

Our Water, Our Life: A new model for water resource management in the Aishihik Drainage

Nadia Joe

Jane Glassco Arctic Fellow



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A NEW MODEL FOR WATER
RESOURCE MANAGEMENT IN THE
AISHIHIK DRAINAGE**

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The Jane Glassco Arctic Fellowship Program is aimed at young Northerners, especially Aboriginal Northerners, aged 25-35, who want to build a strong North guided by Northerners. It is for those who, at this stage in their lives, are looking for additional support, networks and guidance from mentors and peers across the North and throughout Canada as they deepen their understanding of important issues facing their region and develop policy ideas to help address them. The program was named in honour of Jane L. Glassco, Gordon Foundation trustee and daughter of founders Walter and Elizabeth Gordon. It was through Jane's direct leadership that the Foundation became deeply interested in Northern and Arctic issues, and in supporting young Northerners.

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*Jane Glassco Arctic Fellow
Walter and Duncan Gordon Foundation*



Nadia's story is only one strand woven into the tapestry of her family's story. She recently returned home to the North to spend more time with her Elders on the land: listening, watching, learning. Like Crow – curious and vocal – she loves to travel and speaks Italian, French and German. Though her attempts at Southern Tutchone are met with laughter, she is determined to learn to express herself in the language of her family.

Like her parents, she understands her role as serving her community. She considers it an honour to have the opportunity to return home and serve the community that has cultivated her cultural values and that continues to support her efforts to achieve a western education so that she may have a more complete understanding of the world today. She graduated from the University of British Columbia with a B.Sc. in chemistry and biological sciences and is currently working her way through a M.Sc. program in environment and management through Royal Roads University.

Community

Dän K'è gugula ùye. Kajet dän ích'e. Dakwäkäda yù nínje. My traditional name is gugula. I'm a member of the Crow Clan from Champagne and Aishihik First Nation in Haines Junction, Yukon (or High Cache as it is translated from Southern Tutchone). I was born in Whitehorse and spent summers with my grandparents at the seasonal fishing camp where my father was born, Klukshu. Klukshu is the Tlingit name for the village that was founded by Ákh Jiyish near the Yukon/B.C./Alaska border in the southern end of the Alsek Watershed.

Fellowship Focus

Sustainable management of water resources has been identified by her community as an issue requiring immediate attention. Nadia's project will combine scientific and traditional knowledge and approaches to develop policy measures for water management that provide for water's sustainable use while maintaining its natural condition – a provision of the Champagne & Aishihik First Nations final agreement.

Table of Contents

<i>Executive Summary</i>	3
<i>Preface</i>	4
<i>Acknowledgements</i>	5
<i>1. Introduction</i>	6
1.1 Background	8
1.2 Research Approach	9
1.3 Research Scope	10
<i>2. Summary of Key Findings</i>	11
2.1 Valuing Aishihik Drainage	11
2.2 Cultural water use	11
2.3 Cultural principles guiding water use	14
2.4 Significant changes observed to water resources in Aishihik Drainage	14
2.5 Key Concerns	16
<i>3. Discussion</i>	19
3.1 Reconciling values	19
3.2 Protecting cultural water needs	20
3.3 Integrating cultural principles into water management	21
3.4 Mitigating impacts	22
3.5 Adapting to change	24
3.6 Personal reflections	26
<i>4. Steps to achieving CAFN's goals for water in Aishihik Drainage</i>	28
Governance	28
Monitoring and Reporting	29
Communications	30
<i>5. Concluding thoughts</i>	32
<i>References</i>	33

Executive Summary

In the winter of 2010/11, I met with nine members of the Champagne and Aishihik First Nations, including several elders, to talk about their concerns for water resources in the Aishihik area. The members participating in the study were either former residents or descendants of former residents because the First Nations people were moved out of the village around the mid-20th Century. These members continue to actively use the area, bringing their families to the land to practice cultural pursuits. Many participating in the study also have the oldest memory of the area before economic developments started. This point becomes important as there are few long-term records of the conditions predevelopment activities.

This paper is an effort to honour the voices of Aishihik. I hope that by documenting shared concerns we can start to identify balanced solutions for the challenges they face in protecting not only their most valued resource, but that resource which links us all: our water.

Key findings include:

1. The Champagne and Aishihik First Nations community value a more holistic approach for the care and use of natural resources in the Aishihik Drainage than the prevailing Eurocentric approach to natural resource management.
2. Since time immemorial, the Champagne and Aishihik First Nations has occupied and used land and water in the Aishihik Drainage. Land and water continues to be of fundamental importance in preserving and enhancing the Champagne and Aishihik First Nations cultural identity, traditional values and lifestyle.
3. The Champagne and Aishihik First Nations' traditional resource management practices – founded on respect – demonstrate an intimate understanding of the complex relationships within their environment.
4. The Champagne and Aishihik First Nations have witnessed significant changes to the land and resources occurring within the last half-century that are adversely impacting what they value most.
5. Shared water resources need updated governance structures and management models that reflect the values, needs and goals of the Champagne and Aishihik First Nations.

I propose foundational principles of the new model for managing water resources in the Aishihik Drainage be based on:

- Shared governance,
- Adaptiveness and
- Sustainability.

Preface

When I first began course work for my Master's degree, I started thinking about what I could do for my thesis. I decided that I wanted it to be something that could be useful to my community in the Yukon. My First Nation has always been very generous in supporting my educational pursuits, which took me from chemistry to environment and management, and I thought my eight long years of post-secondary education should benefit my sponsors so that they might see some sort of return on their investment. After returning home, I casually started asking my elders and some community members what they were concerned about in their communities. What were they worried about and what subjects needed more research. The response was quick, clear and consensual: how can we protect our water? The most common concern was that we need to ensure our water is protected not only for us, but for future generations. A conversation with one of my mentors, Mary Jane Jim, supported this conclusion. She had found the same concerns from the community in her dialogues with the elders. She also had concerns that constitutional commitments under Chapter 14 of the Umbrella Final Agreements were not being recognized.

Apart from the few months of sampling water quality in northern B.C., my experience with water was limited and I didn't know how this community concern translated into a Master's thesis. At first I started by documenting sweet water locations that elders had used for tea water. But my supervisor suggested that might be a bit too narrow of a focus. My thesis supervisor and I brainstormed a proposal that could be used as a potential model for water management in the North. It is a model that would first integrate the community's values into a water management strategy, then work to balance the needs of all water users within the area. This would include:

- the area's most active users, members of the First Nations community;
- the area's most demanding water user, Aishihik Dam; and
- the silent but omnipresent water user, the ecosystem.

Finally, to build principles of sustainability into the model, it would have to consider the needs of the future water user. This was to ensure that whatever we do today does not compromise the needs of future generations.

That left me wondering where to begin this project, and whenever I wonder how to begin something new, a clear image of one of the community's most respected elders appears and I hear in her sharp but broken English, "At the beginning, granchil!" Her smile wrinkles her already weathered face and thinking of the sparkle in her eye I am reminded of what's important. I silently thank her, take a deep breath and begin.

Acknowledgements

I am grateful to the Walter and Duncan Gordon Foundation for not only providing financial support to carry out the research but for also giving me the push to begin exploring the world of policy. It is not a field I would have attempted on my own. A huge thank you to my academic advisor and trusted mentor, Dr. Glenn Brown, for first helping me to develop a personally meaningful research project, then encouraging me to seek out funding to support my research, and finally for providing helpful and always honest feedback (sometimes at 3 a.m., sorry about that!) Many thanks are owed to Champagne and Aishihik First Nations Lands, Heritage and Resources personnel, including Roger Brown, Linaya Workman, Sheila Greer and Sheila Quock, for assistance in developing a research protocol and providing support, guidance and access to resources when I requested it. Thank you to all the research participants for sharing your time, expertise and knowledge. Without your knowledge, this project would not exist. Finally, a special thank you to my elders. You've cultivated my values, supported my educational pursuits – both on the land and in the classroom – and continue to support me with the information needed to complete this research.

