

CLIMATE CHANGE IN THE COLUMBIA BASIN

(NOTE: links are in blue)

Selected notes from the April 16, 2008 community meeting taken by K Moore with additions by Bob Bechaud, Sheree Sonfield, Ken Holmes and Derek Choukalos. The presentations will be on the CBT website and we can use any part of them that we wish.

Learn more about the impacts of climate change in the Columbia Basin at three free evening presentations being sponsored by the Columbia Basin Trust (CBT), hosted in Rossland by KAST and the City of Rossland.

The sessions will begin with a presentation of climate change research findings from the Columbia Basin region followed by a question and answer session featuring some of North America's foremost climate change research scientists, including:

- **Robert Sandford – UN Water For Life Decade;**
- **Michael Demuth – Glacier Specialist, Geological Survey of Canada;**
- **Alan Hamlet – Hydrologist, University of Washington; and**
- **[Hans Schreier](#) – Watershed Specialist, University of British Columbia.**

Well attended by approximately 100-150 (?) citizens including several staff members (Mike Thomas and Mike Maturo) and all councilors except Steve Knox (on holidays)

“Kindy” from the CBT introduced panel and commented that the CBT is working with communities throughout the basin to address climate change.

Bob Sandford, UN Water For Life Decade - believes that the CBT’s water initiatives are some of the best around. Decision makers must adapt to climate change with innovative and forward thinking policies.

Right now we are approaching a disastrous “perfect storm” of climate change; loss of habitat, degradation of ocean ecologic values, population expansion, political and social concerns. This is a world wide phenomenon.

Small changes in temperature will have a major impact on ice pack conditions in Canada. The ice/water interface is critical but on a micro-organism level climate change and water issues will affect us at the cellular level. From diseases to insects (pine beetle infestation) these impacts will move up the chain of plants and animals and have a tremendous effect at each stage.

Atmospheric temperature changes risk making global warming its own cause. It is becoming too late to have an impact if we do not act now; the effects will be irreversible. Climate change is happening and we have been slow to recognize it much less do anything about it. Society isn’t structured to deal with problems of this scope.

We are so mobile today that we often haven't lived in any single location more than 5 years. Therefore, we don't notice the changes and *they are irreversible once we do notice them.*

Planning by government is dominated by short term thinking and implementation. The tendency is to ignore threats until they become a crisis. Climate change will test politicians, science and societies. Unfortunately there has been no preparation but we must act now anyway.

In BC there is a lot of community interest. Here is what must happen:

- 1) First, *acceptance* of real problems.
- 2) Make personal commitment to act and community commitment to act
- 3) Keep regional, national and global perspective too.

Population growth, ecosystem decline, habitat degradation all can be attributed to improper land use resulting in ecosystem degradation.

The survivors will be those best able to save themselves, their community, their ecosystems and their water supplies. We are in an excellent position here; we live in a desirable place but the world will encroach. Be ready for an invasion from other areas. Must be able to adapt.

Follow the water! Undisturbed water ecosystems will slow climate change. Land, water and climate must all be managed as best as possible. Local water quantity and quality is crucial.

Monitoring is essential; understand all sources of water: snow pack, rainfall, glacial, and ground water. Monitoring is essential to understanding and protecting. Integrated water management requires monitoring. *Monitor both flow and temperature in the streams.*

We need to protect ourselves better: build better houses, renovate existing structures to deal with variable climate (heavier rains and snow falls, flooding droughts, fires etc.) Study surrounding geography- move everyone out of a 50 year flood plain. Fire and water interaction is critical. Create resilient communities and believe and involve the youth. Take the opportunity to think of future generations- slow the relentless pursuit of upward mobility- dig in and stay. Become grounded in one place and stand up for the values we believe in.

Kindy: Economy is built around water. It is the biggest issue we face. Communities are looking for more water sources.

Alan Hamlet- U of Washington hydrologist. Works with the IPCC (Intl Panel on Climate Change).

