Staff _____

RiverWatch
Science. Education. Adventure

Edmonton River Interpretation

A Resource for RiverWatch Guides on the North Saskatchewan 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.

Dawson Park

edmonton.ca

Dawson Park Shelter

Dawson Park is named after John Dawson who studied engineering at the U of A in the early 1900's and became a pioneering geologist in northern Alberta.

The current Riverview residential area once had a lumber mill, a brickworks and a coal mine nearby. The City once had an early wastewater treatment plant in the area where the Dawson Picnic Shelter now stands.

Designed by Edmontonian Glen Norton, the park features gravel paths specifically designed for visually impaired visitors, lined with raised wooden edgers that can be tapped with a person's white cane. Along the trail are seven Braille signs, which can be read by sighted and visually impaired visitors.

Dawson Park contains an off leash site on the granular trail on northwest side of Dawson Bridge extending to Capilano Bridge and on to 50 St. Keep dogs on leash when crossing bridges.

The Alberta flag flys above the shelter. Alberta's motto is "Freedom to create. Spirit to achieve."

Used syringe complaints ignored, park users say

Needles remain in downtown Edmonton's Dawson Park

Posted: Aug 14, 2012 7:17 AM MT

Used syringes can be found under the vegetation bordering a small park at Jasper Avenue and 92nd Street. (CBC)

People who use a park on Jasper Avenue and 92nd Street say the city isn't reacting to their complaints about used hypodermic needles that pose a danger to them, their children and their pets.

"The response from the city seems to be minimal," said Patrick Gignac, who walks his dog in the park east of downtown Edmonton every day. "They don't have staff who know which department to direct to have this stuff cleaned up."

Gignac says he and other users have called the city about the problem for months. But city officials claim they haven't received any complaints.

Patrick Gignac says the park was well-used after it was cleaned-up last year. CBC

Sharon Chapman, with Capital City Clean-Up, says residents need to call the city's 311 information line. "According to the 311 script that the City has in place, it's fairly clear where and who is responsible for picking up the needles," she said.

Staff from Capital City Clean-up and city firefighters are trained to dispose of used syringes.

Gignac is frustrated at the state of the park, which was well-used after a two-year clean-up. "Last year it was really nice and this park was utilized quite a bit. People were in here, they were bringing their pets every day here, playing with their kids, having picnics here," he said.

"Now it's too messy, it's too dirty and too dangerous."

Welcome to the North Saskatchewan River!

Welcome to the North Saskatchewan River and Watershed. We're setting off on an adventure to **learn river ecology and understand solutions** to issues that impact water quality and riparian areas.

Just to orient you, we're downstream of Rocky Mountain House and Drayton Valley. This river has its source in the **Columbia Ice Fields** of Banff and Jasper National Parks and is designated there as a Canadian Heritage River.

From here, the river continues downstream through Ft. Saskatchewan, Saddle Lake Reserve, into Saskatchewan, through Battleford, Prince Albert and on to Manitoba to join Lake Winnipeg and **eventually empty into Hudson's Bay**.

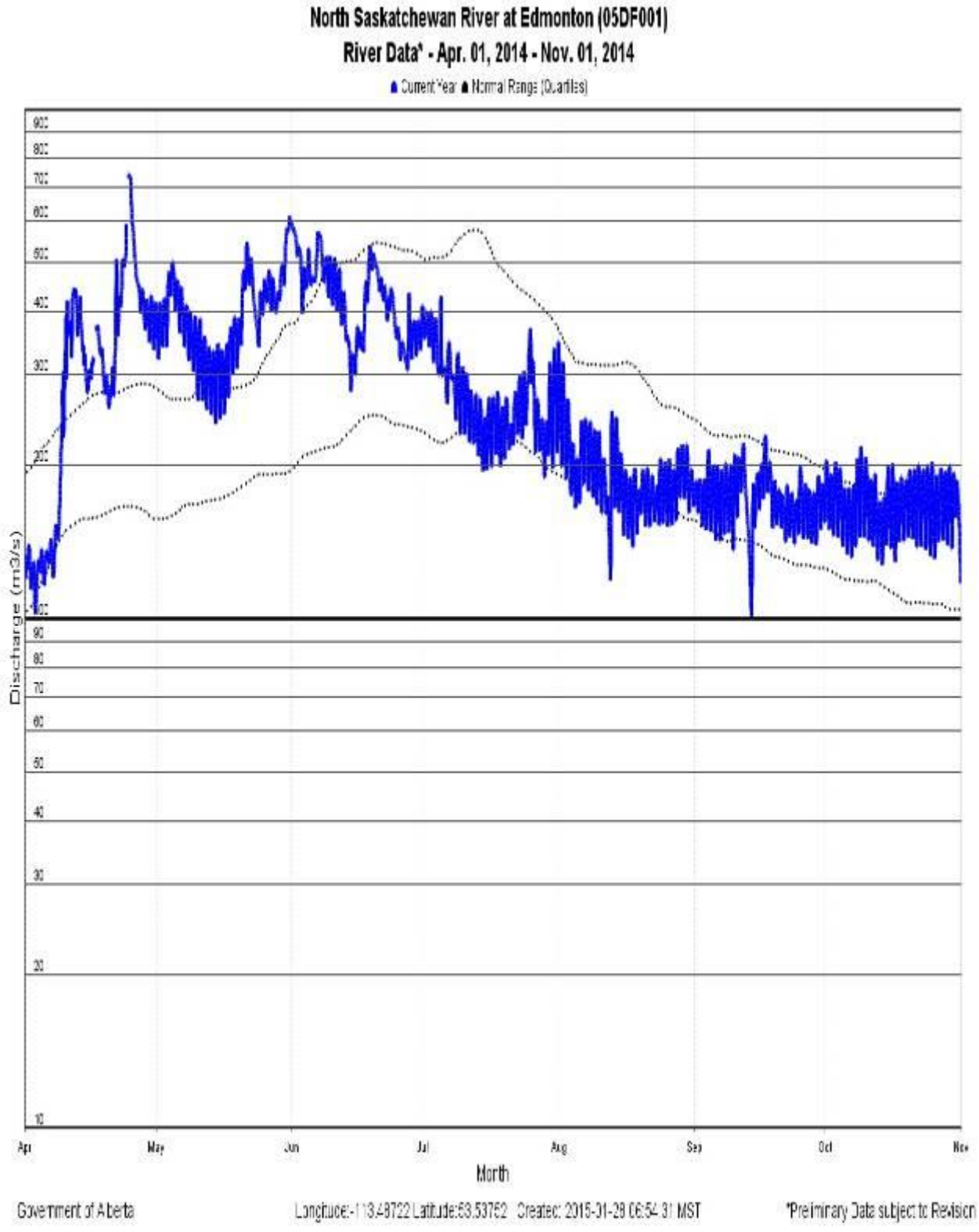
The **flow rate** today is about _____ cms which is _____ for this time of year. The massive peak flow of the 1915 flood was approximately 4600 cms or nearly 50 times greater.

There are two large **hydroelectric dams** and reservoirs upstream on this river. The Big Horn Dam on the North Saskatchewan River creates Lake Abraham and the Brazeau Reservoir is created by the Brazeau Dam located on the Brazeau River. The dams are operated by TransAlta.

How deep is the river? You can **try poking your paddle down** as far as you can right now.

NORTH SASKATCHEWAN flows at EDMONTON

RiverWatch programs are limited to flow rates below 500 cms – at flows greater than that, there is no longer enough shoreline for water quality monitoring stops.



NORTH SASKATCHEWAN flows at EDMONTON

Bill Mah, The Edmonton Journal

Published: Tuesday, May 08, 2007 and updated by RiverWatch

EDMONTON - BY THE NUMBERS

The Water Survey of Canada has recorded the flows of the North Saskatchewan River at the Low Level bridge in Edmonton since 1911.

- 5800 cms - The highest flow on record occurred on June 28, 1915, with a flow of 5,800 cubic metres per second.

- 4520 - The next biggest flood occurred on July 19, 1986, with a flow of 4,520 cubic metres per second.

- 2841 – The high water event Sunday June 23, 2013 15:00 at 2841 cms was linked to the same rain event that caused Calgary's Flood 2013

- 2600 – The high water level on June 21, 2005 had a flow of 2,600 cubic metres per second. In the last days of this flood event, the river peaked early Sunday morning with a flow of 1,680 cubic metres per second. As of noon Monday, the flow had dropped to 870 cubic metres per second. Calgary also had a high water event at the same time.

- 300 - Normal mid-summer flow would be about 300 cubic metres.

- 75 - Extreme low flow during the summer would be 75 cubic metres per second.

Source: Alberta Environment

Watershed Geography

After the first test site and while floating to the 50 St. Boat Landing. Five minutes.

We've been rafting and exploring this river all morning. Let's review some geography.

- **What river** is this? (North Saskatchewan) And it starts in the mountains with melting snow and ice from what glacier? (Saskatchewan Glacier…. in Jasper National Park.)

- Where does the river pass **on the way to Edmonton?** Abraham Lake, Big Horn Dam, Nordegg, Rocky Mountain House, Drayton Valley and Devon

- Where does the river go **after Edmonton**? Ft. Saskatchewan

- Way downstream, **what rivers start to join together**?…North Saskatchewan into South Saskatchewan, Saskatchewan through Saskatoon, Lake Winnipeg, Nelson, Hudson Bay and finally….the Arctic Ocean.

- Rivers are located in a watershed. **What is a watershed?** It's an area of land drained by all the creeks into one main river. Edmonton lies in the _____ watershed.

- 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 (1%).

- **Why doesn't a river just run dry in the summer?** The Water Cycle or Hydrologic Cycle keeps matter recycling. The water molecules have been on earth since the beginning of time! Once part of a dinosaur, maybe a buffalo…

- **In a 100-year period, a water molecule can spend** 98 years in the ocean, 20 months as ice, about 2 weeks in lakes and rivers and less than a week in the atmosphere.

Geography of the North Saskatchewan River

http://www.edmontonrivervalley.com/geography.html

The North Saskatchewan is a majestic and beautiful river winding in a northeastern direction through Edmonton.

It originates 1,800 metres above sea level in the massive 325 sq. km Columbia Icefield. It flows across Alberta and Saskatchewan to Lake Winnipeg, into the Nelson River and eventually into the Hudson Bay.

Dividing the parklands and the plains, providing a navigable corridor for most of its 1,300 kilometre route, the North Saskatchewan River is one of Canada's most historic waterways.

In the 18th and 19th centuries, the Saskatchewan River Route was one of the country's most important fur trading arteries, and in the 20th century, it anchored the urban and economic development of much of Canada's western prairies.

In Edmonton It runs from the southwest to the northeast through the city and is fed by numerous creeks throughout the city, such as Mill Creek and Whitemud Creek. This creates numerous ravines, many of which have been incorporated into the urban parkland.

North Saskatchewan in Edmonton

Dawson Bridge

The Dawson Bridge was built in the early 1900's and was named in honour of H.S. Dawson who owned the Dawson Coal mine. Dawson Park is named after his son.

Originally, it was a railway bridge carrying coal across the river.

The nearly 100-year-old bridge was closed all of 2010 while crews replaced the road surface and bolts and reinforced trusses. The structure was also be repainted and a new, wooden sidewalk was added. The upgrades are expected to extend the life of the bridge to 2060.

Edmonton's Dawson Bridge set to reopen

Year-long rehab finally at an end

By Jamie Hall, edmontonjournal.com December 17, 2010

The Dawson Bridge, here shrouded in early morning fog will be closing for repairs starting January 4 2010. The repairs are expected to be completed by December 2010.

Photograph by: Rick MacWilliam, edmontonjournal.com

EDMONTON - Edmonton's Dawson Bridge will reopen to traffic, nearly a year after the city closed the nearly 100-year-old structure for major repairs.

"The rehabilitation of a bridge that is almost a century old posed some unique challenges," said city spokesman Allan Bartman, "but closing it to traffic over the past year allowed us to accomplish a great deal.

"The work we've done means that the Dawson Bridge will continue to provide safe access to and from the downtown area for another 50 years."

Work will continue through December and into January on the south sidewalk of the bridge, and paving work will need to be finished on the Rowland Road approaches in the spring, but the rest of the work has been completed.

In the past year, crews have replaced the concrete deck with a new lightweight deck, replaced old-style rivets with modern high-strength bolts, repaired worn truss components, constructed a new widened wooden sidewalk and completely repainted the entire bridge.

Historic photos just a click away

City archives puts more than 25,000 pictures online

By Cigdem Iltan, Edmonton Journal
July 9, 2009

North Saskatchewan River in Flood. On June, 1915 a train was placed on Edmonton's Low Level Bridge to prevent it being washed away. Photograph by: City of Edmonton archives, Edmonton Journal

People digging through Edmonton's archives can now access more than 25,000 photos from their home computers instead of visiting the archives building.

The archives website features the top 200 most-requested photos from the archives, many of which can be seen on walls of homes and offices in Edmonton, said archivist Michael Payne.

The most requested photo in the archives collection depicts a train parked on the Low Level Bridge during the flood of 1915 to keep the bridge from being swept away, he said. The outline of the Hotel Macdonald can be made out faintly in the background.

People can order most images online for $20, except for panoramic images of Edmonton, which are priced by the foot, she said.

People can visit Edmonton's photo archives website at archivesphotos.edmonton.ca.

June 28, 1915 Flood sweeps away 50 homes

edmontonjournal.com June 28, 2012

Edmonton Yukon and Pacific on the Low Level Bridge during the flood of 1915. Note the buildings crushed on the upstream side of the bridge. Photograph by: City of Edmonton Archives

A shaken telephone operator at Rocky Mountain House sent this warning to the City of Edmonton: "My God, Edmonton, look out; the river's up 20 feet and still jumping."

Heavy rains caused the North Saskatchewan River to rise 11 metres above the low-level mark. Nearly 50 homes were swept away in the torrential waters; 500 more were either partly or entirely submerged. At least 2,000 people were left homeless, and more than 35 city blocks were under water.

In the previous 24 hours, nearly 40,000 people had witnessed the spectacle of floating and submerged houses, of big industries standing in lakes of water, buildings crumbling and floating away. Hundreds of families were grouped on the hillside, standing guard over the remnants of their belongings.

The Low Level Bridge was in a precarious position. A heavily loaded freight train was driven onto the bridge to weigh it down.

The city power plant and pumping station were operating under the greatest difficulty. The flood had so far claimed no lives. There were ample warnings given and 20 police officers were patrolling the outer edge of the danger area.

One man was rescued after getting swept into the current while trying to save some furniture. Two venturesome boys were removed from the area by police.

By the next day, it would all be over, leaving residents to assess the damage.

Dawson Coal Mine

Edmonton.ca and Herzog on Heritage | January 24, 2013 | Article 035

Dawson Park shares a long history of industry and coal mining dating back to the early 1900's.

The Dawson Mine was situated across the river on the east bank where the current Riverside Golf Course parking lot is. The Dawson Coal Mine, founded by H.J. Dawson just east of the Dawson Bridge, was operating by 1907. The mine was the driving reason for building the Dawson Bridge in 1911. The bridge was built to help facilitate the movement of workers and coal. The Dawson Mine closed in 1944.

Dawson Coal Company Ltd., 1914.
Glenbow Archives, NC-6-1170.

Riverside Golf Course celebrates 60th anniversary

By Curtis Stock, edmontonjournal.com August 22, 2011 9:02 PM

Ken Darlington, a 94-year-old golfer, golfs at the Riverside Golf Course as the course celebrates its 60th anniversary with a nine hole tournament on Aug. 22, 2011 in Edmonton. Photograph by: Greg Southam, edmontonjournal.com

EDMONTON - Sixty years ago, Riverside Golf Course opened its doors, a nine-iron from downtown in the river valley. Sixty years later, Norm Seehagen, a member since Day 1, is still trying to bring the old girl to its knees.