Gwänichis
Shäw ni thän
Thank you.

1. Introduction

Water is an important resource. In the most basic sense, we cannot live without it. Globally, population and economic growth are placing larger per capita demands on natural resources.¹ For water resources, particularly in the North, additional pressures exist. Climate change is a significant factor influencing water quality and flow in Northern Canada. Recent studies indicate that hydrology in the northern environment is particularly susceptible to warming as small rises in temperature result in increased melting of snow and ice.²

Furthermore, water rich regions such as the Aishihik Drainage in southwestern Yukon endure conflicts over water use and allocation. Yukon's recent population growth and a booming economy bolstered by an active mining industry are placing increased demands on its water resources. Increasing energy use and industrial activity require large volumes of water while further polluting and degrading water resources.³ In contrast, freshwater resources are culturally significant to resident First Nations who value water not only for the ecosystem services water provides, such as aquatic habitat, but also for its inherent worth. Cultural principles and protocols continue to influence how water resources are valued and used by the First Nations in the Aishihik area.⁴

Mounting pressure and competing interests over the Aishihik Drainage's water resources indicate the need for improved management strategies to ensure use of freshwater resources can be sustained for future generations. Constitutional commitments outlined in chapter 14 of the Umbrella Final Agreements call for shared and sustainable management of water resources in the Aishihik Drainage. However, conversations with community elders and former residents of Aishihik Village reveal that the current framework does not adequately consider traditional use and cultural principles associated with water use for the First Nations communities, who often identify different values and indicators for the care and use of the region's resources.

Developing sustainable water management strategies first requires understanding the people actively using the watershed and its water resources.⁵ As the study area is situated in the traditional territory of the Champagne and Aishihik First Nations (CAFN), and CAFN members comprise the area's most active users, the research summarized here centres on understanding the values, needs, goals, and concerns for water of the CAFN community. Finally, achieving sustainable water management will require establishing – and sometimes balancing – the multiple priorities the CAFN community has for culturally significant features and activities associated with the area.

¹ Brooks, K.N., Ffolliott, P.F., Gregersen, H.M., DeBano, L.F. ,*Hydrology and the Management of Watersheds* (2nd ed.) Iowa: Iowa State University Press (1997)

² Ogden, A., & Johnson, P., *Climate change impacts and adaptation in northern Canada No. 3*. Yukon: Northern Climate ExChange (2002)

³ Anisfeld, S.C., *Water resources*. Washington: DC (2010)

⁴ Joe, N., *Initiating integrated watershed management in the Aishihik Drainage: an adaptive co-management approach*. Victoria: Royal Roads University (2012)

⁵ Heathcote, I., *Integrated watershed management: Principles and practices* (2nd ed.), New Jersey: John Wiley & Sons, Inc. (2009):76

This paper summarizes key findings from interviews completed with nine CAFN members and presents a few options to guide further discussions towards better water management practices. I hope this can be the launching point to guide further discussion around achieving shared and sustainable water management practices in the Aishihik Drainage.

1.1 Background

Aishihik Drainage

The Aishihik Drainage is an important and productive ecosystem in the Yukon. It provides highly valued ecosystem goods and services, including drinking water, wildlife habitat, and opportunities for tourism and recreation. It is also an important source of energy production via the Aishihik Hydro facility at the south end of Aishihik Lake, providing the Yukon with up to 37 MW of power. In addition, Aishihik Lake and the surrounding areas have been and continue to be culturally significant to the Southern Tutchone peoples of Champagne and Aishihik First Nations.

Aishihik Lake – derived from a Southern Tutchone word – is the second largest lake in Yukon. Located in the Boreal Cordillera Ecozone, it forms the headwaters of the Alsek Watershed draining south into the Pacific. The lake is bordered by the Ruby Range mountains in the west and by low mountains reaching 1,500m above sea level in the east. At the north end of the lake lies Aishihik Village, which was inhabited until the mid-20th Century when families were removed from the village and children sent to residential school. The village has a long history of use and occupancy and archaeological evidence indicates human use of the area radiocarbon dated to about 7,195 years ago.⁶

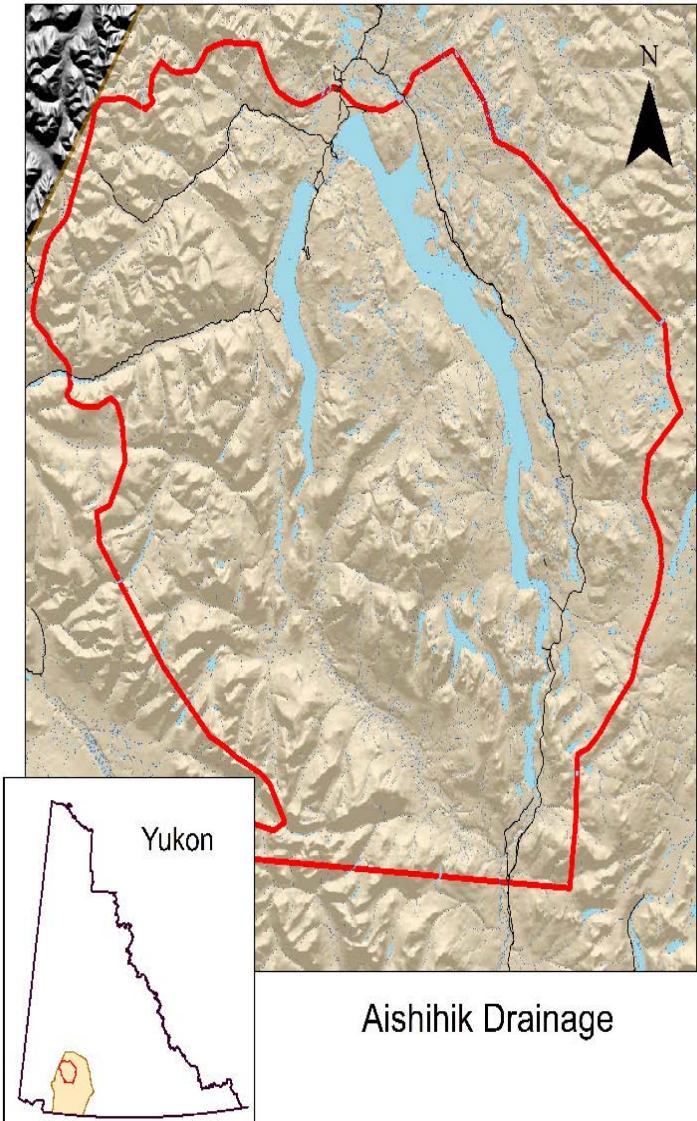


Figure 1 – Outline of Aishihik Drainage

sheep, small game and locally caught fish.⁸ The area also provided key habitat for fur-bearing animals.⁹ Trapping provided an important resource for winter survival and contributed to the traditional economies

Champagne and Aishihik First Nations

Today, the most active users of the Aishihik Drainage, members of the Champagne and Aishihik First Nations, are descendants of the Southern Tutchone peoples. Oral history reports by J. Allen (1992) conclude the Aishihik Lake area was heavily utilized by the Southern Tutchone and their ancestors for a number of reasons. It was prime hunting grounds for big game supplemented with an abundance of small game birds and animals.⁷ Traditionally, the Southern Tutchone peoples in the area were subsistence hunters and fishers living on caribou, moose,

