



Adjusting to Longer and Drier Summers in British Columbia: Drought Affects Us All

2021 BCWWA 4th Annual Operators Continuing Education Day on November 17, 2021

Keynote presentation by Kim A Stephens, M.Eng., P.Eng., Executive Director
Partnership for Water Sustainability in British Columbia

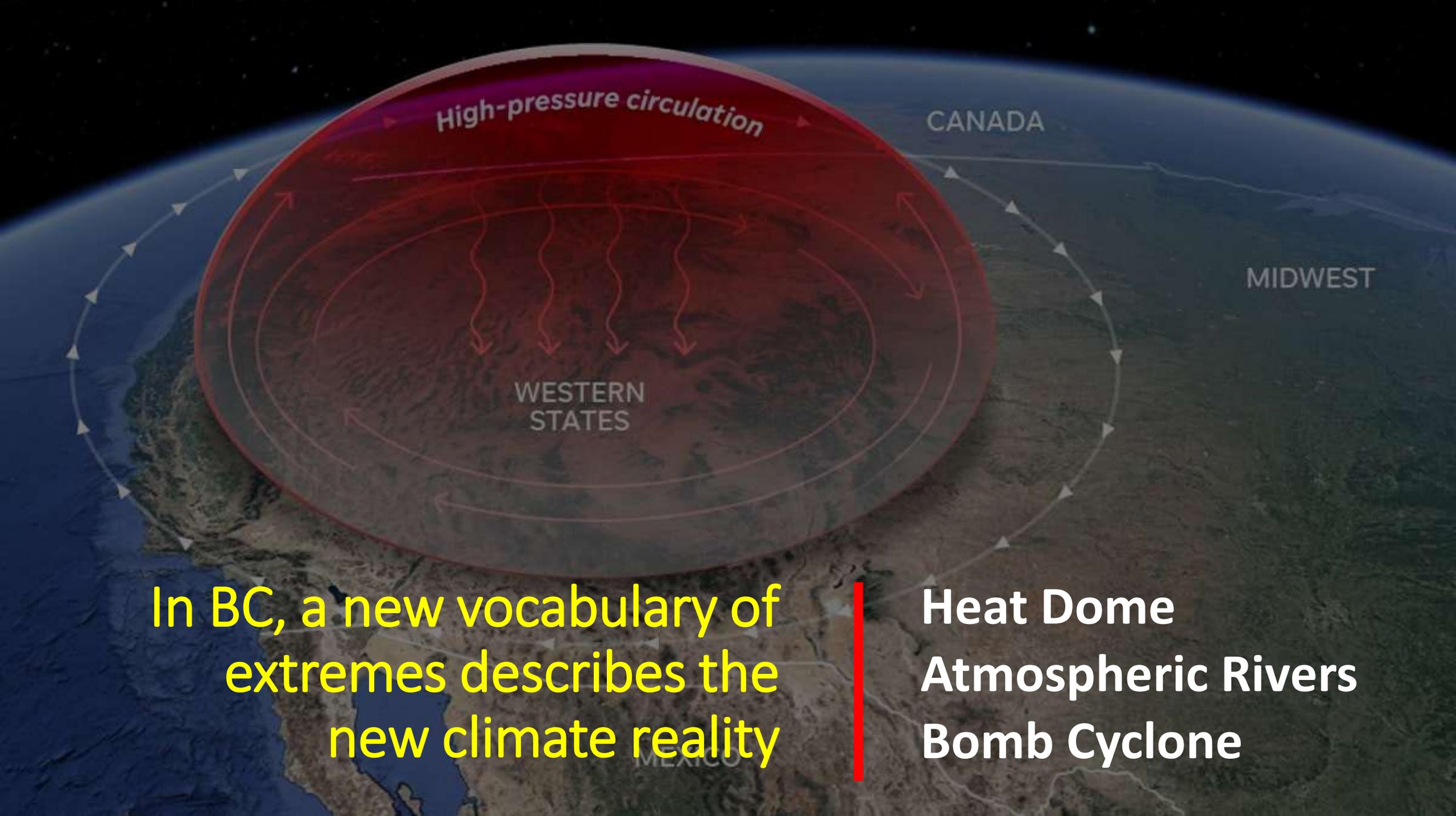
When Don Degen asked me to deliver this keynote, he said:

“Please give the audience something that is ‘thought provoking’, and big picture, that goes beyond their daily duties.”

“Something that they in their work life and their personal life are part of and have a responsibility to consider.”

“Help them understand why their senior water managers and community must make decisions in terms of how it affects their utility and the community they live in.”





High-pressure circulation

CANADA

MIDWEST

WESTERN STATES

MEXICO

In BC, a new vocabulary of extremes describes the new climate reality

Heat Dome
Atmospheric Rivers
Bomb Cyclone

“In your keynote, Kim, would you please touch on these questions,” suggested Don Degen “

- **What’s really happening out there?**
- **Why is it happening more frequently?**
- **How is it affecting us (me) in our organization?**
- **How can we best be prepared?**
- **What are practical tools available to us?**
- **What are simple steps that we need to take to be prepared and minimize the impact?**



My Career Perspective

1987 – BC's first wakeup call

2003 – It truly was a “teachable year”

2015 – BC's new climate reality hit hard

2021 – The era of extremes is upon us!

Starting in 2003, we have had one teachable year after another, and in rapid succession !

- Droughts
- Floods
- Forest Fires
- Wind Storms



2003 forest fires resulted in mass evacuations from the City of Kelowna



DROUGHT: TOP NEWSMAKER 2015

Vancouver

0:00:52

0:02:13



Dan Burritt CBC Vancouver News at 5 PM



Bob Sandford

Global Water Futures Chair
Water and Climate Security
United Nations University Institute
for Water, Environment and Health

In 2015, Bob observed that:



Our Climate is Changing

“The drought of 2015 suggests we may be crossing an invisible threshold into a different hydro-meteorological regime in Western North America.”

