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## South Delta needs dramatic solutions to flood risks

UBC researchers helping low-lying community develop mitigation measures

BY SCOTT SIMPSON  
VANCOUVER SUN

South Delta will be vulnerable to disastrous flooding in the coming decades without wholesale adaptation to rising sea levels.

Speakers at a science symposium in Vancouver on Sunday said projections of a one-metre rise in sea level are too conservative – and that continuing international failure to deal with global warming likely means a “multi-metre” rise in ocean height by the end of this century.

For 21,000 residents of Ladner, a low-lying suburban community that fronts onto the south arm of the Fraser River near its confluence with the Strait of Georgia, that means an urgent need to protect the community from flooding.

Waterfront homes, inland suburban developments, roads and farmland are all vulnerable to a sea level rise of 1.2 metres, according to research presented by David Flanders of the University of B.C.

Flanders, along with Simon Fraser University professor of geology John Clague, were featured local speakers at a symposium for the annual convention of the American Association for the Advancement of Science, which continues through today at the Vancouver Convention Centre.

The South Delta situation will be particularly acute in the event of a so-called perfect storm involving high tide, a major storm surge, and a sea level rise of 1.2 metres. Inaction would leave about 90 per cent of South Delta vulnerable to floods.

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**THE WORLD'S SCIENTISTS** in Vancouver 

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• Land pathogens found in sealife  
• Vancouver Island unprepared for quake  
• Cancer smart bombs



SFU geology professor John Clague speaks at a symposium on sea level changes due to global warming at the AGM of American Academy for Advancement of Science in Vancouver on Sunday.



Researchers are exploring whether Delta should prepare for rising sea-levels by lifting homes, roads and critical infrastructure above the floodplain.

## B.C. criminals failing to complete rehab programs

Report finds just 35 per cent finished required interventions

BY EVAN DUGGAN  
VANCOUVER SUN

Two-thirds of criminals assigned rehabilitation programs while serving their sentences in the community may be failing to complete them, according to the province's auditor-general.

As part of case plans developed by probation officers, offenders may be required to complete counselling, substance abuse support, domestic violence prevention, anger management, and sex offender intervention to reduce the chance that they will reoffend.

About half of B.C.'s 24,000 offenders who served sentences outside of jail in 2010-11 were ordered to complete a rehabilitation program – called an intervention.

But in an audited random sample of 60 offenders, only 35 per cent of those who required interventions completed their programs, according to the report by Auditor-General John Doyle.

About 12,000 offenders required interventions in 2010-11, and 2011, suggesting that thousands of the rehabilitation programs were never completed.

The Community Corrections and Corporate Programs (CCCP) of the Ministry of Public Safety and Solicitor General wasn't able to confirm the number of offenders with incomplete programs.

Intervention programs targeted at offenders deemed medium or high risk to offend as well those convicted of domestic abuse. Interventions may also include training and employment programs.

It costs \$194 for each offender spends in jail. An offender who serves their sentence in the community costs taxpayers only \$7 per day, according to the Dec. 2011 report, which noted 90 per cent of offenders serve their sentences outside of jail.

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LANGLEY

## Seven-year-old may have ingested GHB

BY GORDON HOEKSTRA  
VANCOUVER SUN

The RCMP is investigating whether a seven-year-old girl may have ingested gamma hydroxybutyrate, a date-rape drug, after drinking from a water bottle in her Langley home.

The child ended up unconscious at her home near 55th Avenue and 208th Street at about 9 p.m. Saturday, but is expected to make a full recovery, say police.

“The substance may have been contained in a water bottle in the residence that the child may have ingested,” Langley RCMP Sgt. Holly Marks said Sunday.

“I can't begin to speculate as to why it would have been there,” said Marks, adding that lab testing will help to confirm whether the substance, commonly referred to as GHB,

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### WEATHER

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# the guns needed in the chemotherapy artillery

and treatment must cast a wider net



JENELLE SCHNEIDER/PNG FILES

Dr. Sam Aparicio, head of molecular oncology research at UBC, thinks it's time to cast a wider net on trials and treatments.

"We have tended to think in silos according to anatomical sites where cancer occurs, but maybe we shouldn't be doing that any more," said Aparicio, noting that he sees a future where all cancer treatment is based on a dissection of tumour biology (molecular or genomic subtyping) and not on the site where the cancer originated.

Typing the genetic profile of tumours, then matching that to a treatment known to be effective is known in the popular vernacular as "personalized medicine." For genomics experts, it is sometimes referred to as predictive computational analysis.

Dr. Michael Stratton, director of the Wellcome Trust Sanger Institute in Cambridge (U.K.) said there are drivers and passengers when it comes to genetic mutations. The important thing is to focus on the drivers — the estimated two per cent of genes that actually cause cancers.

"We hold the seeds of disaster within us," Stratton said, referring to the fact that DNA is constantly under assault by known marauders like ultraviolet

radiation and carcinogens in tobacco. But it remains a mystery why some immune systems fend off the attacks but others don't.

