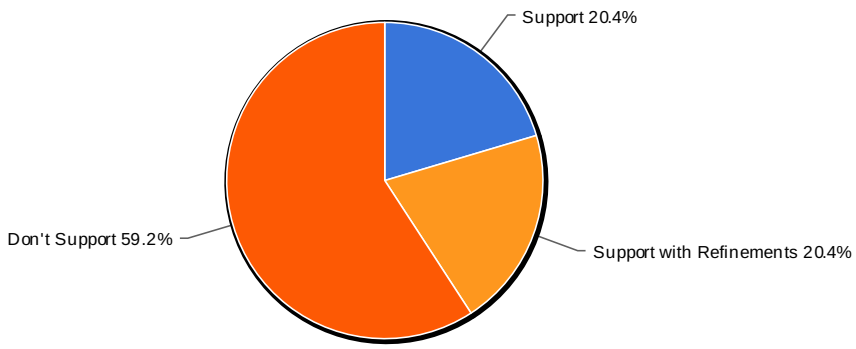
Statistics	
Total Responses	50

Comments

Count	Response
1	How does the flood wall affect the 200-year flood levels upstream of the structure?
1	Invest in return to natural water flow patterns ASAP
1	My preferred option would be a floodway leading to the farmland of the Courtenay Flats
1	do not permit further development there (especially 8 stories!) and have managed withdrawl.
1	A new rein foreced concrete beam bridge at 5th St & footings 16 ' wider - 8 ' on each side no need to paint old 5th St bridge
1	This does not address the reason for flooding at all and reduces habitat. The flood waters need a place to go, building walls will necessitate building more walls. It also puts more pressure on the opposite bank.
1	Building up a higher flood wall is an option along the city banks, but I think a New Dike, Channel or very large Culverts positioned along the prime areas of concern leading to the flood plaines of the old Ducks Un-limited (Farquasons Farm land) would be an option. No doubt an expensive one, but not as expensive Im sure as the clean up costs it takes out of the City, with each flood.
1	It doesn't help the overall water dispensation to erect hard structures to restrain river. Protection of individual buildings instead, and allow building to 200 year standards..
1	Any floodwall needs to be functional during benign periods. It should be a bike path or walkway, viewing stand and have benches. perhaps bird nest areas ie bluebird. It needs to be earthquake resistant and resilient as well as strong adn flexible to hold water pressures.
1	Floodwalls are going to push the water further upstream to already over-burdened floodplain properties.
1	study should include Maple Pool complete flood mitigation requirements along Tsolum River as well.
1	Area should be designated flood plane and developement should be restricted to be compatible with flooding
1	An IPCC report released in the spring of 2012 shows that what have until now been considered 1 in 20 yr precipitation events in our region may soon be occurring with a frequency of up to once in 7 years. Will the wall be designed for the old 20-year event, or the newly-redefined 20-year event? The economics of designing for the "new" 20-year event should be examined/understood prior to committing to this option. For example, is a floodwall even capable of holding back the "new" 20 year event or will some diking be required as well? Regardless, the floodwall will provide improved

	short-term protection over the current situation and as such the idea is supported.
1	Major emaphasis should be on managing storm/rainwater runoff and BC Hydro water release from Comox reservoir.
1	Concerned that flood wall will inrease flooding up river for Merville e.g. River Ave North River Ave South regions
1	The water has to go somewhere. You have already created the floodwall by sand bagging the concrete barrier along the Old Island Highway and the old Tsolum relic channel.
1	Mitigate upstream and downstream properties affected through changes in river elevations caused by the flood wall
1	By constructing a flood wall in Courtenay it ,will push the flood waters further up river causing more rural properties to more severe flooding, like Farnam, River Ave N & S, Railway Ave.etc.
1	BC Hydro plays a a major role in flood mitigation, through water releases from Comox lake.This has been a MAJOR FACTOR in recent floods. Storm water retention from development is the other major factor that can be managed, not only in the study area,but in Rural areas impacted by neihgbouring developments. It is appearent that replacing treed areax with parking lots will create more runoff problems, and loading of the existing flood plains.Much more attention need to be placed on the types of developement and mitigation measures.
1	also promote tree cover throughout the watersheds and prohibit filling of wetlands and floodplain areas other than for building sites

Full Dike Long-term Improvement: Do you support further study and costing of the elements below, or do you have better ideas or related comments?a) Construct Dike along both sides of Courtenay/Lower Tsolum Rivers, by raising Old Island Highway, Comox Road, and riverside dikes to 200 Year Levels.



6. Full Dike Long-term Improvement: Do you support further study and costing of the elements below, or do you have better ideas or related comments?a) Construct Dike along both sides of Courtenay/Lower Tsolum Rivers, by raising Old Island Highway, Comox Road, and riverside dikes to 200 Year Levels.

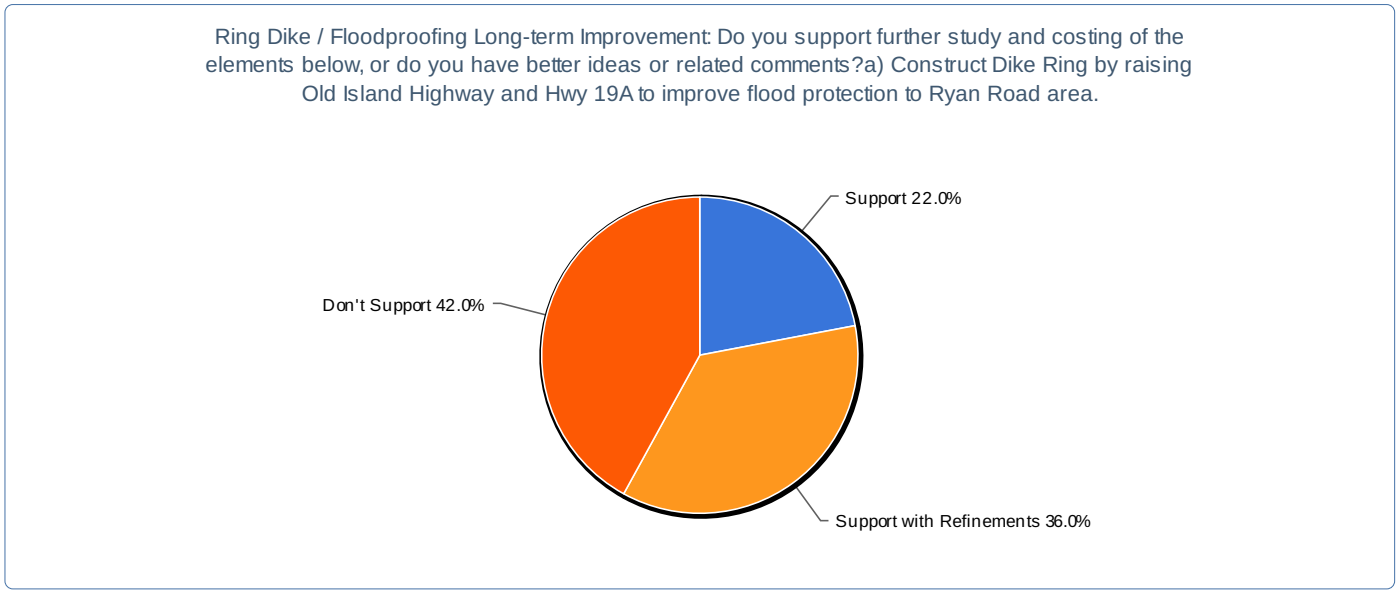
Value	Count	Percent %
Support	10	20.4%
Support with Refinements	10	20.4%
Don't Support	29	59.2%

Statistics	
Total Responses	49

Comments

Count	Response
1	As above
1	Doesn't work - it transfers the problem somewhere else.
1	I need more information to make a decision
1	Improve roads that are outside flood plane. Eg Veterans highway to new Island highway
1	No diking but allow water travel under the raised roads mentioned above
1	Same reasons as Q5

1	This is the hardest option when looking at natural flood relief systems.
1	This sounds like it would be very expensive. Hard to justify without knowing the costs involved.
1	long term solution means more information
1	Assess what happens if tree cover in the watershed lessens or if wetlands are drained or filled. A healthy ecosystem throughout the watershed could reduce the impact of storms.
1	This does not address the issue either and with sea level rise and more severe storm events we may under estimate the 200 yr levels.
1	How do the river flood maps integrate with coastal flooding? Coastal water level rise predictions? Pump stations?
1	The economics of diking such a huge area would likely be cost-prohibitive, particularly when it will only be a temporary solution. With continued sea-level rise and intensification of storm severity, the time frames for which we calculate the effectiveness of these structures may be considerably less than intended.
1	The river is walkled & dyked enough already. Salmon are eaten by seals due to the channelization of the river
1	i think it's important to also start to adjust the allowable uses within the floodplain area. i don't think the city's planning policies should support further growth and densification in the flood plain area. the city could investigate land swaps for any vacant land within the floodplain area. long term (next several hundred years) the city should remove businesses and residents from this area.
1	We don't need to look like the Mississippi River where the dykes are so high that the river flows through towns at 20 feet above street level
1	Mitigate upstream and downstream properties affected through changes in river elevations caused by the flood wall
1	Given the long term forecast for rising water levels this is an expensive "short term" solution.
1	See above - if public money is to be spent, let's get value for tax dollars. I don't particularly want to live inside a walled city. What about wildlife corridors - a policy



7. Ring Dike / Floodproofing Long-term Improvement: Do you support further study and costing of the elements below, or do you have better ideas or related comments?a) Construct Dike Ring by raising Old Island Highway and Hwy 19A to improve flood protection to Ryan Road area.

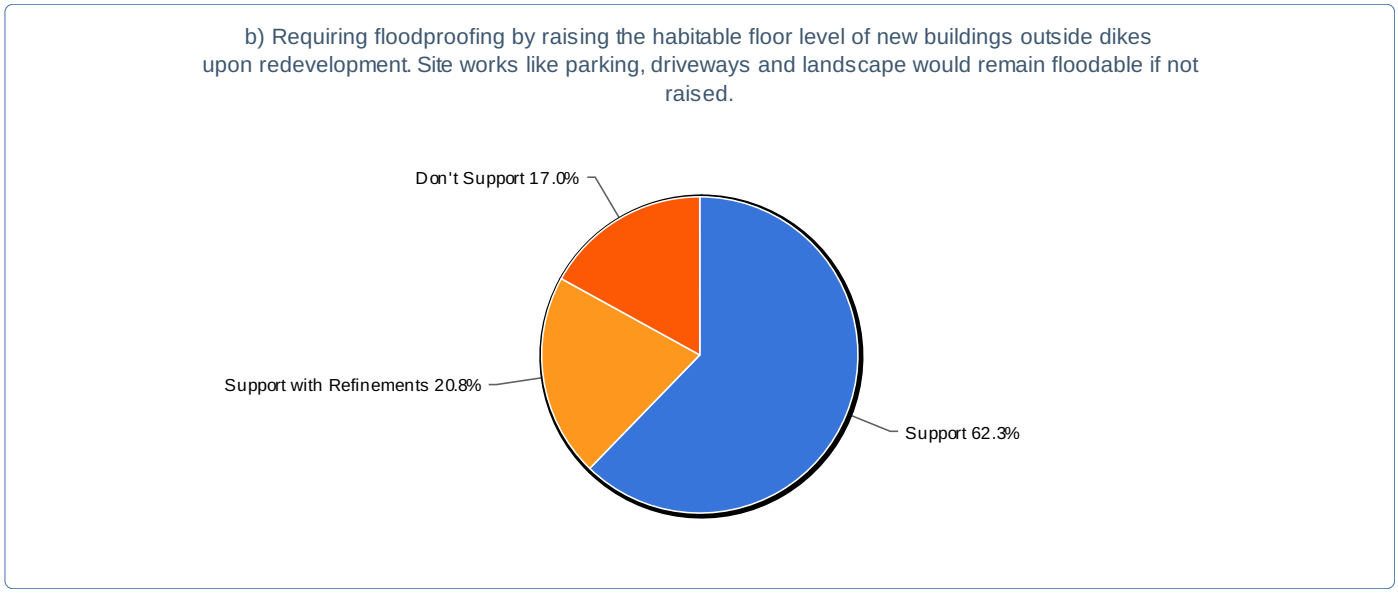
Value	Count	Percent %
Support	11	22.0%
Support with Refinements	18	36.0%
Don't Support	21	42.0%

Statistics	
Total Responses	50

Comments

Count	Response
1	Again, I would like more information the effects to the many residents who live upstream

