

Ecosystem Health, Human Health

**Presentation to the Forum on
Protecting Environmental
and Human Health
through Partnerships and Communities**

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1930	Meuse Valley Belgium	60 deaths
1948	Donora Pennsylvania	20 deaths
1952	London England	12,000 deaths

The London Killer Fog of 1952



Los Angeles 1955





Los Angeles - 1956




Los Angeles - 2008

Dirty Cities 2006

CITY	PM 2.5 LEVEL(mcg)
Beijing	70-99
Mumbai	40-55
Mexico City	27-38
Athens	26-36
Los Angeles	18
London	6-9
BC objectives	6-8

For every additional microgram of fine particulate in the air, 0.6-1.6% more people will die every year.

(Nature 2006)

An aerial photograph of Vancouver Island, British Columbia, Canada. The image shows a dense network of rivers and streams flowing across the island's terrain, which is covered in lush green forest. The water bodies are a mix of dark blue and turquoise, indicating varying depths and sediment levels. The coastline is visible on the left side, with the ocean extending to the bottom left corner. The overall scene depicts a complex hydrological system in a mountainous region.

**Aerial view of
Vancouver Island**



Cowichan Valley Open Burning 2008

10/11/2008

Cowichan Valley Open Burning 2008



Cowichan Valley Open Burning 2008



James Bay Cruise Ship Exhaust



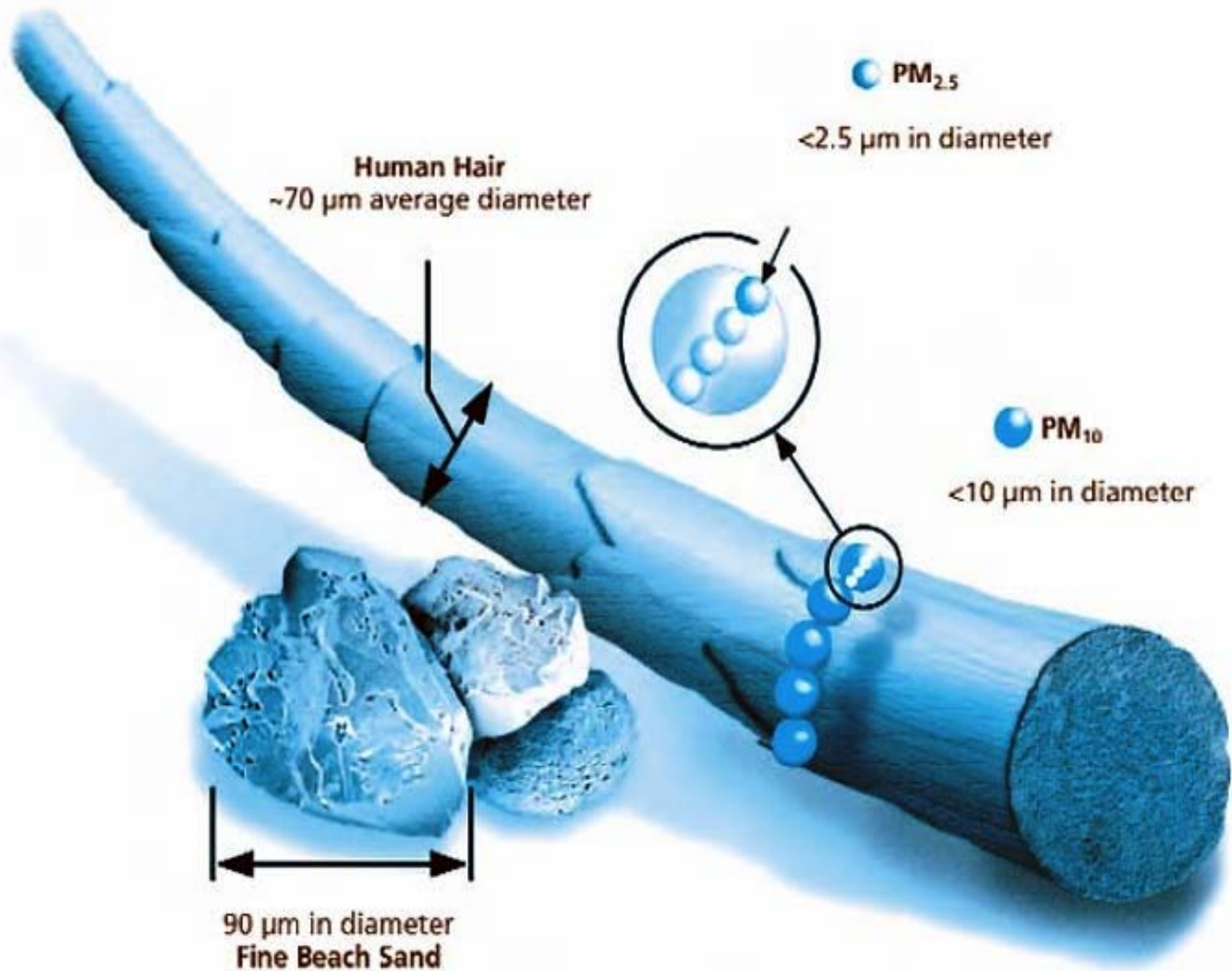


Spirit of Vancouver Island

BC Ferries



**Diesel Exhaust
from School Bus.**



● PM_{2.5}

<2.5 μm in diameter

Human Hair
