Vuntut Gwitchin First Nation

NANH KAK EJUK GWEEDHAA NAKHWAANDÈE HAH GWANAA'IN

"WATCHING CHANGES ON THE LAND WITH OUR EYES"

A report on environmental monitoring activities and priorities within the lands of the Vuntut Gwitchin First Nation

Prepared by The Firelight Group
for the Vuntut Gwitchin Government, Natural Resources Department

May 11, 2018

Vuntut Gwitchin First Nation

the firelight group

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FINAL REPORT: May 11, 2018

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On behalf of:

Vuntut Gwitchin Government, Natural Resources Department

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Back cover photo credit: Van Tat Gwich'in Cultural Technology Project, 2007

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List of Acronyms

ABEKS	Arctic Borderlands Ecological Knowledge Society
DFO	Department of Fisheries and Oceans
ECCC	Environment an Climate Change Canada
INAC	Indigenous and Northern Affairs Canada
NYLUPC	North Yukon Land Use Planning Commission
NYRRC	North Yukon Renewable Resources Council
NRHL	Natural Resources and Heritage Library
PCMB	Porcupine Caribou Management Board
VGFN	Vuntut Gwitchin First Nation
VGG	Vuntut Gwitchin Government

1 Introduction

This project was initiated by the Vuntut Gwitchin Government (VGG) to better understand environmental change in their traditional territory, and how this change has been tracked over time. The practice of tracking changes on the land is often referred to as "environmental monitoring", particularly in government, university, and other research institutions. From a community perspective, changes are tracked through observation and personal experience on the land over long periods of time. In this sense, understanding environmental change is complex and informed by traditional knowledge and the Vuntut Gwitchin way of life. *Nanh kak ejuk gweedhaa nakhwaandèe hah gwanaa'in* – "Watching changes on the land with our eyes" – refers to a deeper, community-based approach to environmental monitoring; one that is built upon generations of community-held knowledge, and watching, recording, and sharing stories of change for millennia.

This report is part of a broader, ongoing initiative of the VGG with respect to watching changes on the land over the next several years. The report captures the approach that is emerging toward community-based monitoring plans, guided by the Vuntut Gwitchin First Nation (VGFN) and its members' values, priorities and way of life.

Four overarching VGG / VGFN priorities that emerged from this research:

- The youth engaged in all monitoring activities;
- Harvester to direct and be engaged in monitoring;
- Local understandings of climate change to be watched on the land; and
- Traditional knowledge to be used to guide the approaches taken in monitoring.

1.1 Goals

As part of the initial steps for building a community-based monitoring plan, the VGFN aimed to gain a deeper understanding about what kinds of monitoring projects and research activities have been taking place in their territory, and what needs to be watched in the future. The goals for this project were threefold:

1) Develop and share the VGFN's understanding of the ways that environmental monitoring occurs in their region, through different agencies, governments, and internally by harvesters and community members;

2) Build a strong community member understanding, particularly amongst youth, of the potential careers, opportunities, gaps, and potential futures for environmental monitoring in their territory; and

3) Document local community direction on research priorities that will benefit the community, and that will inform future research projects.

2 Methods and Approach

To achieve the goals of this research, two key tasks were undertaken. The first task involved conducting a scan of the existing environmental monitoring activities in the VGG region, and activities that have occurred in the past. In order to get a detailed understanding of past activity, a broad approach was taken to collecting this data (i.e. reports were not reviewed in depth). Each document or study that was reviewed – either electronically, physically or orally – was entered into an Excel spreadsheet that was organized by criteria (i.e. author, year, primary media, key issues, outcomes, area of study, etc.). The data were then available to be analyzed.

The second task involved running a community workshop in Old Crow, YT. The aim of the workshop was to share the findings from the database search, and have community members share their ideas and opinions for a VGFN approach to monitoring the land in the future. The findings of this workshop are listed in Section 4 below.

2.1 Limitations

An essential part of reviewing data for this task was being able to access electronic material online, and physically access documents in Old Crow and at the Natural Resources and Heritage Library (NRHL). Many studies were completed, but were only available in hard copy. This means that reports before the 2000's were not easily reviewed. While the research team was able to review a number of physical copy reports through the NRHL, the exact number of projects that took place in the past, or were shared with the community, remains unknown. While there was success in accessing some older reports in Old Crow, the bulk of our findings focus on monitoring projects that took place within the last 20 years.

The aim of this project was to gain a broad and wide-reaching understanding about the kinds of monitoring activities that have occurred in VGG territory. While this research is built upon a range of studies across many years and an array of themes, this limited the opportunity to dive deep into the results and outcomes of past monitoring activities. This limitation is flagged as an area for possible future research with respect to planning for change in VGG traditional territory.

3 Results

3.1 Research Database

Data from the literature review revealed a broad scope of study topics, criteria and priorities for managing environmental change in the region. In total, 145 studies were reviewed across the following research themes:

- Vadzaih / Porcupine caribou
- Łuk / Freshwater Fish
- Łuk Choo / Salmon
- Dinjik / Moose
- Dzhii / Birds
- Dzan / Muskrat (and other small fur-bearing animals)
- Nin / Animals (and other)
- Gwànzhìh / Plants (and vegetation)
- Chuu / Water
- Yeenoo Dài' / Long time ago (heritage values)
- Gwidèerdrìi' / Spiders (and other findings)
- Dinjii Kat / People (human health);
- Nanh-Gwidhah / Land-Water (climate change)*
- Vantat Gwich'in / Community-Driven*

Data were recorded in a Google Doc sheet where several researchers were able to populate the database simultaneously. The database was then downloaded as an Excel file and stored on a local hard drive.

