

Fraser River Pile and Dredge's 360-foot hopper dredge ship **Fraser Titan** on the Fraser River. FRPD does a large amount of dredging on the river each year on behalf of the Fraser River Port Authority.



# Flood Mitigation in the BC Lower Mainland

*A Katrina waiting to happen?*

BY TIM LYNCH

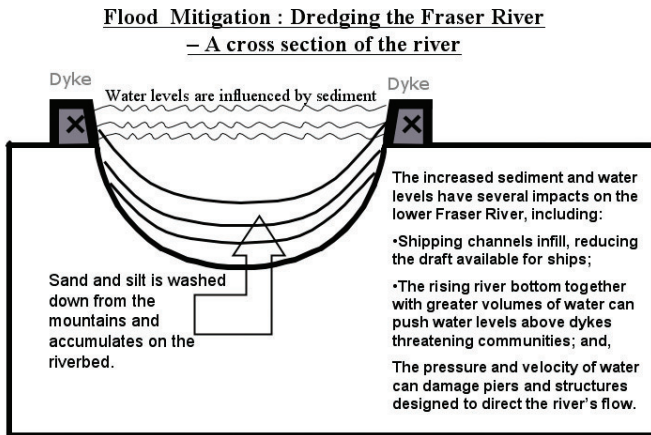
**S**imilar to New Orleans, Louisiana, a large number of communities in BC's Lower Mainland are located on land that is reclaimed from the Fraser River flood plains and the Gulf of Georgia tidal plains. Some communities are several feet below sea level at high tide. Over 50 per cent of the population in the Lower Mainland rely on dike systems that prevent the Fraser River from engulfing their communities as occurred in New Orleans during hurricane Katrina in August 2005, when the local levee (dike) system failed.

## Dikes and Dredging

Thriving communities that make up the BC Lower Mainland are dependent on the integrity of 600 kilometres of dikes, 400 flood-boxes and 100 pump-stations, which serve to protect a collective value of over \$13 billion in development. The legal responsibility for the operation and maintenance, including inspection and emergency response, of these dikes is overseen by some 120 local authorities, diking districts, municipalities, crown corporations and senior government departments who own and operate public diking systems in BC. The province oversees dike maintenance through the Dike Maintenance Act and the Drainage Ditches and Dike Act.

In addition to maintenance of the dikes, the threat of flooding is reduced by maintaining appropriate depth in the tributaries flowing through the Lower Mainland. Each spring, the snow pack melts in regions bordering the Fraser River as far north as McBride. During this natural annual cycle, millions of tonnes of water, sand and silt drain into the river in a process called freshet. Annual deposits can range up to 3 million cubic meters, depending on the snow pack. Figure 1 illustrates a cross section of the river showing how increasing levels of silt on the bottom of the riverbed can push water increasingly close to the level of the dike. The increased sediment and water levels have several impacts on the lower Fraser: Shipping channels infill, reducing the draft available for ships; the rising river bottom potentially pushes water levels above dikes; and, pressure and velocity of water can damage piers and structures designed to direct the river's flow.

Figure 1



Mitigation and prevention of river water swelling over the dikes is further managed through the process of dredging the river. Dredging involves removing sand and silt washed down from the mountains that accumulates on the riverbed. The federal government, through its Canadian Marine Act, is responsible for managing commercial access to ports in the area and hence is responsible for dredging the Fraser River. Evidently the optimum management of the risk associated with a Katrina-like scenario unfolding in the BC Lower Mainland is dependent on close collaboration between federal, provincial and municipal governments.

Currently the federal government is primarily concerned with the South Arm of the Fraser River bordering on Richmond and Delta, which serves as a major Canadian gateway to international markets. In order to promote and ensure year-round access to these ports the federal government has created the Fraser River Port Authority. Figure 2, illustrating the Deep-Sea Shipping Channel Fraser River; show the areas of the South Arm of the Fraser River that are dredged by the Fraser River Port Authority.