~70 μm average diameter

● PM₁₀

<10 μm in diameter

90 μm in diameter
Fine Beach Sand

Particulate matter (PM) and illness

Increases the risk of:

- heart attacks
- pneumonia
- lung cancer
- worsening chronic lung disease
- asthma attacks
- reduced lifespan (in longitudinal studies)

Fine particulate air pollution and life expectancy

- WHO: 1.4% of all deaths worldwide are caused by particulate air pollution
- Improvements in life expectancy from reductions in fine particulate air pollution; 15% of total gains in LE, 10 MCG less means 31 weeks LE (NEJM 2009)

Effects on fetal health, child health

- Intrauterine effects
- Infant mortality
- Worsening symptoms in asthmatics
- Mike Brauer (UBC) association between traffic related air pollution in utero and initial onset of asthma in children

Woodsmoke Health Effects

- Forest fires, agricultural fires
- Woodburning stoves, fireplaces,
- Woodsmoke is a complex mixture
 - CO, NO_x,
 - At least 5 human carcinogens including PAHs, benzene,
 - PMs; seasonal variation (nephelometer studies)

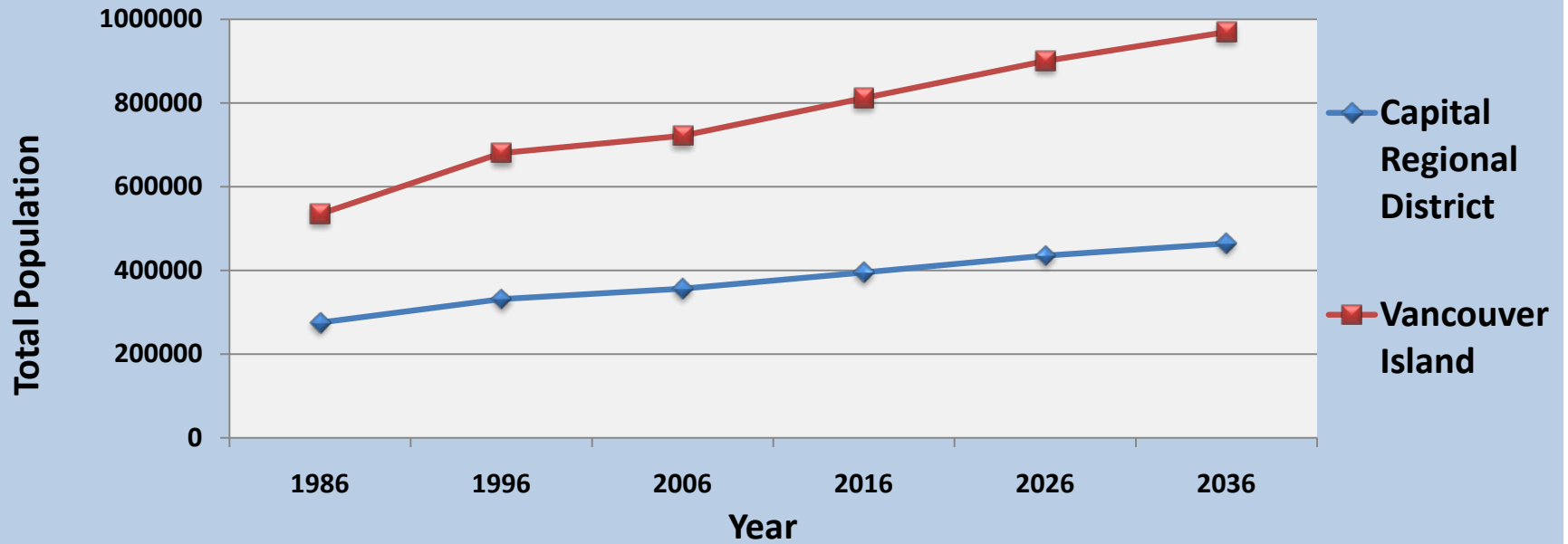
Traffic-Related Air Pollution and Mortality

- Living near a major road increases risk of death slightly; 2009
- Long term exposure to air pollution reduces life expectancy; European cohort study
- Diesel exhaust: a complex mixture of particles and gases;
- brief exposure to diesel exhaust produces myocardial ischemia while exercising
- Diesel exhaust may cause 70% of air pollution related cancers.