1	Depends on cost involved.
1	If flood ring was constructed through the farmlands on the flats
1	Same reasons as Q5
1	Seismic consederation r/t dikes
1	as above
1	long term solution means more information
1	see above
1	reduce direct flows to the waterways from developed areas by reducing the amount of area that can be hard surfaced.
1	Appears there may be some options to work with the water and provide routes to help drain after a flood.
1	Building up Dike Walls, for all low lying areas inhabited by housings or commercial buildings would be the idea.
1	Remove benches on island high way and build a flood wall and dredge under 5fth St bridge to lower water
1	This idea is supported as it is more economically feasible than the full dike option and provides protection for the heavily-used Ryan Road area. It is also important to keep in mind that dikes can only be raised so high, and that even with this option, it is likely that in the very long term, managed retreat may end up being required, or perhaps more economical.
1	Mitigate upstream and downstream properties affected through changes in river elevations caused by the flood wall
1	This is next to the hardest option, removing more of the floodplain only pushes the water somewhere else.
1	i think dikes offer a good short-term (20 - 50yr) solution but as climate change continues to create higher water levels over time relocation to higher ground may be a better alternative.
1	I support extending green shore lines - make the Green Slough and Island so that people might tube and paddle and swim around it. There already is a culvert and in high tide nearly a water passageway. Too much debris gets trapped near the moored boats - most of whom would sink if untied. oo many grocery carts - let's beautify while becoming more sustainable in the Lewis and Simms Park ares.
1	Raising the main roads may have to be included in floodproofing but instead of diking creating channels that can carry the floodwaters away from the area to the farmers fields would be the option I support. I also in no way would support dredging - dredging destroys habitat, disturbs ancient fish stakes and creates a pile of dredged material that has to be dealt with.
1	Should include dike protection for properties (W side of Courtenay River) along Anderton Ave, between 5th Bridges and Condenway Bridge, including safe exit routes in case of flooding or earthquakes or other emergencies.
1	This area wil continue to be increasingly at flood risk. any developement should actively be discouraged.



b) Requiring floodproofing by raising the habitable floor level of new buildings outside dikes upon redevelopment. Site works like parking, driveways and landscape would remain floodable if not raised.

Value	Count	Percent %
Support	33	62.3%

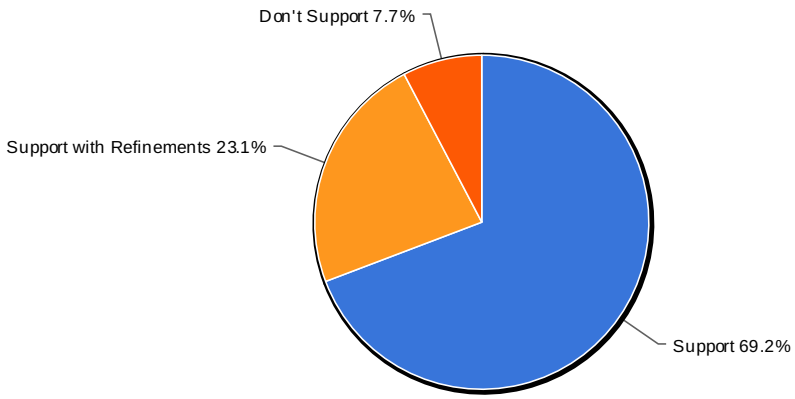
Statistics	
Total Responses	53

Support with Refinements	11	20.8%
Don't Support	9	17.0%

Comments

Count	Response
1	Do not allow new development in this area
1	Dridging in moderation together with other things
1	I don't expect general acceptance of below so this would be my 2nd choice
1	New development in the floodplain should not be allowed. If redeveloping then yes.
1	This makes sense, older buildings can't be protected
1	no dikes
1	Please make new buildings of a zoning that is conducive to promoting convivality in the floodplain areas. We turn our backs on our beautiful river it seems especially near the Ryan intersection. It is so ugly. It could be a great hub of tourist type establishments (restaurants, more of the small type businesses) and parks. Please adopt innovative building technologies for dealing with flooding.
1	No new building in flood area. Actively discourage continued use of buildings in presenr area. Only develope recreation areas compatible with flooding.
1	require new development to be 1m above freeboard to account for the unpredictability of climate change
1	Ideally, no further new development would be allowed in this flood-prone area. Where possible, purchase by the City, or land swaps, would be ideal. Increased base flood elevations would be very prudent both inside and outside the dikes.
1	I favour up and out but not down ie dredging. undulating river bottoms are much more biodiverse and less likely to provide seals easy passage to salmon spawning. Also less likely to be a swift funnel when waters is voluminous
1	again, this may offer a good short term (20 - 50yr) solution, but as climate change continues to create higher water levels over time relocation to higher ground may be a better alternative.
1	Build channels for floodwaters, promote softshores, no additional and a reduction in existing impervious surfaces.
1	Would work for the new Buildings but what about existing ones? Building up the grounds of existing buildings and maybe raising those onto higher foundations that can be raised.

c) Pursue 'managed retreat' from public lands (existing or purchased) in the floodplain outside dikes by removing uses that cannot be adapted to flooding.



c) Pursue 'managed retreat' from public lands (existing or purchased) in the floodplain outside dikes by removing uses that cannot be adapted to flooding.

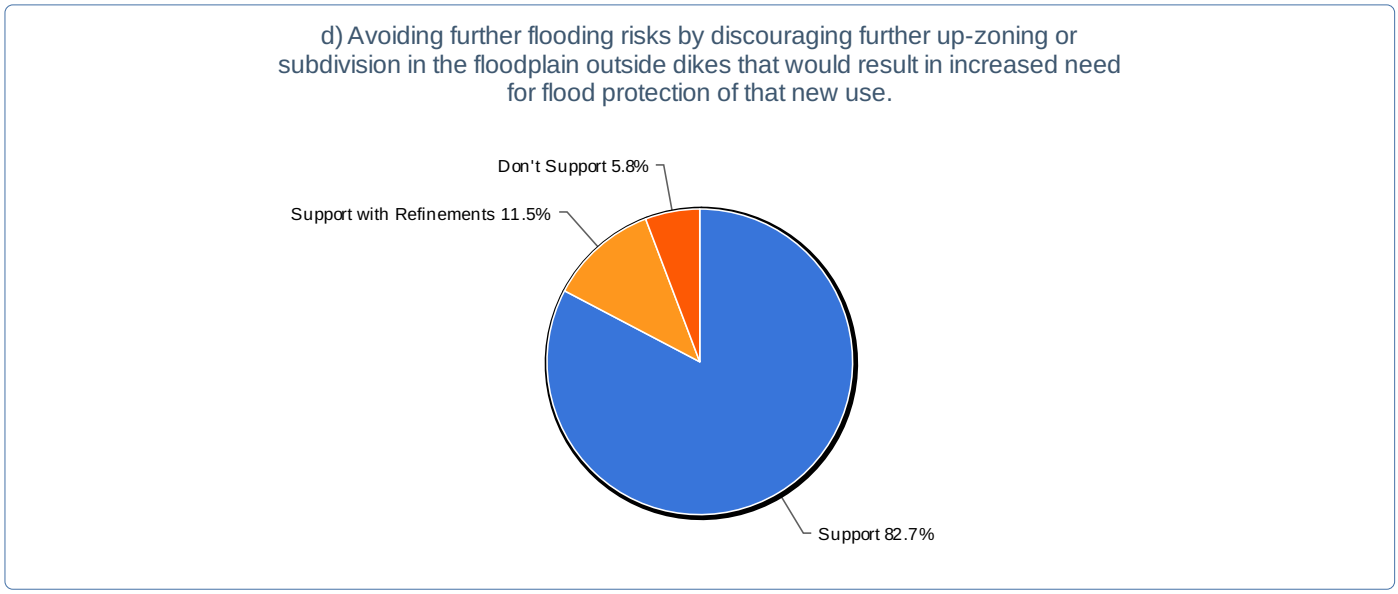
Value	Count	Percent %
Support	36	69.2%
Support with Refinements	12	23.1%

Statistics	
Total Responses	52

Don't Support	4	7.7%

Comments

Count	Response
1	Climate change will force us to do this
1	Lewis park has traditionally been a flood plain and should continue to be. Don't build there.
1	My first choice
1	Seems very logical!
1	The term - Managed retre is a poor descriptor.If you mean EPP (regardless of the reason, natural or human in origin, I totally support removing users who have businesses and personal practices that damage the watersheds and reparian areas. ie dumping batteries.
1	I do support this - but wonder why the Lewis Centre was allowed to go through then??? And what about managed retreat from private lands???
1	restore river and coastline riparian zones to create a buffer that can absorb fluctations in water levels
1	no dikes - managed retreat from land flooded by natural flow patterns allowed by raised roads incorporating water flows underneath (box culverts, bridging, etc.)
1	In the long run this will be the most economical solution, with the lowest risk to human health and safety.
1	Private lands also need to be considered. I don't like the "outside the dike" language since I don't agree with diking.
1	No further structural development of any land in 1-20 flood area however how would land owner be compensated?
1	An idea to think of, and those that decide not to adhere to the plan to take on their own costs for clean up and renovations of property after flood destruction, than making the Tax payer pay for it.
1	The land could still be used in non-flood risk times. Business or not-for-profits may be interested in a shared responsibility.
1	i support this as the very long term solution. in the short to medium term however some floodproofing will be required. for now i believe the city should begin to adjust thier planning policy to prevent further development within the floodplain.
1	Existing non inhabited flood plains should be utilized to the maximum -Lewis park, Comox Valley farm should be overflow areas for exess storm water.



d) Avoiding further flooding risks by discouraging further up-zoning or subdivision in the floodplain outside dikes that would result in increased need for flood protection of that new use.

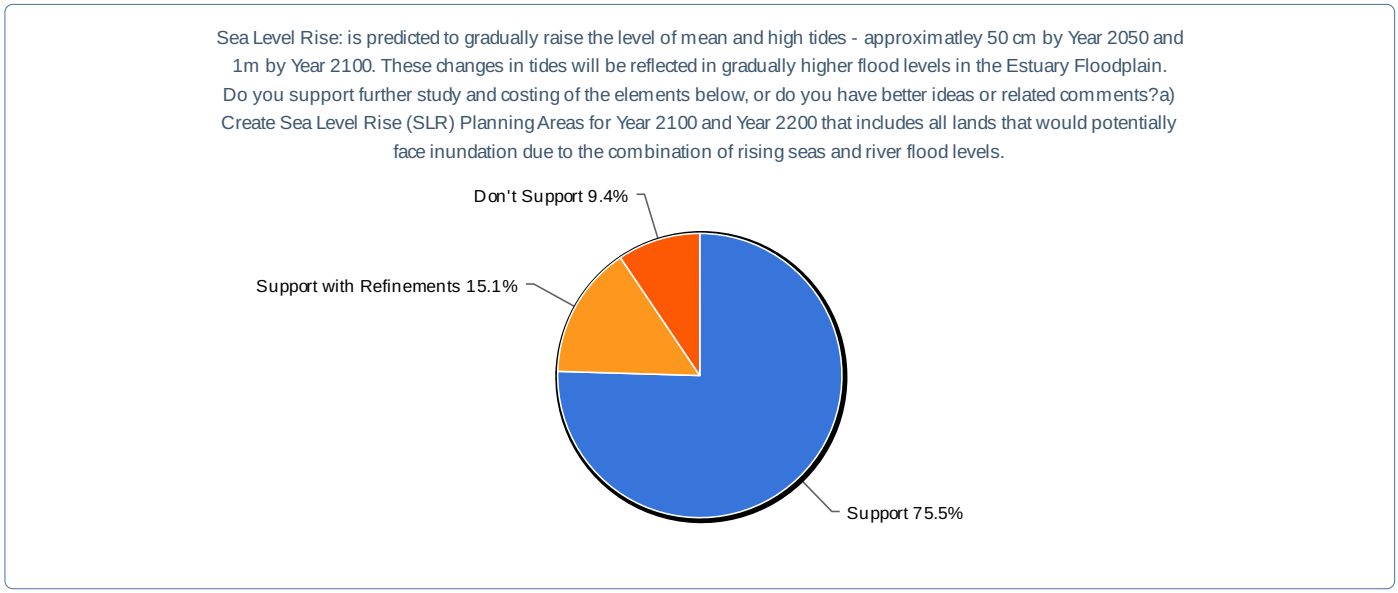
Value	Count	Percent %
Support	43	82.7%
Support with Refinements	6	11.5%

Statistics	
Total Responses	52

Don't Support	3	5.8%

Comments

Count	Response
1	I don't like the "outside the dike" language since I don't agree with diking.
1	I don't know why any other approach would be suitable. How do these folks get insurance anyway?
1	Totally avoid Residentual and Commercial new buildings in the flood existant areas.
1	absolutely
1	We should not allow any more building in the flood plane. Lets not make the problem worse. We have already make large errors in building super store and other retail buildings.
1	mitigate flows to these swollen rivers with stormwater facilities designed to retain runoff rather than discharging as quickly as possible
1	If there is natural hazard risk, they should not be allowed to build similar to other environmentally sensitive areas.
1	no further up-zoning or subdivision in the floodplain, period. further return to natural areas or uses that will tolerate a "managed retreat" Optimum Adaptation!
1	Need to reopen old historic channels where possible to redirect flood waters away from problem areas and minimize damage.
1	In addition, we need to consider how we currently deal with redevelopment in the floodplain outside the proposed ring dike area. Redevelopment of existing uses, as much as development of new uses, should be subject to the same flood protection requirements.
1	I need more information to make a decision and likely this should be considered on a case-by-case basis
1	No more impervious surfaces should be added to the area and there should be encouragement for existing establishments to convert impervious to pervious.
1	No more development in flood prone areas.We could all be living near the Forbidden Plateau in a couple hundred years time
1	Any developement flood issues and mitigation should be the responsibility of the developer, with appropriate bylaws to ensure that flood damage is mitigated.
1	We desire densification and not urban sprawl; but also need to be safe and sustainable. Other communities have proved they can do so - why not Courtenay, Canada. It could be a visitor attraction. See Cowichan Bay as an example of one such model.