"It was a different golf course back then; much tougher," recalled Seehagen, 84, after Mayor Stephen Mandel, ward councillor Ben Henderson and course head pro Ken Ingoldsby were among those participating in Monday's sun-washed, ceremonial, rededication, tee-off and nine-hole mini-tournament. "Some of the holes had to be changed because some people thought it was just too tough."

Another longtime member, Ken Darlington, 94, said the biggest difference to him are the trees. "They're much taller than they used to be," he said, laughing.Not that it's stopped Darlington. Last year, he shot his age or better 40 times. "I've done it 15 times this year, but I missed one month of playing golf after I had a slight heart attack," he said. Asked what his favourite hole at Riverside is, Darlington said: "I like them all, but I guess I should say No. 14 because I've had two holes-in-one on that hole." Darlington's latest ace came just two years ago.

Seehagen said the tall trees that now line every fairway, and the rerouting of some of the holes, aren't the only changes. "There were a lot more bushes. And if you hit it in there, it was pretty much lost. Now they've cleared away some of the bushes." Mandel mentioned the trees himself. "It's a great track," Mandel said. "I've played Riverside several times. But mostly from out of the trees. "Over the years, Riverside Golf Course has played a major role in this city's golfing scene. Our city is honoured to have a course that is rich in history and regarded as one of the best municipal courses in Canada."

Riverside was built on the site of the old Dawson mine, where Seehagen's father, Ernest, used to work. Seehagen recalls that when the old Prince Rupert Golf Course, which used to be operated by the Hudson's Bay Company — sitting between 107 and 111 Avenues and around 116 Street — was shut down in 1950, the Riverside course designers and staff simply took the greens right off the Prince Rupert track and put them down at Riverside. "Two weeks after the sod was put down, we were playing golf at Riverside," said Seehagen.

"It's just a great golf course," said longtime member Mary Reimer, whose daughter, Jan, used to be the city's mayor. "There have been many, many changes. All for the better."

Riverside is home to many stories and many characters, but it's most famous denizens might just be its squirrels, which snatch up balls in their teeth and then happily run up trees and put them in the nests of magpies. The story goes that the squirrels aren't larcenous, they just do it to drive the magpies away. On one occasion, Ben (Ball Hawk) Kucher, who had his ashes spread at Riverside several years ago, climbed one tree and didn't leave until he had thrown some 250, well-chewed and bitten golf balls to the ground.

Our Badlands

Discussed while rafting downstream from Dawson Park . Two minutes.

See that light grey riverbank downstream? That riverbank is composed of relatively soft and dinosaur-aged sandstone and shale called **cretaceous bedrock**. The sediments were originally deposited in river channels and mudflats. Back then, there were sediment-laden rivers meandering through submerged mud flats and volcanic eruptions to the west darkened the skies with ash that settled onto the mud.

Hoodoos form when harder **reddish ironstone cap rock** on top protects the **softer grey sandstone** underneath from eroding. It's not necessary to travel to Drumheller to see badlands!

Some of the soil layers here are mixed with **volcanic ash** from a volcano that erupted 8000-years ago. This soil and ash mixture is chemically unstable and weathers to form thin layers of something called **bentonite clay.** Something very unique happens when it gets wet: bentonite expands 5-10 times in volume. Sometimes it's called "**popcorn rock**" because that's how it looks when it expands and then dries out again. The reason there is no vegetation on the clay is because the bentonite actually sucks up water faster than the roots of a plant can suck up water. Also, it is about as **slippery** as grease!

Combined Sewer System – Rat Creek

This outfall is called Rat Creek (after muskrats here in the river).

It is a special kind of storm drain called a **Combined Sewer Outfall (CSO)**. In combined sewers, both storm water and sanitary water may be mixed and may go to the Gold Bar plant for treatment.

Q. What happens when a storm produces too much water and Gold Bar is over capacity?

If there is high runoff from storm water, Gold Bar cannot handle all this wastewater. To prevent a release of diluted raw sewage into the river, a really neat new system closes a valve and stores the water backed-up right in the pipe. Once the storm is over, the water can be slowly diverted to Gold Bar for treatment.

There are three kinds of sewer systems that we will be talking about today:

1) Storm Drains
2) Sanitary Sewers
3) Combined Sewers.

What's the difference?

Rat Creek Combined Sewer Outfall (CSO)

Floating near the Rat Creek outfall and point the raft to shore.

Q. Does anyone know what that concrete ramp and tunnel is? **A.** Storm water outfall.

Q. Where does the water come from that might run out of this outfall? **A.** Streets and toilets.

Thousands of kilometres of underground storm drain pipes carry surface runoff to the river. Some of the water has a chance to clear in settling ponds or wetpond marshes before entering the river. In Edmonton's older communities – like downtown – some of this storm water is combined with sewage wastewater and treated at the wastewater plant.

Q. Is stormwater treated before it drains into the river? **A.** Maybe!

Much of the stormwater in all the newer 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.).

Q. Why are storm water outfalls numbered? **A.** So you can report pollution problems.

Q. Why isn't water coming out of this Rat Creek CSO? (Named for muskrats!)

Edmonton Drainage Services Engineers have recently installed "Real Time Monitoring" at this site. In a localized storm event, a metal gate closes this outfall and traps up to 80,000 cm^3 of run-off and sewage inside the pipes for later gradual release to the Gold Bar Wastewater Treatment Plant. Cool idea. Technology can help the environment! So even in wet weather, there probably won't be water gushing out here any more.

Construction Crane. The City of Edmonton Drainage Services is tunnelling under the river 2008-2010 to connect the Rat Creek Storm Water Outfall to the Gold Bar Wastewater Treatment Plant. The tunnel is hundreds of meters under the river and takes years to complete. Edmonton is known around the world for its tunnelling expertise.

Edmonton’s new sewer tunnel will reduce contaminants in North Saskatchewan River

By Alexandra Zabjek, Edmonton Journal June 5, 2013

EDMONTON - The underground construction of a new sanitary sewer tunnel that will decrease the amount of sewage-contaminated water that flows into the North Saskatchewan River during heavy storms is complete, but the system won’t be in operation for this summer’s storm season.

The West Edmonton W12 Sanitary Sewer Tunnel will reduce the amount of combined sewage outflow — which includes stormwater and raw sewage — from about 200 million cubic metres per year to 600,000 cubic metres per year at the Rat Creek outflow point.

“After it’s completed, there will be less sanitary discharge to the river,” said Junhao Zou, a senior engineer at the city. This will especially benefit those who live downstream, or east, of Dawson Park where the Rat Creek outflow is located.

The real-time control building for the sewer tunnel is scheduled to be in operation by November. It will be located at the Gold Bar Wastewater Treatment Plant.

Combined sewage outflow is an issue in Edmonton because the underground sewage and storm systems combine in older city neighbourhoods, such as downtown. During storm events, this dirty water overwhelms the system’s current capacity and flows into the North Saskatchewan at the Rat Creek outflow point.

But according to 2012 data from the city’s drainage department, the amount of fecal coliform entering the North Saskatchewan River from Edmonton has now dropped to levels last seen in 1910.

That’s good news for the boaters, paddle boarders and canoeists who use the river every summer. Several municipalities in the Edmonton-area are hosting River Day activities this Saturday to encourage residents to get onto the North Saskatchewan.

Sturgeon Story

Sourced from Canadian Geographic Magazine

In the Great Lakes of eastern Canada, anglers were catching Lake Sturgeon with elastic bands wrapped around their noses. The fish were weak and dying and in trouble as they were being cut and could not 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 lake sturgeon fed off the bottom of the lake they got their noses stuck inside the band. Each time the fish pushed into the mud looking for clams, the elastic got tighter.

I find it amazing that a person dropping elastic bands on the ground can effect a species of fish so dramatically…Do you? How many people, including myself, 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?

Sturgeon Habitat Creation

Downstream of Dawson Park. Outside bend.
Jason McDiarmid, R.E.T. Terra Erosion Control Ltd., Consultant's Website

Only 190 breeding sturgeon adults are thought to exist. This is even more of a concern because of the three dams which divide the river into genetically isolated 'lakes'. Below the Rat Creek CSO is a rehabilitation sturgeon spawning habitat. Concrete structures were placed on the river bed to create eddies where sturgeon prefer to spawn.

Stantec Engineering worked closely with Fisheries and Oceans and The City of Edmonton in the creation of approximately 900m^2 of Sturgeon habitat on the North Saskatchewan River.

Fisheries and Oceans (DFO) requires compensation for projects whose impacts are deemed to be unmitigable. Such projects that have potential for (HADD) - harmful alteration, destruction or disruption of existing fish habitat - require compensation in the form of conservation.

Stantec was retained by The City of Edmonton to fulfill requirements of HADD compensation accrued during construction of two recent City projects. Stantec, DFO and The City approach allowed for unique and substantial conservation effort in the form of a 900m^2 area of in stream boulder placement for the creation of sturgeon habitat.

From August 1st to September 15th of 2005, equipment and materials were mobilized to Dawson Park where a 230-ton crane placed specially selected limestone boulders in the North Saskatchewan River adjacent to the Rat Creek Outfall. Juvenile and adult fish will use this habitat for resting and feeding and it will provide nursery habitat for fry allowing them to escape faster currents and predators. This new habitat is hoped to result in a significant boost to the Sturgeon population on the North Saskatchewan River.

Rat Creek Fish Habitat Creation
The Rat Creek Fish Habitat Creation project involved construction of Sturgeon habitat in the North Saskatchewan River as compensation for other outfall construction and rehabilitation activities. I was responsible for the design and tender phases of this project. Jason McDiarmid, R.E.T. Terra Erosion Control Ltd.

Conclusion
According to an ESRD Fish and Wildlife official April 17, 2015, the project was not successful for sturgeon but likely was of benefit for walleye and suckers. The site was likely chosen as a showcase project for remediation.

Lake Sturgeon Habitat Construction

Edmonton Biodiversity Report 2008

Edmonton's Drainage Services Branch helped to protect Lake Sturgeon living in the North Saskatchewan River through the construction of a replica fish spawning bed in 2005.

Approximately 950 square meters of Lake Sturgeon spawning habitat were created along a stretch of the river thought to be attractive for spawning. Staff worked with researchers to create an optimal spawning habitat based on a similar design that successfully protected populations of Lake Sturgeon in Wisconsin (United States). It is hoped that these efforts help to strengthen the Lake Sturgeon's at-risk population.

Creation of LakeSturgeon Spawning Habitat on North Saskatchewan River

Lead: Drainage Services Branch

Type of project: Protection of a fish population through habitat creation

Project Goals: To construct a replica fish spawning bed that successfully supported Lake Sturgeon populations in rivers in Wisconsin. This project was located on a stretch of the North Saskatchewan River within the City's Dawson Park and upon completion, converted approximately 950 square meters of river bottom to Lake Sturgeon spawning habitat.

Timeframe: Work completed 2005

Methods used: Consultation with local experts, review of known natural spawning areas along the NSR, review of a similar project completed in Wisconsin, application of principles to Edmonton context

Roles/Partners: Drainage Services, Alberta Sustainable Resource Development, Fisheries and Oceans Canada

Biodiversity Threat(s) addressed: Habitat Degradation, Extirpation

Sturgeon

Downstream of Dawson Park. Outside bend.

This deep outside river bend may also be home to sturgeon.

This is one of the oldest families of bony fish in existence unchanged for millions of years. They are native to Eurasia and North America. They are distinctive for their elongated bodies, lack of scales, and occasional great size ranging from 2-3½ m in length. Sturgeons are bottom-feeders eating freshwater clams.

Several species of sturgeons are harvested for their eggs which is made into caviar—a luxury good which makes some sturgeons pound-for-pound the most valuable of all harvested fish.

Because they are slow-growing and mature very late in life, they are particularly vulnerable to over-fishing and to other threats including pollution and habitat fragmentation. Most species of sturgeons are currently considered vulnerable, endangered or critically endangered.

No sturgeon fishing Licences are issued in Alberta. Harvest opportunities have been suspended until stocks recover. The sturgeon limit is 0 for all waters in the province

Notes, Owen Watkins Lecture April 17, 2015

- Historically, oxygen levels downstream of Edmonton were near zero and impacted fish
- Less than 2000 in the North Saskatchewan, and this is with recent rebound success
- Most are under 25 years old; some up to 45 years old; very few old fish; none are 120 years
- Annual mortality of nearly 10%
- No sturgeon further upstream than Drayton Valley but found all the way into Saskatchewan
- Only 500 breeding fish
- Females mature at 25 yrs and spawn every five years
- Only 35 females spawn each year
- Caught with salt water gear, pyramid weight and a hook with a minnow during the night
- Lucky 4 upstream of Edmonton is renowned location
- Radio implants into 55 and tracked from air craft
- Difficult to track from the air –depends on fish depth and aircraft altitude
- Sturgeon move in spring and fall, up to 500 km

Sturgeon Lecture

A St. Albert biologist is giving a free talk on the namesake of the Sturgeon River. Alberta

Environment Wednesday, Apr 15, 2015 06:00 St. Albert Gazette

Fisheries technician Daryl Watters puts a just-netted lake sturgeon into a water-filled trough for examination in this 2010 photo on the North Saskatchewan River. KEVIN MA/St. Albert Gazette

Biologist Owen Watkins is speaking at the Edmonton Nature Club this Friday about the life history of lake sturgeon in the North Saskatchewan River.

Lake sturgeons are the huge, armoured, long-lived fish after which the Sturgeon River was named. Watkins, who lives in St. Albert, has spent many years using radio tags to track the movements of lake sturgeon in the North Saskatchewan in hopes of mapping their breeding grounds.

Equipped with armoured plates, sensory barbells and an upturned snout, these ancient fish can grow to up to 2.5 metres long and live for up to 150 years.“They’ve pretty much remained unchanged for the last 200 million years.”

Once abundant in Canada and in the Sturgeon, lake sturgeon are classified as a species at risk in the Saskatchewan river basin, with many researchers recommending that they be upgraded to endangered status.

Lake sturgeon populations around Edmonton plunged after the 1950s likely due to low flow and oxygen levels in the river caused by the city’s activities, Watkins said. Fertile adults are rare nowadays, making it tough for them to build their numbers.

Lake sturgeons are an important indicator species of river health, Watkins said. “We don’t want to lose this species.”

The talk is at King’s University College at 7:30 p.m. on April 17. Visit edmontonnatureclub.org for details.

Sturgeon surgeon

Researcher sews transmitters into North Saskatchewan River lake sturgeon to find out why the ancient fish's numbers are dwindling.

By Bev Betkowski on October 26, 2011

http://uofa.ualberta.ca/news-and-events/newsarticles/2011/10/sturgeonsurgeon

Owen Watkins releases a lake sturgeon equipped with a transmitter. Watkins says poor numbers of lake sturgeon in the North Saskatchewan River could be an indicator of river health.

(Edmonton) - Owen Watkins is skilled at deftly sewing radio transmitters into lake sturgeon, one of Alberta's most ancient fish. He jokingly calls it "sturgery," but, wordplay aside, his research project is addressing a serious problem.

The lake sturgeon, classified as an endangered species in Canada, has been in existence for 200 million years, but their numbers are dangerously low—about 1,700 fish— in Alberta's North Saskatchewan River.

Watkins, a master's student in the U of A Department of Renewable Resources, is working in collaboration with Alberta Sustainable Resource Development to find out why the population is low, and what can be done to manage the situation. Currently, there are four to six lake sturgeon per river kilometre, compared to a healthy population in for instance, Wisconsin, where the sturgeon are managed to 150 per river kilometre.

"Right now, five per cent of those 1,700 fish are mature, and if we assume a ratio population of 50:50 male to female in any given year, there are only about eight female fish that are spawning," said Watkins, who also works as a woodlands area fisheries biologist with Alberta Sustainable Resource Development.

Female fish can take upwards of 25 years to mature and can live up to 154 years. The overall sturgeon population should be showing a wide age variety in the river, but the oldest sturgeon his research team has been able to find is 64.

“There is a possibility of losing the species completely,” he says.

Popular with sport fishermen, the sturgeon historically was commercially harvested and shipped to Europe as a food source, and today could be an indicator of river health, Watkins said.

