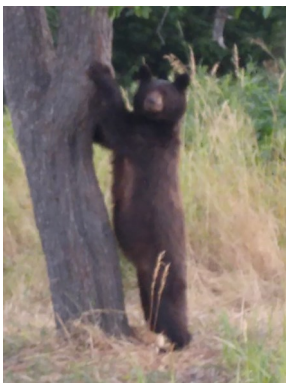


The **Christina Lake Watershed Management Plan (CLWMP) and Implementation Strategy Annual Review** brings together a variety of speakers to discuss the status of our watershed as well as future plans for the area. There were 74 people that attended including those from local government, the provincial government, non-profit organizations, biologists and local residents. There was also an emphasis on updating the implementation strategy to see where the Christina Lake Stewardship Society (CLSS) is and where they should be going. It gave everyone the opportunity to provide input on future initiatives. There was a great lunch provided by Twisted Forks, and Grace McGregor, Area "C" Director (RDKB), facilitated the event and introduced all the various speakers.

PROCEEDINGS WERE VIDEOTAPED AND AVAILABLE ON YOUTUBE

Christina Lake Watershed Management Plan Annual Review 2015

Brenda LaCroix, Stewardship Coordinator/Project Manager for the Christina Lake Stewardship Society (CLSS)

CLWMP and Implementation Strategy Annual Progress Report

Brenda LaCroix began with describing how programs and projects are based on issues identified in the Community Watershed Management Plan & Implementation Strategy.

She then described the projects they have been involved in over the last year. These projects include stream -spawning Kokanee enumerations, the Young Stewards of the Boundary Youth Program, the Aquatic Invasive Species (AIS) program, the Derelict Dock Removal Program, as well as other monitoring projects including the use of critter cameras. CLSS also teaches WildSafe BC, and provides water quality sampling.

Although Kokanee numbers were down this year, Brenda explained that the spawning fish were much larger than the last couple years, and more indicative of the population four years ago. The Kokanee life cycle is four years long, so the fish seen this year were the offspring of those making their way up the creeks in 2011.

She then provided details about their newest project, the Native Plant Nursery and Riparian/Wetland Restoration (Demonstration) Site, and a movie was shown at lunch showing the progress.

Brenda also introduced all of the various speakers, and made a point of thanking all of their supporters, volunteers, and members that have made the 2015 season so successful.

Mike Sokal, Environmental Impact Biologist, Environmental Protection Division - Ministry of Environment (MoE)

2015 Water Quality Review

Mike Sokal began by thanking the CLSS for their contribution to the water quality sampling that is done at Christina Lake. He then explained the lake is part of a large regional scale monitoring program, and how they are attempting to expand it province-wide. This will promote standardization of lake monitoring and identify data gaps, as well as encourage relationships with stewardship groups and other organizations.

Dr. Sokal then talked about Water Quality Objectives that were established in 1994, and are used as a guideline to determine water quality of Christina Lake from year-to-year.

He then described some of the characteristics of the lake including the flushing rate of 4.5 years, and went into sampling specifics. Christina Lake is sampled in the spring and fall by MoE, and bi-weekly by CLSS from spring to fall.

The results from this year's sampling showed overall excellent water quality. All of the key nutrients and other parameters were within the Water Quality Objectives. Dr. Sokal also said that this year was the earliest onset of peak temperature (early July) on record, and there was a similar peak surface water temperature to last year (25-26°C); one of the warmest on record.

He is also hoping to update the Water Quality Objectives in 2016.

Brent Dennis, P.Eng, Past President for Western Canada Onsite Wastewater Management Association of BC

Septic Systems – Public Health and Lake Water Quality

Brent Dennis first talked about the water cycle and how Christina Lake is a reservoir where water is taken out and put back in. He then described the wastewater cycle, where after treatment there is "the solution of dilution" which can cause input of nutrients.