8. Sea Level Rise: is predicted to gradually raise the level of mean and high tides - approximatley 50 cm by Year 2050 and 1m by Year 2100. These changes in tides will be reflected in gradually higher flood levels in the Estuary Floodplain. Do you support further study and costing of the elements

below, or do you have better ideas or related comments?a) Create Sea Level Rise (SLR) Planning Areas for Year 2100 and Year 2200 that includes all lands that would potentially face inundation due to the combination of rising seas and river flood levels.

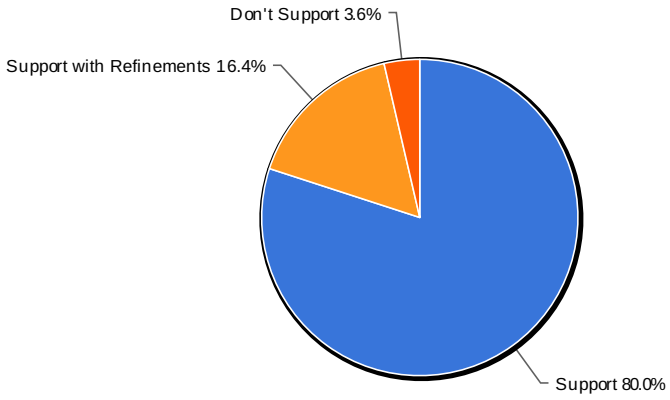
Value	Count	Percent %
Support	40	75.5%
Support with Refinements	8	15.1%
Don't Support	5	9.4%

Statistics	
Total Responses	53

Comments

Count	Response
1	Absolutely support this.
1	How do these predictions integrate with the flood maps... no data shown on the City site?
1	These go hand in hand one cannot be done without the other
1	The CVRD consultant stated that there was no concern about this sea level rise as the Island is tilting at about the same rate.Will you be discusing this with their consultant to deetremine what the likey scenerio will be?
1	Please check with the CVRD . Their consultant stated that the sea water rise will not occurr here, because of the tilting of Vancouver island. Why invest in a study if this is the case?
1	Long term planning is just as crucial as it is for the present time. Courtenay is only going to grow.
1	please also model a flood relief scenario incorporating raised major roadways with flow-through capabilities underneath.
1	Flood area should be zoned only for a agreculture or recreational use compatable with flooding. Higher grounds zoned for developement.
1	We absolutely MUST factor sea level rises into any equation and subsequent plan. Also earthquake and tsumani probabilities.
1	i think this is a good idea for year 2100. by year 2200 it wuold be great if the area was no longer used as a commercial and residentail area but rather the land was used for park or farming which may be ablt to better tollerate flooding events.
1	Study recomendations from Dept of Environment regaring Sea Levlel Rise they have a complete section on this subject.
1	Although you are overstating the predicted slr in my reading of the BC Government reports. Those are general coastal wide predictions and don't take into account glacial rebound. They are also the highest of the many models use to predict slr.

b) Review land use applications and public capital works in SLR Planning Areas to ensure the proposals anticipate how to adapt to the potential changes in flood levels. Avoid projects that are not adaptable with reasonable benefit:cost.



b) Review land use applications and public capital works in SLR Planning Areas to ensure the proposals anticipate how to adapt to the potential changes in flood levels. Avoid projects that are

not adaptable with reasonable benefit:cost.

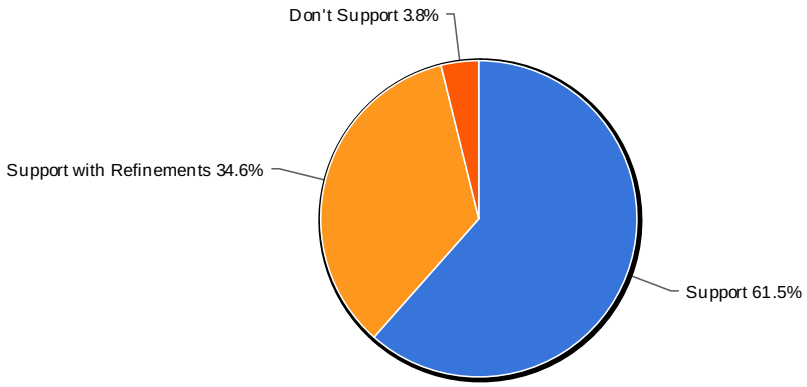
Value	Count	Percent %
Support	44	80.0%
Support with Refinements	9	16.4%
Don't Support	2	3.6%

Statistics	
Total Responses	55

Comments

Count	Response
1	Absolutely support this.
1	Avoid projects that incur public cost
1	Isn't this a no--brainer?
1	There must be restrictions on filling the natural floodplain as an adaptive method.
1	as per previous comments on developement.
1	Also avoid projects and business that have short term :benefits" at the expense of long-term sustainability ie sawmills along a river shore line. Sustainable businesses shoudl be given a tax advantage and incentives; developers know they must make a contributions - what not operating businesses. And existing ones should be upgraded witin a realistic time frame. Finally monitor, monitor, monitor. Adn then fine when necessary - substantively.
1	The city should not agree to planning proposals that may entail costs in flood prevention in the future.
1	Avoid projects that are not adaptable. Increase setbacks from the river. Re-slope the Fields Sawmill site and widen the river in any places possible.
1	in addition to ensuring that proposals anticipate how to adapt, applicants should also be encouraged to relocate to higher ground. it may actually be less expensive than some of the adaptation strategies.
1	As above, it is not only flood lands that are the issue-it is developing other lands in a manner that creates more flooding.

c) For land uses that warrant flood mitigation, organize long-term adaptation programs to adjust to SLR, including period raising of dikes, minimum flood construction levels for habitable buildings, and strategic 'managed retreat'.



c) For land uses that warrant flood mitigation, organize long-term adaptation programs to adjust to SLR, including period raising of dikes, minimum flood construction levels for habitable buildings, and strategic 'managed retreat'.

Value	Count	Percent %
Support	32	61.5%
Support with Refinements	18	34.6%
Don't Support	2	3.9%

Statistics	
Total Responses	52

Comments

Count	Response
1	AS per previous comments
1	Absolutely support this.
1	I do not support raising of dikes.
1	Instead of dikes, channalize.
1	Make sure if new buildings go in they are not on flood plain.
1	Measures should focus on retreat and not raising of dikes
1	No construction only a managed retreat.
1	not raising dikes
1	salmon need channels in estuary, not a canal.
1	Analyze existent businesses, homes and strata for weaknesses to such natural threats. Provide support and incentives for change - and a time frame. We all will suffer if we don't make the weaker links stronger. Ie one dangerous spill over from a flooded car lot could pollute the entire parks area for years.
1	I wouldn't support the dikes. I think we should get out of areas we are going to have to overly engineer to exist within (doesn't seem sustainable). But I do support the construction levels and managed retreat of all uses, public and private. The Netherlands do this... (compensation involved). Role of province? Or perhaps role of all those who got in the way of supporting policies and actions to mitigate climate change in the first place and avoid this mess??
1	over time, i believe the area should be returned to flood plain and allowed to flood as nature intended. any mitigation should be short to medium term with the long term objective of moving to higher ground.
1	Include consequences of earthquake "Big One," on dike protected flood plain area, including potential landslide blockage of Puntledge, Tsolum, Browns Riverand Comox Lake Valleys for evacuation of people/ businesses in potential flood areas when blocked water is released (by itself, only controlled means) - ie: Emergency Measures Planning and clean roads for safe evactuation of residents from danger area.
1	no dikes. ensure major roadways receive an adequate lift and their subsurface flow capabilities meet the needs.
1	Again filling the floodplain is not the answer. An integrated rainwater management plan in the Tsolum and Puntledge/Browns watersheds would shave the peaks off the predicted floods.

9. Do you have any other comments or ideas you would like to share about flooding in Courtenay and the study area?

Count	Response
1	I hope you are working with the Comox Indian Band on this as well.
1	Put webcams on the bridges so people can see when to avoid using them.
1	Thanks for the workshop very interesting + informative
1	Would like to see the flood plan for larger area as more homes are in danger than just Courtenay.
1	i think this is great work that the City is doing. Well done.
1	In the next month I'm moving out of the flood plain area, in part due to concerns about flooding.
1	Trying to mimic the natural historical channels should be the most cost effective over the long term, have additional benefits (increase habitat, be aesthetically pleasing, raise land values) and be the most effective over the broadest range of circumstances.
1	Flood management needs to take into consideration possible impacts upstream as well as the study area. I believe that sea level rise is already beginning to show that the impacts will be faster than anticipated in this survey.
1	I'm so glad to see the City of Courtenay taking the impacts of Climate Change seriously. Thank you for preparing for the long haul. Please do not support further incompatible developments in the projected floodplain. Take a hard stand as regulators and do not allow please. Do not concede to the market. It does not know how to work for the collective long term benefit. And please restore Fields Sawmill site - restore to fish channels and park.
1	Up-stream mitigation for flooding, and managed areas that are allowed to flood should be options that are considered.
1	1. Is this a Courtenay project only? Does Comox have anything happening in their area? 2. Any project where is the money coming from Federal, Provincial, Municipal, Regional, Property Tax?

