


1

What are we talking about today?

Sayward and the SRD have engaged McElhanney to Update the Floodplain Mapping in the Sayward Valley

- **Why re-study the floodplain issues now?**
 - Things have changed since the 1980s. We need to get up-to-date!
 - Things will continue to change. We need to plan for the future!
- **The past is the key to the Future:**
 - The Hydrology (the flows in the Rivers) has been updated.
 - New Hydraulic modelling (how the flow moves through the Valley)
 - Consider Changes to Climate and Sea Level Rise (SLR)
 - Conceive of a plan to protect the community, and
 - Plan for the future (Integrate with OCP)
- **Public Engagement**


McElhanney: Salmon & White River Flood Hazard Mapping

2

The Watersheds

Salmon River & White River

- Salmon River Drainage Area is 1324 km² with the White River about 367 km²
- Last review of Flood Discharges was completed in 1995. Discharges for 1:200 Year Flood at:
 - Salmon River = 2329 m³/s
 - White River = 1069 m³/s
- Discharges were based on records from Water Survey of Canada Gauge on the Salmon River (3 gauges as far back as 1956)

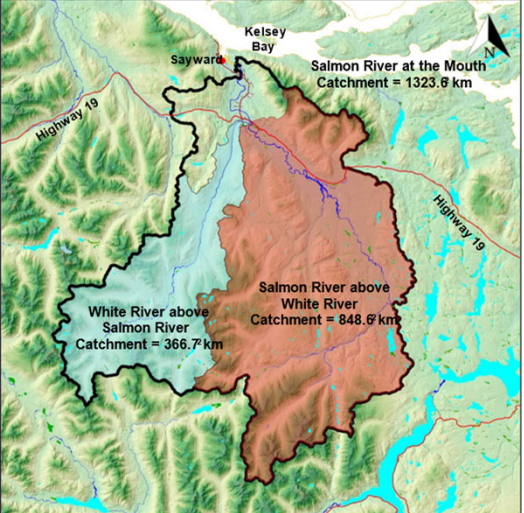


Figure 2: Salmon and White Rivers Catchment Areas

McElhanney: Salmon & White River
Flood Hazard Mapping

3

3

The Watersheds

Salmon River & White River

- New Data since 1995 and the Salmon River Diversion has been decommissioned
- 2020 Estimates for the 1:200 Year Flood
 - Salmon River = 2331 m³/s (almost the same, no diversion)
 - White River = 877 m³/s (18% less than 1995, more data = better estimate)

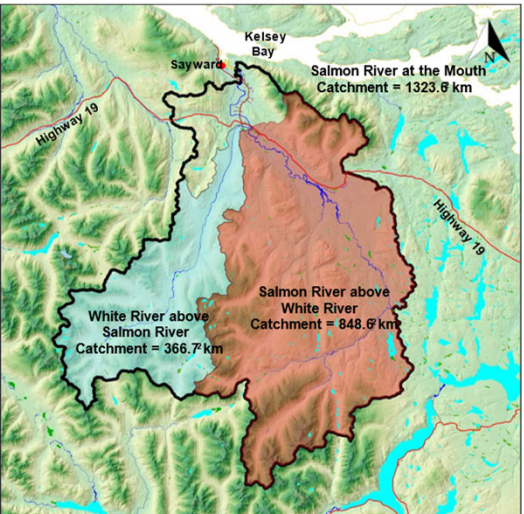


Figure 2: Salmon and White Rivers Catchment Areas

McElhanney: Salmon & White River
Flood Hazard Mapping

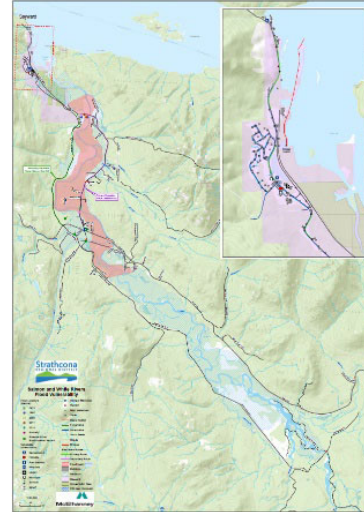
4

4

Historical Flooding

The 2019 Flood Risk Assessment reviewed historical flooding

- Flooding as recently as 2016
- Floods have been recorded since the 1800s
- Major Flood in 1927
- Other significant Flood Events: 1975, 1990, 2008, 2011, 2014 and 2016



