

Columbia Basin Trust

Columbia Basin Residents' Views on Water

Final Report January 2005

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PROJECT GOALS AND OBJECTIVES

Water issues are at the core of the Columbia Basin Trust's existence. The Columbia Basin Trust was created in recognition of the impacts associated with the management of water in this region.

Basin residents have identified a broad range of concerns regarding water quality and quantity, from both human use and natural ecosystem perspectives.

Currently there is neither a comprehensive vision nor a strategic plan that incorporates a wide range of values regarding water issues in the Basin. The Columbia Basin Trust wants to involve Basin residents in building a network of organizations to address water issues in the Basin. The Columbia Basin Trust is committed to ensuring that long-term water quality and quantity issues in the region are addressed according to the residents' values and views.

The Columbia Basin Trust recognizes that one of the most significant water issues in the Columbia Basin is the opportunity to renew, terminate, or re-negotiate the Columbia River Treaty (CRT). The Columbia Basin Trust is committed to ensuring that Basin residents' values and views are a key part of the process from start to finish.

The purpose of this project is to identify Basin residents' values and views regarding water and water related issues. By doing so, the CBT aims to address the range of concerns by developing and identifying appropriate programming - reflecting the values and views of the people of the Basin - for Basin communities to better deal with the identified issues in their communities.

METHODOLOGY

With the purpose of gathering the most relevant and detailed information regarding water issues in the Columbia Basin, a comprehensive water information questionnaire was devised to address both water quality and water quantity concerns.

In order to carry out the study in an effective manner, we sought to target the water information questionnaire to a broad range of respondents that fell within the Canadian portion of the Columbia Basin geographically defined by the Columbia Basin Trust Act (please see map in Appendix A). Targeted respondents fell into the following main stakeholder categories: municipal, regional, provincial and federal government agencies; community and watershed groups; industry and agriculture groups; recreation and tourism groups, as well as First Nations groups. Because of the large study area, we sought to target specific individuals within the aforementioned stakeholder categories who would be able to provide meaningful responses for the study, and who would be able to represent, to a certain extent, a larger body with which they are affiliated. Recognizing the need for adequate representation, the questionnaire was (and still is) also available on the CBT website where Basin residents were welcome to complete it and be a part of the study. In addition, a press release was sent to local newspapers notifying Basin residents of the CBT study with information as to how one could partake in this process.

An initial list of 128 contacts was assembled, and those individuals were contacted via e-mail with some background information about the study, as well as provided with a copy of the

questionnaire for them to complete. They were asked to invite other individuals within their respective organizations whom they felt would be able to contribute to this study to also complete the questionnaire in order to widen the survey scope. Because of the nature of some of the more open-ended questions, in-person meetings were more conducive to obtaining in-depth responses. Therefore, meetings took place with many key individuals (predominantly representatives from municipal and regional governments) to further expand on the water issues their communities are facing. These meetings took place between July 12, 2004 and July 30, 2004. Many of these meetings had multiple attendees and their responses were documented to become a part of the final study results. Many key individuals who were not able to meet were followed-up with over the phone. A total of 61 people were interviewed in a series of 34 meetings. These figures include formal phone meetings that took place in lieu of personal interviews, but do not include informal follow-up phone conversations.

All respondents who completed a questionnaire were entered into a Microsoft Access Database along with their responses.¹ This was critical for data analysis and much of the statistical information that is a result of this study. During the stage of data input and analysis, many individuals were contacted for clarification of their responses, and in many cases this was an opportunity for respondents to expand on their concerns. Some respondents completed a preliminary and incomplete version of the questionnaire, and their responses were taken into consideration for content analysis, but were not entered into the database because it would have skewed other statistical results. Their responses will still be kept for archival purposes and future reference. The total number of complete questionnaires used for statistical analysis was 67.

Figure 1: Microsoft Access Database form used for each respondent

The screenshot shows a Microsoft Access form titled "Contact Information". It is divided into two main sections: "A. Contact Information" and "B. Background Information".

Section A: Contact Information

- 1. Person ID: [Auto] (button)
- Name: [Text Box]
- Address: [Text Box]
- City Code: [Text Box]
- Email: [Text Box]
- Home Phone: [Text Box]
- Business Phone: [Text Box]
- Regional Districts: [Text Box]
- 2. Please list any organizations you are affiliated with: [List Box]

Section B: Background Information

- 3. My interest in water is mainly in the area of:

Water Interest	Specify
[Text Box]	[Text Box]

 Record: 1 of 1
- 4. My geographic areas of interest are:

Geo Interest	Specify
[Text Box]	[Text Box]

 Record: 1 of 1
- 5. What do you or your organization do in the area of water? [Text Box]

The form is displayed in "Form View".

In order to adequately and verifiably analyze the respondents concerns, both data and content analysis took place to come to the results of this study. In addition, because of the wide array of concerns among respondents, finding common themes at the local, sub-basin and basin level was critical in maintaining a sense of focus for this study. Nonetheless, all respondents concerns are in a database that will be used by the Columbia Basin Trust for future and ongoing water related projects, where Basin residents' values and views can be consulted.

¹ Many questionnaires represented multiple views. For example, many municipal representatives chose to have only one questionnaire, under one contact name, represent all the views of their council members, public works persons, and mayor etc. who contributed to the process. As a result, each single questionnaire was entered into the database as a single response.

EXECUTIVE SUMMARY

The study found that respondents overwhelmingly indicate domestic water use to be the main water interest and the most important use of water. As such, water related issues addressed in this study closely correspond with that consideration.

By far, the most widespread water issue in the Columbia Basin is that of water conservation. Seventy percent of all respondents feel that water consumption in their area is high. Moreover, 88% of respondents agree that water conservation measures are needed. Reasoning behind this varies. With increasing population and high consumption rates putting pressure on limited available water resources, both quality and quantity issues arise. As the quantity of water in any available source declines, so too does the quality of that water since the capacity for “pollution dilution” is greatly reduced as is the well-being of aquatic habitat. Also, ensuring a good quality, safe supply of drinking water is costly. And with the amended *Drinking Water Protection Act* and regulations that came into force in May 2004, water purveyors are burdened with an increasing cost of providing potable water that is much greater than what the average Basin resident pays (which is about \$206.65 per annum per single-family residence). Water that has been treated for drinking safety is being used for bathing, in toilets, maintaining lawns, and cleaning sidewalks and streets. All of this is costly, puts pressure on the capacity of existing infrastructure, and necessity is questionable. In addition, that consumers use water in a wasteful manner is of great concern for purveyors trying to manage a sustainable water supply system.

And for owners of small domestic water systems, the cost involved in meeting these new regulations is expressed by many as being insurmountable. For many of the smaller systems, they are unaware of any obtainable funding to upgrade their systems, so they are vying to be taken over by their regional district (if that is an option) where more funding then becomes available. The pressure and cost to upgrade the systems then encumbers the regional district. And for either scenario, the cost involved remains a concern to whomever takes on the responsibility of the system.

A public uninformed about the value of water is the momentum behind this urgent need to conserve. A sense of entitlement to an abundant resource, and a general lack of knowledge about the cost of potable water, the ecological services it provides, human impact, and the finite nature of water are fuelling over consumption and a lack of interest to conserve and safeguard all water sources, including aquatic ecosystems.

A large majority of respondents suggest a Basin wide education and conservation program that will address all water related issues is required to deal with Basin water concerns. Educating residents on the effects and consequences of human impact on water resources - domestic water supplies and aquatic ecosystems – will provide a foundation for all conservation efforts. When residents learn more about the reality of water as a resource and the challenges faced in managing it in a sustainable manner, change is to be expected and garnering public support in water conservation and protection efforts will be less of a challenge.

The state of aquatic ecosystems is also of mentionable importance to respondents, who collectively indicate aquatic/terrestrial use of water to be the second priority next domestic water

use. The impacts of development on or near riparian areas and the vulnerability of streams and rivers to pollution of various sources are of concern. Forty-nine percent of respondents agreed that there may be a pollution problem in the local streams in there area. Contributing to this are concerns about forest activity, agriculture, septic systems, mining, wildlife, and urban activities influencing the health of their streams and rivers, which are in many cases important fish spawning areas that also sustain other important aquatic life. It is also mentioned that aquatic health is an indicator of domestic water health as many residents use surface water as a source of domestic water supply.