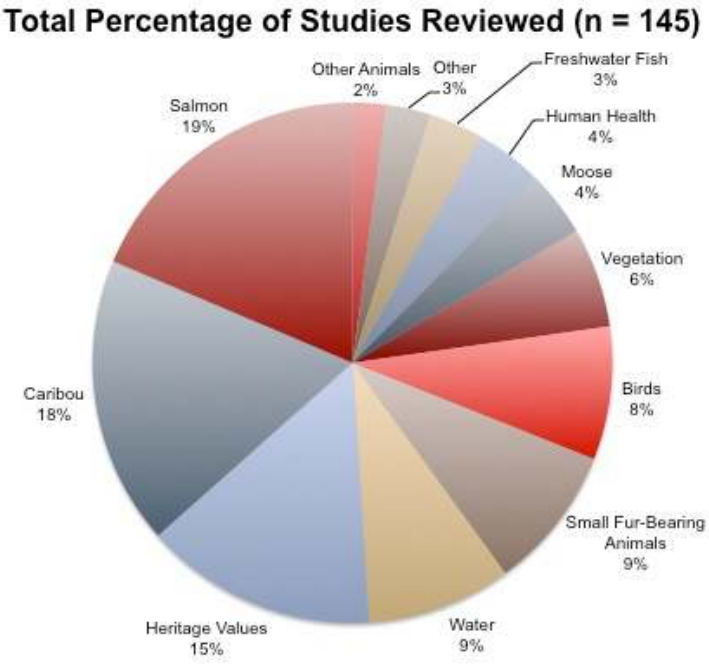


Figure 1: Total percentage of studies reviewed

The chart above reveals the range and percentage of study topics covered in our literature review. The majority of studies are focused on salmon, caribou, and heritage resources. The themes of climate change and community-driven research are not reflected in the chart as they are captured within all other areas of research, but were important to distinguish as broader themes.

Published materials and reports that were reviewed for this project span from 1959 to 2017. Data within the published materials, however, date much further back than the 1950s. For example, some of the physical materials that were reviewed in the NRHL, such as the Oral History Project, contains data and knowledge of events from the 1840s. Archaeological data published by Bourgeon, Burke and Highman (2017) reveal human occupancy at the Bluefish Caves from as early as 24,000 cal BP. While there were limitations in accessing materials published prior to the 1950s, a number of the reviewed documents contained oral histories, knowledge and data related to environmental change from previous decades, centuries and millennia.

The graph below displays the timeline of reviewed published research dates for each research theme.

