Staff _____

Calgary River Interpretation

A Resource for RiverWatch Guides on the Bow River

Updated April 18, 2015

RiverWatch seeks to advance education by organizing and delivering programs, projects, science curriculum supplements, field studies and tours that assist teachers, students and others in the study of the environment.

Tilden's Six Principles of Interpretation

Adapted from Notes at the Kerry Wood Nature Centre

Freeman Tilden was the first person to write about interpretation as a profession. After many years working for the US Forest Service, he wrote the 1957 book "Interpreting Our Heritage", in which he outlined six principals to developing programs for the public. Freemen Tilden is often called the father of interpretation and his six principles of interpretation are still amongst the first topics of study for any new interpretive naturalist learning the craft today.

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.

This is arguably the single most important guideline for interpretation. When something is discovered during a trip, don't think "what do I know" but instead "what do they know" and proceed from there. Unless the discovery is so grand as to etch itself indelibly in their minds on its own, most students will forget much of what they learn quickly if it doesn't related to their world and their lives, allowing them to make the connections again and again down the road.

2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However all interpretation includes information.

This is how interpretation differs from traditional classroom teaching. We wish to have the students take away information, but preferably at the end of a phase of personal discovery.

3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.

Your own background, experiences, education, and personality play an important role in your own personal style of interpretation. Resources and instructors can teach you many things and help you grow in your talent, but in the end the best of what you do will be uniquely your own.

4. The chief aim of Interpretation is not instruction, but provocation.

This is the "wow" factor. Don't just tell students what to think, but challenge their current views and comfort levels and empower them to draw their own conclusions. If you're raising their eyebrows, you know you're on the right track.

5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.

This is why we try not to just study flowers, bugs, or birds, but how those organisms interact and exist in their habitats. As the students get older, we try to connect habitats to the greater environment around us, as well as their role in it.

6. Interpretation addressed to children (say up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best, it will require a separate program.

Age-appropriate interpretation is important. The more experience you have with each age group, the better you'll be able to reach their minds and tap their interests.

Welcome to the Bow River!

Ferry to or near the gravel bar across from the Cushing Launch

Welcome to the Bow River and Bow Watershed!

We're setting off on a science adventure to **learn river ecology and understand solutions** to problems that impact water quality and riparian areas.

Just to orient you, this river has its source in the Bow Glacier of Banff National Park and flows through Banff, Canmore and Cochrane.

There are several hydroelectric dams and reservoirs upstream on this river. The Bearspaw Dam creates the Bearspaw Reservoir just upstream of the city. The Ghost Dam creates Ghost Reservoir just upstream of Cochrane. Both dams are operated by TransAlta.

From here in Calgary, the river continues downstream and joins the Old Man River to become the South Saskatchewan River, flows through Medicine Hat, into Saskatchewan and on to Manitoba to join Lake Winnipeg and **eventually empty into Hudson's Bay**. This water will eventually see polar bears, seals and beluga whales.

The **flow rate** today is about _____ cubic meters/second (cms). Imagine a cms as a cube of water 1mx1mx1m. That's about a bathtub full. It's mass is a tonne of water.

- Peak flow in 1932 was 1520 cms
- The highwater of 2005 reached nearly 1000 cms
- The flood of 2013 peaked at almost 1700 cms.

Bow River

Wikepeia

The **Bow River** begins in the Rocky Mountains and winds through the Alberta foothills onto the prairies where it meets the Oldman River, the two then forming the South Saskatchewan River. These waters ultimately flow through the Nelson River into Hudson Bay.[1]The Bow River runs through the city of Calgary, taking in the Elbow Riverat the historic site of Fort Calgary near downtown.

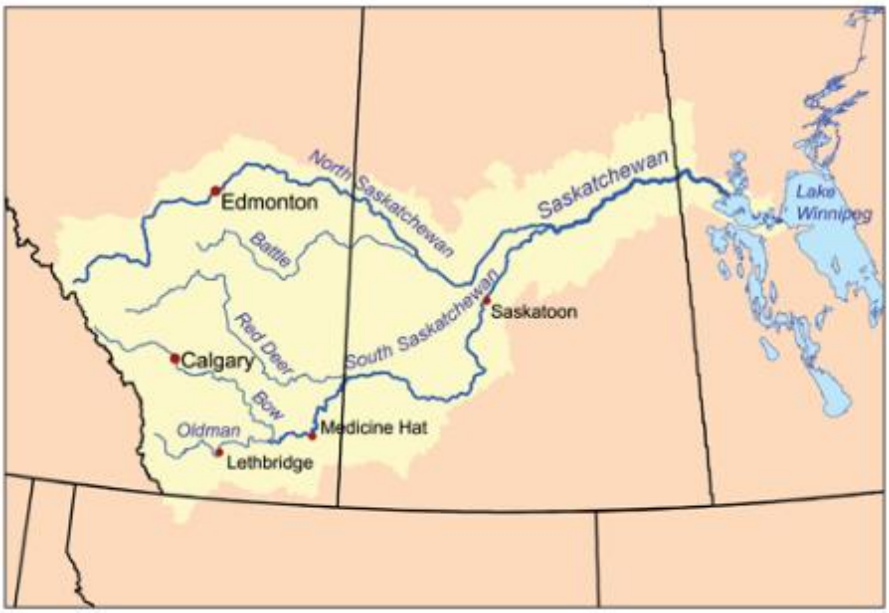
First Nations peoples made varied use of the river for sustenance before settlers of European origin arrived, such as using its valleys in the buffalo hunt.[3] The name "Bow" refers to the willows that grew along its banks and were used by the local First Nations peoples to make bows; the Peigan name for the river is "Makhabn", meaning "river where bow reeds grow".

The river is an important source of water for irrigation and drinking water. Between the years 1910 and 1960, the Bow River and its tributaries were engineered to provide hydroelectric power, primarily for Calgary's use. This significantly altered the river's flow and certain ecosystems.

The river's source is from the Bow Glacier, which is part of the Wapta Icefield. The outflow from this source flows into Bow Lake in theCanadian Rockies. It flows south to the village of Lake Louise then turns east and flows through the town of Banff then through Canmore. The Ghost Lake reservoir is formed upstream from the town of Cochrane. The Bow then flows eastward to the city of Calgary; it continues on to form the South Saskatchewan River when the Bow joins with the Oldman River near Grassy Lake in southern Alberta. Its waters are further shed in the Hudson Bay through the Saskatchewan River, Lake Winnipeg, and Nelson River.

Communities located on the Bow include Lake Louise, Banff, Canmore, Cochrane, Calgary, and Arrowwood. The Bow Falls are located on the river's course, near Banff.

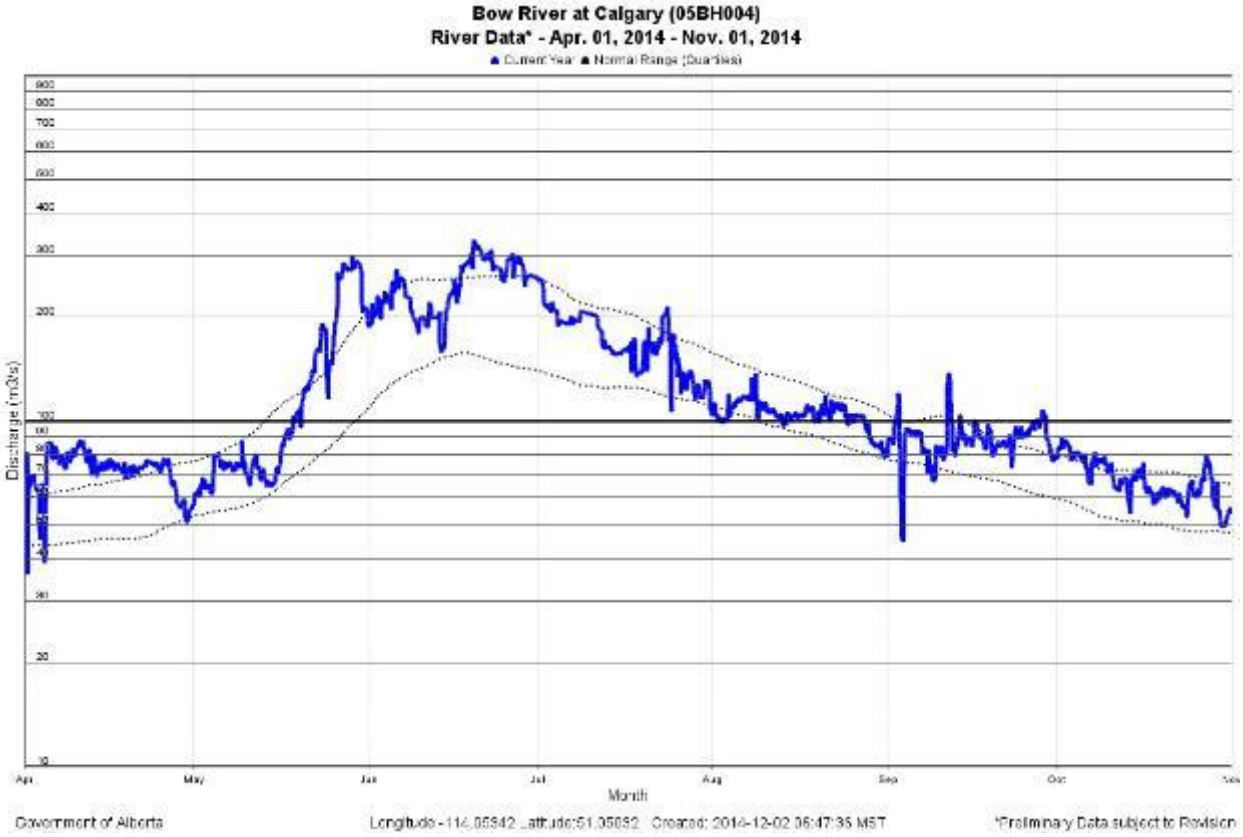
The Bow River has a total length of 587 km



Bow River Flow Pattern

http://www.environment.alberta.ca/apps/basins/default.aspx?Basin=8

RiverWatch trips are limited to combined Bow and Elbow flows under 240 cms. At higher flow rates, there is no shoreline for our water quality monitoring stops.



Cushing Bridge

Paddle against the current near the grave bar downstream of the Cushing bridge.

The bridge just upstream of us is the **only cantilever bridge in Calgary**.

Remember cantilevers from **grade seven science**? An airplane wing and diving board are examples. Imagine two diving boards meeting in the middle to form a bridge.

Cantilever bridges basically use two diving boards facing each other with a short beam stuck in between them. **Can you see the two cantilever diving boards at both ends and the beam stuck in between them?**

The cantilever bridge was a popular type of bridge in the first half of the 1900's. This design made longer spans possible and **wider clearance without pillars in mid-river**.

One great advantage of a large cantilever bridge is that it can be built outwards from the piers (columns or pillars) and over the river without any temporary in-river support underneath, then the centre span can be dropped into place.

Who was "Mr. Cushing"? William Henry Cushing (1852-1934) was a politician and philanthropist. He was part of Alberta's first cabinet and was the thirteenth mayor of Calgary.

Southern Alberta flooding Canada's costliest disaster

By Edmonton Journal, December 29, 2013

It all began the evening of June 19, when intense rain started falling in the Rocky Mountains; more than 50 millimetres fell in the first five hours. The torrential downpour kept coming, and by the early morning of June 20, it was clear there would be substantial flooding. By 7 a.m., High River had declared a state of emergency.

In the end, the storm would dump about 350 millimetres of water over two days. Vast swaths of southern Alberta were flooded, including several parts of Calgary. More than 100,000 people were forced from their homes in 30 communities. The damage totals from the flood, which has been called the most costly natural disaster in Canadian history, are estimated to reach $6 billion.

David Phillips, Environment Canada's senior climatologist, called it "the flood of floods" and one of the "most disruptive" storm events in Canadian history.

It certainly will have long-term impacts for Albertans.

- In July, the province announced it was tightening up the rules for any future development on floodplains, to discourage property owners from remaining in high hazard areas.

- And in August, it offered to buy homes on high-risk floodway zones to encourage those homeowners to relocate. The province announced in December that only 46 families of the 254 eligible homeowners had agreed to move.

- The province has estimated it's on the hook for an estimated $1.7 billion in total for recovery efforts — the federal government is expected to contribute $2.8 billion to flood recovery efforts, but that could increase to $3.1 billion. Private insurers will cover another $1.7 billion.

- The cost of the recovery prompted the province, which brought down a tough financial plan in the March budget based on low resource revenues, to later announce that any surplus created by better resource prices would not be used to offset budget cuts, but instead would be earmarked for flood recovery.

- And this month, insurance companies warned Albertans to brace for higher rates in the coming years, noting that current hikes don't even take into account the June floods (they're due to hailstorms in 2012 and the 2011 Slave Lake fire, among other incidents).