⁶ Greer, S., Archaeological Excavations at Sites JhVf-14 and JhVf-16, South End of Aishihik Lake and Related Investigations at Other Aishihik Area Sites (2005):3; Workman, W.B., First Dated Traces of Early Holocene Man in the Southwest Yukon (1974):101

⁷ Allen, J., Champagne and Aishihik oral survey and report of traditional food fishing in the Aishihik area (1992):4

with neighbouring groups. Trapping and the fur trade grew increasingly more important in the 19th Century as demand for furs from the coastal market increased and trading posts were established along traditional trade routes.¹⁰

Shared management

In 1993, the Champagne & Aishihik First Nations concluded a comprehensive final agreement with the federal and Yukon territorial governments providing for shared and sustainable management of water resources in CAFN settlement lands. Under chapter 14 of this agreement, the CAFN peoples have specific rights relating to water resources, including rights to use water for traditional use and rights protecting biophysical parameters of water flowing through or adjacent to settlement lands.¹¹

1.2 Research Approach

I assumed a community based action research approach as the method of inquiry, applying both primary and secondary research tools. I worked with the CAFN Heritage, Lands, and Resources Departments to develop the research protocol and identify key informants to participate in semi-structured interviews. I completed nine semi-structured interviews with former residents and/or active users to:

- identify the community's needs and goals related to water resources;
- document traditional knowledge relating to changes observed to land and water in the study area; and
- begin to define preferred future use of the study area.

I asked participants to describe their knowledge of traditional resource use, changes they've observed occurring in the study area, and features and activities they identify as culturally significant. Research aides used during the interviews included a collection of maps for the extent of the study area. Two types of maps were available for participants to mark culturally significant features - one 1:50,000 topographical map set of the study area and one Traditional Place Names map created by the CAFN Heritage Department. Participants were encouraged to use the maps they felt most comfortable and familiar with. Interviews ranged from 30 to 90 minutes in length. The interviews were transcribed and key themes extracted and summarized.

To preserve cultural and intellectual property, I mapped culturally significant features identified during interviews using ArcInfo (TM) 10.2 at a coarse scale and labelled culturally significant features within a locked database, but omitted labels from the maps. I applied conceptual modelling techniques, linking impacts to culturally significant features and activities identified to illustrate how one action or activity impacts many culturally significant features and activities. These linkages can help to identify specific and preferable management options to mitigate the impacts associated with an action or activity.

⁸ Greer, S., Archaeological Excavations at Sites JhVf-14 and JhVf-16, South End of Aishihik Lake and Related Investigations at Other Aishihik Area Sites (2005):9

⁹ Allen, J., Champagne and Aishihik oral survey and report of traditional food fishing in the Aishihik area (1992):4

¹⁰ Greer, S., Archaeological Excavations at Sites JhVf-14 and JhVf-16, South End of Aishihik Lake and Related Investigations at Other Aishihik Area Sites (2005):9

¹¹ Champagne and Aishihik First Nations Final Agreement (1992).

1.3 Research Scope

The research summarized in this paper is part of a larger long-term project initiating a sustainable watershed management strategy for the Aishihik Drainage. A complete summary and analysis of the study can be found in my thesis: "Initiating sustainable watershed management in the Aishihik Drainage."¹² The focus of this component of the research project was:

1. to identify the goals and needs of the First Nations community for water in the study area;
2. to document Aboriginal traditional knowledge of the study area to better understand the effects of land and water use on valued cultural features and activities in the area;
3. to establish management priorities of the Champagne and Aishihik community for the sustainable use of water resources in the Aishihik Drainage.

¹² Joe, N., Initiating integrated watershed management in the Aishihik Drainage: an adaptive co-management approach. Victoria: Royal Roads University (2012)

2. Summary of Key Findings

This section summarizes key themes from the interviews. (Parts of this section are paraphrased and other parts are copied verbatim from my thesis. The reference for my thesis can be found in the references section at the end of the paper.)

2.1 Valuing Aishihik Drainage

"[Aishihik has] more than a multi-million dollar value on it. You can't put any specific price on it."

*Champagne and Aishihik
First Nations Elder*

When asked to describe what they valued most in Aishihik Drainage, the interview questions elicited very emotional responses from all of the research participants. Most of the participants saw the value of the Aishihik area as part of their heritage and a connection to their cultural identity. Many expressed the importance of the Aishihik area remaining relatively wild, pristine, and remote so that their descendants could continue to harvest fish, wildlife, berries and medicines, and feel connected to their culture.

Many of the participants valued the sense of community they felt being on the land and the time afforded for reflection. One participant made special note of the aesthetic value of the area and appreciation for recreational opportunities the area provided. All participants valued the area for its ability to sustain the community and many felt that Aishihik area continued to provide all the resources necessary for survival.

"My ancestors used to move around that area there. I grew up in [Aishihik], my grandparents, my parents and on and on, and now my children are doing it. And I'd like just to see it [continue]."

*Champagne and Aishihik
First Nations Elder*

2.2 Cultural water use

"Between Otter and Aishihik Lakes [where] the fish [are] coming and going, the water is flowing in the winter [and] it doesn't freeze over 'cause of the movement of water [between] the lakes. That's a natural place for people to be even year round. You can get fish there. Fish is such an important part of our culture."

*Champagne and Aishihik
First Nations Elder*

To better understand how CAFN community members value Aishihik Drainage it is important to understand how they use the land and the water. This section briefly describes the cultural significance of water use in the Aishihik Drainage.

During the interviews, participants marked down culturally significant water resources, including drinking water

locations, fish and wildlife habitat, and recreational sites. Sources of open water in wintertime were critical to the community as sources for drinking water and also for fishing and harvesting other resources.