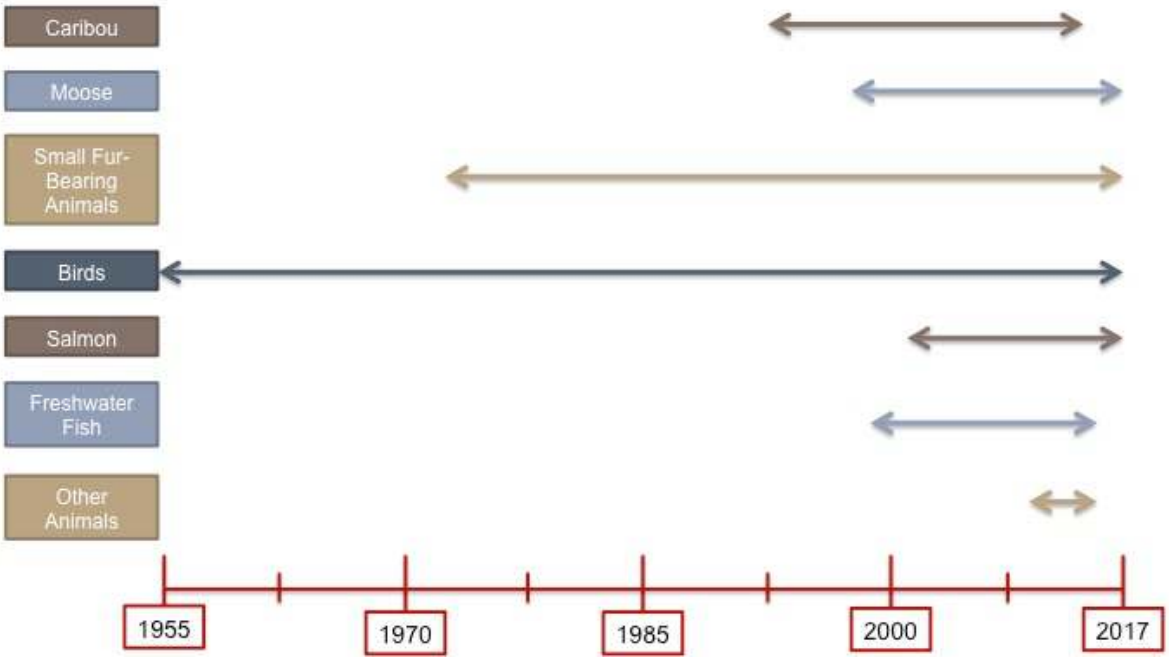


Figure 2: Timeline for research conducted on animal species

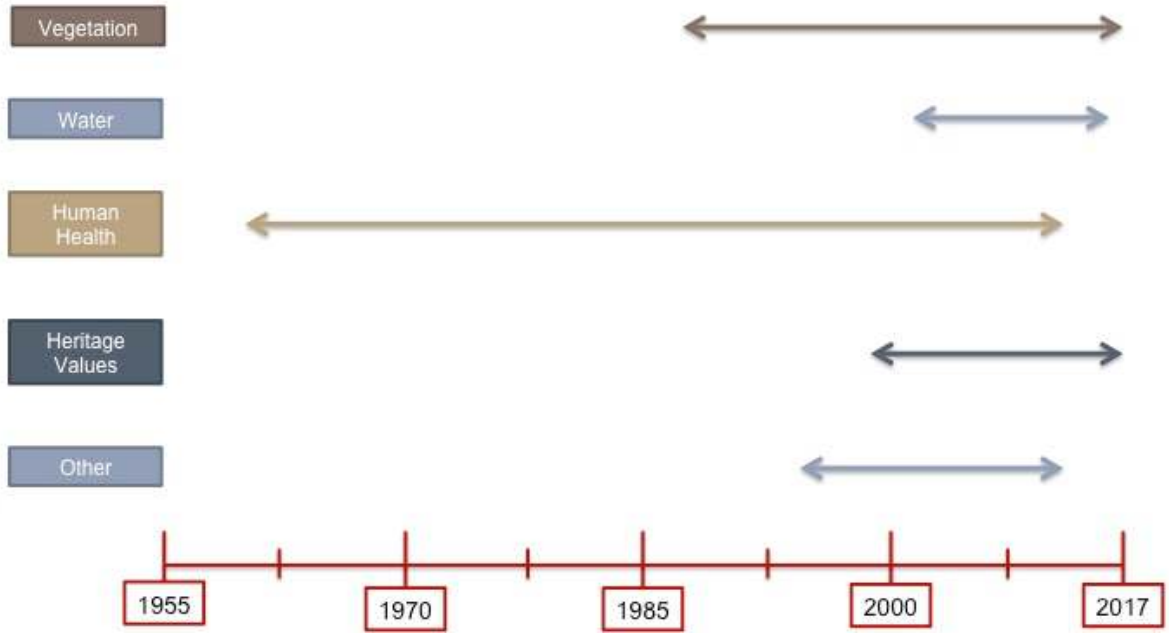
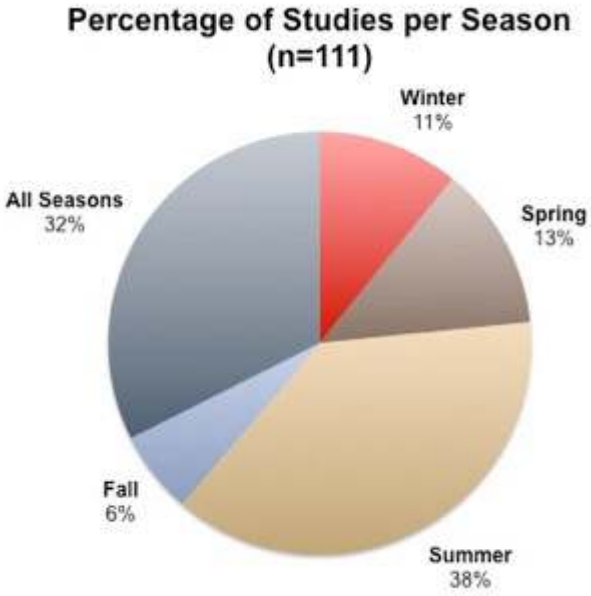


Figure 3: Timeline for research conducted in other areas

When considering the seasonality of the work being done on the land, the majority of the monitoring research, or times when changes are being watched, take place either in summer when the weather is warmer, or year-round. Year-round monitoring was typically associated with understanding migration patterns amongst several species, such as caribou, sheep and moose, changes in water levels, and dietary patterns.



Winter: - Small Fur-Bearing Mammals - Fish	**Spring:** - Muskrat - Birds
Summer: - Water, Vegetation - Fish, Birds - Archaeology/ Paleontology	**Fall:** - Water - Fish - Caribou
All Seasons: - Caribou, Sheep, Moose - Wolves - Water, Vegetation - Human Health	

Figure 4: Percentage of studies per season

4 The Workshop

On March 23, 2018, a workshop was held in Old Crow to learn from the community members about monitoring research trends, gaps, and priorities for the future. The workshop was an opportunity to share the results of our review of monitoring activities in Vuntut Gwichin lands, discuss gaps in these monitoring activities, and identify community priorities for monitoring within the next five years.

Figure 5: Roundtable of participants at the workshop

Figure 6: Participants listening in at the workshop

Notes were taken during the workshop on poster paper to document community responses, feedback, and priorities for future research. The pages of notes were then taped up on the walls of the room once they were filled. Participants were provided with sticky notes to continue to add their comments and suggestions to the posters throughout the day. Written comments were also submitted and incorporated in the final report.