McElhanney: Salmon & White River
Flood Hazard Mapping

5

5

Floodplain Mapping

Original Mapping
Issued Dec 1980

- Showed wide spread flooding in the Valley
- Did not cover a significant portion of the Village
- Used older technology in predictions and was based on older data



McElhanney: Salmon & White River
Flood Hazard Mapping

6


6

Updating the 1980 Mapping


Much has changed since 1980 and 1995.

Though the Valley remains similar to then in terms of land use, we must look to the future

We must account for changing climates and changing Seas



2014


 McElhanney: Salmon & White River
 Flood Hazard Mapping

7

What does the Future Hold?

Sea Level Rise (SLR)

- 1m rise as a guide for the year 2100

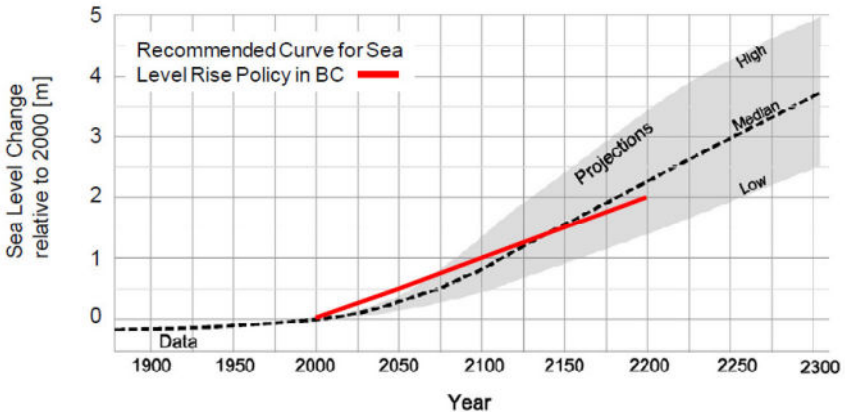



Figure 2-2: Recommended Global Sea Level Rise Curve for Planning and Design in BC
 (Ausenco Sandwell, 2011a)


 McElhanney: Salmon & White River
 Flood Hazard Mapping

8

What does the Future Hold?

Sea Level Rise (SLR)

- 1m rise as a guide for the year 2100
- Flood Construction Level for Sayward is **likely to be about 5.0m**, includes, tidal effects, storm surge, wave effects and freeboard (Safety Factor)
- McElhanney and GreatPacific are working on site specific analysis

Table 2-4: Preliminary 2100 FCL Estimates for Various Locations (Ausenco Sandwell, 2011b)

FCL Component	Fraser River Delta	Vancouver Harbour	Squamish River Delta	East Vancouver Island	West Vancouver Island	Central and North Coast
Global SLR (2100)				1 m		
Regional Adjustment	+0.21 m	0 m	0 m	-0.17 m	-0.27 m	-0.22 m
HHWLT	2.0 m	1.9 m	2.05 m	1.6 m	2.0 m	3.8 m
Storm Surge	1.7 m	1.4 m	1.3 m	1.3 m	1.3 m	1.7 m
Wave Effect	0.65 m	0.65 m	0.65 m	0.65 m	0.65 m	0.65 m
Freeboard	0.6 m	0.6 m	0.6 m	0.6 m	0.6 m	0.6 m
FCL	6.2 m	5.6 m	5.6 m	5.0 m	5.3 m	7.5 m

Notes:
 1. Reproduced from Ausenco Sandwell (2011b), Table 9-2.
 2. Regional adjustment based on current values. Vancouver and Squamish assumed to be neutral.
 3. HHWLT = Higher High Water Large Tide. Varies by site and location in BC.
 4. Storm surge allowance includes allowances for local wind setup.
 5. Wave effect allowance assumes runup on natural gravel-pebble shoreline.
 6. FCLs are elevations relative to Canadian Vertical Geodetic Datum.