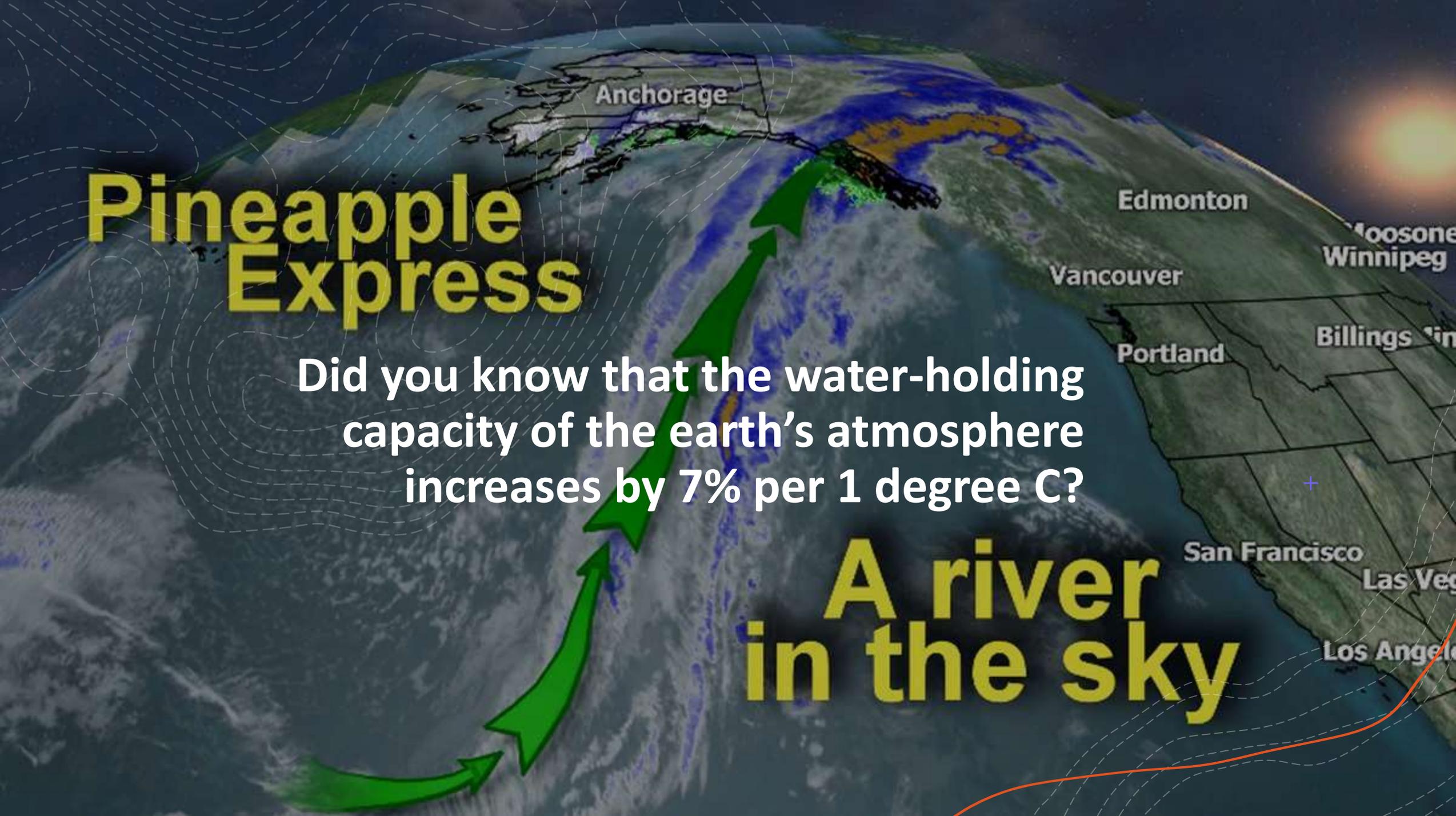


*The BC government
position since 2008 is that*

Adaptation to climate change:
it's all about the water

By Jim Mattison, Assistant Deputy Minister, Water Stewardship Division, Ministry of Environment

Pineapple Express



Did you know that the water-holding capacity of the earth's atmosphere increases by 7% per 1 degree C?

A river in the sky

A satellite-style map of British Columbia, Canada, and the Gulf of Alaska. The map shows the coastline, major cities, and the surrounding water. The text "Gulf of Alaska" is visible in the upper left, and "BRITISH COLUMBIA" is visible on the right side of the landmass. A thin red line outlines the province's border. A small orange rectangle is in the top left corner.