Figure 7: Jorja Creyke taking notes at the workshop

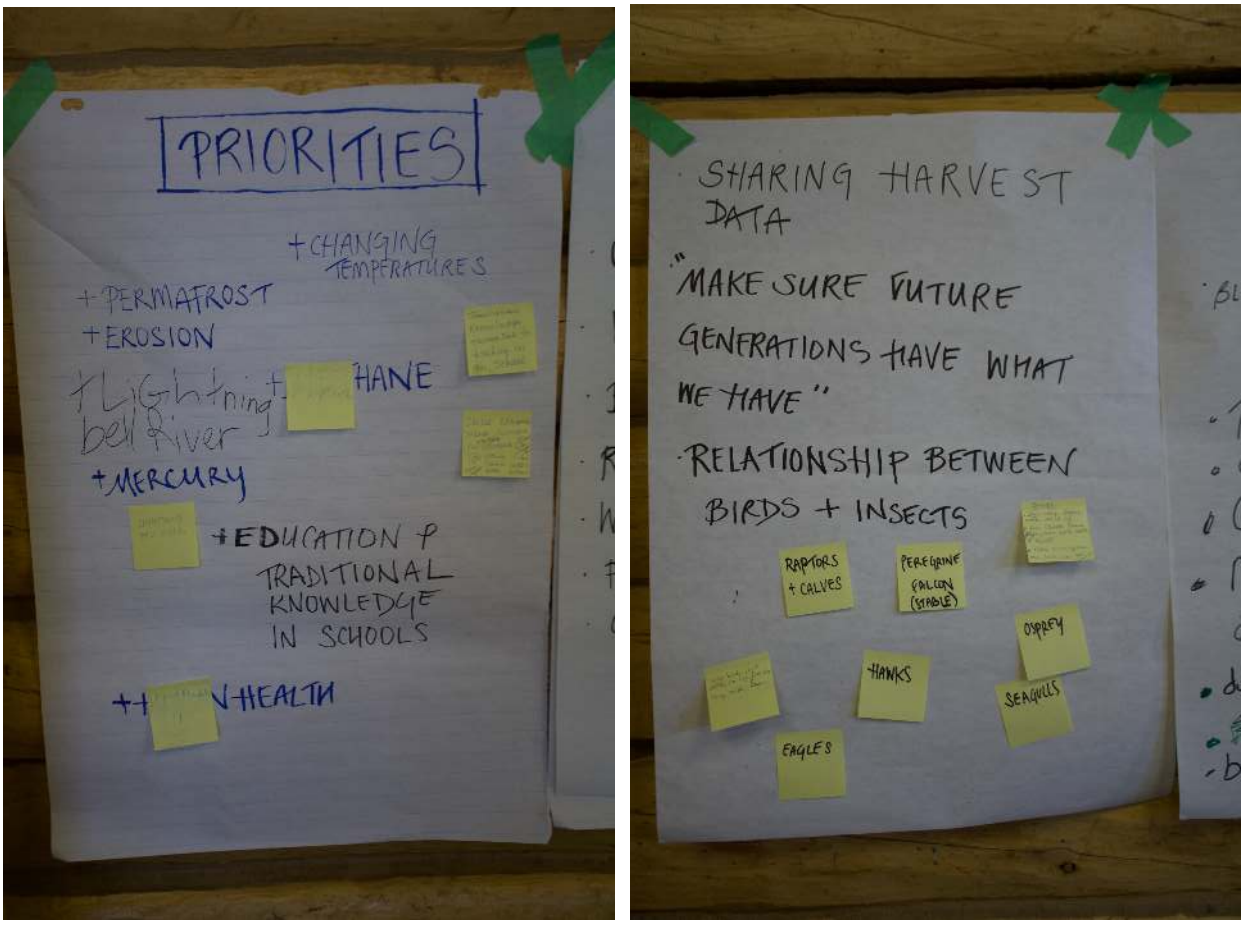


Figure 8: Examples of the workshop notes and participant contributions

4.1 Workshop Outcomes

The workshop helped us to understand the broader community priorities for monitoring water, species and other themes in VGG territory for the next several years. A recurring theme in the workshop was the emphasis about everything being connected. Community members recognized that while individual species, plants or environmental features might be studied independently, as they are all a part of the health and vitality of the broader ecosystem.

With this in mind, it was not possible to identify singular themes as priority research areas. All themes are viewed as being inextricably linked. Monitoring priorities within each theme, however, were identified. The table below summarizes the results of the research trends, gaps and priorities with respect to monitoring and watching changes on the land for each theme, based on the research results and discussions in the workshop. The trends and priorities listed in Table 1 below is a collective summary of the data obtained from published research materials, and community member input provided in the workshop.

Table 1: Research Findings and Priorities

Theme	Trends (what has been happening)	Priorities (Future research needed)
VADZAIH // caribou	• Studies focusing primarily in the Old Crow Flats and near the community • Research championed by VGG, PCMB, ABEKS and Government of Yukon • Most studied species in the VGG region • Population counts shows population increase in recent years and overall good health in the species • Data collected via radio collars, tissue sampling, and harvest reporting • New collars are being introduced this spring that track their location in real-time • Long-term data from community-driven monitoring	• Harvest numbers and reporting have been inconsistent in the past; need to have clearer understanding of harvesting numbers at a community level • Further monitoring on habitat changes due to vegetation change, changing water levels, forest fires and predation are needed • The 1002 Calving grounds need to be protected and monitored, as it is critical to the species ability to thrive • Predation from wolves has been on the rise; this needs to be addressed to protect caribou population numbers • Range of caribou herd has changed from studies from the Porcupine Caribou Management Board (PCMB), would like to know why there are areas they don't use and areas they are moving to • Continue to work with elders to understand changes with the herd • Involve the youth in further research, education and monitoring efforts • Finalize the Porcupine Caribou Native User Agreement

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Research led by VGG, ABEKS, Yukon Fish and Wildlife Management Board, Gamberg Consulting, North Yukon Renewable Resource Council and the Yukon Government • Monitoring species in lakes and rivers, such as northern pike, lake whitefish, arctic grayling, slimy sculpin, least cisco, loche, inconnu, pike and longnose sucker • 2016 study from traditionally harvested fish found higher mercury in loche than previous years; concern for both human consumption and fish health • Reports of increased water temperatures, which is a concern for fish health and mortality; change in fish spawning locations and migration patterns as they gravitate to colder waters • Community reports of declining sucker populations (hard to net nowadays)	• Conduct more studies regarding contaminants and mercury to better understand the breadth and extent of impacts • Monitor important freshwater fishing locations, such as Fish Lake, Little Flats and Old Crow Flats • Increase the number of projects focused on monitoring freshwater fish; community members want a better understanding of fish species, populations, overall health, and habitat quality • Finalize and implement the Ch'ihilii Chik (Whitefish Wetlands, "Where fish come out of the lakes") Habitat Protection Area management plan • Review and update the Ni'iinlii Njik (Fishing Branch) Ecological Reserve & Settlement Land R-5A & s-3A1 Management Plan • Review and update the Ni'iinlii Njik (Fishing Branch) Wilderness Preserve & Habitat Protection Area Management Plan • Review and update the Community Based Vuntut Gwitchin Fish & Wildlife Work Plan.

