



Climate Change II: Water

Tues: Library

Tues: Consumerism / marks

Wed: Pinebeetles & Pipelines

Thurs: Essay due / MCQ /

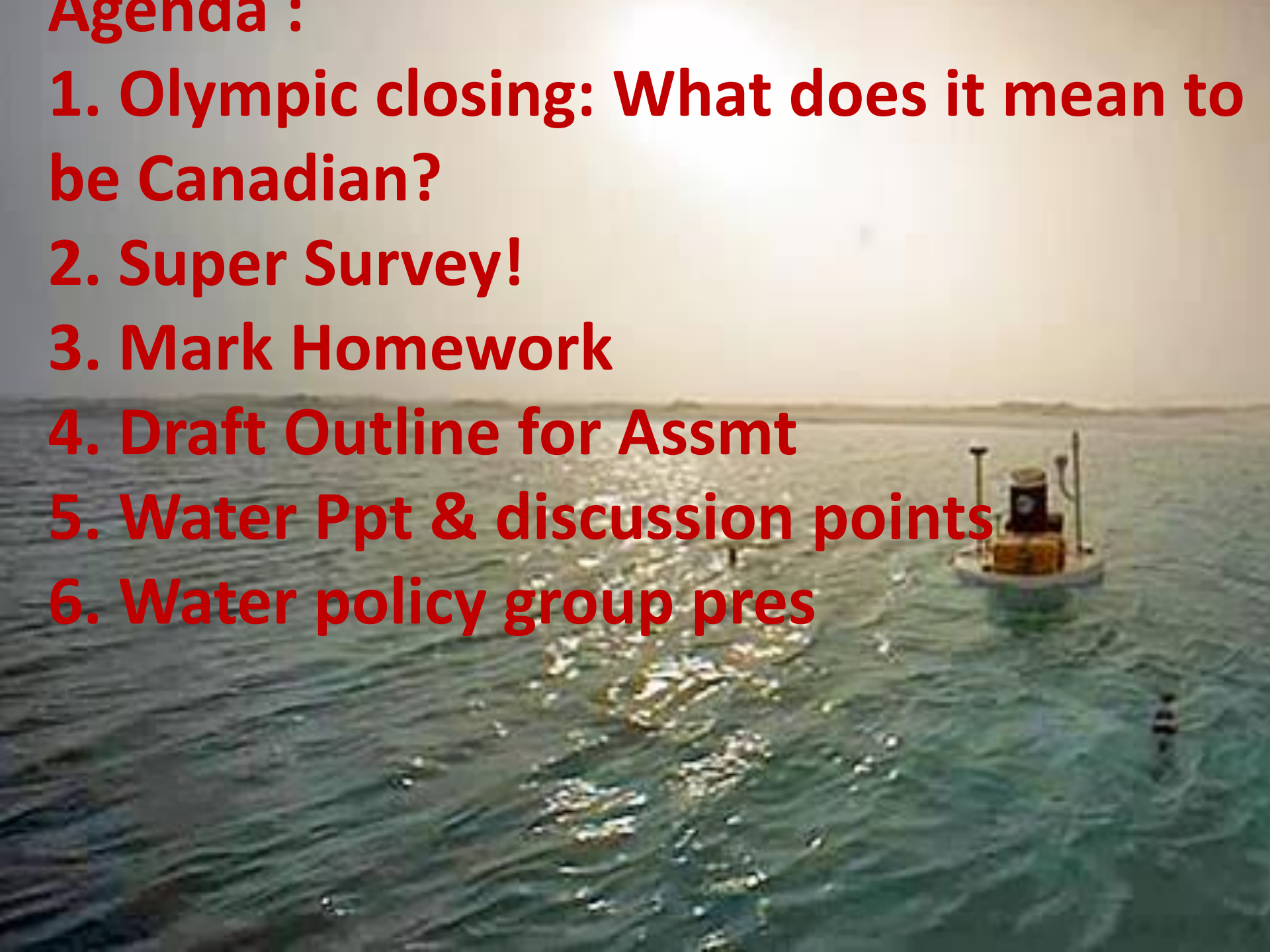
Consciousness

Fri: Government



Agenda :

1. Olympic closing: What does it mean to be Canadian?
2. Super Survey!
3. Mark Homework
4. Draft Outline for Assmt
5. Water Ppt & discussion points
6. Water policy group pres



Block C – ACADEMIC VOCABULARY

used in MDG written work

- Torture - *Ermi*
 - Incentive - *Igor*
 - Embellish – *Garett*
 - Intriguing – *Madi*
 - Purchasing – *Lauren*
 - Procedures – *Patrick*
 - Peaceful – *Hanlin*
 - Crude – *Trista*
 - Survive – *Judy*
 - Trafficking - *Iris*
 - Scarcity – *Alex*
 - Representative – *Ryan*
 - Refreshment – *Jordan*
 - Effective - *Lin*
- Nice work folks 😊

Why did we cover so much?

- The more the information is repeated or used, the more likely it is to eventually end up in long-term memory, or to be "retained."
- (That's why studying helps people to perform better on tests.)

That day when the
North Pole became a lake...



North Pole - July 22, 2013

CLIMATE CHANGED.

