DEH CHO LAND USE PLANNING COMMITTEE
One Land One Plan
Ndéh Łié - Mek'ę́ę́ Ats'et'ı Łié
Dehcho Ndéhé T'áhagot'ı gha Sáàhniogı̨páh-ké

DEH CHO LAND USE PLANNING COMMITTEE

WILDLIFE WORKING GROUP SUMMARY REPORT

November 24-28/03 - Fort Providence, NT

Prepared By: Heidi Wiebe, Executive Director
Deh Cho Land Use Planning Committee

Table of Contents

List of Figures:

List of Tables:

Background

Following the signing of the Deh Cho First Nations Interim Measures Agreement in 2001, the Deh Cho Land Use Planning Committee was established, consisting of representatives of the Deh Cho First Nations, the Government of Canada and the Government of the NWT. Regional land use planning in the Deh Cho territory is intended to outline what types of activities should occur, generally where they should take place, and the terms and conditions necessary to guide land use proposals and development projects over time. The Plan will involve finding a balance between development opportunities, social and ecological constraints, which reflect community values and priorities while taking into consideration the values of all Canadians.

Introduction

As part of the information gathering phase of our planning process, the Committee contracted EBA Engineering out of Yellowknife to conduct a literature review and spatial analysis of wildlife and wildlife habitat use in the Deh Cho territory which your department funded last year. This research pulled together all existing information on wildlife habitat use and compiled it into a final map showing areas of low, moderate, high and very high value for wildlife habitat. Unfortunately, there are many gaps in wildlife research for this region so the current wildlife map is more a picture of where wildlife research has been done, than a realistic representation of wildlife habitat values. Due to the importance of wildlife to the cultural and economic well-being of the Deh Cho communities, the current map is not acceptable as an input to the planning process.

Purpose

The **Wildlife Working Group (WWG)** was proposed to bring together community harvesters and biologists to correct, update and fill in the data gaps in wildlife information using both traditional and expert knowledge. Wildlife includes fish. Harvesters and biologists recorded current wildlife range, seasonally important areas, migration routes, critical habitat (calving, denning, staging, spawning areas, etc.) and areas of high wildlife concentrations to the best of their own personal or expert knowledge. All this information will be compiled into a final map of wildlife habitat value to be used in the land use planning process.

Participants

We had good participation from the community harvesters. Both Kakisa and Nahanni Butte were unable to send harvesters the first day, but they were able to come for the other days and filled in what they missed as time permitted. Most of the biologists came only for the day on which their expertise was most needed due to their heavy schedules. Many came with helpful maps to guide discussions or discuss the latest surveys. Others followed up with more digital files which were incorporated into the final wildlife map. Those who were unable to attend sent data along later or followed up with us to ensure we had sufficient information. A list of participants is included in Appendix A.

Event Summary

Day 1 was a travel day for participants. The facilitators arrived at the office at 1 PM for an orientation and test mapping session to ensure everyone understood the interview questions, the coding and mapping methods to be used. We held a dinner and introductory session at the Snowshoe Inn at 5 PM to welcome participants, explain the basic mapping procedure, and discuss TK and confidentiality issues that had been raised (discussed below).

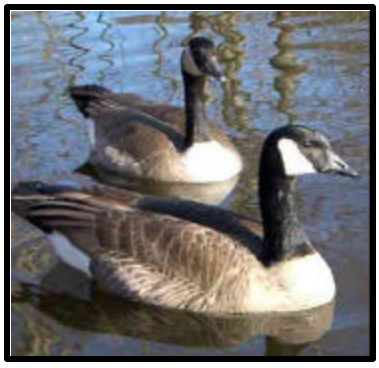
We then had all participants map their area of knowledge on a blank map. This provided participants with their first taste of mapping and provided us with a map of "spatial expertise" – i.e. where the participants have knowledge of wildlife and where they don't. If we have blank spaces in the final map, we can use this spatial expertise map to determine if areas of low wildlife value exist because of a lack of information or because of actual low use. We also used this initial map to delineate 4 groups of approximately equal size in which to complete the mapping over the next 3 days.

Day 2 was the first day of species mapping. Caribou, beaver, muskrat, otter, marten, and other furbearers were mapped. Each group was given a blank base map to work on (only towns, elevation contours, hydrology and cutlines). In addition, each table had numerous references to assist discussion and present known information. These included:

- Maps of harvesting sites for each species (requested from DCFN for reference only).
- Pictures of the species to be mapped,
- Field guides,
- EBA's Wildlife Report to review what was currently known, and
- Other recently acquired wildlife maps from earlier mapping projects (1970's pipeline corridor wildlife mapping).

These initial species were used to determine the appropriate level of detail that could be mapped, work out problems in coding, definitions (what is critical habitat) and translation, so for the most part we chose easier (less detailed) species to map first. Caribou is the one exception to this and was put on the first day to get participants' interest and also to clarify coding for the more complex species as well. Each mapping day ended with the facilitators presenting the completed maps to participants and highlighting key wildlife areas.

On Day 3, we mapped cougar and lynx; sheep and goats; moose; and bison, deer and elk. Nic Larter (Deh Cho Regional Biologist), Deborah Johnson (South Slave Regional Biologist) and Mike Grande (Parks Canada – Nahanni Region) assisted in mapping and provided additional maps and digital data to complete mapping for the ungulate species. This was an interesting day as 3 of the species mapped are not native to this region (cougar, deer and elk), but are gradually expanding their range northwards into the Deh Cho from British Columbia and Alberta. Mapping for those species consisted of noting new northern-most sightings. Also of interest was an Albino moose sighting in the Yukon, just west of the Deh Cho boundary. We held a Traditional Hand Game Tournament in the evening as entertainment for participants and community members.



On Day 4, we mapped fish; birds and waterfowl; bears; and wolves, foxes and coyotes. Paul Latour (Canadian Wildlife Service and Edehzhie Working Group), Craig Machtans (Canadian Wildlife Service – Song Birds) and Shannon Hazard (Ducks Unlimited) were all on hand that day to assist with mapping and provide additional information. The fish and bird map received the most interest due to their importance to communities. The workshop wrapped up with dinner at 5 PM and participants traveled home either that evening or the next morning.