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Research led by VGG, ABEKS, Yukon Fish and Wildlife Management Board, EDI Environmental Dynamics Inc., DFO, Yukon River Panel, North Yukon Renewable Resource Council and the Yukon Government • Consistent chinook and chum salmon counts being conducted by VGG since 2002 • Salmon counts are relatively consistent, thousands of tags issued every year for counts • Salmon traditional/local knowledge survey including fish trap locations • The VGG is developing a Salmon Management Plan	• Expand salmon studies to include transboundary migration between the Yukon and Alaska; explore collaborative approaches with Alaska to better share information • Increase monitoring work with coho salmon; little is known about their spawning locations, numbers, and migration patterns • Continue to monitor salmon spawning locations, both in the major rivers and explore new areas • Traditional fishing practices: continue to use traditional fishing methods, and practice with youth and community members on smaller rivers (such as the Crow River) • Finalize the community-based Porcupine River Drainage Salmon Management Plan
	• Moose surveys were conducted on the Porcupine River and in the Richardson Mountains approximately 10 years ago • Habitat availability for moose is closely linked to water quality and quantity, especially in Old Crow Flats • Limited data is available for current health and vitality of their populations • Community members are reporting a decline in moose sightings, and that the population is migrating further north	• Replicate the moose survey on the Porcupine River; important for community's understanding of the current state of moose in their territory • Predation studies are needed as wolf populations are increasing; they affect moose numbers and survivability • Harvest reporting: Would like to have a greater understanding of community harvest numbers of moose • Monitor hunting pressures from outsiders and hunters coming up from the south; understand if this has an impact on moose moving north

Theme	Trends (what has been happening)	Priorities (Future research needed)
		• Continue to monitor the relationships between water levels, vegetation and moose populations • Conduct some tissue sampling: want to know if there is contamination within moose • Monitor moose populations in the Old Crow Flats, Eagle Plains and the Johnson Creek area
	• There used to be lots of birds in Old Crow Flats, but community members are seeing less and less • Studies conducted by Robert Bluth in the 1950s and Dave Mossop in 1970s continue to be replicated in order to understand change • The peregrine falcon population has increased and stabilized • Seeing less songbirds and migratory birds in the area, as confirmed by research at Watson Lake • Recent increases in seagull populations, at the expense of young ducks they are hunting • Annual waterfowl surveys are being conducted; seeing declines in some waterfowl (scaup, green-winged teal, canvasback, long-tailed duck) and nesting shorebirds • Seeing a relative increased abundance of barrow's goldeneye, pacific loon, white-fronted goose, mallard, northern shoveler, arctic tern	• Monitor the fluctuating population of black ducks, as they are a relied-on food source in the community • Monitor changes in bird populations in the region, such as geese, seagulls and raptors; seeing less of these birds in the area • Examine how the changes to insects and vegetation are affecting bird populations in the region; if their habitat and food source is changing, then birds will change too • Migratory patterns: monitor migratory bird patterns to see if their timing of arrival / departure has changed in the northern Yukon • Gwich'in bird names are indicators for the particular species; it's important for the community and youth to know their traditional names in order to understand them

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Some birds are losing their food sources, which is contributing to their decline in the area	
	• Muskrats are the most studied species of small fur-bearing animals; they are a keystone trapping species in Crow Flats and wetlands near Old Crow • Muskrat populations have been relatively stable since the 1980s; they continue to be safe for human consumption • Transect study on muskrats is underway in the Old Crow Flats • There are fewer sightings of beaver along the Porcupine River, Johnson Creek, Whitestone, Eagle River, and Bell River • Less sightings and studies are being completed on otters	• Explore the links between industrial development and impacts on small fur-bearing animal populations • Develop a species management plan in Old Crow Flats, with particular focus on small fur-bearing animals • Continue to do survey monitoring via trapping with muskrat, beaver, marten and wolverine; this will help obtain better baseline data for less studied species • Monitor areas affected by forest fires, and how it affects fur-bearing populations • Gain a stronger understanding of food sources for fur-bearing animals, such as mice and other small species • Continue to involve youth in trapping and monitoring activities on the land
	• Muskox tracking underway in 2018; 11 currently collared; Partnership between Parks Canada, NWT and Yukon Government • Studies done by Bob Hayes and community observations show a rising wolf population, which is impacting moose and caribou • Declining sheep population over the past 9 years; harvest numbers have averaged 33 per year between 1970 and 2006 • Observed healthy grizzly bear populations along the Dempster Highway	• The population and vitality of prey species (such as rodents) are not strongly understood; this area could use further research • Continue to monitor wolf populations, migration patterns and their impacts on other species; prefer to do this by trapping, tracking and relying on traditional knowledge, not helicopters; Focus on the Whitefish Wetlands, from Old Crow to the Dempster Highway • Increase number of research and studies done on grizzly bears, particularly within the

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Bear populations are directly linked to berry and fish abundance;	Richardson Mountains • Monitor deer populations to see if populations migrate further north, and how they might affect other animals (i.e. competition for food sources and habitat) • Finalize and update the June 2008 Management Plan for Dall's Sheep in the North Richardson Mountains
	• Studies conducted on wetlands, plants, ecosystem change, trees, lichen, soil • White spruce trees showing divergent growth patterns in Old Crow Flats • Community observations reveal change in vegetation is closely tied to climate change • Wetlands ecosystem monitoring in Old Crow Flats shows change in species diversity since 1970 • Seeing an abundance of willows in Old Crow Flats • Berry pickers are reporting fewer berries available to collect • VGFN participating in Yukon Government Wetlands Policy development • Soil erosion and permafrost degradation is impacting trail systems, affecting both people and caribou	• Invasive species are largely understudied and underexplored, and the community is seeing more along the Dempster Highway; more work is needed to better understood and how they affect the larger ecosystem • Further study on important food plants (i.e. cranberry, blueberries, salmonberries) and medicines are needed to ensure availability for use • Continue to monitor and understand links between changes in vegetation with climate change, and what this might mean for forest fires, food chain impacts, insects, etc. • Continue to monitor soil erosion and its impacts to animals, vegetation, water and the broader ecosystem, particularly with respect to potential contamination