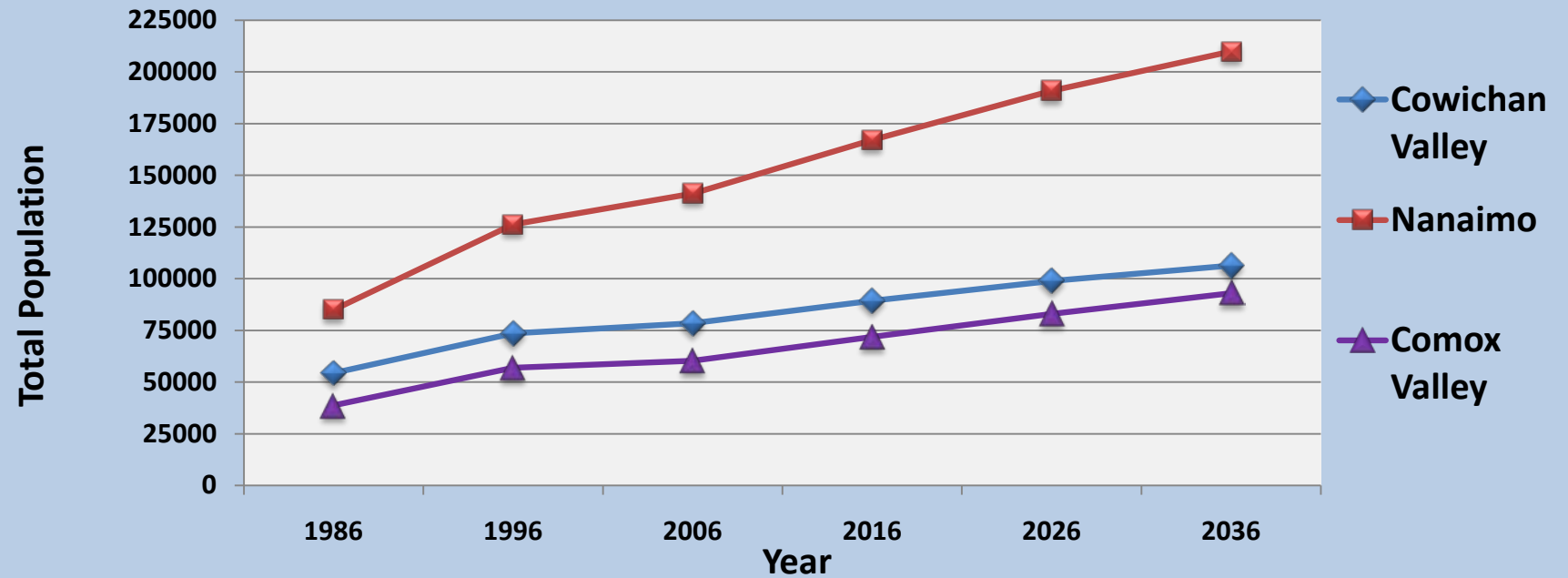
Air quality management to improve human health

- Includes:
- Burning bylaws
- Woodstove exchanges, woodsmoke reduction
- Idling bylaws
- marine emission management
- Reduce second hand smoke

Population Projections 1986-2036



Population Projections 1986-2036



Percentage of Population Change from 2001 to 2006 on Vancouver Island

Regional District	% Change
Nanaimo Regional District	9.1
Cowichan Valley Regional District	6.8
Capital Regional District	6
Comox-Strathcona Regional District	5.7
Alberni-Clayoquot Regional District	1.1
Mount Waddington Regional District	-11.1

Change in Annual Daily Traffic Volumes, 2001-2006





Women doing laundry in the streets of Soho, London in the early 1850s.



The original Broad Street pump in Soho, London, the site of the cholera outbreak of 1854.

November 3, 1952 Cuyahoga River Fire.



Removing garbage from the Los Angeles River after a storm.



