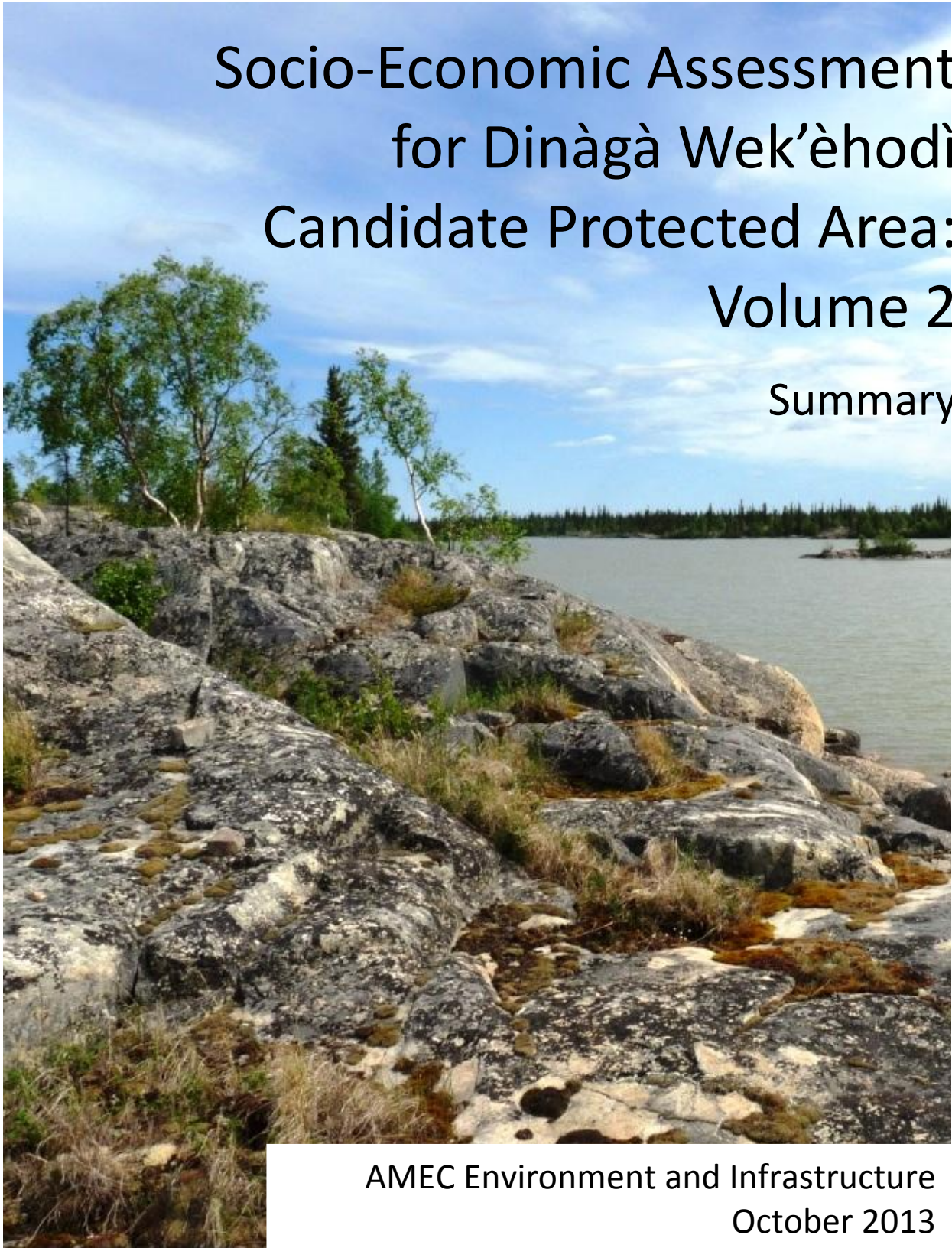


Socio-Economic Assessment for Dinàgà Wek'èhodì Candidate Protected Area: Volume 2

Summary



AMEC Environment and Infrastructure
October 2013

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Photo Credit: Paul Woodard, Environment Canada

Introduction

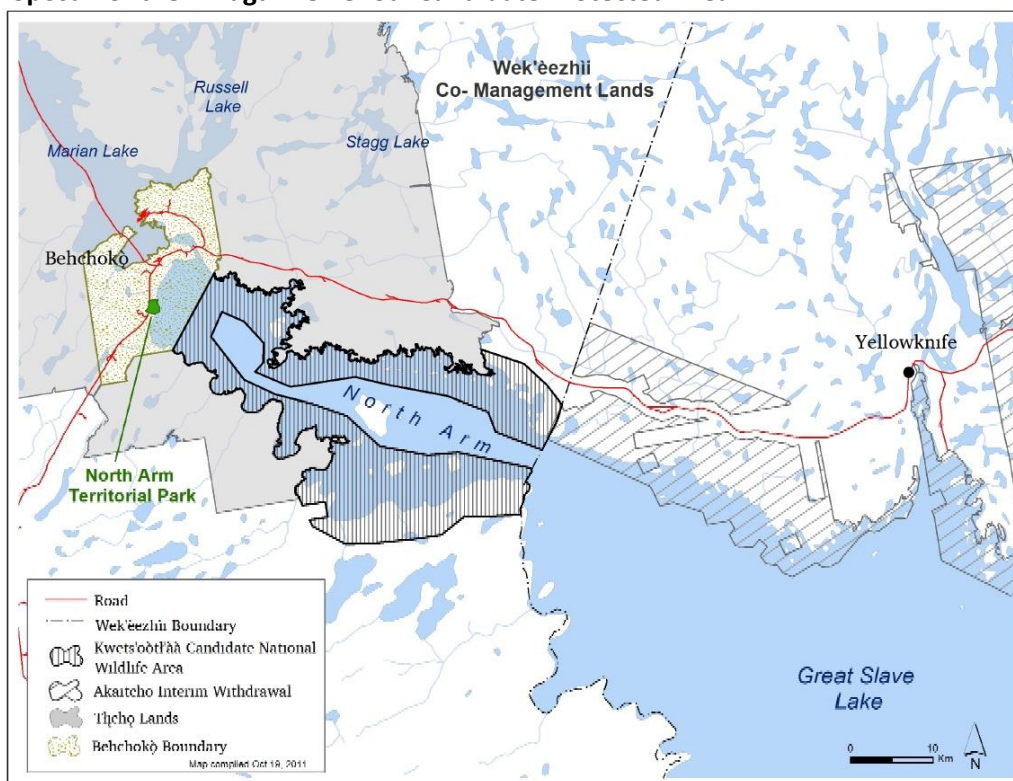
Dinàgà Wek'èhodi is an area of about 593 square kilometres (km²) in the Tłı̄chǫ Region of the Northwest Territories. It consists of the northern portion of the North Arm of Great Slave Lake. About 72% of the area consists of open water (426 km²) while the remainder consists of the mainland shoreline and numerous islands.