Results and Analysis

Mapping

Overall, the Wildlife Working Group was a great success. We had very good turnout from all participants and were able to map significant amounts of information. There was considerable variation in the level of detail recorded for each species depending on the type of species and knowledge of the harvesters present. The species that received the greatest amount of attention were caribou, moose, birds and waterfowl, and fish. For animals like furbearers, it is difficult to map critical areas as they use their habitat more generally. For such species, we mapped only range and concentrations. On the other hand, for caribou, it is possible to map a wider variety of information including range, seasonal use areas, migration corridors, calving areas, etc. For all mapping, care was taken to denote historical information as such so it could be considered separately from current information.

In some cases, mapping the absence of a species was just as important – e.g. a lack of caribou or moose in bison areas is a big concern. Caribou and moose used to be found abundantly in these areas and now avoid them. Bears also presented a special consideration in that the North Group explained that it was inappropriate to talk about bears while they are denning. Bears were mapped everywhere but the northern portion of the Deh Cho out of respect.

We had no harvesters present who were active in or have detailed knowledge of the western portion of the Deh Cho territory so very little information was mapped for that region. Many participants enquired about running full workshops in each community so that other harvesters could also contribute their information and provide more complete coverage than what they could offer alone. Due to time and budget constraints this is not possible at the moment but may be considered as a means of updating information during subsequent planning revision cycles. Additional base maps were sent home with interested participants to facilitate community-based mapping projects.

Digitizing and Coding

All the maps were digitized and coded to develop ArcView Shapefiles. In cases where the coding wasn't clear, we went back to the facilitators for direction to understand the intent of the mapping and discussion surrounding it. We also had the videotapes if more detailed review was required. Each shapefile was ranked for conservation value using similar criteria to those used in EBA's analysis. In general, the ranks are:

- Low value for general range;
- Moderate value for seasonally important areas or for areas that meet all habitat functions;
- High value for concentrations and migration corridors;
- Very high value for critical habitat (nesting, spawning, calving, breeding, denning, etc.)

In some cases, ranks were increased or decreased due to special circumstances or the relative importance of the species. For example, a large area circled as critical habitat but having no specific function provided might be downgraded to high or moderate because the information is too generalized to be an accurate reflection of actual habitat use. In other cases, a ranking might be upgraded because it relates to a species of special concern. We have included our final ranking table in Appendix B so that others may review the assumptions that create the final map.

Composite Wildlife Habitat Value Map Development

Initial comparisons were done between the WWG shapefiles, the raw maps, the EBA maps and other existing information to determine if the information was consistent and to detect any merging problems. While the general intent was to merge all information to provide a complete picture of wildlife habitat information, some of our older files had known deficiencies. In these

cases, we hoped there would be sufficient overlap of information that we could replace the old information and remove it from further analysis (e.g. our old furbearer information which was incomplete and cut off at mapsheet boundaries in the middle of the Deh Cho territory).

Initially, we kept all existing shapefiles and merged everything together (WWG, EBA, and other wildlife reference information that had been used at the workshop). Each shapefile was converted to grid and they were all overlayed together. The maximum value for each grid provided the value for the final composite map. The initial composite had a few deficiencies as expected due to the old information. We removed these layers and reran the composite. The result is a clearer picture of wildlife habitat that does not include false boundaries where information was cutoff.

The Wildlife Composite Map is shown in Figure 1. Most of the Deh Cho has at least moderate wildlife habitat value. Areas of high and very high potential tend to centre around the dominant rivers (the Mackenzie, Liard, Willowlake, Blackwater, Root and South Nahanni) and lakes (edge of Great Slave Lake, Mills, Beaver, Kakisa, Tathlina, Trout, Cli, Little Doctor, Sibbeston, Blackwater, Keller, Fish, Greasy, Bulmer, Willow, and Falaise) of the region. This is due to two reasons. Water is a critical component of habitat for most species and they tend to gather there for feeding, travel routes, shelter from bugs, etc. People also tend to concentrate around water for fishing, hunting and trapping and so are more likely to see wildlife around water. It shows how important water is to the Deh Cho, both for people (physically, culturally and spiritually) and for wildlife. Other areas identified as having high or very high wildlife habitat value are Edehzhie, the Mackenzie Bison Sanctuary, the Cameron Hills, Redknife Hills, east of the Liard River, and the western point of the Deh Cho heading into Nahanni National Park Reserve.

The Composite Wildlife Map shown is only preliminary. It is a compilation of over 150 different layers of information overlaid together with only a preliminary look at how all the files relate to each other. They are all given equal consideration regardless of age, accuracy or level of detail. Some species have very little information or only general information while others are better studied. No claims have been made as to the completeness of current information; it is simply the best currently available. At some point in the near future, we will have to go through all the files and merge them at the species level. In doing so, we will have to decide whether it is appropriate to merge it all together, whether some of it should be removed as old and inaccurate, or whether further refinements can be made.

For example, sheep have very specific habitat requirements in the mountains linked to elevation and surface type. Discussion during our workshop suggested that our base maps were not detailed enough to show this habitat so the harvesters mapped habitat very generally for this species. Based on those discussions though, we were able to take the generalized maps drawn by harvesters and overlay them with more detailed habitat criteria to identify refined habitat areas within the more generalized polygons (see Figures 2a, b and c). Though we do not have the time or budget to do this for all species, we can apply general criteria in merging files for each species that will improve the overall accuracy of wildlife habitat values and eliminate very generalized or inaccurate information.