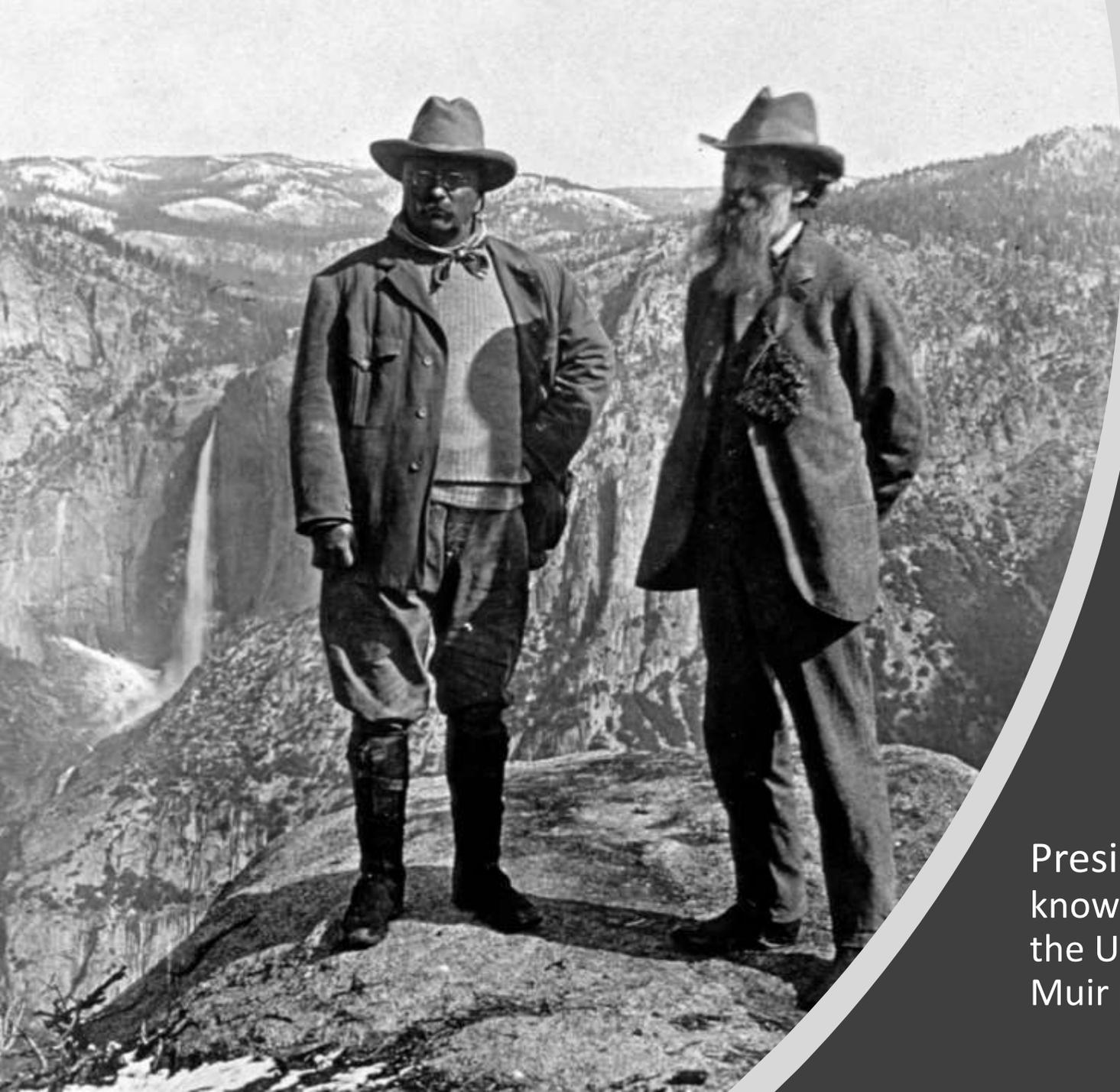
Adjusting to longer and drier summers in British Columbia:

**Our seasonal use of water must be in
balance with a changing water cycle.**



“Since 2000, summer precipitation has dropped about 20 per cent. That means we need to be far more conscientious about summer water use.”

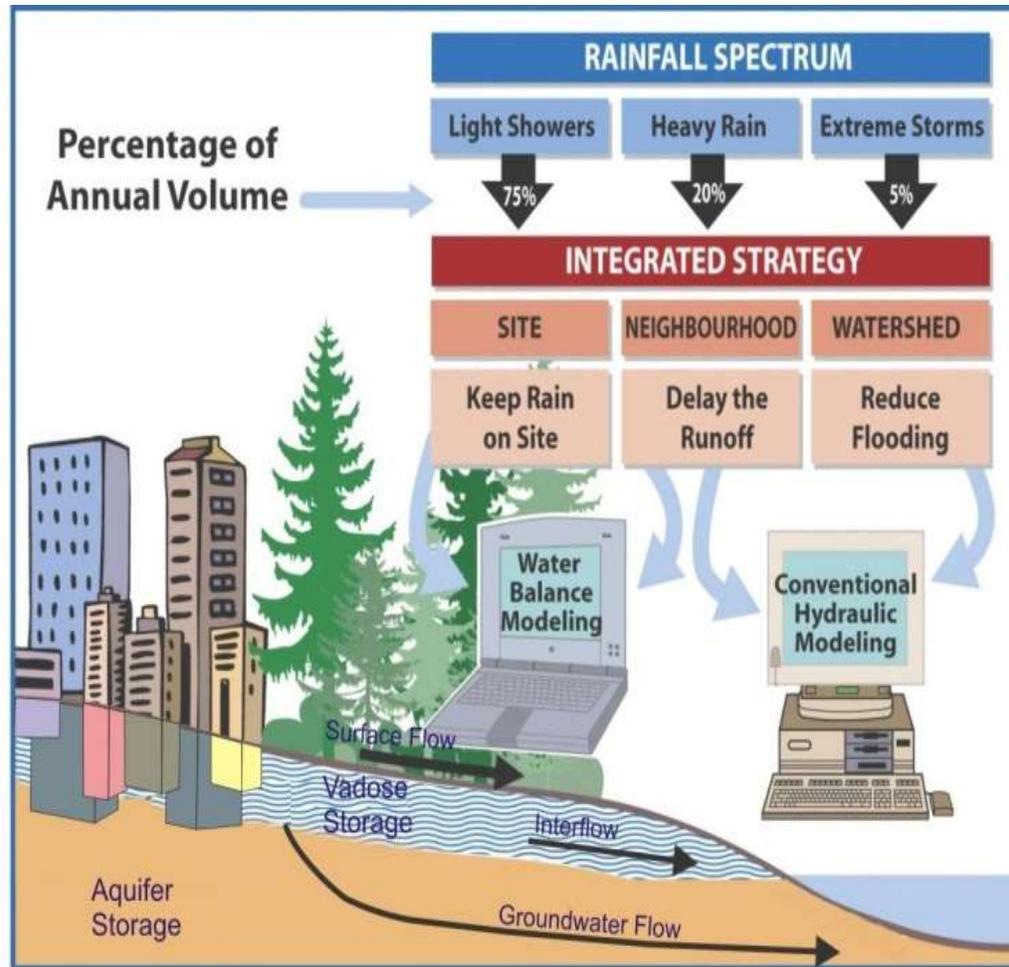
HANS SCHREIER,
UBC PROFESSOR EMERITUS
VANCOUVER SUN NEWSPAPER /
JULY 2021



“When we try to pick out anything by itself, we find it hitched to everything else in the universe.”