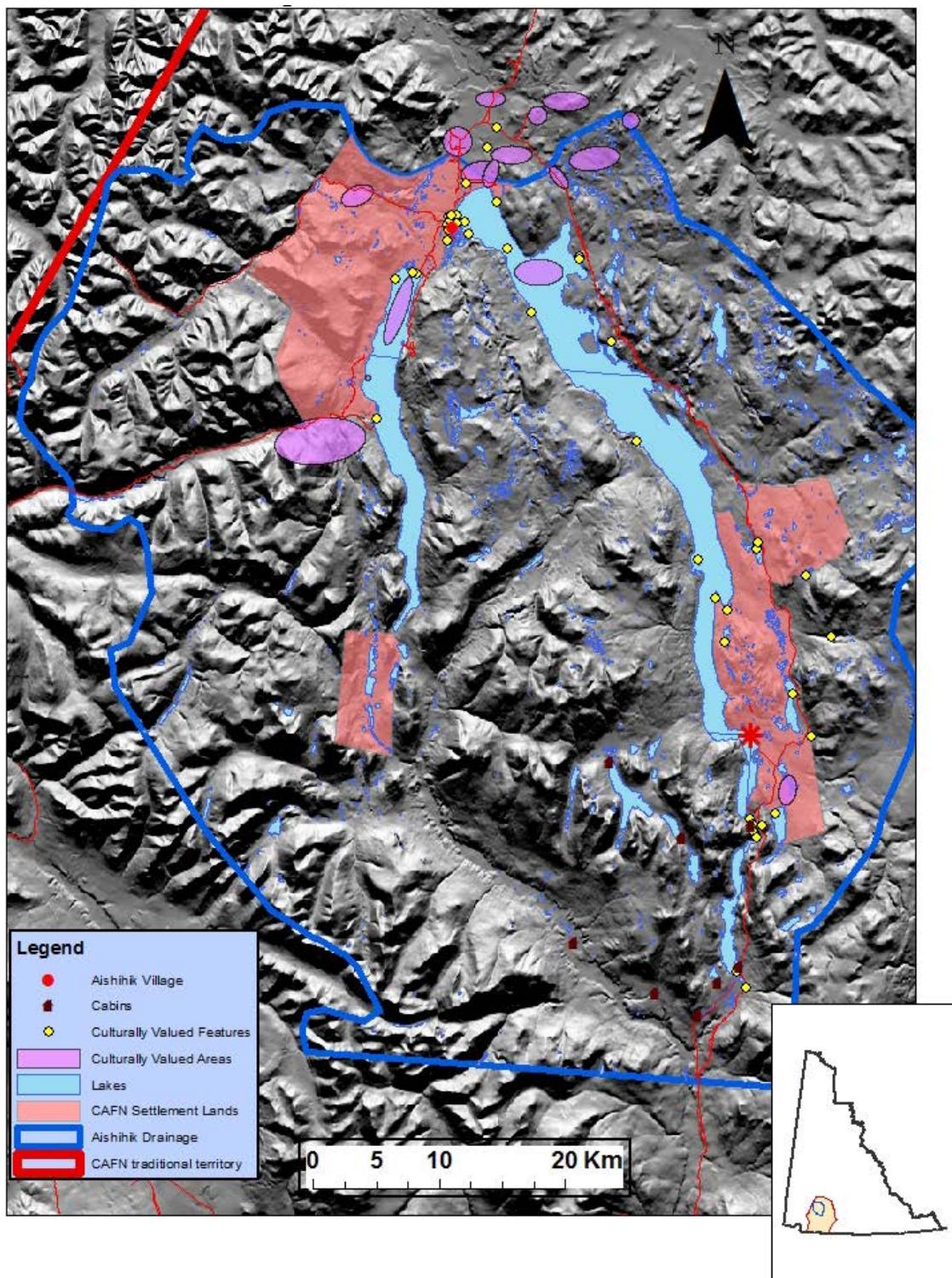


Figure 2 – Culturally significant features and sites identified by research participants during interviews.

Open and flowing water during wintertime was also considered a sacred place and deserved respect:

"There's a place [near Aishihik Village] it was open water in the wintertime and they say that's where the 'big fish' is moving in there and that's why the water stays open. It's a spiritual type place."

*Champagne and Aishihik
First Nations Elder*

Most participants identified specific locales for collecting drinking water along Aishihik Lake (see Figure 2). Participants indicated these were trusted drinking water sites where generations of families would collect water.

Every participant identified fish spawning habitat in the Aishihik Bay area as an important feature and resource central to their culture. Spawning habitat for trout and whitefish extends right across the bay where the village was built. A small river connects Aishihik Lake to Sekulmun Lake allowing for fish passage between the lakes.

"In the summertime, if you set up fish traps between the [lakes], especially the streams, those are the best places for catching fish, and that's why these villages ended up in those places, and that's the importance of it."

*Champagne and Aishihik
First Nations Elder*

Fishing was practiced year round and continues to be practiced throughout the year by active CAFN users. Several interviewees maintain that the abundance and easy access to fish was a primary reason why the village is located there:

"That was a major spawning ground there in front of the village.... That's why they put the village there. White fish spawning grounds."

*Champagne and Aishihik
First Nations Member*

The Aishihik Lake area continues to be a rich source of caribou, moose, sheep, beaver, muskrat and ground squirrel for subsistence harvesting. Furthermore, participants indicated water fowl, migratory and game birds, such as willow grouse, are an important food source. In the past, activities such as hunting and fishing were pursued primarily for subsistence and as part of the traditional economy between families and other groups. Today, these activities continue as an important cultural practice among CAFN members.

2.3 Cultural principles guiding water use

"Definitely you gotta respect the water, the water is the life."

*Champagne and Aishihik
First Nations Elder*

Many of the Southern Tutchone's traditional management practices relating to natural resources stem from a fundamental understanding of their dependence on these resources for their survival. This section describes traditional resource management practices that guide how CAFN members care for their water resources.

During the interviews, several participants shared stories about cultural restrictions on specific water resources. Many recalled being told as children not to throw anything into the water so as not to disturb the fish that live there, as the fish sustained their community. Another participant recalled being told by his elders not to swim in certain areas because it was important to keep certain water resources clean. Many of these participants maintained that they continue practicing this principle and pass it on to the younger generations, particularly when they see a group of young people throwing objects like sticks and rocks into the water.

Furthermore, respect for water itself is displayed by the community not only for physical and biological needs, but also for the spiritual power attributed to water. One elder related a story about how powerful and potentially dangerous the lake and the rivers could be, especially if you're not familiar with the water source.

Other key principles guiding the Southern Tutchone peoples' traditional resource management include taking only what you need. One elder shared how her family did not leave the fish net in day after day, but rather checked the net every day and removed it once they had enough to feed their family for a specified period of time. This principle was typically accompanied by the practice of consuming all of the resource once it was taken so that nothing was wasted.

"Don't laugh at [water] because it'll destroy you in no time."

*Champagne and Aishihik
First Nations Elder*

2.4 Significant changes observed to water resources in Aishihik Drainage

This section documents observed changes occurring to the water resources in the area, climatic changes observed and changes to fish and vegetation.

Significant changes observed to water resources

All participants have observed changes occurring to the land and water in the Aishihik Lake area. Often the first and most noticeable change shared by all participants was the drastically fluctuating water levels occurring in Aishihik Lake that were noticed after operation of the Aishihik Hydro Facility began in 1975. Some asserted that fluctuation was more noticeable in spring while others noticed the fluctuations in the winter because of the impact of the varying water levels on the ice.

Another common observation by participants included changes to water conditions around Aishihik Village. Most participants indicated the fresh water spring located in front of Aishihik Village now has greater turbidity than before the dam operation and can no longer be used by the community to collect drinking water. Some

participants also noted that water in the bay next to the village and surrounding the fish spawning grounds experiences a higher level of turbidity compared to before the dam operation. Some participants have observed an increase in water temperatures of Aishihik Lake in the bay next to the village.

Participants shared a number of observations about various ecological changes in the Aishihik Lake area. A common observation included changes to shorelines and banks along Aishihik Lake and Sekulmun River.

"Those cabins [around Otter Lake] are just about to fall in the lake now. The bank is kind of giving away."

*Champagne and Aishihik
First Nations Elder*

Most participants agree that the rate of erosion occurring along the lake's banks has accelerated since Aishihik Dam began operating. A few participants observed the beach at Carnation Point at the north end of Aishihik Lake is widening. Several participants also mentioned dewatering of littoral areas observed around the bay near Aishihik Village. A number of interviewees also noted that the small hill where Aishihik village is located has sunk.

The focus area of most changes observed was around the north end of Aishihik Lake; however, many participants also mentioned changes to surrounding areas. While reviewing the topographic maps, a few participants made note of several smaller lakes in the area that have disappeared and others which are experiencing much lower water levels.

"There's lakes on the map but you go there and there's nothing, just a big hole in the ground. Some of the creeks are not even there anymore. Some are dried up."

*Champagne and Aishihik
First Nations Member*

Other significant changes observed include flooding occurring at both the north and south of Aishihik Lake:

"[The dam] flooded the whole [Aishihik] village out. We had to move up higher."