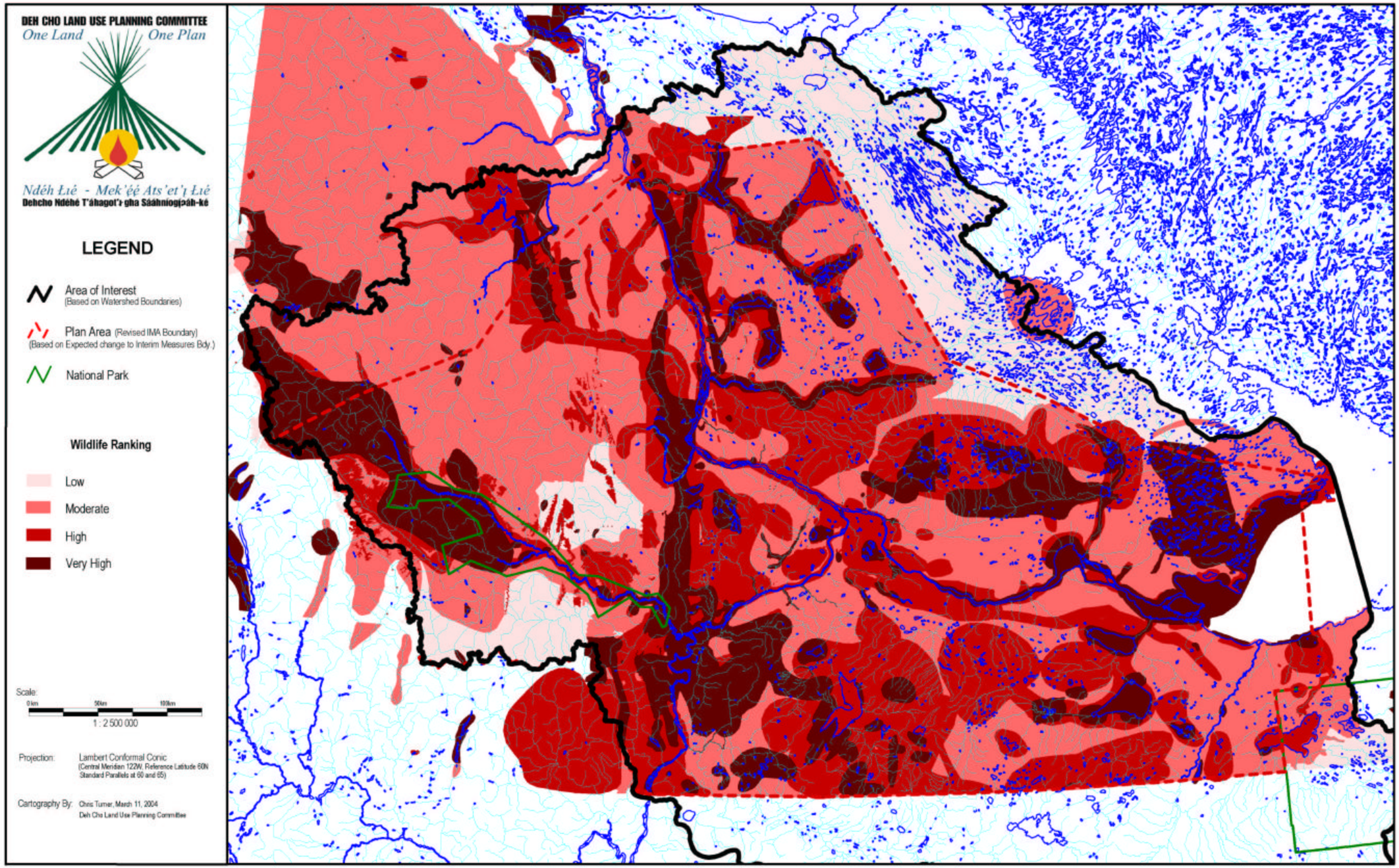


Figure 1. Draft Composite Wildlife Values for the Deh Cho territory.

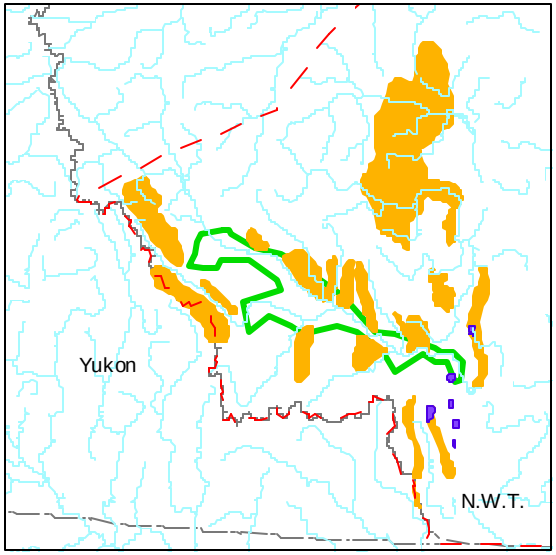


Figure 2a. Sheep concentrations (orange) mapped by harvesters at the wildlife workshop.

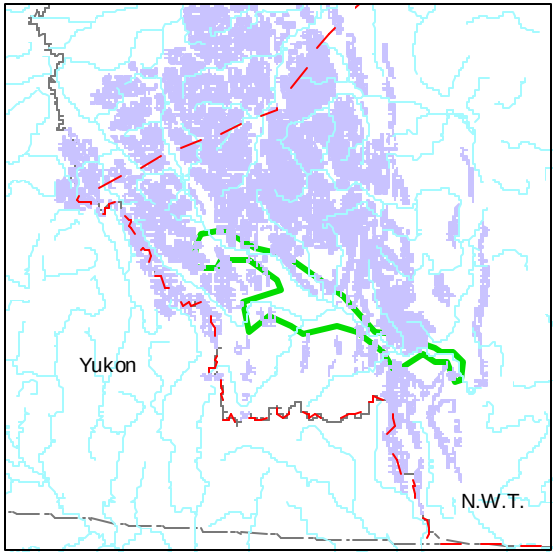


Figure 2b. Sheep range (purple) as defined by elevation and surface criteria using landsat imagery.

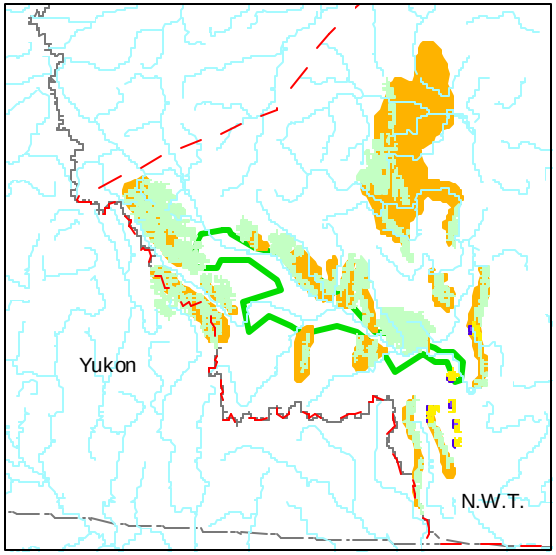


Figure 2c. Refined sheep concentrations (green) as compared with generalized concentrations (orange) as mapped at the workshop.