1	Land use 101- don't build on floodplains. We have wasted so much valuable marsh, estuary, farmable land on useless one-story shopping wastelands. Let nature run
1	It is imperative that we try to work with nature and natural water hydrology rather than trying to dike and hard-surface our way in a floodplain that should have not, in large part, been built on in the first place. Please consider the raised routes incorporating flow-under scenario in your modeling.
1	We found the presentation at the Western to be very well done, and most informative. As long as Lewis Park is allowed to flood this will assist properties on Anderton Ave to remain flood free.
1	1) The flood maps that have been prepared are excellent. Two things that would make them even more useful are:
1	The best way to deal with current and future flooding events is to ensure that we use land use planning to ensure vulnerable activities are relocated from flood plain areas.
1	I feel the adding of a third bridge should seriously also be in the plan; and I feel the best location would be straight from 29th street over the water to Comox road linking up around the Java Junction Coffee area, not only would it cut down on traffic flow going to South Courtenay and Traffic conjestion on the Dike be lessened, but it also sits on a little higher ground, if 5th street and 17th street Bridge become un-accessable do to major flooding in the area a third bridge would be absolutely necessary. Courtenay is going to grow and instead of waiting another 20 years before something is done about it and traffic is at a stand still the wait for a new Bridge to be built then would be still another 10-15 years in the making. Your already looking ahead 50 years for flooding control, look ahead for traffic flow control. The Comox Valley was not originally designed for high population traffic and unless you stop people from moving into the Valley its only going to get worse! Just saying.
1	Again, old river channels need reopening to allow flood waters to dissapate. These channels exist on the farm lands in the estuary. Some have been covered and filled in and are probably not able to be reopened.
1	If we want a vialble salmon run & fisheries in our area we have to protect and restore the estuary to historic levels. Dikes & channellized rivers are not good for salmon. Salmon are "sitting ducks" for seals when if the river is dikes & channelized. The options outlined are designed by engineers with no biological input.
1	There is a long history of failing dikes, often with catastrophic results. Constricting the channel with dikes will move the problem upstream. If there are millions of dollars available to be spent I support their use to purchase properties in the flood plain and make the property available for parks or agriculture. Detour routes are available when the roads in the flood plain are flooded.
1	1. Water is entering the floodplain more quickly than it did even 8 years ago. A two inch rain event used to take significantly longer to raise the river levels than it does now. Obviously water from upstream is entering the system faster than it used to. Is this because of the "downpipe" effect that ditching, roadbuilding and clearcutting have on the system? Continuing to dump more water, more quickly into an already over-taxed floodplain will never be kept up with by building dikes. The volume is too great already. Diking will push the problem further upstream to properties that are already threatened there. Deal with the source of the problem. Get a moratorium on clear-cutting, road-building and ditching in the upper watershed and the farmland in the lower areas. Get the re-planting done as quickly as possible. The dike is an un-necessary expense if you allow the natural sponge of a healthy upper watershed to slow the water down and give it a chance to escape. 2. BC Hydro seems much more co-operative in controlling the Comox Lake dam. With the technology available now to forecast major rain events, there is no excuse for not letting large amounts of water out of the dam ahead of time so that there is capacity in the system to absorb the large events. 3. The Tsolum is a major contributor to the Courtenay floodplain. Surely it would be more cost effective to build an upstream control device on the Tsolum. A better dam on Wolf Lake or some other strategic spot would not only allow the holding back of flood water, but would help augment summer flows to enhance fish habitat in the dry months. 4. Is there a way to divert some of the water flow into the Bevan wetlands? 5. I'm curious as to why businesses and landowners along Puntledge Road in Courtenay and along the Tsolum in the CVRD did not receive invitations to the forums?
1	Are you working with the Regional District for areas outside of your survey? Someone commented you can buy insurance against floods. Can you please let me know who that insurer would be? I have checked with many and they will not insure you against flooding if you live on a flood plain. Are you considering the impact of logging in other areas on inflow into the river (though the previous Tsloum River survey denies this is an issue, I highly doubt that)?
1	Sorry, I prematurely submitted my survey in the middle of filling out this page. Here we go again: 1) The flood maps that have been prepared are excellent. Two things that would make them even more useful are: - Make the flood water transparent so that we can see what is in the areas that are flooded - Add sea-level rise to the 200-year inundation zone 2) It may be useful to conduct a critical asset identification/prioritization/ranking study. This would involve identifying critical assets/infrastructure in the flood-prone areas (both inside and outside the dikes) and developing plans for adaptation for these assets. Which will be impacted soonest? How will they be impacted? What is the life expectancy of the asset... should plans be made to adapt or relocate? 3) While it is understood that the projected time frames and extent of increase of storm intensity and sea-level rise are constantly changing with new and emerging studies, a way to incorporate these updates as seamlessly as possible into planning horizons should be developed. 4) ******One major question that ought to be addressed as clearly as possible (granted it is an extremely challenging question): To what extent can we protect the Ryan Road area from flooding? In other words, how much sea-level rise and what kind of storm recurrence/event would be the maximum reasonable amount that we can protect the area from with diking? Are

	we talking about 2m of sea-level rise with a 200 year storm or is it 3m with a 500 year storm? Or 1m with a 200 year event? I cannot emphasize enough that we need to know what our limit is because this is critical information for directing our planning efforts. If we do not know our limits, it is as though we will be moving forward blindly. Yes, dikes can be built as high as we want them, but there is a certain level above which they become impractical from either an economic or physical standpoint... please provide us with some guidance in this respect. Thank you for your most excellent work in preparing these studies!
1	Past practice was to dredge the river to give better flow and more capacity, maybe give this a try again.
1	glad to see the city is making it a priority to plan ahead for an increase in flooding due to changes in the watersheds and climate change taking into consideration planning, engineering, ecology and erosion protection. A similar study is needed to assess the potential impact of coastal areas in the Valley. Thanks for this opportunity to comment and good luck with the plan.
1	The best agricultural land is in the flood plane and therefore should b prised as such. Developement should on higher and poorer land which will not be effected by flooding
1	I believe quite a bit of flooding is due to factors within the whole watershed. When Lannan Forest was under threat of being destroyed, I went to an information session on one of the adjacent residential streets. The ditches on either side of this street had significantly different levels of water in them. The ditch that came from the intact forest was almost empty, while the ditch flowing from the land that had been clearcut and subdivided/ built up was quite full of water. I think that we need to keep as much water out of the rivers as we can, to begin with. Some factors to consider are: -preserve wetlands and forests, plus avoid clearcutting--this will enable large quantities of water to be held/stored in the land and wetlands. -strict riparian zone regulations--developers must follow these rules too. -try to minimize new hard-surfacing (paving, etc). Instead parking areas can have more porous surfaces, and contain rain gardens, thus reducing runoff into storm drains. -encourage rainbarrel use (I know you have already been doing this--thank you) -also encourage landscaping with shrubs, trees etc instead of lawns--they have much more extensive root systems, thus holding more water in the soil instead of letting it run off; they also require less watering once established. I know these comments do not really apply to the flood management options covered by the study. But I believe they are important in reducing the amounts of water entering the rivers in the first place. As far as the options you have listed in your study, it seems to me that a combination could be quite effective. Thank you for all your work!
1	It seems to me inevitable that the sea level will rise so we need to make buildings forth coming take that into account in design or not let buildings be built on the flood plain. Diking and channeling the water will have huge downsyream affects on someone!
1	1. insurance is becoming increasingly difficult and expensive to obtain - anywhere on Vancouver Island.becoming part of the North American demographic pool has not reduced rates - it has raised them, given American problems. We pay for NY flooding right here on V Isle. We need Cdn insurance as much as Cdn banks. 2. Hardship caused by previous building in good faith must be reduced. 3. Balance benign years against the expectation of disaster and plan for both. Review the plans periodically. It requires ongoing dynamic management not a static spreadsheet vision. 4.Include all of the Estuary - not just to Mansfield Drive. 6. Get rid of the corregated metal fence along Field's Sawmill immediately and clean up the concrete top. It was covered in the recent high floods. Very dangerous - for humans , salmon and other living creatures -except perhaps seals who love the backboard. We need fewer fat seals and more spawning salmon. And plant eel grass to increase carbon offsets, erosion and to provide nutrients. 7. Continue - this is very important work. Much needed to provide a quality of life in CV for many more species than the human one - whose priorities will shape the future of the CV. We must stand on guard for our country - it is a heritage we are in danger of squandering. A sustainable future is a worthwhile investment.
1	I would like to see a modelling of a flood relief scenario that see the flood water being able to relieve itself onto the historic floodplain at the level of the existing Old Island Highway. Physically this could be designed by removing the sand bags (or the concrete barrier) along the Old Island Highway and use it along with sections of Puntledge Road to channel the flood waters through a new breach in the Highway 19a road fill near your pump station. The breach could be a series of box culverts or a low profile bridge.
1	Yes. This should be a co-ordinated effort with Comox,CVRD, MOT. Developmenst that do not manage rain water, impact on neghbouring comuniuities. This needs to be managed on a Valley basis. Rain water management is part of the flooding problem in our area. I would like to know that my feedback has been received
1	This should be a study involving all local goverements that have some impact, or suffer consequences of storm water mismanagement. This includes logging etc, that impacts on run off into the Comox Valley watershed.
1	Important local government - first nations get out in front of issue and support initatives, make funds available that allows retreat (through compensation) of areas that are in flood zones. Will be expensive and perhaps not popular. How do you communicate facts to larger population to support options and take emotions out of debate.
1	I am a retired senior living on Anderson Ave (River Glen) in a strata developmet surrounded on 3 sides by the Puntledge, Tsolum and the Courtenay Rivers. I enjoy the peaceful, quiet beauty of nature and the healthy environment for the Comox Valley. I hope to be able to live out my life in this place before climate change, Rising Sea Levels and/ or earthquakes force me to move from here. I'm sorry to the following generations who come after me, for the environmental damage and destruction that my generation has inflicted on them, through pure ignorance, stupidity and/

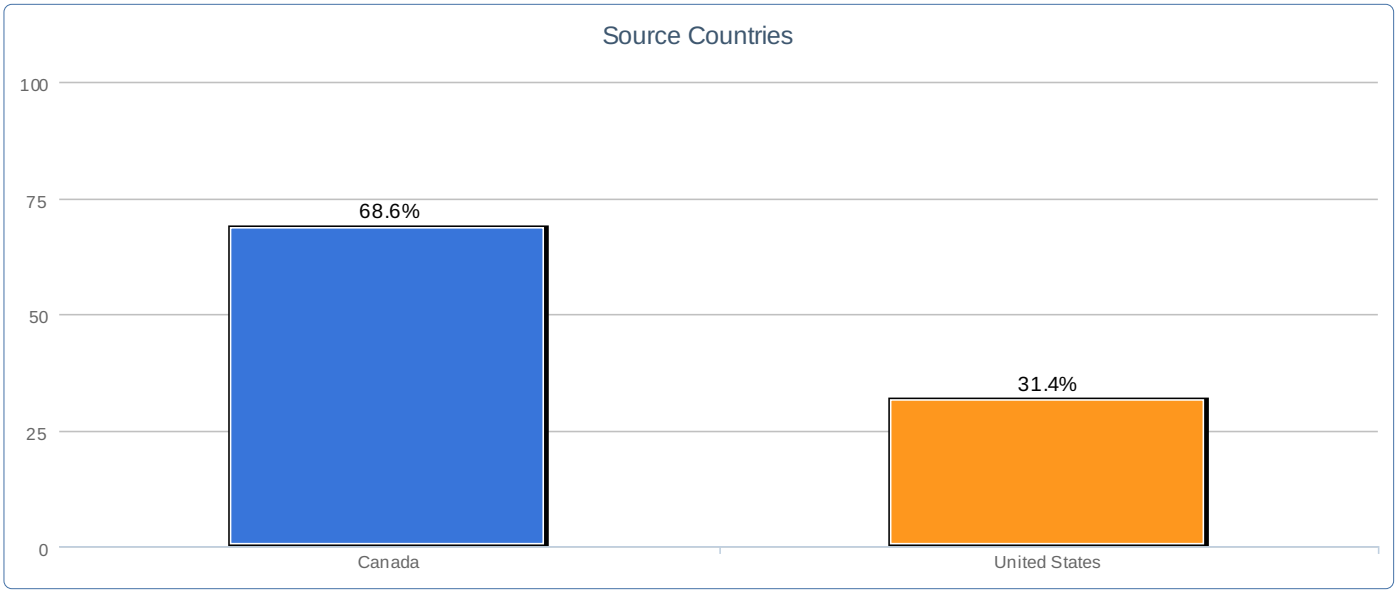
	or greedy selfishness. I've tried to cherish and protect nature during my life, and I wish more of my generation had done the same as well. Maybe the outlook for the future wouldn't look as bleak now.
1	I did not mention the artisan wells in my previous submission. They are an important dimension. Vancouver Island is honeycombed with underground springs. When above ground, they are known as caves and some have water in them part of the time. Below ground, the water levels vary depending upon rain fall, links with other streams and creeks, and the tidal flow. They are sometimes called gysers, guzzles artisan wells. Some can blow, given sufficient pressure. Others disappear 0 such as the Hot Springs in Haida Gwaii post recent earthquake. Regardless, they are a factor to be considered when planning for floods and other disasters.