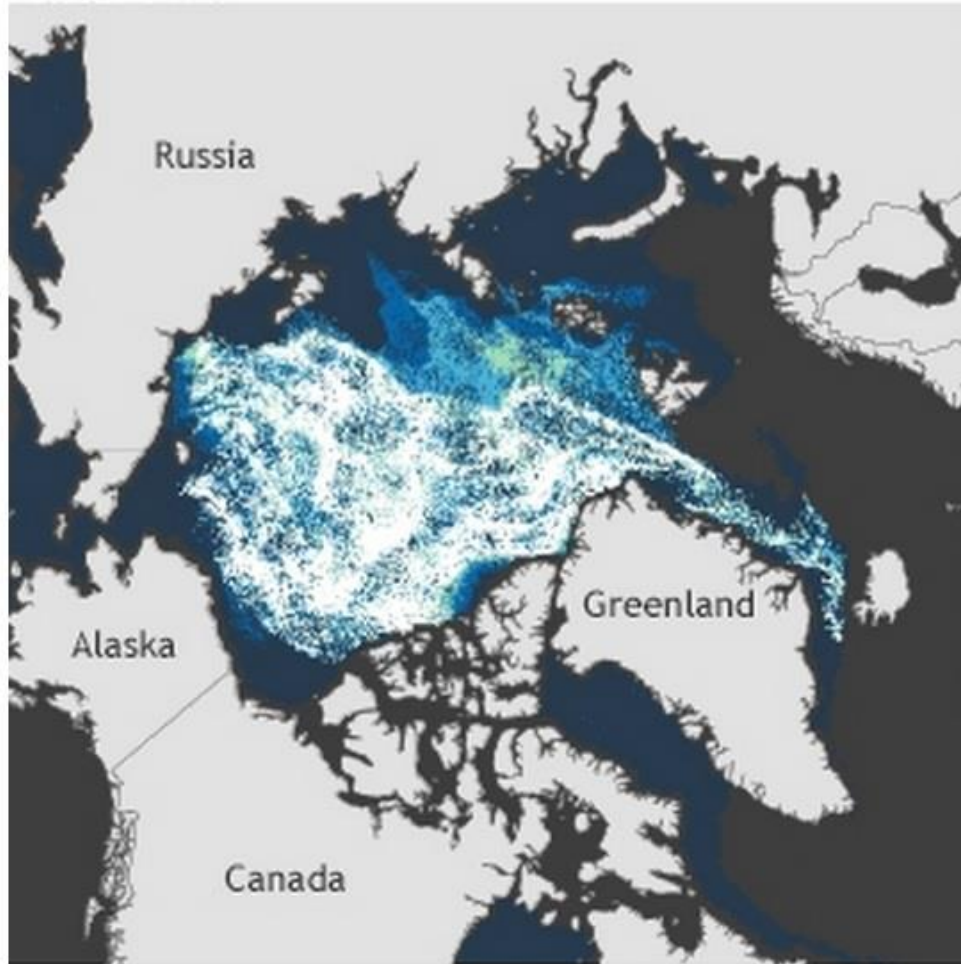


Where is this?