Truck found buried in riverbed

Calgary Herald September 1, 2013

The Calgary Fire Department uncovered a truck at the bottom of the Bow River, which may have been swept away in June's historic flood.

Aquatics team members were on a routine patrol when the discovery was made downstream of Harvie Passage about 4 p.m.

Dive crews did not see any bodies in the capsized vehicle, which battalion Chief Ernie Molineaux described as a half tonne truck heavily covered by gravel.

"We're thinking it was put here by the flood, there's no roads in the immediate area," Molineaux said.

Crews went back to survey the scene and determine a plan for removing the truck. Once ashore, investigators will search its vehicle identification number.

"That might solve the mystery of where it came from and how long it's been there," Molineaux told reporters.

City to repair ‘critical’ flood-eroded riverbanks

By Michael Wright, Calgary Herald October 29, 2013 6:00 PM

The city will work through the winter to repair six “critical” sites along the Bow River eroded by flood waters, but says it may not be finished before next flood season.

Repairs would not normally be permitted in the colder months but have been deemed necessary after torrents of water ate metres out of riverbanks during the June floods and threatened to swallow several riverside houses in Inglewood.

City senior planning engineer, water services, Frank Frigo, said the work could not wait. “These sites are vulnerable to further erosion in high river flows, which could result in damage to city infrastructure if no stabilization work is implemented.

A further 26 sites on the Bow and Elbow rivers were also found to be vulnerable and the city hoped to have repair plans finalized by mid-May next year — the start of flood season.

A $12-million repair budget had been approved for work this year and Frigo said his team would be seeking approval for the 2014 work from council in November.

That bill could “quite possibly” exceed $12 million, he said, but the costs were recoverable under the province’s Disaster Recovery Program and Provincial Erosion Repair Program.

Work has started at the 8th Avenue S.W..

The repair was different at each site, Frigo said, but many would include a riprap — layered rock lines at the base of the bank — and a rebuilt, carefully shaped bank of gravel and earth.

Some sites were tricky locations for repairs, Frigo said. “It’s not as simple as backing up trucks and dropping rocks into the water.

“There’s no room to place rock, have stockpiles. (It’s) very difficult to get equipment in and out, there’s safety concerns because of the proximity to pathways. You’ve got some steep areas that are difficult to work in and require the cutting of ramps.”

More than 35 kilometres of banks of the Bow and Elbow rivers were damaged by flood waters.

Calgary's 2013 flood could have been much worse

Colette Derworiz, Calgary Herald
Published on: December 30, 2014

Southern Alberta's first large rain-on-snow event, in recent memory, took place during the Cougar Creek flooding in Canmore in 2012.

Alberta's historic flooding could have been even worse had the rain-on-snow event been similar to the ones in the United States, says a hydrologist who studies in the Rockies.

At a recent meeting of the American Geophysical Union in San Francisco, John Pomeroy talked about his detailed diagnosis of the 2013 floods in southern Alberta.

"What we had was an exceptional flood," he said during a press conference at the December meeting. "It was driven by rain, and there's nothing exceptional about that, but we have never had a rain-on-snow flood in recent memory.
"So when you see a climatic event that's not occurred before, those things without statistics become strong indicators of a changing climate."

The flooding, which left five people dead and caused an estimated $6 billion in damage, has been deemed the worst natural disaster in Canadian history.

At least 250 millimetres of precipitation fell over three days in June 2013. "The rain fell on the snow," said Pomeroy, noting rain-on-snow events cause large floods during the middle of winter in the United States.

In Alberta, the University of Saskatchewan hydrologist said it ended up being a different event. "We didn't see an acceleration of the snowmelt rate," he said. "It actually decelerated because we were near the summer solstice and the cloudiness associated with the rain-on-snow reduced the solar radiation energy driving snowmelt.

"If we had the high energy associated with some mid-winter U.S. rain-on-snow events, it would have been much, much worse in Calgary."

As a result, Pomeroy called it a 'cold' rain-on-snow event that would require more research because it means Alberta won't be able to rely on the work in the Pacific Northwest or British Columbia in preparing for future floods.

"We had our first large rain-on-snow event in recent memory in 2012," he said, referring to Cougar Creek flooding in Canmore. "Then we had another one the next year, and there are elements of that in 2014 down in Lethbridge. So clearly this is an element of our floods and high-flow generations out of the Rockies.

"It's a really different mechanism then just straight rain or straight snowmelt, and we need to understand it better so we can better predict it and better design our floodplain areas … and better anticipate how large floods will be in the future."

Inglewood Oil Refinery History

Just past the 8 Ave river bank homes

Up until 1995, there was a metal wall and outfall pipe at this river bend that were remnants of an old refinery site. The metal wall and pipe were removed and the river bank was sloped back and reclaimed into the Inglewood Bird Sanctuary.

During the flood of 2014, a concrete structure was eroded out of the river bank and was left mid-river. The structure may have been a pumping station for the old refinery site.

The 78-acres of land behind this mid-river concrete structure has been transformed over time from a native hunting ground, to a homestead and then to a British American oil refinery (1939-1960) processing crude oil predominantly from the Turner Valley Oil field.

- In 1960, ownership of the refinery was acquired by Gulf Canada Resources Ltd.
- From 1973-1979, the primary focus shifted from oil refinery to oil storage and asphalt production.
- In 1977, an oil slick appeared on the Inglewood Bird Sanctuary lagoon.
- 1978, a hydrocarbon recovery system was put in place and 400,000 litres of oil were recovered from the ground water table.
- In 1983-1985, the Gulf refinery was decommissioned.
- In 1992, along with the clean-up, the development of the site as a wilderness habitat and educational site began to take shape with the help of Petro-Canada, eight Calgary Rotary clubs, U of C Faculty of Environmental Design students, Ducks Unlimited Canada, The City of Calgary, Len Novak Architect and the Inglewood Community.

The Inglewood Wildlands has developed into a 78-acre sanctuary where both young and old can gather to experience the original river valley while learning how environmental protection and sustainability are important aspects to a sound future.

- From 1993-present, over 36,000 trees and shrubs were planted by hundreds of volunteers.
- In 2003, 1200 cubic metres of native prairie (topsoil, seed bed and root mass) were transplanted from a Simons Valley site slated for development.

Inglewood Bird Sanctuary

At the Bird Sanctuary gravel bar

Inglewood Bird Sanctuary is a 34-hectare (80 acre) site located in a **federal migratory bird sanctuary** along the Bow River in Calgary. The site was purchased by the City of Calgary in 1970 and has operated it as a natural area ever since.

This federal bird sanctuary was **created in 1929 by the family of NWMP Colonel James Walker**. Colonel James Walker lead the original North West Mounted Police to establish Fort Calgary. He later helped to organize Calgary's first school, owned the first telephone company and became the first president of the Stampede. He was voted Calgary's Citizen of the Century. The heirs of the Walker estate sought federal protection for the area as a means to restrict homeless camping.

How do birds know this is a migratory bird sanctuary?
There is good bird habitat here – lots of variety and biodiversity. Think beyond the daytime and what you see right now. Birds migrate at night, right? What would this area look like at night? A dark spot in the centre of a giant city lighted-up! What would birds prefer – the safety of darkness or the confusing lights of a city?

Inglewood Bird Sanctuary and Nature Centre
The Inglewood Bird Sanctuary is a large wildlife reserve with numerous nature trails where over 270 species of birds have been observed. The on-site Nature Centre has exhibits and information on the sanctuary and nature and school programs are offered.

Bird School
Did anyone here attend Bird School during their elementary grades? What do you remember about it?

About the park
This 36-hectare wildlife reserve offers more than two kilometers of level walking trails and over 1 km of nature trails, throughout the riverine forest, by the flowing river and alongside a peaceful lagoon.

While spring and summer are prime times for viewing birds, a variety of wildlife can be seen throughout the year. The public is welcome to visit the Sanctuary during daylight hours, year-round but please leave your pets, bicycles, roller blades and bird food at home. Most of the trails are wheelchair and stroller accessible and can be reached from the paved pathway leading from the Nature Centre. Admission is free; however, the Sanctuary gratefully accepts donations.

Experience nature in the city
The following plant and wildlife species have been observed in the area:

- 347 species of plants
- 270 species of birds
- 27 species of butterflies
- 21 species of mammals
- 7 species of fish
- 2 species of amphibians
- 2 species of reptiles

Cash boost for flood-damaged bird sanctuary

At the Bird Sanctuary gravel bar

Calgary Herald April 3, 2014 7:18 AM

The Inglewood Bird Sanctuary, one of the city's most beloved natural park areas, received a six-figure cash injection this week to further flood restoration efforts and expand its popular programming for adults and kids.

TD Canada Trust donated $500,000 to the city's parks department on Wednesday. That money will be used to build a three-season classroom, replacing an old viewing deck below the Colonel Walker House.

"This generous donation towards the construction of an outdoor classroom will be enjoyed by all visitors and provide essential outdoor learning facilities for children and birdwatching enthusiasts of all ages," said city parks director Anne Charlton.

The new outdoor classroom would allow the sanctuary to expand its programming for children and adults.

More than 364,000 people visited the sanctuary in 2012, with nearly 32,000 students and adults attending its nature and birdwatching programs; the new classroom could boost attendance by 2,000.

The new facility will include a roof, movable walls, as well as furniture and teaching equipment and allow for larger events to be held at the Colonel Walker House, in the sanctuary, said Charlton. A deck and bird blind on the water side will bring nature in while the functionality of the space will provide a longer season for more comfortable outdoor learning.

DAMAGE DONE

While the sanctuary's Nature Centre and the Colonel Walker House are open to visitors, it's still unclear when the park will be fully open to the public. Last year's flooding rendered sections of the 36-hectare sanctuary inaccessible because of debris. Raging waters uprooted trees, washed out bridges and viewing platforms, and eroded the riverbanks. Wetlands and lagoons were also damaged.

Restoring the sanctuary, which includes measures to protect the riverbank and bridge foundations, could cost $350,000.

Established as a federal migratory bird sanctuary in 1929, more than 270 different bird species and 21 mammalian species visit or call the area home each year.

"The Inglewood Bird Sanctuary is a protected area offering a respite for birds and other animals alike," said Anne Charlton, director of city parks. "It is also an important educational facility offering programs engaging young Calgarians around nature, conservation and environmental protection."

Cottonwood trees a reminder of flood a year ago

CALGARYHERALD

Published on: June 11, 2014

We probably don't need to remind you that one year ago, 200 millimetres of rain fell on southern Alberta. Flooding ensued. Mudslides slid. Evacuation orders were issued. National Parks and highways were closed; Saddledomes were swamped; houses and stores were lost.

It was a soggy disaster of apocalyptic proportions that, as has been reported time and time again, ultimately revealed the good hearts of neighbours and communities who are still helping one another catch their collective breath after a very, very long year.

As an image junkie, photojournalist and former Calgary Herald chief photographer Grant Black has both seen and taken hundreds of photos in the wake of the 2013 flood. Still, until he came across these cottonwood trees south of the Sue Higgins Bridge in Fish Creek Provincial Park, Black hadn't found an image that symbolized the spirit of the event in a personally meaningful way.

"We all saw so many pictures of people in pain after the damage caused by the flood," he says.

"And yet there's no photo of a person that can really capture those feelings completely—photographs just aren't that good."

Instead, in this eerie mash-up of trash and tree Black saw not just garbage and a threateningly high watermark (the debris marks the Bow River's six-foot climb here) but a manifestation of the flood "as part of the bigger continuum of nature at work."

Without flood events, says Black, recalling stories and photos from earlier centuries, "you don't get cottonwood trees—it's important ecologically" (cottonwood trees need moisture to germinate). To Black, this hairy beast—captured six weeks ago with a slow exposure and a flashlight to illuminate the foreground—represents the potentially destructive power of nature and of humans, as well as the weird, wild beauty of both.

Thanks to the province's $81-million investment in post-flood park restoration, Fish Creek, among several other parks, will continue to undergo repair work to paths, parking lots, benches and picnic sites. This part of the park (east of the Bow Valley Ranche Restaurant), however, will remain relatively unruly—a symbol, says Black, "that this is how the river is, and always will be."

Cottonwood Forest

In rafts somewhere near Inglewood Bird Sanctuary. Five minutes.

The trees in this park are native cottonwoods. This particular species is called a Balsam Poplar or Black Poplar. They likely sprouted during one of the occasional spring floods that overflowed the river banks.

Cottonwood forests are native to prairie river valleys in Southern Alberta. They are most abundant where valleys are broad and river channels move freely.

Cottonwood trees usually start their lives as tiny seeds with cottony tails that are blown by the wind or carried by the water to freshly flooded sand or gravel bars beside the river channel. We often see this seed fluff or cotton blowing in the spring wind. The trees can also start by sprouting form roots or suckering from buried branches.