Once we have a refined map for each species, these would be overlayed to create a revised wildlife composite map that is a more accurate reflection of species habitat value. We don't expect the current map to change substantially, but it will have some minor modifications that may be important in future land use decisions. The current version and any future revisions to the wildlife habitat value map are static snapshots of the current known value of habitat for wildlife. Fires could change significant portions of this map, as could new research. The information and mapping will be updated every five years or as required during the land use plan revision cycle.

The composite wildlife value map will be used in conjunction with other conservation values (traditional use, ecologically important areas, important tourism sites, etc.) to develop a conservation priority map ranked from low to very high. This map will be combined with a similarly ranked development priority map in a weighted GIS overlay to develop a series of land use options from which to begin discussions of regional land use priorities. Future versions of this map will be substituted into our model as they are prepared to ensure we have the best information available as we progress towards selecting a final land use map. The Composite Wildlife Value map, Conservation Priority map, Development Priority map and land use options will be widely distributed for review.

Traditional Knowledge and Confidentiality

The information gathered from harvesters in this workshop is considered traditional ecological knowledge. The collection and distribution of such information is governed by the Committee's Traditional Knowledge Policy which states that, "any new information collected may be referred to in a general way in text but never shown or illustrated on maps unless the owner has specifically granted permission to the Committee to do so." We explained that we will not show the species specific information mapped in this workshop, but only the final summary map. This map is a compilation of existing wildlife data along with traditional knowledge in an overall summary form. No one would be able to extract traditional knowledge from this map so confidentiality is still maintained. The participants were comfortable with this.

In organizing this workshop, there were a few enquiries about how this information could be accessed in the future, both from the participating biologists and from other organizations. Such information could be used to direct future wildlife research or as supporting evidence for new candidate protected areas. We discussed these possibilities with participants, but confirmed that such requests would be forwarded to participants in writing for approval.

Since the workshop, two requests to access the information have come forward. The first request is from RWED (Resources, Wildlife and Economic Development) to access all caribou information collected for use in the Caribou Recovery Strategy required by the new Species at Risk Act. This request was referred to Deh Cho First Nations for consideration. The second request was from Trout Lake to access all information mapped by their community members. Since the information was mapped in groups, the Committee will have to go through the video tapes and extract what information was mapped by each community so that we do not send out information belonging to other communities. Both of these requests were supported by resolutions at Deh Cho First Nations February Leadership Meeting in Fort Providence, subject to appropriate conditions.

Workshop Expenditures

This workshop was made possible by a generous contribution of $53,500 from the Protected Areas Strategy. The Committee fully used the funding provided. Additional funding came from the Committee's own budget for workshops. The budgeted amounts and actual expenditures are provided in the table below. The biggest discrepancy was on digitizing costs. This was a result of the amount of information collected at the workshop, and the need to digitize additional reference maps not originally planned for. Merging all this additional information also required more time and we went through several revisions before we were able to complete a full composite map.

Table 1. Final Expenditures For The Wildlife Workshop.

Goods and Services	Budget	Actual	Variance	PAS Funded
Accommodations	4,000.00	9,854.00	(5,854.00)	*
Travel	16,000.00	10,810.95	5,189.05	*
Meals	5,000.00	9,087.55	(4,087.55)	
Honorariums	24,000.00	20,225.00	3,775.00	
Hall Rental	500.00	225.00	275.00	
Audio-Video Recording	15,000.00	16,575.50	(1,575.50)	*
Translators	6,500.00	5,800.00	700.00	*
Facilitators	8,500.00	9,274.08	(774.08)	*
Digitizing Costs	5,000.00	15,930.01	(10,930.01)	
Mapping Supplies	500.00	80.06	419.94	
½ GST*	2975.00	2,022.59	3,927.41	
TOTAL	**$ 90,950.00**	**$ 99,884.73**	**($ 8934.74)**	
PAS Contribution	53,500.00	52,546.12		
½ GST*		1,449.34		
Total	**$ 53,500.00**	**$ 53,763.87**	**($ 263.87)**	

* Note: DCLUPC only pays 50% GST as a non-profit organization.

Conclusions

The purpose of this workshop was to fill the gaps in wildlife habitat information for the Deh Cho territory. A quick comparison of the Final EBA map (Figure 3a) to our new Composite Wildlife Habitat Value Map (Figure 3b) shows how much our information has improved. We were able to bring together traditional harvesters with biologists to share information and work together. The result is a real merging of views and values that creates a better product than looking at both forms of information in isolation. As a side benefit, the wildlife workshop greatly increased awareness of the Committee's activities among community members and has generated much excitement about the work we're doing. We are very happy to see data requests come forward as it reinforces the need for such research. We hope it will encourage future work in this area.

Mahsi Cho to all our participants for making this workshop a great success!

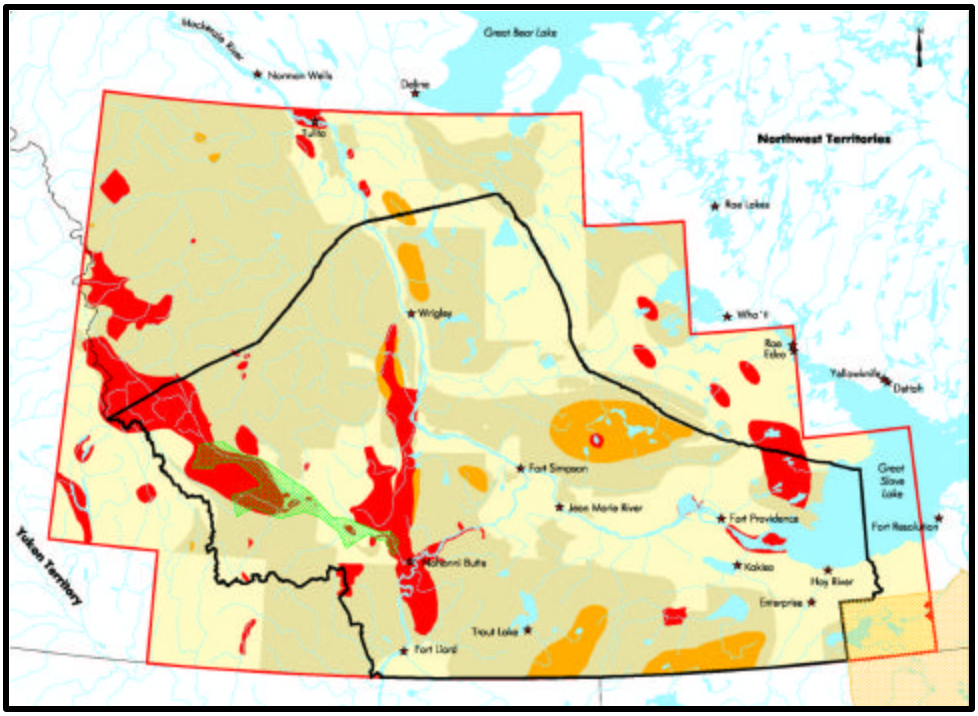


Figure 3a. Wildlife Composite resulting from EBA Wildlife Report. Data is ranked as low (yellow), moderate (tan), high (orange), and very high value (red).