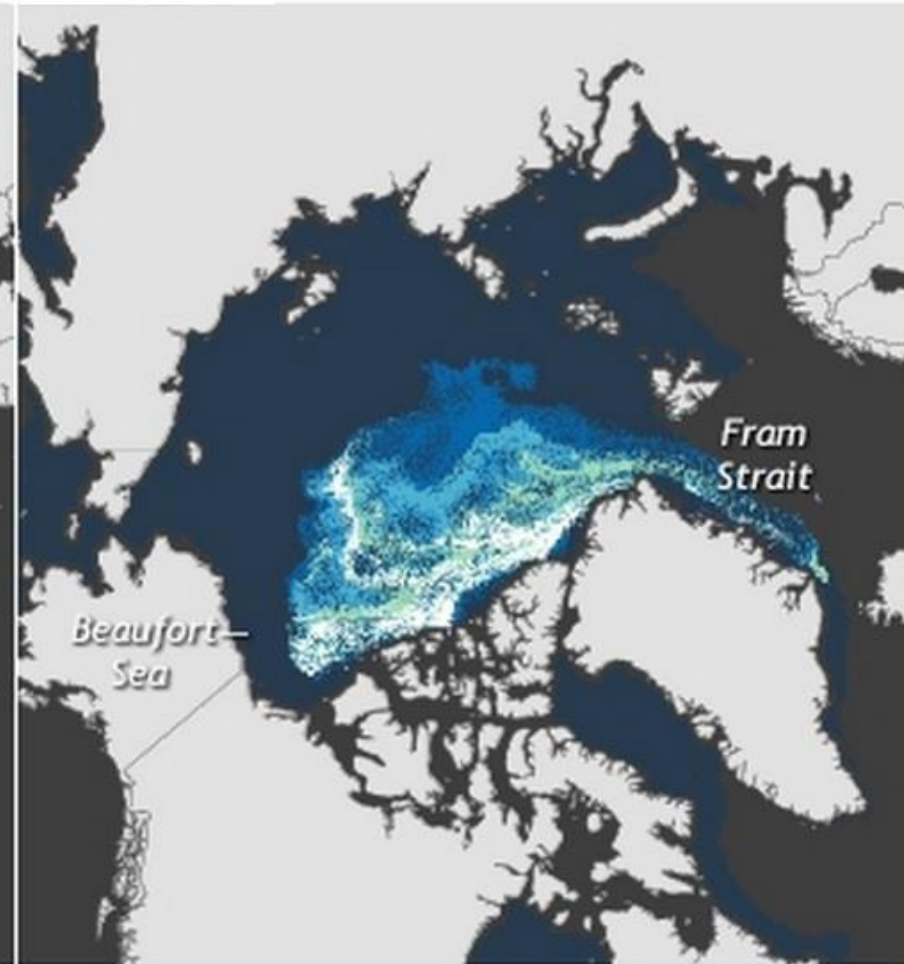
Consequences: Ice Caps



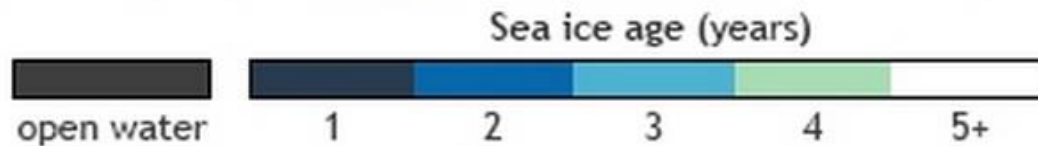
Consequences: Ice Caps



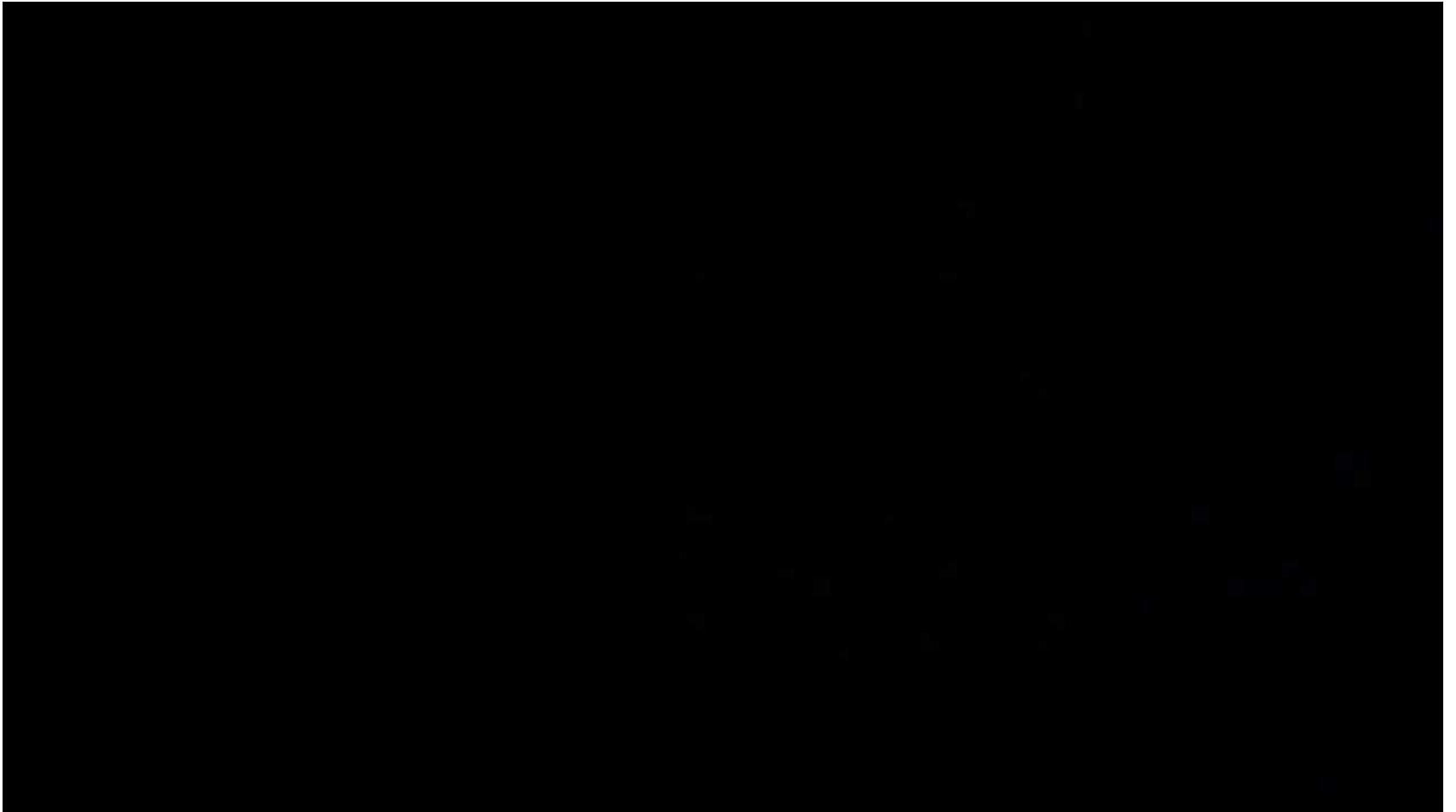
March 1988



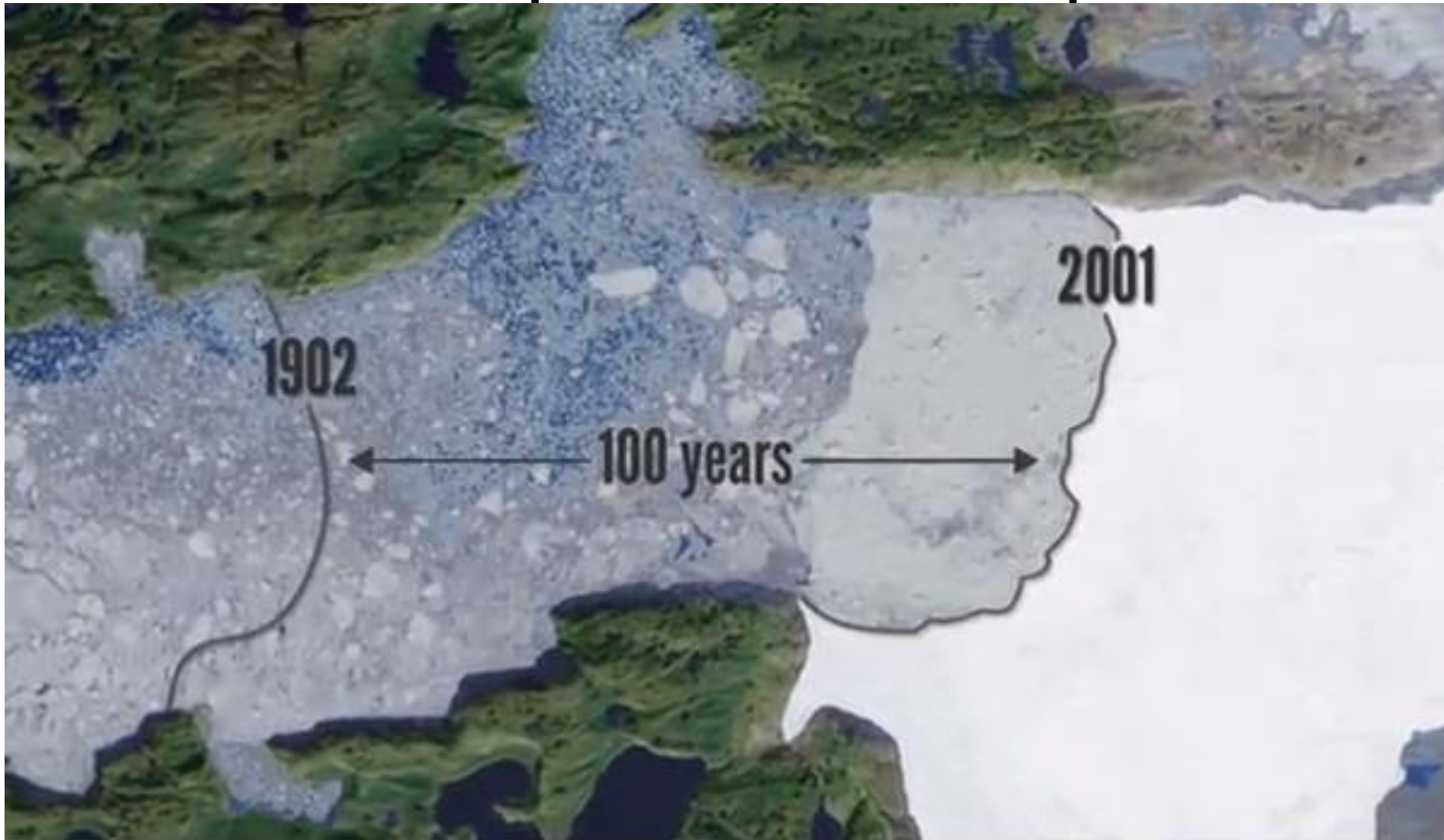
March 2012



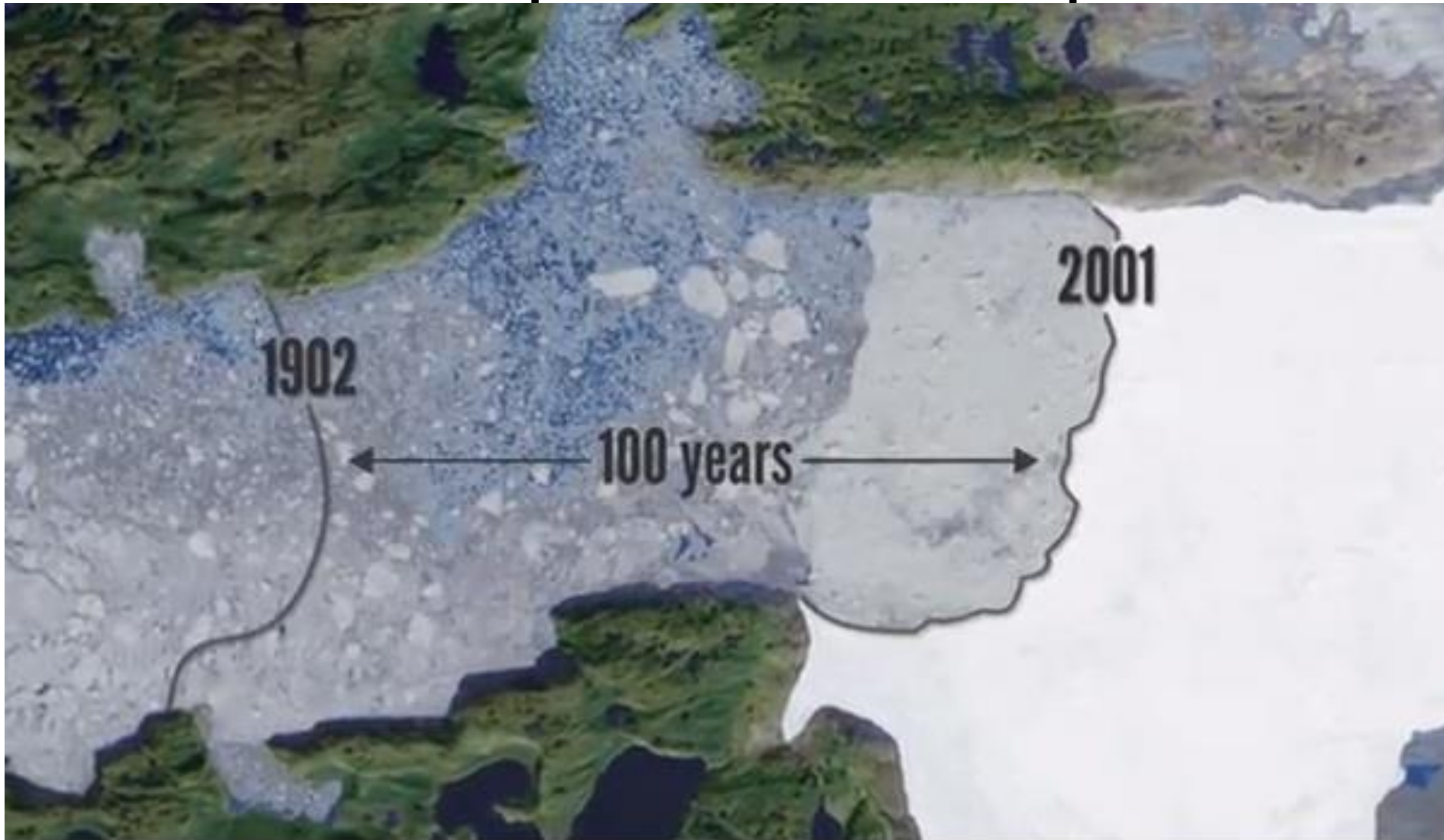
Consequences: Ice Caps



Consequences: Ice Caps