President Teddy Roosevelt (left) & John Muir, known as the “Father of the National Parks” in the USA, at Yosemite National Park in 1903 when Muir pitched the concept

Flow of rainwater from cloud to stream is comprised of three water balance pathways, each with a different time scale:



Surface runoff
from minutes to hours

Interflow (shallow horizontal)
from days to seasons

Deep Groundwater
from years to decades or more

GUIDING PRINCIPLE: *Maintain the proportion of rainwater entering the stream via each pathway!*

This deceptively simple equation embodies the basic principles and concepts for **dealing with uncertainty and managing risk**

Climate change is not a driver; rather, it is another variable.

The Water Balance

$$\text{OUT} = \text{IN}$$

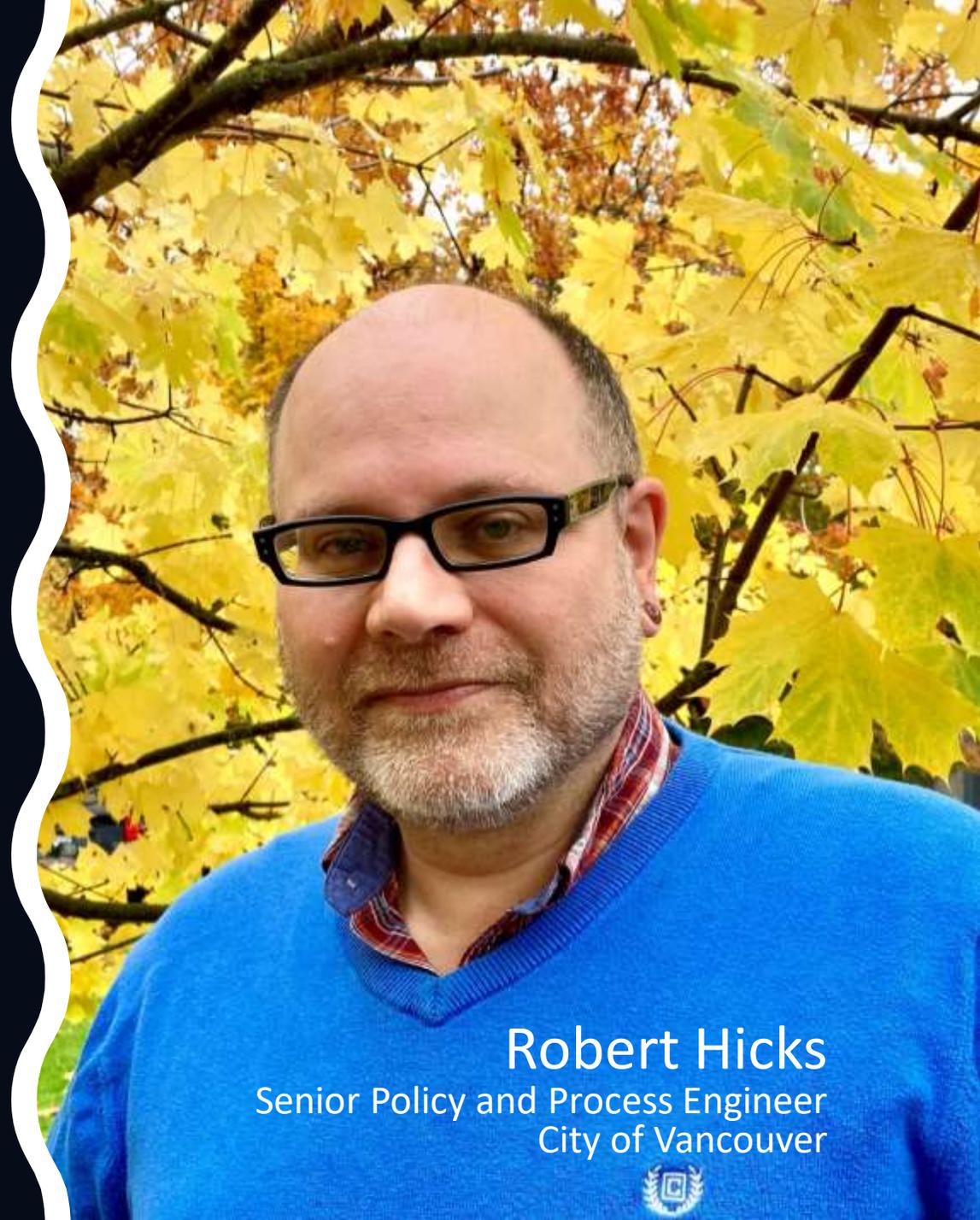
IN = *f* function of climate, season, durations of wet and dry periods, and....

OUT = *f* function of land uses, integrity of water pathways, volume distribution by pathway, dry-weather recession pattern, and....

and where both sides of equation are variable!

"Given the variability of the factors behind the '**water out = water in**' equation, this relationship always will represent a snapshot in time as its' inputs shift, evolve and change over time."

"There is no silver bullet. Communities need to do many little things. Over time the cumulative benefits of doing many things do add up."



Robert Hicks

Senior Policy and Process Engineer
City of Vancouver



To adapt to a changing water cycle, soil depth as an 'absorbent sponge' is a primary water management tool, during both dry-weather & wet-weather periods.