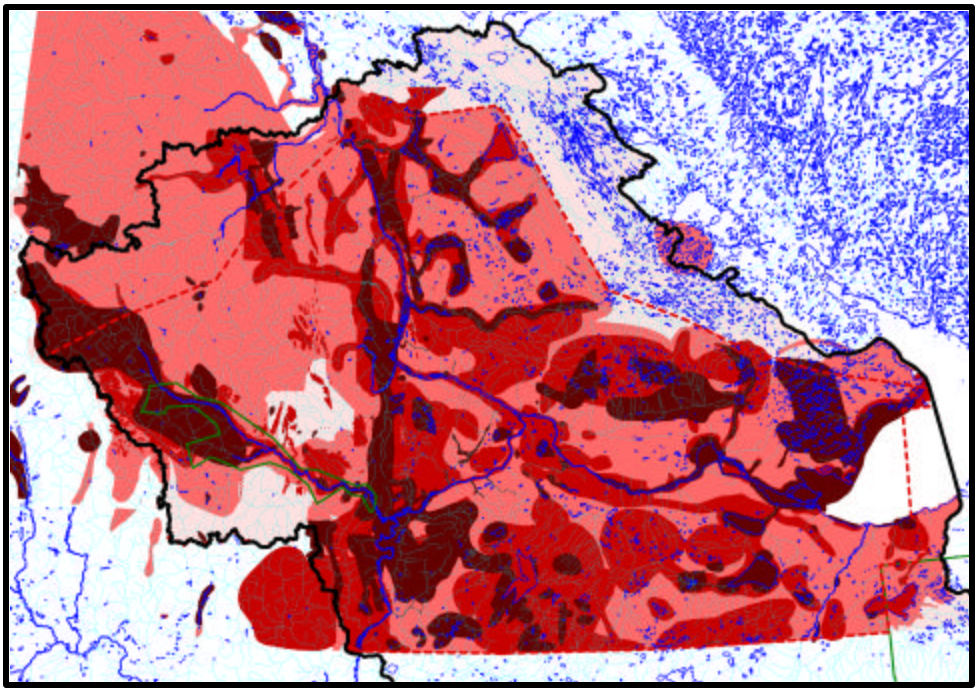


Figure 3b. Wildlife Composite resulting from combination of EBA report and Wildlife Working Group. Data is ranked as low (light pink), moderate (dark pink), high (red), and very high value (brown).

Appendix A. Participant List

Delegates	Community
Jonas Lafferty	Fort Simpson
Joseph Tsetso	Fort Simpson
Peter Sabourin	Hay River Reserve
Joe Smallgeese	Hay River Reserve
Robert Lamalice	Hay River Reserve
Darcy Moses	Wrigley
David Horesay	Wrigley
Leo Moses	Wrigley
Douglas Norwegian	Jean Marie River
Ernest Hardisty	Jean Marie River
Billy Norwegian	Jean Marie River
Andrew Lomen	Trout Lake
Dolphus Jumbo	Trout Lake
Tony Jumbo	Trout Lake
Frank Kotchea	Fort Liard
Jimmy Klondike	Fort Liard
Stanley Bertrand	Fort Liard
John Cayen	West Point First Nation
Napolean Cayen	West Point First Nation
Chris Chicot	Kakisa
Lloyd Chicot	Kakisa
Gabe Chicot	Kakisa
Johnny St. Pierre	Kakisa
Albert Bonnetrouge	Fort Providence
Henry Sabourin	Fort Providence
Lucas Elleze	Fort Providence
Leon Konisenta	Nahanni Butte
Morris Vital	Nahanni Butte

Biologists	Organization
Steve Moore	EBA Engineering Consultants Ltd.
Deborah Johnson	South Slave Regional Biologist (RWED)
Nic Larter	Deh Cho Regional Biologist (RWED)
Mike Grande	Nahanni National Park Reserve
Craig Machtans	Canadian Wildlife Service (Birds)
Paul Latour	Canadian Wildlife Service (Edehzhie)
Shannon Hazard	Ducks Unlimited
Edwin Sabourin	Fort Providence Resource Management Board

Observers	**Organization**
Tim Lennie	DCLUPC Board member
Herb Norwegian	DCLUPC Chairman
Heidi Wiebe	DCLUPC Executive Director

Facilitators	**Translators**
Petr Cizek	Joe Tambour
Jonas Antoine	Sara Gargan
Chris Turner	Philip Constant
Priscilla Canadien	Peter Sabourin

Youth Participants	**Film Crew - Yellowknife Films**
Ross Lafferty	Terry Woolf
Janelle Minoza	Gary Milligan
Maxine Lacorne	Matthew Warburton
Jonah Bonnetrouge	Stephen Woolf
Fabian Nadli	
Kara Gordon	

Appendix B. Wildlife Habitat Rankings

SPECIES	SOURCE	SCALE	DESCRIPTION	RANK	COMMENTS
FURBEARERS					
Furbearers	NLUIS 1972	1:250000	general range	n/a	Displays known range of furbearers across the Deh Cho. Animals include beaver, muskrat and marten and data differentiates between seasonal use and critical and important range.
Beaver	WWG	1:500 000	critical habitat	high	
Beaver	WWG	1:500 000	general range	moderate	Very generalized polygons
Fisher	WWG	1:500 000	general range	low	
Marten	WWG	1:500 000	concentrations	moderate	
Marten	WWG	1:500 000	general range	low	Very generalized
Mink	WWG	1:500 000	concentrations	high	
Mink	WWG	1:500 000	general range	low	
Porcupine	WWG	1:500 000	general range	low	
CARNIVORES					
Cougar	WWG	1:500 000	cougar sightings	N/A	range extension
Coyote	WWG	1:500 000	concentrations	moderate	year-round
Coyote	WWG	1:500 000	general range	low	year-round
Fox	WWG	1:500 000	dens	very high	
Fox	WWG	1:500 000	heavy concentrations	high	