Email

Count	Response

Phone Number

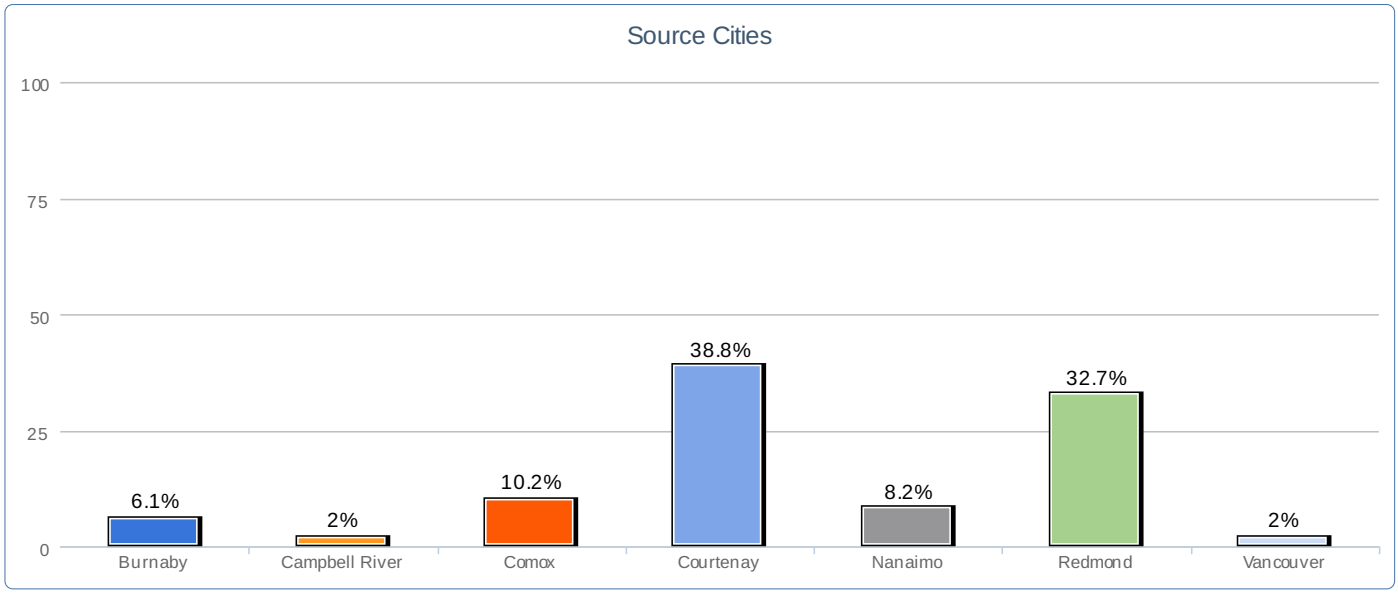
Count	Response



Source Countries

Value	Count	Percent %
Canada	35	68.6%
United States	16	31.4%

Statistics	
Total Responses	51



Source Cities

Value	Count	Percent %
Burnaby	3	6.1%
Campbell River	1	2.0%
Comox	5	10.2%
Courtenay	19	38.8%
Nanaimo	4	8.2%
Redmond	16	32.7%
Vancouver	1	2.0%

Statistics	
Total Responses	49

Comox Valley Project Watershed Society Box 3007, Courtenay, BC, V9N 5N3
Phone: (250) 703-2871 Fax: 703-2872 Email: projectwatershed@shaw.ca
www.projectwatershed.bc.ca

Derek Richmond
Manager of Engineering
City of Courtenay
Courtenay, BC

November 29, 2012

Dear Derek

Re. City of Courtenay's Integrated Flood Management Study

As a follow up to our meeting last week I would like to provide a summary of the views of the Estuary Working Group (EWG)* concerning measures being taken to mitigate expected flooding in the estuary flood plain.
*The EWG represents eleven local environmental groups, key federal and provincial agencies and individuals concerned with protecting and restoring the Estuary.

The EWG believe that the best approach to dealing with flooding is to work with natural processes, making it possible for flood waters and tidal storm surges to be dispersed onto the estuary flood plain. We believe this can be achieved by creating passage ways for flood waters to pass under existing roads and dykes, spilling out onto the natural flood plain. A series of box culverts or a low bridge through Highway 19a near where the City has a pump station would provide maximum release of flood waters onto the flood plain. These waters would drain rapidly during low tide once tidal storm surges have eased up.

The City has road right of ways right up to Highway 19a. The idea would be to use some of the roads in the area - the Puntledge and Tsolum Roads - as flood channels (ie: keep them at a lower elevation than the lots). The roads would provide flood relief channels capable of handling the volume of water that needs to be moved during floods. The whole idea is to allow the flood to spill freely onto the fields at the lowest elevation possible thereby keeping the depth of the flood to the lowest level possible. The City may lose the use of Dike Road near the Dike Slough tide gates but would maintain a road connection along Highway 19a which could be raised if necessary since flood relief would be provided by the works we propose. Connection to the proposed site of the new hospital will be an irresistible objective to take into account for citizens on the west side of the river so this has to be kept in mind.

We suggest that any flood works built at this time be designed so that they can be incorporated in future measures that will have to be taken as the threat of future increased flooding becomes inevitable.

The EWG also recommends that wherever possible `green shores' be the standard for shore line protection. This is especially critical along the Dyke Road where the road is exposed to major wave action. Indigenous vegetation and sloping shores would dissipate much of the power of incoming waves.

We are of the view that **development should not be permitted in the flood plain.** From our reading of the alternatives presented in the Options Survey, we think that Option #3. Ring Dike/Floodproofing Long Term Improvement, c & d may come closest to our view.

c. Pursue managed retreat from public lands (existing or purchased) in the floodplain outside dikes by removing uses that cannot be adapted to flooding.

d. Avoid further flooding risks by discouraging further up-zoning or subdivision in the floodplain outside dikes that would result in increased need for flood protection of that new use.

These measures need to be considered in concert with consideration of the threat from sea level rise. With this in mind we recommend Option (a).

a. Create Sea Level Rise (SLR) Planning Areas for year 2100 and year 2200 that include all lands that would potentially face inundation to the combination of rising seas and river flood levels.

City of Courtenay's Animated Map

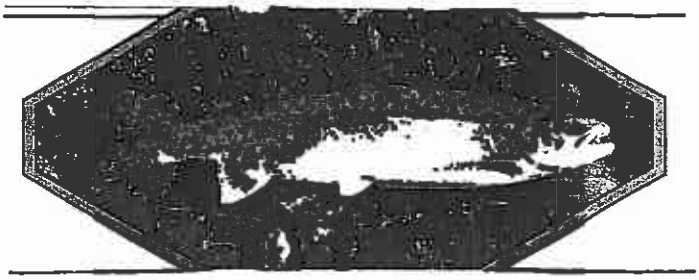
We would like to recommend that the City include an animated illustration of the combined impact of an extreme weather event and maximum anticipated tidal storm surge - the perfect storm - in 2100 and again for 2200 as one of their flood relief scenarios in the Animated Map of the Estuary. **This should then be evaluated before a decision is made re. the construction of any walls or dikes.**

We trust these recommendations are of assistance in your planning to manage future flooding. We look forward to continuing collaboration on future initiatives you may take to protect and restore the estuary.

Sincerely

Don Castleden
Chair, Estuary Working Group
Comox Valley Project Watershed Society

STEELHEAD SOCIETY of British Columbia Comox Valley Chapter



City of Courtenay Nov.30,2012
Re: flood management planning

I am chair of the Comox Valley chapter, Steelhead Society of BC, co-chair of the Puntledge River Restoration Committee, and immediate past chair of both the Comox Valley Environmental Council and the Conservation Committee of the Courtenay and District Fish and Game Protective Association.

Concerning your flood management planning: all of these groups encourage the "soft shores " approach: on oceans, lakes and rivers. In your planning we urge you to do two things: a) keep stream shores as soft as feasible b)plan your water escape routes through natural avenues so that pressure is eased through natural routes rather than forced routes.

We expect to have more input, separately and together, as the process moves forward.

Yours truly, L. W. Peterson

Larry Peterson

864 Evergreen Ave.
Courtenay

ph. 338-8675

Courtenay
Integrated Flood Management Study
Public Values Survey

welcome

Flooding is an historic concern in the Courtenay and lower Puntledge and Tsolum River areas. The City is updating its floodplain mapping and starting an Integrated Flood Management Study. Please provide your input in this survey.

The study will model flood levels, both for today and for projected climate change scenarios at Year 2100 and 2200 accounting for potential sea level rise. The goal is to ensure gradual improvements to the waterfront and floodplain are based on a long-term understanding.

The planning is just kicking off and this survey is intended to gather preliminary community ideas.

Please complete your response no later than
Friday, July 6, 2012.

Would you rather complete this survey online?

Please go to:
www.courtenay.ca

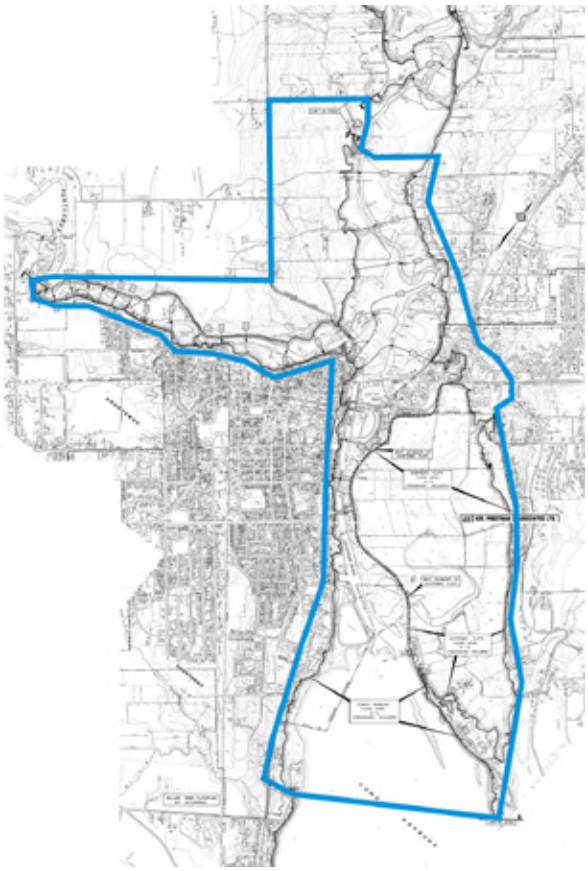
Courtenay
Integrated Flood Management Study
Public Values Survey

about the floodplain

The Courtenay/Comox floodplain is central to First Nation, agriculture and more recent urban settlement in Comox Valley. The rich soils in the agriculture and estuary parts of the floodplain result from the interaction of glacier and river waters and the sea. Natural species have adapted to the regular flooding of the low areas, agriculture and human settlements must do the same. What adaptations to current and future climate and flood risk are optimum? And how can these improvements maintain or increase values for habitat, recreation and resilience?

where is the current plan area?

The study area is outlined on the map below - including the significant floodplain and adjacent upland areas of the lower Tsolum, Puntledge and Courtenay Rivers adjacent to Comox Estuary.



the site today

Flood events have occurred regularly in the study area. This photo is from November 2009.

Courtenay
Integrated Flood Management Study
Public Values Survey

A. demographics

1. Which best describes where you live?

- ◯ On property within the study area (received a direct mail invite)
- ◯ Within City of Courtenay but not in the study area
- ◯ Within K'omoks First Nation housing
- ◯ Other (please specify) _____

2. In which age group are you?

- ◯ Under 19
- ◯ 19 to 34
- ◯ 35 to 49
- ◯ 50 to 74
- ◯ 75 or More

3. What gender are you?

- ◯ Male
- ◯ Female

4. Which statement(s) describes you best? (Please select all that apply.)
When I visit the study area, I like to:

- ◯ Pass through in a car or other motorized vehicle
- ◯ Use the Riverway trails or public parks
- ◯ Fly from the Courtenay Airpark
- ◯ Enjoy my home there
- ◯ Patronize the businesses within the study area
- ◯ Work at a retail, office or industry within the study area
- ◯ Work in agriculture or fisheries based in the study area

Other (please specify) _____

B. Your flood story

5. **Please provide a short story (newspaper paragraph) that describes a special experience, family legacy, or issue related to flooding in the study area. Stories about flooding might be positive, negative, or mixed. Try to think of information only you would know, or that is especially relevant to the study. Your story will be published on the City website, so please refrain from naming individuals. But please do tell us what we might not otherwise know about your values and this wonderful place.**

Courtenay
Integrated Flood Management Study
Public Values Survey

C. Flood Priorities

6. Flooding has and will continue to occur in the Floodplain. But how often and where? The water has to go somewhere, and priorities for level of protection of land uses are value judgements. The greater protection that is constructed, the greater cost and potential environmental impact. For each land use type below, select one cell that represents your judgement on how often flooding should be acceptable for that use, considering risk to public health, relative cost and environment.

Land Use/ Risk Types	Approximate Flood Frequency	1/10000 Years	1/4000 Years	1/200 Years	1/10 Years	1/2 Years
Roads	Old Island Hwy					
	Highway (19A)					
	Other Major Roads(Comox)					
	Local Roads					
Residential	Living Areas					
	Basements					
	Parking					
	Yards					
Commercial	Buildings					
	Parking					
	Storage					
	Landscape					
Agriculture	Active Fields					
	Fallow Fields					
	Drainage areas					
	Wetlands					
Parks/ Airpark	Airpark					
	Playing Fields					
	Manicured Parks/ Trails					
	Natural Areas					

D. comments?

7. **Do you have any other comments you would like to share about flooding in Courtenay and the study area?**

Courtenay
Integrated Flood Management Study
Public Values Survey

thank you!