Figure 2 shows the only part of the Fraser River that is systematically dredged primarily to facilitate passage of large ocean cargo vessels accessing ports in the region. As a byproduct of these dredging activities the bordering communities, primarily Richmond and Delta, do benefit in a reduction of the risk of the river transcending parts of the dikes that protect their communities. The Fraser River Port Authority is under no legal obligation to maintain a dredging program, however, the Authority continues to dredge critical parts of the Fraser River

Figure 2




south of New Westminster primarily to facilitate ocean-shipping lanes. The cost of maintaining the shipping channel dramatically reduces the Fraser River Port Authority's ability to fulfill its core legislative mandate under the Canada Marine Act, which is to advance trade and economic development. Current dredging operations cost the Port Authority over \$7 million each year. It offsets roughly half that cost through an arrangement with its contractor regarding the selling of much of the sand that is dredged. The Port Authority is seeking the support of the federal and provincial governments to secure sustainable public funding for annual dredging activities and essential public infrastructure that promotes appropriate flood protection, sound river management and the promotion of trade development opportunities.

### A Question of Responsibility

In his role as Chair of the General Commercial User Group for the Fraser River, Michael Owen (President of Mike's Marine Services Ltd. in Ladner) has extensive correspondence and resolutions that have passed among federal, provincial and municipal politicians about the need to dredge the Fraser River. When interviewed for this article he said "Mismanagement of the Fraser River comes about because Ottawa has failed to fund a sustainable dredging program from Chilliwack to Steveston. When the Feds closed the Department of Public Works and sold off their dredging equipment, they were told that the \$14 million

dollars that they earmarked for dredging was totally insufficient and cannot be compared with \$500 million given to Manitoba for building of flood protection measures, so the Red River would not flood Winnipeg or the \$90 million a year to break ice on the St. Lawrence River to prevent flooding in Quebec. Silt is BC's ice." Owen goes on to say that "The problem is not the Fraser River Port Authority; downsizing by the feds in the late '80s meant less money for doing the work needed. The Fraser Port Authority is only responsible for the part of the river below Kanaka Creek, sixteen kilometres above the Port Mann Bridge, to Sand Heads (Steveston) and with the \$14 million and their revenues from selling the sand; they can only deal with a portion." Owen also expresses concern that "Large gravel and sand bars are building up around Chilliwack, Harrison, Mission, Aldergrove, North Langley and Maple Ridge. There is no regular maintenance for dredging around these communities. Infilling of the North Arm of the Fraser, affects all of the industrial and residential lands of Richmond, Burnaby's Big Bend and the Airport." Comparing the situation in New Orleans Owen said " Over 1,000 people dead, 300,000 people displaced, 40,000 homes or businesses destroyed, 300,000 cars damaged, 250,000 appliances needing replacement, hazardous wastes to disposal. All that, from an area about the size of Lulu Island!" Owen concludes by saying "A flood, as a result of dyke subsidence from an earthquake, is an act that man cannot prevent. A flood from lack of dredging is in my opinion a criminal act."

The disastrous consequences that occurred in August 2005 with hurricane Katrina flooding New Orleans and surrounding communities is identified as being caused by a failure of the federal, state and municipal governments in the US to coordinate their roles and responsibilities for flood mitigation in the region. When 9/11 happened in the US, the Canadian government responded by enforcing national border security. There is no evidence to indicate that the federal government sees the need for similar action in support of flood mitigation in the BC Lower Mainland in anticipation of a hurricane Katrina like scenario. What makes the situation in BC different is the threat of a "backdoor tsunami" scenario occurring as a consequence of the Canadian government not properly managing the flow of water from the Canadian Rockies into the Pacific Ocean. The probability of such a scenario unfolding over the next ten years is not likely to be higher or lower than a pandemic influenza outbreak occurring in the same timeframe. Perhaps the federal government responds better to acts of violence, or international pressure, than it does to potential natural disasters. Supporting a police/military infrastructure to fight terrorism, or taking the international lead in planning for pandemic influenza may be more politically attractive than having to assess and mitigate the potential of natural catastrophes occurring within Canada. It is evident that the vibrant healthy communities that make up the BC Lower Mainland are vulnerable to floods similar to what happened in New Orleans. It is also evident that the roles and responsibilities of federal, provincial and municipal governments and the expectations of the Fraser River Port Authority are not integrated for mitigating such consequences. 

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