In 2010, the Tłı̄chǫ Government proposed that this area, which was initially referred to as Kwets'ootł'àà, be designated as a National Wildlife Area (NWA) and the Canadian Wildlife Service (CWS) agreed to sponsor the area for formal designation as an NWA. In 2013, Tłı̄chǫ Elders proposed that the name of the proposed protected area be Dinàgà Wek'èhodi.

This area is an Important Bird Area in Canada. It is a key migratory site for swans, geese and other waterbirds such as Herring Gull, Mew Gull, Ring-billed Gull, Common Tern, Arctic Tern and Caspian Tern). It is also used for trapping, fishing hunting and camping by both the Dene and Métis people and has many historical and cultural resources.

As part of the process for establishing protected areas in the NWT, an assessment of current socio-economic conditions in Behchokǫ and the surrounding region was prepared by AMEC in 2012. This report is a summary of a larger report and describes five future options for the Dinàgà Wek'èhodi Candidate Protected Area. It also describes the social and economic effects that would result.

Original Proposal for the Dinàgà Wek'èhodi Candidate Protected Area



Source: NWT PAS (2011)

Current Use of the Dinàgà Wek'èhodi Candidate Protected Area

For generations the Dinàgà Wek'èhodi Candidate Protected Area (CPA) has been an important and sacred place for the people who live in Behchokq and the Tłìchq Region. It is currently used for a number of traditional and commercial purposes:

Food

Most households in Behchokq (73%) rely on hunting and fishing for more than half of their food. Based on studies undertaken elsewhere in the NWT, it is estimated that residents annually harvest between 298,250 and 319,875 kilograms (kg) of meat and fish. To buy these quantities of meat and fish in a store would cost between \$3.80 million and \$4.07 million, each year. Interviews with six Tłìchq elders suggested that the CPA provides meat and fish valued at between \$133,900 and \$122,200 per year.

Medicinal Plants

Various plants such as spruce roots and gum, birch bark and sap, cranberries, cloudberry, rat root, baby moss and Labrador tea for medicinal or other purposes.

Wood for Fuel

Residents of Behchokq use 918 cords of wood each year for heating. To buy this much wood, it would cost about \$72,000. The value of firewood, measured in terms of the costs of the next best fuel (fuel oil), is estimated to be about \$263,000 per year. The amount of wood taken from inside the CPA is not known.

Recreation

People in Behchokq and Yellowknife use the area for recreational activities and for food harvesting activities like hunting and fishing. About 45 days of duck hunting occurs in the CPA each year, along the northern shore.

Resident hunters spend about \$2,070 to participate in these activities and their enjoyment of these activities (non-market benefits) is estimated to \$940 per year.

Trapping

In 2008, there were about 166 active trappers in Behchokq. The furs they trap are worth about \$77,210 each year. How much trapping occurs in the CPA is not known.

Tourism

Four companies operate within the CPA, providing guided fishing and hunting trips, voyageur canoe trips, and opportunities for parties to be on the land. Total revenues from these operators directly related to the Dinàgà Wek'èhodi CPA are estimated to be about \$245,000 per year.

Arts and Crafts

In 2008, 174 residents of Behchokq made arts and crafts worth \$51,300. These arts and crafts were made using bones and antlers, feathers and fur, animal hair and hides, porcupine quills, sinew, and wood and stones. There is no information on how much of these materials are gathered from the CPA.

Culture

The Dinàgà Wek'èhodi CPA is a culturally important area for people in the Tłìchq Region. Use of the area for harvesting brings the people together with other-than-human entities (animals, plants, spirits) and at places where significant events have occurred.

Important Areas in the Dinàgà Wek'èhodì Candidate Protected Area

Some areas in the Dinàgà Wek'èhodì CPA are more important than others. Areas of greatest importance to the Tłı̨chǫ people include:

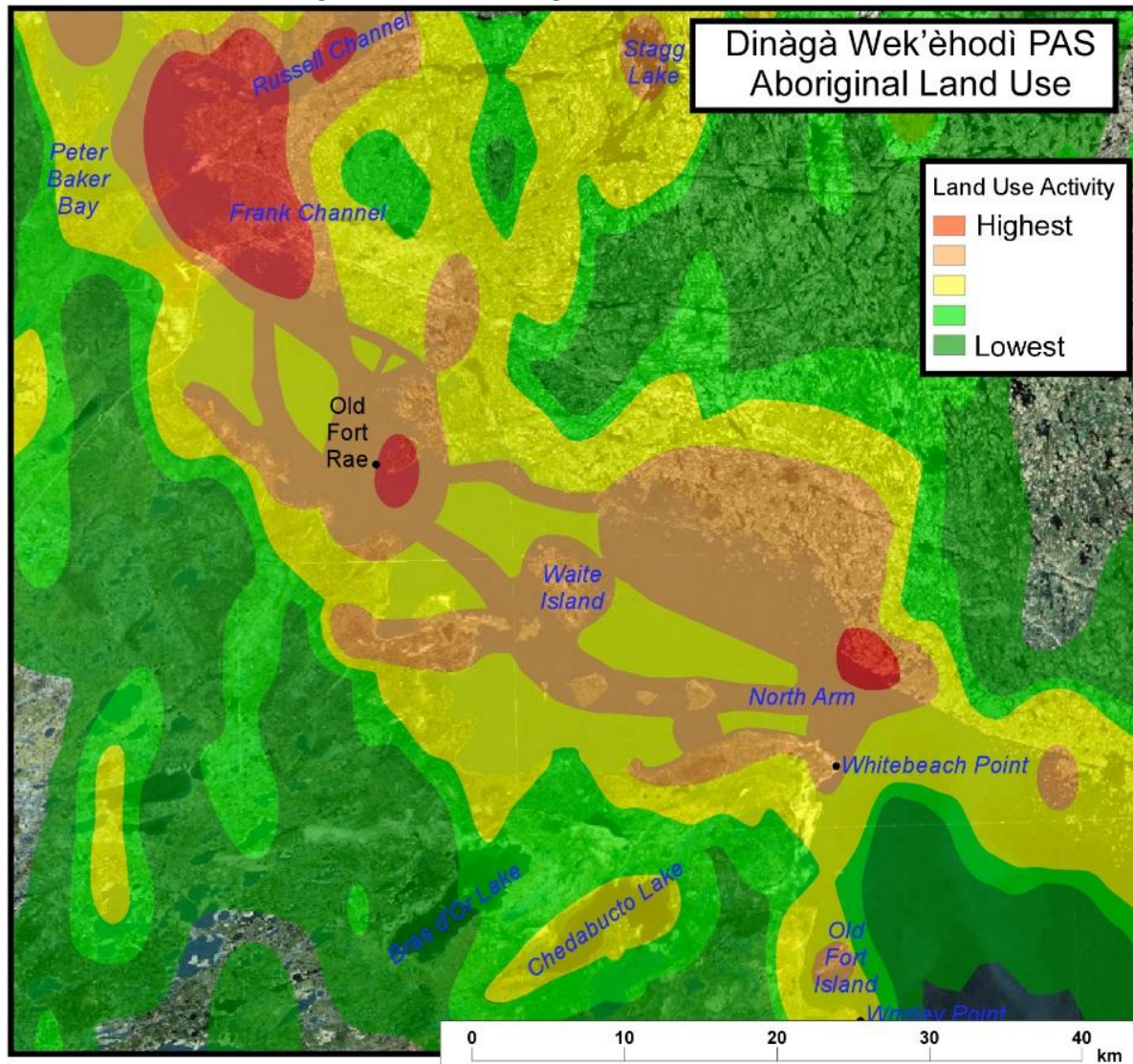
- areas that are currently or have historically been used; and
- areas that are of cultural importance.

A map of these areas was created using information from traditional land use studies and archaeological data obtained from the Prince of Wales Museum.

Tłı̨chǫ Elders and members of the Working Group added important information to this map.

Areas with very high values are coloured in red. The orange areas are thought to have high values. The green areas are thought to have moderate values.

Areas of High Value in the Dinàgà Wek'èhodì Candidate Protected Area



Important Renewable Resources

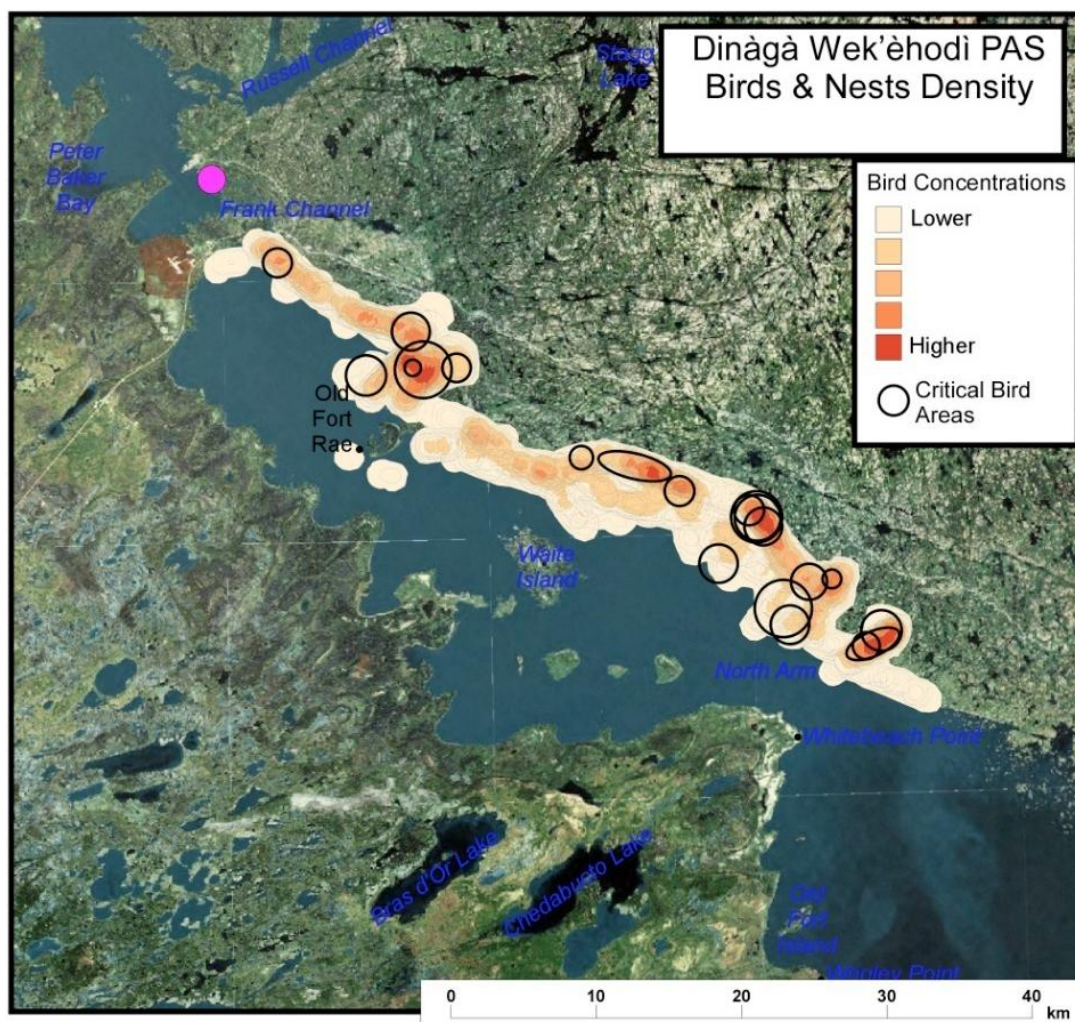
The Dinàgà Wek'èhodi CPA contains abundant ecologically significant features including wetlands, marsh and lake habitats, rare species, species at risk, pristine waters and landscapes, and high wildlife richness.