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Porcupine River and Old Crow Flats are closely watched areas • Observed lake surface decreasing, ponds increasing from 1950s to 2001 • Rising water temperatures are a risk to both freshwater fish and salmon • Community monitoring reveals later freeze ups and earlier melts, which affects species migration, human travel and the fish • Permafrost has been melting, and continues to be monitored by Yukon Research Centre and VGG • Between 1951 and 2001, the overall surface area of lakes has decreased • Erosion of shorelines tends to follow ice wedges and are impacted by the ice push in late spring when there are strong winds that accelerate erosion • Porcupine River and Crow River are at risk of rising temperature levels; tributaries are cooler than the main rivers	• Water is connected to all parts of the ecosystem; elders advise that the water, ice and snow must be protected • The spirit of water must be included in management and legislation; it is a living being • Continue to monitor water temperature levels, and their impact to fish and salmon ability to spawn and migrate upriver • Permafrost monitoring needs to continue, including its location, composition and potential implications of it melting • Important areas to monitor water: Eagle Plains, Porcupine River, Headwaters of the Porcupine River, Drown Lake in Crow Flats, Zelma Lake (drainage), creeks (e.g., Chance Creek/McFarland Creek), South of Eagle Plain, and surface water • Conduct water sampling tests to understand if methylmercury is in the water, particularly with the shorter freezing season and melting permafrost • Finalize the Peel Watershed Regional Land Use Plan
	• VGG traditional territory is part of the Beringia, an unglaciated area that is home to an abundance of archaeological and paleontological data • The Bluefish Caves, which are southwest of Old Crow, revealed one of the earliest records of humans in North America (dating back as early as 24,000 BP)	• Continue to explore, study and protect and Bluefish Caves • Additional archaeology and paleontology work can be done at Bear Cave Mountain, Whitefish Wetlands, 12 Mile Bluff, the Bell River in the Richardson Mountains, and in the Crow River area

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• Annual archaeological work conducted at the Bluefish Caves • Archaeology and paleontology work is conducted on an annual basis in VGFN territory, including Old Crow Flats	• Continue to bring information from these sites into the community, especially since many community members may not visit these areas • Ensure youth are educated on these topics and have knowledge about the significance of the places
	• Some research is being conducted on spiders and insects, but is less explored • Community members are observing a decline in insects over the past several years • Yukon Economic Development examined the resource potential of the Old Crow Basin in 2001, showing significant gas potential in the region	• Further research on insects is required, particularly understanding their changing populations and impacts on other species • Monitor the winter road (Eagle Plains to Old Crow) to understand vehicle numbers, and impact to the vegetation; travellers could report changes they are seeing • Monitor the smouldering shale in the upper tributaries of the Eagle River area, and why the area continues to burn • Trapping and Harvesting reporting: need people to report their harvest numbers, as well as other observations they are seeing on the land; this will help the community with realistic management plans; could offer incentives to members so that people are inclined to report
	• Food security and diet surveys have been taking place since the 1950s, and recently replicated by Laurie Chan in 2015 • Physical health studies were conducted in the 1950s, showing little evidence of metabolic disease then • People in community talk about a time when researchers studied them physically in the 1960s	• Important to have traditional knowledge incorporated into risk-management for human health concerns • Continue to monitor changes in community health and its links to way of life, particularly with respect to cancer and diabetes; need to know why some diseases are on the rise

Theme	Trends (what has been happening)	Priorities (Future research needed)
	• In the early 1990s, Old Crow consumed the highest amounts of wild foods in the Yukon • Federal Government conducted an extensive study on traditional foods in the late 1990s • The community is seeing a big change in community health today compared to the 1950s; linked to change in lifestyle and lower dependence on wild foods • Disease and illness more prevalent in the community nowadays	• Mental health is an underexplored issue and needs to be addresses; important for people who might feel isolated or disconnected • Conduct a gaps analysis and needs assessment on health services in Old Crow, and provide VGG and Health Canada with recommendations • Incorporate more cultural components of human and mental health in the schools; ensure youth are a part of the solution • Bring mobile clinics into the community (i.e. dentists, doctors, dietician, mental health, counsellors, etc.) to provide support to community members
	• Climate change is linked to everything • Tied to decline in birds in the area, such as migratory birds and songbirds • Fluctuating water temperatures and water levels are directly linked to changes in caribou migration patterns (e.g., spring migration routes depend on timing of snowmelt) • Observing slumping happening in VGG territory, particularly on southwest Porcupine River bank slope • Climatology changes include increases in both year-round temperatures and precipitation • Closely connected to issues surrounding food security, human health and continuing the Vuntut Gwitchin way of life	• Continue to annually monitor climate change in order to track and understand changes • Use weather station data to track change, and how fluctuation temperatures and levels of precipitation impact the land • Continue to apply adaptive management: ensure salmon have a path to reach Old Crow • Observe how the climate change is impacting food sources, animal habitat, and migration patterns (including specific impacts like forest fires and extreme temperatures) • Explore radiation, and if there are any impacts to the land and plant life • Plan ahead and be proactive: rely on changes in the past in order to plan for changes in the future

Theme	Trends (what has been happening)	Priorities (Future research needed)
VAN TAT GWICH'IN // community-driven	• VGFN members are a core part of monitoring activities on the land, often hired as informants, guides and research assistants • Traditional knowledge is an essential part of understanding change; central to the last 20 years of research • VGG is working on building a lands information system and database for public access, assessments and information sharing • Oral History Project extensively documented elder and community knowledge via interview tapes, transcripts, GPS data, photographs, videos, place names, and other published and unpublished materials (located in the NRHL)	• Continue to includes elders, youth and community members in the research; they are the ones who know the land best, and will care for it in the future • Develop a species management plan in the Old Crow Flats, as its one of the most valuable areas to the community • Implement and update the Old Crow Flats Van Tat K'atra'anahtii and Vuntut National Park management plans • Finalize and implement the Daadzaii Van ("Black Headed Loon Lake") Territorial Park Management Plan • Employment: expand the role of VGFN members in the work to include research design, analysis, bird surveyors for the Crow Flats, plant station monitors, guides and boat operators to take researchers on the land, set up camps, make observations, etc. • Provide VGFN members with the appropriate training in the community, and obtain their commitment, to fulfill community monitoring objectives; have training built upon traditional knowledge and Vuntut Gwitchin way of life • Develop solutions for information sharing in the community, such as an app-based platform for maximizing community knowledge and involvement in the process, one that incorporates traditional knowledge and the Gwich'in language