Fox	WWG	1:500 000	concentrations	moderate	
Fox	WWG	1:500 000	general range	low	
Lynx	WWG	1:500 000	critical habitat	very high	
Lynx	WWG	1:500 000	concentrations	high	
Lynx	WWG	1:500 000	general range	low	very generalized
Wolf	WWG	1:500 000	dens	very high	
Wolf	WWG	1:500 000	concentrations	moderate	
Wolverine	WWG	1:500 000	breeding areas	very high	
Wolverine	WWG	1:500 000	high concentrations	high	
Wolverine	WWG	1:500 000	concentrations	moderate	
Wolverine	WWG	1:500 000	general range	low	
BEARS					
Black Bear	NLUIS 1972	1:250000	denning area	very high	Data limited to a small study area within Nahanni Park Reserve.
Black bear	WWG	1:500 000	dens	very high	In some cases black bear dens are mapped outside of the mapped species range.
Black bear	WWG	1:500 000	critical habitat	high	
Black bear	WWG	1:500 000	general range	low	It seems that the areas mapped as bear range are in fact areas of high bear concentration known to advisors. The mapped range seems very conservative in comparison to actual known range. The distinction between grizzly and black bear is not clear in some cases.
Black Bear	Environment Canada 2002	1:1000000	general range	low	
Grizzly Bear	NLUIS 1972	1:250000	denning area	very high	Data limited to a small study area.
Grizzly Bear	WWG	1:500 000	dens	very high	
Grizzly Bear	CWS, 1973	1:250 000	1 - high use	very high	CWS series includes 4 mapsheets within plan area. "Grizzly bear units are generally very large, determined mainly to be physical landforms, broad vegetation zones and relative abundance of grizzly bears."

Grizzly Bear	CWS, 1973	1:250 000	2 - common use	high	CWS series includes 4 mapsheets within plan area. "Grizzly bear units are generally very large, determined mainly to be physical landforms, broad vegetation zones and relative abundance of grizzly bears."
Grizzly Bear	WWG	1:500 000	concentrations	high	
Grizzly Bear	WWG	1:500 000	general range	moderate	It seems that the areas mapped as bear range are in fact areas of high bear concentration known to advisors. The mapped range seems very conservative in comparison to actual known range. The distinction between grizzly and black bear is not clear in some cases.
Grizzly Bear	CWS, 1973	1:250 000	3 - occasional use	low	CWS series includes 4 mapsheets within plan area. "Grizzly bear units are generally very large, determined mainly to be physical landforms, broad vegetation zones and relative abundance of grizzly bears."
Grizzly Bear	Environment Canada 2002	1:1000000	general range	low	Data come from large study area and is probably not very precise.
BIRDS AND WATERFOWL					
Migratory bird sites	Alexander, S.A. et al. 1991	1:250000	nesting areas	very high	Displays critical nesting areas for birds without differentiating bird species. The data are limited to several small study areas.
Ducks	WWG	1:500 000	nesting areas	very high	
Ducks	WWG	1:500 000	concentrations	high	
Geese	WWG	1:500 000	nesting areas	very high	
Geese	WWG	1:500 000	concentrations	high	
Loons	WWG	1:500 000	nesting areas	very high	
Peregrine falcon	Matthews,S 2003	1:50000	nesting areas	very high	Displays known nesting areas for the Peregrine Falcon. Small study area located in the northern area of the Deh Cho
Peregrine Falcon	WWG	1:500 000	nests	very high	buffer 500m
Peregrine Falcon	WWG	1:500 000	sightings	very high	

Peregrine falcon	Environment Canada 2002; Matthews, S 2003	1:250000	general range	low	Displays known range of the Peregrine Falcon. Large study area that encompasses the Deh Cho Territory, probably not very precise.
Peregrine Falcon	WWG	1:500 000	historic nest sites	N/A	
Peregrine Falcon	WWG	1:500 000	historic range	N/A	
Trumpeter swan	Alexander, S.A. et al. 1991; Eng, M. et al. 1989	1:250000	general range	very high	Displays known range of the Trumpeter Swan. Data limited to known locations of Trumpeter Swan. Data do not differentiate between seasons.
Trumpeter Swan	WWG	1:500 000	nesting areas	very high	point locations
Trumpeter swan	Alexander, S.A. et al. 1991	1:250000	nesting areas	very high	Displays know nest locations for the Trumpeter Swan. Data come from small study area within known range of Trumpeter Swan.
Trumpeter Swan	WWG	1:500 000	range (limited)	medium	Nests are mapped outside of mapped range
Trumpeter Swan	WWG	1:500 000	historic nest areas	N/A	
Waterfowl	WWG	1:500 000	nesting areas	very high	
Waterfowl	NLUIS 1972	1:250000	breeding areas	very high	Displays waterfowl breeding area. Data limited to small study area.
Waterfowl	CWS, 1973	1:250 000	1 - excellent	very high	CWS series only includes 8 mapsheets within plan area. "Specific rating of wetland habitats in this region tends to reflect breeding areas for ducks." The rating assigned units are based upon the physical characteristics of the wetland habitat; and densities of breeding waterfowl, where known.
Waterfowl	CWS, 1973	1:250 000	2a - very good	very high	
Waterfowl	CWS, 1973	1:250 000	2b - good	high	
Waterfowl	CWS, 1973	1:250 000	3a - fair	mod	
Waterfowl	CWS, 1973	1:250 000	3b - poor	low	
Waterfowl	CWS, 1973	1:250 000	4a - marginal	low	
Waterfowl	CWS, 1973	1:250 000	4b - not digitized	n/a	
Waterfowl	NLUIS 1972	1:250000	migration and staging areas	mixed	Displays migratory routes and staging areas for waterfowl. Data cover the entire Deh Cho study area, but do not display potential migratory routes or staging areas such as the many rivers and lakes.