*Champagne and Aishihik
First Nations Elder*

Further changes observed by several participants included changes to the fish in Aishihik Lake. Many felt the flesh of fish is softer now, inedible at times, compared to before the dam began operating. Some also noted that during some seasons there is an increasing presence of parasites found in the fish, as well as mud or silt found in the gills. Most participants asserted that fewer fish are caught in nets compared to their childhood. One participant, however, stated that while there were still a lot of fish, she did notice a change in ratio of fish species caught, such as more jack fish and fewer lingcod. She recalled this catch ratio being reversed as a child.

Several participants have noticed a new growth of a dark weed-like plant growing in the lake near Aishihik Village. Participants did not recall seeing this plant in any abundance during their childhood spent at the village.

Climatic changes observed

Most participants have observed changes to the climate and weather patterns indicating an increased unpredictability of the weather since their childhood.

"The weather is so warm, next thing you know there's no snow, and next thing you know there's a big snow storm. It's not stable."

*Champagne and Aishihik
First Nations Elder*

Further impacts attributed to climatic changes include changes to ice conditions, such as how quickly the ice freezes in winter. There was some discrepancy between the responses from interviewees. Some felt the ice took longer to freeze in the winter and was slower to thaw in spring while others didn't notice any appreciable change when the ice on the lake froze or thawed.

"Usually in November there'd be a foot of snow and people [would] be trapping and [this year] here we're just waiting and waiting and waiting. The [whitefish spawning] season is over already."

*Champagne and Aishihik
First Nations Member*

A few participants felt the ice on Aishihik Lake was also thicker now than when they were young.

"The ice is thicker [now]. Usually five to six feet. I have an ice auger only four feet. If it can't go through then forget [about fishing]."

*Champagne and Aishihik
First Nations Member*

2.5 Key Concerns

"We live off the land. So we want to protect the animals and that too. And the fishes and the water and things."

*Champagne and Aishihik
First Nations Elder*

During the interviews, participants raised a number of concerns with changes they have observed occurring in the area within their lifetime. Concerns ranged from security of private property to over-harvesting of fish and wildlife populations to potential impacts associated with climate change.

When asked to identify concerns relating specifically to water resources, all participants expressed concerns associated with the operation of the Aishihik Dam. These concerns included fluctuating water levels, higher turbidity observed in lake water around Aishihik Bay, flooding of key wildlife habitat, accelerated shoreline erosion, and dewatering littoral areas.

"If they left the water [in Aishihik Lake] alone it'd be nice. Those fishes would be happy too, and the muskrat and the beavers."

*Champagne and Aishihik
First Nations Elder*

Though currently not a part of the Aishihik Drainage, all participants expressed concerns relating to a proposed project to divert water from another watershed into Aishihik Lake for increased energy production.

"That's what really scares me is when they say they're not going to have any control on that river [from Gladstone Lake] when they [divert] it. We're going to have the same problem with flooding out again."

*Champagne and Aishihik
First Nations Elder*

Participants expressed concerns with increased activity by non-CAFN citizens. Activities such as mineral exploration, sports fishing and recreational harvesting were identified by most participants as potentially impacting culturally significant features in Aishihik Lake area. Many participants suggested these activities could negatively impact fish and wildlife migration patterns as well as result in over-harvesting of fish and game.

Participants also cited concerns with increased use of motorized vehicles by both CAFN and non-CAFN citizens.

"Our animals are disappearing."

*Champagne and Aishihik
First Nations Elder*

Most participants identified climate change as a potentially significant threat to the Aishihik Lake area, but most participants were reluctant to assign any observed changes to climate change.

One participant indicated that without sufficient monitoring of changes occurring in the area, it was difficult for the community to know what changes were natural and which could be attributed to human influences.

All of the participants expressed a clear desire to know their children and grandchildren could return to the land not only for survival, but for spiritual replenishment as well.

"My concern is I want the young people start using the land again because there's a hardship gonna go on amongst the people. There's too many people on Earth here now."

*Champagne and Aishihik
First Nations Elder*

The most commonly expressed concern between participants involved the loss of cultural identity as conditions deteriorate in the Aishihik Lake area. Some participants also questioned the impact to the CAFN community and their cultural connection to the land and water if key cultural features, such as the fish spawning habitat, moose populations or heritage sites, disappear.

3. Discussion

Changes to the land and water in the past 50 years in Aishihik Drainage have introduced significant changes to the area's water resources, and these changes have not gone unnoticed by the area's most active users, the CAFN community. Increasing demands for energy and resources are impacting not only water resources but culturally significant features and activities in the Aishihik Drainage. This section describes some of the impacts and provides some policy options to address concerns and impacts.

3.1 Reconciling values

It is clear from the interview responses that the CAFN community greatly values intangible characteristics of the Aishihik Drainage and its natural resources, including water. The area's resources are valued for heritage significance and knowledge that the resource will be available for future generations to enjoy. In addition, the area's resources are valued for the ecosystem goods and services they provide for the community.

In contrast, the other primary user of the Aishihik Drainage, Yukon Energy Corporation's hydro-electric facility, place more value on direct use of the area's resources. For example, the Yukon Energy Corporation values the ability to generate hydropower and maximize profit. The recent addition of a third turbine is reputed as saving the company \$1.2 million or more per year in diesel costs.¹³

Very often, water management strategies have failed because they neglected to incorporate the full range of values and perspectives present among water users.¹⁴ Divergent values, whether over water or other natural resources, almost inevitably lead to conflict. Reconciling values over how the resource is to be managed will need to be addressed to continue providing a secure long-term energy supply to the Yukon, to conserve key cultural features and ultimately, to achieve the long-term management of water in the Aishihik Drainage.

Goal

Equal consideration of CAFN community values in managing water resources.

Policy Options for CAFN to Consider

1. Development of a comprehensive environmental policy that outlines cultural values for land and water use.
 - This land and water policy should be shared with economic and industrial water users in Aishihik Drainage as well as any other authorities responsible for managing land and water resources in Yukon to communicate the cultural values of the CAFN community.
2. Engage territorial government in developing an integrated land and water use plan for the Aishihik Drainage that adopts cultural values of the CAFN community.

¹³ Yukon Energy Corporation, Aishihik third turbine (2011) Retrieved December 30, 2011, from <http://www.yukonenergy.ca/energy/projects/third/>

¹⁴ Heathcote, I., Integrated watershed management: Principles and practices (2nd ed.), New Jersey: John Wiley & Sons, Inc. (2009)

- Land use planning is a constitutional commitment under chapter 11 of the CAFN Final Agreements and is a critical step in preserving culturally significant features and activities of the CAFN community.
3. Apply community based social marketing, or similar techniques, to raise awareness of cultural values among recreational users of the Aishihik Drainage
 - The Aishihik Drainage, roughly 4,800 km², is remote and largely unpopulated. Capacity is limited for monitoring and enforcing policies and regulations governing land and water use. Community based social marketing techniques have proven very effective at engaging the general public and helping to foster new and sustainable behaviour.¹⁵

3.2 Protecting cultural water needs

The CAFN community has diverse and extensive water needs. Mapping out culturally significant sites and activities (See Figure 2) for just nine CAFN members shows extensive land and water use within Aishihik Drainage. Domestic use (ie. drinking water) is the least consumptive use of water but arguably the most important. Other needs include cultural needs to sustain harvesting activities and significance of historical water sites. Water is also important for transportation and recreational opportunities on lakes and rivers. Perhaps the greatest water need, in terms of volume and identified through the interviews, is the water needed to maintain fish and wildlife habitat.

Additional and sometimes competing uses for water in Aishihik Drainage include the Aishihik Dam and natural resource extraction activities. Large water infrastructure projects such as dams have numerous documented effects causing serious environmental and social impacts. While hydropower is a non-consumptive use of water, it can have devastating effects on the local ecosystem and the Aboriginal peoples who depend on that ecosystem.