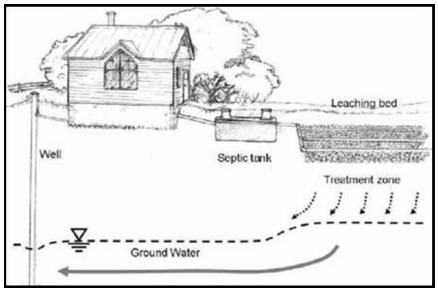
Brent then went into the regulations regarding wastewater treatment. He stated that old regulations focused on disposal, whereas new ones focus on treatment and dispersal. The Ministry of Health's Sewerage System Regulation (SSR) provides guidelines that Practicing Engineers (P.Eng) and Registered Onsite Practitioners must follow. They are 100% responsible for design and installation of the system, and any problems that might arise.

The Municipal Wastewater Regulation (MWR) also has regulations in regards to public health including limits on nutrient loading.

On the environmental side of things, the SSR has guidelines regarding water courses. The RDKB's Official Community Plan for "Area C" also states that septic systems have a 100 meter setback from the water, and these regulations are some of the best Brent has seen in the Province. Brent also stated that other regulations may come into play to protect the environment including those regarding fisheries, and subdivision development.

Brent then went into some of his work including testing for septic system health with a hydrogeologist to see environmental impacts along the shoreline. He also talked about the 3 types of septic systems, and although Type 3 has more treatment levels, it might not necessarily be better.

He finished up by providing the crowd with resources regarding septic systems in the province.



Alan Stanley, General Manager of Environmental Services for the RKDB & Phil Maki, Eurasian Watermilfoil Removal Dive Crew Supervisor

Eurasian Watermilfoil Program 2015

Alan Stanley first introduced Phil Maki to talk about the 2015 season of Eurasian watermilfoil removal. Phil began by talking a little bit about the crew of 8 divers with 2 of those being new to the program, and each bringing their own skills to the table. He then talked about the state of the shoreline in 2012 when he first started working for the RDKB, and how they were in pretty bad shape. This included the out of control south bay, and how the milfoil was pretty much the only plant they would find.

Since 2012, and the implementation of 2 crews, Phil stated that they have steadily gained control of the shoreline and native plant species have begun to return. They were also able to push into areas this year that have never been touched before including the buoyed-off areas of the north and south ends. Phil also stated that nearly all of 575 sites where they pull, have seen a decrease in plant counts since 2012.

In 2016 they are hoping to focus on dense areas of milfoil in the south bay.

Alan Stanley then spoke to the state of the possible use of a weevil for the biocontrol of the milfoil. After 5 years they have received a letter from the province, which sets guidelines for the release of weevil including a source, where they will be released, first nations referral, etc. which could take years. There have also been some issues on the political side of things but Alan stated that Director McGregor is still working on it.

Alan also stated that the gear for the removal program will need to be updated this year, and unfortunately they do not have the capacity for much scientific research beyond pulling the milfoil and doing plant counts.

Heather Ling, Senior Stewardship Assistant for CLSS

Christina Lake Aquatic Invasive Species Program 2015

Heather Ling first talked about some of the impacts that aquatic invasive species (AIS) can have on the aquatic system. She then went into some of the species that are in Christina Lake including Fragrant waterlily, and the Curlyleaf pondweed, and some to watch out for including the Northern pike and Red-eared sliders.

Heather then discussed their Zebra and Quagga mussel monitoring program which includes the use of a plankton haul net, and substrate samplers around the lake. These samples are then examined microscopically for mussels. They did have one scare this year, but no mussels were found!

Heather then went into the AIS educational program, which began with collaboration with the Canada Border Services Agency (CBSA) and Auxiliary Conservation Officers from the Ministry of Environment at the Cascade border crossing. She then talked about public outreach at the Texas Creek Boat Launch by summer students Holly Heximer (CLSS), Ashley Lawrence (BIS), and Simon Ryder (of the milfoil crew). Of the 379 non-repeat visitors to the boat launch, the majority were from BC and Alberta, with a few from Washington, 1 from Alaska, and one from the North West Territories. About 31% of these visitors talked to staff at the gazebo set-up there.

She then talked about other aspects of the educational program including incorporation into the CLSS Youth Program, and gave everyone a lesson on the difference between native and introduced species including mussels.