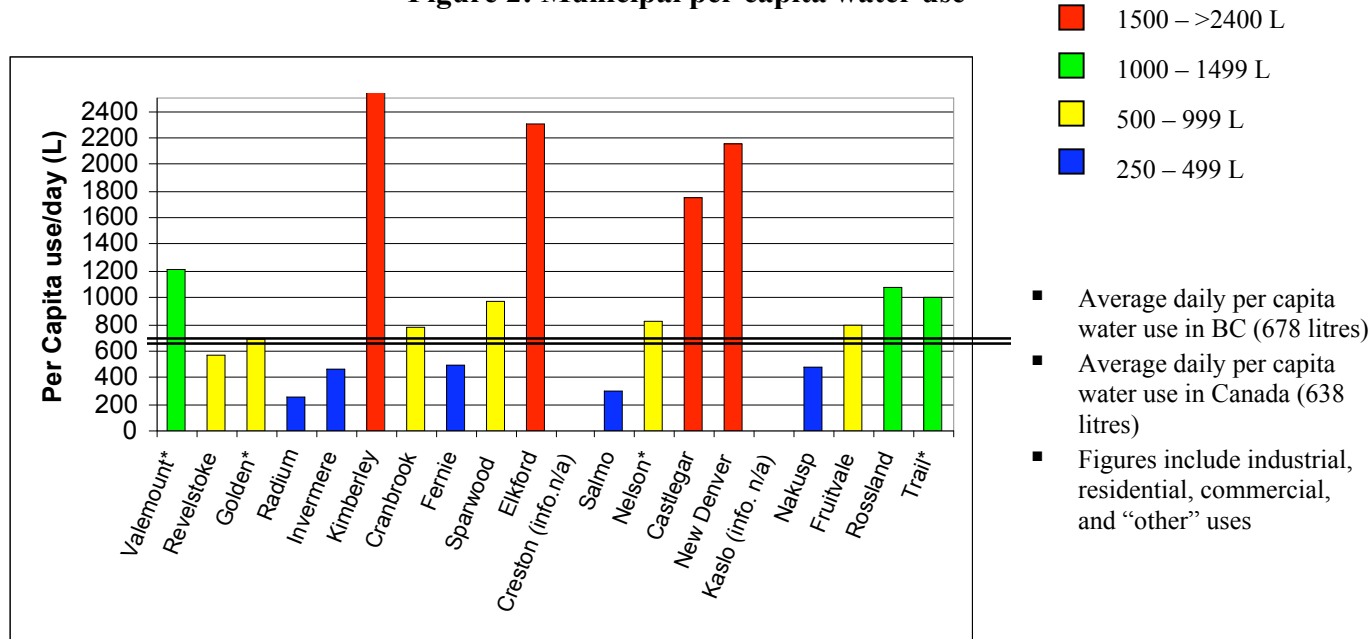
In addition to the aforementioned concerns, the unpredictability and fluctuation of reservoir, lake, and river levels as a result of dams has tremendous negative impact for many shoreline residents. An array of social, economic, and environmental concerns arise from what is identified by respondents as poor water management for hydro operations. Impacts on recreation, moorage difficulties, managing shoreline property, dust, sinkholes, decimation of aquatic ecosystems, and off-putting visual effects are among the identified issues. The effects of these on the quality of life for shoreline residents or neighbouring residents who also enjoy these areas are a common theme throughout the Basin. Better hydro management that addresses Canadian Basin values and needs, and more public awareness of expected water levels is a strong appeal of those that are affected.

SUMMARY OF BASIN WIDE ISSUES – *LOOKING FOR TRENDS*

Consumption

The study found the most outstanding and prevalent concern among the respondents pertains to issues surrounding domestic water consumption. As indicated in the municipal per capita water use figure (Figure 2), 72% of the selected surveyed communities exceed consumption rates of

Figure 2: Municipal per capita water use



*Data from 1999 Environment Canada statistics

Additional Sources:

Environment Canada 1999. Available at: <http://wlapwww.gov.bc.ca/soerpt/8surfacewateruse/municipal.html>

500 litres per person per day². Furthermore, although per capita consumption rates are not easily available for the surveyed areas that do not fall within the chosen municipal boundaries, 70% of all respondents still indicated that water consumption in their area is high. The concerns about the high use of water are varied. Many municipal and regional government representatives express a concern for the cost of treating a resource that is and has been, for the most part, considered free. With new drinking water regulations that require more stringent treatment, monitoring, and operating responsibilities, the cost of providing potable water is increasing in conjunction with the increased regulatory measures. Because of a noticeable abundance of water in many parts of the Basin, coupled with low flat-rate pricing³ and a lack of residential metering (with the exception of Invermere), many respondents suggest that water in their communities is used in a wasteful manner. For example, when asked if there are enough water resources for their needs, 80% of respondents agreed; however, 85% of respondents also agreed that conservation measures are needed for their area (indicating that although there is enough water to meet their needs, it should still be conserved – not used in an irresponsible, unsustainable way). Several municipal representatives were quick to note that summer consumption is much greater than winter consumption, attributing much of this to extensive lawn and garden watering. Some respondents noted that it is not uncommon to see neighbours' sprinklers on for days, even weeks at a time during drier periods. For water purveyors, the cost of pumping and treating potable water for lawn care is of great concern. (It should be noted that municipal comparison of per capita water consumption is difficult because of the variability of users on each system that could not be easily separated. For example, some municipalities were able to separate the rates of residential use from industrial and commercial, whereas others were not able to do so. Therefore some figures may be skewed as a result.)

Respondents also indicate a need for conservation due to inadequate water supply in some areas in the Basin. Examples and reasons include: wells drying up, depletion of aquifers, streams drying up during certain times of year, and less snowfall and precipitation recharging these sources.

In addition, increased levels of consumption put pressure on aquatic life. Regions drawing extensively from surface sources lower water levels and alter aquatic habitat. Increases in turbidity, water temperature, and concentration of pollution contribute to this degradation.

Health Regulations

The cost of providing potable water is a concern not only for public water purveyors, but also for private water users as well⁴. Since the amended *Drinking Water Protection Act* and regulations (that replace the Safe Drinking Water Regulation under the Health Act) that came into force May 16, 2003 there is an overwhelming concern by respondents about the resources required in being able to meet these new regulations. "Under the new drinking water legislation, the province has increased the basic expectations around assessing water systems, certifying operators and suppliers, and monitoring and reporting on water quality" (Government of British Columbia: 2003). There is also concern about what the best course of action is in meeting these new

² Note that consumption figures are "total" figures and do not distinguish between industrial, commercial, or residential use; separation was not feasible for many communities.

³ The average cost of water for a single-family residence is \$206.65 per year (average taken from 15 of the surveyed communities).

⁴ 32% of respondents indicate being on a private system.

regulations. Where do they start? Where will they get the finances to meet these standards? Where/how do they get information on how to achieve this? Because these regulations apply to any water supply system that supplies more than one single-family residence⁵, the magnitude of this concern is intensified because of the number of people that are affected. There are infrastructure (distribution and treatment systems) and operation costs involved in meeting the new health regulations. Also, trained operators are required to maintain these water systems, however certification is required to do so, and respondents express concern about the costs and logistics involved in meeting those requirements (either operating the system themselves or hiring an outside party to do it). Many regional district representatives also express a concern here. As many community members on private water systems are finding it extremely difficult to take on the task of upgrading their water systems to meet health regulations, many have approached the regional districts to take over their water systems. By doing this, they have access to funding for system upgrading since the regional district is eligible for more funding than individuals. However, these water systems may be required to meet certain criteria in order for the regional districts to take them over⁶. It is also too big of a task to take over every small system that does not yet comply. So, for all affected, how do they approach the challenge of meeting health regulation standards with limited resources?

Education

There is also a large concern of respondents about the lack of education and knowledge regarding the value and nature of water as a resource. This includes both the monetary value attached to the costs in providing potable water as well as the value of water with respect to the ecological services it provides. As treatment requirements increase alongside consumption rates, then so does the cost of providing potable water. The concern is that most people do not understand this because they are not faced with having to pay the real cost of the water that flows through their tap (a result of low-cost flat-rate pricing versus pay-per-use i.e. metering). The study found that 85% of respondents agree that conservation measures are needed for their area. However, respondents also indicate that without education, addressing conservation will be futile. For example, if people do not know the costs involved in securing a safe water supply, pumping, treating, distributing, and operating water systems, how do you get them on board to conserve (or to not waste at the very least)? There is also concern about the general lack of knowledge of water as a resource. How does the hydrologic cycle work? What is the hydrogeology of the area? Where does our water come from (non-confined aquifer, confined aquifer) and what are its influences (upstream activity, pollutants, climate change)? What is the role water plays in one's life? In what ways does the average Basin resident impact their water system?

Also, education regarding the ecological value of water is also important for conservation efforts addressing water use and the sustainability of aquatic life and habitat.

⁵ "The Drinking Water Protection Act defines a water supplier as the owner of a domestic water system supplying drinking water to anything other than a single-family residence. This includes very small water systems, such as those that supply a single business or several residences (a water users community) by well or creek" (Government of British Columbia: 2003).

⁶ Regional districts may have different rules and regulations regarding criteria and eligibility for water systems to be taken over (if it is an option at all).

There is a great concern that the majority of Basin residents do not have this range of knowledge that many respondents feel would be critical for the success of any kind of water conservation effort.

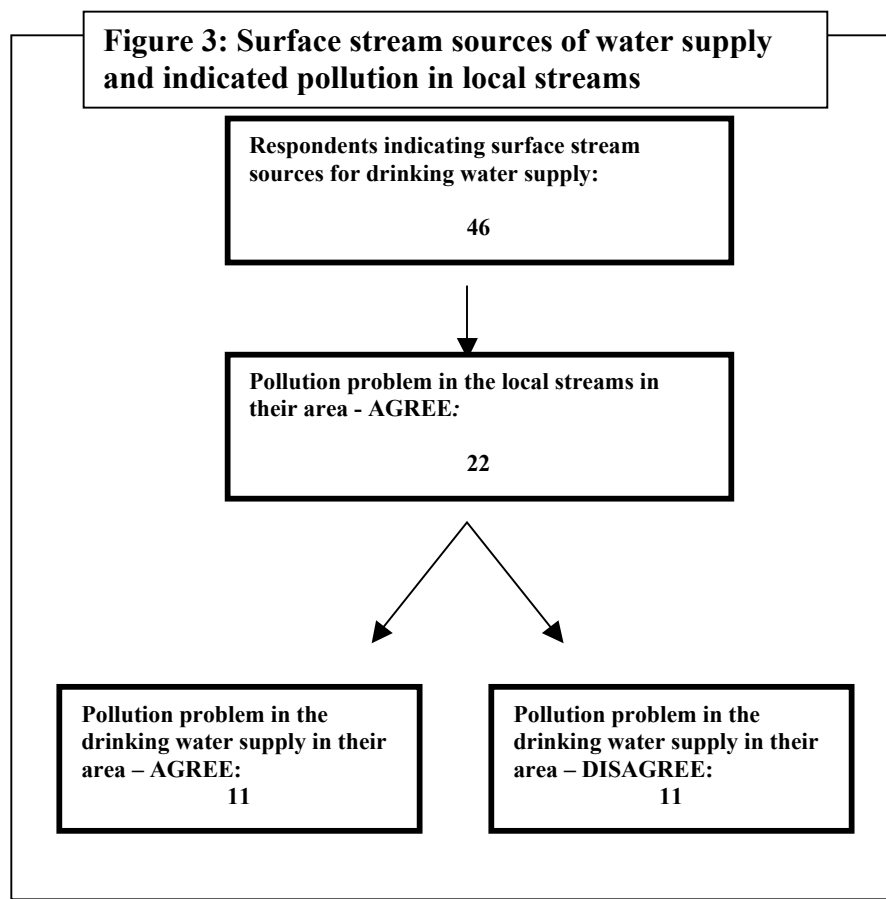
Rivers

There is a widespread concern for the sustainability of rivers and their tributaries within the Basin. When asked if they feel there is a pollution problem in the local streams in their area, 49% of respondents agreed. Those respondents are further broken down in the following geographic areas:

Regional District	# of Total Respondents for that Area	% of Total Respondents for that Area
CSRD	2	40%
RDEK	11	48%
RDCK	13	46%
RDKB	7	70%

Resource development and industry on or near riparian areas is a concern with respect to how it affects the overall quality of the water within the rivers and the quantity of run-off into the rivers. Forest activities were indicated to be the main concern as possible pollution sources of the river systems. Agricultural activity is also a concern for many respondents of which cattle were the leading targets in how they affect both domestic water sources and aquatic health. The concern is that their proximity and access to riparian areas allows for contamination of the water through urine and excrement as well as destruction of aquatic habitat through physical disturbance from wading by such sizeable animals. Additional concerns include: What kind of industry/development is contributing to the pollution of the rivers? Exactly what pollutants are going into the rivers? What input can the rivers handle? How does this affect our drinking water supplies? How does this affect aquatic habitat?

Of those respondents that indicate they obtain stream water for domestic use and agree that the streams in their area could be polluted, only 50% of them agreed that there might be a pollution problem in the drinking water supply in their area. Unless those individuals are referring to specific streams versus all streams in their area, this brings forth an interesting disparity in how residents understand their water supply.



Septic systems and sewage are also indicated to be a concern regarding the health of rivers in the Basin. How does primary and secondary treated sewage entering the river systems affect downstream users and aquatic life? Also, how much septic field seepage is entering the rivers? There is a shared concern about the cumulative impacts of septic systems on not only rivers, but on other surface sources and groundwater supplies as well. With increased population in many areas in the Basin, subdivision of lots and the resulting increased stress on existing septic fields compounded by the addition of new septic systems, how is this going to affect domestic water supplies and aquatic life? Again this information gap lends to support a need of further knowledge of water sources – what are the causes of pollution, where is our water going, and where is it coming from? This especially is a concern for groundwater users who have very little knowledge about the hydrogeology of their area.

The impacts of Coal Bed Methane extraction were a concern for river sustainability as well. With proposed CBM mining in the Elk Valley, respondents demonstrated a concern for how it will affect the domestic and aquatic health of the river systems throughout the entire Basin.

The study also found a great deal of concern regarding the lack of aquatic habitat protection within the rivers, lakes and reservoirs in the Basin.⁷ Concerns include the fragmentation of aquatic habitat and ensuing consequences (increased water temperature, depletion of nutrients, etc.) from dams, lack of meaningful riparian setback regulations for development, and level of

⁷ *Aquatic/terrestrial* is indicated to be the 2nd most important use of water next to *domestic*

pollution inputs from known and unknown sources. Several respondents from community and watershed groups suggest that the health of aquatic systems is directly related to the health of domestic water sources since many Basin residents rely on surface water for domestic use (respondents indicate that 60% of all domestic water *sources* are *surface* sources).⁸

The potential damage to and preservation of the Columbia River Wetlands is another Basin wide concern. This area is valued for its large size, ecological diversity and cultural importance for First Nations groups. It is a concern from social, cultural, and ecological perspectives. In addition, First Nations representatives note that because of the water control at the Libby Dam, many culturally important plants in the wetlands of the Kootenay River System have been lost as a result of an ecosystem imbalance. This area is of great cultural importance whereby the wetlands are referred to by First Nations as the “medicine chest”.

Another widespread concern is the inconsistent flow of rivers in the Basin due to manipulation from dams. This is also tied to the concern for fluctuation levels of reservoirs and lakes, of which the implications of this are extensive. Maintaining adequate river flows is a concern for the viability of aquatic health (natural meandering of geomorphology, preventing loss/loading of nutrients), dilution of sewage that enters the river systems to minimize impacts on downstream users, recreational access and use (boating, swimming, fishing) and any subsequent economical impacts on tourism, property values etc.

Also, many respondents fear a lack of domestic control over Basin water resources, and attribute the inconsistent fluctuation levels to US control over international waters. Respondents assert that the management of the Columbia River Treaty (CRT) dams is such that it favours the needs of the US over those of Canadian Basin residents. Furthermore, the lack of knowledge of many Basin residents about the CRT and how it directly affects them is also a related concern. Respondents indicate the need for a greater Basin awareness of CRT issues, and the advocacy of Canadian interests for future Treaty negotiations.

Reservoirs

The study also found a concern for the fluctuating reservoir levels within the Basin. Inconsistent levels of the Koocanusa Reservoir have negatively impacted recreation and tourism. The fluctuation of the Arrow Reservoir has resulted in health concerns because of dust levels, affected recreational uses - access, moorage, fishing – and tourism as a result. Furthermore, fluctuating water levels have degraded the shoreline and aquatic sustainability. The subsequent negative visual impacts associated with low reservoir levels, are attributed to affecting tourism, shoreline property value, and the general aesthetic appeal of the environment. The low level of the Kinbasket Reservoir generates dust and has a negative visual impact. And the water levels of Kootenay Lake make access difficult and also impact tourism. Tied with these concerns is how US needs are affecting low reservoir levels in the Basin and how Canadians are not getting fair and equitable access to international waters.

The study found that many respondents believe there should be more long-term planning of water in the Basin that will address all users’ interests and values. There needs to be a balance of

⁸ Note that percentages only represent *sources* of water supply, not *amount* of water supply.

users of surface water where industrial, recreational, domestic, and agricultural needs are met in a way that will not compromise the interests and values of other users.

Water quality

The protection of drinking water supplies from contamination is also a common concern among respondents. An issue for many municipalities is that of backcountry access (tenures included) and resource development in their watersheds. Many municipalities' watersheds do not fall within municipal boundaries so they lack the jurisdiction necessary to ensure source protection. It should be noted however, that respondents living outside municipal areas are also concerned about the lack of local control over watershed access. Such access can lead to pollution and sedimentation of rivers and streams.

Groundwater quality is also an issue. A general lack of information regarding groundwater is the chief concern. The lack of groundwater legislation, lack of knowledge about groundwater (hydrogeology) in the area, and potential for aquifer pollution are all areas of concern. Not knowing the influences (potential pollution sources) on a given aquifer, whether it is confined or non-confined, or how many different users are drawing from any one aquifer, are also issues.

SUMMARY OF LOCAL CONCERNS

The study found that many communities share common local issues. Some issues are expressed by respondents to be both Basin wide and local concerns, therefore some reiteration occurs with information above. However it is important to address common local issues, as well as what respondents feel to be Basin wide issues. A more detailed account of local concerns can be found in Appendix A.

Consumption

Respondents in 18 of the 20 surveyed municipalities and all 4 of the regional districts express concerns regarding high levels of domestic water consumption. And 70% of all respondents indicate that water consumption is high in their area. With population increases putting pressure on limited resources, level of consumption is by far the most outstanding water issue within the Basin. The over-use of domestic water is reportedly a result of water's seeming abundance, its low price, being non-metered (with the exception of Invermere), and liberal watering restrictions, if any. Concerns regarding consumption include the cost of supply (securing sources, treatment, distribution etc), a general lack of knowledge and education about water and its cost, wasteful use of water, lack of incentive to conserve, and lack of knowledge about how to address conservation. Uses, such as inefficient lawn watering⁹, sidewalk washing, and excessive car washing etc. are expressed as being irresponsible uses of potable (oftentimes treated) water when considering the costs involved in delivering it from source to tap. Many people believe the main problem is an understanding by water-rich Basin residents that water is a renewable resource that is abundant and endless. It is also this mentality that has contributed to why municipal governments have reservations about implementing residential water metering. Only one of the 20 surveyed municipalities has already implemented residential metering, while 4 others

⁹ By far, indicated as the main culprit for increases in summer water consumption.

maintain that residential metering is part of a long-term plan for their communities. However, over half of those 20 municipalities fear it would elicit a negative public response; therefore it has not been a strong political objective. In addition, municipal government representatives also address the logistics involved that stand in the way of metering - how much would it cost, how do they budget for such a project, how do they retrofit existing and older houses, and how do they monitor consumption? Overall, a general lack of knowledge about water coupled with a sense of entitlement to inexpensive, un-metered water in the face of abundant supply is what many municipal governments express as standing in the way of moving forward with metering, as well as other conservation efforts.

Health Regulations

Respondents from 7 of the 20 surveyed municipalities express concerns about the cost of meeting the new drinking water regulations. Furthermore, respondents from all 4 regional districts also share this concern. The costs involved for municipalities to upgrade their systems to meet the regulations is absorbed by all its residents, but for smaller systems that require similar infrastructure the cost is not divided to such an extent. There is also a concern about the increased scrutiny in the certification process and the difficulties in the process of becoming properly certified. Private users also mention the absence of funding available to help them in this process unless they are under the operation of the regional district. As a result, there has been an increased pressure on the regional districts to take over many of these smaller systems. How do Basin residents meet the drinking water regulations with limited resources?