Waterbird Habitat

The North Arm has been identified as a “Key Migratory Bird Terrestrial Habitat Site” that supports over 1% of the national populations of Canada and Cackling geese, Tundra Swans and breeding Caspian Terns. The CPA is also important for numerous other migratory birds

including many species of ducks, gulls and terns, marsh birds and birds of prey. The most important migratory waterbird areas with the Dinàgà Wek'èhodi CPA are shown below.

The most important water bird habitat is located along the north shore of the North Arm. Analysis indicates that 6.3% of the CPA (42.9 km²) is considered to be of medium to highest waterbird habitat.

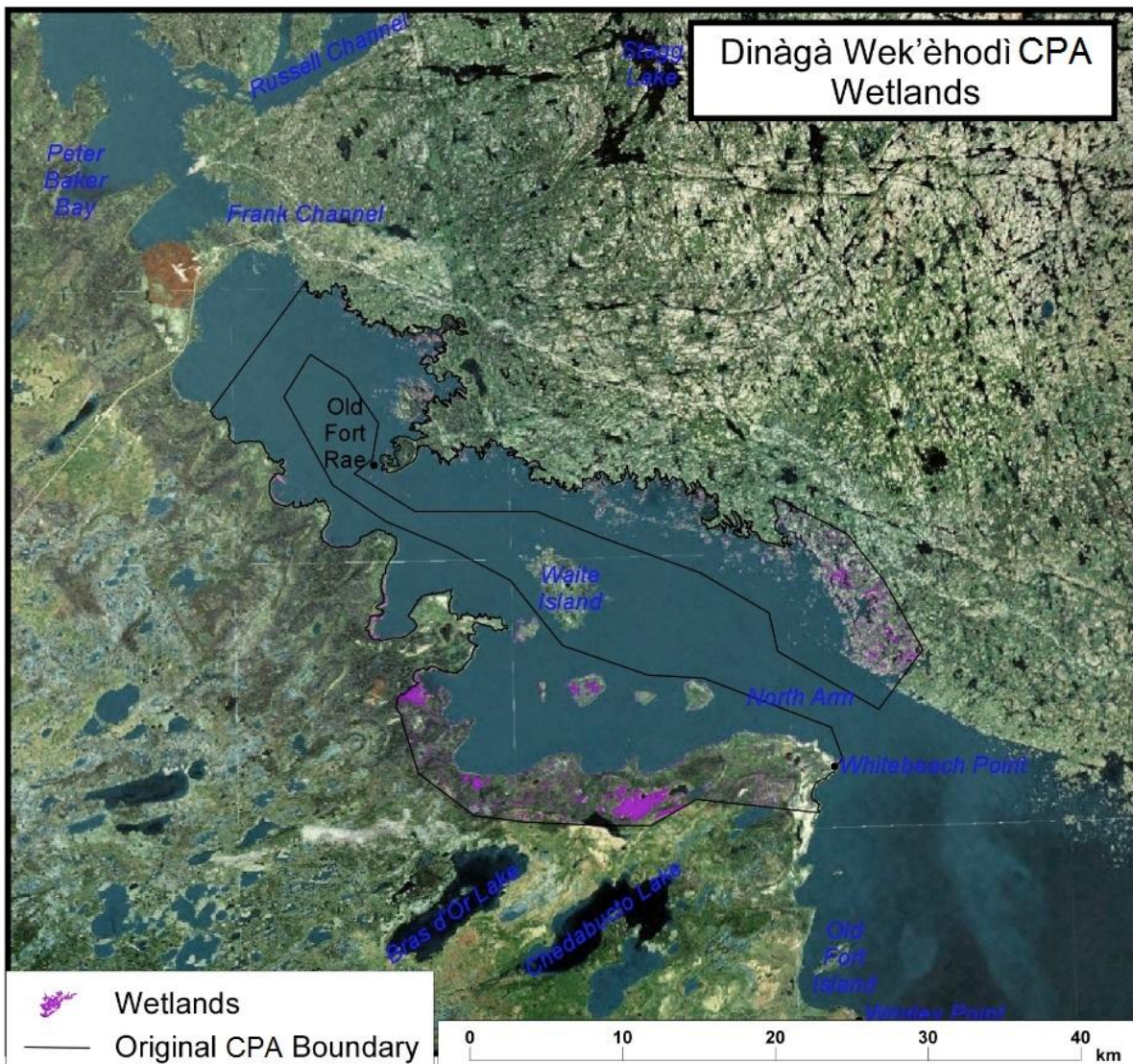


Wetlands

Wetlands are important ecosystems that provide various types of benefits for people. Wetlands can capture carbon from the air and convert it into plants; this benefits the atmosphere. Wetlands also filter water, which improves water quality), help prevent flooding and provide nursery habitat for many species.

Wetland areas within the Dinàgà Wek'èhodi CPA were mapped by CWS (2011).

There are 15.3 km² of wetlands in the CPA, and this represents 2.5% of the total area of the CPA and 9.1% of the land area within the CPA. There were 5.9 km² of treed wetlands, 5.0 km² of herb wetlands and 4.4 km² of shrub wetlands.



Non-Renewable Resources

A study conducted by the NWT Geoscience Office concluded that the Dinàgà Wek'èhodi CPA has low potential for finding mineral resources. Exploration efforts to date have not yet been able to find mineralization that would support development.

Potential mineral resources in the area include:

1. Iron Oxide Copper Gold Deposits (IOCG) – There is some potential for IOCG deposits in the western part of the CPA but the potential is considered low to moderate.
2. Uranium – While deposits containing uranium are found southwest of the CPA, the potential for finding similar deposits in the CPA is low to moderate.
3. Giant Quartz Veins – Although some veins have been observed in the CPA, the potential for finding mineralization is low.
4. Dimension Stone – Deposits of granite suitable for building are found along the northeast edge of the CPA but the potential for development is low.
5. Clay Minerals – Abundant deposits are found just outside the CPA so the potential for development in the CPA is low.
6. Silica sand - Deposits in the CPA may be suitable for use by the oil and gas industry and have high potential.

Potential Non-Renewable Resource Development Opportunities

The silica sand deposits in and adjacent to the CPA offer the greatest potential for mineral development. Silica sand is of particular interest to the oil and gas industry which injects the sand to keep fractures in rock open. This allows oil and gas to flow more freely and increases total oil and gas production. This practice is known as hydraulic fracturing or fracking. Silica sand will be needed to extract natural gas from shale formations in Northeast BC and southwestern NWT. Two new silica sand mining projects have been proposed for development in Northeast BC.