Sustainability of Water Supply –

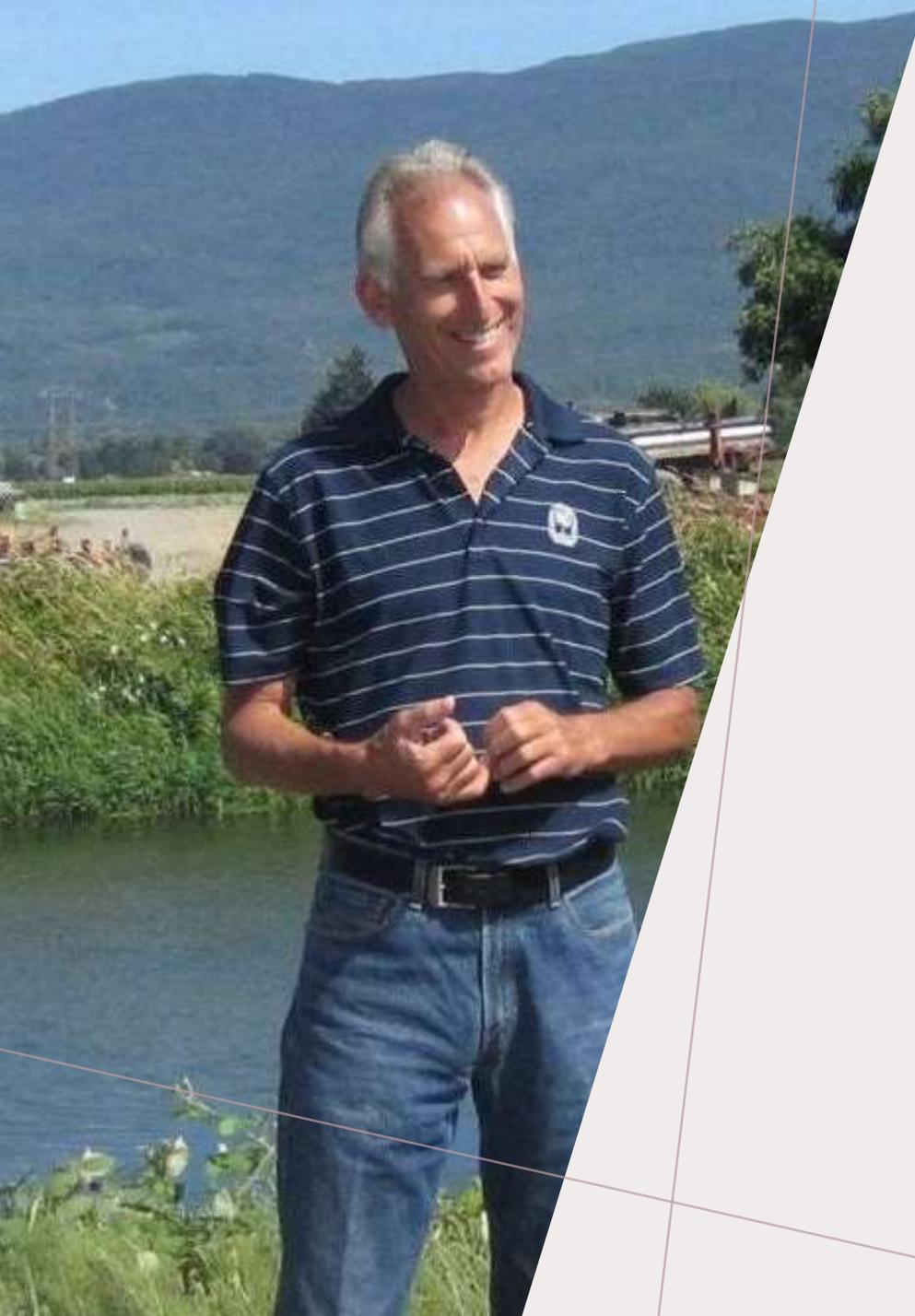
if use less water to irrigate during dry-weather

Sustainability of Aquatic Habitat –

if less runoff during wet-weather & if more baseflow during dry-weather

A photograph of a garden bed next to a concrete sidewalk. The garden features tall purple flowers, green foliage, and some yellow flowers. The text is overlaid on the image in a bold, yellow, sans-serif font.

**Living Water Smart in
British Columbia:
*Operationalizing the BC
Landscape Water Calculator***



“NOW ANY PROPERTY OWNER IN BC CAN ZOOM IN TO THEIR PROPERTY AND QUANTIFY THEIR OUTDOOR WATER NEED BASED ON CLIMATE, SOIL, PLANT TYPE AND IRRIGATION SYSTEM.”

TED VAN DER GULIK, PRESIDENT,
PARTNERSHIP FOR WATER SUSTAINABILITY

FORMER SENIOR ENGINEER, MINISTRY OF AGRICULTURE
CHAIR, BC LANDSCAPE WATER CALCULATOR PROGRAM

Water Calculator

Lower Island

Welcome Irrigation Profile Help

About the Calculator

v1.0.2

The BC Landscape Water Calculator helps British Columbians estimate the water requirements for their landscaped areas.

Before using this tool, prepare a sketch showing the dimensions and area of the landscaped areas on your property (in meters). Also note the type of plant material, irrigation system present or type of system to be installed. This information is required to add to the calculator.

When you're ready to get started, click and zoom on the map to find your property, or enter a civic address in the search bar. Then click on the Irrigation Profile tab.

300 m
1000 ft

Leaflet | data.gov.bc.ca, Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

the partnership BRITISH RBC icbc

<https://bcwatercalculator.ca/landscape/welcome>

*The power of the BC Landscape Water Calculator is that it is linked to a provincial 500 metre gridded climate dataset that was built for the Agricultural Water Demand Model. This is what establishes the **allowable water budget** for each and every property in BC.*



“The new BC Landscape Water Calculator would allow local governments to further support their Water Conservation Plans with the next piece of education for those who are actually turning on the taps at their homes.”

Brian Bedford, Executive Director,
Ministry of Municipal Affairs & Housing

“An unintended outcome of customizing the BC Landscape Water Calculator for Abbotsford conditions is in the way it gives homeowners direction for selection of native and water efficient plants based on sun, shade or a combination. This is powerful.”