Reservoir/Lake Levels

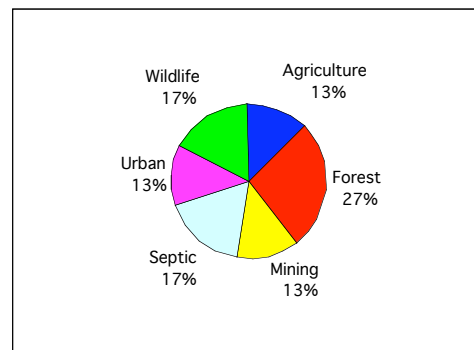
The fluctuation of reservoir levels is another shared concern. Respondents from all along the Arrow Reservoir (namely Castlegar, Nakusp, Revelstoke, Rossland, and Trail as well as other respondents from the CSRD and RDCK) are concerned about the fluctuating water levels in the Arrow Reservoir. The resulting impacts on recreation and aquatic habitat are of primary concern. Inconsistent and unreliable water levels result in damage to fish spawning, debris in creeks, and the inability to manage lakefront property for boat launching, moorage, gardens (planting to cover shoreline rock piles in front of homes), and swimming platform. Other impacts pertain to sewage disposal, as well as the general aesthetic appeal of the reservoir. The fluctuating levels of the Koocanusa Reservoir have mentionable impacts on recreation and its effect on the flow of both the Kootenay and Columbia Rivers. Respondents in the Lower Columbia region rely on regular flow of the Columbia River for municipal sewage disposal and fluctuations in the Koocanusa can affect the flow of the Columbia and alter dilution significantly. Furthermore, low levels of Kootenay Lake may be impacting trout populations, are affecting lake access and as a result - tourism. Respondents affected by the fluctuating levels of the Kinbasket Reservoir assert that low levels result in dust and particulate generation which is a health concern, as well as an overall negative visual impact.

Rivers and Water Quality

Respondents from over _ of the surveyed municipal areas address a range of water quality issues. 100% of respondents who rated the relative quality of water in their area as “poor” are located in

the Central Kootenays – specifically Areas E and D (Kootenay Lake region). Also, of those who agreed to the statement, “*There is a pollution problem in the drinking water supply in our area,*” 47% are located in the Central Kootenays (Procter, Salmo, Nelson, Boswell, Wynndel, Castlegar). The indicated sources of drinking water pollution are seen in Figure 4. Not necessarily regarded as polluted, domestic water quality is nonetheless an indicated concern for respondents in Castlegar, Cranbrook, Fernie, Invermere, Kimberley, Nelson, New Denver, Radium, Salmo, Rossland, and Sparwood. Sewage, storm water, septic systems, forest activities, mining, and recreational access affecting water supply areas are among the contributing concerns.

Figure 4: Drinking water pollution sources indicated by respondents in RDCK



Respondents from the Elk Valley are concerned about contamination of the Elk River and its tributaries. Older mining endeavours as well as proposed Coal Bed Methane development in the area are of primary concern. Respondents are also concerned about the adjacent recreational facilities such as golf courses and ski hills and their impacts on the Elk River. What is going into the Elk River, and what are sustainable uses of the river? The Elk River is a popular fishing area, and contamination would impact aquatic health as well as tourism in the area.

Respondents from the Kootenay Lake express concern about future growth and subsequent impacts to the lake. Growth along the west arm of Kootenay Lake, and an increase in private septic systems close to the lakeshore could contribute to lake pollution. Alleged logging plans, which would involve road construction and increased access to watersheds in the area, are also concerns for water quality in the Kootenay Lake region.

Respondents in the Upper Kootenay River area express concerns about the impacts of drawing water from fish bearing streams, and the overall health of the watersheds in the area. Matthew Creek, Mark Creek, and Joseph Creek (which flow into the St. Mary's River – then into the Kootenay River) are sources for municipal draw. Increased population and over consumption of water have resulted in increased draw from these creeks, which is affecting aquatic habitat by altering the level of flow and natural river geomorphology. Also, as the water levels decrease so does the relative quality of the water. Furthermore, these creeks run through urban areas, which makes them susceptible to increased pollution from storm drains and garbage. The re-channelling of Joseph Creek through the City of Cranbrook and its low capacity are making the creek bottleneck, which is affecting the fish in the creek. Recreation access, roads built for logging, former mining operations and future mining exploration in the Matthew Creek and Mark Creek areas are all concerns for water quality and sustainability of the watersheds in that area.

Respondents in the Lower Kootenay River/Lower Kootenay Lake region assert that because of the Libby Dam, the flow of the Kootenay River is too low resulting in mass erosion, nutrient loss, and consequently a major decrease in aquatic life. Further development along tributaries such as the Goat River has blocked the rearing and spawning habitat for Kokanee and Ling Cod.

Respondents in the Lower Columbia River area are concerned about the impact of industries (such as Celgar and Teck Cominco) on the water quality of the Columbia River, which is highly valued for its recreational uses. The water quality of Salmo River and its tributaries is also a concern, where contaminated sites rehabilitation is required to remedy identified mining impacts.

Water Quantity

The study found water shortages to be an issue mainly among respondents in the East Kootenay and the Kootenay Boundary regions. A combination of low rainfall, climate change, and industry changing terrestrial landscape are suggested factors contributing to low creek levels, low lake levels, and wells drying up. 40% of all respondents who indicate that water resources are not easily accessible are from the East Kootenays.¹⁰ Also, 40% of all RDKB respondents indicate that there are not enough water resources for their needs.

Information Gaps

The following information gaps are expressed by respondents as concerns in managing and understanding water in their area.

Planning – a lack of continuity among Basin communities in water resource management and planning. An integral part of the problem with managing water resources is the lack of knowledge about what is happening outside of any given community, and establishing how neighbouring water management and use is affecting them. Who are all the users/stakeholders in the entire system? For any given water source, who are the users? How many water licenses are available for each source? What are the riparian setback regulations for rivers/creeks, and how are they enforced? What is going into the water systems and can they handle it? What can any given water source sustain in terms of pollution before they are faced with a major crisis? How will future development and population growth affect the quality and quantity of water resources for communities? How does the Basin assess and plan for this?

Hydrogeology – how much water is in the Basin? How much rainfall and snowfall does the Basin get each year, and how does that affect each community? What is the location and capacity of groundwater sources? There is concern that there is too little available data in this area, which provides important information for water management.

Consumption and Conservation – where do we start? Many communities have expressed the desire to implement conservation strategies, but do not know where to begin. Where can they get information on water conservation success stories, and how can they tailor a conservation plan that would be effective for their community? What resources are available for them to do this? How do you get the public on board to conserve – incentives, education?

¹⁰ 26% of all RDEK respondents and 30% of all RDKB respondents indicate that water resources are not easily accessible.

Meeting drinking water regulations – where do we start? How do small systems comply with the new regulations with very limited resources? Where do they get information that will guide them through the process of what is required of them, and how they go about meeting those requirements?

Education – general lack of knowledge about water as a resource, and the nature of the hydrologic cycle. How do you disseminate information regarding water and water related issues to Basin residents? How do you teach people about the value of water?

WHAT NEEDS TO BE DONE TO ADDRESS THESE ISSUES?

Education

In order to address the many and varied Basin water related issues, respondents indicate an imperative need for a Basin wide education program that will address those issues. It is recommended that the education program have a preliminary objective of having residents understanding water at a basic level. With that foundation, more complex issues regarding water can be addressed in a meaningful way. Educating Basin residents in such a way will empower them to make informed choices and decisions regarding water use and water management on an individual and Basin wide level. Equipping residents with a greater understanding of the water issues they face could also be an impetus for greater community involvement into addressing these issues, and put pressure on neighbours to do the same. Respondents suggest that any education program should address the following:

- The general nature of the hydrologic cycle – available fresh water is a finite resource.
- How much water is being used for toilets, lawn watering, showers, etc.?
- The cost of potable water – pumping, treatment, storage, distribution, finding new sources etc.
- The importance of water on a local and global level.
- The importance and nature of watersheds.
- The ways people influence and pollute water i.e. storm water, grey water, fertilizers, changing terrestrial landscapes, septic systems.
- The challenges/difficulties of cleaning up contaminated water sources.
- What is/are the community's water sources?
- The connection between water and our livelihoods – including water's role and amount required in sustaining food growth.
- Challenges and consequences of other communities that experience severe water quality and quantity issues.

In addition to the above, the education program should address the need for a *comprehensive water conservation plan*:

- Why conserve when there is water all around?

- Conservation tools such as metering, low flush toilets, low flow showers, efficient lawn care practices, collecting rainwater for garden care, xeriscaping etc.
- Changing personal consumption habits - making it socially unacceptable to waste water.
- Show success stories to give positive examples of water conscious communities.
- Inform residents of what might happen if they continue with current use.

The program should also address residents at all levels including decision makers. Many respondents indicate that dissemination of the information will also be required: meetings, brochures, pamphlets, commercials, radio etc.

Meters

Domestic metering is another way respondents feel these issues could be addressed. Obliging users to pay for the amount they use in a way that reflects the real cost of water will encourage less waste of the resource and a more mindful understanding of the true cost of potable water.¹¹

Treaty Negotiations

Respondents also express a need for strong Basin representation regarding future Columbia River Treaty negotiations. Many feel there is a US stronghold over their water resources attributing consistently low and fluctuating reservoir levels to lack of Canadian control over dams and subsequent water flow.

Legislation

A concern for legislation is expressed in the following areas:

- A need for ecologically meaningful riparian setback requirements for all types of development.
- A need for municipal control over the protection of their watersheds.
- A need for the regulation of human activity where it affects water supply.
- A need for conservation practices to be incorporated into a form of legislation.

WHAT ROLE COULD THE CBT PLAY?

The Columbia Basin Trust could play an instrumental role in numerous capacities in order to address the water related concerns identified by respondents. Having representatives/liasons located throughout the Basin that have established a level of knowledge about Basin communities and their needs and built relationships with local residents, the CBT has the advantage of being a visible and influential force within those communities and neighbouring areas.