Waterfowl	NLUIS 1972	1:250000	migration routes	n/a	Displays general migration of waterfowl. Contains no other information. Data used to display direction of migration paths. It holds no other information.
Waterfowl	NLUIS 1972	1:250000	migration routes	n/a	Displays general migration of waterfowl as well as seasonal data. Data come from a large study area and generally shows migration directions for different seasons.
Whooping Crane	Environment Canada 2002; Decker 2003; NLUIS 1972	1:250000; 1:50000; 1:250000	general range	very high	Displays known range of the Whooping Crane. Data limited to two spots within the Deh Cho Territory.
Whooping crane	WWG	1:500 000	known fall habitat	very high	
Whooping crane	WWG	1:500 000	known spring habitat	very high	
Whooping crane	WWG	1:500 000	known summer habitat	very high	
Whooping crane	WWG	1:500 000	historic habitat	N/A	
UNGULATES					
Bison	WWG	1:500 000	breeding areas	very high	
Bison	WWG	1:500 000	concentrations	very high	
Bison	Chowns, T. 1987	1:50000	concentrations	very high	Data are limited to Mackenzie Bison Sanctuary.
Bison	WWG	1:500 000	general range	moderate	
Bison	Gunn et al. 2002a; RWED 2002; Gates, C.C. et al. 1991;	1:50000	general range	low	Data very general in estimating bison ranges.
Caribou	WWG	1:500 000	breeding area	very high	woodland caribou
Caribou	WWG	1:500 000	calving area	very high	woodland caribou
Caribou	Gray, P. and Panegyuk, P. 1989	1:250000	calving areas	very high	Three known caribou calving areas within the mountain caribou and boreal caribou populations.

Caribou	Gunn 2002	1:50000	calving areas	very high	Displays known calving range of the South Nahanni Mountain caribou herd.
Caribou	NLUIS 1972	1:250000	mineral Licks	very high	The data represent only areas where licks are present and do not display individual licks.
Caribou	WWG	1:500 000	mineral licks	very high	Mapped licks occur in a relatively small area - all species, all seasons
Caribou	CWS, 1973	1:250 000	areas displaying heavy use	very high	CWS series only includes 8 mapsheets within plan area. "..all animals observed were class as caribou [i.e., no distinction made between subspecies]." Landform unit mapping was based on aerial photo interpretation and aerial surveys were completed in winter and summer. "...descriptions of the land units in which caribou were observed were taken as examples of suitable caribou habitat...The areas in which large numbers of caribou and tracks occur were noted as heavy use areas."
Caribou	CWS, 1973	1:250 000	known and potential range	moderate	
Caribou	WWG	1:500 000	seasonal use	high	Woodland caribou spring concentrations
Caribou	WWG	1:500 000	seasonal use	high	Woodland caribou year-round concentrations
Caribou	WWG	1:500 000	seasonal use	high	Barren ground caribou winter concentrations
Caribou	WWG	1:500 000	seasonal use	high	Woodland caribou winter concentrations
Caribou	WWG	1:500 000	migration routes	moderate	all species, all seasons
Caribou	Gray, P. and Panegyuk, P. 1989	1:250000	calving areas	high	Displays suspected calving areas in both the mountain and boreal caribou populations. Data cover a large and general area and only represents suspected calving areas.
Caribou	Gray, P. and Panegyuk, P. 1989	1:250000	seasonal areas	moderate	Displays known wintering areas for the Woodland caribou. Data generated from a large study area and probably not very precise.
Caribou	Gunn 2002	1:50000	rutting area	high	Displays known fall rutting range of the South Nahanni Mountain caribou herd.
Caribou	Gunn et al. 2002b; Lortie 1982	1:250000; 1:50000	general range	low	Displays known range of the Woodland Caribou mountain population. Data come from a large study area and are very general in its display of range.
Caribou	Environment Canada 2002	1:1000000	general range	low	Displays known range of the Woodland Caribou boreal population. Data come from a large study area and are very general in its display of range.
Caribou	Gray, P. and Panegyuk, P. 1989	1:250000	seasonal areas	low	Displays known summering areas for the Woodland caribou. Data generated from a large study area and probably not very precise.
Caribou	Gunn pers. Com. 2002	1:250000	subpopulations	low	Displays sub populations of the Woodland Caribou Mountain Population Range. Data generated from a large study area (Mackenzie Mountain Range) and are probably not very precise.

Caribou	WWG	1:500 000	no caribou	N/A	Area specifically mapped as having no caribou value - caribou displaced from these areas by bison?
Dall's Sheep	Case, R. 1989	1:50000	calving/nursing areas	very high	Displays detailed information of individual mountain blocks containing known calving and nursing areas. The data are limited to individual mountain blocks and do not provide coarser distributional information.
Dall's Sheep	NLUIS 1972; Simmons, N 1982; Comin 1978; Bob Decker pers. Com.; Ferguson et al. 1985	1:250000	lambing area	very high	The data come from a variety of sources and is limited to the Mackenzie Mountain Range.
Dall's Sheep	Simmons, N 1982	1:250000	mineral licks	very high	Displays known mineral licks on well-established trails which are used most frequently in the spring and early summer. The data came from a large distributional study area within the Mackenzie Mountains.
Dall's Sheep	NLUIS 1972	1:250000	mineral licks	very high	Displays areas where there are known mineral licks. The data represent only areas where licks are present and does not display individual licks.
Dall's Sheep	WWG	1:500 000	mineral licks	very high	
Dall's Sheep	WWG	1:500 000	critical areas	very high	reconciled with landsat interpretation
Dall's Sheep	WWG	1:500 000	concentrations	high	reconciled with landsat interpretation
Dall's Sheep	NLUIS 1972; Simmons, N 1982; Comin 1978; Bob Decker pers. Com.; Ferguson et al. 1985	1:250000	known range	moderate	The data come from a variety of sources and is limited to the Mackenzie Mountain Range.
Dall's sheep	CWS, 1973	1:250 000	2 - Mod. winter range or good summer habitat	moderate	CWS series only includes 2 mapsheets within plan area. Based on photo interpretation and aerial surveys in winter and summer.
Dall's sheep	CWS, 1973	1:250 000	3 - Marginal summer habitat	low	CWS series only includes 2 mapsheets within plan area. Based on photo interpretation and aerial surveys in winter and summer.
Dall's Sheep	CT	1:250 000	potential range	low	sheep range potential interpreted from landsat satellite imagery