New sprouts or regeneration depends on spring floods to produce ideal sites for the seedlings and suckers. Work is underway by Dr. Stewart Rood of the University of Lethbridge to determine how the operation of dams might be altered to provide for the critical needs of cottonwood forests while also accommodating the water use needs of southern Albertans.

Provided they are not trampled, browsed, flooded or dried out, seedlings can grow to two meters tall in the first few years. At about ten years, both male and female trees are sexually mature. Some cottonwoods can live to be over 150 years old.

Cottonwood forests are important natural habitat for many reasons:

- Breeding bird densities in prairie cottonwood forests are among the highest in Canada. Migrating forest songbirds use cottonwood forests as rest stops and feeding grounds on their way to more northern forests.

- Deer concentrate in cottonwood forests during the breeding season and winter. Surveys found deer densities higher in these forests than any other prairie habitat.

- Several bat species, such as the Big Brown Bat, Red Bat, and the Long-legged Bat use these riparian forests for food, roosting and breeding sites (in the trunks of older cottonwood trees).

- Beneath the cottonwood canopy there are often layers of tall and medium shrubs, herbs and grasses. These multiple layers create a rich biodiversity.

Riparian Zones

At the Bird Sanctuary gravel bar

Riparian zones are the **lush green belts** of vegetation where land and water meet adjacent to streams, river, lakes and wetlands. Both the Inglewood Bird Sanctuary and the Inglewood Golf Course are located in the riparian zone, sometimes called the flood plain.

Note the vegetation layers of sandbar willows, alder and then balsam poplars layered along the riparian zone .

In Alberta, only 2 to 5% of the entire land base is riparian, however these areas are among the most productive and valuable of all landscape types.

Some of the critical functions riparian areas perform include:

- trapping sediment from runoff or overland flow
- preventing erosion of stream banks and shorelines
- reducing flood damage
- acting like a sponge to hold and store water helping to maintain water levels
- providing abundant forage and shelter for livestock and wildlife
- improving water quality through the filtration and uptake of nutrients
- maintaining biodiversity

In Alberta, 80% of our wildlife relies in whole or in part on riparian areas to survive. Livestock depend on riparian areas for forage, shelter and water.

Thus, it is critical that we manage riparian areas in a sustainable manner for the benefit of all users.

The health and functioning of riparian areas can be influenced by activities as diverse as road construction, resource extraction, agriculture, urban or rural development and recreation.

Trout

On or near the gravel bar across from the Inglewood Bird Sanctuary

The Bow River is internationally renowned for sport fishing. The fish are of prize-winning size and the river is nicknamed the Blue Ribbon Bow.

Sport fish that currently live in the Bow River include Rainbow and Brown Trout. Funny thing is that they are not native in the Bow River. Both were introduced in the 1920s; the browns reached the river when a truck carrying 45,000 fingerling broke down near the river before reaching its intended destination, and the driver released them into the Bow rather than see them perish.

There are also fish that are no longer here. The types on fish that used to be in the Bow River were Cutthroat Trout and Bull Trout. They are not in the city sections of the rivers any longer because of human impact. One of the major impacts we created was the building of dams which affect some of these fish - they need to go upstream to the colder water to spawn.

There are many other non-game fish species living here – suckers and minnows. Minnows are small fish that never grow more than a couple of centimetres long.

Fish are found in larger quantities downstream from the treatment plant as more nutrients are released into the river allowing more bugs to thrive.

Floods can actually be a great thing for fish populations. Contrary to what most people think, floods can have good and bad effects. Floods clean the silt from the bottom of the river – housecleaning if you will. After the 2005 flood, the fish population quadrupled.

Brown Trout

Rainbow Trout

Fishing Regulations

On or near the first gravel bar across from the Inglewood Bird Sanctuary.

The "Eastern Slopes Management Area" of the Bow River runs from Pearce Estate Park to downstream at the Carseland Weir.

This section of the river is open all year.

All waters within the Bird Sanctuary are closed but not the main channel of the Bow River**.**

Fishing with bait is not allowed.

Limits:

All Trout over 35 cm	must be released
Trout	1 under 35 cm
Mountain Whitefish	5 over 30 cm

Brown Trout

Rainbow Trout

Reading Rivers

Just before leaving the grave bar across from the Bird Sanctuary

In the next river section, we're going to enjoy pools, riffles, eddies and eddy turns!

- A pool is a wide, deep slow moving area just before the river picks-up speed. Fish like to hang out in these slow areas to rest. These areas are like a living room for fish.

- A riffle is the shallow, narrow faster moving area or "mini rapid". Yahoo! Invertebrates are adapted to living in the riffles, hiding amongst the bottom rocks and enjoying the oxygen there. These areas become a smorgasbord restaurant for fish.

- Eddies are the calm spots in the river are caused by rocks or shore sticking out into the current, or behind islands, rocks or bridge pillars.. These are good places for ducks and fish to take a break from swimming against the current.

- Just a short ways down the river, we'll try a very sharp eddy turn or two on the next section of river. As the raft enters an eddy, it will spin quickly as the river current pushes the back of the raft one way and the eddy current pushes the front of the raft the other way.

- Eddy lines are the ridges and small waves separating the main current from the quiet eddy. These eddy lines are good places to fish.

- Eddy turns happen when our raft spins a circle when the front end crosses the eddy line. Hook your feet under a seat and lean into the turn like riding a bike when enjoying an eddy turn! Get ready to paddle forward on one side and backward on the other.

- If someone falls overboard, they should try to grab the raft perimeter rope and not stand up.

Inglewood Golf and Curling Club

http://www.inglewoodgolfclub.ca

Inglewood Golf and Curling Club is a semi-private, non-profit recreational facility, dedicated to providing excellent golf, curling and social activities in a friendly environment for the enjoyment of its members and guests.

The prestigious course is located along the banks of the Bow River just five minutes from downtown Calgary. Inglewood Golf and Curling Club is not only a great location but also one of the finest semi-private 18-hole Championship courses in the Calgary area. Dating back to the 1930's, this par 71 layout boasts superb conditions and is very traditional in layout with many large old trees making accuracy a premium.

Even though Inglewood is located in the heart of Calgary, its surroundings are very natural. Our course offers amazing views of the Bow River and the adjacent Inglewood Bird Sanctuary with the nearby city skyline beyond.

Membership Initiation Fee
Amount $9,000.00

Green Fees 18 Holes
Monday - Thursday $72
Friday - Sunday $80
9 Holes $40
Twilight $52

Our central location makes Inglewood an excellent venue for public play, corporate and charity golf tournaments and member play. Inglewood also offers a variety of practice facilities including a 31-stall driving range, 2 putting greens and a short game area complete with a practice bunker for all your game improvement and warm up needs.

Our unique log clubhouse is open year round and features a newly renovated kitchen and lounge, an outdoor patio overlooking the 18th green, Men's and Ladies locker rooms, banquet and meeting facilities to meet any groups needs and a 6-sheet Curling Rink. Inglewood also offers a fully stocked Pro Shop with a great selection of quality merchandise at competitive prices. Canadian P.G.A. Professional staff members are always available to provide professional advice and service as well as renowned instructional programs and clinics.

Plan: Golf Course Bank Swallow Colony

Calgary Urban Park Master Plan
1994 September

Dear Citizens of Calgary;

It is a pleasure to enclose the Calgary Urban Park Master Plan which represents an exciting milestone in the successful completion of Calgary's River Valley park System. This plan evolved from an extensive public participation program that include input from over 2000 special interest groups and individual citizens. The public input process was extremely valuable in helping us prepare a plan which reflects Calgarians' concerns for our river valleys.

On behalf of all Calgarians, I would like to thank everyone who participated in the preparation of the Calgary Urban Park Master Plan. Implementation of this plan will occur over time and will ultimately improve the quality of life for all Calgarians.

Yours truly,
Al Duerr
Mayor

Urban Park Master Plan
Inglewood Golf Course

"Its riverbanks are also considered important habitat and nesting area for birdlife, containing one of the largest colonies of bank swallows in Alberta. To protect the integrity of the area both aesthetically and for wildlife, it is proposed that the natural character of the riverbank be protected and enhanced."

Dave Elphinstone
Natural Parkland Management Coordinator
Urban Forestry and Central Services #75

Complaint: Golf Course Bank Swallow Colony

From: Dave Brown [mailto:owlspotter@shaw.ca]
Sent: Tuesday, April 18, 2006 11:10 PM
To: env.infocent@gov.ab.ca
Cc: Andrews, Sid; McCulley, Kym; Cole, Amanda; Aldermanic Office Ward 10; Aldermanic Office Ward 3; Office of the Mayor; MLA Shiraz Shariff; Alderman Jo Ceci
Subject: Inglewood Golf Course nesting site

To whom it may concern,

I have been a volunteer at Inglewood Bird Sanctuary for approximately 20 years and have visited this sanctuary for over 30 years.

During that time I have always had the pleasure to look across at a section of the Inglewood Golf Course and watch each summer as the Bank Swallows enjoyed using the bank below the golf course for their summer nesting.

A couple of years ago when we had some flooding it was evident that the bank below the golf course was in danger of being washed out and it would eventually encroach onto the green. At that time the powers that be okayed an extension of the bank into the Bow River consisting of many large rocks and this was to prevent the flood waters and the action of the river from continuing to erode the banks further. Obviously this was the best decision for all concerned.

Last year we experienced our one in a Hundred or Two Hundred year flood. Many banks within the City of Calgary suffered erosion and the golf course area was one of these. I was not too surprised this spring to see them hard at work putting down more rocks along the whole length of this particular piece of embankment. I was a little concerned that all the work of the heavy equipment may even impact the bank where the Bank Swallows had nested for all those years and that the rock would go to the top of the bank. Imagine my relief when I saw the wall stopped a considerable number of meters down from the top of the bank.

A few days later when I was doing a shift at the Birds Sanctuary, imagine my horror when I looked across and saw sod had been laid on top of the soil and then a layer of heavy metal meshing. Hardly a befitting homecoming to all of those Bank Swallows that will be arriving anytime now.

I would like to know how the Department of the Environment and the City of Calgary could allow something like this to happen.

This was a prime nesting site for Bank Swallows. Yes there are other banks along the Bow River. I don't know how many others suffered from the floods of 2005. I believe that this area above the rock wall should have been put back to the original condition so that when the swallows arrive back they could continue again to tunnel into the banks and continue nesting as they have all these many years.

I truly believe this area could have been saved as well as protected from future flooding of both the golf course and the nesting site of the Bank Swallows.

I believe the volunteers at Inglewood Bird Sanctuary, as well as many other birders and the citizens of the City of Calgary are owed an explanation.

Sincerely yours,
David Brown

Reply: Golf Course Bank Swallow Colony

Sent: 2006 April 19 9:52 AM
From: Gibbons, Vania
To: Nicolson, Diana
Cc: McCulley, Kym; Ceci, Joe; Chabot, Andre
Subject: RE: Inglewood Golf Course nesting site

Hi Diana-

Further to our conversation this morning, here are some details relating to the bank stabilization project at the Inglewood Golf Course. I am copying Kym McCulley and Wards 9 & 10 on this email.

The first phase of this project was completed in 1997. The second phase was not constructed at that time because of the presence of bank swallow nesting habitat.

By the fall of 2004, there were indications that the bank swallows had abandoned the site. Parks requested that Water Resources hire an independent consultant to assess the habitat. In May of 2005, Water Resources hired an ornithologist (P. Biol.) to prepare a report on the viability of the site. He visited the site 3 times and also reviewed breeding and observation records.

As David Brown probably knows, bank swallows look for habitat in banks that are cut vertically by erosion, provide adequate clearance for flying in-and-out of their nests and are not accessible to predators. In fairness to the birds though, it should also be noted that bank swallows have been known to abandon a site but return a few years later.

Since 1997, the bank had been affected by annual erosion to the point that it was becoming a safety concern for the golf course. In terms of the bank swallows, the river was undermining the bank such that as the bank was eroded, the dirt slumped into a pile/platform at the bottom of the bank. Also, there was one report from the Bird Sanctuary in 2005 of a weasel lurking around this portion of the bank. The ornithologist's findings were that the site probably only had marginal potential for future nesting.

Based on these findings, we decided to proceed with the project. The idea was to have it built before nesting season began in the off-chance that any bank swallows did appear in 2006. Although the high water in June 2005 did erode the bank further (the golf course estimates about 30 cm), this project was in our budget before then.

David Brown suggested that the top half of the bank could have been left for the bank swallows, unfortunately this would not have provided the structural support necessary. He also mentioned that the flooding that occurred was about a 1:100 or 1:200 event. Actually, it was probably closer to about a 1:20 year event on the Bow River. Therefore, you can imagine what the effects of a 1:100 event might be.

Both Alberta Environment and Environment Canada (Fisheries and Oceans) were notified of Water Resources plans for the Golf Course. I believe that wildlife biologists from both agencies reviewed the plans. They were also provided with the ornithologist's report. We were given approval by both agencies to proceed with construction.