- The CBT could launch a Basin wide water education and conservation campaign that would speak to all residents and stakeholders including government, industry, community groups etc.

¹¹ After implementing residential water metering, the District of Invermere experienced a per capita water consumption reduction from 740 L/day to 470 L/day (most currently documented rate).

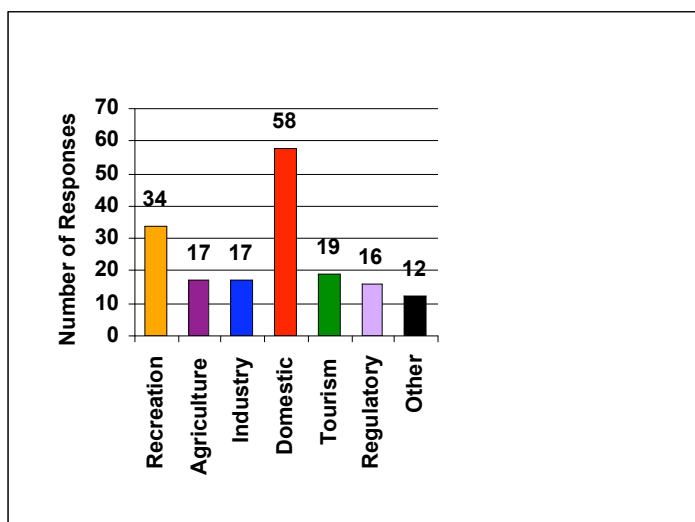
- Instead of fragmented, piecemeal efforts by individual communities to address their concerns, the CBT could help join the efforts of these communities where issues could be brought to a common table and addressed at a Basin wide level.
- The CBT could aid in the collaboration of communities to find local solutions to identified concerns.
- The CBT could become a Centre of Excellence for watershed management with an objective of identifying and increasing awareness of Basin water issues.
- The CBT could provide expertise and funding to bring together research regarding water conservation for communities as well as undertake regional co-ordination of this.
- The CBT could take on a metering project that would collaborate information, research and cost analysis about metering thus providing communities with all the necessary information for them to go forward with it.
- The CBT could play an important role in being an advocate for Basin residents and their concerns regarding water related issues and impacts on sustainability as a whole.
- The CBT could help fund and/or partner with already existing community and watershed organizations that have a mandate for the education and protection of watersheds and aquatic ecosystems. Ongoing funding would help ensure the sustainability of already established localized organizations.
- The CBT could devise a Basin water management plan that would incorporate Basin residents' values and views about water.

BACKGROUND INFORMATION

Interests In Water

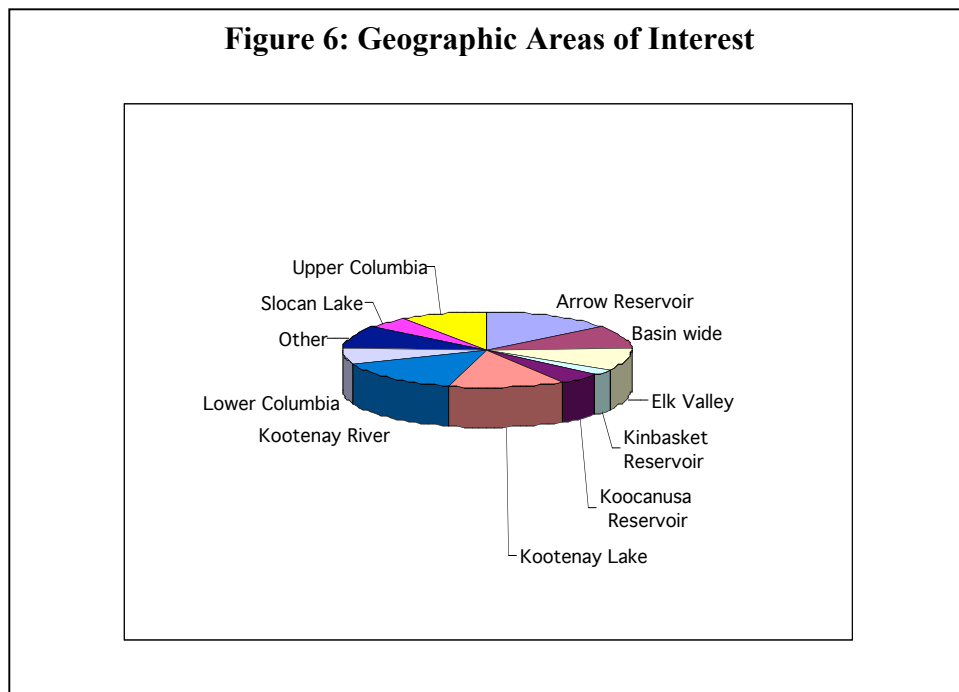
As indicated in Figure 5, domestic water use is the main water interest among respondents for this study. Recreational use and access is also a common concern among respondents.

Figure 5: Water interests of respondents



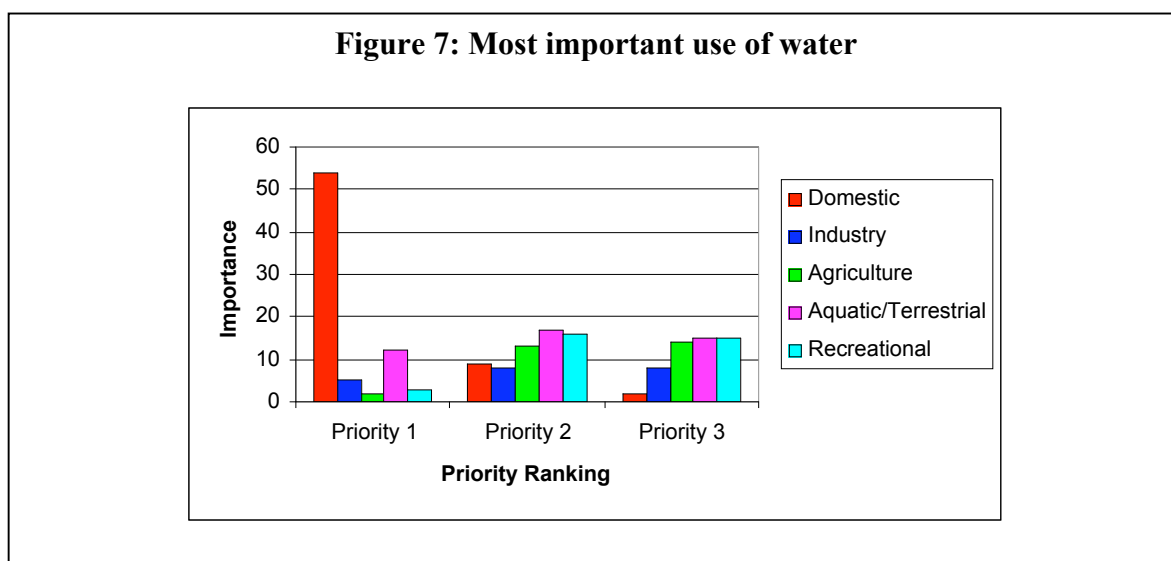
Geographic Areas Of Interest

Respondents indicated the following areas of interest for this study (Figure 6). Note that individuals marked multiple areas of interest in some cases.



Most Important Uses Of Water For Your Area

Domestic water is indicated to be the most important use of water by respondents, followed by aquatic/terrestrial.



PERCEPTIONS AND KNOWLEDGE OF DOMESTIC WATER USE

Additional information for the following can be found in Appendix C.

How Would You Rate Your Knowledge Of Water Use In Your Community?

The study found that 52% of all respondents indicate a high level of knowledge of water use in their community (they know the per capita use of water in their area). 74% of those are representatives from either regional or municipal governments; 20% belong to community and/or watershed groups. 43% of all respondents indicate a medium level of knowledge of water use in their community (they have knowledge of water use and water quality in their area). 52% of those are representatives from provincial, regional, or municipal governments. 24% belong to community and/or watershed groups. Only 5% of respondents indicated a low level of knowledge of water use in their community (they have no specific knowledge of water use or quality in their area). None of those respondents indicated an affiliation with government, community, or watershed groups.

What Are The Sources Of The Drinking Water Supply For Your Community?

Many respondents indicated that their communities rely on multiple sources for their drinking water supply. Of all the specified drinking water sources, 43% of them are surface streams. An additional 17% are surface reservoirs. Thus 60% of all indicated water sources are surface waters. The remaining 40% of water sources are ground aquifers (confined and non-confined)¹².

Are You On A Private Or Public Water System?

68% of all respondents¹³ indicated that they are on public water systems, and 32% are on private water systems.

Who Manages Your System?

Of the private systems, individuals or single households manage 76%. Water users communities manage the remaining 24% of private systems. It is indicated that public systems are managed either by a regional district, municipality, improvement district, water board, BC Hydro, or water users community.

WATER QUANTITY

What Is The Per Capita Use Of Water In Your Area?

Many respondents could not provide verified data to support their response for this question. This is because rates of consumption on most private systems (33% of all total systems in this study) are not regularly monitored or quantified. Therefore only verified municipal values (annual averages) are used for comparative purposes. In addition, some communities were not

¹² Note that percentages only represent *sources* of water supply, not *amount* of water supply.

¹³ 3 respondents did not complete this question.

able to separate domestic from industrial and commercial data for this study, which skews the results to a certain extent. However, a 1999 Environment Canada study found that only about 35% of all municipal water use is commercial and industrial (2004).

75% of the surveyed municipalities indicated per capita water use rates of over 500 L/day. 10% have consumption rates between 400-500 L/day, and an additional 10% have consumption rates between 200-300 L/day.

How Do You View Water Consumption In Your Area?