The hydro-electric facility at the south end of Aishihik Lake generates up to 37.5 MW of power or approximately one-third of the total hydro energy of the Whitehorse-Aishihik-Faro¹⁶ system and is an important source of renewable energy for the population of Whitehorse. However, energy production has been generated largely to support economic development and resource activities, specifically mining.

"Electrical power generation in Yukon has almost always gone hand-in-hand with mining."

*Yukon Development Corporation & Yukon Energy Corporation
The power of water: The story of hydropower in the Yukon*

Rising mineral prices are increasing demand for energy in the Yukon and demand is projected to exceed supply over the next two years and beyond without additional energy projects.¹⁷ However, impacts to culturally significant features and activities make it difficult for the CAFN community to

¹⁵ Mackenzie-Mohr, D. and Smith, W., Fostering sustainable behaviour: an introduction to community based social marketing. Canada: New Society Publishers (1999)

¹⁶ Yukon Energy Corporation, Aishihik third turbine (2011) Retrieved December 30, 2011, from <http://www.yukonenergy.ca/energy/projects/third/>

¹⁷ Yukon Energy Corporation, Yukon energy strategic plan 2010 – 2012

support generating additional hydro-power for an unsustainable resource extraction industry. These two competing interests for water use will require coming together to develop a shared vision for the area's water resources.

Goal

Ensure water needs of CAFN community are met today and will be available for future generations, including:

- access to clean and reliable drinking water sources;
- preservation of sacred and culturally significant water sites;
- water needed for recreational and traditional use; and
- maintenance of instream flow needs and water quality in protecting the ecological integrity of key fish and wildlife habitats.

Policy Options for CAFN to Consider

1. Work with community to prioritize water use in areas experiencing competing and/or incompatible interests.
2. Build these priorities into the comprehensive land/water policy developed for Aishihik Drainage.
3. Build awareness of priorities with other users and Yukon Government and government departments responsible for managing water resources in Aishihik Drainage.

Policy Options for Yukon Energy Corporation to Consider

4. Provide incentives for the biggest energy consumers to encourage demand side management.
5. Explore alternative energy technologies that make little or no difference to the end user.

Policy Options for Yukon Government to Consider

6. Encourage mines to become energy self-sufficient.
7. Explore potential for adopting Soft Path water and energy approaches in Yukon.

3.3 Integrating cultural principles into water management

Cultural principles and protocols have long guided how the Southern Tutchone of the CAFN community use water resources. Founded on respect, these principles ensure the sustainable use of water not only for today's users but for the next generation. Furthermore, the recognition of the relationship between land and water is key to preserving the ecological integrity of critical fish and wildlife habitats.

In contrast, the Yukon's water resources are managed primarily by point source controls through the Yukon Water Board.¹⁸ While the board must consider cultural needs and principles in issuing water use licenses, as per conditions of chapter 14 of the Umbrella Final Agreements, this is carried out on a case by case basis and comprehensive assessments are limited to formal interventions by the First Nations governments. The board also has no direct responsibility over land resource management thereby limiting its ability to proactively manage water resources.

¹⁸ Waters Act (2003).

Goal

Greater application of cultural principles and practices in resource management.

Policy Options for CAFN to Consider

1. Formally adopt cultural principles into land/water policy.
2. Integrate land and water management as an alternative to point source controls.
3. Engage Yukon Government, and other responsible agencies, to pursue integrated land and water use planning.

3.4 Mitigating impacts

The most significant changes observed to water resources and changes to fish and wildlife populations can likely be attributed to the operation of the Aishihik Dam. The environmental assessment completed for Aishihik Dam's water license identifies similar environmental effects as those observed by the CAFN community.¹⁹ The assessment was completed under the Canadian Environmental Assessment Act (CEAA), which only considers socio-economic effects that are the result of an environmental effect.²⁰ This excludes alternative effects experienced by the CAFN to culture and heritage. For instance, many participants were concerned about the impacts that these events and activities have on the cultural identity of the CAFN community. The Yukon Environmental and Socio-economic Assessment Act has since replaced CEAA and has a broader mandate for socio-economic considerations.²¹ This may better position the CAFN community to assert their concerns and develop strategies to help mitigate and minimize impacts to core values within the Aishihik Drainage.

Goal

Mitigate or minimize impacts from human activities to culturally significant features and activities in Aishihik Drainage.

Policy Options for CAFN to Consider

1. Monitor and continue documenting significant changes and impacts to Aishihik Drainage.
2. Continue documenting culturally significant features and activities in Aishihik Drainage.
3. Document infringements on ability of CAFN citizens to pursue traditional activities

Policy Options for Yukon Energy Corporation to Consider

4. Continue to work with CAFN to identify and then mitigate and/or minimize impacts to culturally significant features and activities.
5. Work with CAFN to develop adaptive measures for impacts that cannot be mitigated (ie. building caribou crossing structures in areas where shoreline erosion attributed to dam operations has obstructed traditional migration routes)

¹⁹ Cooperative Environmental Review Team, Aishihik hydroelectrical relicensing project: environmental screening report (2001)

²⁰ Ibid

²¹ Yukon Environmental Socio-economic Assessment Act. (2005).

6. Work with CAFN to develop culturally appropriate indicators to monitor (ie. taste of fish harvested).
7. Include traditional knowledge and local observations as part of the annual reporting requirements.
8. Consider energy supply alternatives such as the Soft Path.

3.5 Adapting to change

The Aishihik Dam is not the only force effecting change in Aishihik Drainage. Impacts from land use and development activities, such as mineral exploration and tourism, can alter not only the quality and flow of water bodies but change wildlife movement patterns and habitat as well. For example, Yukon's recent staking rush has also affected the Aishihik Drainage (See Figure 2). Exploration activities can affect wildlife migration patterns affecting CAFN members' ability to harvest game along traditional migration routes.