Barb Stewart, Project Coordinator for Boundary Invasive Species Society (BIS)

Boundary Invasive Species Society Update 2015

Barb Stewart began by talking about some of their educational signage which has been put up around the Boundary including at all high-traffic areas for watercraft users. She then talked about the wetland restoration project at Boothman's Oxbow which is starting to see some successes, and has been a great educational venue.

Barb then talked about priority species for eradication in the Christina Lake Area including Mouse-ear hawkweed, and Longspine sandbur, and those they are attempting to contain including Knotweeds and Common tansy.

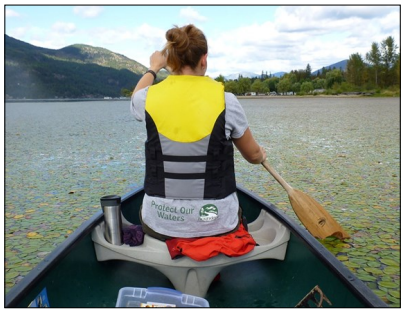
Next, Barb spoke to the Yellowflag iris removal in Christina Creek. This invasive riparian plant is very difficult to remove, and there are large patches along the creek. They are experimenting with tarping this year, and it will be interesting to see the results.

She also spoke to some changes that have occurred in the Gilpin area that were once completed covered in invasive terrestrial species, but due to the effort of BIS, have seen some comeback of native species.

Barb then went into some of the work they have been doing with aquatic invasive species, and some of the surveys they have done throughout the Boundary in 33 locations. They did not find any American bullfrogs, Red-eared sliders, or New Zealand mudsnails which is great news. They did however find two new introductions of Yellow flag iris, and one of Japanese and Giant knotweed, and Fragrant waterlily. In 2016 BIS is hoping to focus on preventing the spread of AIS including the release of aquarium plants and pets.

Barb also did a summary of provincial initiatives regarding AIS including working to establish the Western Canada Invasive Species Agreement, and a Federal Provincial Territorial Alien Species Task Force. The BC Mussel Defense Program, that included the roving teams in our area, inspected 300 boats, 70 from high risk areas, where 34 were decontaminated, and 15 of which had mussels or larvae (12 were from Eastern Canada). She also spoke to the Pacific Northwest Economic Region's Mussel Leadership Workshop which includes collaboration with groups from the US.

Barb also made a point of thanking their many supporters, and partners.



Holly McLellan, Principal Investigator for the Fish and Wildlife Department of Colville Confederated Tribes

Lake Roosevelt Wild Kokanee Research

Holly McLellan began her presentation by talking about the Kokanee fishery in Lake Roosevelt. These are large fish (20 -24 inches), and part of their research is determining where these unusually big Kokanee are coming from, as they are not from the lake's tributaries, and they do not spawn in the upper 50 feet of the shoreline. They are either coming from upstream, or reproducing deep in Lake Roosevelt's waters.

Holly then went into their sampling methodology including locations as north as the Arrow Lakes. In order to determine the source population of these Kokanee, they do an isotope study in conjunction with Pacific Northwest National Laboratories (PNNL). They look at the otoliths ("ear bone" structures) of the fish that grow daily, and incorporate trace elements in the water into the $CaCO_3$ matrix of the bone, providing a chronological history of where the fish has been. They look at Strontium isotope ratios ($^{87}Sr/^{86}Sr$), and trace elements, Ba, Zn, Mg, U, Pb, Cd, and compare these to concentrations in different waterbodies. They also did the isotope analysis of native mussel shells including floater types (Anodonta), and Western Pearl shell (Margaritifera).

Holly then went into the results of their studies. They found that rivers in the west side of the basin had high Sr ratios, whereas those in the east had low. Their mussel study was inconclusive, but they are willing to identify native mussels for CLSS. They also identified 4 different life history patterns for Kokanee, so they are still looking into finding where these fish are coming from, and they plan on expanding their search in 2016. They are also planning on applying this research methodology to a baseline water study, and other fish species including the Northern pike, that appear to be coming from the west (i.e., the Kettle River) to Lake Roosevelt.