9

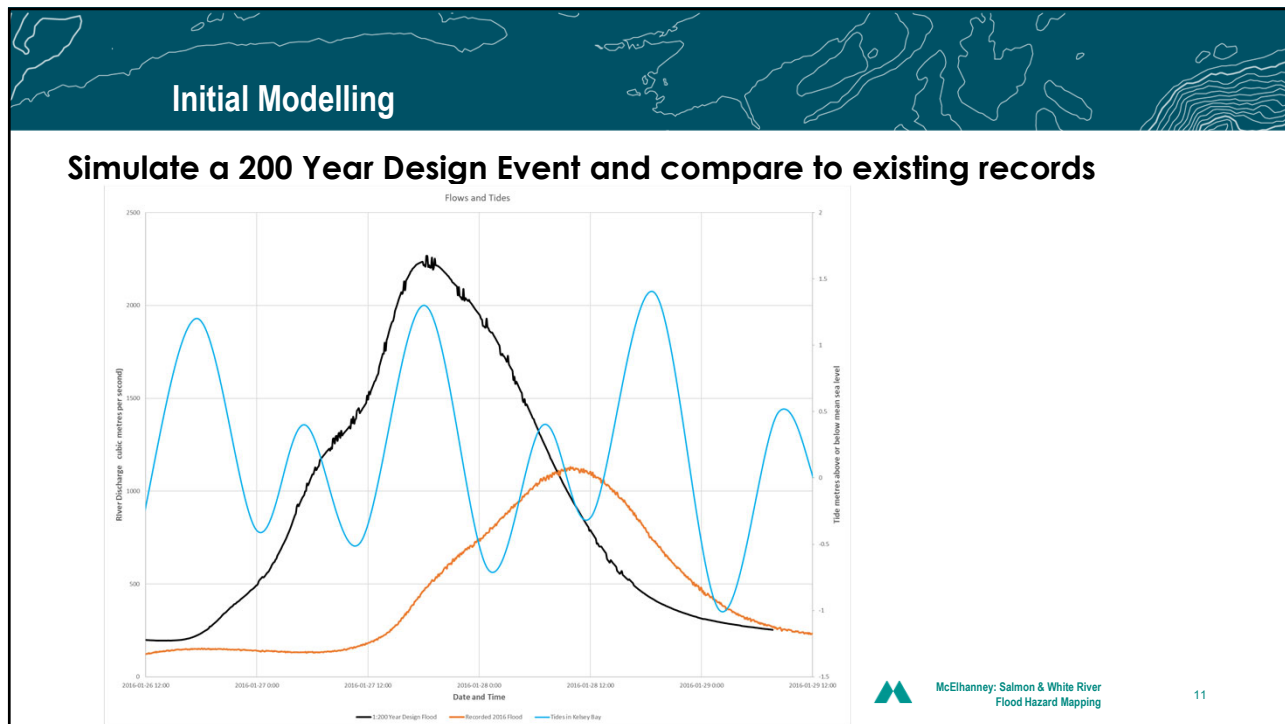
Climate Change in the Watershed

Climate Change

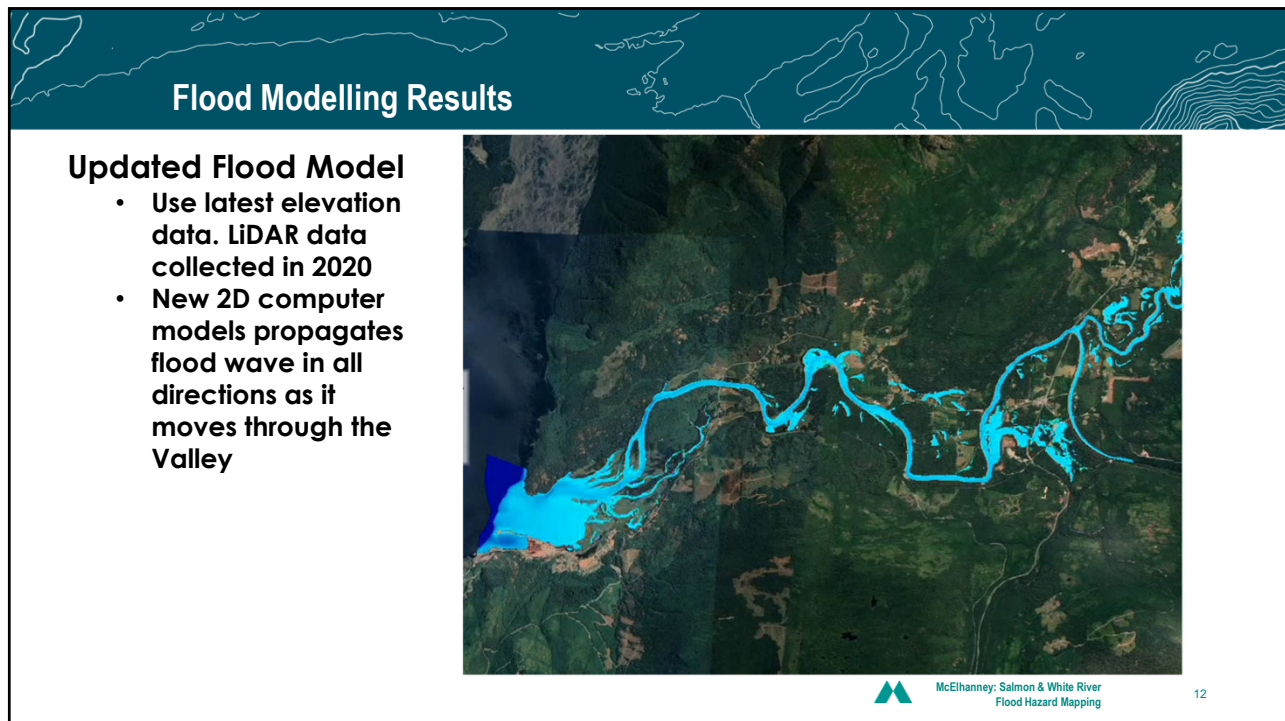
- According to PCIC – The Pacific Climate Impacts Consortium
- Drier summers, wetter winters
- +/-10% more rain in November and December from 2070-2099