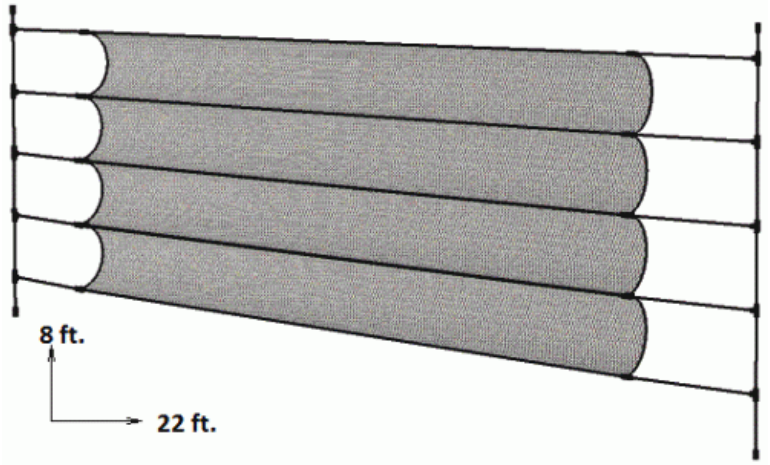
Feel free to contact me if you have anymore questions. Thanks,
Vania

Bird Banding

While floating past the Bird Sanctuary

The south part of the Bird Sanctuary is off-limits to the public and we'll see a couple of very fine "mist" nets set-up to catch small migrating birds for banding. Approximately 270 species of birds have been identified using the Inglewood Bird Sanctuary.

Do you know why researchers band bird legs with metal rings?



http://www.birds.cornell.edu/AllAboutBirds/studying/migration/

Why do birds migrate?
Birds migrate to move from areas of low or decreasing resources to areas of high or increasing resources. The two primary resources being sought are food and nesting locations. Birds that nest in the northern hemisphere tend to migrate northward in the spring to take advantage of burgeoning insect populations, budding plants and an abundance of nesting locations. As winter approaches, and the availability of insects and other food resources drops, the birds move south again. Escaping the cold is a motivating factor but many species, including hummingbirds, can withstand freezing temperatures as long as an adequate supply of food is available.

Migration triggers
The mechanisms initiating migratory behavior vary and are not always completely understood. Migration can be triggered by a combination of changes in day length, lower temperatures, changes in food supplies, and genetic predisposition.

Navigation
Migrating birds can cover thousands of miles in their annual travels, often traveling the same course year after year with little deviation in the path followed. First year birds may migrate unescorted to a winter home they have never before seen and return the following spring to the area in which they were born. The secrets of their amazing navigational skills remain largely hidden. Birds appear to navigate using a variety of techniques, including navigation by the stars, sensing changes in the earth's magnetic field, and even smell. Some species follow preferred pathways on their annual migrations. These pathways are often related to important stopover locations that provide food supplies critical to the birds' survival.

Alyth Rail Yard Outfall

Park the raft just downstream of the Bird Sanctuary near the outfall

Take a look at that square concrete tunnel. It's a type of stormwater outfall and there is usually some water coming out of it. This outlet is fed by water from the Inglewood Wildlands which is an oil refinery reclamation site located back behind the railway tracks.

From the 1940's to the 1970's, approximately 1.5 million litres of oil spilled on the oil refinery property. It wasn't until an oil slick flowed through gravels 5 m underground and appeared right over here on the bird sanctuary lagoon in 1977 that someone realized there was a problem back there.

A very impressive oil reclamation project has been going on back there ever since. A skimmer pump floats on the water table and separates oil from water and pumps the oil to the surface. The oil is collected and sent to an oil recycling facility. As part of the process, large volumes of groundwater are piped to a pond and the excess is discharged here through pipes.

See the orange color? It's not rust – it's from algae adapted to obtain nutrients from the iron pipes along the way to the river. The algae oxidizes iron in the water to release energy and forms iron oxide as a by-product - which is a rusty color. The outfall has a strong hydrocarbon odour which comes from the remaining oil in the groundwater in this area.

This was a licensed point-source of some pollution and it was monitored monthly by the City and Alberta Environment.

If your raft floats close to the outlet, you might be able to detect the smell of this interesting environmental story.

From: Beverly Ross [mailto:ross@rundle.ab.ca]
Sent: June 2, 2009 1:52 PM
To: 'Riverwatch'
Subject: RE: RiverWatch Feedback

Hi Cal –

You might note that they have done such a good job of cleaning that the pumps are very inefficient now. The oil on top is just too thin to pool. They now rely more on bacteria (bioremediation) than anything else to get the remaining oil. A good sign is that ground squirrels are starting to re-populate the NE corner where oil was originally spilled. This bioindicator species shows that that area is probably pretty much clear by now. They are also using phytoremediation to clean any remaining soil contaminant (alfalfa and cattails). Probably too much info – just interesting.

Bev

Alyth Rail Yards

Just before leaving the first science test site

Hear all that squeeling and groaning? See that control tower and wind sock? That's the CP Rail Alyth Yards. The screeching noise you can hear is from **"humping" rail cars** – they are pushed uphill and allowed to run downhill to join a train being assembled boxcar by boxcar. Two retarder rails slow them down just before they crash and lock together. Cars are sorted onto 48 different classification tracks and switchers compile trains for new destinations. This is what it takes to move goods by rail - consumer products from around the world pass through Calgary.

The **wind sock** on Control Tower is to help react in the event of a hazardous chemical spill.

Railroad yards are bustling centers of activity 24 hours a day, 7 days a week. Long trains roll in from all across the country to be inspected, separated, and classified before being routed out to the four corners of the continent. The shops do repairs and cars are inspected and repaired, locomotives are refueled and put through giant washing stalls.

Is this a good place for a rail yard? Why is it here? It was built when steam trains were used but it is still here today with diesel trains and more chemicals being transported. Lots of diesel has soaked into the soil and spills have resulted in emergency clean-ups. A rail line goes from here and under the Palliser Hotel downtown. This entire yard will be moved south of Calgary in the future.

Fish Habitat. Erosion of the river pathway has been stabilized with rock. Some rock has been placed in the river for fish habitat enhancement - fish rest from the current behind the groynes.

Irrigation Canal

Stop the rafts at the spillway and walk up the paved portage trail

The Western Irrigation District WID collects river water back at the weir and sends water out to Chestermere Lake and then to farmlands. The irrigation canal was built in the early 1900's to entice new farmers to settle the west use the railway. The stair-like overflow spillway leading from the canal to the river goes into action if stormwater from north east Calgary threatens to overfill and damage the canal.

This irrigation system is comprised of 1,200 kilometers of canal east of Calgary and has been member owned since 1944 with annual water revenues of $2.2 million. The system removes water from the Bow River at the weir and delivers water to 400 farmers, acreage owners and various industrial customers; provide storm water removal systems for Calgary, Strathmore and Chestermere; provides municipal water supply for towns of Strathmore, Rockyford, Gleichen, Cluny and Standard; and employ approximately 30 people.

The system was built in the early 1900's as part of the Canadian Pacific Railway's initiative to attract settlers to Alberta. It was taken over by a group of farmers in 1944 to prevent the C.P.R. from closing the canals and abandoning the system and then played an important role in settling areas east of Calgary by providing water, training and land to farmers.

There is a spillway leading from the canal in the event that east Calgary stormwater threatens to damage the canal. Stormwater can't reach the river! The spillway also drains the canal each fall when no more irrigation water is needed. Volunteers rescue the fish that are stranded in the shallow water and put them back in the river.

Water transfer priciest in history

Balzac megamall clears hurdle

Renata D'Aliesio, Calgary Herald

Published: Saturday, September 29, 2007

After several failed attempts and more than a year of searching, the Municipal District of Rocky View has secured water for a horse racetrack and megamall in Balzac -- dubbed the largest Alberta construction project outside of the oilsands.

Alberta Environment said Friday it has approved a water deal between Rocky View and the Western Irrigation District. In exchange for guaranteed water rights, the M.D. will pay the irrigation district $15 million to convert 50 kilometres of a leaky canal into a pipeline. The licence transfer is the largest and priciest in the young history of Alberta's market to buy and sell water.

Rocky View Reeve Al Schule, who is not running again in the municipal district's upcoming election, said Friday he's relieved the water search has come to an end. "It's just great that finally it came to this point," he said."This whole thing is making everyone more water conscious."

A system to transfer water rights, introduced in the Oldman River Basin in 2002, was expanded to the Calgary region last year after the province declared a moratorium on further requests for water for every southern Alberta river basin except Red Deer. The ban scuttled Rocky View's plans to obtain a water licence for the Bow River to supply the horse track and mall development.

While the M.D. scrambled for water -- making a controversial play for piping water from the Red Deer River -- construction on the $1-billion project went ahead, although significantly slower than scheduled. The track, for instance, was originally expected to open this fall. Instead, it now plans to open in 2009.

Rocky View's experience has underscored an emerging reality: Water is no longer a certainty for development in southern Alberta. Schule believes developing a regional water system would solve future gridlock, but such a proposal hinges on urban and rural municipalities working together.

In the Balzac case, the City of Calgary declined to service the development, citing a policy against supplying water to rural districts. The city was also one of seven parties that recently submitted statements of concern on the transfer between Rocky View and the Western Irrigation District.

Irrigation District general manager Jim Webber said concerns mostly centred on the presumption that the commercial development would take water from the Bow River year-round, including when river levels are low in the winter. But Webber said that won't be the case. Water in the winter will be drawn from a reservoir near Langdon.

Aside from spending $15 million to secure water, the M.D. must now find a way to finance the construction of a pipeline and treatment plant to deliver water to the Balzac development. Because it has limited debt borrowing capacity, Schule said, Rocky View is exploring the option of a public-private partnership.

In the meantime, construction of the mega-entertainment complex continues."We're pleased to see things moving forward," said John Scott, vice-president of development for Montreal-based Ivanhoe Cambridge, builder of the shopping centre. Like the horse race track, the mall expects to open in 2009.

Shepard Wetlands

calgary.ca

Ralph Klein Park is Calgary's newest major park featuring a man-made wetland that uses natural vegetation to treat stormwater before it is discharged into the Bow River. Ralph Klein Park offers numerous on-site programs and events and can also be booked for private functions and birthday parties.

Leader in Stormwater Management and Conservation

The Shepard Wetland at Ralph Klein Park was constructed to help solve a stormwater management issue for the east side of Calgary. In the past, stormwater from east Calgary was being discharged into the Western Headworks Canal (part of the Western Irrigation District's irrigation system). Concerns over the quality of water entering this system led to Alberta Environment and the City jointly investigating and implementing a plan to manage stormwater within this 6,000 hectare area.

Constructed wetland at Ralph Klein Park

When you are at Ralph Klein Park take in the view, including the constructed wetland that surrounds the main building. This wetland functions as both a stormwater storage facility and a treatment wetland that naturally filters stormwater, improving the quality of stormwater before it is discharged south to the Bow River. At 156 hectares (385 acres), it is the largest constructed stormwater treatment wetland in Canada.

The wetland can store over 6 million cubic meters of water. This means it has enough capacity to handle a 1 in 100 year flood. A flood of this type will fill the wetland, making it look more like a lake (in any given year there is a 1% chance that this type of flood event may occur).

How it all works

A diversion channel intercepts water from the Western Headworks Canal during major rain events, channelling it 4 km south to the wetland at Ralph Klein Park. The stormwater enters the wetland in the NW corner of the park where it flows into two large forebays. This is where the initial cleaning process begins; the sediment (dirt) and heavy materials slowly sink to the bottom at this stage in the process.

The water is then dispersed into five wetland cells. Through the growth and decay of plants within the wetland cells, in combination with the micro-organisms associated with each of them, nutrients and pollutants are removed from the water.

In each cell there are several berms that create a longer flow path for the water, which aids in the cleaning process. Each treatment cell is designed to operate under base flow conditions of approximately 30 cm (1 foot) of water depth. Water depth can be up to 3 metres during a severe storm event, which submerges the internal berms, but the water remains contained by perimeter dykes and existing land forms. Once the water has travelled through these cells, it is then released into a common discharge bay that empties into a ditch that leads south to the Bow River, 10 km away.

Fish Rescue

Walk up to the *canal*

Several species of fish make their way into the WID canal system. Fish impact follows the normal fall dewatering around the Thanksgiving weekend in October and can take up to a week for the canals to drain. The majority of fish are assumed to move to the safety of deeper waters within the canal system such as Chestermere Lake, Langdon Reservoir and Bruce Lakes during the dewatering process. However, some fish do remain in the deeper pools of the canals.

Trout Unlimited volunteers help remove as many minnows and sport fish as possible each fall using volunteers, electrofishing packs, nets, buckets and aerated transport trucks.