Spanning 500 kilometres of the river between Drayton Valley in west-central Alberta and the Onion Lake bridge on the Saskatchewan border, Watkins’ study is testing three theories on the population: first, that the fish population is now slowly recovering from low oxygen levels that existed prior to the 1960s before Edmonton began treating its sewage; second, that the fish use the river only seasonally to spawn, forage and then leave; and third, the possibility that the population is being overfished, even with a catch-and-release regulation, there is an associated mortality factor.

By implanting transmitters, tagging, measuring and collecting age data on the fish, the researchers are tracking their habitat movements, deriving population estimates and collecting other data to get a snapshot of what the sturgeon population has been doing for the past 20 years.

“We want to get an idea of whether the population is up, down or unchanged.”

Fishermen on the river are also being surveyed as part of the study.

Initial positive findings indicate that young sturgeon, aged two and three, are being found, which means the fish are reproducing, Watkins noted.

The team’s final findings will be presented to the provincial government and will “guide a recovery plan and help manage the North Saskatchewan River not just for sturgeon, but for the benefit of other river fish,” he added.

Watkins’ research is funded through Alberta Sustainable Resource Development and through Environment Canada’s Habitat Stewardship Program.

Fisheries biologists see small signs of recovery in species' populations in the North Saskatchewan

By Brent Wittmeier, Edmonton Journal September 7, 2013

Owen Watkins, a master's student in the University of Alberta's Department of Renewable Resources, prepares to weigh and measure this lake sturgeon. Photograph by: Shaughn Butts , Edmonton Journal

At dusk, fisheries biologist Owen Watkins casts a line into the North Saskatchewan River.

Fisheries biologist Owen Watkins baits a line at dusk.

Sling in hand, fisheries biologist Owen Watkins runs to where a sturgeon is being reeled to shore along the North Saskatchewan River on Aug. 21,2013.

Fisheries biologist Owen Watkins scans to see if and where this sturgeon has been caught and tagged before.

Fisheries biologist Owen Watkins is able to determine the presence of fish that have been caught and tagged with telemetry equipment. Shaughn Butts/Edmonton Journal

This teenage lake sturgeon had previously been caught and tagged in Saskatchewan

Fisheries biologist Owen Watkins ensures his reading and tagging equipment is ready.

Its whisker-like barbels are evident as this teenage lake sturgeon floats in a sling that allows it to be weighed and measured.

A teenage lake sturgeon floats in the shallow waters of the North Sasaktchewan River in a sling which allows the fish to be weighed and measured. Owen Watkins, a master's student in

the University of Alberta's Department of Renewable Resources, has been tracking the lake sturgeon population in the river between Drayton Valley and the Saskatchewan border.

EDMONTON - In a snapshot retrieved from his cellphone, Owen Watkins is grinning, his arms wrapped around a sleepy, slightly inebriated friend.

The stupefication of his 44-year-old buddy is understandable: Watkins heaved him from the North Saskatchewan River, placed him in a water bath full of dissolved anesthetic, then performed minor abdominal surgery to insert a knuckle-length transmitter.

A few seconds after the photo, the fisheries biologist returned the 35-kilogram fish to the current.

Mature lake sturgeon are so rare in these parts that Watkins doesn't show that picture to just anyone. It's perfectly legal to catch and release the fish in Alberta, but with the inevitable stress it causes the fish, the thought of anglers snapping their own fishy selfies gives Watkins nightmares.

Lake sturgeon haven't really changed in 200 million years of evolution, can outlive any human and balloon to nearly 100 kilograms and a length of more than two metres. But after decades of pollution, damming and fishing, only an estimated 6,300 remain in the North Saskatchewan River. Most are pre-adolescents, not even old enough to spawn.

On a hot August afternoon three years after the photo was snapped, Watkins stands on the same muddy bank, a hairpin turn between Drayton Valley and Spruce Grove. Looking out to coal-seamed cliffs pocked by swallows nests, he has already spotted a distinctive dorsal fin breach the surface. Thundering crashes will punctuate the serenity in the hours that follow. If you didn't know better, you'd mistake them for rocks tumbling off the banks.

Watkins has caught "Number 75" — the fish in that photo — roughly 40 times in the past three years, albeit without pulling him out of the water. As part of a conservation biology project at the University of Alberta, he's been tracking 52 "sturgery" patients. During 5-1/2-hour flights from Lloydminster to Drayton Valley, the fish's western boundary, he finds his fish from the wings of a Cessna, locking in signals up to 10 kilometres away.

When Watkins wraps up his analysis later this year, he'll have created something Alberta Environment and Sustainable Resource Development has never had before: an accurate understanding of the size, age and seasonal terrain of the North Saskatchewan's sturgeon population.

Size and history aren't the only things that mark sturgeon as a curiosity. Instead of scales, they have five rows of armoured scutes, barbed blades that wear down into bony plates in old age. Whisker-like barbels and an extendable mouth allow them to taste their way across the riverbed, sucking up larvae and mollusks along the way.

The fish are octoploids — four times the number of chromosomes of most animals — making it tricky to differentiate the males from females. Biologists gauge their age like they would a tree, counting growth rings on bones from fin samples. It gets trickier with older fish. Watkins shrugs off accounts of sturgeons in their 150s as just "really old."

Endurance might be the sturgeon's most vital characteristic. Number 75 isn't in the neighbourhood today, the radio tracker shows, but in the spring after his first capture, the fish swam roughly 700 km to near North Battleford, Sask., for spawning. A month later, it was back at these banks.

Watkins is a Pisces, born a year earlier than Number 75. He actually grew up on the Sturgeon River. From the waters behind his parents' home in St. Albert, he'd catch pretty much everything: pike, whitefish, walleye, suckers, even the occasional "tree fish." But sturgeon haven't been found in the Sturgeon for many years.

After high school, Watkins initially studied renewable resources at NAIT, then completed an education degree. Between classes and periodic stints as a substitute teacher, he spent summers working doing "creel surveys" for the province. The job meant checking anglers' baskets to see what was inside and therefore in the water. Data analysis extended into falls and winters. And Watkins gradually morphed into a full-time fish and wildlife worker.

About a decade ago, he began working with Stephen Spencer, a senior fisheries biologist for the North Saskatchewan watershed. With Spencer's assistance, Watkins picked sturgeon as a project for a master's degree at the U of A. It was a perfect partnership: Watkins gets a degree, the school gets a peer-reviewed study and Alberta Environment and Sustainable Resource Development fills in gaps in their understanding of the prehistoric bottom-feeder. High-cost items — such as the plane rentals — are being covered through court fines paid by people who've damaged these waters.

Spencer is on Watkins' advisory committee and has accompanied him on many fishing expeditions. Today, he helps guide 50-metre gill nets along the banks in the hopes a sturgeon might roll into it, their characteristic evasive tactic. But there's no luck. As Spencer observes, if we were catching lots of them, they wouldn't be at risk.

At the simplest level, Spencer equates the work of the province's fisheries' biologists with pencil pushers.

"We're basically accountants," Spencer says. "We need to know how much money's in the bank, so that's why we do population estimates. We need to know interest rates, so we look at the old fish and young fish. And we need to know how much money's being spent. Our goal is not to overspend."

Watkins is essentially conducting a sturgeon audit. He divides the river into two populations, an older group of 2,700 mostly southwest of Edmonton, another 3,600 south and east of Smoky Lake. The study has shown the dividends of improving water management, evidence that numbers of younger fish are multiplying close to the Saskatchewan border..

Back on shore, eight fishing rods stand at attention at five-metre intervals on the bank, bells rigged in case a gargantuan bottom-feeder likes the looks of earthworms writhing on the river floor. Ringing will direct Watkins to the correct spot to reef back on the rod and set the hook. Then he'll reel like a madman.

The real action doesn't really get going until the coyotes are howling. Once it does, the fish bite steadily until two in the morning, Watkins grins, "until it stops or people can't stay awake any longer."

Sturgeon research in Alberta began in 1990 with a fisheries biologist known now as the "Sturgeon General." Over the years, Daryl Watters heard anecdotes about snagged logs that suddenly swam upstream. He figured all that remained of the river's sturgeon was a remnant population, until one day when a trusted angler told him about hooking several sturgeon. Watters tagged along.

By the next spring, Watters had assembled a team of four volunteers to catch and tag nearly 80 fish to get an idea of their age, population and size. Initially, most fish fell into two groups: duck-billed 50-centimetre kids or heftier 20-kilogram adults.

“It was just sort of evidence that these fish are just hanging on by the skin of their toothless gums,” says Watters, whose tagging program continues to this day. Aluminum tags were replaced by spaghettilike anchor or floy tags, then by transponders injected just below the skin. The cadre of certified volunteers grew to an almost-unmanageable 65, but has since scaled back to about a dozen.

There are several explanations for why the North Saskatchewan’s lake sturgeon population is a fraction of other North American rivers, between nine and 18 sturgeon per river kilometre compared to 150 in some U.S. rivers. The main one is that summer is shorter here. But there are also historical reasons. Before proper sewage treatment was instituted in 1960, Edmonton heaped garbage on its riverbanks and waste water and meat-packing run-off directly into the river. That left dead zones of little to no oxygen. Damming and agriculture run-off can also wreak havoc.

Sturgeon were also historically deemed expendable: trophies, caviar-fodder or lure-gobbling nuisances. Watters has seen pictures of a half-dozen giants strung up on an a wire. Prairie fishermen used to stack the oily fish on docks to dry, then use them like cordwood to power their steamboats.

Sturgeon weren’t just an alternative fuel source, they were also the canary in the coal mine. Females take 25 years to reach sexual maturity and spawn only once every five to seven years. Males mature in their late teens. When such a slow reproductive cycle is interrupted, populations plummet quickly.

Watters’ data was instrumental in showing how close the species was to the brink. It led to the end of legal harvesting of Alberta sturgeon in 1997, and it’s being used in Watkins’ study. Though Watters retired last year and is now just a volunteer, he takes some pride in seeing small signs of recovery.

“In recent years, we see some evidence of spawning success,” he says. “That, for me, is exciting because that’s kind of first fruit of a 23-year effort.”

More precise data will also clarify the consequences of industrial projects on the banks. It’s no longer possible to plead ignorance, Watters says, as these fish use almost all of the North Saskatchewan.

Apart from getting skunked in May, Watkins hasn’t been out to the old fishing hole much this year. The banks were much higher then, the water more turbid and the wind was blowing harder. Tonight looks more promising, though so far, it’s mostly suckers and goldeyes.

Shortly after 7 p.m., a ring emanates from one of the middle rods. Spencer grabs it and pulls up sharply, stepping back as he guides the fish to shore and into a stretcher designed to minimize handling. The 15-kilogram sturgeon is plump, likely a teenager, and extends 1-1/4 metres from nose to tip.

It’s already been on quite the journey: A spaghetti tag shows the fish had first been caught east of Prince Albert, Sask. Watkins lets the fish off the line and back into the water.

“He looked pretty healthy,” he says.

Edmonton company fined $200,000 for destroying creek

By Hanneke Brooymans, edmontonjournal.com February 16, 2011 Comments (4)

EDMONTON — A local company will pay a $200,000 fine for destroying a northeast Edmonton creek that could have harmed a provincially threatened fish.

Jovnic Ltd. pleaded guilty to commencing or continuing an activity without obtaining the necessary approval under the Water Act.

The activities took place between September 2007 and June 2008.

In the fall of 2007, the company paid $14.5 million in cash for approximately 61 hectares in the Aurum Industrial Business Park, says an interim ruling written by Judge Elizabeth Johnson. Soon after, the company began removing topsoil and started grading. The company wanted to use the property as a storage yard.

The work destroyed a creek and wetland. The property is bisected by an intermittently running creek that flows south to north. The water leaves the property at the north end, flowing into a ravine and ultimately entering the North Saskatchewan River about one kilometre downstream from the point at which it leaves the property. The area downstream where the water enters the North Saskatchewan River is described as a "Class A" watercourse – a water body with important fish habitat, in this case for sturgeon. Lake sturgeon, which live in some of Alberta's larger rivers, are classified as provincially threatened and nationally endangered.

A watercourse can't be altered without permission from the government. No such approval was given.

Photographic evidence showed significant erosion and sedimentation occurred. "There was no provable damage downstream to the sturgeon population, but the activity created the potential for damage," Johnson wrote. She settled on the fine recommended by Crown prosecutor Susan McRory. The maximum fine for this type of offence is $1 million.

Johnson noted that the people involved in the offence, primarily Simon Sochatsky and to a lesser extent Greg Michaeleski, were previously involved in an offence under the Water Act. "They should have known better," she wrote.

Johnson still has to decide how to split up the fine. A portion will be distributed under creative sentencing, likely to a project that benefits lake sturgeon.

Fishing Regulations

North Saskatchewan River
Guide to Alberta Sport Fishing Regulations

The North Saskatchewan River from Drayton Valley through Edmonton and downstream to the Alberta/Saskatchewan border is open for fishing all year.

The fishing regulations are the same all along this section of river called “Zone 2 Prairie Parkland”.

Limits:

Goldeye	10
Burbot	10
Mountain Whitefish	5 over 30 cm
Sauger	3 from May 21 to Mar 31 (summer, fall, winter)
	0 from Apr 1 to May 20 (spring)
Pike	1 over 63 cm
Walleye	0
Lake Sturgeon	0

Eddy Foam

Minnesota Pollution Control Agency

The foam that appears along shores is most often the result of the natural die-off of aquatic plants. Plants are made up of organic material, including oils (i.e., corn oil and vegetable oil). When the plants die and decompose, the **oils contained in the plant cells are released** and float to the surface. Once the plant oils reach the surface, wind and wave action pushes them to the shore. The concentration of the oil changes the physical nature of the water, making foam formation easier.

Naturally occurring dissolved **organic compounds in the water act as "surfactants"** and reduces the surface tension of the surface film of water. This allows fine bubbles and froth to form, accumulate on the surface, and be moved into calm areas by wind and water currents. The turbulence and wave action at the beach introduces air into the organically enriched water, which forms the bubbles.

The foam itself, if natural, is simply an interesting part of the ecosystem. However, if it is derived from human activities, there may other pollutants associated with it that may affect human and environmental health. Some foam in water can indicate pollution. When deciding if the foam is natural or caused by pollution, **consider the situation**:

- Natural occurrences in rivers can be found downstream of a turbulent site.
- Proximity to a potential pollution source such as the textile industry, paper production facilities, oil industries, and fire fighting activities
- The presence of silt in water such as from a construction site.
- Presence of decomposing plants or organic material in the water.

Natural foam is usually persistent, light and not slimy to the touch. If you find pollution and believe it is human-induced, report it.

Solid Waste Management

Discussed while rafting downstream from Rat Creek and close to the old dump.

Edmonton's river valley was once used as a garbage dump in the early 1900's. The idea of a 'landfill' and "recycling" had not yet been invented. Things were thrown away and buried!

Q. What kind of garbage do you see? (Paddle up close to the bank)

Glass, porcelain, wood, metal, rubber, nylons…but no plastics!

Q. Should all this garbage be removed? Some of this material now stabilizes the river bank erosion.

Q. What new practices does Edmonton use instead of putting garbage into a dump?

Discuss what happens at the Edmonton Waste Management Centre.

Since starting a curbside recycling program in 1988, Edmontonians have proudly become national leaders in effective waste management. Waste and recyclables collected from Edmonton homes are processed at the Edmonton Waste Management Centre, a unique collection of world-class waste facilities that routinely attracts visitors from around the world.

The centre is especially famous for the Edmonton Composting Facility, the destination of Edmonton's residential waste and one of the largest composting facilities in the world.

A second important feature is the Materials Recovery Facility, where recyclables from our Blue Bag and Blue Bin programs are sorted for market.

The new GEEP Electric and Electronic Waste Recycling Facility is where e-waste is processed for recycling.

Edmontonians also use Eco Stations, which are drop-off facilities for household hazardous waste and almost all other waste materials.