Walkerton 2007

- 7 deaths, 2300 illnesses; a wake up call
- Still need more safeguards in place to assure consistently safe drinking water
- governments to recognize the need to manage the water resources

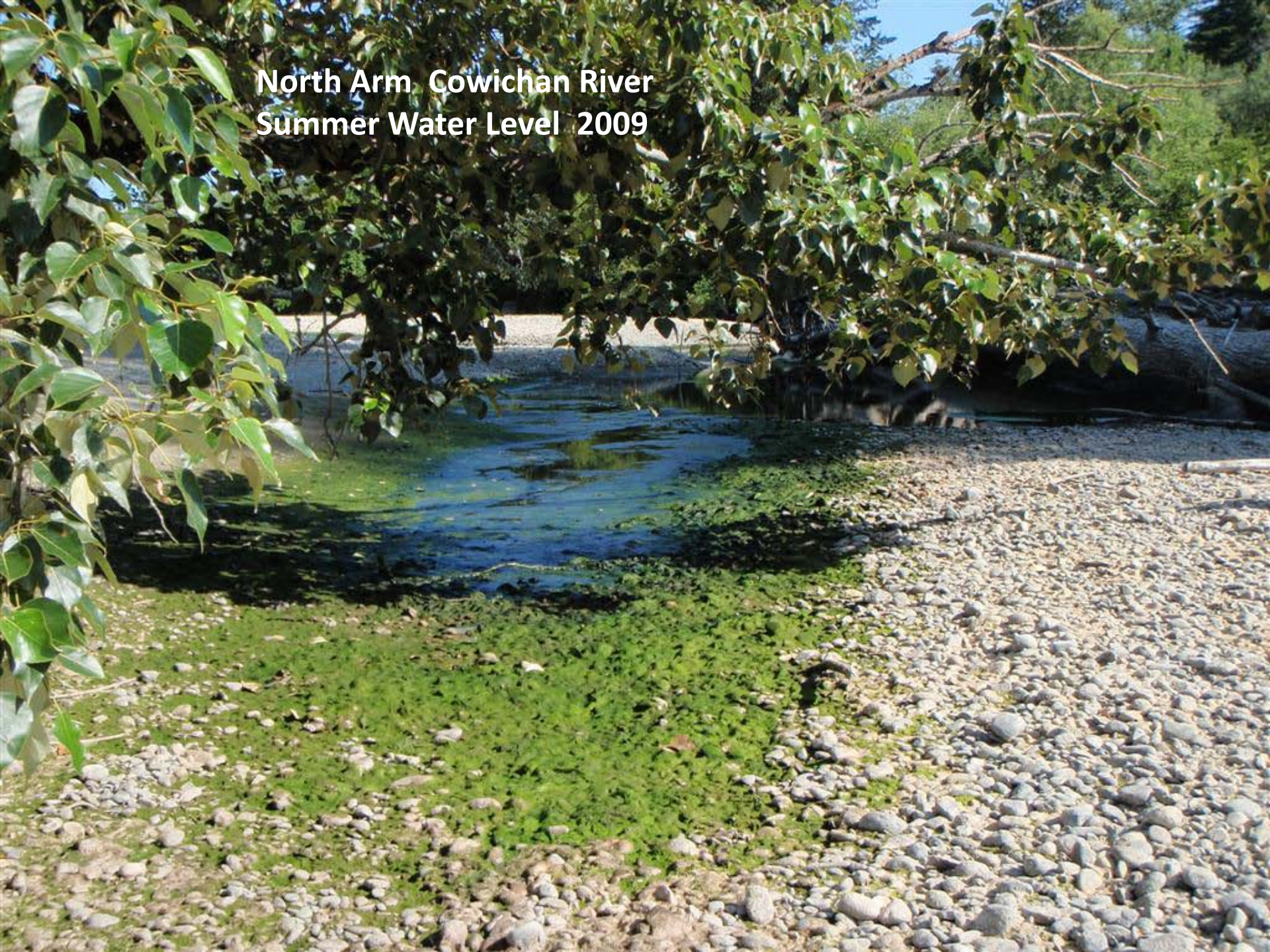
Turbidity on the Englishman River November 2009





Koksilah River Log Jam

North Arm Cowichan River
Summer Water Level 2009






Truck leaking oil –
potential run off to
water course

Water access and quality

- The global population has tripled since 1950.
- Water demand has gone up seven-fold.
- Water underpins industrial processes from building cars to growing chicken (meat)
- Waterborne diseases are still the greatest killer and disabler in the developing world

Moving forward

- “The significant problems we face cannot be solved at the same level of thinking we were at when we created them”: Einstein
- “The important thing is not to stop questioning”
- move beyond reductionism to holistic science
 - Transdisciplinary methodologies to understand dynamics of whole systems
 - Integrate qualitative and quantitative approaches

A high-speed photograph of a water droplet falling into a pool of water. The droplet is captured mid-fall, just above the point of impact, creating a crown-shaped splash. The background is a soft, out-of-focus blue. The text is centered in the upper half of the image.

from competing to consume
to collaborating to conserve