The Bow River water source is world-renowned for its blue-ribbon trout fishery and boasts over 3000 trout per mile of river. It is not currently known how many fish make their way into the WID diversion and how many of these become trapped in the WID irrigation canal system.

Assuming that all of the stranded fish will die throughout the winter months, then the species and proportions of fish removed yearly are mostly Longnose Sucker, some Northern Pike, Mountain Whitefish and to a much lesser extent Rainbow Trout, Brown Trout, Yellow Perch and Spottail Shiner. The loss of the small number of fish are likely negligible when compared to the larger Bow River fishery. The age of the trout -most are mature fish 2 to 3 years- may indicate they are in the canal system for more than one year. The lack of smaller, younger trout may be attributed to the abundance of pike preying on these fish throughout the canal system.

Group rescues thousands of fish from canals

By Colette Derworiz, Calgary Herald October 27, 2013

NEAR GRANUM, AB — The water in the irrigation canal, between Granum and Fort Macleod in southern Alberta, is only knee deep but there's fish hiding in the riffles and pools beneath the surface.

"Any fish that are in here after today are dead," says Brian Meagher, a provincial biologist with Trout Unlimited in Calgary. "The fish will not be able to overwinter here."

Each fall, when the water is no longer needed by the communities along the canals, they are turned off and the water drained. Any fish left in the canals are trapped because there's no way for them to return to the rivers.

Trout Unlimited, with help from Alberta Environment and Sustainable Resource Development and dozens of volunteers, tries to save the fish before they die — rescuing about 769,000 fish since the program began in 1998.

This year, the group worked in five different irrigation canals in southern Alberta fed by the Bow, Highwood, Belly, Waterton and Oldman rivers. The final numbers aren't in, but they have so far tallied 195 brown trout, 195 rainbow trout and 3,666 mountain whitefish.

On one of the field days on the canal near Granum, students from Glenwood School and Lethbridge College help rescue this year's stranded fish — everything from the rainbow and brown trout to mountain whitefish and northern pike — and learn why it's important to save the fish.

"We've got these kids who are a captive audience and they have very little idea of what we're actually doing and what happens in these ecosystems," explains Meagher. "All of a sudden, you put a fish in their hands and you can see those light switch moments where they actually understand that these aren't just waterways, these are living ecosystems."

Trout Unlimited staff suit up in chest waders and wear insulated gloves for the electrofishing operation. Lesley Peterson and Eliot Lindsay wear the electrofishers, a backpack that looks like it came straight out of a Ghostbusters movie — or 'Fishbusters' as some of the students called it. The backpack provides electricity through two electrodes that deliver a current into the water to momentarily stun the fish, allowing their capture.

It's a task the students also get to help with throughout the morning, learning how to identify the fish. "There's a whole bunch of minnows," explains Meagher. "What we see on this guy is that he's got sort of a purplish hue and this really orange armpit here." "Is it blood?" asks one of the students. Meagher explains it's not, but the natural colouring of the fish. "His mouth is on the front, not on the bottom," he says, as he continues to describe the fish. "So it's not a sucker," offers one of the girls. "Not a sucker," agrees Meagher. "This is what we call a lake chub." "They are kind of chubby" suggests a young boy, prompting laughter in the group.

The students are clearly interested, asking lots of questions and offering to help every step along the way — precisely the reason the schools come out for the days in the field.

Province reveals next step combatting mussels

COLETTE DERWORIZ, CALGARY HERALD
Published on: March 10, 2015

Alberta Environment and Sustainable Resource Development photo of zebra mussels.

BANFF — A strategy to prevent invasive mussels from hitching a ride into Alberta will ramp up this year, starting with a change to the province's fisheries legislation to make boat inspections mandatory. Officials are also planning a blitz on snowbirds bringing their boats back from the United States later this month and the expansion of a pilot project with mussel sniffing dogs for the checkstops.

"Once we have it, we have it. We can't get rid of it," said Cindy Sawchuk, a strategic adviser for Alberta Environment and Sustainable Resource Development, in a recent talk to the Bow Valley Naturalists in Banff. "It's kind of a big deal. We don't have them and we don't want them."

The invasive species — zebra and quagga mussels — are spreading throughout the western United States and Eastern Canada, making it as far west as Lake Winnipeg in Manitoba. There's no record of the non-native mussels in Alberta waterways, but several infested boats have been intercepted in the past couple of years.

It's estimated it would cost about $75 million in annual losses if they were to establish themselves in Alberta's lakes and rivers. Sawchuk said it would have major repercussions for Alberta. "The impacts are huge," she said. "Ecologically, they are filter feeders, so they can filter through one litre per mussel a day," she said. "By doing that, they are taking the good nutrients in the water and not leaving anything for our natives. What it's doing is really affecting the biodiversity of our water."

Concerns have also been raised by the Western Irrigation District, which is worried the mussels could damage 1,100 kilometers of canals and pipelines transporting water to Albertans. It could also affect farmers, municipalities and tourism in the province. As a result, the province has been working for two years to prevent the mussels from invading Alberta waters — based on a similar program in Waterton Lakes National Park.

In 2013, there were seven boats with the invasive mussels found coming into Alberta. Another four were found in 2014. Sawchuk said they'll continue those efforts, which include monitoring lakes and educating boaters, this year. The province will improve its policy and legislation to make it mandatory for anyone pulling a boat to stop at an inspection station. Fisheries officers do already have authority to stop, detain or seize a boat considered high risk after a ministerial order was passed in 2013.

Past inspections have been set up on four major highways coming from the eastern provinces and the U.S., where the snowbirds take their boats to infested destinations such as Lake Powell and Lake Mead. Sawchuk said they've already received a call last week from Nevada about a boat they've intercepted that was coming to Buffalo Lake in Alberta. "They let us know and we talked to the boat owner and we're going to be able to do an inspection when they get back to Alberta," she said.

Stop Aquatic Hitchhikers

Posted on June 19, 2013 by Alberta ESRD

If you bring a boat from another province or state into Alberta, make sure to **clean it, drain it, and dry it** first to help keep aquatic invasive species out of our waterbodies.

Non-native aquatic invasive species, like rock snot algae, zebra mussels and Eurasian watermilfoil, have no natural predators – so they can spread very quickly.

Once introduced to a waterbody, these species are virtually impossible to eradicate. They can transform and damage entire ecosystems, impact native species, and threaten Alberta's biodiversity. They can also damage your boat and equipment, and clog water-operated infrastructure like power plants, water intakes and irrigation canals.

If you own or use a boat, you are on the frontlines of the fight to keep invasive species out of Alberta. Everyone who enjoys our lakes and rivers need to do their part to keep our aquatic ecosystems safe.

Know how to spot aquatic invasive species:

Rock Snot Algae

- gooey algae that attaches itself to rocks, plans and other submerged surfaces
- grows rapidly, covering stream beds and attracting aquatic insects to its sticky surface
- reduces fish habitat quality and food availability

Zebra and quagga mussels

- small clam-like, freshwater species takes over hard and soft surfaces like beaches, boat propellers, docks and irrigation pipes
- reproduces rapidly causing significant ecological damage – one female mussel can produce 1 million eggs every year
- destroys fish and wildlife habitats by removing plankton which increases toxic algal blooms and vegetation growth and affects fish spawning areas

Eurasian water milfoil

- Submerged, rooted plant with long narrow leaves and feathery look
- Spreads quickly forming a large floating mat that prevents light from reaching the water, fish and plants beneath it
- Alters water chemistry, damages habitat, and creates breeding ground for mosquitoes
- Clogs irrigation pipes and gets caught in boat propellers and equipment

Clean Drain Dry

Posted on **June 19, 2013** by **Alberta ESRD**

Stop the spread: Aquatic invasive species can live up to 30 days outside of water. Inspect your boat, trailer, and equipment after each use and take these steps to properly clean, drain, and dry your boat.

Clean

- Remove all plants, animals and mud at the access area or dock.
- At home, soak your gear in a two per cent bleach solution for one minute (20 ml of bleach per litre of water).
- Rinse, scrub or pressure-wash your boat away from storm drains, ditches or waterways.

Drain

- Drain all water from bait buckets, coolers, livewells, bilges, ballasts, transom motors and internal compartments on land before leaving the waterbody.
- Never release live bait into a waterbody or transfer aquatic plants or animals from waterbody to another.
- Drain paddleboats by inverting or tilting the watercraft, opening compartments, and removing seats if necessary.

Dry

- Dry all gear completely between trips and allow the wet areas of your boat to air dry.
- Leave compartments open and sponge out standing water.

For more information or to report something suspicious on your boat or equipment, call **1-855-336-2628 (BOAT).**

Always properly clean, drain, and dry your boat to protect it – and Alberta's ecosystems – from invasive species.

Ogden/Bonnybrook Bridge Tragedy

This location is the site of the first Bow River bridge in Calgary built by the CPR in 1883. This was also likely the location where the NWMP crossed to the north side of the river on their way from Fort Macleod.

There was a ferry crossing operating here in 1877. Since those days, a new steel bridge has replaced the original wooden truss version, a second railway bridge has been added and the Bonnybrook traffic bridge was built.

In July 2005, a large herd of horses were being moved to the Stampede across the Ogden Road Bonnybrook Bridge. They were scared by a train whistle on the CPR mainline and nine horses jumped to their deaths off the bridge. The tragedy occurred with guests paying $10,000 to experience an old style horse drive.

The horses were spooked while being brought across the Bonnybrook bridge over the Bow River, and some plunged 10 metres into the water. Some died when they hit the embankment and others drowned in the swollen river. One was put down because of injuries suffered in the fall.

The tragedy has left the Stampede reviewing the ride, which was being held to commemorate the province's centennial, and dealing with criticism from those who say they never should have tried to move 200 unbroken horses through the city in the first place.

Bonnybrook bridge collapse due to flood

By Clara Ho and Sherri Zickefoose, Calgary Herald June 27, 2013 8:52 PM

The head of Canadian Pacific Railway insists a bridge that started sagging Thursday while a train carrying flammable petroleum products passed over the Bow River was properly inspected in the wake of last week's flood.

As crews worked to pump the fluids out of the rail cars that remain atop the Bonnybrook bridge, CPR chief executive Hunter Harrison told reporters the span had been inspected five times since the deluge, and that flooding was to blame for weakening the bridge's pier.

Harrison added he didn't anticipate "a problem like this occurring at all" and that it would have been "jeopardizing commerce" to hold the trains until divers could get in and inspect the bridge under the water.

"We would normally have probably put divers in to inspect, but the current was too fast. Somebody would have drowned if they had tried to go in there, plus the current was so fast, and it's so murky, you couldn't do an appropriate inspection" Harrison said.

CPR engineers at the scene said the bridge was inspected 18 times since the flooding began. The company wouldn't do anything differently, added CPR spokesman Mark Seland. "We inspect our bridges vigilantly, and in the past week, we've inspected more vigilantly than usual. . . . But you can't put a diver in murky, fast-moving water."

The 102-car mixed cargo train was heading from Edmonton east to St. Paul, Minn., when the span suddenly started to sag at around 3:30 a.m. as the train passed through. Six cars ended up derailed atop the bridge. Five were carrying a petroleum distillate, a product used for solvents, metal polishes, paint thinner and household paint. The sixth was empty with some residue of a non-regulated product. The drooping bridge led to a tense rescue operation in which a stabilization train loaded with rocks and grain cars, and resting on an opposite track, was coupled to the six damaged rail cars to prevent them from toppling.

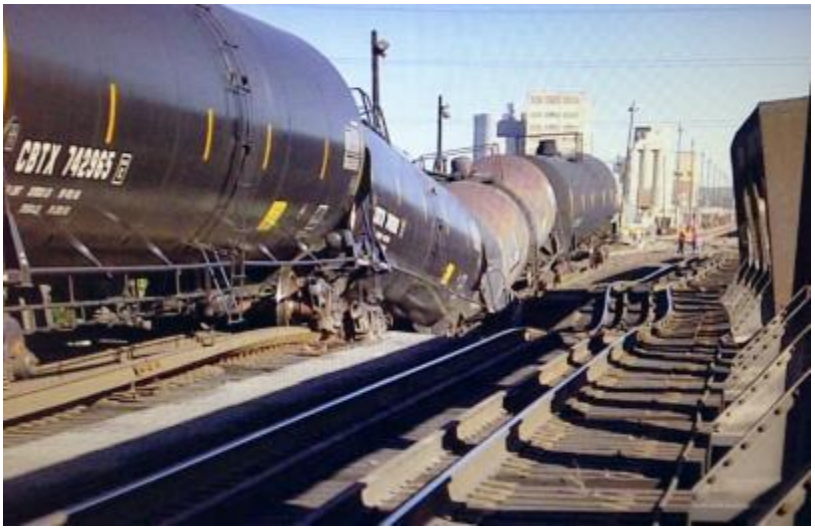
A half-mile area near the site had to be evacuated, including the Bonnybrook wastewater treatment plant. A section of the Deerfoot Trail was closed in both directions until 2 p.m. Later, 100 crew workers showed up to pump out the fluids, with plans for the damaged cars to be removed from the bridge early Friday. None of the petroleum contents leaked, though booms were deployed down the river in case of any spills. No one was injured and crews managed to stabilize the bridge.