Another recent study for the NWT Geoscience office identified 15 sources of silica sand in the NWT. Eight of these are in bedrock and seven are on the surface. One of these sources is on the North Arm of Great Slave Lake at Whitebeach Point. Studies are currently underway to learn more about the silica sands at Whitebeach Point.

It is not known whether the silica sand at Whitebeach Point will ever be developed. These silica sands are much farther away from the shale gas formations in southwestern NWT than many other sources in the NWT, so transportation costs would be very high. An access road and electrical power would have to be constructed. Surface mines can only operate when the ground is not frozen. There are also environmental concerns: some types of crystalline quartz silica are hazardous to human health, the machines used to dry sand after washing can be very noisy, and mining practices can affect surface and groundwater. For these reasons, it is considered unlikely that silica sand in and near the CPA will be developed within the near future (the next 40 years).

Baseline Development Scenario

This section of the report talks about what can be expected to happen if the Dinàgà Wek'èhodi Candidate Protected Area is not designated as a National Wildlife Area (NWA).

Non-Renewable Resource Development

It is unlikely that the silica sand resources in the CPA will be developed in the foreseeable future because other, less expensive silica sand deposits closer to the shale gas deposits in southwestern NWT will be developed first.

Traditional Activities

Residents of Behchokò are expected to continue to use the area within the Dinàgà Wek'èhodi CPA for traditional purposes. The amount of use will grow as the population increases and people continue to eat country food.

Recreation

Recreational use of the CPA by residents of Behchokò, Yellowknife and other parts of the NWT are expected to increase as the population grows.

Tourism

The amount of tourism in the CPA will depend on increases in the number of people travelling to the region to participate in outdoor adventure and general touring. Tourism use is expected to increase at a rate of about 3% per year between 2010 and 2015.

Cultural Values

There will be no change in the cultural values of the area because archaeological sites are protected by laws.

Ecological Goods and Services

With no renewable resource development expected to occur, there would be no change in the benefits being provided by land, wetlands and water in the CPA.

Summary

If the area is not designated as an NWA, it is expected that the current use of the area would continue. Population growth and increased tourism would cause a slow increase in the value of the benefits being generated by the CPA. When these values are added up over time and discounted (adjusted for uncertainty in the future), they amount to about \$7.1 million in today's dollars (assuming a discount rate of 8%). If more importance is given to future benefits (a lower discount rate), the value would be \$17.1 million. Most of these benefits are related to tourism, followed by resource harvesting for traditional purposes.

Present Value of Future Resource Uses (millions)	Discount Rate		
	0%	3%	8%
Traditional Activities	\$6.5	\$3.4	\$1.6
Recreation	\$2.9	\$1.5	\$0.7
Tourism	\$27.6	\$12.2	\$4.8
Cultural	Not quantified but no change		
Ecological Goods and Services	Not quantified but no change		
TOTAL	\$37.1	\$17.1	\$7.1

These estimates are known to be low, however, because values associated with cultural resources and with the benefits that natural environments provide to people are not included.

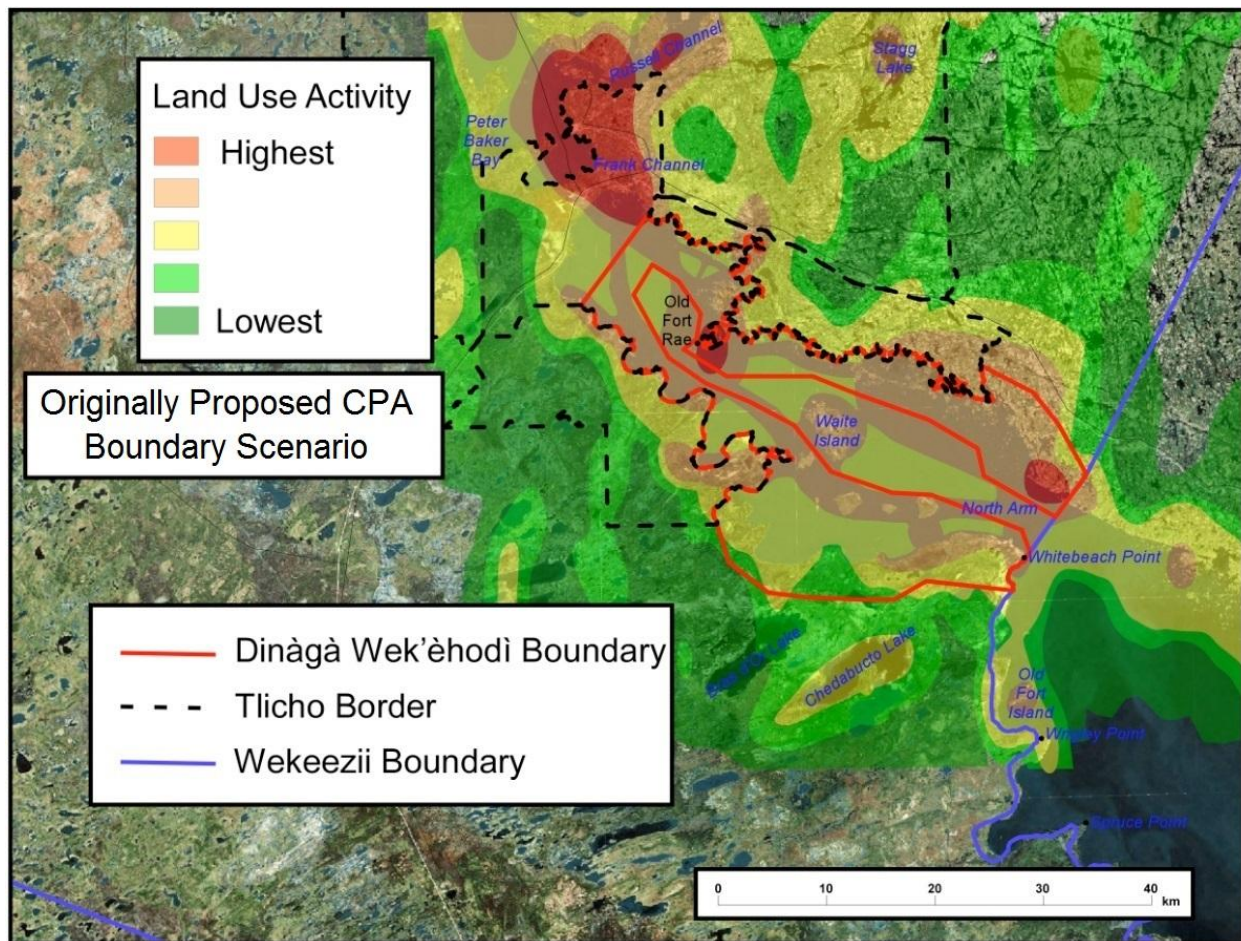
There would be no changes in socio-economic conditions in Behchokò or Yellowknife if the area was not designated as an NWA.