70% of all respondents feel that water consumption in their area is *high*. The remaining 30% feel that water consumption in their area is *normal*; no respondents feel that water consumption is *low*. Of the respondents from the municipalities indicating the lowest water consumption in this study (Revelstoke, Salmo, Invermere, Nakusp), 66% still maintain that water consumption in their area is *high*.

How Would You React To The Following Statements?

a. Water conservation measures are needed for your area.

88% of all respondents *agree* that water conservation measures are needed for their area, of which 52% *strongly agree*. Many of those who agree indicate that the current water restrictions in their area (if applicable) are not effective enough, and further conservation practices are necessary. Only 11% *disagree* that water conservation measures are needed, with an additional 1% undecided. Of those who disagree that water conservation measures are needed, 88% indicate a low or medium level of knowledge of water in their area.

b. There are enough water resources for our needs.

78% of all respondents *agree* that there are enough water resources for their needs. However, _ of those who agreed stipulate that water resources need to be managed carefully and used wisely in order for there to be enough water resources in the future. Over-consumption, climate change, population growth, and growth of industry could all play a role in limiting water resources for the future. Of the 18% who *disagree*, 1/3 of them are from RDKB (representing 40% of all RDKB respondents).

c. These water resources are easily accessible to us.

74% of all respondents *agree* that water resources are easily accessible to them. 40% of those who *disagree* that water resources are easily accessible to them are from the East Kootenays (specifically, the Upper Columbia and Kootenay River areas). (Graph Q17)

WATER QUALITY

How Would You Rate The Relative Quality Of Water In Your Area?

74% of all respondents rate the relative quality of water in their area as *good*, 16% rate it as

average, 6% as *poor*, and 4% *unknown*. Those that rate it *poor* are all from the Kootenay Lake area (75% of whom are from the west arm of the Kootenay Lake).

How Would You React To The Following Two Statements?

a. *There is a pollution problem in the drinking water supply in our area.*

69% of all respondents *disagree* that there is a pollution problem in the drinking water supply in their area. Of the 25% who *agree* that there is a pollution problem in the drinking water supply in their area, 47% are located in the Central Kootenays (29% of all RDCK respondents). Bacteria and sediment are indicated as the main probable pollutants, with forest activities and wildlife being the two main sources.

b. *There is a pollution problem in the local streams in our area.*

49% of all respondents agree that there is a pollution problem in the local streams in their area. Those respondents can be broken down into the following geographic locations:

Regional District	# of Total Respondents for that Area	% of Total Respondents for that Area
CSRD	2	40%
RDEK	11	48%
RDCK	13	46%
RDKB	7	70%

Bacteria, and sediment are indicated as the main probable pollutants, with forest activities, agriculture, and septic systems being the three main sources.

What Is Your Perception Of The Risk To Water Resources?

Extreme climatic events, water shortages and water pollution are the three main identified risks to water resources for the future.

RECOMMENDATIONS

With consideration given to the results of this study, where Basin residents' values and views regarding water and water related issues are identified and addressed, it is recommended that the Columbia Basin Trust invest in a Basin wide water education and conservation campaign. Such a legacy will lay a foundation of knowledge and understanding about water and its invaluable role in the sustainability and longevity of Basin communities. Through education, hopefully a greater understanding of the value of water will lead to increased stewardship of the resource and a willingness, by all stakeholders, to join forces with a common goal of attaining sustainable water management.

"...perceptions of the abundance of water resources must be tempered by a realization that these resources are finite. Fuller appreciation of the value of water resources is a prerequisite to more effective allocation that minimizes

*conflict among competing uses and enhances the sustainability of these uses.”
Kreutzwiser (1995: 281) as cited in Brandes & Ferguson (2003:12)*

Focussing on demand-side management (DSM) to address the necessary shift in water use patterns should be considered in tackling this project. Whereas “supply-oriented approaches treat water as a virtually limitless resource, resulting in water policy that continually seeks out new sources of supply to respond to increasing demand,” demand-side management “places an emphasis on increasing efficiency in end use, avoiding system losses or leakage, providing incentives to reduce use, and matching supply quality and quantity with appropriate end use” (Brandes & Ferguson 2003: 37-38).

Another educational focus should address the interconnection of all water resources and the connection between domestic water supply and the general health of all aquatic systems. An understanding of the relationship between human use and natural ecosystems is imperative.

Since water consumption is identified as being a main concern among respondents, tackling this seems an evident priority. In conjunction with an education program that addresses current water behaviour, a metering program is also suggested. Studies by Environment Canada have shown that “water metering and full-cost, volume-based, user-pay systems appear to influence water-conserving behaviour. They provide a financial incentive to Canadian householders to use less water” (2001). To further support this claim, Environment Canada found that in 1999 metered households consumed 50% less water than un-metered households. Further water demand management measures as outlined by Tate (1990) include:

Category	Examples
Economic Techniques	▪ Rebates for water efficient fixtures and appliances ▪ Tax credits ▪ High use penalties and fines ▪ Pricing structures ▪ Increasing block rates ▪ Peak hour pricing ▪ Summer rates ▪ Excessive use charges
Structural / Operational Techniques	▪ Metering ▪ Reducing pressure ▪ Efficient fixtures and appliances ▪ Low flush toilets ▪ Low flow showers ▪ Low flow faucets ▪ Efficient appliances (washing machines and dishwashers) ▪ Reuse and recycling of water ▪ Greywater catchment/distribution ▪ Reuse of treated wastewater ▪ Leak repair ▪ Xeriscaping ▪ Water restrictions during times of water shortage
Socio-political Techniques	▪ Public education ▪ Mail ▪ Media ▪ Events ▪ Laws and regulations

	▪ Development codes ▪ Landscaping by-laws ▪ Land development planning ▪ Water use restrictions
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APPENDIX A:



APPENDIX B: MUNICIPAL LOCAL CONCERNS

A collaborative summary of specific local concerns is addressed here in detail. Note that some issues pertain to areas that extend beyond municipal limits and are those of adjacent communities.

Castlegar	▪ Meeting new health regulations ▪ Problems with EOCP certification ▪ High consumption because water is not metered, no incentive to save ▪ Conservation needed ▪ Arrow Reservoir levels – affecting sewage outfall dilution, recreation, moorage, fish ▪ Water quality not meeting standards ▪ Lack of education about water ▪ Bad municipal distribution system
Cranbrook	▪ Cost of meeting new health regulations ▪ How do we meet new health regulations? ▪ Over-use of water – “water hogs”. ▪ Shortages of water for domestic consumption. ▪ Quality of domestic water questionable. ▪ Drawing water from Joseph Creek – fish bearing stream. Channel improvements needed. ▪ Inconsistent Koocanusa level
Creston	▪ Economically delivering water to residents. ▪ Looking into metering ▪ Regional district supplies water to town and has had to cut it off at times.
Elkford	▪ Cost of supply greatly increased since having to chlorinate the water. ▪ Overuse of water – inefficient lawn watering etc. ▪ Lack of education about water - people generally not aware of the cost of potable water.
Fernie	▪ Water supply – excellent Artesian Spring source, but have no idea how much supply is still available. Information gap: Where is our water coming from and going to? ▪ Backcountry access to our water supply area. ▪ Proposed Coal Bed Methane – pumping treated water into Cold Creek that leads to Elk River (great fishing); sedimentation from development in watersheds. ▪ Effects of industry on tourism. ▪ Elk River – How much is going into it? ▪ Sewage from ski hill ▪ Storm drain from city