But Mayor Naheed Nenshi questioned whether the company had done enough to prevent the bridge from failing. In addition, Nenshi said the bridge in question was old, built in 1912, and was not built into the bedrock — "something I didn't know until today" — unlike the city's bridges.

Linda Duncan, NDP MP for Edmonton-Strathcona whose portfolio includes oversight of the Privy Council Office — including the Transportation Safety Board of Canada — questioned, "Our economy needs this, but not at the risk of human life and polluting rivers already struggling to self clean," she said.

Major flood at root of bridge collapse: report

By Bill Graveland The Canadian Press
Global News Dec 17, 2014



Major flood at root of bridge collapse: report

By Bill Graveland The Canadian Press
Global News Dec 17, 2014

CALGARY – The Transportation Safety Board says unprecedented flood water was to blame for a derailment and partial bridge collapse in Calgary last year.

The Bonnybrook bridge over the swollen Bow River gave way beneath a Canadian Pacific Railway train (TSX:CP) on June 27 as the city was trying to recover from high water that had washed over many neighbourhoods just days before.

Six tank cars carrying a petroleum dilutant teetered on the failing bridge. They were unloaded and removed over two days and never went into the river.

“Unprecedented flooding of the Bow River was a major factor in this bridge failure. The bridge handled several major floods for over a century, but the river was not to be denied last June,” said George Fowler, a civil engineer who conducted the investigation. “Intense, unprecedented floodwater flow had attacked the shale, sandstone, bedrock and clay pier foundation — eroding and undermining it.”

Fowler said the bridge, which was built in 1897 and expanded in 1912, had been properly inspected by Canadian Pacific Railway. “Inspections conducted on the Bonnybrook bridge exceeded regulatory requirements during the flood. Visual observations of the rail and track alignment, and service, would normally detect deviations. However, in this case, such inspections did not provide warnings of the sudden bridge failure,” said Fowler.

“This bridge has been around since 1897 and in that time it survived several significant flooding events,” he added. “There was no reason to believe this event would be any different.” Fowler said the true extent of the damage to the foundation wasn’t known until repairs were underway two months later.

Railways fall within federal jurisdiction and are responsible for their own inspections. Fowler said CP has revised its bridge inspection practice and its inspector training program and is investing in research into early detection of erosion at railway bridges.

CP dismantled the Bonnybrook Bridge in the autumn of 2013 and work on a new span was completed in April of this year. The damaged bridge pier has been replaced and reinforced with a new foundation.

An official with CP Rail welcomed the final report. President and chief operating officer Keith Creel said he agrees with the safety board that the City of Calgary’s command structure worked well to get the site secure and to help remove the derailed cars.

“Our relationship with the first responders of the City of Calgary allowed us to co-ordinate efforts to work quickly and to safely remove the cars from the bridge,” said Creel. “CP is grateful to the Calgary Fire Department and other first responders and thanks them for their skill, effort and commitment to public safety.”

Old Refinery Park

calgary.ca

Just past the CP railway bridge and on river-left, a former Imperial Oil Refinery is still leaching petrochemicals from the ground and run-off water is being collected by a concrete weir protecting the river.

Old Refinery Park lies along the eastern bank of the Bow River in the southeast part of Calgary, just north along the pathway from Beaverdam Flats, and was once home to an oil refinery.

About the park

Old Refinery Park lies along the eastern bank of the Bow River in the southeast part of the city. The park was created in the early 1990s and occupies about 32 hectares. The name is derived, as you might guess, from the fact that there was an oil refinery on this site (from 1926 to 1976).

The sub-surface of the area was severely polluted by oil spills and is in the process of being cleaned-up and converted to safe and quality parkland. The park will include recreational facilities, grass/shrubland and a small but mature riverine forest.

History

Due to the contamination from the oil refinery, this area was rendered unsuitable for permanent human habitation. However, with the reclamation efforts underway, the area is safe for recreational use and the water quality of the Bow River is not under threat. The park, with its variety of habitats, provides an important part of the effort to naturalize the city's river valleys.

Plant life

The park's location provides periodic flooding that allows Balsam Poplars to thrive; they require this flooding to regenerate. Mixed with the poplars are many species commonly found in riverine forests including shrubs like willows and Water Birch and flowers such as Blue Columbine and Mealy Primrose.

Inland, there are low terraces with Trembling Aspen, various shrubs including Saskatoon, American Silverberry and Choke Cherry. American Silverberry is also known as Wolf Willow. Many of these species and some hardy exotics have been planted in the park as part of the effort to clean-up and reclaim the land.

Much of the inland area, called the "savannah" is now a mixture of native and non-native grassland. A section of sharply uneven ground, made up partly of covered rubble called the "moguls", is also being naturalized.

Wildlife

Certain bird species such as Cedar Waxwings and Yellow Warblers prefer to breed and feed in this type of forest. Along this stretch of the river there is an extremely high concentration of waterfowl particularly in late fall and early winter. Most of the birds are Canada Geese and Mallards. There are also many diving ducks including Buffleheads, Common Goldeneye and occasionally, Hooded Mergansers.

Beaver Biology

From Wikipedia

The **beaver** (genus ***Castor***) is a primarily nocturnal, large, semi-aquatic rodent. Beavers are known for building dams, canals, and lodges (homes). Their colonies create one or more dams to provide still, deep water to protect against predators, and to float food and building material. The North American beaver population was once more than 60 million, but as of 1988 was 6–12 million. This population decline is due to extensive hunting for fur, for glands used as medicine and perfume, and because their harvesting of trees and flooding of waterways may interfere with other land uses.

Beavers are known for their natural trait of building dams on rivers and streams, and building their homes (known as "lodges") in the resulting pond. Beavers also build canals to float build materials that are difficult to haul over land.[2] They use powerful front teeth to cut trees and other plants that they use both for building and for food. In the absence of existing ponds, beavers must construct dams before building their lodges. First they place vertical poles, then fill between the poles with a crisscross of horizontally placed branches. They fill in the gaps between the branches with a combination of weeds and mud until the dam impounds sufficient water to surround the lodge.

They are known for their alarm signal: when startled or frightened, a swimming beaver will rapidly dive while forcefully slapping the water with its broad tail, audible over great distances above and below water. This serves as a warning to beavers in the area. Once a beaver has sounded the alarm, nearby beavers will dive and may not reemerge for some time. Beavers are slow on land, but are good swimmers, and can stay under water for as long as 15 minutes.

Beavers are herbivores, and prefer the wood of quaking aspen, cottonwood, willow, alder, birch, maple and cherry trees. They also eat sedges, pondweed, and water lilies.[3]

Beavers do not hibernate, but store sticks and logs in a pile in their ponds, eating the underbark. Some of the pile is generally above water and accumulates snow in the winter. This insulation of snow often keeps the water from freezing in and around the food pile, providing a location where beavers can breathe when outside their lodge.

Beavers have webbed hind-feet, and a broad, scaly tail. They have poor eyesight, but keen senses of hearing, smell, and touch. A beaver's teeth grow continuously so that they will not be worn down by chewing on wood. Their four incisors are composed of hard orange enamel on the front and a softer dentin on the back. The chisel-like ends of incisors are maintained by their self-sharpening wear pattern.

Beavers continue to grow throughout their lives. Adult specimens weighing over 25 kg (55 lb) are not uncommon. Females are as large as or larger than males of the same age, which is uncommon among mammals. Beavers live up to 24 years of age in the wild.

Beaver Family Life

From Wikipedia

The basic units of beaver social organization are families consisting of an adult male and adult female in a monogamous pair and their kits and yearlings. Beaver families can have as many as ten members in addition to the monogamous pair. Groups this size or close to this size build more lodges to live in while smaller families usually need only one. However, large families in the northern hemisphere have been recorded living in one lodge. Beaver pairs mate for life; however, if a beaver's mate dies, it will partner with another one. Extra-pair copulations also occur. In addition to being monogamous, both the male and female take part in raising offspring. They also both mark and defend the territory and build and repair the dam and lodge.

When young are born, they spend their first month in the lodge and their mother is the primary caretaker while their father maintains the territory. In the time after they leave the lodge for the first time, yearlings will help their parents build food caches in the fall and repair dams and lodges. Still, adults do the majority of the work and young beavers help their parents for reasons based on natural selection rather than kin selection. They are dependent on them for food and for learning life skills. Young beavers spend most of their time playing but also copy their parents' behavior. However while copying behavior helps imprint life skills in young beavers it is not necessarily immediately beneficial for parents as the young beaver do not perform the tasks as well as the parents.

Older offspring, which are around two years old, may also live in families and help their parents. In addition to helping build food caches and repairing the dam, two-year olds will also help in feeding, grooming and guarding younger offspring. While these helping two-year olds help increase the chance of survival for younger offspring, they are not essential for the family and two-year olds only stay and help their families if there is a shortage of resources in times of food shortage, high population density, or drought.] When beavers leave their natal territories, they usually do not settle far. Beavers can recognize their kin by detecting differences in anal gland secretion composition using their keen sense of smell. Related beavers share more features in their anal gland secretion profile than unrelated beavers. Being able to recognize kin is important for beaver social behavior and it causes more tolerant behavior among neighboring beavers.

Territories and spacing

Beavers maintain and defend territories, which are areas for feeding, nesting and mating. They invest much energy in their territories, building their dams and becoming familiar with the area.[47] Beavers mark their territories by constructing scent mounts made of mud, debris and castoreum, a urine based substance excreted through the beavers castor sacs between the pelvis and base of the tail. These scent mounts are established on the border of the territory.

Once a beaver detects another scent in its territory, finding the intruder takes priority, even over food. Because they invest so much energy in their territories, beavers are intolerant of intruders and the holder of the territory is more likely to escalate an aggressive encounter. These encounters are often violent. To avoid such situations, a beaver marks its territory with as many scent mounds as possible, signaling to intruders that the territory holder has enough energy to maintain its territory and is thus able to put up a good defense. As such, territories with more scent mounts are avoided more often than ones with fewer mounts. Scent marking increases in August during the dispersal of yearlings, in an attempt to prevent them from intruding on territories. Beaver also exhibit a behavior known as the "Dear Enemy Phenomenon". A territory-holding beaver will investigate and become familiar with the scents of its neighbors. As such they respond less aggressively to intrusions by their territorial neighbours than those made by nonterritorial floaters or "strangers".

Beaver Engineering

From Wikipedia

Beavers fell trees for several reasons. They fell large mature trees, usually in strategic locations, to form the basis of a dam, but European beavers tend to use small diameter (<10 cm) trees for this purpose. Beavers fell small trees, especially young second-growth trees, for food. Broadleaved trees re-grow as a coppice, providing easy-to-reach stems and leaves for food in subsequent years. Ponds created by beavers can also kill some tree species by drowning but this creates standing dead wood, which is very important for a wide range of animals and plants.

Dams: Beaver dams are created as a protection against predators, such as coyotes, wolves and bears, and to provide easy access to food during winter. Beavers always work at night and are prolific builders, carrying mud and stones with their fore-paws and timber between their teeth. Because of this, destroying a beaver dam without removing the beavers is difficult, especially if the dam is downstream of an active lodge. Beavers can rebuild such primary dams overnight, though they may not defend secondary dams as vigorously. (Beavers may create a series of dams along a river.)

Lodges: The ponds created by well-maintained dams help isolate the beavers' homes, their *lodges*, which are created from severed branches and mud. The beavers cover their lodges late every autumn with fresh mud, which freezes when the frost sets in. The mud becomes almost as hard as stone, and neither wolves nor wolverines can penetrate it.

The lodge has underwater entrances to make entry nearly impossible for any other animal (however, muskrats have been seen living inside beaver lodges with the beavers who made them).[18] A very small amount of the lodge is actually used as a living area. Contrary to popular belief, beavers actually dig out their dens with underwater entrances after they finish building the dams and lodge structures. There are typically two dens within the lodge, one for drying off after exiting the water, and another, drier one where the family actually lives.

Illustration of lodge

Beaver houses are formed of the same materials as the dams, with little order or regularity of structure, and seldom contain more than four adult and six or eight young beavers. Some of the larger houses have one or more partitions, but these are only posts of the main building left by the builders to support the roof, for the apartments usually have no communication with each other except by water.

When the ice breaks up in spring beavers always leave their embankments and rove about until just before fall, when they return to their old habitations and lay in their winter stock of wood. They seldom begin to repair the houses until the frost sets in, and never finish the outer coating until the cold becomes severe. When they erect a new habitation they fell the wood early in summer, but seldom begin building until nearly the end of August.

Beaver Control

What do we know about beavers? **They live in** lodges or bank burrows. **They sometimes build** dams to create deep water if needed. They eat tree bark, not wood.