Amy Peters
Water Quality and Resource
Coordinator, City of Abbotsford

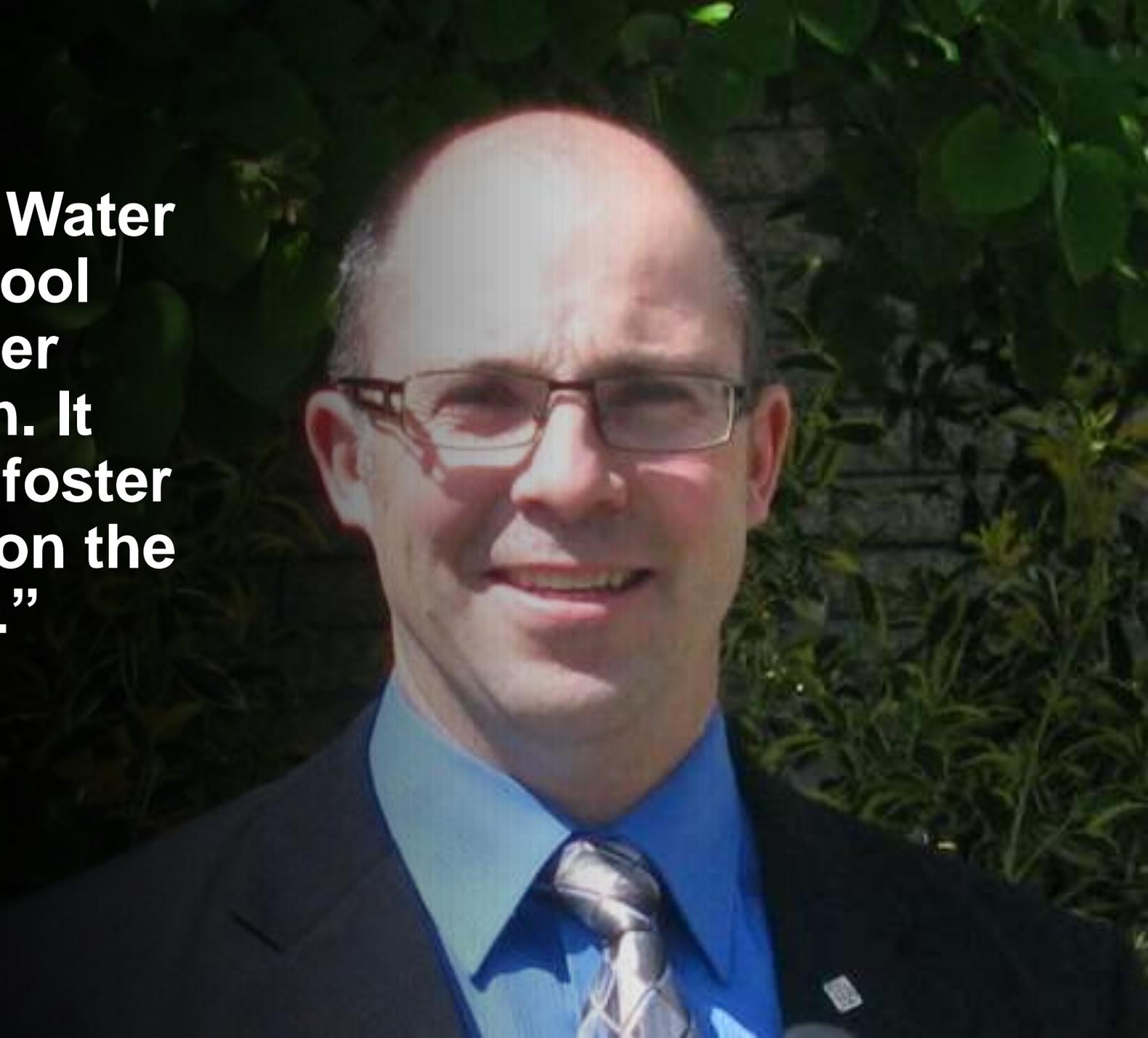


“The City Utility is excited to promote this online water tool (BC Landscape Water Calculator) to our residents. It makes the process of understanding, calculating, and submitting water use reports to the City so much easier and user-friendly.

Ed Hoppe

Water Quality and Customer Care Supervisor, City of Kelowna



A portrait of Glenn Harris, a man with glasses, wearing a dark suit, a blue shirt, and a patterned tie. He is smiling slightly and looking towards the camera. The background is a blurred green foliage.

“The BC Landscape Water Calculator is a new tool for the CRD’s Summer Waterwise Campaign. It has real potential to foster a stewardship ethic on the part of homeowners.”

Glenn Harris, Senior Manager,
Environmental Protection
Capital Regional District

A satellite image of Earth showing a large, swirling storm system over the Pacific Ocean. The storm is characterized by a dense, dark core with concentric, lighter-colored bands of clouds extending outwards. The western coast of North America, including Mexico and the United States, is visible in the lower right portion of the frame. The text is overlaid in the center of the image.

Don Degen asked me to conclude with a takeaway message that is 'thought provoking' and big picture.

A photograph of Michael Blackstock, a man with grey hair and a mustache, wearing a white short-sleeved button-down shirt. He is sitting on the ground, leaning against the trunk of a large tree with rough, grey bark. He is smiling and looking towards the camera. In his hands, he holds a pair of wooden paddles. The background is a lush green forest with sunlight filtering through the trees. In the top left corner, there is a small orange horizontal bar.

“Let's move past ceremonial reconciliation, to true reconciliation, validating Indigenous wisdom”