Designation of the Candidate Protected Area as a National Wildlife Area

This section of the report describes what would happen if the Dinàgà Wek'èhodi Candidate Protected Area was designated as an NWA. The boundary of the NWA would be as shown below:

Non-Renewable Resource Development

Establishment of an NWA would mean that surface resource rights would be transferred to Environment Canada, no non-renewable resource development would be permitted to occur, and subsurface rights may be withdrawn under the *Territorial Lands Act*.



Traditional Activities

Residents of Behchokq would be able to use the area within the Dinàgà Wek'èhodi NWA for traditional purposes. The amount of use will grow as the population increases and people continue to eat country food.

Recreation

Recreational use of the CPA by residents of Behchokq, Yellowknife and other parts of the NWT would be expected to be the same as if the area were not protected. While creating an

NWA might create more interest in the area, there may be restrictions on the types of recreational activities that would be allowed in the NWA.

Tourism

Designating the area as an NWA would raise the awareness and interests of Canadians who currently do not use the area and may result in increased tourism interest and activity in the area. Tourism use is expected to increase at a rate of about 4% per year.

Cultural Values

There will be no change in the cultural values of the area because archaeological sites are protected by laws.

Ecological Goods and Services

With no renewable resource development expected to occur, there would be no change in the benefits being provided by land, wetlands and water in the CPA.

Existence Values

Protected areas have value for people who may not currently use them for recreation or tourism. People have an interest in protecting areas of ecological, cultural or historical importance. These are called “existence” values. A 1997 study found that Canadian households would be willing to pay average of \$5.90 (in today’s dollars) to create additional parks in the NWT. If an NWA is considered to the same as creating a national park, Canadian households would be willing to pay as much as \$42.4 million (or \$3.4 million per year, based on a discount rate of 8.0%) to have the Dinàgà Wek’èhodi CPA protected as an NWA.

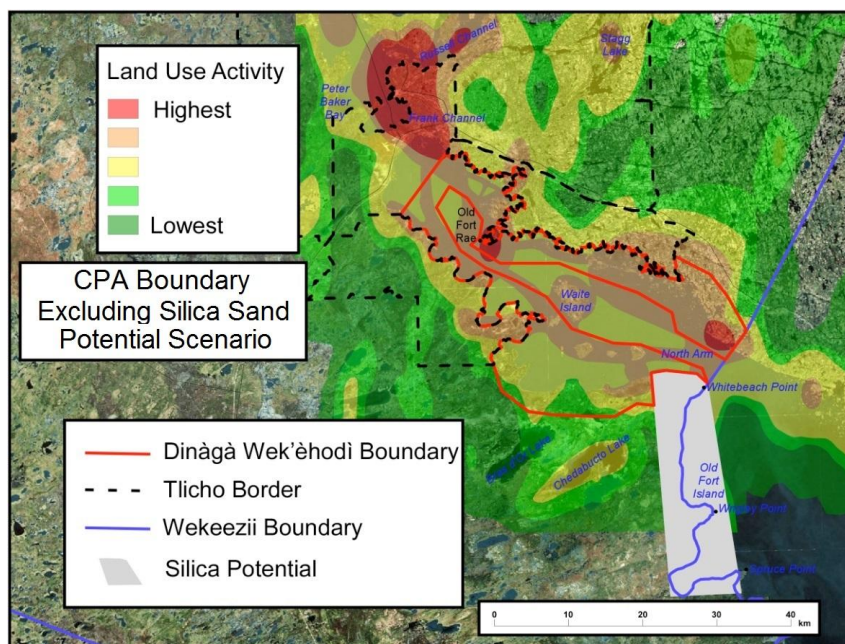
Summary

Establishing an NWA based on the boundaries of the Dinàgà Wek’èhodi CPA would increase the value of future benefits to \$50.4 million. Most of these benefits (84%) are existence values for Canadian households.

Other Boundary Scenarios

1. CPA Boundary Excluding Silica Sand Potential Scenario

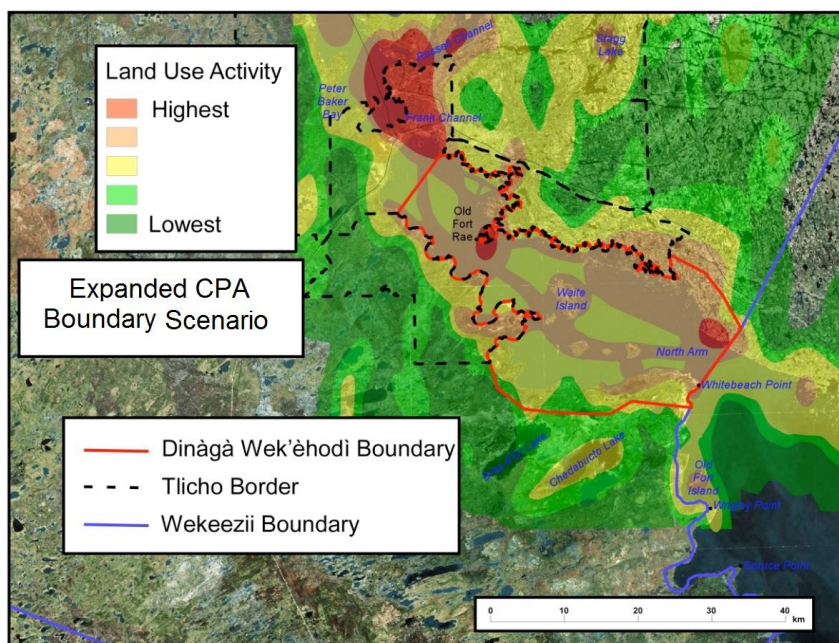
This scenario would be similar to the CPA Boundary Scenario, but would exclude the areas having silica sand potential. The resulting NWA would be slightly smaller (563 km²), would protect less wetland area (14.4 km²) and less areas of high or highest importance to Behchokq (339.6 km²). The amount of known medium to highest migratory waterbird habitat being protected would be the same, and the NWA would generate the same economic benefits (\$50.4 million) as the CPA Boundary Scenario.