Stratton, a pioneer of the International Cancer Genome Consortium in which nations around the world, including Canada, are involved in a project to sequence 25,000 cancer genes, said in one type of kidney cancer, for example, there are 13 known mutations, including a new one discovered last year.

The fact that tumours can have so many mutations explains "the diversity of response" to treatment, or why some patients recover, but not others.

"And it's why it's essential we finish the job of finding all the drivers of mutations," he said, referring to the fact that unless treatment is aimed at all the mutations in tumours, there will always be a risk of only partial recovery, cancer spread and relapse.

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## 's first robot capable of lifting patients nears testing

soon be used to lift patients in bed-to-wheelchair transfers



RIBA-II wasn't able to make the Vancouver conference.

The Japanese love affair and expertise with robotic technology has produced a robot with enough "joints" that it can bend its arms to hold a human body and even crouch down to floor level, if necessary. The robot, which has adorable bearlike facial features, has a soft exterior, touch-screen panels, tactile sensors and travel guidance controls.

RIBA-II can lift 80 kg, 20 kg more than the first RIBA (Robot for Interactive Body Assistance). In North America, nursing homes and hospitals have introduced mechanical hoists to lift and transfer patients, a measure taken because so many health care workers were getting injured while performing such tasks.

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## Delta needs solution to flood risk

Delta has a few decades in which to prepare for the change — although Clague warned that global sea level changes at present are lagging behind a global warming trend and no one can predict when the oceans will catch up, although it's a certainty that they will.

Delta, with water on three sides, isn't alone in facing this problem. In Metro Vancouver, 250,000 people live on the delta plain of the Fraser River, including residents of Richmond and most of them are living below the high tide line.

A team of UBC researchers has been working with planners in the municipality of Delta to create a model for community consultation around sea level effects.

A five-metre-high concrete wall around the community might succeed in protecting it, but Flanders reported that residents who were consulted for the UBC research project don't find it esthetic.

A grass-covered, gently rising earthen berm was considered more attractive, but it would have to be three times as wide as it is tall — which means River Road West would be buried underneath it, and some homes along the road would be lost as well.

Other scenarios include

putting Ladner's homes on stilts, or "getting their feet wet," said Flanders, a research scientist with the university's Collaborative for Advanced Landscape Planning.

Another scenario would involve residents living in homes that float up and down with the tides. Others would involve dramatic landscaping and drainage measures, removing or elevating roads, and gradually depopulating areas with a "managed retreat."

"Doing nothing is not an option at all," Flanders said, adding that he expects the municipality to adopt a mix of options in lieu of a single solution.

As well, he anticipates that Delta will have to weigh out the cost of all of its options, and that some of the community's agricultural land will be lost.

"There is no silver bullet here. There was no perfect solution. The ideal strategy doesn't exist. There's trade-offs."

SFU's Clague said the sea level may be changing more rapidly than it has in several thousand years, and its historic stability has given people around the world the mistaken impression that it's not prone to dramatic change.

"This, I think, has had a huge impact, a kind of unrecognized

*There is no silver bullet here. There was no perfect solution.*

*The ideal strategy doesn't exist. There's trade-offs.*

DAVID FLANDERS  
UNIVERSITY OF B.C.

or unappreciated impact on our collective attitude toward coastal communities and coastal infrastructure," he said.

"It has had a big impact on civilization as we know it. There are hundreds of millions of people who live very close to the present shorelines and have assumed through these thousands of years that the sea is not going to change its position at all."

"However we have seen recently that that's maybe not the case, that a new factor is coming into play and maybe sea level is going to change more rapidly over the coming decades than it has over the past several thousand years."

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### GLOBAL WARMING

## Veteran climate researcher sees major threats

The world needs an immediate reduction in the burning of fossil fuel to head off potentially disastrous effects from global warming, a prominent American scientist warned Sunday in Vancouver.

James Hansen, head of NASA's Goddard Institute for Space Studies and an iconic figure among climate researchers, said "even the skeptical scientists now agree" that Earth is undergoing a warming trend.

Hansen told the annual

convention of the American Academy for the Advancement of Science that worldwide fossil fuel combustion has pushed the average global temperature up 0.8 degrees Celsius since the 1880s, a trend that could see ocean levels rising several metres by the end of this century.

That's a vastly more gloomy outlook than projections in 2007 by a global network of scientists working under the banner of the United Nations, who suggested

a rise of perhaps one metre by the end of the century.

One of the principal effects of global warming is to heat up the oceans — water expands in size as it gets warmer, which means ocean levels will get higher and potentially engulf low-lying coastal areas.

Research shows that sea level has been relatively stable, within about one metre, for 2,000 to 5,000 years.

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Scott Simpson, Vancouver Sun

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RIBA-II wasn't able to make the Vancouver conference.

professionals do the heavy lifting of patients during bed-to-wheelchair or other transfers, Salzberg said in an interview at the American Association for the Advancement of Science meeting.

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