Thank you for taking the time to complete this survey. Your responses, along with those of fellow community members, will help guide the development of floodplain management approaches for Courtenay and the study area.

To return your paper survey:

- ***Drop it off*** or ***mail*** it to the City of Courtenay offices:

  Attn: Eva Harding
  Administration Coordinator, Operational Services Dept
  City of Courtenay
  830 Cliffe Ave., Courtenay BC V9N 2J7

- ***Fax it*** to the City of Courtenay at: **250 703 4864**
- ***Scan and e-mail*** to: **engineering@courtenay.ca**

Do you know anyone else who would be interested in filling out this survey?

Please direct them to: www.courtenay.ca

how to stay informed

The Courtenay Integrated Watershed Management Study will be completed over the next few months. To remain involved:

- Check the website at www.courtenay.ca where we will report on the feedback to date and share info, options and ideas for flood management.
- Provide us with your **e-mail** or **phone number** if you would like a reminder about any future related events

  E-mail _____

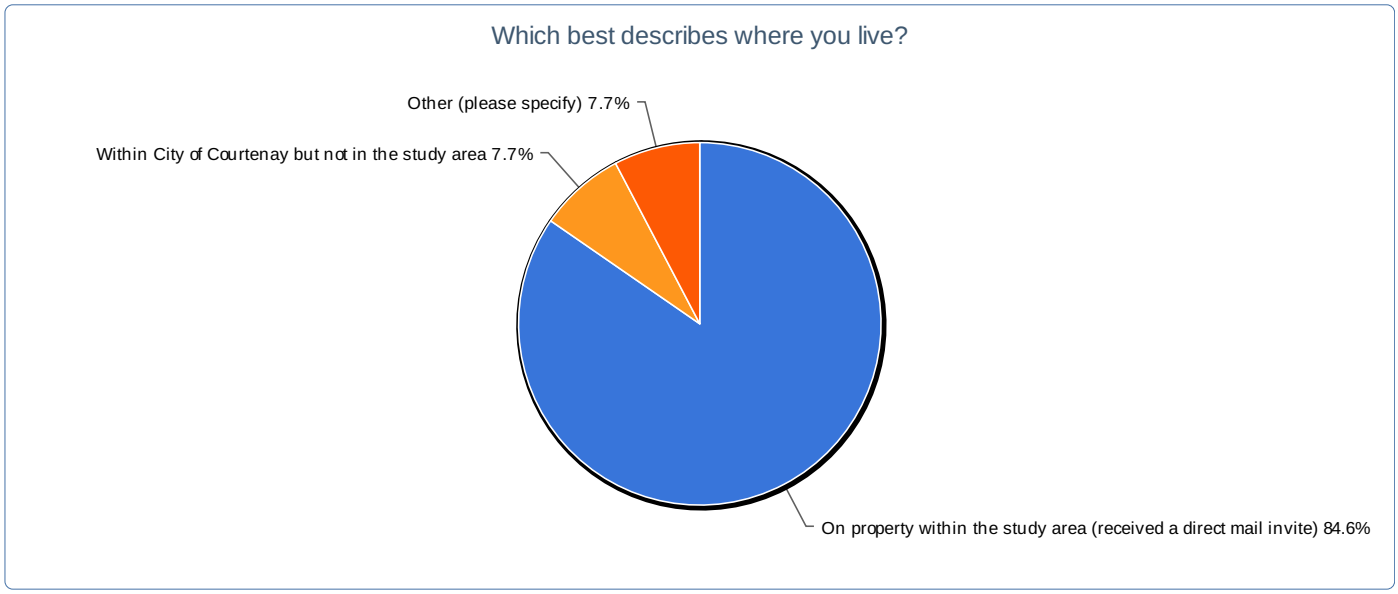
  Phone Number _____

- If you have questions or comments about this process, please email:

  info@courtenay.ca

Summary Report - Jul 9, 2012

Survey: Courtenay Public Values Survey

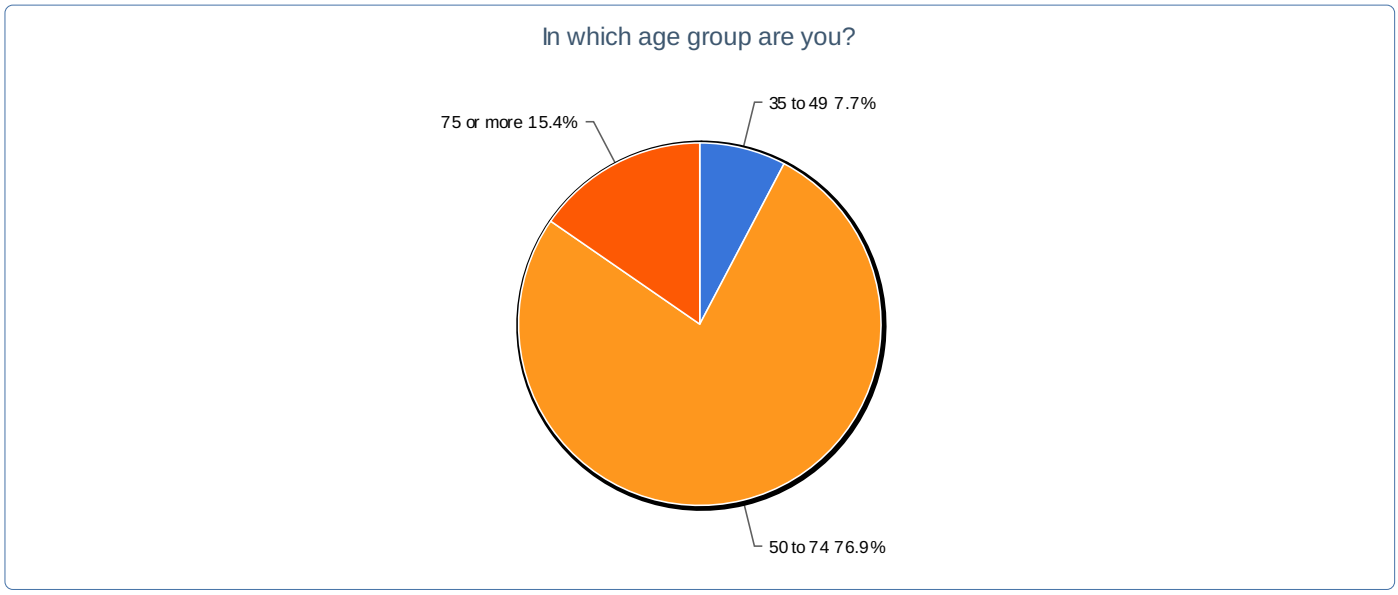


1. Which best describes where you live?

Value	Count	Percent
On property within the study area (received a direct mail invite)	11	84.6%
Within City of Courtenay but not in the study area	1	7.7%
Within K'omoks First Nation housing	0	0%
Other (please specify)	1	7.7%

Statistics	
Total Responses	13

Open-Text Response Breakdown for "Other (please specify)"	Count
Property within the study area, but did NOT receive invite	1



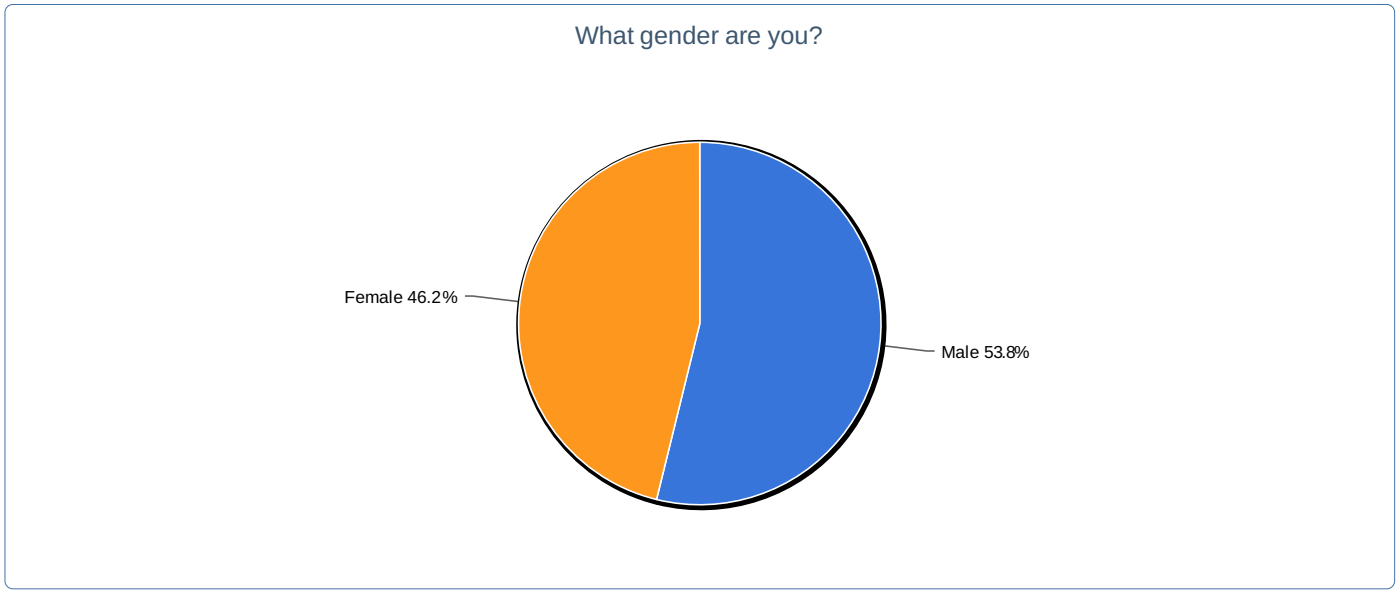
2. In which age group are you?

Value	Count	Percent
Under 19	0	0%
19 to 34	0	0%

Statistics	
Total Responses	13
Sum	685.0

35 to 49	1	7.7%
50 to 74	10	76.9%
75 or more	2	15.4%

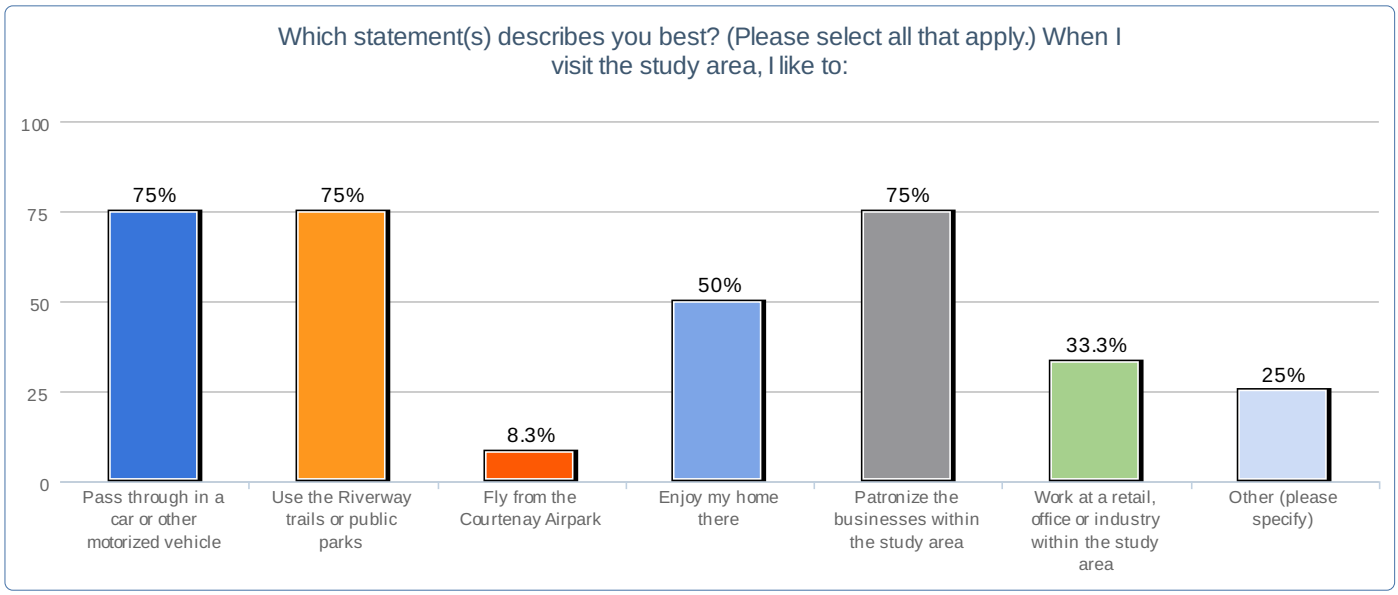
Avg.	52.7
StdDev	10.31
Max	75.0



3. What gender are you?

Value	Count	Percent
Male	7	53.8%
Female	6	46.2%

Statistics	
Total Responses	13



4. Which statement(s) describes you best? (Please select all that apply.) When I visit the study area, I like to:

Value	Count	Percent
Pass through in a car or other motorized vehicle	9	75%
Use the Riverway trails or public parks	9	75%
Fly from the Courtenay Airpark	1	8.3%
Enjoy my home there	6	50%
Patronize the businesses within the study area	9	75%
Work at a retail, office or industry within the study area	4	33.3%

Statistics	
Total Responses	12

Work in agriculture or fisheries based in the study area	0	0%
Other (please specify)	3	25%

Open-Text Response Breakdown for "Other (please specify)"	Count
I like to know the estuary and the Courtenay River are being restored	1
bird and wildlife watching, view of vistas from airpark walkway	1
bird/wildlife watching	1

5. Please provide a short story (newspaper paragraph) that describes a special experience, family legacy, or issue related to flooding in the study area. Stories about flooding might be positive, negative, or mixed. Try to think of information only you would know, or that is especially relevant to the study. Your story will be published on the City website, so please refrain from naming individuals. But please do tell us what we might not otherwise know about your values and this wonderful place.