Graham Watt, Project Coordinator for Kettle River Watershed Management Plan (KRWMP)

Kettle River Watershed Management Plan Update

Graham Watt's presentation provided the crowd with an update on the KRWMP and where they are with its implementation. He began by speaking to the RDKB's endorsement of the plan which includes: using the plan for information as well as decision making; implementation of the plan through local government planning documents, services, and participation in partnerships and collaborative initiatives; and promoting implementation through endorsing it for use by other local and regional organizations, governments and stakeholders, and through lobbying other levels of government and agencies for policy support and capacity improvement. He then discussed how different groups are responsible for different aspects of the Plan's implementation, and how they work together which was visualized using a flow chart.

Graham then gave some details about the Kettle River Watershed including sub basins, local government affiliation and the First Nations territories.

Following this, he discussed drought and climate change in the Boundary. This year, peak water temperatures were reached earlier in the season, which led to fish die offs in the Kettle River in July. The discharge rates were lower this year, which could be due to irrigation, leading to decreased levels of water in the aquifers. Small tributaries also dried up early this year, and some still have not regained flow of water.

Graham then went into the drought response at the regional/local level and the provincial level. This included collaboration with various local agencies and groups and the Technical Drought Working Group at the regional level, and the Inter-Agency Drought Working Group (which includes various ministries) at the provincial level.

Graham then described some of the projects that have been implemented, including a Learning Garden in Grand Forks, and restoration of riparian areas along the Kettle River.

Graham finished by thanking his supporters and funders.

Graham Watt, CommonsPlace Consulting Ltd. presenting for Jenny Coleshill, Project Coordinator for the Granby Wilderness Society

Kettle River Watershed Riparian Threat Assessment

Jenny Coleshill was unable to attend due to illness, so Graham Watt presented on her behalf regarding the Kettle River Watershed Riparian Area Threat Assessment. Graham first discussed the benefits of riparian areas including providing habitat, avoiding and reducing erosion, aquifer recharge, and water quality protection. He then went into some of the issues along the Kettle River and it's tributaries. These include serious erosion problems due to loss of riparian vegetation, changes in water courses over the years, an increase in Pine beetle activity, and a large number of road and stream crossings.

Graham then briefly went over their field work which included Riparian Assessments by two field technicians. He then touched on some field observations which include issues from logging, agriculture, burning and removal of riparian vegetation, dumping, and riprapping.

Graham then discussed how some of these impacts can be mitigated by striking a balance between protecting land and infrastructure and maintaining river function (flood and erosion planning and response); improving function of riparian areas and wetlands near development and settled areas; controlling impacts of resource (forestry, mining) roads in backcountry/ headwaters; and encouraging agricultural protection and conservation of wetlands and riparian areas.

For the remainder of the presentation, Graham showed the crowd some of the work that is being done to protect these riparian areas.

Dave Webster, Conservation Officer for the Ministry of Environment, Grand Forks

Conservation Officer Service—Christina Lake Concerns

Dave Webster began his presentation by providing those in attendance some of his background with the Conservation Officer Service (COS) for the last 23 years. This included working different positions on the Lower Mainland which is the busiest area for problem wildlife calls in BC. He also talked about being a decoy coordinator when he first came to the area, which involved catching poachers using decoy animals. The Kootenay-Boundary area also received new decoys this year including, a whitetail buck this year, that was very successful in catching poachers. Dave then talked about his duties as a training officer for new recruits, which involves travelling to an academy in Saskatchewan. Since 2007, Dave has also been involved in an organization that helps the families of fallen officers throughout North America, and he travelled to South Carolina this year to pass on the presidency.

Dave then discussed some of the successes and challenges of 2015. The COS in the Kootenay-Boundary increased their hours for enforcing fishing regulations, and they saw an increase in the number of warnings and fines, but the majority were at Kootenay Lake for not having a fishing license.

During the fire season, Dave was also recruited by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) to enforce campfire bans. Tickets were actually given out for illegal fires just following the Rock Creek fire.

Dave then stated that this was the worst year for bears that he has seen in his 23 years of service. He had to begin putting them down in mid-September, and there has been 31 bears in Christina Lake that had to be destroyed, and 5 in Grand Forks. Contrary to what some people believe, the Conservation Officers do not destroy these bears as soon as you call, they would rather deal with the issues at hand (i.e., garbage, bird feeders, etc.). Dave believes that this year was so bad because of drought and lack of food for the many yearlings that were born last year (lots of food last year). He also said that there is no true rehabilitation centre for bears in BC, and relocation does not work, as he learned working on the Lower Mainland.