Consequences: Ice Caps





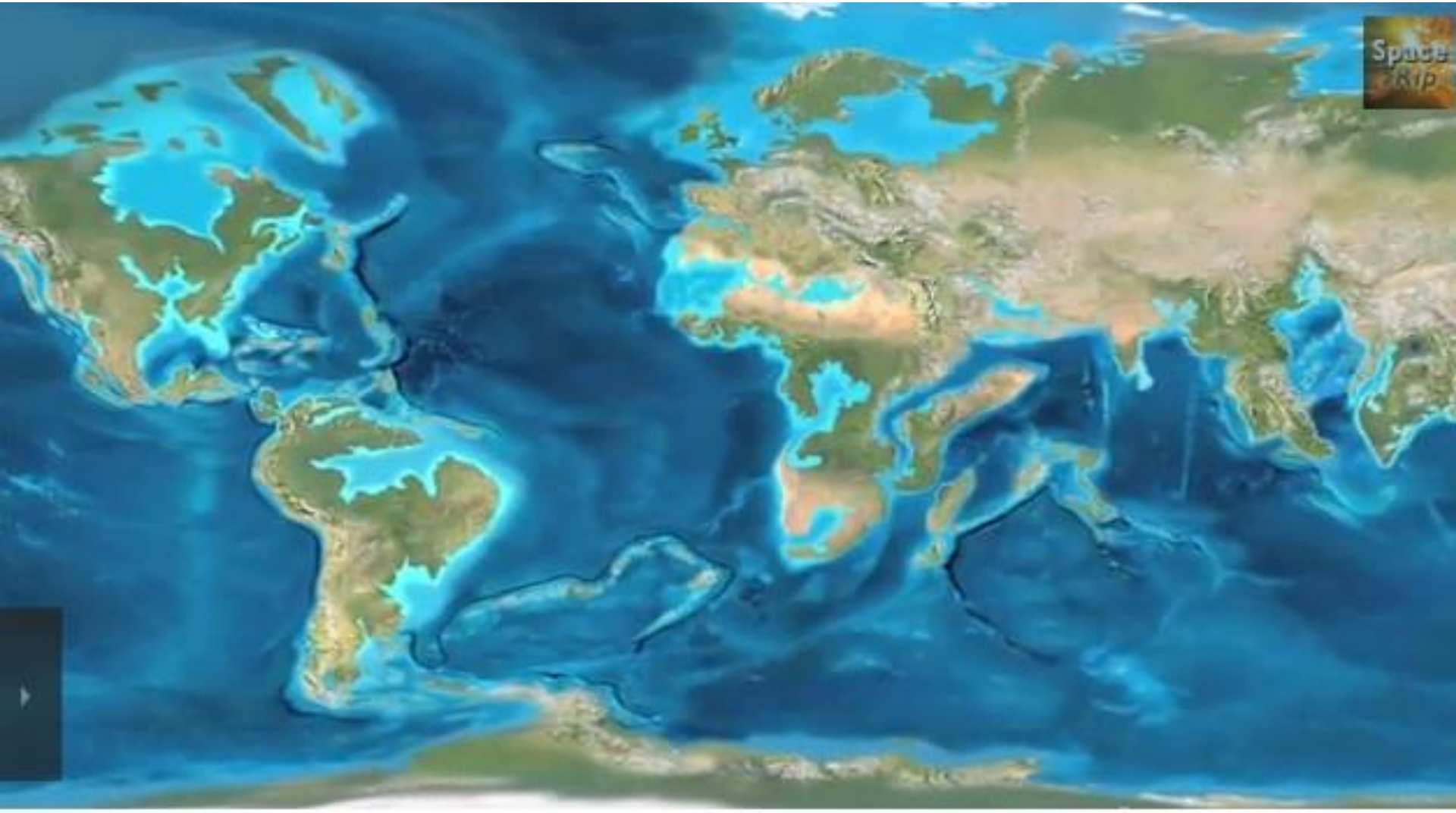
Consequences: Raising Water



Consequences: Raising Water



Consequences: Raising Water



Fresh Water

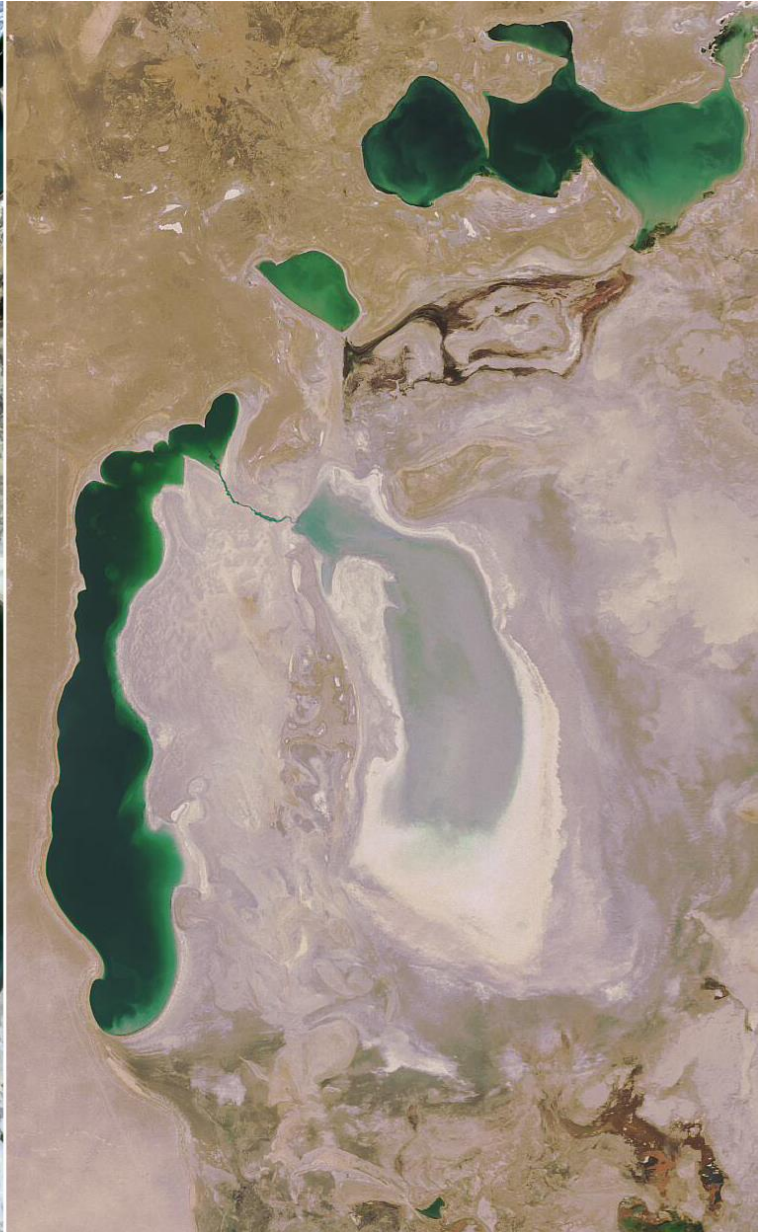
- Important facts:
- Only 3% of the world's water is fresh water.
- 18% of the world's surface fresh water is in the Great Lakes.
- Most fresh water is either frozen or underground.

Why are we worried about water
supply?

Water Supply

- The world's population is constantly growing.
- Each person needs at least 5 liters of water per day.
- In developed countries, most people use over 200 liters per day!
- Result: Groundwater and surface water resources are dwindling.