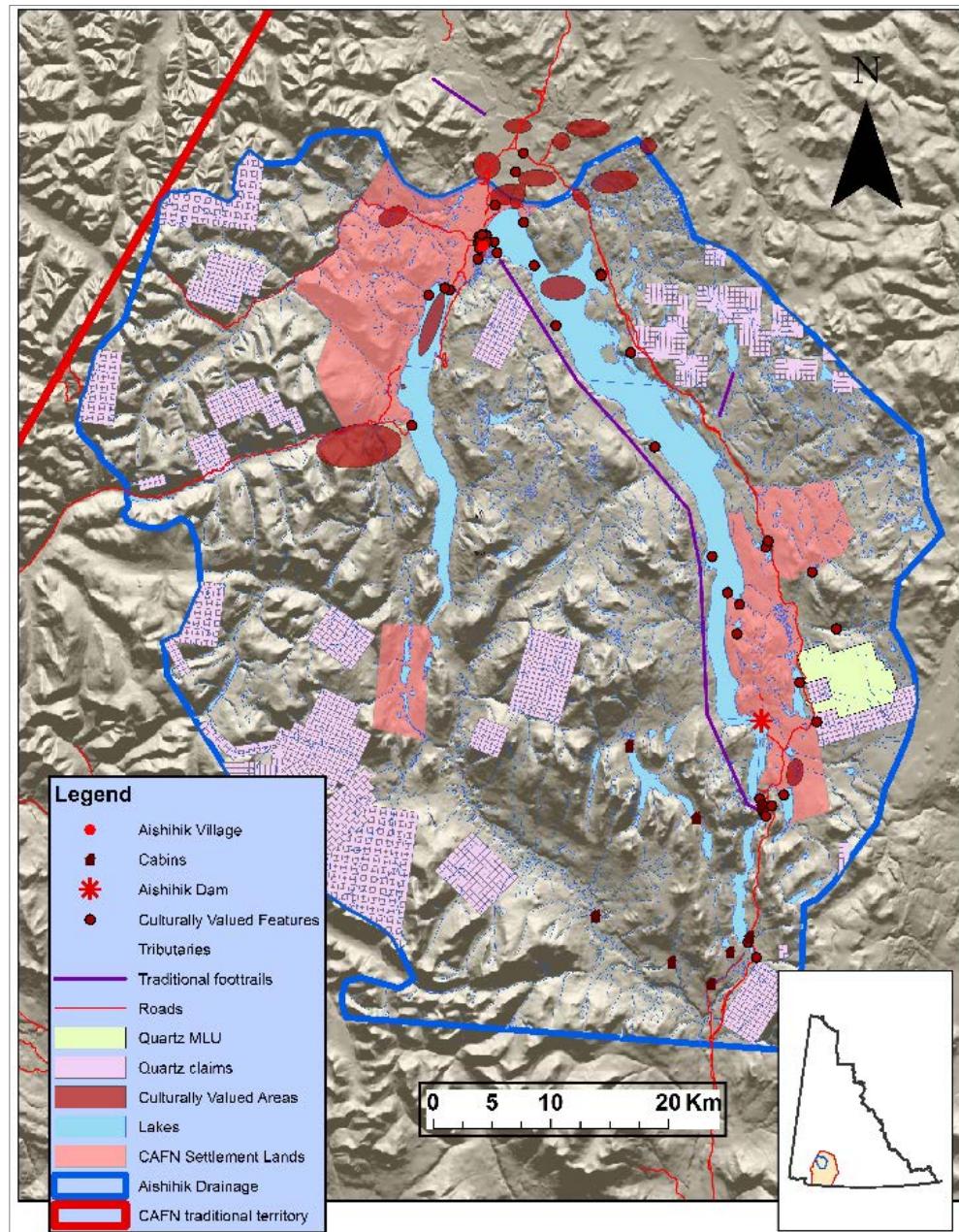


Figure 3 – Competing interests over land and water resources in Aishihik Drainage

While climate change is considered an important factor influencing environmental change in the Aishihik Drainage, the research participants seemed to view the impact that it would have on their culture as equally important. According to the responses for additional concerns for the Aishihik Drainage, I used impact hypothesis models (See Figure 4) to illustrate the impacts that the community was already beginning to experience.

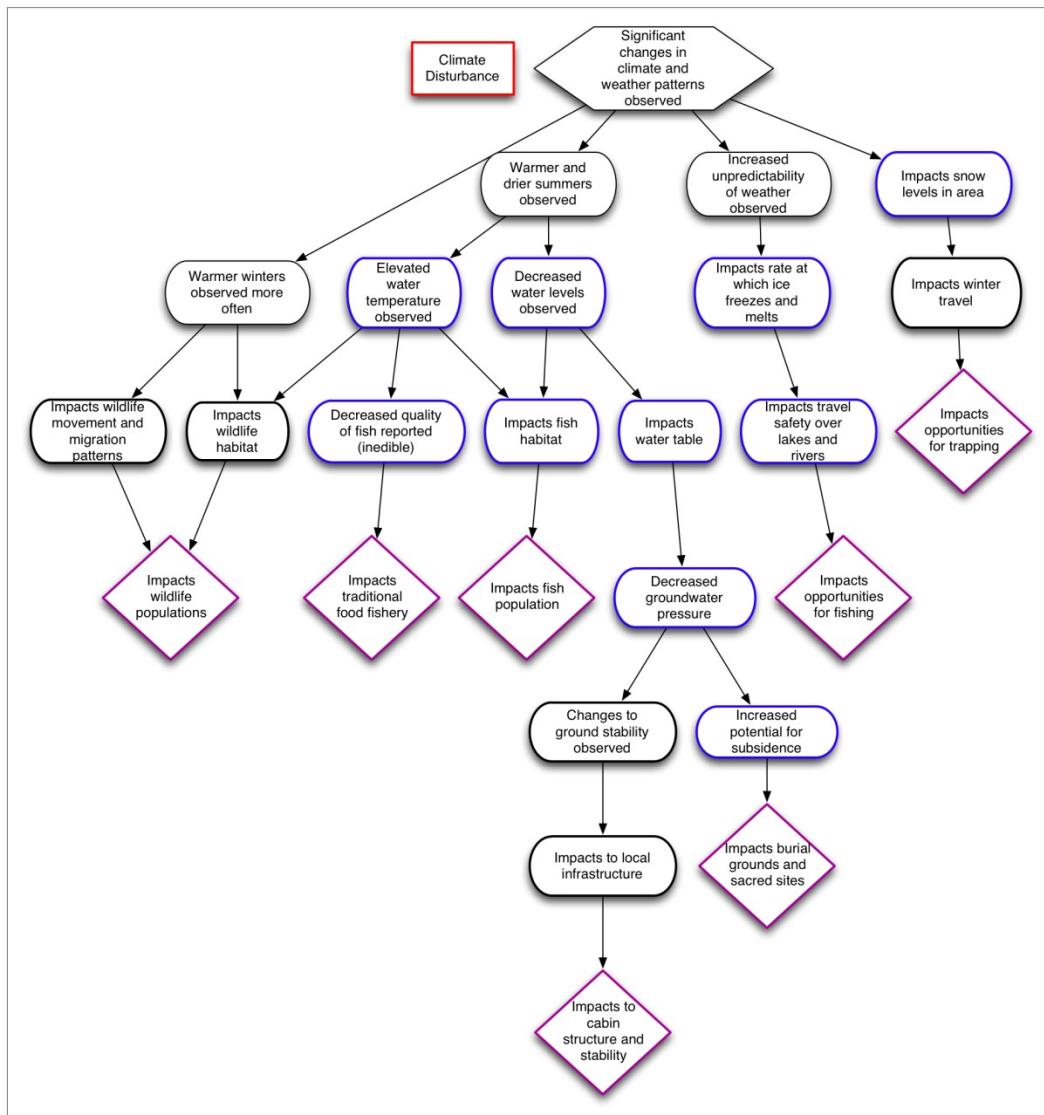


Figure 4 – Impact hypothesis model illustrating possible linkages between climate change and culturally significant features and activities (represented by purple diamonds) in the Aishihik Drainage.²²

²² Figure 4 adapted from Joe, N., Initiating integrated watershed management in the Aishihik Drainage: an adaptive co-management approach. Victoria: Royal Roads University (2012)

Effectively, the combined influences driving change in the Aishihik can interfere with CAFN's ability to pursue cultural practices as fundamental as harvesting foods and medicines. And if CAFN citizens are unable to practice traditional and cultural pursuits and the next generations lose the connection to their ancestors, what happens to their cultural identity? Preparing for change will be critical in preserving culture and identity in the future.

Goal

The coming generations of CAFN people have the ability to practice cultural and traditional use of the lands and waters in Aishihik Drainage.

Policy Options for CAFN to Consider

1. Greater CAFN involvement in designing shared and adaptive management processes.
2. Use of technologies to help community adapt to changing conditions in Aishihik Drainage.

3.6 Personal reflections

My time with my research participants was time well spent. In academic and professional circles, it is generally accepted that attaining expertise requires about 10,000 hours of direct engagement of an activity. And a lifetime spent on the land exceeds this. This became apparent as all of the research participants I spoke to had an intimate understanding of the complex relationships between the land, the water and themselves. In fact these three topics often weren't distinguished during the course of the interviews. This demonstrated to me not only the limitations of previous resource management approaches to consider only land or water or human activity but also my own limitations in understanding the complexities of our relationship with the land and water when designing my research approach.