Count	Response
1	N/A
1	None- new to area
1	I was eating at the old house restaurant one winter when the river flooded. The river had flooded right up to the footings of the restaurant and the dchef came out with boots on and waded into the grounds, (under 2-3 ft of water) He put his hands down in the river water and after 5-10 minutes of chasing something, he pulled out a good size salmon. At which time he pronounced "Who wants the salmon special, I will guarantee it is fresh!.
1	My family lives alonside the Tsolum and enjoys the river year round. We experience the 2010 flood which caused an enormous amount of erosion of our property, but luckily did not flood our home. We are concerned about the future potential for flooding and hope tha this process will assist in mutigating the risks so that my children and grandchildren can enjoy the legacy of a family farm.
1	I have lived at the Cold House Restaurant as it was my parents home - only flood was in 1953 but never moved out of the home. I have been at #12-5th St and have never flooded. I have property at 279 Puntledge and never flooded. I have played in the Courtenay River for close to 70 years. Concrete wall is not a wall but invitation to flooding as present concrete is set 6-8" above roadway making water to flood. Park only back floods from the Courtenat slough and not at tennis or CRA Pool.
1	2 years - 50 years - Saratgoa Whole life - 1961 - at end of Anderton Ave Condensory Bridge - Courtenay High 34 years - Braid wood Tsolum river changed channel parkside parkade riverglen strata management
1	Condensory Bridge - water right up to the deck 2010. Bridge was shut down. 2011 better because City, Hydro Emerg Services more coordinated. 41 years on the flood plain Puntledge Terrace built in area that was known to flood. 2 years ago Portugese Creek was allowed to come through - had to use a boat in yard. Neighbours couldn't get through chest-deep water. Pump water out of crawl space. Current Erosion issues. Riverglen built 4' above high water Water eroding bank, trees falling/leaning over past 3 yrs north of Condensory Bridge. Problem with competeing jurisdictions. Hard to know who to contact with concerns.
1	My flooding story has to do with my observation that flooding is a natural phenomenon and the problem is that there is infrastructure, businesses and homes built on the floodplain. There is much we can do to reduce flooding and again my observations show it is the Tsolum Watershed above the Rees Bridge that contributes floodwater in a rush to the Courtenay River added to the Puntledge flow and finally backed up by a high tide means flooding occurs. A planned managed retreat for all infrastructure in the floodplain is essential over the next 100 years or so.
1	Our first experience with flooding was our first rainy season on the property, Nov 15/04. We were told when we bought that we could expect "periodic water on the lawn". We were wakened by our dog barking, because, it turned out, he heard floating debris banging around in the open area below our house. That was one of the smaller floods we have experienced, but very memorable because of the number of large salmon that were trapped in pools all over our property as the water receded. I managed to get a few of them back into the river alive, but some we didn't find for several days (by smell and by eagles screeching),

6. For each land use type below, select one cell that represents your judgement on how often flooding should be acceptable for that use, considering risk to public health, relative cost and environment.

	1/10000 Years	1/4000 Years	1/200 Years	1/10 Years	1/2 Years	Responses
Roads - Old Island Highway	**0.0%** 0	**0.0%** 0	**46.2%** 6	**30.8%** 4	**23.1%** 3	**13**
Roads - Highway (19A)	**0.0%** 0	**11.1%** 1	**55.6%** 5	**0.0%** 0	**33.3%** 3	**9**
Roads - Major Roads (Comox)	**0.0%** 0	**0.0%** 0	**54.5%** 6	**27.3%** 3	**18.2%** 2	**11**
Roads - Local Roads	**0.0%** 0	**0.0%** 0	**45.5%** 5	**18.2%** 2	**36.4%** 4	**11**
Residential - Living Areas	**9.1%** 1	**18.2%** 2	**63.6%** 7	**0.0%** 0	**9.1%** 1	**11**
Residential - Basements	**9.1%** 1	**0.0%** 0	**81.8%** 9	**0.0%** 0	**9.1%** 1	**11**
Residential - Parking	**0.0%** 0	**0.0%** 0	**27.3%** 3	**63.6%** 7	**9.1%** 1	**11**
Residential - Yards	**0.0%** 0	**0.0%** 0	**27.3%** 3	**63.6%** 7	**9.1%** 1	**11**
Commercial - Buildings	**9.1%** 1	**18.2%** 2	**54.5%** 6	**0.0%** 0	**18.2%** 2	**11**
Commercial - Parking	**0.0%** 0	**0.0%** 0	**40.0%** 4	**30.0%** 3	**30.0%** 3	**10**
Commercial - Storage	**10.0%** 1	**0.0%** 0	**40.0%** 4	**40.0%** 4	**10.0%** 1	**10**
Commercial - Landscape	**0.0%** 0	**10.0%** 1	**10.0%** 1	**50.0%** 5	**30.0%** 3	**10**
Agriculture - Active Fields	**9.1%** 1	**9.1%** 1	**18.2%** 2	**0.0%** 0	**63.6%** 7	**11**
Agriculture - Fallow Fields	**0.0%** 0	**10.0%** 1	**10.0%** 1	**20.0%** 2	**60.0%** 6	**10**
Agriculture - Drainage Areas	**0.0%** 0	**10.0%** 1	**10.0%** 1	**20.0%** 2	**60.0%** 6	**10**
Agriculture - Wetlands	**0.0%** 0	**0.0%** 0	**0.0%** 0	**0.0%** 0	**100.0%** 8	**8**
Parks/ Airpark - Airpark	**9.1%** 1	**9.1%** 1	**9.1%** 1	**27.3%** 3	**45.5%** 5	**11**
Parks/ Airpark - Playing Fields	**0.0%** 0	**10.0%** 1	**0.0%** 0	**20.0%** 2	**70.0%** 7	**10**
Parks/ Airpark - Manicured Parks/ Trails	**0.0%** 0	**9.1%** 1	**0.0%** 0	**18.2%** 2	**72.7%** 8	**11**
Parks/ Airpark - Natural Areas	**0.0%** 0	**9.1%** 1	**0.0%** 0	**0.0%** 0	**90.9%** 10	**11**

7. Do you have any other comments or ideas you would like to share about flooding in Courtenay and the study area?

Count	Response
1	We have lived in our house for 8 years. The biggest thing we've noticed is the increase in frequency and severity of the flood events. We have tracked all the rainfall as well as the floods. We have also noticed that the river rises faster than it used to. A two inch rainfall took a lot longer to cause the river to rise dramatically than it does now. Perhaps because the water is entering the system much more quickly through increased ditching in the upper watershed?
1	For a reasonable cost. I feel that the flooding by Riverside lane can be minimized in the future. Incease in run off from the mountain (snow/rain combined) combined with storm surges in Nov/Dec and Jan result in annual flodding of this area. This combined with continued silt build up along the riverbed has increased the freguency of flooding in this area. A series of riveer laid rocks, backing along the bank to raise the bank along 200-250 fl of the river would elminate a lot of this flodding. Plus dredging the river would also help
1	Widen the accommodation of the 5th St Bridge to let the flow of water to get under and through the bridge. Dredge the Courtenay River from the Ountledge and Tsoleum River down the river to the sall water - dredge depth to be minimum of 8' deeper. Have BC Hydro release the water better in Sept/Oct/Nov/Dec and let the common lake level very much lower. Install leggo blocks as a cheap trial water contain basin from Court Pool up the Tsolem to a safe destination from houses.
1	Buildings and parks that are within the current floodplain should be assisted in figuring out how to cope with more

	frequent flooding. Some areas will just have to flood temporarily and we'll have to get used to it (a managed retreat) Soft solutions need to be emphasized - including reducing the hard surfaces and resulting run-off in heavy rain events, Green Shores The pinch point at the 5th Street Bridge needs to be addressed - but no more dredging of the Courtenay River. Is Comox Valley Rainwater Management included as part of this project? The large scale deforestation of our watershed has to be looked at - a problem in so many ways.
1	Very counterproductive to be doing this study in isolation from other jurisdictions. Comox Valley Rainwater Management needs to be looked at as a whole and an integrated approach needs to be adopted. Large-scale deforestation of this watershed needs to be addressed NOW. Without upland forests contributing to a management solution we are fighting an uphill battle. Inappropriate development on wetlands and shorelines needs to cease. Continued hard-surfacing (asphalt, concrete, etc.) of the landscape needs to be curtailed and reversed where possible. A Green Shores approach needs to be taken with our waterways and wetlands. Historical drainage patterns for the lower river reaches need to be studied, modeled and reactivated wherever possible. "Hard Engineering" and fighting natural systems is not the way to go - we need to work with ecological processes (some areas will just have to flood temporarily and we will have to live with it).
1	Flooding must be acceptable at any time in the floodplain. I have lots of ideas about reducing flooding contribution from the Tsolum and am working on many of these with the Tsolum River Restoration Society

Courtenay
Integrated Flood Management Study
Information Survey

welcome

Flooding is an historic concern in the Courtenay and lower Puntledge and Tsolum River areas. The City is updating its floodplain mapping and starting an Integrated Flood Management Study. Please provide your input in this survey.

The study will model flood levels, both for today and for projected climate change scenarios at Year 2100 and 2200 accounting for potential sea level rise. The goal is to ensure gradual improvements to the waterfront and floodplain are based on a long-term understanding.

The planning is just kicking off and this survey is intended to gather preliminary community knowledge and ideas.

Please complete your response no later than
Friday, July 6, 2012.

Would you rather complete this survey online?

Check your email... there will be a link to the online survey

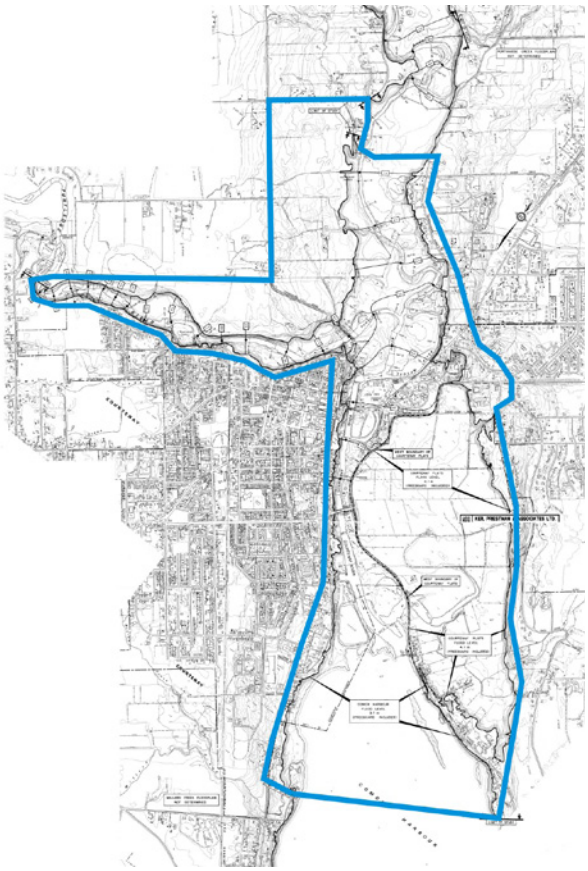
Courtenay
Integrated Flood Management Study
Information Survey

about the floodplain

The Courtenay/Comox floodplain is central to First Nation, agriculture and more recent urban settlement in Comox Valley. The rich soils in the agriculture and estuary parts of the floodplain result from the interaction of glacier and river waters and the sea. Natural species have adapted to the regular flooding of the low areas, agriculture and human settlements must do the same. What adaptations to current and future climate and flood risk are optimum? And how can these improvements maintain or increase values for habitat, recreation and resilience?

where is the current plan area?