First dump opened in 1894

Unknown location in the river valley

Edmonton Journal
August 17, 2009

Edmonton's first municipal dump, or nuisance grounds as such sites were then called, was opened in 1894 at an unknown location, probably in the river valley. The then-town paid $286 to put a fence around the property.

- The city began garbage collection in 1918 with horses and wagons. Horse carts continued in use until the early 1950s, although the vast majority of the trash was picked up by truck.

- Although recycling is seen as a modern idea, by 1956 officials asked residents to separate paper and rags from the rest of their garbage so it could be sold along with cardboard to a paper company. A glass firm was interested in buying used glass, and the city hoped to sell cans to a steel factory.

- Many businesses, and some homeowners, continued to burn their cardboard and other trash until at least the late 1960s.

Nuisance Grounds

Rat Creek Nuisance Grounds 1903-1939
Rat Creek Incinerator 1908-1930's

Edmonton Journal
August 17, 2009

Emonton's first move into industrial waste disposal was the incinerator opened in 1908 beside the Rat Creek "nuisance grounds," a 10-hectare dump started five years earlier on the approximate site of Commonwealth Stadium and Clarke Park.

The ravine was filled with ashes and unburnt garbage from 40 tonnes of trash a day so the area could be developed, although they had to stop incinerating manure when neighbours complained about the stench.

By 1929, 23 teams of horses and 49 men were required to collect Edmonton's trash. While restaurant scraps were sold to farmers as pig food, most "stable" trash, such as metal and paper, was left at Grierson Hill or burned. The incinerator was shut down in the early 1930s, although the dump was used until at least 1939.

When crews began excavating to build the stadium foundations in 1974, more than 7,000 bottles, jars and ceramic jugs were dug up from the old dump, most of them sent to the city artifacts centre.

Rooms with a view ... of garbage

Grierson Dump 1930's - 1940's

Edmonton Journal August 17, 2009

Edmonton's original major dump was at the foot of Grierson Hill, upstream from Dawson Park around the current base of the Shaw Conference Centre and visible from the majestic Hotel Macdonald.

Conveniently located near the heart of the city, it achieved notoriety during the Depression as the location of a shantytown that housed up to 65 people, some living in shacks built at the openings of old coal mines that once dotted the area.

The inhabitants survived selling discarded items they scavenged, from cleaned paint cans for storing nails to clay pots decorated with coloured broken glass to car parts, says historian John Gilpin's book Edmonton: Gateway to the North.

The site appears to have gone out of operation by the early 1940s. Like the other dumps, the land became public recreation space. It was part of a history of trash disposal that in Edmonton, like nearly everywhere else in the world, put convenience and cost ahead of community and environmental concerns.

Haze over downtown

Cloverdale Incinerator 1932-1971

Edmonton Journal August 17, 2009

Edmonton's largest incinerator was built near what is now the Muttart Conservatory “Pyramids”. Erected in 1932 on an old brickyard, the facility was expected to burn most of Edmonton's "garbage, horses, etc." without odour, a big improvement on the stinky "nuisance grounds" that dotted the city. When it was expanded in 1954, it could handle 325 tonnes of trash a day, belching smoke over surrounding communities through a 45-metre-high chimney.

Furnaces in the multi-storey brick structure burned up to 65,000 tonnes a year of apple cores, cracked plastic toys, broken radios, empty cereal boxes, steak bones and anything else people tossed away, belching enough soot up the chimney to cause a smoggy haze in Bonnie Doon.

The hope was that it would eliminate the disposal of smelly organic waste in open dumps down the Kennedale Ravine, near the Canada Packers plant on Fort Road and along the riverbank near Highlands. Unfortunately, there were still numerous complaints.

Forty residents signed a petition in 1948 complaining about the flies, smoke and "horrible stench" from a growing half-acre dump near 98th Avenue and 80th St. The piles of ash and half-burned trash was pushed into a nearby pit that eventually formed the mounds beside Connors Road where the white metal Dove of Peace stands. Flocks of gulls were attracted to the feast. Children used to play in the hills and if they needed a couple of cents to buy bubble gum, they would grab some bottles out and take them to the nearest store for the deposit.

The incinerator operated at its now-unimaginable city-centre location for almost 40 years until closing in 1971.

Edmonton's dumps reborn as playgrounds

Parks, golf courses sprouted where we used to discard and burn our waste

Cloverdale Incinerator 1931-1971
Just upstream from Dawson Park

By Gordon Kent, Edmonton Journal
August 17, 2009

When Robert Tomazewski was a boy, residents of his Cloverdale neighbourhood shared the beautiful North Saskatchewan River valley with Edmonton's biggest garbage incinerator.

Furnaces in the multi-storey brick structure burned up to 65,000 tonnes a year of apple cores, cracked plastic toys, broken radios, empty cereal boxes, steak bones and anything else people tossed away, belching enough soot up the chimney to cause a smoggy haze in Bonnie Doon.

"I reroofed my mom's house," says Tomazewski, who has lived in the area since he was born in 1952. "When I removed the shingles, I found ashes underneath...She knew what time they were burning and would put her laundry in and out real quick, otherwise she would get little black spots all over it."

The incinerator operated at its now-unimaginable city-centre location for almost 40 years until closing in 1971, part of a history of trash disposal that in Edmonton, like nearly everywhere else in the world, put convenience and cost ahead of community and environmental concerns.

The Clover Bar landfill, which has reached capacity and is being phased out, was the city's first properly engineered site for hauling rubbish when it opened in 1975, including a clay liner to stop contaminated run-off from polluting the groundwater.

But for the previous 90 years people weren't so choosy. While there were a few main disposal sites, usually in the river valley or down ravines, other dumps were created as needed.

Forty residents signed a petition in 1948 complaining about the flies, smoke and "horrible stench" from a growing half-acre dump near 98th Avenue and 80th Street, leading city engineer A. W. Haddow to concede they should look for another location in the district.

Tomazewski remembers the "sour, bitter smell" of garbage burning in Cloverdale, the piles of ash and half-burned trash pushed into a nearby pit that eventually formed the mounds beside Connors Road where the white metal Dove of Peace stands, and the flocks of gulls attracted to this feast.

"We used to play in the hills. If we needed a couple of cents to buy some bubble gum, we would go and grab some bottles out of there ... and take them to the nearest store" for the deposit.

Like the other dumps, once the last milk carton and plate of uneaten spaghetti was buried under layers of dirt, the land became public recreation space.

Bioengineering

Traveling along river left downstream of the dump

Bioengineering is a construction technique that uses poplar and willow cuttings to help revegitate disturbed areas.

Here at this stormwater outfall, large boulders were brought in by dump truck to stabilize the river bank and protect the concrete outfall from damage by river ice.

The wood stems that you see inserted into the soil and rocks were intended to sprout roots and stems if there was enough water.

Why is there an island in the river?

Just before the island test site upstream of Gretzky Drive.

The island up ahead is our next destination. Once we get there, you notice that the island is made of sand held together by willow roots.

Q. Why would there be an island in this river?

Q. Where did the sand come from?

Sand is a product of erosion. Somewhere back upstream of the island there must have been a location with significant erosion occurring. Erosion steals away land and dumps it somewhere else as sand.

A. Erosion has occurred in three places nearby – one or more built the island!

1.) We passed steep cliffs on outside of the **last river bend** that have eroded into the river. Some of the glass from the dump is found on the shores of the island – brought there by river currents.

2.) During floods over the last centuries, the high swollen river **short-cut** river right over the inside of the last bend and flowed overland across what is now the Riverside Golf Course. The present day bench land is used for golf fairways and was possibly scraped flat and the debris was swept away and deposited here to form an island.

3.) Rat Creek cut down to form the deep **Kinnaird Ravine** directly across from the island on river left.

Whatever the source of sand was, the formation of the island has been good for us scientists – because the island makes a great stopping place for our water quality testing.

Teen girls charged after bridge rescue

edmontonjournal.com

August 24, 2007

EDMONTON - Two teenage girls who got stuck climbing beneath the Capilano Bridge Wednesday evening have been charged with mischief.

The girls were working their way over the North Saskatchewan River when the scaffolding platform twisted on its pulleys. The girls swung out over the river, 20 metres from the bank and 15 metres above the water.

A passing dog-walker spotted the pair around 6 p.m. and called police. It took almost an hour for police and fire crews to guide the girls on how to balance the scaffolding and get themselves safely back to shore. The platform is used by maintenance workers to access pipes under the bridge.

The girls, who are 16 and 17-years-old, cannot be identified under the Young Offenders Act. They had spent three days planning the climb and had brought along backpacks and water.

RiverWatch 360 Slow Spin

Sarah Michaud June, 2012 (6 minutes 20 seconds)
After floating under and past the Capilano Bridge on Gretzski Drive

This interpretive segment "RiverWatch 360 Slow Spin" was developed by RiverWatch Guide Sarah Michaud during the spring of 2012 for use with school science programs. Sarah presented her experiential activity thirty times May-June during the morning of each full day aboard her raft on the North Saskatchewan River in Edmonton, Alberta. The corresponding video can be viewed by the same title on YouTube.

Sarah: This is one of my more favorites – my beautiful English, right – parts of the river valley because there is a neat contrast between the two banks. So, if you look at the left side, and then you take a look at the right side, and then the left side, and then the right side – you can go get dizzy. But, what do you guys notice about the two banks?

Student: There's like coniferous trees on that side.

Sarah: Wow, you've got the terminology.

Student: There's a dog. He's cute. I'm going over. I'm going over. (Laughter)

Sarah: Those are not … not, the elusive wolves of the river valley with the Sasquatch – I don't know. Big Foot. Anyways, so someone just said – what side is the coniferous side?

Student: The right side.

Sarah: The right side. So, what does that make the left side?

Student One: Deciduous.

Sarah: Deciduous. The decide-uous trees decide to lose their leaves, right? And then, coniferous has … those trees have…

Student: Needles.

Sarah: Needles … and cones. That's another way to remember cone-iferous. So, ya, we have a deciduous forest on our – this is also our north bank. And then the other side here is our south bank. So, what kind of things do you think might cause completely different forests to pop up on either side of the river? (Pause) Any guesses?

Student: Temperature.

Teacher: Think about biomes. Where are coniferous, deciduous?

Student: I think both are forests.

Sarah: Well, ya, they both are forests. Let's try a little activity. Keep that thought. I'm going to invite you to close your eyes – not just yet, but well you can if you want - hold onto your paddles, make sure they don't disappear on you - and I'm going to rotate the raft around really slowly. And try to pick up on whether you can tell if the raft is rotating using your other senses. So you might be listening to the abiotic and biotic factors in the environment. Abiotic is non-living, right? Biotic is … living. So, you might hear,

you might feel, you might - I don't know, maybe you'll smell, who knows – but use your other senses other than your vision and see if you can tell if the raft is rotating and if you can kind of orientate yourself to which direction you're facing with your eyes closed. So, I'm going to stop talking. Just enjoy the peace of the beautiful river valley while I rotate the raft. And I'll stop talking from now on. So, eyes closed.

360 Spin: The raft spins slowly and students are quiet with their eyes closed. The low north bank with its sunny, deciduous forest is on the inside bend passing behind the raft. Background sounds include a warbler and the knocking of a jack hammer. The glint of reflected sunlight moves along the paddle t-grip and shaft, and also glints off the guide's sunglasses. The sky is blue with white clouds. The high south bank with its dark, mixed coniferous forest on the outside bend appears behind the raft. And finally, we see the Capilano Bridge as it crosses the North Saskatchewan River along Gretzky Drive. (1 minute, 8 seconds)

Sarah: So, that's about 360 degrees right there. Whoa. Could anyone … could everyone tell the raft was rotating?

Students: Ya, a bit.

Sarah: Ya, it was clockwise. And could, could … did anyone not tell at all?

Students: The sunlight. Ya, the sunlight. The sunlight. The sun.

Sarah: The sun! You could feel it really strong on your face today. It is bright. So, we're a northern country, right? We're a northern city; we're always getting a slant of sunlight. What? Where's the sun coming from? Where's it go around the earth? At the…

Student: From east to west.

Sarah: From east to west. At the…

Student: Equator.

Sarah: The equator. So, the sun is coming from the south. So what bank is going to get more sunlight?

Students: Oh, the south side! North.

Sarah: The north bank. This is the north bank getting a lot more sunlight. And then if you looked at our south bank, it's really slanted. This side of this hill here coming down to the river is really shaded and cooler, basically.

Student: What if it's like cloudy out?

Sarah: Still, over the course of the whole day, it's getting more sunlight. So, this is almost – we're getting to mid-day now – and the sun is never going to be completely overhead like if we were right at the equator. It's going to always be at a slant. So, it's our north bank that's getting the bulk of the sunlight. So, does that make sense for a deciduous forest to pop up? Because what are they needing to do with the sunlight?

Student: Photosynthesis.

Sarah: Photosynthesize, that's right! So, a neat effect that comes from this with the two really different banks on either side, is we can see the kind of transition that our region really is going through. So, in our region around Edmonton, it's sometimes known as a transitional ecozone. So, the predominant forests around Edmonton are what are called aspen parkland. Kind of like these deciduous forests. Lots of aspen

trees with those fluttery little leaves when the wind blows; birch trees, poplar. And then we're moving more north into Alberta towards - does anyone know that biome? That biome, where more coniferous trees are? Starts with a "B"…

Students: Boreal. Boreal.

Sarah: The boreal forest. So that forest that we just went by with all those coniferous trees, that's more a taste of what the boreal forest is like. So, this is the transition. So, does anyone use the river valley for running or biking ever? Or, a picnic once in a while? If you ever use the pathways, you can pick your ecosystem. You can go into aspen parkland jungle, or you can go to the boreal jungle. Well, forest, it's not really a jungle, don't get confused...

Incised River Valley

Notice the steep cliff on the outside of the bend – stream energy has been directed against the bank and erosion has occurred, trees have fallen into the water, etc.

- Most of the river current and bank erosion occurs on the outside of a bend and when we want the most raft speed today, the outside route is the one we'll likely follow.

- Cliffs and falling trees are evident on the outside of a bend.

- The steep valley wall and sparse vegetation reflect undercutting and slope failure.

The inside of the bend is relatively flat – an area of sediment deposition.

- Streams and rivers move to the outside of a bend and leave beaches behind them.

- On the inside of river bends, we'll see gravel bar deposition, river flats and forest succession.

These two opposite types of river banks affect vegetation and land-use as we'll see during our float trip.

Albert Einstein noted that no stream or river can move in a straight line for long – the spin of the Earth (Coriollis Effect) – eventually throws its path against a bank and erosion begins.

Deposition on one side and erosion on the other can widen a valley and the river becomes more sinuous.

Our journey today will take us through some of the really last big bends in the river before it heads on to Saskatchewan. River bends dispel the energy of a young river rushing out of the mountains and slow it down considerably.

The river up to here has done a lot of erosional work and often appears muddy. In Edmonton, you have to "love the brown through town"!

North and South Facing Slopes

What do you see **on river left?** Dry hillside, a golf course, poplar trees, stormwater outfall,

What do you see **on river right?** Spruce forest

Compare the trees on both sides of the river valley.
What do you notice? There is very different vegetation grows on each side of the river valley. The river left side of the valley has a **southern exposure**, which means it receives more solar radiation and has much drier soils. These are ideal conditions for grasses and deciduous trees to grow. What are some examples of **deciduous trees**? (Birch, Poplar, Elm) On the river right, the valley has a **northern exposure** that receives less sun and thus has moist soils. These conditions are ideal for coniferous trees. What are some examples of **coniferous trees**? (Spruce, Pine, Fir)

On river left south-facing slopes, we see groves of trembling aspen, balsam poplar and intermittent grasslands characteristic of the **Parkland**. On river right north-facing slopes, we see mixed coniferous forest similar to the composition of more northerly **Boreal Forest**.

On river left, note the sparser upslope vegetation of poplars. On river right, note the wall of balsam poplars and white spruce. Parkland vegetation is on the left; boreal forest vegetation is on the right.