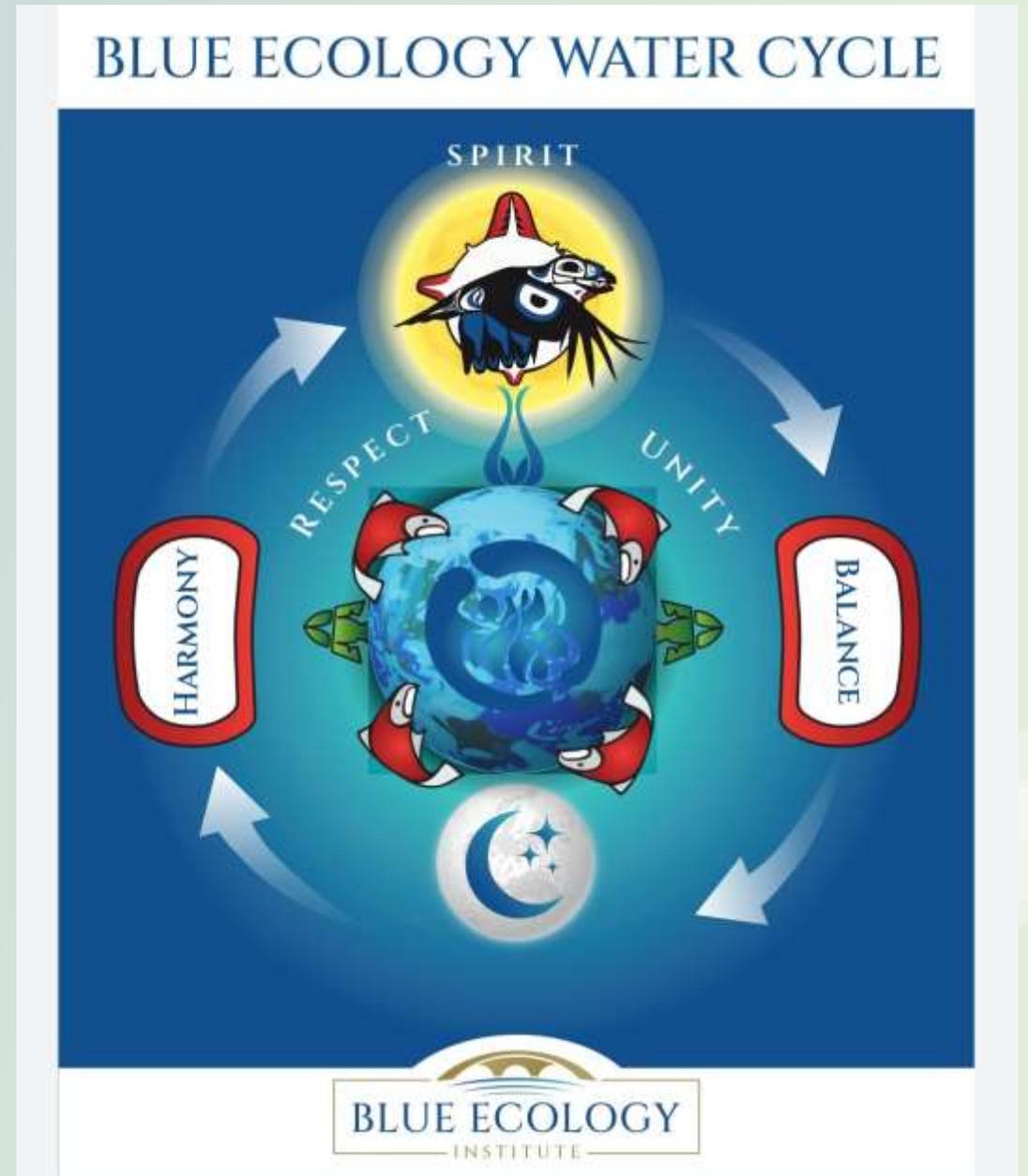
Michael Blackstock (aka *Ama Goodim Gyet*)

Independent Indigenous Scholar,
former member of UNESCO Expert Panel,
and founder of Blue Ecology Institute

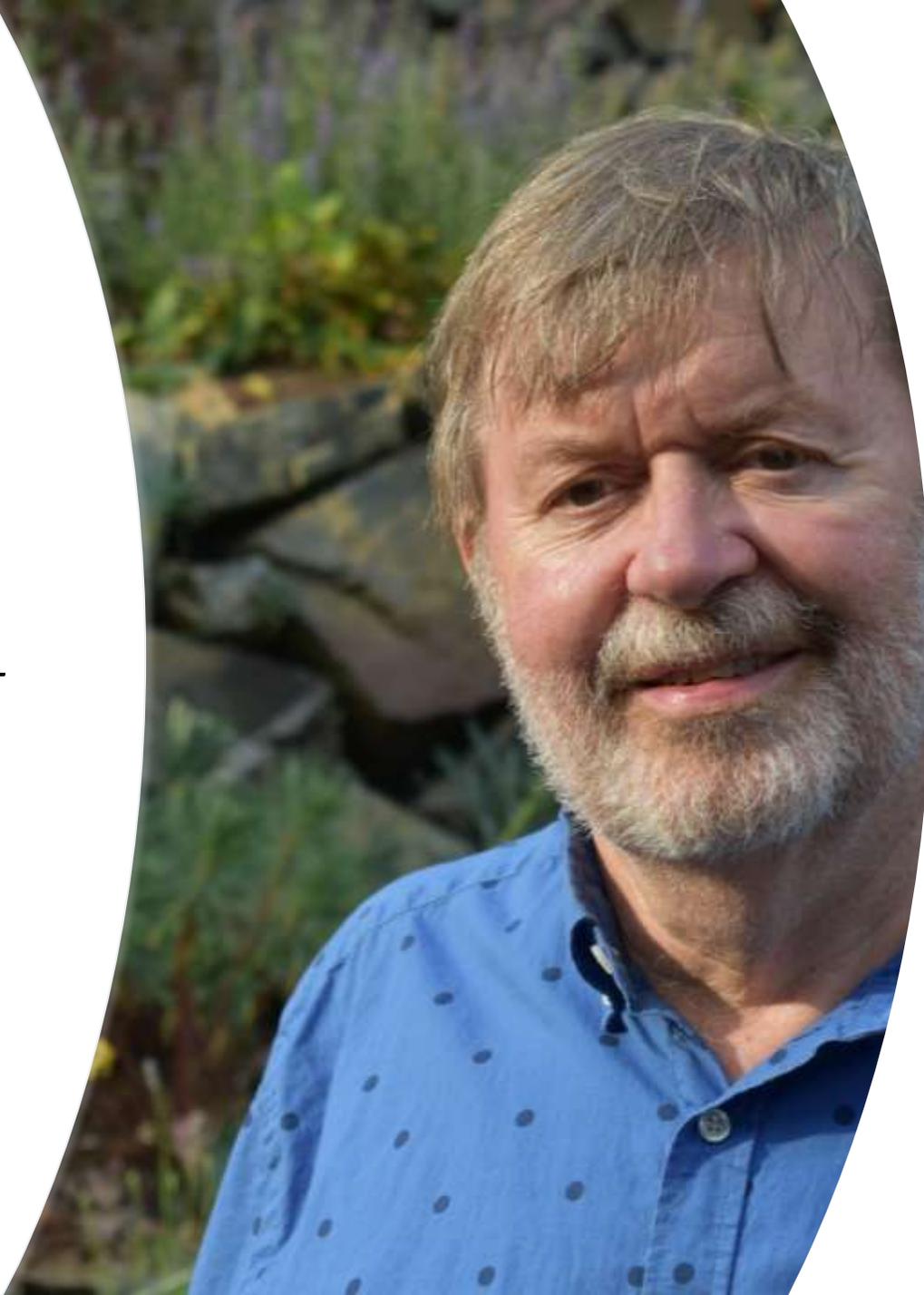
Water Reconciliation is a driver for interweaving of Western Science and Indigenous Knowledge

“Western science and Blue Ecology are truly partners. It is time the marriage was made official.”