2. Expanded CPA Boundary

This scenario would see the boundaries of the NWA expanded to include all the land and water in the centre of the North Arm of Great Slave, resulting in protection of 793 km². This scenario would increase the amount of wetlands being protected (15.8 km²) and protect more areas of high or highest importance to Behchokoq (470.7 km²).

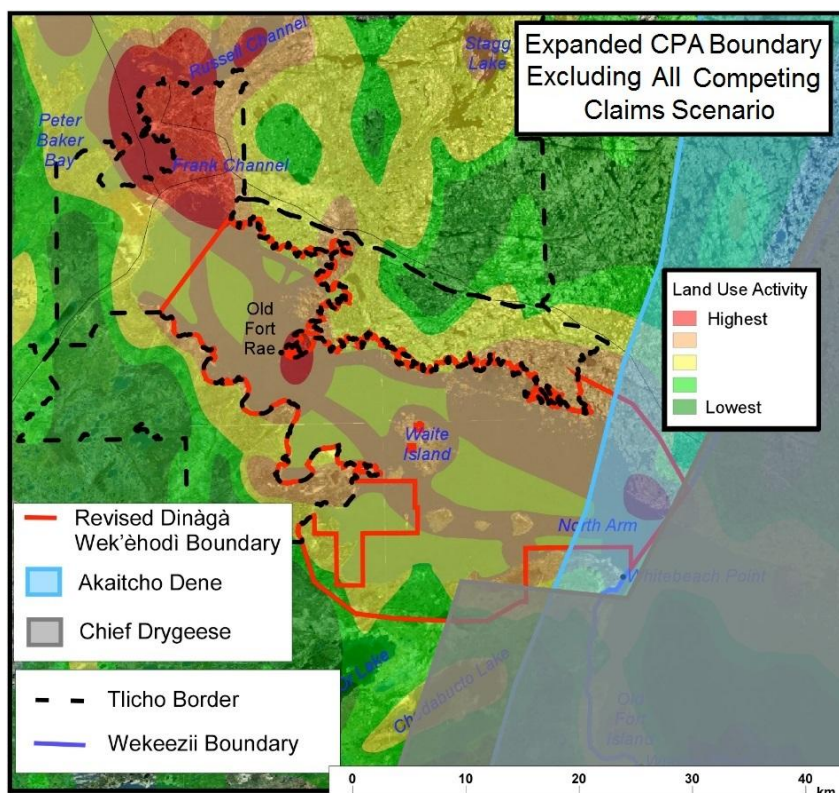
The expanded boundary would protect the same amounts of moderate to highest migratory waterbird habitat as the CPA Boundary Scenario and would generate the same economic benefits (\$50.4 million).



3. Expanded CPA Boundary Excluding All Competing Claims Scenario

This scenario would involve expanding the NWA to include all the land and water in the centre of the North Arm of Great Slave Lake but exclude lands within the Chief Drygeese boundary or the Akaitcho Interim Measures Area and lands that are the subject of existing mineral claims.

The resulting NWA would be 606 km² in area, but would exclude some important wetland areas (7.6 km² would be protected) as well as some areas having medium to highest known migratory waterbird potential (30.1 km² would be protected).

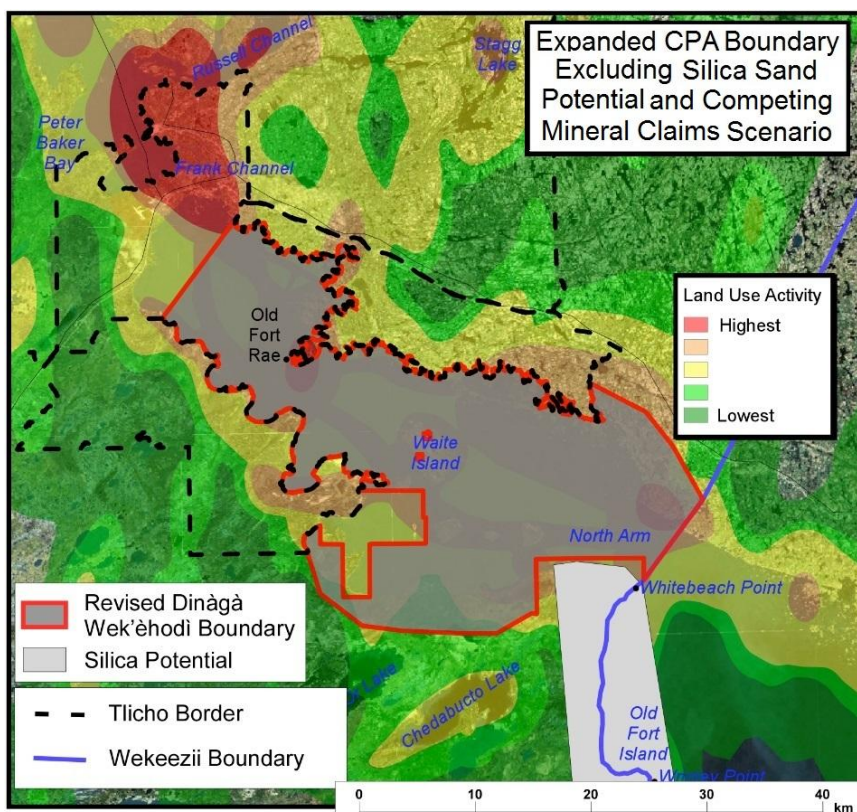


This scenario would also protect less area of highest importance to the community (8.7 km² of the 20.7 km² that would be protected under the CPA Boundary Scenario) although the quantifiable economic benefits (\$50.4 million) would be the same

4. Expanded CPA Boundary Excluding Silica Sand Potential and Competing Mineral Claims Scenario

This boundary would see the NWA boundaries expanded to include all the land and water in the centre of the North Arm of Great Slave but would exclude areas having silica sand deposits and lands that are the subject of existing mineral claims. This NWA would be 704 km² in area.