The **microclimate** on south-facing slopes is drier and warmer. The microclimate on north-facing slopes is wetter and cooler. **Abiotic** (non-living) factors such as slope and sun exposure determine the type of ecosystem.

The slopes of this river valley give rise to the expression of parkland on one side and boreal forest on the other. Edmonton is in the Aspen Parkland bioregion where the prairie ecozone is in **transition** to the boreal forest. If parkland is a transition zone, then the river valley really expresses this **confused personality**!

Ecotones and the Edge Effect

An ecotone is a **transition area** between two adjacent but different communities, such as river and forest; forest and agricultural land.

The word was coined from a combination of eco(logy) plus -tone, from the Greek tonos or tension – in other words, a place where ecologies are in tension.

Ecotones may appear on the ground as a gradual blending of the two communities across a broad area, or it may manifest itself as a sharp boundary line and linear zone.

Ecotones are particularly **significant for mobile animals**, as they can exploit more than one set of habitats within a short distance. The ecotone contains not only species common to the communities on both sides; it also may include a number of highly adaptable species that tend to colonize such transitional areas. E.g. coyotes, hawks, ducks.

This situation can produce an edge effect along the boundary line, with the area displaying a **greater than usual diversity of species.** The phenomenon of increased variety of plants as well as animals at the community junction is called the "Edge Effect" and is essentially due to a locally broader range of suitable environmental conditions or ecological niches.

Riparian areas support 80% of all wildlife in Alberta. Native bird populations are 2 to 3 times higher in healthy riparian areas than unhealthy ones. This river valley is a wildlife **sanctuary from cultivated and settled lands** up and beyond the river banks.

The transformation of the ecozone by agricultural and urban activities has resulted in dramatic reduction in habitat for many species. It has resulted in a significant number of extirpated, threatened and endangered wildlife species relative to its area and population.

Biodiversity

Biodiversity refers to all the different types of organisms on Earth.

Another word for diversity is variety.

Biodiversity describes the variety and array of life on Earth.

A standard measurement of the biodiversity in an area is the total number of species found in that area. Healthy riparian areas with their tangle of shrubs, trees, cattails and grasses are able to support a wide variety and abundance of species.

The biodiversity in healthy riparian areas is higher than in most uplands in Alberta, and areas with a high level of biodiversity are better able to handle environmental stressors such as drought, floods or disease.

Healthy riparian areas are essential to link a variety of plants, animals and ecosystems together. Animal, plant, fish and insect species travel through riparian systems which, as if acting as meandering trails, join distant pieces of the landscape together.

There is huge variety within types of individuals, species, populations, communities and ecosystems…

- Each of the ***individuals*** in this boat is different and unique.
- Okay, now let's name some different ***species*** we might have around us today…humans, dogs, goldeye fish, mayflies, beavers…
- What about some different ***populations*** we might come across today?…fish in the river, magpies in a park, poplar trees in the riparian zone
- Some different ***communities*** we'll see today?... raft, river, golf course, city park
- What about naming some different types of ***ecosystems*** ?….boreal forest, parkland, a river, a city

Is variety a good thing?

You bet! "Variety is the spice of life."

Riparian Areas

Riparian zones are the **lush green belts** of vegetation where land and water meet adjacent to streams, river, lakes and wetlands.

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

In Alberta 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

Some of the key "urban" values that derive from riparian areas include: filtration of contaminants through water and soil, biodiversity and wildlife movement, energy absorption and retention, vegetation for forage and shelter, shoreline stability and protection of property, flood water conveyance and aquifer recharge, cultural heritage and public recreation, aesthetic character, public image and quality of life.

In Alberta, 80% of our wildlife relies in whole or in part on riparian areas to survive. Even 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.

Recreational Use of Riparian Areas

Riparian areas on the inside of a river bend are characterized by flatlands, forest and river access well-suited to parks, golf courses and campgrounds.

In instances where river currents threaten to erode river banks in these recreational areas, bank fortification or **armouring** may take the form of rock or concrete **rip rap** or steel walls put in place against the river bank.

Recreational, residential, industrial and agricultural activities may have a serious impact on riparian biodiversity. Residential subdivisions, campgrounds, noise and activity, and the removal of vegetation may reduce the variety of species in these areas.

Some agricultural practices - such as grazing riparian areas for long periods of time, or allowing cattle to continually access water at a shoreline – will damage plant species and soils, and reduce the variety of animal species.

City tree canopy sucks in 531 tonnes of pollution a year

By Hanneke Brooymans, Edmonton Journal May 15, 2010

EDMONTON - A scientific survey conducted for the first time pegged the city's average tree canopy cover at 10 per cent, according to Edmonton's principal of forestry.

"I think (Edmontonians) will be surprised it's not higher," said Jenny Wheeler. "A lot of places, when you drive through them --like the river valley and some residential areas -- they're so well treed."

The survey involved sampling 300 random spots in the city --whether they were in the river valley, an industrial area, or in a co-operative persons' backyard -- and calculating overall tree canopy cover based on what was in those spots. The city used a program called the Urban Forest Effects Model, developed in the late 1990s by researchers at the U.S. Department of Agriculture Forest Service. It has been used by many cities around the world. Edmonton is the fifth city in Canada to use the model, Wheeler said. Calgary was the first and calculated an average canopy cover of seven per cent, she said.

Coverage in Edmonton's parks and residential areas averaged around 15 per cent, while the city's agricultural and industrial areas had about eight per cent. Commercial spots fared worse, at five per cent.

Wheeler is happy to have the figures. She knew she wanted more trees, and hence canopy coverage, in the city, but she needed to know what the baseline was first.

Now that she knows where the starting line is, she has a new finish line in mind. Wheeler would like the canopy coverage to hit an average of 20 per cent. That target has not yet been approved, though. The figure will be part of a larger 10-year urban forest management plan, which she hopes to have ready by the end of the year. The city won't be able to hit the target on its own, she said, and partnerships and education will play an important role.

The survey program also provided the number of tonnes of pollutants removed by the tree cover: 531 tonnes. Almost half of that is ground-level ozone, an air contaminant that irritates lungs and can put people with lung or heart disorders at risk. The value of this pollution removal rings in at $3 million, according to the program calculations.

"In a city that has this kind of industrial activity (that service) becomes increasingly important," said Janice Cooke, a tree biologist at the University of Alberta. "This is not just any old city. This is a city with significant industrial activity. As an Edmontonian, I place a lot of value on that."

Cooke said she thinks Wheeler's 20 per cent target is reasonable. The city would be better off if industrial areas and new neighbourhoods could have the same canopy level currently found in mature neighbourhoods, she said.

Coun. Don Iveson, whose council portfolio includes environment issues, said Wheeler's goal is worth looking at. "It depends on the zone, but we have expectations in terms of landscape requirements that are probably lower in industrial areas and certain kinds of commercial areas. But I'm sure citizens would agree that shopping areas that have a bit of tree cover in their parking lots, that they keep their cars cool under, are desirable and look a little bit less windswept. So I think there are definitely some functional and esthetic reasons to look at it in a commercial setting."

In an industrial area, trees might have use as a shelter belt to reduce dust, he said. Pilot projects with interested industrial land owners could be worth exploring, Iveson said.

Make or break year for Edmonton trees 2010

Archie McLean, edmontonjournal April 7, 2010

A decade-long drought has parched trees and fields across northern Alberta and may be radically reshaping Edmonton's ecology, say forest and climate experts. Environment Canada says each of the past 10 years has been drier than the long-term average in the city. The past two years have been the driest back to back since record-keeping began in the 1880s.

Like withdrawals from a chequing account, the city's trees have drained the soil's deep water and depleted their own stores of carbohydrates and nutrients. That leaves them extremely vulnerable. "This is the year that's going to make or break many trees," said Victor Lieffers, a professor of silviculture and forest ecology at the U of A.

Lieffers was reluctant to predict future weather patterns, but said without a wetter year the city will see major ecological changes. "We're entering really uncharted waters in terms of understanding how bad this will be," Lieffers said. "If the drought is sustained, I suspect we'll have many trees die." It only takes a walk or drive through the river valley to see the evidence of the drought — birch trees with dead tops and conifers with purple needles and dead branches.

David Phillips, a climatologist with Environment Canada, said the past 10 years may represent the new normal for the region. "There's something happening there. It's just been dry, dry, dry for 10 years." Drought also makes trees more susceptible to storm damage, disease and insect infestation.

Decade of drought withers city trees

Up to one-third of natural areas seeing significant problems

By Hanneke Brooymans, Edmonton Journal June 7, 2010 6:30 AM

Michael Silzer, on a walk through Sheriff Robertson Park at 82nd Street and 112th Avenue, said he is concerned about the amount of deadwood -- fuel for afire -- on the forest floor in city ravines. Photograph by: Brian Gavriloff, The Journal, Edmonton Journal

EDMONTON - The edge of Kinnaird Ravine bristles with the bare branches of dead and dying poplar and aspen, signaling the state of the city's river valley and ravine system. A forest ecosystem is a layer cake of vegetation, and the evidence of drought now taints every segment. Once inside the ravine, anyone can see the ground is covered in dried grasses and crispy leaf litter.

Dead shrubs poke their matchstick twigs in all directions. Some of the aspen and poplar trunks have snapped a third of the way down. Most of the spruce that have died still stand, ghostly in their grey needles. The situation is more serious than some Edmontonians might realize.

"I would say about 30 per cent of natural areas within the city, including the river valley and tablelands, are experiencing dieback," said Michael Silzer, an ecological planner with the city's Office of Natural Areas, during a stroll through the ravine.

Dieback is when living trees have an abnormal number of dead branches. The decline creeps down the tree, banishing green leaves to the lower branches until, finally, the tree can't produce enough energy and it dies. If drought doesn't outright kill the tree, it will whittle away at its immune system enough to allow insects or fungi a successful attack, said Silzer, who has a forestry degree. Local trees have faced relentlessly dry conditions.

The last 10 years were drier than average, with the last two years capping off the decade as the driest back-to-back years since record-keeping began in the 1880s, according to Environment Canada. The natural areas are also full of older aspen and poplar, which aren't especially long-lived trees.

Now, the river valleys and ravines are rife with deadwood. "Fuel-loading is getting to be a concern, to say the least, particularly within ravine areas," Silzer said. Fires in the river valley and ravines are always a concern to Edmonton's fire department.

"I don't have to tell ... anybody that's lived in Edmonton for any length of time, we do have a very rugged river valley and ravine system feeding into the river valley and the access is always a concern, especially with the size of our equipment," said John Lamb, Edmonton's deputy fire chief.

Since having to deal with about 800 brushfires in 2002, the department has become better prepared for those specific battles. In the last few years, the department has outfitted its crews with forest firefighter equipment. Lamb said the specialized equipment includes hoses that are quite a bit lighter than you would see at a typical house or commercial fire, making it easier to handle and drag them through forests. The smaller capacity lines allow the firefighters to spread smaller volumes of water over larger areas.

The Mill Creek ravine is just one spot in the system that is no stranger to fire. In 2002 afire swept up the bank, destroying a house on 97th Street. Last month, another blaze sprang up in the area of 98th Street and 93rd Avenue, but it was quickly quelled. Residents contacted in the area seemed unperturbed by the proximity of the fires, having great confidence in the city's firefighters. Some were concerned about the state of the trees in the natural areas, though.

Jewel of the City

"It's the jewel of the city," said Ray Harper, who lives just down the block from a path into the ravine. "It's one of those things people from other cities say, 'You're so lucky to have this.' "Any loss of that natural protected area would be a tragedy."

But he doesn't know what options the city has to save trees down there. Harper said he doesn't see any way to bring water down to those trees, unless big tanker trucks were used to flood areas once in a while.

Murray Cann was similarly philosophical. "If those poor trees lack water, then that's nature," he said. "I don't think the city should spend any money on trees there." Like everyone else in the area, he said he'd rather see them spend money on boulevard trees. "Let Mill Creek ravine look after itself and let the city look after the boulevard trees."

Across the street from Andrew Schoepf's house, the woods and grass are still charred from the recent fire. The weekend before the fire he said he was walking with friends through the ravine and they were commenting on the unusual amount of fuel that has gathered on the forest floor. Part of the problem is that it's been too dry for the dead material to rot, he said.

Schoepf said there is one thing the city can do to reduce risk and that is insist on roads being built as a buffer between homes and ravines and river valleys. In this case, the road and the fire crews were what reassured Schoepf. "I wasn't worried about the fire at all." It's natural for people to want to live next to natural areas, he says. It's beautiful and there are birds and animals all around, he added, referring to the pileated woodpecker that had just called behind his house. "That can all happen with the road here. It doesn't diminish the value of the lot, either."

In rural areas prescribed burns would be used, but the city and fire department dismiss that option for obvious reasons. The city has had crews clearing especially worrisome areas, Silzer said, near the Highlands golf course, and in Henrietta Muir and Dawson parks.

University of Alberta associate professor Tara McGee said local governments have many tools to help reduce fire risks at the junction between natural areas and neighbourhoods, frequently called the wildland interface. Some of these focus on preventing fires, such as fire bans and education programs, she wrote in an e-mail. Others focus on reducing the risk to properties from fires in the river valley, such as land use planning measures, vegetation thinning, education, encouraging residents to work together to reduce interface fire risks, requiring residents to remove flammable vegetation close to their home, and prescribed burning.

Capital City Recreation Park "Announcement"

Plaque and monument in Gold Bar Park…

On April 26, 1974, Premier Peter Lougheed and the sixteen Edmonton Members of the Legislative Assembly of the Province of Alberta announced the approval of the "Capital City Recreation Park" for the City of Edmonton. This unique urban park plan, estimated to cost in excess of 35 million dollars, was initiated and developed by the Government of Alberta with input from the City of Edmonton.

The main features of this unique Park, a cooperative enterprise between the City of Edmonton and the Alberta Government, include:

- A series of new provincial and city parks and recreation areas involving over 3000 acres of land on either side of a 16 kilometer stretch of the North Saskatchewan River, commencing at the High Level Bridge and terminating two kilometers north of the Beverly Bridge and including the Legislature area.

- A Natural Resources Science Centre depicting the growth of Alberta's natural resources

- A series of six pedestrian and bicycle river and highway crossings, strategically located along the river and connected to approximately 46 kilometers of foot paths, bicycle trails, observations posts, park bench areas and horticultural displays throughout the 16 kilometer stretch of the river valley

- Several man-made lake in river parks and the possible creation of a river valley lake by placing a weir across the North Saskatchewan River to permit recreation sports events.

- A "Water Conservation Area" encompassing a minimum 240 meter set-back from each shore-line of the river with appropriate bank protection, terrain and landscape long the river

This Park is our vision of a good quality of life to be enjoyed by the people of Edmonton and by their children.

Peter Lougheed, Premier

A New Capital Region River Valley Park

After the first test site. While floating to the 50 St. Boat Landing. Five minutes.

There is a new and larger vision for a Capital Region Valley Park covering 18,000 acres **stretching over 88 kilometres** through the North Saskatchewan River valley. It could truly become a world-class river front park that would be to the Capital Region what **Stanley Park is to Vancouver** or **Central Park is to New York**.

Imagine a continuous river valley park system from Devon through Parkland County, Leduc County, Edmonton, Strathcona County, and Sturgeon County to Fort Saskatchewan. It would be **used by families, hikers, cyclists, boaters and paddlers. Not to mention the wildlife!**

There are people working to preserve this river valley for the benefit of our **future generations.** They wish to protect the pristine areas of the river valley to ensure they remain the home of a wide range of wildlife and flora. At the same time, the plan is to enhance appropriate areas of the river valley by improving access, developing amenities and in doing so, enhancing our quality of life.

The River Valley Alliance vision is an **appropriate balance** of protecting pristine areas while ensuring our residents and visitors can access and enjoy the river valley for a variety of **active and passive pursuits.**

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.

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.

Using the River

After the first test site. While floating to the 50 St. Boat Landing. Five minutes.