A 4 degree change in temperature will result in a 40% reduction in species. Even a slight increase will change the hydrolysis of the Columbia Basin. That we must reduce emissions and adapt to global warming is inevitable.

The Columbia Basin River Treaty doesn't deal with the consequences of massive change. Modeling indicates that by 2060 the US will lose 35% of its Pacific Northwest snow pack while the Columbia basin will only lose 12%. The US will want to renegotiate the treaty.

Environmental impacts are worldwide but not equally distributed. The entire planet is warming.

Impacts on water include:

- Quantity and timing
- Reduction of flow
- Drought
- "Hydro extremes" flooding, hurricanes
- glacial loss
- water quality issues
- other disturbances

Economic Impacts

- outdoor recreation
- energy
- storm water infrastructure
- transportation corridor (landslides closing roads in Revelstoke)
- sea level- flooding
- food shortages

Human health risks

- not properly understood but many are water related

Requires us to adapt and plan:

- Anticipate change, it will happen
- Use scenario planning, evaluate the options, can't rely on historical models.
- Expect surprises and adapt
- Plan for the long term; continue to adapt as circumstances change.

Michael Demuth- glaciers

Modeling trends and actual field research show obvious reduction of glaciers. Lots of cool pictures and graphs. Will have significant impact on water.

As the glaciers' nourishment in winter changes, the storms track differently. As the glaciers recede, the annual water yield is less from each valley.

A data hole exists, we know it is happening but we don't know what it will mean.

Funding has been cut so resources are very limited at a critical time.

I didn't take many notes on this, but Sheree adds the below in this section.

He made a big point about sensitivity to temperature change and showed visual projections. *Many of the areas that are warmer now will have no snowpack in 2060.* While the larger glaciers and areas of snowpack saw less projected reduction, the smaller areas were obliterated.

Impacts of warmth to areas with snowpack:

- Increased winter flow
- Earlier and reduced peak flow
- Reduced minimum flow volume
- Reduced late summer low flow

Hans Schrier- Adapting to Increased Climate Variability.

Very entertaining speaker with a lot of good info to share.

Must start with things you can do at home, change the community, and change what happens in the watershed.

Simple steps: Don't try to calculate your carbon footprint, start with your water footprint: mandatory water meters. Canada provides cheap or free water and we use the most of any people in the world. (340 liters per day) Europe, water is expensive and they use much, much less. As soon as meters are installed (for water, electricity etc) usage drops dramatically.

Land use has a greater impact on climate variability than climate change. In our cities we pave over land, make it impervious to absorption of the rain water into the soil. Must keep a minimum of 10% of land clear for natural drainage to occur to maintain biodiversity.

We don't manage our water well at all. Land use policies have a huge impact on hydrological cycle.

Individual steps: Conserve water at home; water meters, low flow shower heads, low flush toilets, rain barrels, no bottled water (ever) encourage trees, and green roofs.

Neighborhood: Delay runoff: no curbs or gutters. Plan natural water drainage- no pipes, let the water percolate through meandering open manmade streams, lined with rocks, sand and plants to serve as a natural filter. Create wetlands for run off. Lots of greenery.

Need good, innovation municipal policies and bylaws. Australia requires each house to have a 5,000 tank for rain water capture on new construction. Building codes that require green roofs, in landscaping require 30-50 cm of turf (uses less water), xeriscaping, plant and retain trees throughout the municipality. Storm water management plans that utilize open sand and gravel areas for infiltration of runoff in to built wetlands to deal with storm events. Use open space brick with greenery for driving and parking surfaces. Or, if must build parking lots, provide good drainage into natural areas with sand, rocks and greenery.

Watershed: Require a large buffer zone between a water way and any development, 50-60 meters is best. Don't build next to a river. Build wetlands, use source control rather than pipes to control water. Control demand through conservation, education and fees. Leave water for the environment- don't take it all. Manage the blue and green water well. (Blue water from streams and lakes, glaciers, Green water from rain and groundwater). Community involvement is essential.