Theme	Trends (what has been happening)	Priorities (Future research needed)
		• Continue to have meetings between researchers, monitors, VGG and the community to revisit research findings, gaps and priorities; • Bring youth into all aspects of monitoring, and bring monitoring and traditional activities into the schools so that it is a part of the youth's ongoing education with the land; • Explore further options for using solar energy in the community in order to reduce dependency on non-renewable fuels and other resources; how could the community benefit from this? • Ask tourists in the region to report sightings and observations about the land when travelling to the community • Consider using drones for monitoring research, particularly in areas that may not be easily accessible (i.e. different areas around a camp setting, landscapes, large bodies of water like lakes and stretches of rivers, wherever it is difficult to reach to use drones for easier access of gathering data) • Use Go-Pro cameras when in the field, while snowmobiling or driving a boat, for easier capture of animal sightings and quick documentation

5 Conclusion

This report summarizes the environmental monitoring work that has been occurring on VGG lands, as well as the priorities for future directions. Research for this project was informed by two primary methods: the first through a community scan and literature review of documented monitoring projects in VGG territory; and secondly through a workshop held in Old Crow in which community members provided feedback on the research results, and identified priorities for moving forward.

Table 1 in Section 4 details the specific priorities for each research theme. The priorities identified by the community will be central to developing plans for monitoring and watching changes on the land for the next several years.

Overarching VGG / VGFN priorities for future environmental monitoring work are:

- **Engage youth**: Ensure youth are being educated on these topics and are trained to carry on the work in the future; youth need to be given the opportunity to learn about Vuntut Gwitchin values, culture and carry on their traditional way of life;
- **Support harvester monitoring**: Develop a robust harvesting reporting program in the community to have a better understanding of what community members are seeing on the land, and aid in developing management plans;
- **Community-based monitoring plans:** Continue to finalize and implement all community-based monitoring programs, while updating the plans on a regular basis;
- **Study climate change locally**: Climate change is having impacts on all aspects of the ecosystem, and needs to be monitored closely on an annual basis; and
- **Engage traditional knowledge**: Continue to have Vuntut Gwitchin traditional knowledge, values and priorities guide environmental monitoring work and research agendas.

Workshop participants requested that these priorities continue to be revisited and discussed on an ongoing basis, and throughout the planning processes for research and monitoring projects. Hosting regular meetings and seeking community member feedback, as well as involvement in doing the work, will continue to reinforce a Vuntut Gwitchin-led approach to *nanh kak ejuk gweedhaa nakhwaandèe hah gwanaa'in*.

Appendix A: References Cited

Bourgeon, Lauriane, Ariane Burke, and Thomas Higham. 2017. "Earliest Human Presence in North America Dated to the Last Glacial Maximum: New Radiocarbon Dates from Bluefish Caves, Canada." *PLOS ONE* 12 (1).

Appendix B: Data Resources

Data that was reviewed, compiled and analyzed for this report was sourced from over 140 sources. A summary of key resources and databases that were reviewed for this report include:

- Arctic Borderlands Ecological Knowledge Society (ABEKS)
- Arctic Institute of Community-Based Research
- ASTIS Database
- Canadian Wildlife Service
- Department of Fisheries and Oceans (DFO)
- Environment and Climate Change Canada (ECCC)
- Environment Yukon (includes former Yukon Territorial Game Branch)
- Geological Survey of Canada
- Government of Yukon
- Interviews and meetings with VGFN staff
- Oral History Project database
- North Yukon Land Use Planning Commission (NYLUPC)
- North Yukon Renewable Resources Council (NYRRC)
- Parks Canada
- The Natural Resource & Heritage Library (NRHL) in Old Crow
- The Polar Data Catalogue
- The Porcupine Caribou Management Board (PCMB)
- U.S. Fish and Wildlife Service
- Universities and researchers across North America
- Yukon College
- Yukon Fish and Wildlife Branch
- Yukon River Panel

Appendix C: Summary of Research Priorities

Table 2: Summary of Research Priorities

Overarching Priorities

- **Engage youth**: Ensure youth are being educated on these topics and are trained to carry on the work in the future; youth need to be given the opportunity to learn about Vuntut Gwitchin values, culture and carry on their traditional way of life;
- **Support harvester monitoring**: Develop a robust harvesting reporting program in the community to have a better understanding of what community members are seeing on the land, and aid in developing management plans;
- **Community-based monitoring plans:** continue to finalize and implement all community-based monitoring programs, while updating the plans on a regular basis;
- **Study climate change locally**: Climate change is having impacts on all aspects of the ecosystem, and needs to be monitored closely on an annual basis; and
- **Engage traditional knowledge**: Continue to have Vuntut Gwitchin traditional knowledge, values and priorities guide environmental monitoring work and research agendas.