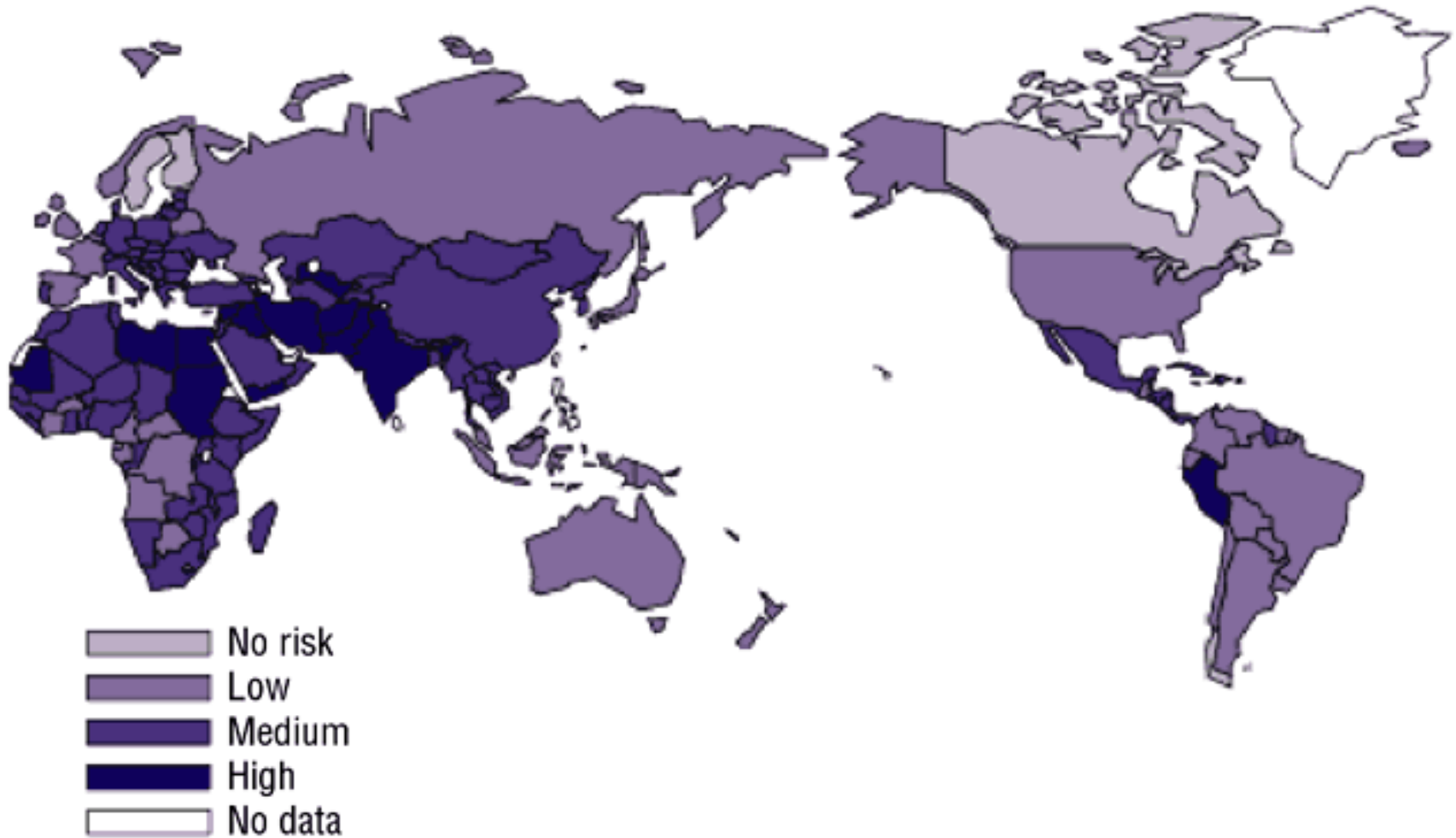
Aral Sea



The problem of population growth

- The more people our planet has, the more food we need to grow.
- Result: More water is used to irrigate land for farming.
- Result: **Water tables are falling** all over the world.

Water shortages around the world:



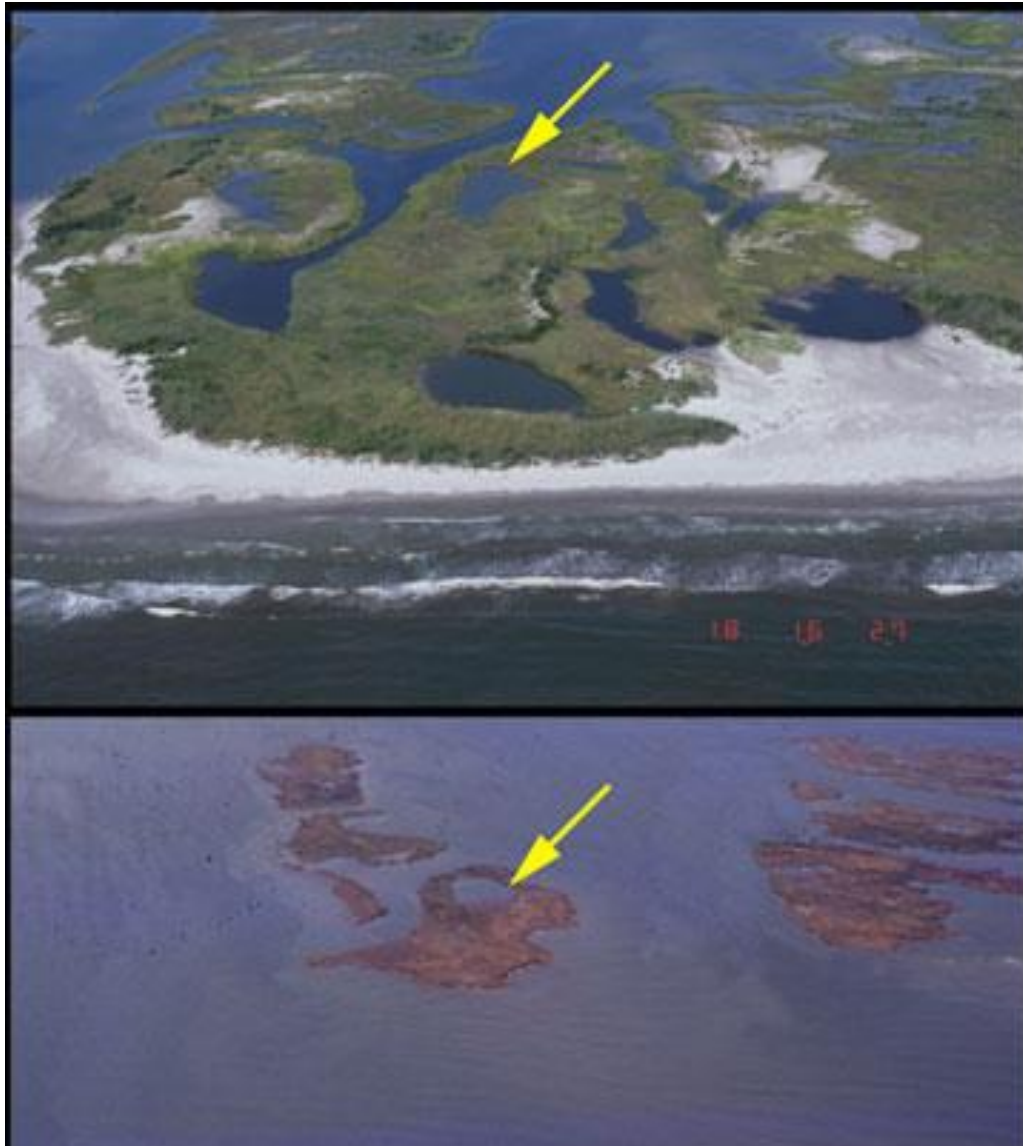
**ONLY ONCE YOU HAVE CARRIED
YOUR OWN WATER,
WILL YOU LEARN THE VALUE
OF EVERY DROP**



Why is depleting groundwater resources dangerous?

- Farmers will have to rely in seasonal rains - farms will yield fewer crops.
- Poor countries with growing populations will depend on imports of food for survival.
- The land above the water table may subside as the water table falls. This is the reason why New Orleans was completely flooded for weeks after it was hit by Hurricane Katrina.