While these boundaries would protect more areas of high or highest importance to Behchokq (434.8 km²) and the same amounts of known migratory waterbird habitat of medium to highest importance (42.9 km²), it would protect less wetland area (13.8 km²). The value of future quantifiable economic benefits (\$50.4 million) would be the same as for the other NWA scenarios.



Summary of Boundary Options and Benefits

The table on the following page compares all the boundary scenarios. It compares them in terms of:

- Whether non-renewable resource (silica sand) development would be possible
- How much important migratory waterbird habitat would be protected
- How much wetland areas would be protected
- How much of the areas of importance to the community of Behchokq would be protected
- The economic value of present and future quantified benefits that would be generated by the area



Which Scenario is Best?

Each of the possible boundary scenarios has some advantages and disadvantages. One way of determining which scenario is best is by scoring each scenario based on how well it protects resources or allows development, and then adding the scores. The scenario with the highest total score can be considered the best.

The table below shows the scores for each of the scenarios in terms of five criteria. A score of “5” was given to the scenario that best achieved the criterion and a “0” if the boundary scenario completely failed to address the criterion. For

some criteria, such as economic benefits, where all the boundary scenarios had the same outcome, each was assigned the same ranking. For non-renewable resource development, a score of “3” was assigned to all the options that would allow silica sand development (this score was given because such development was concluded to be possible but not likely) and a “0” was assigned to those options where silica sand development would be precluded. Each of the criteria was considered to be of equal importance.

Summary of Potential Protection and Development Given by Possible Boundary Options for the Dinàgà Wek'èhodi Candidate Protected Area

Evaluation Criteria	No Protection	Boundary Scenarios				
		Candidate Protected Area Boundary	CPA Boundary Excluding Silica Sand Potential	Expanded CPA Boundary	Expanded CPA Boundary Excluding All Competing Claims	Expanded CPA Boundary Excluding Silica Sand Potential and Competing Mineral Claims
Non-Renewable Resource Development Potential						
Silica Sand	Possible but unlikely	Prohibited	Possible but unlikely	Prohibited	Possible but unlikely	Possible but unlikely
Protection of Migratory Waterbird Habitat (km²)						
Highest	0.0	4.6	4.6	4.6	4.4	4.6
High	0.0	12.8	12.8	12.8	9.5	12.8
Medium	0.0	25.5	25.5	25.5	16.2	25.5
Low	0.0	53.4	53.4	53.4	40.3	53.4
Lowest	0.0	91.5	91.5	101.3	79.5	101.3
Not quantified	0.0	405.6	375.4	595.7	456.4	506.4
TOTAL	0.0	593.2	563.1	793.1	606.3	703.8
Protection of Wetlands (km²)						
Area protected	0.0	15.3	14.4	15.8	7.6	13.8
Protection of Areas of Importance to Behchokò (km²)						
Highest	0.0	20.7	20.7	22.0	8.7	22.0
High	0.0	332.9	318.8	448.7	351.4	412.8
Medium	0.0	208.5	192.2	291.3	219.5	238.2
Low	0.0	31.1	31.1	31.1	26.6	30.8
Lowest	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	593.2	563.1	793.1	606.3	703.8
Present Value of Economic Benefits from the Area (\$millions discounted at 8%)						
Economic Benefits	\$7.1	\$50.4	\$50.4	\$50.4	\$50.4	\$50.4

Evaluation Criteria	No Protection	Boundary Scenarios				
		Candidate Protected Area Boundary	CPA Boundary Excluding Silica Sand Potential	Expanded CPA Boundary	Expanded CPA Boundary Excluding All Competing Claims	Expanded CPA Boundary Excluding Silica Sand Potential and Competing Mineral Claims
Non-renewable Resource Development	3	0	3	0	3	3
Protection of Migratory Waterbird Habitat	0	5	5	5	3	5
Protection of Wetlands	0	4	3	5	1	2
Protection of Areas of Importance to Behchokq	0	3	1	5	2	4
Economic Benefits	2	5	5	5	5	5
TOTAL	5	17	17	20	14	19

The Expanded CPA Boundary Scenario, with no exclusions for silica sand potential or competing claims, had the highest total score. This boundary scenario would protect the largest area and offers the highest level of protection for migratory waterbird habitat, wetlands, and areas of importance to Behchokq. No non-renewable resource development would be allowed.

Expanded CPA Boundary Excluding Silica Sand Potential and Competing Mineral Claims Scenario had the second highest score. While the resulting NWA would be slightly smaller than the Expanded CPA Boundary Scenario, it would allow development of the silica sand resources to occur. This scenario ranks second highest in terms of protection areas of importance to Behchokq, but ranks fourth in terms of protection of wetlands.

Two scenarios have the third highest score. These include NWA boundaries that are based on the CPA boundary or on the CPA boundary but excluding areas of silica sand potential. While the CPA Boundary Excluding Silica Sand Potential Scenario has a higher score for allowing potential development of the silica sands, it ranks lowest in terms of protecting areas of importance to Behchokq and was third best in terms of protecting wetlands. The CPA boundary based on the NWA boundary would completely prevent silica sand development, but would be second best in terms of protecting wetlands but third best in terms of protecting areas of importance to Behchokq.

The Expanded CPA Boundary Excluding All Competing Claims Scenario had the fourth highest score. Some of the areas that would be

left outside the NWA are of very high importance to Behchokq and include some important migratory waterbird habitat and wetlands.

waterbird habitat or areas of importance to the community.

The no protection scenario had the lowest score. Without NWA designation, there would be no formal protection of wetlands, migratory

For More Information

For more information about the proposed The Dinàgà Wek'èhodi Candidate Protected Area Candidate Protected Area, please visit: <http://www.nwtpas.ca/area-kwetsootlaa.asp>

For more information about the NWT Protected Areas Strategy and the process for creating a protected area, please visit: www.nwtpas.ca

The full details of this study can be found in the report titled: [Socio-economic Assessment of the Dinàgà Wek'èhodi Candidate Protected Area, Phase 2: Socio-economic Assessment of Boundary Options](#).



Photo Credit: Paul Woodard, Environment Canada