10



11



12

Model Results Flood Map

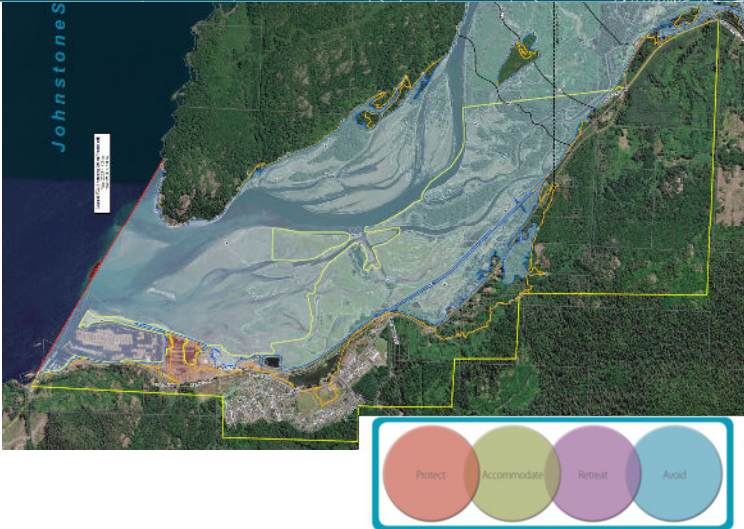
Determine New and Future Flood Extents

- Complete Modeling of Ocean Levels in Kelsey Bay incl SLR
- Refine Model and Determine Flood Extents for 2021 & 2100
- Prepare Flood Maps