The study area is outlined on the map below - including the significant floodplain and adjacent upland areas of the lower Tsolum, Puntledge and Courtenay Rivers adjacent to Comox Estuary.



the site today

Flood events have occurred regularly in the study area. This photo is from November 2009.

Courtenay
Integrated Flood Management Study
Information Survey

A. Contact information

1. What agency do you work for?

_____

2. Please list your name, position and email address

Name _____

Position _____

Email _____

B. Your floodplain knowledge

3. **Please list any current projects that you are involved in or aware of that are related to the Courtenay and study area floodplain. Make sure to include the project name, description and explanation of how we can access this information.**

4. **Please list any relevant studies (existing or underway) that are related to the Courtenay and study area floodplain. Make sure to include the study name, description and explanation of how we can access this information.**

5. **Please list any relevant policies that are related to the Courtenay and study area floodplain. Make sure to include the policy name, description and explanation of how we can access this information.**

Courtenay
Integrated Flood Management Study
Information Survey

C. Flood Priorities

6. **Flooding has and will continue to occur in the Floodplain. But how often and where? The water has to go somewhere, and priorities for level of protection of land uses are value judgements. The greater protection that is constructed, the greater cost and potential environmental impact. For each land use type below, select one cell that represents your judgement on how often flooding should be acceptable for that use, considering risk to public health, relative cost and environment.**

Land Use/ Risk Types	Approximate Flood Frequency	1/10000 Years	1/4000 Years	1/200 Years	1/10 Years	1/2 Years
Roads	Old Island Hwy					
	Highway (19A)					
	Other Major Roads(Comox)					
	Local Roads					
Residential	Living Areas					
	Basements					
	Parking					
	Yards					
Commercial	Buildings					
	Parking					
	Storage					
	Landscape					
Agriculture	Active Fields					
	Fallow Fields					
	Drainage areas					
	Wetlands					
Parks/ Airpark	Airpark					
	Playing Fields					
	Manicured Parks/ Trails					
	Natural Areas					

D. comments?

7. **Do you have any other comments you would like to share about flooding in Courtenay and the study area?**

Courtenay
Integrated Flood Management Study
Information Survey

thank you!

Thank you for taking the time to complete this survey. Your responses, along with those of fellow community members, will help guide the development of floodplain management approaches for Courtenay and the study area.

To return your paper survey:

- ***Drop it off*** or ***mail*** it to the City of Courtenay offices:

  Attn: Eva Harding
  Administration Coordinator, Operational Services Dept
  City of Courtenay
  830 Cliffe Ave., Courtenay BC V9N 2J7

- ***Fax it*** to the City of Courtenay at: **250 703 4864**
- ***Scan and e-mail*** to: **engineering@courtenay.ca**

Do you know anyone else who would be interested in filling out this survey?

Please forward them the link to the online survey by email

how to stay informed

The Courtenay Integrated Watershed Management Study will be completed over the next few months. To remain involved:

- Check the website at www.courtenay.ca where we will report on the feedback to date and share info, options and ideas for flood management.
- Provide us with your **e-mail** or **phone number** if you would like a reminder about any future related events

  E-mail _____

  Phone Number _____

- If you have questions or comments about this process, please email:

  info@courtenay.ca

Summary Report - Jul 19, 2012

Survey: Courtenay Information Survey

1. What agency do you work for?

Count	Response
1	
1	
1	

2. Please list your name, position and email address.:Name

Count	Response
1	
1	
1	

2. Please list your name, position and email address.:Position

Count	Response
1	
1	
1	

2. Please list your name, position and email address.:Email

Count	Response
1	
1	
1	

3. Please list any current projects that you are involved in or aware of that are related to the Courtenay and study area floodplain. Make sure to include the project name, description and explanation of how we can access this information.

Count	Response
1	no current some in planning -- will contact the municipality if they move forward
1	Courteany River Estuary Management Plan - recently revised. Still active with the CVRD on this and other development issues adjacent and related to fish and wildlife habitats in the estuary. Also involved in planning towards the creation of a Wildlife Management Area designated under Section 4 of the BC Wildlife Act
1	1) Courtenay River Estuary Management Plan (CREMP) http://www.comoxvalleyrd.ca/cremp/cremp_e.htm The Estuary Management Plan has four purposes: 1. With respect to defining policy, the purpose of the Estuary Management Plan is

	to provide goals and objectives to guide human activity and economic development in the estuary, while maintaining and enhancing, where possible, the estuary's environmental values. 2. In terms of strategy, the purpose of the Estuary Management Plan is to establish a framework for ongoing coordinated management of interests and activities associated with the estuary. 3. Regarding actions, the purpose of the Estuary Management Plan is to define the steps necessary to implement the Estuary Management Plan, including program targets and activities, management tools such as Area Designation Agreements, and opportunities to involve citizens and businesses. 4. With respect to process, the purpose of the Estuary Management Plan is to incorporate mechanisms to monitor, evaluate, and improve successful aspects of the Estuary Management Plan and identify areas that require change. The Estuary Management Plan is a dynamic document that will be updated to meet future needs and address changing social, environmental, and economic conditions. 2) Courtenay Flats Drainage Service The Courtenay Flats are located northeast of the Courtenay River estuary, and contain a large tract of high capacity farm land on the floodplain between Comox Road and Back Road in Lazo North – Electoral Area „B" (see Appendix A). Historically drainage and flood problems have been reported and prior to the creation of the service were becoming increasingly more severe. In 1987 the Comox-Strathcona Regional District made application under the Agricultural and Rural Development Subsidiary Agreement to assess the extent of drainage problems in the Courtenay Flats area and to determine the cost and benefits of potential improvements which could be undertaken. After thorough study, with multiple stakeholders, it was determined that a flood control and tide gate should be installed. In order to fund the installation of the new infrastructure, the regional district created a service area of participating properties and financed the works through Municipal Finance Authority debt. Participants in the service area were charged an annual parcel tax of $47.90 per hectare. The debt was fully repaid in 2009. In addition to repaying the debt the service has contributed to future expenditures and capital works reserve funds. The flood control and tide gate infrastructure were generally to be operated by the property owners and adjusted seasonally to affect water levels. To date, the infrastructure has not required any maintenance. It is expected that the flood control and tide gate will soon require some general maintenance in order to keep them in good operating condition. A site visit and visual inspection of the infrastructure was completed in the fall of 2011. The infrastructure is partially overgrown with vegetation and does not appear to be operated in any way by the property owners. It is recommended that in 2012 the CVRD, MOA, DFO and the City of Courtenay meet with the participants of this service to discuss the CFD service, the benefits provided by the service, and upcoming future maintenance requirements. (Please see attached staff report dated February 24, 2012 for more information on the current status.)

4. Please list any relevant studies (existing or underway) that are related to the Courtenay and study area floodplain. Make sure to include the study name, description and explanation of how we can access this information.

Count	Response
1	CREMP
1	n/a
1	Bird Use of Baynes Sound- Comox Harbour 1980-88 (publ. 1998) Neil K. Dawe, Ron Buechert, Donald E.C. Trethewey CWS Tech Report 286 Contact me or Kathleen Moore at CWS gretchen.harlow@ec.gc.ca/ kathleen.moore@ec.gc.ca

5. Please list any relevant policies that are related to the Courtenay and study area floodplain. Make sure to include the policy name, description and explanation of how we can access this information.

Count	Response
1	Nothing specific but, in general, policies related to fish and wildlife protection Wildlife and Fish Protection Acts, Water Act and Areas regulation
1	1) Comox Valley Regional Growth Strategy (RGS) Bylaw No. 120, 2010 http://www.comoxvalleyrd.ca/section_rgs/content.as id=3211&collection=71 Page 77 of the RGS outlines Objective 8-F: Plan for climate change adaptation and supporting polic Policies 8F-2, 8F-5, and 8F-6 in particular are relevant to the Courtenay and study area floodplain. 2) Comox Valley Region Bylaw 2782 – Floodplain Management Bylaw, 2005 http://www.comoxvalleyrd.ca/uploadedFiles/Property_Services/Planning/Bylaws/2782/Bylaw2782_SchedAFloodplainManag A bylaw to regulate the siting and construction of buildings and structures in floodplains and near watercourses in the Regio District of Comox-Strathcona with the exception of Electoral Area 'K' and portions of 'G' as noted in the Bylaw. 3) Draft revis Courtenay River Estuary Management Plan http://www.comoxvalleyrd.ca/cremp/
1	Species At Risk Act http://www.sararegistry.gc.ca/involved/you/default_e.cfm Migratory Birds Convention Act http://www.ec.gc.ca/nature/default.asp?lang=En&n=7CEBB77D-1

6. For each land use type below, select one cell that represents your judgement on how often flooding should be acceptable for that use, considering risk to public health, relative cost and environment.

	1/10000 Years	1/4000 Years	1/200 Years	1/10 Years	1/2 Years	Responses
Roads - Old Island Highway	**0.0%** 0	**50.0%** 1	**50.0%** 1	**0.0%** 0	**0.0%** 0	**2**
Roads - Highway (19A)	**0.0%** 0	**100.0%** 2	**0.0%** 0	**0.0%** 0	**0.0%** 0	**2**
Roads - Major Roads (Comox)	**0.0%** 0	**50.0%** 1	**0.0%** 0	**50.0%** 1	**0.0%** 0	**2**
Roads - Local Roads	**0.0%** 0	**0.0%** 0	**50.0%** 1	**0.0%** 0	**50.0%** 1	**2**
Residential - Living Areas	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**0.0%** 0	**2**
Residential - Basements	**0.0%** 0	**0.0%** 0	**50.0%** 1	**0.0%** 0	**50.0%** 1	**2**
Residential - Parking	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Residential - Yards	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Commercial - Buildings	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**0.0%** 0	**2**
Commercial - Parking	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Commercial - Storage	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**0.0%** 0	**2**
Commercial - Landscape	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Agriculture - Active Fields	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Agriculture - Fallow Fields	**0.0%** 0	**0.0%** 0	**0.0%** 0	**0.0%** 0	**100.0%** 2	**2**
Agriculture - Drainage Areas	**0.0%** 0	**0.0%** 0	**0.0%** 0	**0.0%** 0	**100.0%** 2	**2**
Agriculture - Wetlands	**0.0%** 0	**0.0%** 0	**0.0%** 0	**0.0%** 0	**100.0%** 2	**2**
Parks/ Airpark - Airpark	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**0.0%** 0	**2**
Parks/ Airpark - Playing Fields	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Parks/ Airpark - Manicured Parks/ Trails	**0.0%** 0	**0.0%** 0	**0.0%** 0	**50.0%** 1	**50.0%** 1	**2**
Parks/ Airpark - Natural Areas	**0.0%** 0	**0.0%** 0	**0.0%** 0	**0.0%** 0	**100.0%** 2	**2**

7. Do you have any other comments or ideas you would like to share about flooding in Courtenay and the study area?

Count	Response
1	recommend contacting the following organizations and representatives Ducks Unlimited-- Dan Buffet D_Buffet@Ducks.ca DU owns land near the estuary. Local naturalists for current bird surveys. Contact Art Martel amartell@shaw.ca Contact Bird Studies Canada there is a Important Bird Area designation in the area. Karen Barry [bcprograms@bsc-eoc.org] and Peter.Davidson@ec.gc.ca for information on the Coastal Waterbird Survey that operates in your area. Peter.Davidson
1	The floodplain operates as part of a complex watershed system. Activities in one part of the watershed can directly impact other areas of the watershed. Likewise, development that occurs in the floodplain alters the function of the floodplain. As such, coordination between the regional municipalities is essential for effective management of risks to

	property and the environment in the floodplain. A common set of planning policies, procedures and evaluative criteria would result in improved floodplain management. Campbell River has made significant progress with regards to floodplain management and may have some helpful insight.
1	It's difficult to answer the questions related to residential housing. If folks are permitted to build wihtin the floodplain (what was a 1/200) return then I guess they might expect to become flooded form time to time.

Email:

Count	Response
1	gretchen.harlow@ec.gc.ca
1	margaret.henigman@gov.bc.ca

Phone Number:

Count	Response
1	250-751-3214
1	604-940-4659