Why do beavers cut giant balsam poplar trees and then just leave them lying around? They only want the top, tender branches that they can't reach unless they cut down the whole tree.

Balsam poplars or cottonwoods are very important trees in the riparian zone along rivers. They shade the water for fish; provide food for insects and birds; hold nests for songbirds and eagles, woodpeckers and cavity nesting ducks.

Balsam poplars or cottonwoods are very important trees in the riparian zone along rivers. They shade the water for fish; provide food for insects and birds; hold nests for songbirds and eagles, woodpeckers and cavity nesting ducks.

In southern Alberta and Calgary, poplars are not reproducing so well because dams are stopping the flooding that poplar seeds (fluff) require for germination. As floods recede after spring run-off, moist bare soil is left for seedlings.

The problems that beavers cause us are flooding behind dams, tree cutting on golf courses, blocking river pathways, etc.. These are problems because there are so few predators left to keep beaver populations in check: wolves, cougars, grizzlies, otters.

One way to protect the large trees we love along the river is to wrap them in wire to keep the beavers from gnawing on them. The beavers can cut some of the trees for age-class variation and eat other bark like willow bushes. Wrapping some trees is part of our stewardship contribution to the health of this river.

Calgary's water consumption drops 17 per cent as population grows 30 per cent

By Robson Fletcher April 6, 2015 The Metro

Last year, Calgarians consumed more than 176 billion litres of water. To put that in perspective, it's equivalent to filling and draining the Glenmore Reservoir 10 times over. That may sound like a lot, but it's actually 17 per cent less water than the city consumed in 2003, despite the fact that the population is now 30 per cent bigger.

For more than a decade now, Calgary has consumed less and less water as it has grown, and 2014 was no exception.Despite seeing the largest population increase on record in 2014 – 38,508 new people – total water consumption actually edged downward by 2.1 billion litres from the year before.

"We're pretty proud what we've been able to accomplish," said Shannon Abbott, a leader of resource planning and policy with Calgary water services. "Since 2003, we've been able to reduce our consumption pretty consistently, and over that timeframe, our population has increased by over 272,000 people – and yet, we continue to withdraw less water."

Abbott said Calgary has made some changes to the way it treats its water, consuming less in the process of making it safe to drink, and has also managed to reduce losses from water mains and other pipes through a leak-detection and repair-and-replacement regime.

But the largest contributor, she said, has been the changing behaviour of Calgarians, themselves. Part of the motivation is financial, as 98 per cent of residential customers are now on water meters, whereas in the past many homes paid a flat rate, regardless of how much they consumed.

Just about 9,000 accounts remain on a flat rate, Abbott said, down from about 20,000 two years ago. Studies have shown that metered customers use up to 60 per cent less water than flat-rate customers, she added.

Widespread adoption of low-flow toilets – in part due to the city's residential toilet rebate program, which has seen more than 70,000 loos replaced since 2003 – and other household appliances that use less water has also contributed."There's been just a general market trend toward efficient fixtures," Abbott said.

The city remains on track to use less water in 2033 than it did in 2003, and Abbott said consumption reduction has been so on-target on the residential side that the city's next emphasis will be on working with industrial and commercial customers to reduce their water use.

Key numbers:

• **70,816**: The number of toilets replaced under Calgary's residential toilet rebate program since 2003.

• **98%**: The proportion of residential customers who now have water meters, up from 94% in 2013.

• **176,445**: The amount of water, in megalitres (ML), that the city diverted from the Bow and Elbow rivers for consumption in 2014. (That's down from 178,530 in 2013 and 212,500 in 2003.)

• **17,600**: The Glenmore Reservoir holds about 17,600 megalitres (ML) of water at full capacity.

Bonnybrook Creek

Just after the Calf Robe Bridge

Calgary On-Line History
http://www.ourroots.ca/page.aspx?id=879052&qryID=aa064db9-32a9-464d-805f-63b797257979

Layers of dump debris at the mouth of Bonnybrook Creek

Bonnybrook itself is a word meaning Nice Brook. The Bonnybrook WWTP is named after it. It might have been an open creek at one time but it's mostly buried now by our RW compound and Deerfoot Trail. Only the few hundred meters of the mouth is now open to viewing. Most of our urban creeks are now really stormwater collectors.

Bonnybrook Creek originally sourced near the present day Inglewood Ball Park and was known for Sunday picnics and boating on a lagoon.

The landowner drained the lagoon, cut the trees and used the land for farming.

Bonnybrook eventually became contaminated with oil from the BA Oil Refinery (now Inglewood Wildlands Park) and a local entrepreneur made money skimming the oil off the creek and selling it back to the refinery.

Lynnview Ridge Contamination

Just after the Ogden Bonnybrook Bridges

Between 1923 and 1975, Imperial Oil owned and operated a petroleum refinery on lands immediately north of Lynnview Ridge, and storage tanks on part of the lands in Lynnview Ridge. Other parts of those lands were used for a "land farm," where petroleum sludge was treated by spreading it on open lands.

The refinery, holding tanks and land farm were decommissioned between 1975 and 1977, and the lands were subsequently developed into a residential subdivision by Devon Estates, a wholly-owned subsidiary of Imperial, and Nu-West Developments. During the decommissioning and redevelopment period, there were no regulatory soil standards relating to lead or hydrocarbon contamination. AENV later adopted the cleanup guidelines for lead in residential soil issued in 1997 by the Canadian Council of Ministers of the Environment (CCME).

In 2001, concerns about lead and hydrocarbon contamination arose as a result of soil testing in Lynnview Ridge. AENV began an investigation, advising Imperial Oil and the city of Calgary that they may have responsibility for the contaminants under environmental legislation.

The department issued the first EPO in June 2001, naming Imperial Oil and Devon Estates as "persons responsible" under the Environmental Protection and Enhancement Act (EPEA) for the contamination and directing them to take various steps. Imperial and Devon Estates appealed the EPO to the Environmental Appeal Board (EAB). A hearing date was set for September 2001.

04/11/2005 ***By Ecolog Week***

Lynnview Ridge Remediation

Just after the Ogden Bonnybrook Bridges

In August 2001 Imperial took steps to deal with the short-term risks to the residents. Since then, the company has voluntarily purchased more than 140 of the 160 single-family homes in the subdivision, and the two townhouse complexes.

Imperial Oil and Alberta Environment (AENV) have reached an agreement for the effective remediation of residential properties and adjacent municipal lands in the community of Lynnview Ridge in southeast Calgary.

The remediation plan, which is being reviewed with Lynnview residents, calls for complete removal of the top 0.3 metres of soil on private properties, Imperial-owned properties and municipal property within the designated area, except soil under homes, garages and municipal roads and sidewalks. Imperial will be responsible for soil removal and replacement, as well as landscape restoration.

AENV will be responsible for a soil sampling program on private properties, to ensure all that soil contaminated with lead levels above 140 parts per million (ppm) is removed by Imperial to a depth of between 0.3 and 1.5 metres. Soil testing will be done on private properties in the specified depth range (0.3 to 1.5 metres) to detect-and remove as required-soil with lead levels above 140 ppm.

(Source: Ecolog Week, April 11, 2005, www.ecolog.com)

Parks Planned for Lynnview Ridge

Just after the Ogden Bonnybrook Bridges

Sean Myers, Calgary Herald

Published: Thursday, July 19, 2007

Imperial Oil has finished demolishing houses in Lynnview Ridge, but it will take close to two years before new development will begin on the site. The city's environmental and safety management department presented a $22-million plan Wednesday that will lead to development of parks, outdoor recreational uses and, eventually, a golf course. The cost will be split 60/40 between Imperial and the city.

It will be spent over a period of up to 25 years to fully remediate city-owned land at Beaver Dam Flats and Pop Davies Park, which will include a 1.5-kilometre concrete wall to protect the Bow River from any seepage of hydrocarbons. Imperial Oil will lease the land it owns back to the city for $1 per year for 99 years.

An environmental assessment and risk management analysis will be completed by next summer to satisfy Alberta Environment and development may begin as early as spring 2009.

"We're looking at parks, nature areas and trails," said David Day, director of environmental and safety management with the city. "We're hoping we can look at a nine-hole golf course as well." Ald. Joe Ceci said there's still a lot of work to be done over the next two years. "One thing I can say for sure is there will never be any residential development on the site," said Ceci.

One Resident Stayed

Just after the Ogden Bonnybrook Bridges

Sean Myers, Calgary Herald Published: Thursday, July 19, 2007

The Lynnview Ridged deal was music to the ears of resident Tim Mather, president of the Millican/Ogden Community Association and a Lynnview Ridge resident who stayed. He is now looking at the rare prospect of owning a house in the middle of open parkland in the inner city.

"I stayed because I'm an environmentalist and I believed it was manageable to clean it up," said Mather. "This proves it was true." Mather lives in one of only 12 houses that remain in the neighbourhood that was once the site of an oil refinery.

Imperial Oil bought and then demolished 142 houses and seven multi-tenant buildings on the land where high levels of lead and hydrocarbons were found in 2001.

Alberta Environment is still waiting for a final report on the remediation of the area where the refinery had been and other pieces of land that were never occupied. "Because of the length of time Imperial Oil operated its oil facility (and the 30 years since it closed) the hydrocarbons have seeped down," said Andrew Horton with Alberta Environment. "If you put something too big such as houses there, it could disturb the hydrocarbons and it would be too deep to monitor."

BP BirthPlace Forest

On river right, we'll float by the BP BirthPlace Forest.

This program enabled parents to honour their children while recognizing the growth of our much needed urban forest and our increasing concern for the environment.

Launched in December 2000 by the City of Calgary Parks and its partners BP Canada Energy Company, Golden Acre Garden Sentres Ltd., and Calgary Health Region, the BP BirthPlace Forest program remains the first of its kind in Canada.

It is the only free program of its kind and is the largest 'green' initiative in Calgary's history.

This program is reshaping the way communities everywhere promote environmental sustainability. Each year for five or six years, approximately 6000 trees were planted in honour of children born in Calgary.

All BP BirthPlace Forests are accessible to the public and can be enjoyed year-round.

The flood of 2013 eroded into the river bank and you can see that planted trees are now falling into the river.

Stormwater Outfalls

That concrete pipe across the river is a storm water outfall.

The water that might run out of that outfall drains from city streets.

Thousands of kilometres of underground storm drain pipes carry surface runoff to the river.

Much of the stormwater in older communities drains directly into the river carrying everything from the street, including cigarette butts, drug needles, oil, dog feces, lawn pesticides, lawn fertilizers, road salt, etc..

In newer communities, stormwater may have a chance to clear in settling ponds or wetpond marshes before entering the river.

None of the storm water is supposed to go to a wastewater treatment plant.

Storm water outfalls are numbered so you can report pollution problems.

Sturgeon Story

Told while floating to the finish.

In 1990's in the Great Lakes, anglers were catching **Lake Sturgeon with elastic bands** wrapped around their noses. These giant ancient fish were weak and dying and in trouble as their snouts were being cut and they couldn't eat enough food. Investigators in Toronto wanted to find out where all the elastic bands were coming from. Here's what they found…

Q. **Who comes to your neighbourhood every day with e-bands?** **A.** Letter carriers! So… a letter carrier would come every day and drop mail off into those large green mail boxes and also drop a few e-bands on the ground…every day…all day.

Q. How do you think the elastic bands got to the water? **A**. The e-bands got washed down the storm drains and went directly into the nearest body of water…the Great Lakes.

Q. How did the elastics get onto the fish snouts? **A.** The e-bands sank to the bottom of the lake and as the sturgeon fed off the bottom of the lake like catfish they got their noses stuck inside the band. Each time the fish pushed into the mud looking for clams, the elastic got tighter.

It's amazing that a person delivering mail can endanger a species of fish so dramatically. How many people have ever thrown garbage on the ground? Do you now see that your actions may have a negative influence on the water quality and bio-diversity?

Alberta Watersheds

Floating toward the Boat Landing

Rivers are located in a watershed or river basin. What is a watershed? It's an area of land **drained by all the tributary creeks into one main river**. Rivers are mostly filled from… ground water! … along with all the melting snow and rain falling on the land and then draining to the river and just a little bit of melting glacier (maybe 1%).

There are many sub-basins in Alberta but really only **five to seven major watersheds** and these will be integral to Alberta's new Land Use Framework legislation. You can remember their names and locations using a **"handy" little memory trick**. Hold your left arm out away from you and look at your left hand. Turn your left hand sideways with the palm facing you and your thumb pointing up. Each of your digits can represent the five major river basins in Alberta.

- First, your **wrist** can represent the Continental Divide or Rocky Mountains – especially if it has a few good wrinkles on it – with rivers flowing out across Alberta.

- Your **thumb** can represent the largest volume watershed with rivers flowing north into the Arctic Ocean – the Peace, Athabasca and Hay watershed.