Let's talk about how we use the river. Besides the rafting during this trip, **who used the North Saskatchewan River today?** How did you use the river? (i.e. getting ready for school this morning by showering, toilet, juice, etc.) In fact, if you've been living in Edmonton for three days, **your body is made of approximately** what % North Saskatchewan? (70-80)

This water bottle of mine holds a litre of water. How many of these does it take to flush the average toilet? (30L) Counting all the showers, clothes washing, dish washing, car washing and lawn watering, how many of these does **each person in Edmonton use a day?** (400L)

Edmonton is not the only city along the river. Starting from the Saskatchewan Glacier, each town all along the way treats their drinking water, people drink lattes and their sewage pee goes back into the river. **Even Devon's sewage just upstream of Edmonton**? No, thankfully that sewage gets sent to Edmonton in big underground pipes for treatment – so the river stays cleaner for us!

Edmonton is almost a city of a million people - how does the river water get to your house clean and drinkable? Where does it go afterwards? Well, there are three steps. First, **stormwater** moves from the clouds to the river…precipitation falls on the watershed, drains to the river and here in the city, drains through storm water pipes. Second, **drinking water** moves from the river to your tap… water is taken into the drinking water treatment plant, purified and pumped to your household taps. Third, **wastewater** moves from the tap back to the river… but the wastewater is first treated before the fish see it again.

Riverbank Geology

After lunch and launching from 50 St., ferry rafts immediately to far river left Five minutes.

At this bend in the river, Gold Bar WWTP is on the inside of the bend on a flood plain. The faster river currents have moved across to the north side - the steep valley wall and sparse vegetation reflect undercutting and slope failure. Deposition on one side and erosion on the other is widening the valley and the river is becoming more sinuous.

Cretaceous Bedrock: The riverbank layers seen on the steep outside bend were formed at the time of the dinosaurs as the rising Rocky Mountains were worn down and the sand was carried to the edge of a warm sea. The darker shale areas were formed in muddier, slower waters. The lighter colored sandstones were formed in faster currents.

Coal Seams:. Coal formed 65 million years ago when swampy areas were buried deep underground, where its chemical structure is changed by the pressure of overlying sediments and heat from inside the earth. Coal mining in Edmonton began in the late 1800s and ended in the early 1970s, and was a huge factor in the city of Edmonton growing as quickly as it did. As a side note, Edmonton's and Alberta's electricity is still predominantly coal-generated.

Glacial Till. Above the buff column layer of lake sediments, we can see a jumbled mixture of loose rock. This material was carried and then dropped by melting continental ice sheets. The ice sheets were kilometres thick in this area more than 20,000 years ago. Because the material is so loose, it can't hold a steep angle against gravity and tends to slope backward.

Lake Deposits. The buff coloured layer above the grey cretaceous bedrock wasn't deposited by a river, but by sediments settling out of a ancient Lake Edmonton. This sediment tends to form columns with angular sides that stand at a steep angle.

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".

Strathcona Refinery Row

While floating to or just after the second test site. Two minutes.

Up ahead of us on river right is the **Edmonton Imperial Oil Refinery**. Edmonton is the "**Oil Capital of Canada**" being in the middle of several major oil fields. A network of **oil pipelines run from the oil fields** to Refinery Row here in Strathcona County along Baseline Road. Other manufacturing plants in this area not only refine the petroleum but manufacture items such as battery anodes, chemicals, fertilizers, insulation, plastic, and steel.

Land planning issues, environmental concerns and a desire to inform the community about industry safety resulted in the **Strathcona Industrial Association (SIA**) in 1974. Members include Gold Bar WWTP, Imperial Oil, PetroCanada, Alcan, AT Plastics, EPCOR, Edmonton Waste Management Centre, Enbridge, Owens Corning, Alta Steel and Alberta Envirofuels.

Members of the SIA association work together to address issues arising out of industrial operations as well as concerns of the public and government. Environmental management is a priority focus of the SIA and it has developed an **air quality monitoring network**. The SIA has advocated retaining a transition zone between heavy industry and residential neighbourhoods reducing the nuisance effects of heavy industry and minimizing the impact of a large-scale industrial incident. Residents are informed of **Emergency Response**.

Recycled Wastewater

Before the Rundle Pedway and before the 2nd Test Site. Five minutes.

A buried 5.5 kilometer treated wastewater pipeline runs between the Gold Bar Plant and the Petro-Canada refinery and crosses the river at two points – here between Gold Bar Park and Rundle Park, and again at our take-out between **Rundle Park** and the **Strathcona Science Park.** At those points, the two-foot diameter pipeline comes out of the ground and runs under the **Pedway bridges**. There are offshoots from the pipeline in these respective parks to assist in refreshing lakes and possibly to make snow for the Nordic ski club.

The membrane treated water supplied to Petro-Canada from Gold Bar is currently up to **5 million liters/day (MLD)** and goes to the Air Products facility located across Petroleum Way, immediately north of the refinery. There the water is dissociated into hydrogen which is then piped to the refinery to process **low-sulfur diesel fuel**. In the future, Petro-Canada's requirement will triple and therefore they'll be taking up to 15 MLD. Additional uses for the water, besides hydrogen production, will be for general process water and steam generation. This whole arrangement was awarded a 2007 Alberta Emerald Award.

Recycled Water Line to Conserve Alberta River Water

http://www.petro-canada.ca/en/media/1886.aspx?id=159C

Mar. 23, 2006

Edmonton, March 23 - A new recycled water line from the City of Edmonton's Gold Bar Wastewater Treatment plant will reduce the amount of water drawn directly from the North Saskatchewan and provide water for Petro-Canada's Strathcona County refinery.

The 5.5-kilometre pipeline, the first of its kind in Canada, sets a new standard for environmental best practices. The award-winning project meets Petro-Canada's water needs for new processes and provides surplus water for other users along the river valley, including the Sunridge and Nordic ski clubs for snowmaking and the parks system for irrigation and pond recharging.

The public-private partnership between the City of Edmonton, Petro-Canada and Strathcona County was funded by Petro-Canada for approximately $25 million.

"The recycled water line reinforces the City's international reputation in environmental management and our expertise in advanced wastewater treatment," said Edmonton Mayor Stephen Mandel. "The unique project serves as a model for other industries and municipalities and has proven to be a win-win business relationship. The treated water meets Petro-Canada's industrial requirements, while the City benefits through enhanced water quality and improved plant capacity with no extra costs to our taxpayers."

The membrane-treated water is cleaner than the wastewater formerly returned to the river at Gold Bar. The recycled water will help Petro-Canada meet new federal standards in the manufacture of fuels to reduce vehicle emissions. Petro-Canada will use the water to produce hydrogen, and for general refining purposes, such as steam production and cooling.

"We welcomed the chance to partner with the local municipalities when they approached us about the recycled water line," said Brant Sangster, Petro-Canada's Senior Vice-President of Oil Sands. "This is exactly the kind of sustainable, world-class thinking that we value as a company. We'll continue to be open to similar opportunities in the future."

Under the water line arrangement, Strathcona County will purchase the recycled water, operate and maintain the pipeline on behalf of Petro-Canada, and deliver the water to the refinery. About 30 per cent of the water used for refining processes will be returned to the river through the Alberta Capital Region Wastewater Treatment Plant.

"This project highlights Strathcona County's commitment to regional partnerships and innovative environmental initiatives," said Strathcona County Mayor Cathy Olesen.

The Recycled Water Line project has been singled out by the Alberta Government for going beyond expectations in protecting water resources and exemplifying the province's Water for Life strategy.

Beverly Heights House Wins a Prairie Wood Design Award

http://manascisaac.com/news/beverly_heights_house_wins_a_prairie_wood_design_award

Congratulations to Shafraaz Kaba on receiving a Prairie Wood Design Award in the "Jury's Choice" category for his Beverly Heights House.

This residential project features many innovative and sustainable wood applications, ranging between reclaimed church pews to carbonized wood. We've watched this groundbreaking net-zero ready home develop over the past years, and know what a labour of love it has been for Shafraaz. The journey has been chronicled at Chasing Net Zero, a blog about the highs and lows of creating a net-zero ready home in Edmonton's varied climate.

To read about the award, and check out other winners, click HERE.

http://www.wood-works.org/index.php?option=com_content&view=article&id=332:prairie-wood-design-awards-2013&catid=49&Itemid=139

Jury's Choice

Beverly Heights House, Edmonton, AB
architect- Manasc Isaac Architects
engineer- Five Star Engineering Ltd.
photo credit – Shafraaz Kaba

Beverly Heights Near Net Zero House

http://www.ecosolar.ca/open_houses.html

August 2011

Address: 3626 Ada Boulevard

Overview: This unique house is very narrow and tall to reduce its coverage of the lot and to maximize its collection of the sun. The house has a passive solar and 2 daylighting design that uses the sun to heat and light all rooms. The small footprint allows the owners to plan for an edible landscape. This house design is currently near net zero; the addition of more solar panels in the future will allow it to become net zero. This very interesting 2,400 ft2 house incorporates many important sustainable design features:

- It considers its footprint and saves space on the lot by being a tall and narrow house. The house maximises passive solar heating and allows refreshing solar daylighting into all rooms.
- The plan of the house leaves as much of the lot as possible for edible landscaping and a large fruit and vegetable garden.
- A basement suite increases the occupancy density and economics.
- The flat roof was designed to lessen the impact of the house's height. Its large overhang on the south side provides summer shade.
- Lots of south-facing walls with excellent solar exposure.
- This house is designed to be all ready to achieve the net zero energy goal. It includes ultra-high levels of insulation, passive solar space heating and a solar-electric system. The addition of a larger solar-electric system in the future will allow the house to become net zero.
- The house will achieve the EnerGuide 86 rating and receive the Alberta government's progressive $10,000 energy efficient housing incentive.
- Stair landings that use pine wood that has been killed by the mountain pine beetle. The wood had been treated in an experimental vacuum kiln to prevent further degradation.

Features that save on heating costs

- Passive solar space heating with large triple-glazed, fibreglass, south-facing windows
- Heat storage: Thermal mass inside the house including a concrete floor, a concrete counter top, and a special high-mass staircase.
- Heat retention: Highly efficient. R90 roof. 380 mm (15") double-stud R60 walls with non-toxic rock wool insulation. Roof contains 150 mm (6") of poly-isocyanurate insulation on top and 300 mm (12") of rock wool insulation below the roof deck.
- Heat recovery: Two heat recovery ventilators (one for each suite). These HRVs ventilate the house ensuring good indoor air quality while reducing the heat lost to the outside.
- Solar control: An awning shades the large 2nd-floor windows in the summer to prevent overheating.

Features that save on electricity costs

- Solar daylighting reduces the use of lighting during the daytime.
- High efficiency lighting is installed throughout.

Features that save on food costs and increase food security

- To maximize the space on the 8,900 ft2 lot for growing fruits and vegetables, the house has a footprint of only 1,000 ft2. This leaves a substantial area for gardening.

Three New Homes in Alberta Produce More Energy Than They Consume

CV3 News January 23, 2009

Imagine a home that saves you more than $2,500 a year in energy bills and emits not a single kilogram of climate change-causing greenhouse gases. Sound too good to be true? It's not as farfetched as it sounds.

There are already three so-called net-zero homes in Alberta - two in Red Deer and one in Edmonton, each producing more energy, from renewable sources, than it uses each year. Two others are under construction in Calgary and Edmonton. If the Canada Mortgage and Housing Corporation has its way, these environmentally friendly pilot projects will encourage other home builders and consumers to build more net-zero houses.

Solar Thermal Collectors on the Riverdale NetZero house

The Riverdale NetZero House, for instance, is a semi-detached duplex nestled among the trees in the historic neighbourhood of Riverdale, just a block from the North Saskatchewan River. Designed and built by Peter Amerongen, president of Habitat Studio & Workshop, its boxy shape and black wall of solar collectors stand out among the neighbourhood's 1950s-era cottage-style homes, illustrating a dramatic change in thinking about the relationship between residential homes and energy use.

"Housing is responsible for a significant portion of Canada's energy use and greenhouse gas emissions," says Amerongen. "If we learn from and repeat what we've done with these prototype houses, we'll soon be in a position to incorporate these changes on the scale we need."

Each two-storey, 2,500-square-foot home contains four bedrooms, three bathrooms, an office/den and a garage. On-site annual production from renewable energy sources includes passive and active solar heating systems and a solar photovoltaic (PV) system. The homes are highly insulated and airtight and have higher amounts of internal mass, which helps to regulate indoor temperatures and reduce heating requirements. The homes also have high-efficiency appliances.

"The key is to start with an integrated design that incorporates energy efficiency and renewable energy collection right from the beginning," says Amerongen. "If you build the best possible building envelope, you can always add renewable energy collection later if it has been planned for."

Although these homes generate all their own energy, they are still connected to Alberta's electricity grid. All surplus electricity generated by the PV system is fed back into the grid, which supplies electricity to the

homes when there isn't enough solar energy, such as at night, during cloudy weather, and/or when household electrical demands are heavy.

Net-zero homes result in significant environmental benefits. At Riverdale, energy use has been reduced to 24 per cent of the average Canadian house (61 kWh/m^2), and all of the heat and electricity it does use is generated on-site from renewable sources. This gives it an EnerGuide rating of 100 and virtually eliminates the 16 tonnes a year of greenhouse gases emitted by a conventional house.

The Riverdale NetZero home will keep approximately 1,000 tonnes of carbon out of the atmosphere over the first 60 years of its lifespan. Water use, too, has been reduced by 54 per cent.

There is a catch, of course. The cost of building a net-zero house can be as much as $100,000, or 25 per cent, more than a traditional home of comparable size. At the current price of electricity and natural gas, the payback period is between 16 and 35 years, but as energy prices rise and the technology improves, the price tag and the payback period of a net-zero home could shrink as fast as its carbon footprint.

Edmonton proves hot spot for net zero homes in Canada

BY ELISE STOLTE, EDMONTON JOURNAL OCTOBER 8, 2014

Paul and Susan Horsman's net-zero house is outfitted with solar panels. Edmonton has become a hotbed for net zero homes in Canada. **Photograph by:** Ed Kaiser , Edmonton Journal

EDMONTON - What was once a niche environmental dream is edging toward the mainstream, and enthusiasts say Edmonton is a hot spot for net-zero technology in wintry Canada.

At least 27 homes that produce as much energy as they consume have been completed here and several more are under construction, including a net-zero office building.

"As a community, we're a little more environmentally and socially aware than most places give us credit for, and because we're in an energy province, we're far more engaged in that conversation," said Dave Turnbull, Landmark Homes' product development manager. "There's just a deeper pool of altruism here."

It cost homeowners just $37,000 to upgrade to "net zero" in Landmark Homes' most recent project, a series of 14 new row houses in Mcgrath Heights.

The prices for Landmark homes are a sign net zero could soon be an option for anyone, said David Dodge, producer of Green Energy Futures with the Pembina Institute.

"That's pretty amazing," said Dodge. Seven years ago, net zero elements on the first experimental home in Riverdale cost more than $100,000, he said.

"It's one thing to build a net zero for someone who can afford it, someone who is wealthy and can afford this awesome house. It's quite another thing to build it for the marketplace."

Dodge is hosting a panel discussion on net zero homes with several homebuilders Thursday at MacEwan University (details at www.greenenergyfutures.ca/NetZero).

Today's net zero homes are simple and efficient, lacking the "starship Enterprise" complexity of the first experimental homes, said Dodge.

Paul Horsman moved into his Richie-neighbourhood net-zero Landmark home in May and likes to show off the five-centimetre-thick concrete flooring that makes a big difference for him.

The house is warmed by a wall of south-facing windows at the back, but it's the concrete that prevents it from overheating. The concrete warms up during the day and holds the heat through the evening. Deep overhangs outside the window prevent too much sun from entering during the summer. But with the sun's lower winter angle, "by Christmas, the sun will reach the front door," said Horsman.

He made a 3-D model of the home before it was built to make sure the overhangs were just right.

"It's not rocket science this stuff, but it is science," said Dodge.