Flashed on a "**horrendogram**" used to calculate the total cost of what we consume, include the cost of water.

Agriculture demands will increase 50% over the next 40 years as developing countries adopt our high water intensity diet (virtual water = water required to produce food- grow the item plus process it) Meat is incredibly water intensive- so is coffee ☹

Sugarcane and beets grow well in southern climes- they are more suitable for biofuels- they are a more efficient fuel and cost less virtual water to get to market. Let Cuba and South America grow these crops while North America grows food. Food riots are already occurring around the world in poor nations because the cost of staple foods (like corn) is now astronomical- out of reach of many people while the US is growing corn for auto fuel.

Forest roads were built fast and cheaply- they are now a major source of pollution in waterways. Turbid water carries far more micro-organisms, many causing disease than clear water or water with settled sediment. **Sedimentary particles are a nursery for bacteria.** Hans had a chart with the number of micro organisms but I didn't catch it. Stunning though.

Dams- many things learned from them. We probably need more but must learn from past mistakes and create completely new concepts. Conventional dams have huge silting problems that render them ineffectual over the long haul.

Issue areas according to Hans:

Governance:

- Old legal system makes innovation difficult.
- No mandate
- Reactive, not proactive; deals in crisis management mode

Enforcement

- Lack of capacity
- No programs

Incentives (Rats- I didn't get them before the slide disappeared)

- Pricing & conservation

Our challenge: don't be inconspicuous! Show leadership!

Questions from the audience:

- 1) Jill Spearn: Talk about golf courses and consumption of water.

Alan: They use a lot of water. It's a community decision; the benefits must be weighed against the costs. Don't just look at history but model the future to try to anticipate what may come. Look ahead and evaluate the options. It is essential to have adequate monitoring and long term data collection to make a decision on such long term water usage issues.

Hans: Make the putting area green and leave the rest natural.

- 2) Bob Bechaud: Dilemma for Rossland; proposal to have a golf course and residential development partially in the watershed. How long should the water and climate change situation be studied before making a decision?

Alan: difficult question. If have records and working with a qualified climate change expert could do it in a few months after monitoring the water (both flow and temp) and reviewing the records. Must consider sustainability issues too.

Kindy: How much water do we have, how will we use it is difficult to say without reliable information and the government has cut funding.

Bob: Hydro monitoring should not be subject to budget cuts by whatever government is in power.

- 3) (Not sure who asked this) More people moving here. Snow pack is smaller each year, stream flows reduced each year- Instead of talking about a golf course at all we should be thinking about whether we have enough water for our needs.

Hans: With no climate info up to 2000, and no water information, one can model but not verify. One could extrapolate from Trail and Castlegar but situation is so different- it would be very inaccurate. Collect data, it is vital and we don't have it. Must quantify source (supply) and demand (use) neither of which we do- no monitoring on streams and no metering on use. Data on ground water is also lacking. ***Be wary of consultants' studies because they are based on whatever info is or is not available.***

- 4) Kelvin: Household efforts to conserve are stymied by existing regulatory frameworks. For instance: Redstone had to build wide streets, with curbs and gutters thus prevented from creating the ideal neighborhood as described here tonight. How do we get around that?

Hans: Need flexible legal system- without can't do innovation. Provide temporary permits to try things. Need to change the laws. Be a maverick, innovate then invite the building inspector down to see. He works with a multi-city storm management group currently- experimenting with different approaches- some work in some areas, some don't. There is a window of opportunity now- don't miss it.

5) **Gary Camozzi- it's a question of tying our spirituality in with the earth and all the resources and embracing change with grace....or something along those lines. He made a profound linkage between pole reversal and the stuff about 2012 and the Mayan calendar, and a short rant about the evil American forces controlling the weather.(Derek).**

6) (Not sure who asked this) Been told that to reduce risk of West Nile disease there should be no standing water, this contradicts the idea of building wetlands.

Hans: Minimize standing water, have flow, in a pond have an aerator, insure no growth of algae on top, plant a variety of species nearby, have fish, occasionally spray with pesticides at the larvae stage.