Concluding sentence in an Op-Ed by Kim Stephens, Michael Blackstock and Bob Sandford, and published by the Vancouver Sun, January 2017



“Conversations with Michael Blackstock got me thinking about how to explain in simple terms what interweaving of Western science and Indigenous knowledge looks like in practice.”

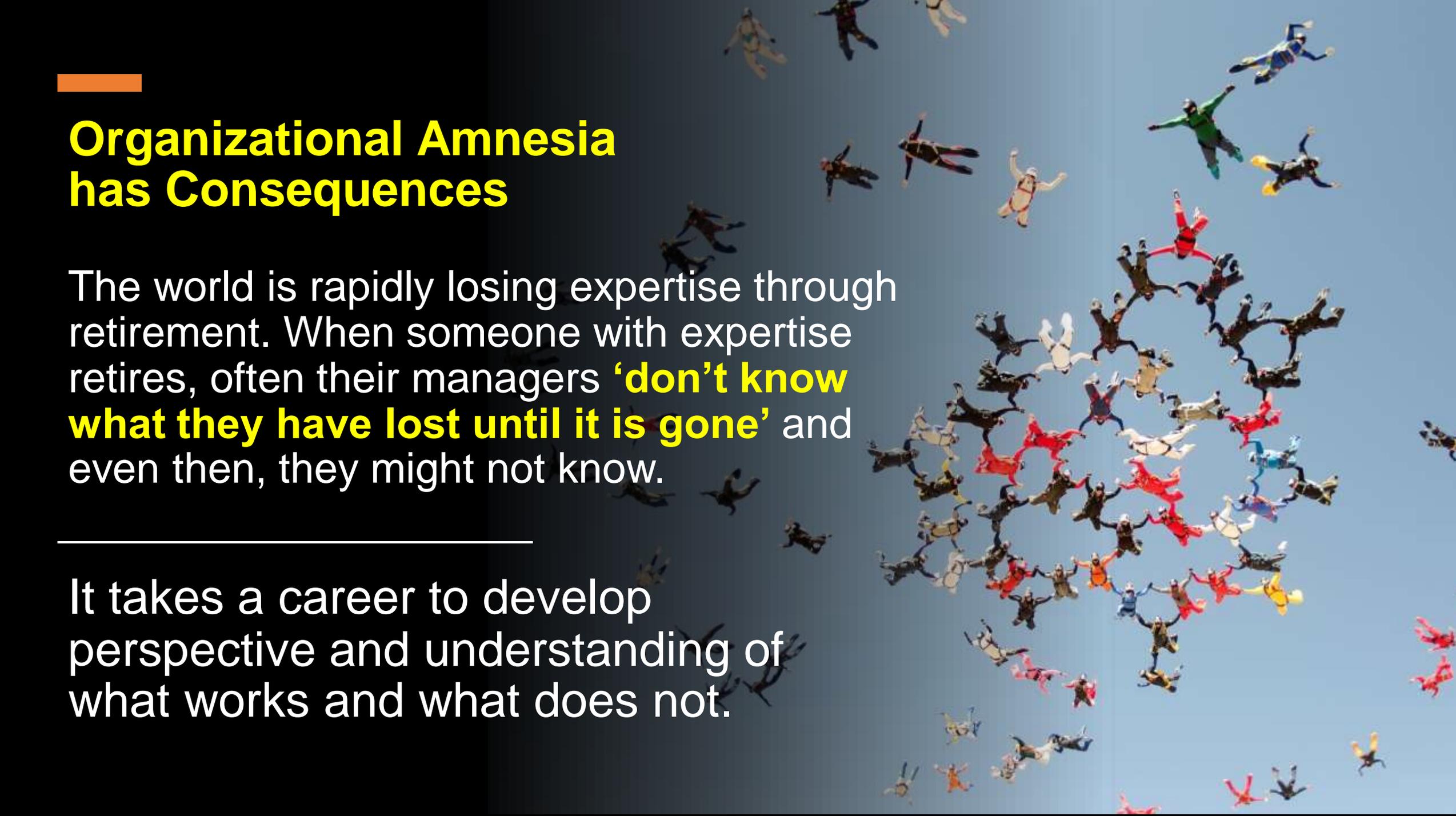


“I concluded that:

What First Nations in British Columbia bring to the water conversation is a whole-system perspective.

It is that basic.

This is something that water practitioners have forgotten.”



Organizational Amnesia has Consequences

The world is rapidly losing expertise through retirement. When someone with expertise retires, often their managers **'don't know what they have lost until it is gone'** and even then, they might not know.

It takes a career to develop perspective and understanding of what works and what does not.

“INNOVATION AND CREATIVITY
ARE INCUBATED WHEREVER YOU
HAVE THE RIGHT COMBINATION
OF EXPERIENCE, ENTHUSIASM,
AND CURIOSITY. MY EXPERIENCE IS
THAT INTERGENERATIONAL TEAMS
ARE MUCH MORE INNOVATIVE.”

KATE RUSHTON

COMMUNITY STRATEGIST, UNITED KINGDOM



When the intergenerational baton is handed off, everyone understands that the race is a marathon, not a sprint.



A large mushroom with a reddish-brown cap and white stem is the central focus, growing in a forest setting. The background is a blurred forest floor with fallen leaves and branches. The text is overlaid on the image.

Please send your follow-up
questions to Kim Stephens care of
outreach@waterbucket.ca