Consequences: 2005





Drought Threatens to Cripple California Agriculture Industry

BY MIGUEL ALMAGUER AND DANIEL ARKIN

Can the depletion of ground water lead to a world wide famine?



Surface Water Supply



Threats to surface water

- Surface water will always be present as it is renewed all the time by the water cycle.
- However, the amount of surface water we can safely use is decreasing as a result of:
- **Pollution**

How is surface water polluted?

- Municipal waste (sewage, detergents, solvents, garbage)
- Agricultural waste (herbicides, pesticides, fertilizers)
- Industrial waste (chemicals, oil, waste)



We may start seeing more of these...



**WATER IS UNFIT
FOR HUMAN
CONSUMPTION**

Ocean Pollution : the North West Gyre











HOW LONG UNTIL IT'S GONE?

Estimated decomposition rates of common marine debris items



Estimated individual item timelines depend on product composition and environmental conditions.

Source: NOAA (National Oceanic and Atmospheric Administration), US / Woods Hole Sea Grant, US
Graphics: Oliver Lide / Museum für Gestaltung Zürich, ZHdK

Canada's Role

- **Victoria** and Halifax dump untreated sewage into the oceans.
- Pulp mills provide 50% of industrial waste in the Fraser River.
- The Fraser Valley and Vancouver dump 90% of the municipal waste found in the river.



(Canada)



USA

Canada
U.S.
Border

Queen Charlotte Strait

Vancouver Island

Strait of Georgia

Vancouver

Victoria

Puget Sound

STRAIT OF
JUAN DE FUCA

Seattle

Olympia

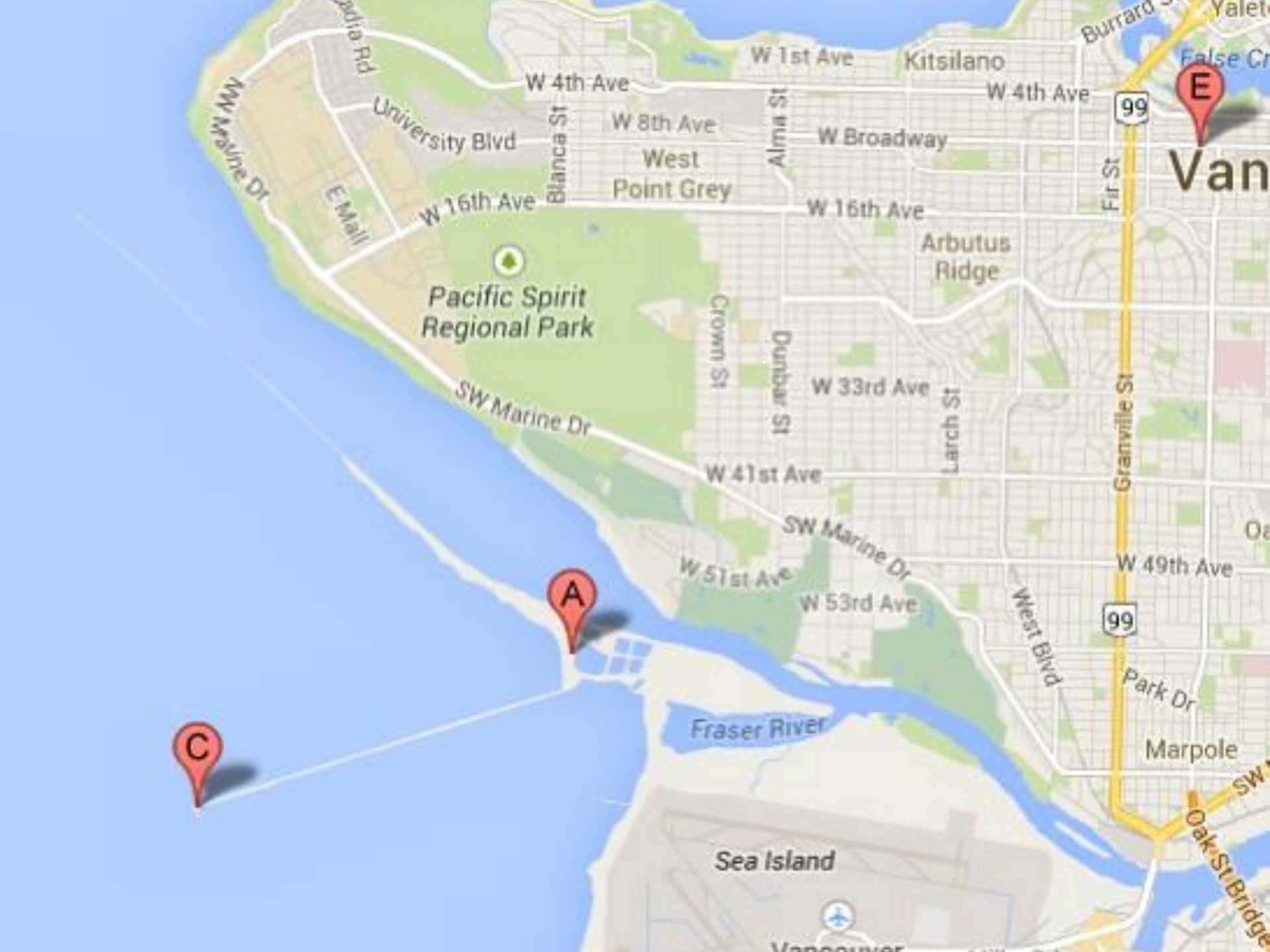
Washington



70 mi

70 km

Pacific Ocean



Vancouver

Pacific Spirit Regional Park

Fraser River

Sea Island

Vancouver

A

C

E

SEWAGE The journey from your home to the ocean

This diagram shows how Greater Victoria's current sewage system operates. It also shows, based on 100 staff interviews, the most likely form sewage treatment could take in the future.

HOW IT WORKS

How It Works
 Sewage enters the system through a manhole. It flows through a main sewer line to a pump/lift station. From there, it is pumped to an outfall pump station. The outfall pump station pumps the sewage into the ocean through a diffuser.



PUMP/LIFT STATIONS

PUMP/LIFT STATIONS
 These stations are used to lift sewage from a lower elevation to a higher elevation. They typically consist of a pump and a lift station. The pump lifts the sewage into a lift station, which then discharges it into a main sewer line.

OUTFALL PUMP STATIONS

OUTFALL PUMP STATIONS
 These stations are used to pump sewage from a main sewer line into the ocean. They typically consist of a pump and a diffuser. The pump lifts the sewage into a diffuser, which then discharges it into the ocean.