Mitigation Strategy

- PROTECT
- ACCOMMODATE
- RETREAT
- AVOID

Planning (OCP) and Bylaws (Floodplain Bylaw)
Capital Works – Upgrade dikes

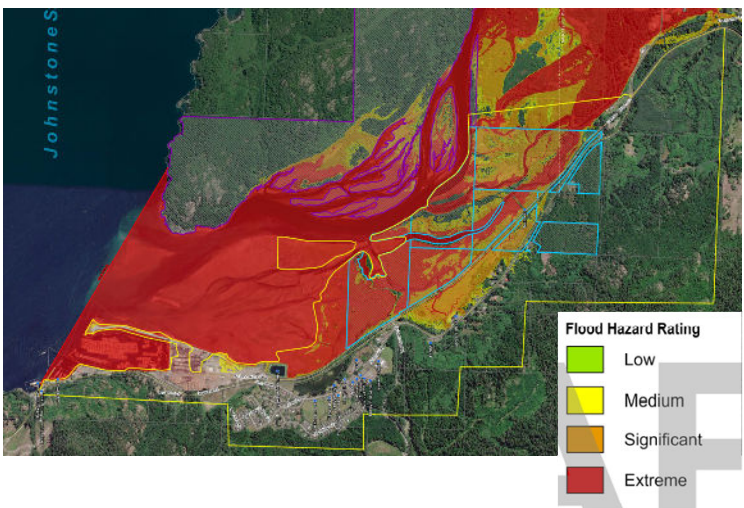


McElhanney: Salmon & White River
Flood Hazard Mapping

13

Model Results Hazard Map

- **Determine Flood Hazard Maps for year 2100**
 - Rating is a factor of water depth and velocity
 - Includes a factor debris potential



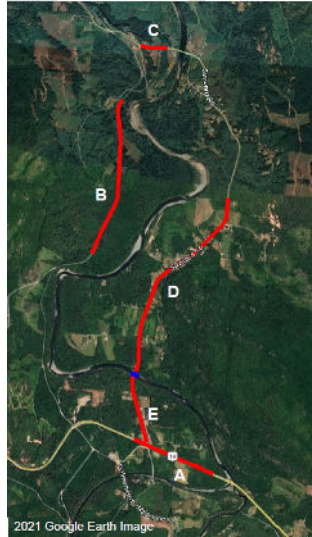
McElhanney Consulting Services Ltd. Presentation Title 14

14

Recommendations

Infrastructure Upgrades

- A. Raise a 1.44km section of the Highway 19
- B. Raise a 1.60km section of the Salmon River Main
- C. Rebuild or raise the existing Hammond bridge and raise a 324m section of Salmon River Road
- D. Raise a 2.81km section of the Salmon River Road
- E. Raise a 942m section of the Salmon River Road



2021 Google Earth Image

McElhanney: Salmon & White River
Flood Hazard Mapping

15

Recommendations


Mitigation Strategy

- PROTECT
- ACCOMMODATE
- RETREAT
- AVOID

Planning (OCP) and Bylaws (Floodplain Bylaw)
Capital Works – Upgrade dikes

Use Study for Emergency Planning

- Preparation
- Emergency Response
- Recovery



McElhanney: Salmon & White River
Flood Hazard Mapping

16

Your Role

Public Participation:

- Anecdotal Evidence of Historic Flooding is important
 - Photos
 - Reports on property flooding
 - Duration
 - Depth
- Get involved and provide feedback for potential bylaw creation-update
- Feedback on potential long-term planning impacts




 McElhanney Consulting Services Ltd. Floodplain Study 17

17



THANK YOU

Contact:
 Name: Mark DeGagné or Dwayne Cybak
 Location: McElhanney, Campbell River Office
 Phone: 250-287-7799
 Email: mdegagne@mcelhanney.com
 dcybak@mcelhanney.com



18