Horsman's walls are 20 centimetres thick to provide better insulation, and he saves energy on hot water by simply running the copper pipe with the used shower water around the cold water intake.

That's a simple money saver anyone could retrofit to a home, said Turnbull. It would cost about $800, including the plumber, and pay for itself in seven years.

Horsman's solar panels produce enough electricity to run the heater, an air source heat pump. It works on the principle that compressing an object makes it heat up. The machine compresses a medium, then pulls the heat from it and warms the air in Horsman's house. It works even when the air outside is -30 C.

It costs four times as much as heating with natural gas, except that Horsman is producing his own electricity, so it costs him nothing.

Landmark, which builds about 1,000 homes a year, has been offering new home buyers the option of going net zero since 2011. Turnbull said the company is really close to a tipping point where net zero could make sense for almost everyone.

If the province took into account the environmental impact of burning coal for the rest of Edmonton's electricity and offered homeowners a better price for the electricity they feed into the grid, that would tip the scale, he said.

As for why Edmonton has emerged as a leader in the field, some credit goes to the local pioneers, such as Peter Amerongen with Habitat Studios, said Turnbull. There is no registry of net zero homes across Canada, but the environmental building community is small enough for local builders to know there aren't that many others out there.

Gold Bar Creek Walk

2nd Test Site. Raft groups walk up Gold Bar Creek and around the bend. Ten minutes.

While **Gold Bar Creek** seems so tiny, over time it has done a lot of work to move soil, rock and trees. Notice the steep cliff on the **outside of the bend** – stream energy has been directed against the bank and erosion has occurred, trees have fallen into the creek, etc.

The inside of the bend is relatively flat – an area of sediment deposition. Streams and rivers move to the outside of a bend and leave beaches behind them. Albert Einstein noted that no stream or river can move in a straight line for long – the spin of the Earth (Coriollis Effect) – eventually throws its path against a bank and erosion begins.

Where does the eroded sediment from Gold Bar Creek end-up? Right, we just finished our second test site while standing on a sand **delta at the mouth of the stream** where it enters the river. Because there are now two dams upstream of Edmonton, there are no longer flood peaks to wash the sediment away and the delta is growing into the river. Humans have interfered with the natural cycle of river flow. Over time, the creek has carried a lot of gold flakes out of the surrounding gravel and rock – hence the area's name "Gold Bar" as in "Gravel Bar". On weekends, you can occasionally find people **gold panning here**.

Imperial Oil charged in wastewater spill

Edmonton Journal

Published: December 21, 2005

Imperial Oil has been charged with violating environmental law for releasing industrial wastewater from Edmonton's Strathcona Refinery Edmonton into the North Saskatchewan River in February of 2004.

The company has also been charged with failing to immediately report the accident.

The charges stem from a malfunction in its water treatment plant that allowed between 100 and 400 litres of a hydrocarbon pollutant, a light oil product from the refining process, to overflow into the river. They follow an investigation by Alberta Environment spanning almost two years.

The spill caused a rainbow-coloured oil sheen covering several metres of the river. Soon after it formed, the sheen began breaking up and dispersing, making it difficult to clean up with containment booms.

Company officials at the time said it was caused by a problem that allowed the water to flow directly into the river, bypassing the Strathcona Refinery's water-treatment plant.

Alberta Environment monitored water quality downstream from the spill and determined it did not pose a threat to drinking water.

The spill did not affect Edmonton's water supply because the city is upstream from the refinery, located in Strathcona County on the city's eastern limits.

Communities and farmers and other land owners along the river were contacted about the spill.

Company officials are to make their first court appearance Feb. 9 in Fort Saskatchewan provincial court. The maximum penalty for each offense is $500,000.

Under provincial law, companies must follow the requirements of their Alberta Environment operating approvals to ensure the environment is protected. Failing to meet the approved requirements is an offence under Alberta's Environmental Protection and Enhancement Act.

A department spokesman said he couldn't release any further details.

Spill fine will help green groups

Hanneke Brooymans, The Edmonton Journal
Published: Friday, September 22, 2006

FORT SASKATCHEWAN - Two lawyers and a provincial court judge used a bit of legalistic wizardry to transform a dangerous slick of industrial wastewater into an animal ambulance Thursday.

In an example of "creative sentencing," Alberta Environment lawyer Susan McRory managed to squeeze something positive out of an accidental spill by Imperial Oil. The company estimated 100 to 400 litres of untreated industrial wastewater flowed from its Strathcona refinery into the North Saskatchewan River in February, 2004. The water contained hydrocarbons. Dead mallards, which had succumbed to hypothermia, were later found close to the plant site.

Violating its environmental approval cost the company $200,000 in fines. But instead of plumping up the provincial treasury, all but $20,000 will go to environmental non-profit groups. The bulk of the cash -- $120,000 -- will go to the Wildlife Rehabilitation Society of Edmonton, which rescues between 600 and 900 injured and ill animals each year. Kim Allan, the society's founder, was ecstatic to hear about the funds.

They plan to get a van and convert it into a well-equipped animal ambulance that can pick up the "patients." Right now, volunteers are carting injured wildlife around in their own vehicles, which can be hairy at times, she said. "In my car alone, I've had deer, fox, coyote, turkey vultures -- you name it." Since the money can't be spent on operating costs, the society will also look at purchasing an X-ray machine and surgical equipment, Allan added.

There are other beneficiaries of the Imperial fine: $30,000 will go to Alberta EcoTrust, a sort of United Way of the environment world. The trust will distribute the funds to an environmental project that will benefit the North Saskatchewan River. **The final $30,000 will go to RiverWatch Science, an education program that takes high school students onto the river and teaches them about pollution.**

Imperial Oil could have faced higher fines. It originally faced two charges, each carrying a maximum $500,000 penalty. Alberta Environment withdrew a charge of failing to immediately report the release after the company avoided the need for a lengthy trial by pleading guilty to violating its environmental approval. McRory also noted the spill was accidental and the company responded quickly. This ended up reducing the potential fine.

The accident occurred on Feb. 19, 2004, when Imperial Oil was performing scheduled maintenance on a flow control unit in an underground vault in the refinery's sewer system. About 110,000 litres of untreated wastewater in the vault was removed by a vacuum truck.

This dirty water was released downstream of a separator where it would normally be treated, instead of upstream. The experienced supervisor directing the work thought the water would go to aeration and settling ponds for treatment. Instead, a decommissioned line allowed some of the contaminated water to bypass the ponds and discharge directly along the old wastewater treatment system into the river. Some of the water also flowed through a corroded hole into the old system and into the river.

When the spill was reported by a downstream neighbour to Alberta Environment and the company at 8 a.m. the next day, Imperial shut down water flow to the river and launched an investigation. By 11 a.m., the company determined it was a possible source and put its emergency response plan into action. Two permanent concrete plugs were installed in the decommissioned line shortly after the accident. McRory noted that instead of blaming the supervisor, the company itself accepted the responsibility for the accident.

Foam discharged into river

By Michael Di Massa, Sherwood Park News

Friday, April 19, 2013 5:39:05 MDT PM

The Suncor facility in Refinery Row experienced a foam discharge from its outfall pond into the North Saskatchewan River on Tuesday morning.

“This pond contains water that is intended and approved for discharge to the North Saskatchewan River,” reads a Tuesday evening notification posted to the Suncor Response website. “At this time we believe the release was a combination of water intended for discharge and a biodegradable cleaning product.”

Suncor spokesperson Sneh Seetal said it hasn’t been determined how long the water was being discharged before the incident was discovered, but that the company did act immediately once the release was noticed.

The water in the pond is comprised of condensed steam and cooling water, Seetal said, and dissipated about two kilometres downstream.

Suncor employees responded to the discharge at 9:30 a.m. and the outfall pond was closed by 10:40 a.m.

“It is not, unfortunately, an instantaneous process, but our folks did respond as quickly as they could,” Seetal said.

Regulatory officials, including Alberta Environment and Sustainable Resources Development were notified by 11:45 a.m.

“We have fully reported to the appropriate regulatory agencies and are working cooperatively with them. We are also in the process of notifying local stakeholders,” the notification notes.

Seetal added that a crew of Suncor employees went downstream to take samples of the water for testing. They also pulled samples from water in the outfall pond before it enters the river. It will be a few days before the results of the bioassay (an examination of trout samples over multiple days) and water quality tests are known.

“Part of the challenge is some of the foam that we see on the shoreline, there’s question if it’s coming from what we would have discharged into the river, or if it’s organic to the actual river. It looks very much like foam or frost or white bubbles that you might normally see anyway at the shoreline.”

Spill Creek

While floating by or stopping at the creek mouth

The source of this intermittent creek is surface rain and snow run-off upstream at the Enbridge and Kinder Morgan industrial sites near the Suncor Energy Refinery. The creek flows for just three kilometers and in that distance, it passes by the Gibsons and Interpipeline industrial sites, under 17 St., under a set of railway tracks and then between the Strathcona Science Park here on the north side and the Imperial Oil Refinery on the south side. Along the way, there are sixteen pipelines servicing Industrial Row that cross the creek before it enters here at the North Saskatchewan River.

A ground worker detected an oil spill upstream on the Gibson property on or about Thursday, Sept. 23 2010. The area Pipeline Association lead by Imperial Oil responded immediately to control the oil entering the creek. An emergency response contractor Quantum Murray was later hired to maintain the oil containment booms, temporary dams and soak-up any oil on the water surface. The clean-up foreman had experience as a firefighter working with hazardous materials (hazmat response). A laboratory services company ALS Environmental was contracted to conduct daily water sampling and analysis here at the creek mouth.

The spill was small and no oil flowed down the creek to enter the river. The clean-up and monitoring continued into the month of October. The leaking section of the oil pipeline was first patched and then cut-out and replaced. The hole in the pipeline was associated with corrosion at a dent in the pipe that might have occurred during initial construction in 1961.

During the initial week of the oil spill, there were containment booms, sandbags, oil collection equipment, absorbent pads, a flat-deck trailer, bins of sample bottles and floodlights placed here at the mouth of the creek. Containment booms and absorbent pads float on the surface of the creek without absorbing any water – just hydrocarbons – and they are later disposed at a Class I landfill or recycled. Into the month of October, there were still containment booms in-place just meters up the creek and all along the way to the creek source at 17 St.

Strathcona Science Park Archaeology Site

While floating by or stopping at the mouth of Spill Creek

The Strathcona Science Park Archaeology Site is located at the top of the north bank of the creek mouth. The site was discovered in the autumn of 1976 during an archaeology survey of the Capital City Recreation Park.

Researchers began excavating here in 1978 and soon discovered that the site was about 4 acres in size and that it had been inhabited periodically for at least the last 4000 years. To provide access to the area and allow people to see archaeological excavations and technology, a wooden boardwalk was constructed with a series of interpretive plaques explaining how archaeologists carry-out their work and how they interpret the evidence of a past way of life.

Archaeologists have excavated portions of the site searching for discarded tools and traces of refuse, fireplaces and shelters. Detailed notes, maps and photographs were taken to record the exact location of all artefacts. The information found by the archaeologists is used to determine how tools were made, what constituted the economic basis of the society and how people and their cultures changed.

In a parkland environment similar to that of today, cultural groups periodically camped on this site from 3000 A.D., through the time of European contact; and into the present historic period. Semi-nomadic hunters and food gatherers were here during their seasonal hunting hunts for bison, moose, elk, porcupine, ducks and geese. This was only one stop on an annual round of travels, and while here, they made stone tools from quartzite cobbles obtained from the river. These tools gave researchers the most visible part of the archaeological record.

Since the 1980's, the interpretive building in the park has been closed by funding cutbacks and the boardwalk, signage and river-view platform have fallen into disrepair. The four-acre archaeological site is still surrounded by a chain link fence.

Strip mine becomes dump

Beverly Dump (now Rundle Park) 1956-1972

Edmonton Journal
August 17, 2009

When Edmonton needed dumping grounds to supplement the incinerator and various smaller landfills, it looked east to Beverly, still a separate town when the city bought an unsuccessful strip mine in 1956 and started hauling in trash.

The property, now Rundle Park, featured garbage fires that could last for days, sewage lagoons and, in its early days, the occasional black bear, says historian Lawrence Herzog. Residents weren't happy with the garbage trucks that rumbled along local streets.

But it allowed the city to stop dumping junk into the Kennedale Ravine and at the edge of the North Saskatchewan River west of the Highlands Golf Course, where hikers can still see poking out of the dirt layers of bedsprings, tires, car parts and other refuse used to stabilize the bank.

The 24-hectare dump was shut in 1972, replaced three years later by Edmonton's first modern engineered landfill at Clover Bar. The short-lived Frontier Farms landfill near Refinery Row took some of the trash in the meantime.

The undulating landscape on Rundle Golf Course comes from the continued settling of the garbage underneath.

Strathcona Science Provincial Park

From Wikipedia, the free encyclopedia

Strathcona Science Provincial Park is a provincial park in Alberta, Canada, located between Edmonton and Sherwood Park, south of the Yellowhead Highway and west of Highway 216.

The park is situated in the North Saskatchewan River valley, on both banks of the river, at an elevation of 625 m and has a surface of 2.9 km^2 . It was established on December 12, 1979 and is maintained by Alberta Tourism, Parks, Recreation and Culture.

This site was for thousands of years the site of an annual aboriginal camp, as it was located close enough to the river for transportation and trade and the bluffs of the river valley provided excellent bison-hunting opportunities. The park was established to preserve the site from encroaching industrial development. It was the site of archeological excavations in 1978 to 1980.

In the east portion of Edmonton, on the south bank of the river and on the edge of the industrial zone, Strathcona Science Provincial Park has been constructed on the site of the abandoned Black Diamond coal mine. Adjoining it is the Alberta Natural Resources Science Center.

The buildings you mention are what remain of a science park to the south of the ski area.It had interactive activities inside each building. It has been closed for many years. I wish a developer or organization would take interest in it. It seems like such a waste of good potential.

There were exhibits inside the buildings. I remember one described the procedure of extracting oil from oilsands. They had some oilsands there and you could put your hands in rubber gloves and feel how gooey it was. Another one talked about hydroelectricity, windpower, etc.

The centers were concerned with mineral and raw material deposits in Alberta, and displays and sundry exhibits sought to explain how minerals are discovered and mined. The Energy Department, providing information about the way oil is obtained from Edmonton's sub-soil, was particularly interesting.

I do believe Alberta Safety Council owns one (maybe all) the science buildings. There is/was motor cycle training done there in recent years.

I believe the science centers were shut down after the tornado tore through the park and demolished the last standing coal mine chimney. There are still come plaques there describing which mines operated.