I was also impressed by the practicality of the people I interviewed in their approach to life. While most of the discussions around water aimed at preserving various aspects relating to water, I would not conclude that any of them were radical environmentalists. All of the participants acknowledged how they have adopted modern technologies to pursue traditional and cultural activities. Unlike many romanticized views of Aboriginal peoples communing with nature using wood or rock tools, my research participants did not and do not hesitate to take advantage of the best tools available to pursue cultural activities. I speculate that none of the research participants would hesitate to pull out a chainsaw to take down a tree that was in the way of their 4x4 vehicle while heading to their cabin. However, what distinguished the use of technology to me was how it was applied. Instead of using technology to conquer or get the best of nature, it seemed to be used by the First Nations to interact with nature. All of my research participants, and most noticeably among the elders I interviewed, demonstrated humility towards the natural environment.

Finally, and I admit rather sheepishly, almost all of the information acquired through my interview efforts had already been captured through various traditional knowledge interviews. As we talked about values and concerns and recorded key locations on the maps, I was reminded again and again that, "I talked to so-and-so about this," or "so-and-so has all this information – somewhere." Despite my efforts to track down this information, I decided it would be quicker for the purposes of my research to duplicate efforts instead of sorting through unmarked boxes of archival materials. While this indicated to me a serious information

management issue it also indicates the potential for research, or consultation, fatigue from the interview participants which may have negative implications for further consultation efforts.

Goal

Ensure important cultural information can be accessed for appropriate purposes to inform research and decision-making.

Policy Options for CAFN to Consider

3. Invest in a comprehensive information management systems for long term storage and accessibility by CAFN government and citizens.

4. Steps to achieving CAFN's goals for water in Aishihik Drainage

To better organize many of the policy options presented in the previous section, here I propose a new model of water resource management needs to be developed to achieve CAFN's water goals. The new model must include the values, needs and goals of the Champagne and Aishihik First Nations' community. I propose foundational principles of the new model be based on:

- Shared governance – Shared decision making, between governments and with community participation, is now viewed as key to develop sustainable solutions for managing natural resources²³
- Adaptiveness – Uncertainty and rapidly changing conditions occurring in the area requires an adaptive management approach that allows for learning by doing.
- Sustainability – Satisfying our needs without diminishing the prospects of future generations will require an integrated approach that considers not only environmental, but an expanded view of social and economic impacts occurring in the Aishihik Drainage.

Governance

1. *Initiate a government to government protocol to develop a working relationship founded on shared values and common interests for the resources of the Aishihik Drainage.*

Reasons

- Competing interests over water use and conflicting values between governments and communities of users are more likely to be resolved when there's a base of common interests and values;
- Helps to improve inter-agency communication and relationships.

2. *Review current framework governing water resources in the Aishihik Drainage to understand how CAFN's values, needs and goals currently fit in the framework.*

Reasons

- Identify opportunities for CAFN to define water policy in Aishihik Drainage.

²³ Brooks, K.N., Ffolliott, P.F., Gregersen, H.M., DeBano, L.F. ,Hydrology and the Management of Watersheds (2nd ed.) Iowa: Iowa State University Press (1997):4

3. *Update the framework governing water resources in the Aishihik Drainage to a governance structure that better reflects CAFN's values, needs and goals for water.*

Reasons

- Ensure CAFN's values, needs and goals are adequately and appropriately reflected in water governance framework.

4. *Co-ordinate efforts with other governments and agencies.*

Reasons

- Developing partnerships can help to address the challenges associated with capacity;

5. *Continue building capacity*

Reasons

- Additional resources and capacity will be needed to advance new water governance framework.

Monitoring and Reporting

6. *Review the original impact assessments for the Aishihik hydro-electric facility to compare how assessed impacts measure against monitored and observed impacts.*

Reasons

- Examine how accurately the initial assessment reflects current conditions;
- Identify unintended consequences of the project;
- Identify effects and monitoring gaps of initial assessment;
- Better understand influence of cumulative effects and other factors possibly not considered in original assessment (for example effects related to climate change and re-introduction of bison);
- Support further claims for compensation.

7. *Further document traditional knowledge, culturally significant features and activities within the Aishihik Drainage, and observed changes to area.*

Reasons

- Traditional knowledge is highly specialized and localized knowledge and is useful to understand environmental conditions where no data exists;
- Contributes to the community's cultural knowledge of the area;
- Encourages community participation in monitoring and managing their resources;
- Documentation of impacts can be used for supporting claims for compensation.

8. *Identify culturally appropriate indicators to monitor.*

Reasons

- In addition to current monitoring carried out by Yukon Energy and Department of Fisheries and Oceans, interview participants identified an additional set of indicators to monitor impacts to culturally significant features and activities.

9. Consider cumulative effects to area.

Reasons

- Small additive effects can accumulate to have a much larger impact on culturally significant features and activities;
- Considering cumulative effects can help CAFN community plan appropriate adaptive strategies.

10. Partner with other agencies (public and private) to create long-term monitoring programs within the area.

Reasons

- Shared responsibilities over resources encourages participation;
- Partnerships help to resolve resource and capacity issues.

11. Invest in a comprehensive information management storage system for all quantitative and qualitative data related to the Aishihik Drainage including geographical data, traditional knowledge, oral histories, etc.

Reasons:

- Information needs to be accessible by people making decisions (CAFN personnel, executive office and all citizens);
- Minimize resources spent on collecting same information for different projects;
- Allows for changes to data to be updated and tracked.
- Quality data are necessary to assess the condition of a watershed and to understand potential impacts of management actions²⁴

Communications

12. Develop plain language communications to inform CAFN citizens of rights and responsibilities under the Final Agreement.

Reasons

- CAFN government policy is guided largely by discussion presented by CAFN citizens at the Annual General Assembly. Greater awareness of First Nations rights and responsibilities under the Final Agreements can help inform better policy and decision-making for land and water use in Aishihik Drainage.

²⁴ Heathcote, I., Integrated watershed management: Principles and practices (2nd ed.), New Jersey: John Wiley & Sons, Inc. (2009):16

13. Apply appropriate social media to communicate cultural values associated with the Aishihik area to CAFN citizens.

Reasons

- Re-establish traditional practices and values associated with the care and use of the area's resources;
- Communicate traditional practices and values with CAFN citizens not living in the Yukon.

14. Apply community based social marketing, or similar techniques, to raise awareness of impacts occurring in Aishihik Drainage.

Reasons

- Sharing a human interest story is one of the most effective ways to bring attention to an issue. Technology exists to communicate these stories to a much larger audience and bring awareness to the issues and challenges facing the CAFN community.
- Awareness helps to foster sustainable behaviour for the use of the region's water resources (ie. harvesters and recreational fishers in Aishihik Lake).

5. Concluding thoughts

While my research interest focused on water resources in the defined area of the Aishihik Drainage, it became immediately clear to me that trying to separate management priorities for land and water was neither the easiest nor even the best approach. During the interviews I quickly realized that my research participants had a thorough understanding of the interconnectedness between activities on the land and water quality. When I asked about their concerns for the water, they told me about concerns for the nearby fish habitat, the decreasing fish populations and the degraded quality of the taste of the fish. When I asked about changes they've observed to the water, they told me about changes they were witnessing to the land. Effectively their responses reinforced all the current best management practices: the notion of an integrated approach to water resource management. We can't manage for the water without also managing the activities occurring on the land. While we can't manage the water, per se, we can manage what we do to our land and water. And what we do to the land and water requires a systematic and organized involvement of the people.

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