7. Dave Diplock: Innovative urban designs, economics and politics all combine. Can the city ask for developers to be innovative? In small rural towns development is welcomed and sought after, there is a fear of scaring developers away. How do we obtain political confidence?

Hans: It's a risk. Start small. In Vancouver, 40% of drinking water is used to water lawns. If rain water (collected in barrels) was used, the city could prolong the life of the reservoir for another 20 years. That is an economic consideration that needs to be looked at. Our infrastructure is old and overburdened, it hasn't been maintained. It is now cheaper to innovate at a new site. Apply rules to new construction and phase in retrofitting over 10 years.

Conclusion by Gord

Thanked all participants. We now have the knowledge to be proactive and hopefully, as Gary said, we'll be able to change with grace.

Further conversation with Bob and Hans:

Bob: You must value your water and change what you do in your watershed. Improve your hydro management. Translate what you believe into language that your council can understand; get it into the bylaws. There is enough science here to manage this region differently than it has been done. Need more informed people, like those here tonight, to use the science and start thinking differently about water usage. It is not too late to back out of what is being done. If it is only being looked at from one perspective; profit for example, the picture needs to be broadened to cover all economics- not just the short term. People must adapt. There is still room to move here.

An excellent example of a major reversal of plan occurred in NYC. The city decided instead of building a massive and \$6-8 billion dollar new treatment plant that they would implement a wide range of watershed protection programs at a total cost of about \$1.3 billion. They partnered with a wide range of governmental and non-governmental stakeholders to accomplish this. Sheree questioned whether this NYC story was a good example of what can be done (it being in the US and all...) but Bob ***insisted*** that (even though the economics and issues are on a larger scale), we should implement the NYC approach of:

1) evaluating the pros and cons of all alternatives and

2) involvement of all stakeholders

This approach is *exactly what is essential* for us to implement in order for us to go forward in a sustainable fashion.

See more about the NYC story here (or use google):

<http://www.epa.gov/innovation/collaboration/nyc.pdf> (good overview)

<http://query.nytimes.com/gst/fullpage.html?res=990CEED61738F937A25755C0A963958260> (lots of problems!)

http://www.nypirg.org/Enviro/water/watershed_agreement.html (overview of the MOA, land acquisition, conservation easements, click on other links for more background, the challenges, problems, etc)

To get any sort of accurate data requires climate change, water monitoring for volume and temperature and evaporation.

Hans: Hoktokes, Alberta (misspelled name, surely) decided not to develop beyond capacity- consciously limited growth. But then there is the issue is upstream riparian rights and usage.

Need a full fledged vision of what we want to be. Does the community want to be a "resort municipality" or something else? Must be defined.

There is enough good science, now what is required is good governance. This is the biggest issue. Land use and water management must be integrated.

If you don't have accurate hydrological information you can't make decisions.

Consultant's reports must be looked at very skeptically if data isn't available. They will make claims that suit the circumstances because there is nothing to refute the report.

Consultants use "available data"- Hans wouldn't have confidence because it is just bad science.

Contact Kimberly and Elkford councils and mayors because they were given CBT grants to do some very innovative things.

Need a collaboration between the ministries and the community to protect the watershed. (DFO, ministry of environment as well as forestry)

Additional notes by Ken Holmes:

The world will be (is already?) coming inland and uphill. Better get ready.

Don't expect actions now to affect established climate change trends until mid-century. But understand that action now is imperative. If we don't, expect the Perfect Storm to arrive by the end of the century.

We need to plan for both "warmer and wetter" and "colder and drier".

Additional comments by Bob Bechaud:

The two most important things I came away with were:

- You can't rely on historical data (even if good data existed) with the changes we can expect in the future. We have to do scenario planning (what if?) for our local situation, and be prepared for surprises
- Water meters....just do it!

If our elected representatives haven't got the message by now that we need a long term water management plan, then we're in real trouble!