Vadzaih / Porcupine caribou	• Monitor habitat change and increasing predation • Monitor and protect the 1002 calving grounds • Continue to work with elders to understand changes to the herd
Łuk / Freshwater Fish	• Conduct studies on mercury and other possible contamination • Increase overall number of studies done on freshwater fish, including Fish Lake, Little Flats and Old Crow Flats
Łuk Choo / Salmon	• Improve transboundary species data sharing with Alaska • Increase monitoring work on coho salmon • Continue to monitor spawning locations • Continue to use traditional fishing methods, especially with youth and in schools
Dinjik / Moose	• Replicate the moose survey on the Porcupine River • Monitor habitat change and increasing predation • Monitor increasing hunting pressures from southerners and non-community members • Monitor moose populations in the Old Crow Flats, Eagle Plains and the Johnson Creek area • Continue to monitor the relationships between water levels, vegetation and moose populations

Dzhii / Birds	• Monitor declining populations of black ducks, geese, seagulls and raptors • Study the relationships between birds and changes in insects and vegetation • Monitor changes in migratory bird timing • Document and share Gwich'in names for birds, as they are indicators for species behaviour
Dzan / Muskrat (and other small fur-bearing animals)	• Explore links between industrial development and impacts on small fur-bearing animal • Improve baseline data by continuing trap muskrat, beaver, marten and wolverine • Gain a stronger understanding of food sources for fur-bearing animals (i.e. rodents)
Nin / Animals (and other)	• Continue to monitor wolf populations, migration patterns and their predation impacts on other species • Increase the number of research studies done on grizzly bears, particularly within the Richardson Mountains • Monitor deer populations migrating north and how they might affect other animals • Collect stronger baseline data on prey species (i.e. rodents)
Gwànzhìh / Plants (and vegetation)	• Increase research studies on invasive species and their impacts • Further work is needed on the locations and health of food plants and medicines • Monitor soil erosion and its connection to habitat degradation and contamination
Chuu / Water	• Water is connected to all parts of the ecosystem and is a top priority; must include the spirit of the water in management plans • Continue to monitor changes in water levels and temperatures • Further research on permafrost and its impacts from melting • Further water quality sampling to understand where contamination exists
Yeenoo Dài' / Long time ago (heritage values)	• Continue to research the Bluefish Caves • Increase archaeology research at Bear Cave Mountain, Whitefish Wetlands, 12 Mile Bluff, the Bell River in the Richardson Mountains, and in the Crow River area • Bring archeology and paleontology research results and findings into the community
Gwidèerdrìi' / Spiders (and other findings)	• Increased research on insects and population change • Improve self-reporting mechanisms from community members and travellers • Monitor the smouldering shale in Eagle River area
Dinjii Kat / People (human health);	• Continue to monitor community health, sickness and disease prevalence in the community • Improve research and community outreach on mental health issues, including with youth and in the schools • Conduct a gaps analysis and needs assessment on health services

	in Old Crow • Bring a variety of mobile clinics through the community
Nanh-Gwidhah / Land-Water (climate change)	• Monitor climate change on an annual basis • Use weather station data to track change • Monitor how climate change is impacting food sources, animal habitat, and migration patterns • Explore potential radiation impacts on the land
Vantat Gwich'in / Community-Driven	• Develop a species management plan for Old Crow Flats • Expand employment and training opportunities for VGFN members • Continue to centre work on traditional knowledge and elder guidance • Ensure researchers report back to community on findings, and revisit research priorities • Explore options for solar energy • Consider adopting new technologies for monitoring, such as drones and Go-pro's

Appendix D: Summary of Research Database

Table 3: Summary of Research Database

Environmental Media*	Number of Studies Reviewed	Date Range of Reviewed Published Research Materials
Vadzaih / Porcupine caribou	26	1993; 1998-2015
Łuk / Freshwater Fish	5	1998; 2008; 2015-2016
Łuk Choo / Salmon	27	2002-2003; 2005-2017
Dinjik / Moose	6	1997; 2003; 2013; 2017
Dzhii / Birds	12	1955-2017
Dzan / Muskrat (and other small fur-bearing animals)	13	1973-1974; 1982; 1989; 2006-2007; 2016-2017
Nin / Animals (and other)	3	2011; 2016
Gwànzhìh / Plants (and vegetation)	9	1988; 1997; 2005; 2011; 2014; 2017
Chuu / Water	13	2002-2004; 2008-2010; 2012-2013; 2016
Yeenoo Dài' / Long time ago (heritage values)	21	1998; 2000-2003; 2006-2007; 2009-2013; 2017
Gwidèerdrìi' / Spiders (and other findings)	4	1994; 2001; 2010
Dinjii Kat / People (human health);	6	1959-1960; 1995; 2010-2011
TOTAL	***145***	***1955 to 2017***

*The themes Nanh-Gwidhah / Land-Water (climate change) and Vantat Gwich'in / Community-Driven are not reflected in the above table as they are broader concepts encompassed within all other areas of research.

Appendix E: Workshop Attendees

Table 4: Workshop Attendees

1.	Chief Bruce Charlie	*20.*	Dennis Frost Sr.
2.	Clara Tizya	*21.*	Debra Leigh Reti
3.	David Lord	*22.*	Marvin Frost Jr.
4.	Dean Njooti	*23.*	Robert Bruce Jr.
5.	George Nukon	*24.*	Andrew Charlie
6.	Jason Van Fleet	*25.*	Robert Kyikavichik
7.	Jorja Creyke	*26.*	Travis Frost
8.	Louise Creyke	*27.*	Stanley Njooti Jr.
9.	Megan Williams	*28.*	Caleb Charlie
10.	Peter Frost	*29.*	Darius Elias
11.	Phillip Frost	*30.*	Harlon Nukon
12.	Rosie Kyikavichik	*31.*	Roger Kyikavichik
13.	Sophia Flather	*32.*	Mary Jane Moses
14.	Stephen Frost Sr.	*33.*	Dana Tizya-Tramm
15.	Tracy Turner	*34.*	Jeremy Brammer (ECCC)
16.	William Josie	*35.*	Janelle Kuntz (The Firelight Group)
17.	Michael Frost	*36.*	Kalene Gould (The Firelight Group)
18.	Vicky Josie	*37.*	Kat Kovalcik (volunteer)
19.	Hugh Charlie		

Vuntut Gwitchin First Nation

the firelight group