Dall's Sheep	Simmons, N 1982	1:250000	seasonal areas	moderate	Displays Dall's sheep habitat for a limited area and distinguishes between seasonal uses. The data are limited to a small area and distinguishes between seasonal use (summer and winter).
Dall's Sheep	Simmons, N 1982	1:250000	seasonal areas	moderate	Displays Dall's sheep summer habitat for a small area
Dall's Sheep	NLUIS 1972; Simmons, N 1982; Comin 1978; Bob Decker pers. Com.; Ferguson et al. 1985	1:250000	approximate range	low	The data come from a variety of sources and is limited to the Mackenzie Mountain Range.
Deer	WWG	1:500 000	concentrations	moderate	year-round concentrations
Deer	WWG	1:500 000	seasonal use	moderate	fall concentrations
Elk	WWG	1:500 000	migration area	high	
Elk	WWG	1:500 000	general range	low	
Moose	CWS, 1973	1:250 000	1 - good moose wintering habitat	very high	CWS series only includes 8 mapsheets within plan area. "Moose are restricted or tend to concentrate in favorable areas in the winter." Landform unit mapping was based on aerial photo interpretation and aerial surveys were completed in winter and summer.
Moose	WWG	1:500 000	calving areas	very high	
Moose	WWG	1:500 000	fall concentration	very high	
Moose	WWG	1:500 000	mineral licks	very high	
Moose	NLUIS 1972	1:250000	mineral licks	very high	The data represent only areas where licks are present and does not display individual licks.
Moose	WWG	1:500 000	spring concentration	high	
Moose	WWG	1:500 000	very high concentrations	high	
Moose	CWS, 1973	1:250 000	2 - fair moose wintering habitat	moderate	CWS series only includes 8 mapsheets within plan area. "Moose are restricted or tend to concentrate in favorable areas in the winter." Landform unit mapping was based on aerial photo interpretation and aerial surveys were completed in winter and summer.

Moose	WWG	1:500 000	concentrations	moderate	
Moose	Winter aerial survey; Cochrane, G.A. 1976; Comin, L.A., et al 1981	1:250000	seasonal areas	moderate	Displays moose winter habitat. Data are limited to the Nahanni Park Reserve area: South Nahanni River.
Moose	WWG	1:500 000	summer concentration	moderate	
Moose	WWG	1:500 000	winter concentration	moderate	
Moose	CWS, 1973	1:250 000	3 - poor moose wintering habitat	low	CWS series only includes 8 mapsheets within plan area. "Moose are restricted or tend to concentrate in favorable areas in the winter." Landform unit mapping was based on aerial photo interpretation and aerial surveys were completed in winter and summer.
Moose	WWG	1:500 000	general range	low	
Moose	RWED 2002a	1:1000000	general range	low	These data are very general and completely cover the Deh Cho study area.
Moose	NLUIS 1972	1:250000	seasonal areas	low	Displays moose range and distinguishes between seasonal uses. The data are from a large distributional study area and are displayed to differentiate between spring and winter ranges.
Moose	Parks Canada 1984; Aerial Survey 1977	1:250000	seasonal areas	low	Data are limited to the Nahanni Park Reserve area and data are displayed to differentiate seasonal habitat use.
Moose	WWG	1:500 000	no moose values	N/A	specifically mapped as having no moose values
Mountain Goat	WWG	1:500 000	mineral licks	very high	
Mountain Goat	WWG	1:500 000	concentrations	high	reconciled with landsat range interpretation
Mountain Goat	CT	1:250 000	potential range	moderate	goat range potential interpreted from landsat satellite imagery
Mountain Goat	Decker pers. Com. 2003; NLUIS 1972	1:50000 1:250000	general range	low	Displays approximate range of Mountain goat without differentiating seasonal use. Data comes from small study area within the Mackenzie Mountains.
Mountain Goat	Parks Canada 1984	1:250000	seasonal areas	low	Displays the known summer range of the Mountain Goat. Data is limited to a small area at the northwest tip of the Nahanni Park Reserve.
FISH					

Fish	NLUIS 1972	1:250000	spawning area	very high	Displays existing or potential fish spawning areas and fish migratory routes. Large study area across the Deh Cho.
Fish	NLUIS 1972	1:250000	spawning area	very high	Displays existing or potential fish spawning areas and fish migratory routes. Study area limited to the South Nahanni River watershed
Fish	WWG	1:500 000	Arctic grayling spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Bull Trout concentrations	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Bull Trout spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Burbot spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Coney spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Dolly Varden spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Goldeye spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Jackfish spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Lake trout spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Pickerel spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Sucker spawning	very high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Arctic grayling concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Burbot concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Coney concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Dolly Varden concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Goldeye concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Jackfish concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Lake trout concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	WWG	1:500 000	Pickerel concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m

Fish	WWG	1:500 000	Sucker concentrations	high	lines left as is, polygons buffered by 250 m; points buffered 500m
Fish	NLUIS 1972	1:250000	migration route	high	Displays existing or potential fish spawning areas and fish migratory routes. Large study area across the Deh Cho.
Fish	NLUIS 1972	1:250000	migration route	high	Displays existing or potential fish spawning areas and fish migratory routes. Study area limited to the South Nahanni River watershed
Fish	NLUIS 1972	1:250000	other	low or moderate	Displays existing or potential fish spawning areas and fish migratory routes. Study area limited to the South Nahanni River watershed
ECOLOGICALLY SIGNIFICANT AREAS					
International Biological Programme Sites	Beckel, D.K.B. 1975	1:250000	IBP Sites	mixed	Displays International biological programme sites in the Northwest Territories. The data displayed is limited to sites within the Deh Cho study area.
NOTES:					
n/a = not included in composite map					
WWG - Wildlife Working Group					
CWS 1973 = "Atlas of Wildlife Habitat Inventory Maps for Environmental-Social Program, Northern Pipelines", Government of Canada, Canadian Wildlife Service, May 1973.					
CT = Chris Turner, Cartographic Solutions Inc. (work completed for the Deh Cho Land Use Planning Committee)					
NLUIS = Northern Land Use Information Series					
Full data sources (other than WWF, CWS and CT) are listed in the report, "A Spatial Analysis and Literature Review of Wildlife and Wildlife Habitat in the Deh Cho Territory, NWT"					