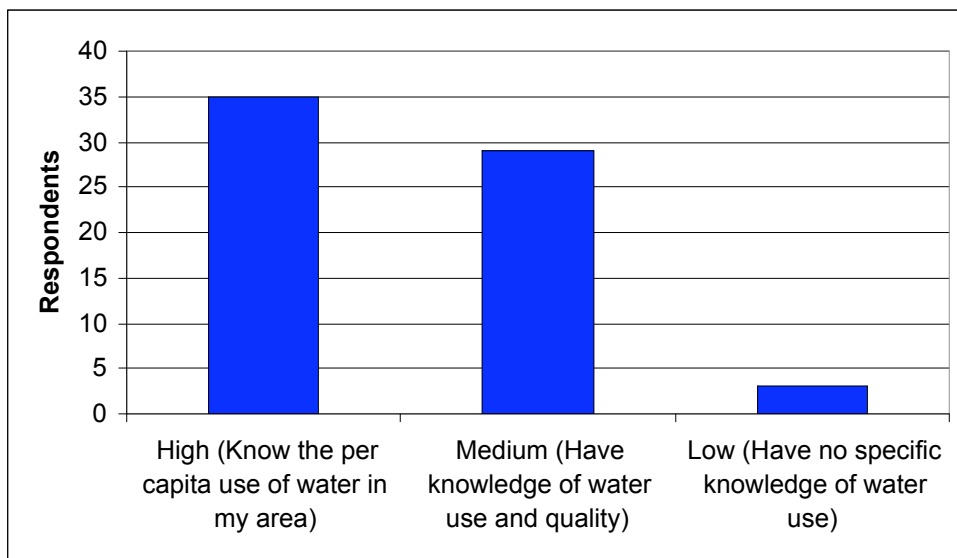
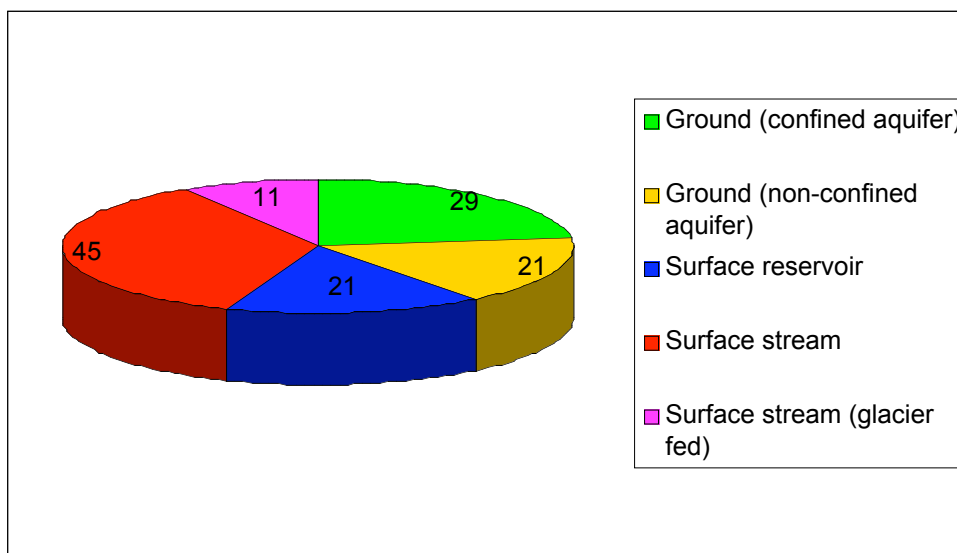
	▪ What is sustainable use of the Elk River (recreation, sewage, community use)? ▪ Golf course water use and contamination of Coal Creek (trout spawning)/Elk River. ▪ Need for storage for peak demands. ▪ Need metering – to address cost of treatment. ▪ Lack of knowledge and education about water – people think it is infinite. ▪ Over consumption – wasteful use of water ▪ Drought issues
Fruitvale	▪ Cost to upgrade the water system – think village is losing 150 gallons per minute due to leakage. ▪ Planning – currently no collaboration with neighbouring communities to join systems. ▪ Quantity – need new sources/storage – Kelly Creek and Fruitvale Creek risk running dry in summer. ▪ Lack of conservation. ▪ Lack of education about conservation needs and methods. ▪ Fire protection flow rates.
Golden	▪ Quality concerns – disinfection (chlorination etc.), fluoridation. ▪ Lack of knowledge about water sources – confined, non-confined? ▪ Lack of education about finite nature of water – a non-renewable resource. ▪ Lack of conservation. ▪ Lack of groundwater legislation. ▪ Pollution from septic fields – densely populated areas not assessed on cumulative impacts. ▪ Quantity – water shortages. ▪ Kinbasket levels.
Invermere	▪ Lack of supply - finding safe, affordable water supply source. ▪ Current source (Paddy Ryan Lakes) like a surface pond. ▪ Protecting and restoring Abel Creek (fish bearing stream that comes from Paddy Ryan Lakes) from adjacent land uses. ▪ Swampy taste and smell of water at certain times of year. ▪ Storm water management (impact on environment). ▪ Wastewater treatment requirements. ▪ Population almost doubles in summer – puts pressure on water systems.
Kaslo	▪ Over consumption – during drier times, have to pump from alternate source. ▪ Cost in meeting new health regulations. ▪ Getting people to understand the cost of treated water. ▪ Need public education about conservation.

	Private sewage systems going into Kootenay Lake.
Kimberley	- Massive overconsumption – too much draw from Mark Creek, which is affecting riparian habitat. - Cost of infrastructure and treatment. - Maintaining water quality for future growth. - Maintaining water quantity for future growth. - Maintaining/restoring riparian and fish habitat. - Recreation and activity in watersheds (Matthew and Mark Creeks) – no municipal jurisdiction over much of the area. - Future logging in watersheds. - Metals pollution from Teck Cominco's old operations.
Nakusp	- Fluctuation and consistently low level of Arrow Reservoir having negative impacts – recreation, access, moorage, unattractive shoreline, rock piles, sink holes, ruining natural harbours. - Sloughing of land along lakeshore.
Nelson	- High domestic water consumption. - Lack of planning for water conservation/use regarding human development and habitation. - Growth impacting water quality on west arm of Kootenay Lake. - Water levels of Kootenay Lake affecting access. - Upgrading systems for treatment and distribution. - Logging plans in the area – road construction and increased access to watersheds leading to pollution. - Downsizing hydrometric stations – need information for planning.
New Denver	- Cost of water supply. - Protection of aquifer – septic nearby. - Municipal responsibilities set by provincial standards.
Radium	- Conservation needed (but difficult to gain public support in the face of abundant supply – Columbia River right there). - How do you address conservation – no means of enforcing it? - Cost effective treatment and distribution. - Public access and backcountry tenures to watershed (heli-skiing fuel shed tank, motor vehicle use) – but watershed is on Crown land, so no means of protecting it. - Need to change public mindset about water, global water issues, human impact on water supplies etc. - Problem at citizen and municipal level where people don't want to put in the effort to conserve.
Revelstoke	- Conservation. - Fluctuation of Upper Arrow Reservoir levels affecting important valley

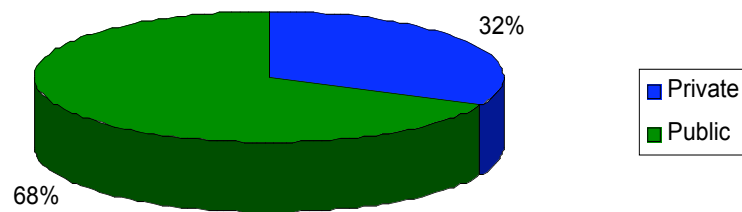
	bottom habitat, fish habitat, recreation, and general aesthetics of the area. ▪ Adequate, safe drinking water for future growth. ▪ Waste disposal for future growth.
Rossland	▪ Over consumption – wasteful use of water and irrigation for lawns and agriculture ▪ Supply – not enough. ▪ Fluctuations in Lower Arrow Reservoir impacting moorage, recreation. ▪ Access to watersheds and use (private timber stands, mining quarries) in watersheds affecting domestic water supply. ▪ Lack of education about conservation. ▪ Cost of meeting new health regulations (not municipal).
Salmo	▪ High consumption - increased pressure on decreasing water supply. ▪ Backcountry access to watersheds ▪ Water quality (containment of aquifer). ▪ Quality of aquatic ecosystem habitat. ▪ Contaminated sites rehabilitation and pollution concerns– Salmo River, Erie Creek, Ymir Creek, Sheep Creek. ▪ Water volume (distribution, licensing) – decreased aquifer levels in outlying areas.
Sparwood	▪ Protecting community water from contamination. ▪ Overconsumption mainly due to lawn irrigation. ▪ Lack of education targeted to public about water and conservation.
Trail	▪ Conservation – cost of treatment. ▪ Selling conservation to residents problematic. ▪ Fluctuations in Lower Arrow Reservoir impacting fish and recreation. ▪ Industry on Columbia River (Celgar, Teck Cominco) a concern. ▪ Flooding of Columbia River (heavy rain + release from Keenlyside Dam). ▪ Corridor plan - development plan needed to protect assets. ▪ Brilliant Dam affects river levels (flooding and recreation)– but no one taking responsibility for this. ▪ Suggestions that Trail's issues with Columbia River levels are influenced by Kootenay River.
Valemount	▪ Fluctuation of Kinbasket Reservoir – unattractive visual impact, health issues from dust. ▪ Want to start Natural Hot Springs.

APPENDIX C: GRAPHS

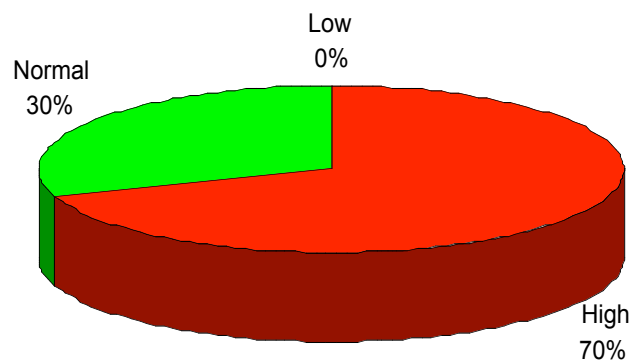
All statistical data taken from the responses in 67 questionnaires.

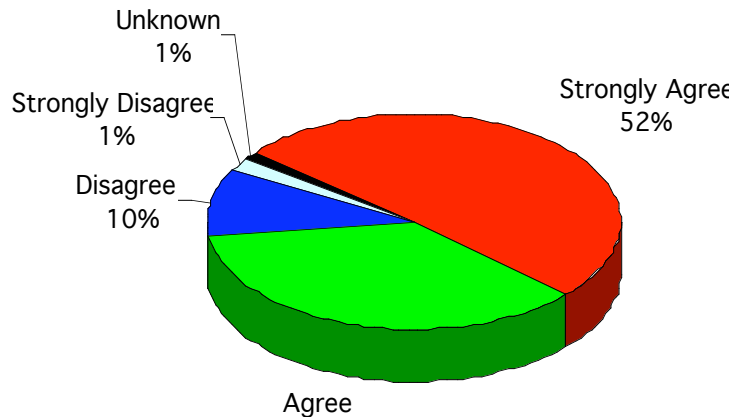
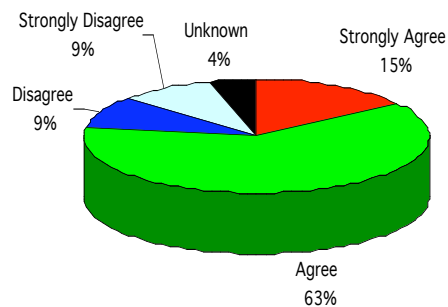
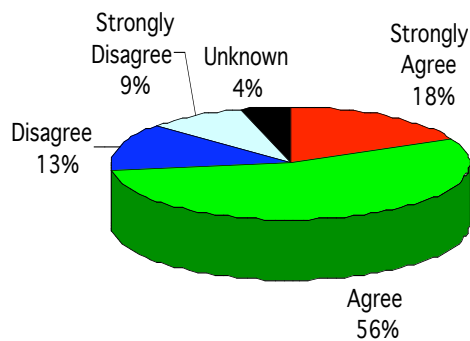
How would you rate your knowledge of water use in your community?**What are the sources of the drinking water supply for your community?
(Please check all that apply)**