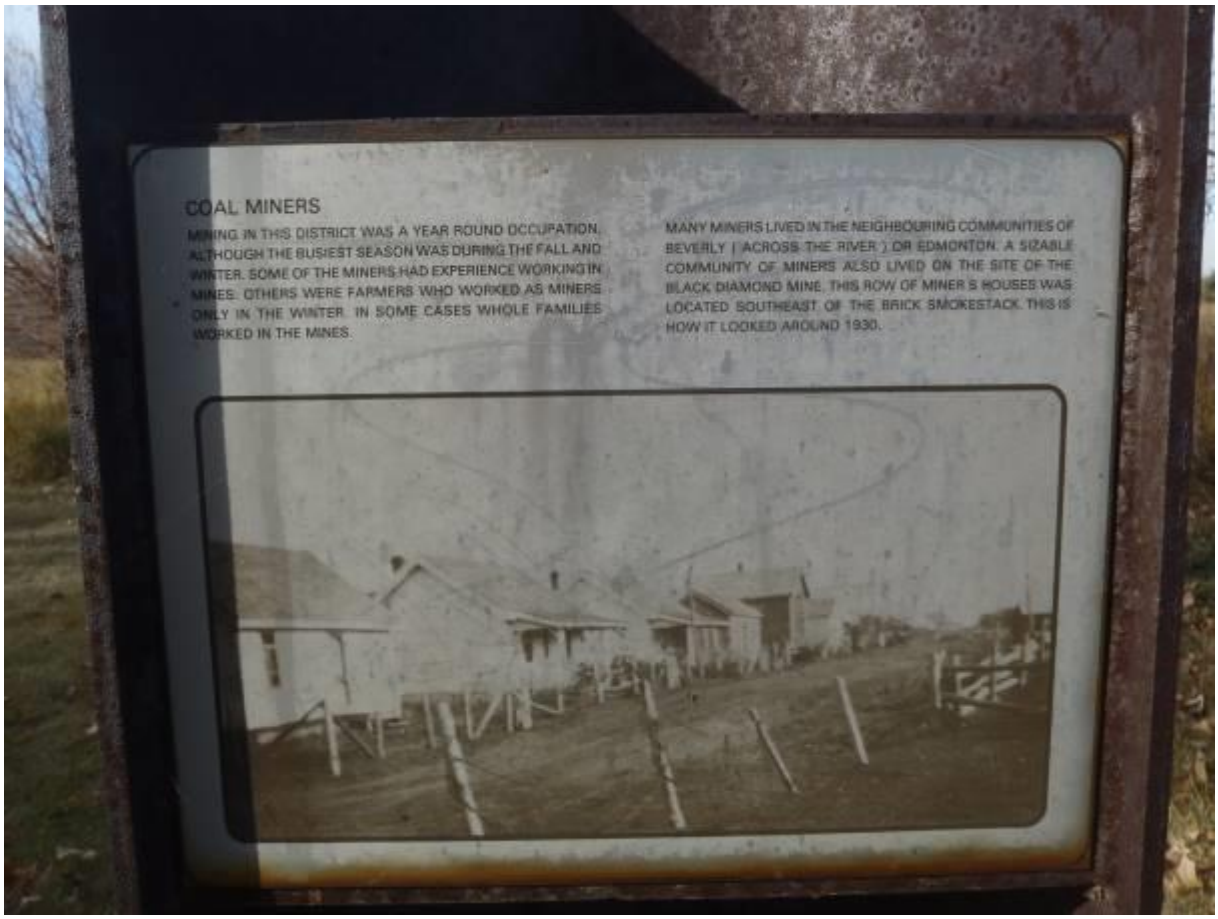
There used to be an archaeological site there, a nature/river valley boardwalk (which still mostly exists) and the buildings which were full of native artifacts, stuff about the coal mines in the area, etc.

Strathcona Science Park Coal Mine Interpretive Signage

Edmonton Oct. 17th, 2011

"An Interpretive Resource in Decline"

There is some irony in that one goal of interpretation is to reveal stories from days long forgotten and things lost, yet it is the interpretative signage itself that is in decline and in danger of being lost and forgotten in Strathcona Science Park, Edmonton, Alberta. Since it's heyday in the early 1970's, much of the park structures are closed, in decay and with an uncertain future.

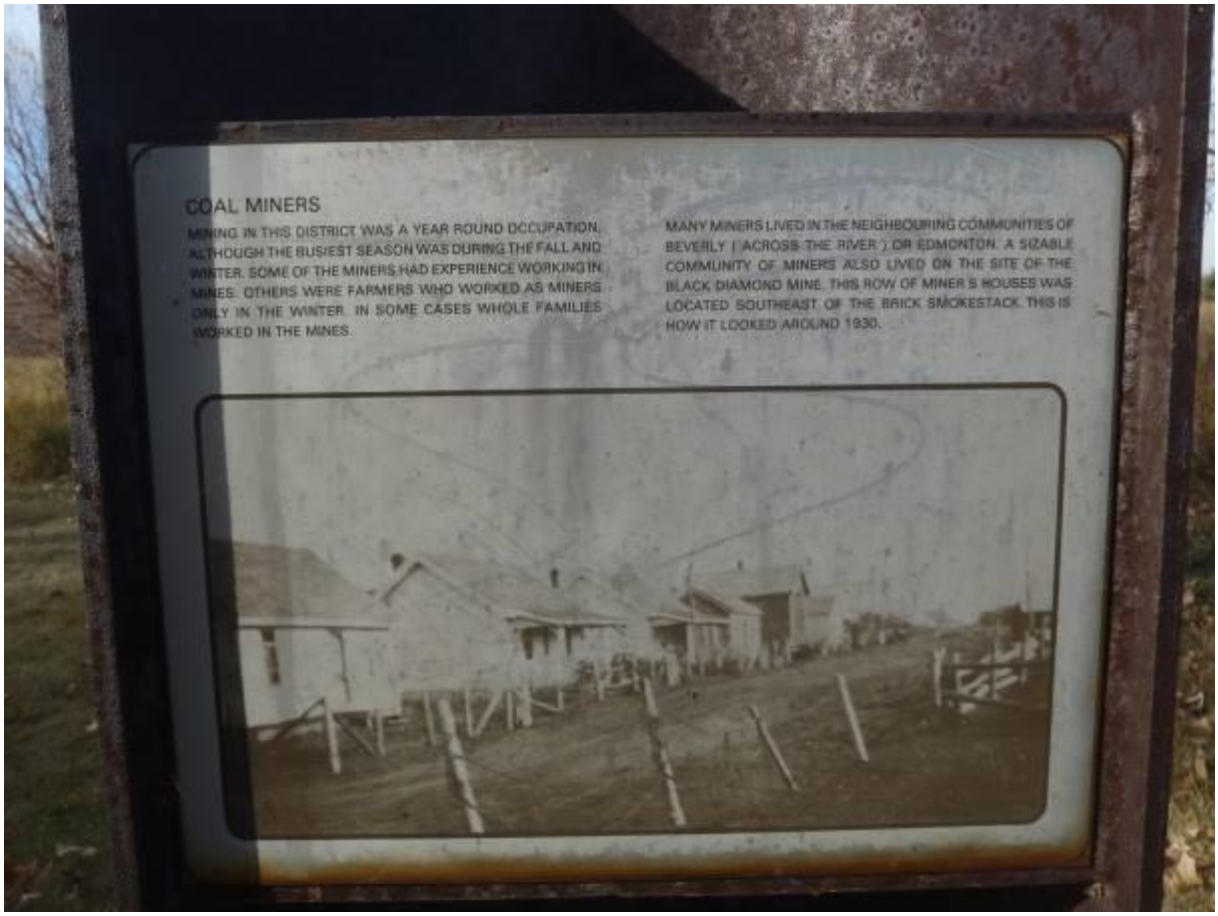


Coal Miners

Mining in the district was a year round occupation, although the busiest season was during the fall and winter. Some of the miners had experience working in mines; others were farmers who worked only in the winter. In some cases, whole families worked in the mines. Many miners lived in the neighbouring communities of Beverly across the river or in Edmonton. A sizable community of miners also lived on the site of the Black Diamond Mine. The row of miner's houses was located southeast of the brick smokestack. This is how it looked around 1930.

Black Diamond Mine

The Black Diamond Mine extended over what is now the southern half of Strathcona Science Park. The brick smokestack was built in 1917 as part of the power system and is all that remains of one of the largest mines in the Clover Bar Seam. This photograph was taken close to where you are now standing. The main shaft into the mine was near what is now the "Land Forest Building" (in Strathcona Science Park).



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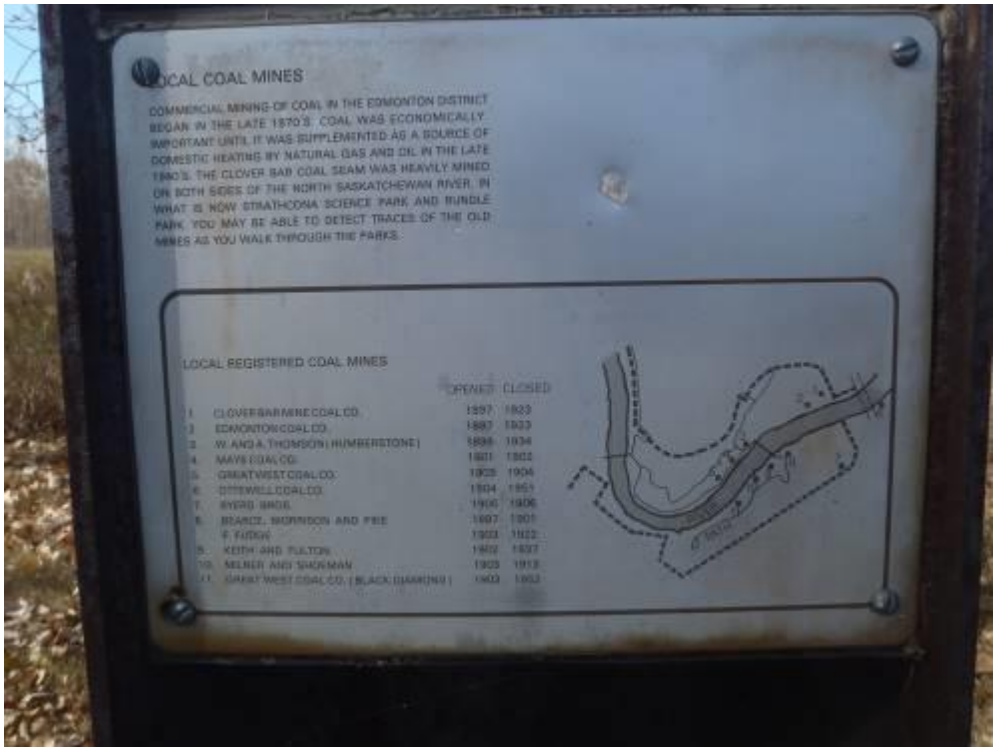
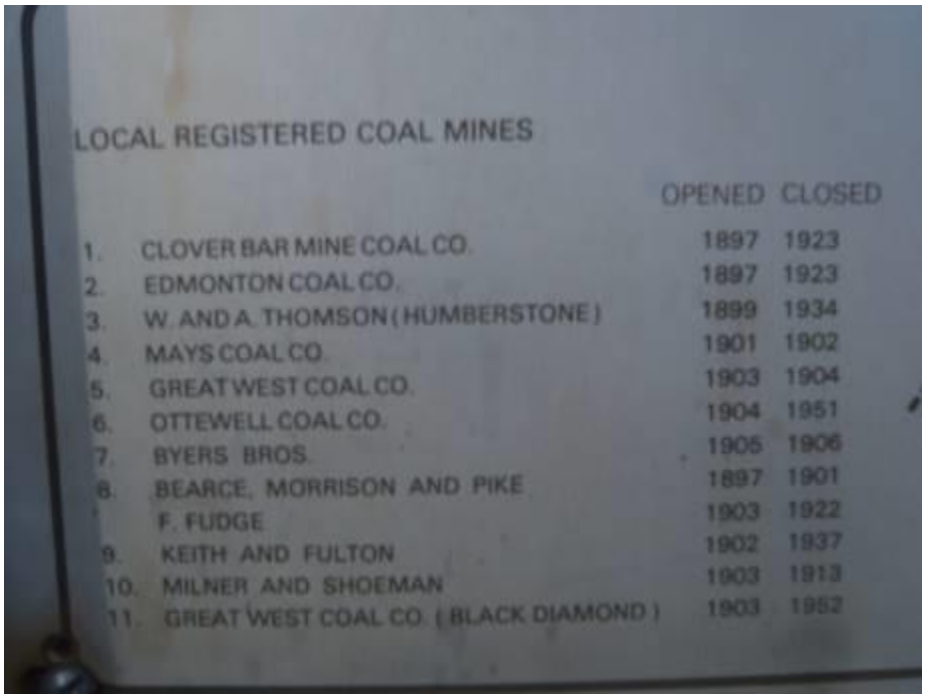
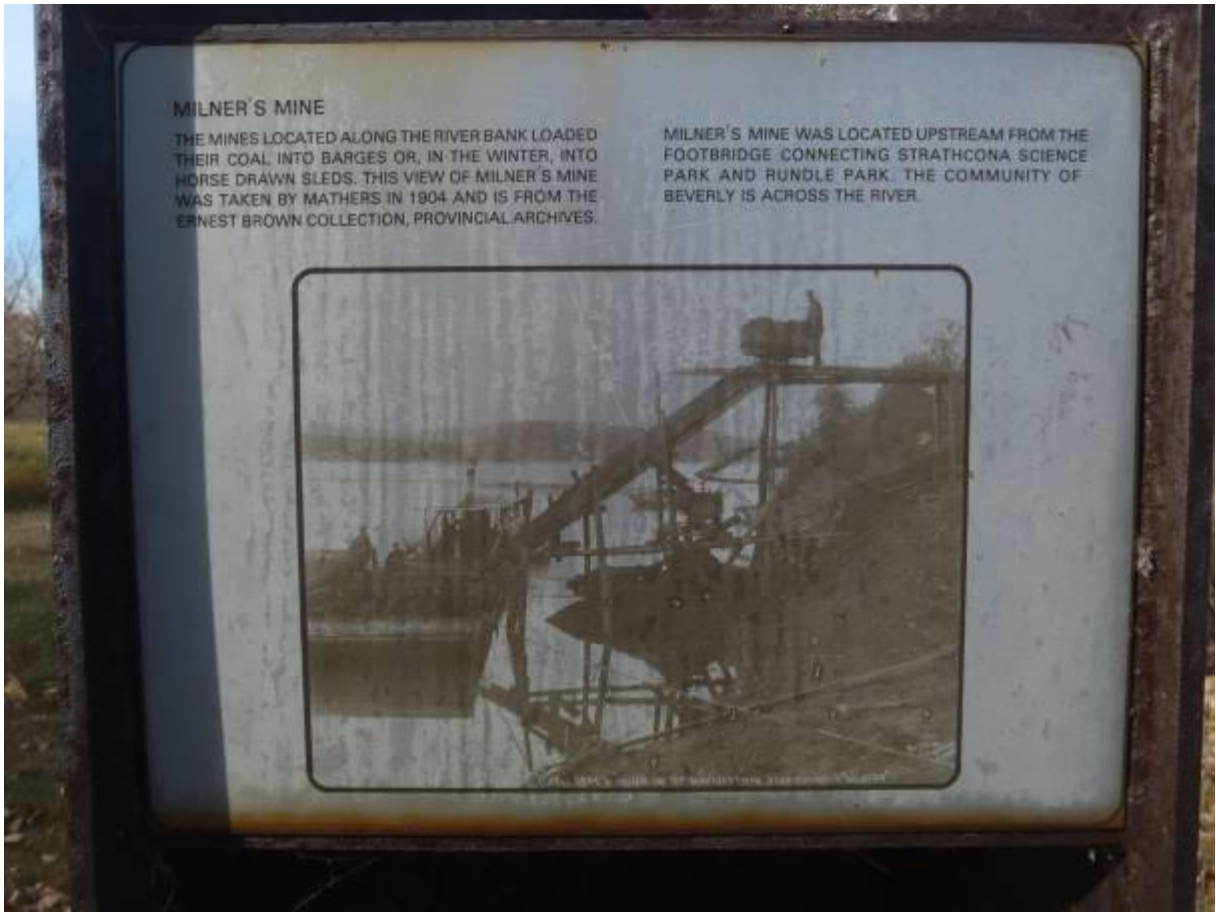


Local Coal Mines

Commercial mining of coal in the Edmonton District began in the late 1870's. Coal was economically important until it was supplemented as a source of domestic heating by natural gas and oil in the late 1940's. The Clover Bar Coal Seam was heavily mined on both sides of the North Saskatchewan River in what is now Strathcona Science Park and Rundle Park. You may be able to detect traces of the old mines as you walk through the parks.





Milner's Mine

The mines located along the river bank loaded their coal into barges or, in the winter, into horse drawn sleds. This of view Milner's Mine was taken by Mathers in 1904 and is from the Ernest Brown Collection, Provincial Archives. Milner's mine was located upstream from the footbridge connecting Strathcona Science Park and Rundle Park. The community of Beverly is across the river.

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 Gold Bar Wastewater Treatment Plant?
9. What will you tell your family and friends about the North Saskatchewan 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!