At the end of October, Dave also went out with CLSS and some volunteers to do a bear attractant assessment audit. This involved visiting 157 homes and talking to people about any bear problems, and making sure any attractants were managed.

Dawn Guido, Practices Forester for BC Timber Sales, Grand Forks

BC Timber Sales Forest Stewardship Plan

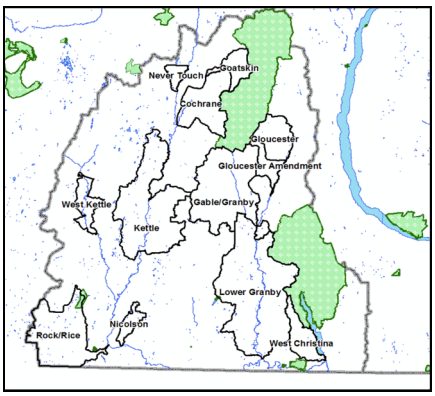
Dawn Guido spoke to the crowd regarding Forest Stewardship Plans (FSP). This is timely because the current FSP expires in 2016, and BC Timber Sales (BCTS) will be asking for public input on the new plan this winter. After referrals and comments are received, the FSP is then submitted by BCTS to the District Manager.

Dawn then described what FSPs are. Forest harvesting is governed by the *Forest and Range Practices Act* which requires licensees like BCTS and Interfor to submit a FSP for approval. The FSP is a strategic plan, and therefore does not include specific locations for harvesting and road construction. It does however, include results and strategies to protect water, soil, fish, wildlife, visual qualities, and other resources when carrying out harvest activities. Dawn then explained that results and strategies for the protection of these natural resources apply to the 11 operating areas within the Boundary Timber Supply Area (TSA), and showed a map.

Dawn then provided an example of results and strategies for streams used for drinking water which included making contact with licensed water users, and providing them the opportunity to comment on the proposed plan.

Dawn finished her presentation by providing a website address where the FSP can be viewed on the BCTS website:

https://www.for.gov.bc.ca/bcts/areas/TKO/FSP_AB.htm



Doug Noren, Forester for Interfor, Grand Forks

Planning Processes and Timelines for Logging

Doug Noren first spoke to the assessment process, and what is required before tree harvesting commences. First they look at the wood within the harvest area that is merchantable, then begin the assessment process which involves looking at what roads would need to be established in order to get at the wood. They also look at wildlife tree patches and establish permanent sample plots where no wood is harvested. They also look at old growth management areas (OGMA), private land, and inoperable areas. Doug also spoke to the wildlife side of things which includes avoiding mountain sheep and mule deer winter ranges. Once these assessments are done, a referral map is generated for approval.

Doug stated the next step in the planning process is to get on the ground, and generate cruise plots, which involves a myriad of different assessments. This data is compiled and a volume summary and stand tables are generated.

All this data is then used to form Site Plans and Logging Plans that must be approved. These plans even take into account terrain stability, riparian area management, and trees that must be left.

Doug finished his presentation by showing some photos of different cut blocks, and some that have started the regeneration process.

The Christina Lake Stewardship Society

1675 Highway #3 (P.O. Box 373)

Christina Lake, BC, V0H 1E0

Phone: 250-447-2504

Email: clss@shaw.ca

Website: lakesteward.ca

Those in attendance had the opportunity to enter a draw to win a poster of local photography, by providing their three main environmental concerns pertaining to our lake and watershed. These are some of their responses.

Erosion of riparian areas and human damage.

— Robin

Control of invasive species.

— Tanis

Large wake damage.

— Maureen

Water quality and septic systems.

— Shirley

Excess clearing and dumping of sand on foreshore.

— Barry

Water quality at public swimming areas.

— Donna

Impacts of climate change.

— Christine

Protecting native fish.

— Holly

Keeping the lake suitable for drinking water.

— Ken