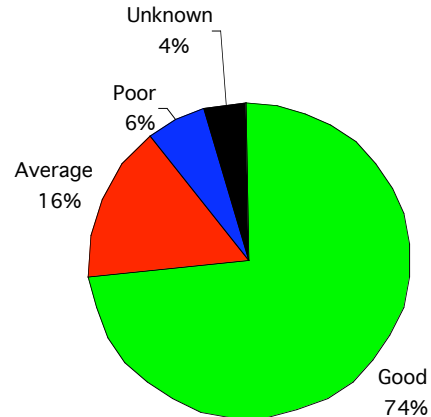
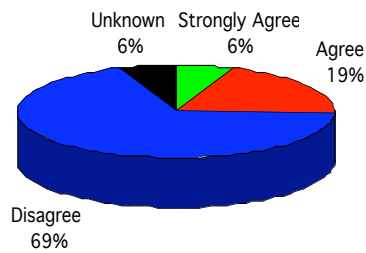
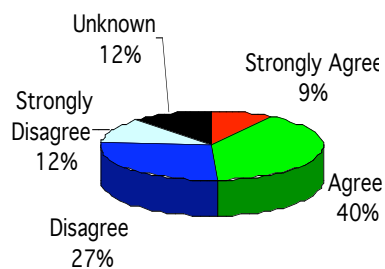
Are you on a private or public water system?



How do you view water consumption in your area?



Water conservation measures are needed for your area.**There are enough water resources for our needs.****These water resources are easily accessible to us.**

How would you rate the relative quality of water in your area?**There is a pollution problem in the drinking water supply in our area.****There is a pollution problem in the local streams in our area.**

APPENDIX D: INTERVIEWS

The following information includes all of the people that were involved in the formal in-person and phone meetings that took place for this study.

Meeting Locations	Number of Total Meetings Attendees	Number of Phone meetings Participants	Total
Castlegar	3		3
Cranbrook	5		5
Creston	7		7
Elkford	3		3
Fernie	4		4
Fruitvale	2		2
Golden	3		3
Invermere	1		1
Kaslo	5		5
Kimberley	3		3
Nakusp		1	1
Nelson	3	3	6
New Denver	1		1
Procter	3		3
Radium	3		3
Revelstoke	1	2	3
Roseland	1		1
Salmo	2		2
Sparwood	1		1
Trail	3		3
Valemount		1	1
TOTAL			61

APPENDIX E: WATER INFORMATION QUESTIONNAIRE

Columbia Basin Water Information Questionnaire

Background:

Water issues are at the core of the Columbia Basin Trust's existence. The Columbia Basin Trust was created in recognition of the impacts associated with the management of water in this region.

Basin residents have identified a broad range of concerns regarding water quality and quantity, from both human use and natural ecosystem perspectives.

Currently there is neither a comprehensive vision nor a strategic plan that incorporates a wide range of values regarding water issues in the Basin. The Columbia Basin Trust wants to involve Basin residents in building a network of organizations to address water issues in the Basin. The Columbia Basin Trust is committed to ensuring that long-term water quality and quantity issues in the region are addressed according to the residents' values and views.

The Columbia Basin Trust recognizes that one of the most significant water issues in the Columbia Basin is the opportunity to renew, terminate, or re-negotiate the Columbia River Treaty (CRT). The Columbia Basin Trust is committed to ensuring that Basin residents' values and views are a key part of the process from start to finish.



The CBT is currently in the process of developing programs to assist Basin communities in dealing with water related issues in the Basin. In order to make these programs relevant to you the CBT has decided to survey Basin residents, groups and communities to identify the range of issues facing the people of the Basin and identify appropriate programming to assist them. Part of this process is properly identifying various values and views that Basin residents have in the area of water.

Your assistance in this process is much appreciated. Please fill out the attached questionnaire by July 19th and either e-mail it to lronalds@telus.net, fax it to 250-365-6670, or mail it to 103 Gould's Island, Golden, B.C. V0A 1H0.

If you have any questions please contact:

Lil Ronalds – Intern, Columbia Basin Trust
Phone: 604-263-0657
E-mail: lronalds@telus.net

Or

Kindy Gosal - Manager of Water Initiatives,
Columbia Basin Trust
Phone: 250-344-7015
E-mail: kgosal@cbt.org

A. Contact Information

1. Name: _____
 - a. Phone: Home _____ Business _____
 - b. Address _____
 - c. Email _____

2. Please list any organization(s) you are affiliated with:

B. Background Information

3. My interest in water is mainly in the area of (if more than one please check the appropriate boxes):

☐	Recreation (please specify):
☐	Agriculture (please specify):
☐	Industry (please specify):
☐	Domestic water use (please specify):
☐	Tourism (please specify):
☐	Regulatory Agency
☐	Other (please specify):

4. My geographic area of interest is:

☐	Upper Columbia (Columbia Valley)
☐	Arrow Reservoir
☐	Slocan Lake
☐	Kinbasket Reservoir
☐	Koocanusa Reservoir
☐	Kootenay River
☐	Kootenay Lake
☐	Elk Valley
☐	Basin wide
☐	Other

5. What do you or your organization do in the area of water?

(i.e. owner of water based tourism using boats, manage domestic water supplies, water licensee for Agriculture & Livestock, manage fisheries, manage hydroelectric facilities etc)

6. In your view what are the most important uses of water in your area? Please identify the value you place on each use by ranking the following in numerical order from 1-10 (where 1 equals your highest value).

☐	Domestic Use
☐	Industrial Use
☐	Agricultural Use
☐	Aquatic/Terrestrial Ecosystem
☐	Recreational Use
☐	Other (please specify) _____
☐	Other (please specify) _____

Please explain the reasons for your ranking:

7. In your view what are the major water issues that:**a. your community is facing on a local level?**

b. we are facing on a basin wide level?

8. What needs to be done to address these issues?

9. What role could the CBT play?

C. Perceptions and Knowledge of Domestic Water Use in Your Community**10. How would you rate your knowledge of water use in your community?**

- | | |
|--------------------------|---|
| ☐ | High (Know the per capita use of water in my area) |
| ☐ | Medium (Have knowledge of water use and water quality in my area) |
| ☐ | Low (Have no specific knowledge of water use or quality in my area) |

Comments if any:

11. What are the sources of the drinking water supply for your community? (Please check all that apply.)

- | | |
|--------------------------|-------------------------------|
| ☐ | Ground (confined aquifer) |
| ☐ | Ground (non-confined aquifer) |
| ☐ | Surface reservoir |
| ☐ | Surface stream |
| ☐ | Surface stream (glacier fed) |

12. Are you on a private or public water system?

- | | |
|----------------------------------|---------------------------------|
| ☐ Private | ☐ Public |
|----------------------------------|---------------------------------|

13. Who manages your water system?

D. Water Quantity Section**14. What is the per capita use of water in your area?**

- | | |
|--------------------------|---------------------|
| ☐ | 50-100 liters/day |
| ☐ | 100-200 liters/day |
| ☐ | 200-300 liters/day |
| ☐ | 300-400 liters/day |
| ☐ | 400-500 liters/day |
| ☐ | >500 liters per day |
| ☐ | Unknown |

15. How do you view water consumption in your area?

- | | |
|--------------------------|--------|
| ☐ | High |
| ☐ | Normal |
| ☐ | Low |

Comments if any:

16. How would you react to the following statements:**a. *Water conservation measures are needed for your area.***

☐	Strongly Agree
☐	Agree
☐	Disagree
☐	Strongly Disagree
☐	Unknown

Comments if any:

b. *There are enough water resources for our needs.*

☐	Strongly Agree
☐	Agree
☐	Disagree
☐	Strongly Disagree
☐	Unknown

Comments if any:

c. *These water resources are easily accessible to us.*

☐	Strongly Agree
☐	Agree
☐	Disagree
☐	Strongly Disagree
☐	Unknown

Comments if any:

E. Water Quality Section**17. How would you rate the relative quality of water in your area?**

☐	Good
☐	Average
☐	Poor
☐	Unknown

Comments if any:

18. How would you react to the following statements:**a. *There is a pollution problem in the drinking water supply in our area.***

☐	Strongly Agree
☐	Agree
☐	Disagree
☐	Strongly Disagree
☐	Unknown

Comments if any:

If you *strongly agreed* or *agreed* to the question above, what do you think are the possible causes or pollution sources?**Pollutants**

☐	Sediments
☐	Bacteria
☐	Nitrate
☐	Fe and Mn
☐	Metals
☐	Other _____

Sources

☐	Septic Systems
☐	Forest Activities
☐	Mining
☐	Agriculture
☐	Urban
☐	Wildlife
☐	Other _____

b. There is a pollution problem in the local streams in our area

☐	Strongly Agree
☐	Agree
☐	Disagree
☐	Strongly Disagree
☐	Unknown

Comments if any:

If you *strongly agreed* or *agreed* to the question above, what do you think are the possible causes or pollution sources?

<u>Pollutants</u>	
☐	Sediments
☐	Bacteria
☐	Nitrate
☐	Fe and Mn
☐	Metals
☐	Other _____

<u>Sources</u>	
☐	Septic Systems
☐	Forest Activities
☐	Mining
☐	Agriculture
☐	Urban
☐	Wildlife
☐	Other _____

19. What is your perception of the risk to water resources (Quality and Quantity) for the future? What are the possible causes and what should we do to reduce the risks?

☐	Water shortages
☐	Water diversions
☐	Water allocations for different uses
☐	Extreme climatic events
☐	Water pollution
☐	Energy Demands
☐	Forest Fire
☐	Other _____

20. Please provide any other additional comments or information you might have on water issues in your community.

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