OUT OF HARM'S WAY

OUT OF HARM'S WAY
 This section discusses the challenges of sewage treatment and the need for improved treatment. It highlights the importance of protecting the environment and public health from sewage pollution.

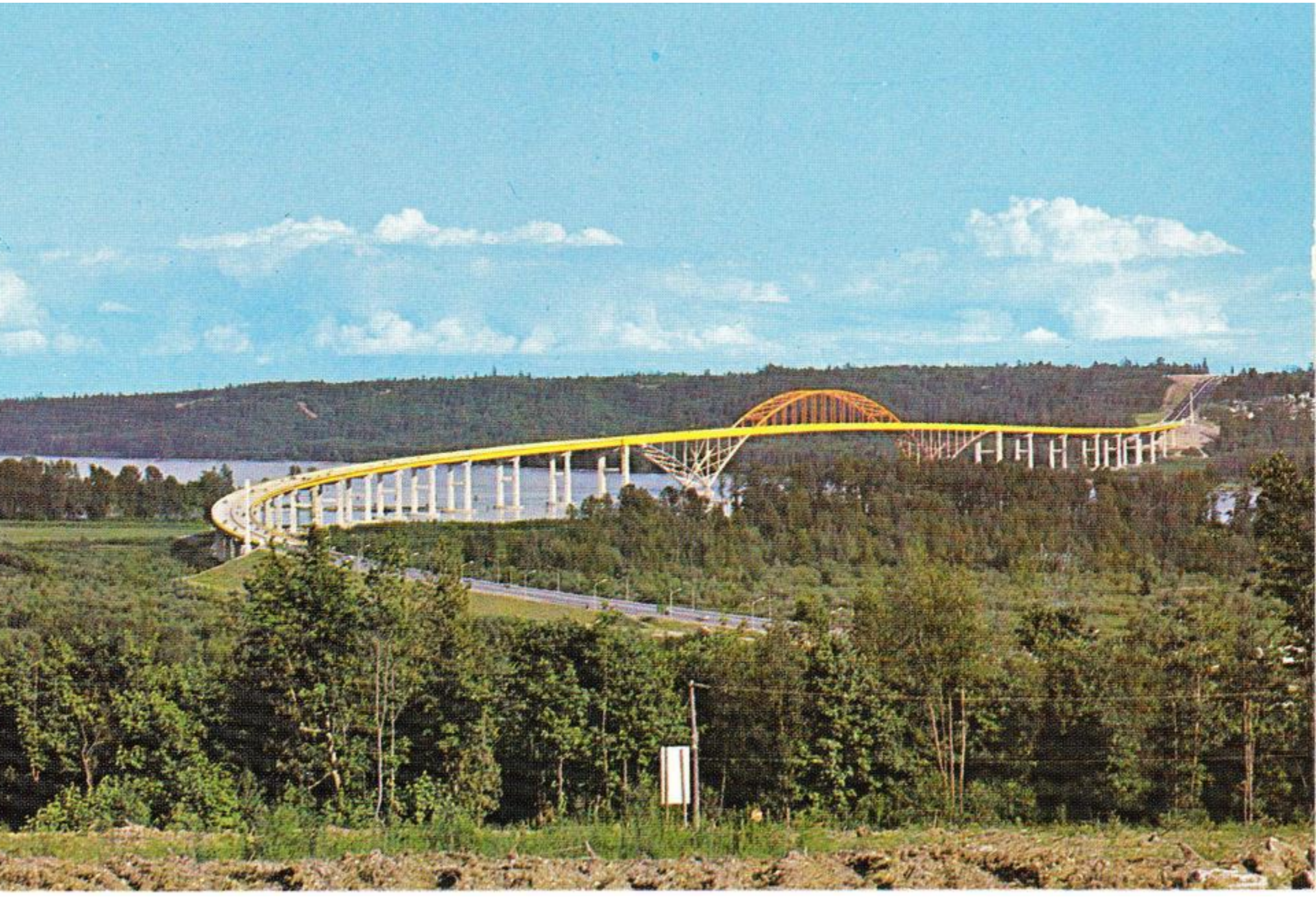
VISIONS OF IMPROVED TREATMENT

VISIONS OF IMPROVED TREATMENT
 This section presents several alternative treatment technologies, including:

- Advanced Oxidation Processes (AOP):** Uses powerful oxidants to break down organic matter.
- Membrane Bioreactors (MBR):** Combines biological treatment with membrane filtration.
- Ultraviolet (UV) Disinfection:** Uses UV light to kill pathogens.
- Electrochemical Treatment:** Uses electricity to break down pollutants.

Technology	Advantages	Disadvantages
Advanced Oxidation Processes (AOP)	Highly effective at breaking down organic matter and disinfecting.	High energy consumption and high operational costs.
Membrane Bioreactors (MBR)	Highly efficient at removing suspended solids and organic matter.	High energy consumption and high operational costs.
Ultraviolet (UV) Disinfection	Effective at killing pathogens and does not add chemicals.	High energy consumption and requires regular maintenance.
Electrochemical Treatment	Effective at breaking down a wide range of pollutants.	High energy consumption and high operational costs.





Consequences

- Fish, such as sturgeon, in the Fraser River are becoming endangered.
- In the St. Lawrence River, Beluga whales are declining in numbers.
- Algae and weeds are growing more often, depleting the water's oxygen and creating dead zones.
- In the Okanagan region, milfoil weed is threatening to destroy all other life present in lakes.

Right whales are the rarest of all large whales. They were named by whalers who thought that they were the "right" whale to hunt because they were slower than other species, floated after they were killed, and provided large quantities of food, oil and baleen. Despite being protected, the right whales are still the most endangered of all whales. There are only a few hundred of them left.

MAY 13



MAY 2013

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

It takes...

10 liters
of water to make
one sheet of **PAPER**



40 liters
of water to make
one slice of **BREAD**



70 liters
of water to make
one **APPLE**



80 liters
of water per dollar of
INDUSTRIAL PRODUCT



91 liters
of water to make
one pound of **PLASTIC**



120 liters
of water to make
one glass of **WINE**



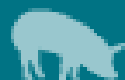
140 liters
of water to make
one cup of **COFFEE**



1,300 liters
of water to make
one kilogram of **WHEAT**



4,800 liters
of water to make
one kilogram of **PORK**



10,855 liters
of water to make
one pair of **JEANS**



15,500 liters
of water to make
one kilogram of **BEEF**



16,600 liters
of water to make
one kilogram of **LEATHER**