- The **next three fingers** can represent the watersheds with rivers flowing east into Saskatchewan and eventually Hudson's Bay – the North Saskatchewan, Beaver and South Saskatchewan watersheds.

- Your **little pinkie** finger represents the Milk River watershed whose river flows up from Montana and then south into the Mississippi River and onto New Orleans and the Gulf of Mexico.

Alberta Watershed Characteristics

Floating toward the Boat Landing

Each Alberta watershed has its own characteristics and quality and quantity issues.

- **Northern Alberta** has the bulk of Alberta's freshwater and issues involve the cumulative impacts of oilsands development, First Nations health, employment and possible dam construction.

- **Central Alberta** issues are now focusing on limited ground water, future demands and aquifer integrity.

- **Southern Alberta** is characterized by limited freshwater, climate extremes, the highest population, agriculture, development pressures and a restriction on water withdrawal allocations.

Water for Life Strategy

Rounding the last river bend to the Take-Out

In the face of an increasing population, economic growth and changing water needs, the Alberta government released Water for Life strategy. The strategy is based on three outcomes:

1. **safe, secure drinking water supply**
2. **healthy aquatic ecosystems**
3. **reliable, quality water supplies for a sustainable economy**

Each of those outcomes will be achieved through knowledge and research, partnerships and water conservation. Because the people who are immediately affected by specific water issues can also more directly and effectively develop solutions, Water for Life is a shared responsibility. Partnerships are a crucial element to the success of Water for Life.

What are healthy aquatic ecosystems?

A Water for Life report in 2005 defined them as "a healthy ecosystem is sustainable and resilient to stress, maintaining its ecological structure and function over time similar to the natural (undisturbed) ecosystems of the region, with the ability to recover from disturbance, while continuing to meet social needs and expectations".

Room for the river report

COLETTE DERWORIZ, CALGARY HERALD
Published on: January 12, 2015

Giving the province's rivers more room to grow by revisiting property buyouts, preventing future floodplain development and widening riverbanks is an effective way to both mitigate future floods and manage watersheds, according to a new report. The study, which was submitted to the province in late December, involved input from water managers, watershed groups, municipalities, environmental groups, experts and the interested public.

It examined an approach called Room for the River — used in the Netherlands as an effective way to manage high water levels along its rivers by giving them more room — after former environment minister Robin Campbell visited Holland and asked for a report on whether similar concepts could work in Alberta.

"The report is advice to the (Government of Alberta) on what has been done and what could be done along the Bow and the Elbow to create room for the river," said Kim Sturgess, chief executive of Alberta WaterSmart, an engineering consulting firm hired to do the work. "It gave some room to talk about giving the river room to grow. "It was more difficult to have that conversation a year ago, with the emotion. The focus a year ago was on big infrastructure. Big, big, big."

Indeed, the province has been working on ways to mitigate future flooding since the historic June 2013 flood — including proposed projects such as off-stream storage in Springbank, a dry dam on the Elbow River near McLean Creek and the Calgary tunnel.

The projects have led to concerns from conservationists and scientists that the province was focused on building infrastructure rather than considering natural solutions. WaterSmart's report noted that creating room for the river in Alberta would involve both using the natural landscape and built infrastructure to protect the health of the watersheds and integrate drought, water quality, ecosystem and flood risk concerns.

Some examples of potential mitigation presented in the report include: designating an overland flooding route through Erlton in Calgary; revisiting the Bragg Creek buyouts; putting conservation easements on the Bow and Elbow rivers; restoring riverbanks near Cochrane; and, retaining wetlands in the headwaters.

Room for the river report: Viewpoints

COLETTE DERWORIZ, CALGARY HERALD
Published on: January 12, 2015

Jason Penner, a spokesman for Alberta Environment and Sustainable Resource Development, said it's a comprehensive report. "It basically takes something that has been very successful in another area, where the flood risk is much higher than in Alberta, and takes those concepts and really sees how they can be applied here," he said, noting it recognizes the difference between The Netherlands and Alberta by focusing on strategy rather than getting caught up on the solutions.

Penner said all of the suggestions — whether it's revisiting buyouts or preventing future floodplain development — would be considered, but any changes to the current policies would be determined at a political level. "We are looking at everything that is presented in the report," he said. "There's a lot to digest. At this point, I don't think there's anything that's off the table. "We'll take a long, hard look at all of the options and then decide what's best."

Those who participated in the study said it's important for the province to take another look at natural solutions. "We definitely support the province exploring it," said Carolyn Bowen, program manager for flood resiliency and mitigation with the City of Calgary. "It's taking an approach as part of many mitigation options. It also supports our riparian strategy that we have in place with the city. We currently have a riparian strategy and we are developing an implementation plan looking at preserving, expanding and enhancing our riparian areas as natural mitigation for floods."

Mark Bennett, executive director of the Bow River Basin Council, said they welcome natural solutions. "The flood of 2013 was an extraordinarily severe event," he said. "It was not uncommon for me to find myself in conversations where I would bring up mention of the importance of healthy intact ecosystems. People would typically say, 'C'mon, you can have all of the wetlands in the world and it wouldn't have stopped that flood.' That's absolutely true. It was never offered as 'the' solution, but part of a broad spectrum of ways of addressing that particular tragedy." Bennett said it would not only protect some properties, but it will also go a long way toward general watershed health.

It's also an important area for the Western Irrigation District. "These rainfall events are natural events," said Erwin Braun, the irrigation district's general manager. "Nothing happens if we do development right. We can have parks, we can have golf courses, we can have things that don't mind if they go underwater. Farmland, for example." Solutions, he said, could include not developing floodplains and revisiting the buyouts along the rivers. "There are people who are going to be uprooted and there's a human toll on that, but a lot of people shouldn't be where they are in the first place," said Braun. "It's hard to hit the delete button and the reverse button and go backwards, but in some cases, that's the right answer. We have a small river and we have a huge human footprint in this relatively small basin — and we have a big natural event. All of sudden, it's a $5-billion price tag. It didn't have to be that way."

For Sturgess, it's time to have a more in-depth conversation about how to deal with future flooding, droughts and watershed health. "A hundred things done right gives you so much more resilience than one big thing done sort of right," she said. "It's less risky, gives you more options because all floods are not going to look like 2013. It's a big step forward. We can have a different level of conversation now."

RiverWatch Science as a Lens

Warren Bowen June, 2012 5 minutes 45 seconds

This interpretive segment "RiverWatch Science as a Lens" was developed by RiverWatch Guide Warren Bowen during the spring of 2012 for use with school science programs. Warren facilitated the wrap-up discussion thirty times May-June during the afternoon of each full day aboard his raft on the North Saskatchewan River in Edmonton, Alberta. The corresponding video can be viewed by the same title on YouTube ”RiverWatch Science as a Lens.

Warren: We’re now going to get a rating of the river health. I want to get your conclusions. So I want everyone to put their fists up in the air, balled fists. Remember, one, clean and pristine; five, disgusting. Ready, set, conclude!

Warren: 1 2 2 2 2 some 3’s, 3’s. It looks like we’re kind of a two; an average of two it looks like. So we increased from a three to two as a group.

Warren: So, who here changed their mind? Oh, wow. Pretty much everyone. So, okay Lizzie, why’d you change your mind? What did you start with? Let’s start with that.

Lizzie: I started with a four, I think.

Warren: You started with a four. What made you think that the river was a four? That it was unhealthy?

Lizzie: At the beginning it looked like there was lots of bubbles and bacteria.

Warren: Okay. So it looked kind of gross, right? There was some bubbles. Maybe you thought it was bacteria. And so, what do you think it is now? What number did you give it?

Lizzie: One.

Warren: A one. Wow. That’s quite a jump. So, why do you think it’s a one now?

Lizzie: Because it’s much cleaner because it went through the plant.

Warren: Okay, so you think that the fact the plant’s doing a good job, then maybe it’s not polluting the river. Did any of these tests help you change your mind? Did any one particular test do it?

Lizzie: Um. The temperature.

Warren: So, you thought it was the temperature. So that it’s within a healthy range. Okay, are there any others here? No, it was mostly the temperature that did it.

Warren: Okay, anybody else change their mind? So, Grace, why did you change your mind? Or, sorry, what did you start with? Let’s start with that. You started with a four. Why did you think it was a four?

Grace: Cause of like everybody else looking a lot; like everything I heard about it before.

Warren: Okay, so people kind of told you it was gross. And you’re like, “Okay”.

Grace: Seeing these numbers and seeing everything that is actually healthy.

Warren: Right. So, what's your number now? Three. And it's because of these tests here. So, they helped to change your mind. Okay, cool.

Warren: Anybody else change their mind? Any of the boys up there? You change your mind? Ya, Brandon.

Brandon: I started a three and just went down to a two.

Warren: Okay, why were you a three to begin with?

Brandon: Because I wasn't really sure about it yet. And now it doesn't seem so bad as I thought it was.

Warren: Okay, so what helped you to change your mind to a two?

Brandon: Ah, mostly the tests and stuff. Not as dirty. I didn't actually test it before. It's not as dirty as I thought it was.

Warren: So maybe you thought the pH was out of whack, or there was some pollution there. At least some of the tests showing that that might not be the case.

Warren: Did anyone not change their mind? Anybody stay the same? So, Lane, what'd you start with and what did you end with?

Lane: Two.

Warren: A two. Okay, so why did you start with a two?

Lane: Just because I assumed it was pretty good because of that worksheet we did before.

Warren: Okay. Nice. You had a worksheet and that helped you to figure out if the water was healthy. And why do you think it's a two now?

Lane: Cause we did the actual tests.

Warren: And it looks okay. So, even though we don't know the dissolved oxygen really. Even though the phosphates look unhealthy or borderline healthy, some of these other test help you to think that the river's healthy. Ya, generally a two.

Warren: So, why did we get you to do these tests? Why didn't we just go for a beautiful float like we did, I could have blabbed and blabbed and blabbed away, and I could have just told you that the river was a two. Why do we need to do any of this? Sorry, Jen, what was that?

Jen: Hands-on. Makes you learn more.

Warren: Hands-on and makes you learn more.

Jen: You're more likely to remember something you do other than what someone says.

Warren: Okay, so you think that this…

Jen: All day. For hours. And you just talk with us. Most of us is going to zone out half the time.

Warren: Right…

Jen: You forget it.

Warren: Right. So, doing this might help you to remember that the river's healthy.

Boy: And the hands-on makes it more interesting so we actually kind of want to learn it.

Warren: Okay, makes it more interesting. Would you have believed me if I told you that the river was healthy? No? Would you have believed me if I said that the river was dirty? Ya? Why? What's the difference?

Girl: Because of all the pollution on the side. It looks green. Foam.

Warren: It looks green. Do you think that people telling you that something is healthy or unhealthy is a good way to make up your mind? No? Do you think that there's other things in your life that people are telling you is one way or another? Ya? Like nutritional facts, right. Do you think you should believe what other people tell you all the time? No, right? Maybe you should do some of your own investigating.

Warren: So, the way I like to think about these tests is a little bit like – and science in general, actually - is like how I think about my glasses. If I took my glasses off, and you said, "Warren, what does the world look like?" I would look at you – sorry - I would look at you, and I would say, "Fuzzy. People look fuzzy. Rafts look fuzzy. Trees look fuzzy. But because I have these glasses – these lenses – it helps to bring things into sharper focus, into a sharper clarity. So, some of these things, some of these things like pH, dissolved oxygen, maybe nitrates, maybe phosphates, maybe even bio-indicators – we might need a lens or a tool to help us see these things properly. Okay, you can think of these tests – maybe like science in general – as a tool to help us see our natural world in better clarity. It's certainly not the only lens we can use, but I think it's a very useful one.

Warren: So, I just want to say that I think you did an excellent job on your tests today. So, you can give yourselves a pat on the back. And give your partner a pat on the back. Well done team. And let's get some nice, strong forward paddles…

Saying Good-Bye

During the last floatable section of river

Well, it's time to say a fond good-bye to RiverWatch today. I enjoyed your help and conversation today.

You were great young scientists and we now know the answer to the question "How healthy is our river?"

1. Just to review, what are the steps of the scientific method?
2. What are three kinds of variables in an experimental study?
3. Thinking of the scientific method, what is another name for our first test site?
4. Thinking of the scientific method, what is another name for our second test site?
5. What do you think of doing science outdoors?
6. Besides us today, who does the monitoring of rivers?
7. How would someone become an environmental scientist?
8. What will you tell your family and friends about the Bonnybrook Wastewater Treatment Plant?
9. What will you tell your family and friends about the Bow River?
10. Do you have any favorite memories from today?

Okay, I think you had a great day!

- How about a round of applause for your teacher/volunteer supervisor today?
- How about a round of applause for this great team!

Things will get a little busy once we hit shore, so it's good to say good-bye now while we have the chance.

- Good luck in your science course and career pathways from here on!