4. THE MVCIMP SURVEY

This section of the report focuses on the MVCIMP IMS Survey, including:

- the survey results;
- the survey analysis; and
- the limitations of the study.

4.1 Survey Results

Sixty-six (66) surveys were sent out: 60 to potential nodes, and 6 to hub examples. Thirty-six (36) completed surveys were received back, for a response rate of 55% (and a confidence level of +/- 10%, 19 times out of 20). The response rate is very high for a mail-out type survey, and is likely due to the coordinated efforts of the Project Team and the Working Group.

A full listing of which organizations were sent the survey (and who responded) is included as Appendix III.

4.1.1 Organization Information

Responses were received from most of the major stakeholders interested in CIM within the Mackenzie Valley, including:

- the Government of Canada (Department of Indian Affairs and Northern Development; Department of Fisheries and Oceans; Environment Canada; Natural Resources Canada);
- the Government of the NWT (Resources Wildlife and Economic Development);
- aboriginal governments (including Dogrib Treaty 11; the Gwich'in; the Inuvialuit; the North Slave Metis; the Sahtu; and the South Slave Metis);
- environmental boards (including two territorial permitting boards, and the co-management boards in the Gwich'in, Inuvialuit, and Sahtu land claims regions);
- and other important stakeholders (including one provincial government; five non-governmental environmental agencies; one research institute; and two hub examples).

A full listing of which units/divisions within each organization who responded to the survey is included as Appendix III.

The major stakeholder not represented within the survey sample is that of industry. The Canadian Association of Petroleum Producers (CAPP) indicated that they, as an industry association, are not directly involved in collecting scientific/traditional knowledge information

(so thus did not fill out a survey). The persons contacted at both BHP Diamonds Inc., and Diavik Diamonds Inc. were not able to fill out the survey within the suggested timeframes. Calls and e-mails sent to the NWT Chamber of Mines were not returned (so the reason for their non-response is not clear).

Despite the lack of participation by the Industry sector, the breadth of coverage of the major stakeholders interested in CIM in the Mackenzie Valley is still quite extensive (i.e., all regions of the NWT, as well as the various levels of government).

Table 4.1.1.1 (next page) shows the types of organizations represented in the survey sample.

Table 4.1.1.1: Organization Type

Organization Type

		Frequency	Percent
Valid	Aboriginal Government	6	16.7
	Environmental Board	8	22.2
	Government - Canada	13	36.1
	Government - NWT	2	5.6
	Other	7	19.4
	Total	36	100.0

The “Government of Canada” (36%; N = 13) comprised the largest portion of the survey sample, while “Environmental Boards” (22%; N = 8), “Aboriginal Governments” (17%; N = 6), the GNWT (6%; N = 2) and “Other” organizations (19%; N = 7) made up smaller portions of the sample.

As Table 4.1.1.2 shows, the largest group of respondents (42%; N = 15) were located in Yellowknife, while the second largest group were from Inuvik (22%; N = 8).

Table 4.1.1.2: Location of Respondents

LOCATION

		Frequency	Percent
Valid	Edmonton	1	2.8
	Fort Good Hope	2	5.6
	Fort Resolution	1	2.8
	Fort Smith	2	5.6
	Hay River	1	2.8
	Inuvik	8	22.2
	Ottawa	2	5.6
	Rae-Edzo	1	2.8
	Tulita	1	2.8
	Whitehorse	1	2.8
	Winnipeg	1	2.8
	Yellowknife	15	41.7
	Total	36	100.0

While fewer surveys were received from other NWT communities (including Fort Good Hope, Fort Resolution, Fort Smith, Hay River, Rae-Edzo, and Tulita) and communities outside the NWT (including Whitehorse, Edmonton, Winnipeg and Ottawa), it can be argued that responses were received from a diversity of locations across the NWT.
Most of the organizations surveyed (45%; N = 16) devote less than 20% of their time to environmental monitoring activities, while less than a fifth of the organizations surveyed (17%; N = 6) devote more than 80% of their time to such activities (see Table 4.1.1.3: Appendix IV).

Despite the amount of time spent on environmental monitoring activities, the majority of respondents placed a high (67%; N = 24) or medium (33%; N = 12) importance on environmental monitoring to their organization (see Table 4.1.1.4: Appendix IV). Additionally, the majority of organizations placed a high (69%; N = 25) or medium (29%; N = 10) importance on contributing to/receiving information from a CIM IMS (see Table 4.1.1.5: Appendix IV).

Table 4.1.1.6 shows whether the respondent organizations employed Information Technology (IT), Geographical Information Systems (GIS), or Library personnel on either a full-time, part-time or out-source basis.

Table 4.1.1.6: Current IT/GIS/Library Staff

Organizations that Employ Staff	IT Staff %	IT Staff N	GIS Staff %	GIS Staff N	Library Staff %	Library Staff N
Full-Time	22	8	35	13	20	7
Part-Time	22	8	20	7	33	12
Outsource	36	13	28	10	11	4
None	20	7	17	6	36	13
TOTALS	100	36	100	36	100	36

Eighty percent (80%; N = 29) of organizations employ IT support personnel; eighty-three percent (83%; N = 30) of organizations employ GIS personnel; and sixty-four percent (64%; N = 23) of organizations employ Library personnel.

Table 4.1.1.7 shows the number (and percentage) of respondent organizations who have computer networks in place. Over 90% (92%; N = 33) of the organizations who responded were computer networked.

Table 4.1.1.7: Organizations That Are Computer Networked

Computer Networked

		Frequency	Percent
Valid	No	3	8.3
	Yes	33	91.7
	Total	36	100.0

4.1.2 CIM Information Use Within the Organization

Table 4.1.2.1 (Appendix IV) shows the types of CIM information that is used/produced by the organizations surveyed. “Fish and Wildlife” information, and “Land and Water Activity” information are used/produced by the most respondents (at 83%; N = 30 and 81%; N = 29, respectively).

Other types of CIM information – including “Land Use” information (64%; N = 23), “Remote Sensing” information (64%; N = 23), “Topographic” information (61%; N = 22), “Land Administration” information (50%; N = 18), “Geological” information (50%; N = 18), “ Socio-Economic” information (47%; N = 17), “Archeological/Heritage Resources” information (47%; N = 17), and “Cultural” information (47%; N = 17) - are used/produced by fewer organizations.

Table 4.1.2.2 shows the break-down of CIM information used/produced by the respondent organizations into the “Biophysical”, “Social” and “Cultural” categories. The majority of organizations use/produce mostly biophysical CIM information, and use/produce lesser amounts of social or cultural CIM information.

Table 4.1.2.2: Biophysical, Social and Cultural CIM Information

% of CIM Information	Biophysical		Social		Cultural	
	%	N				
80-100	53	19	---	---	---	---
60-80	22	8	---	---	---	---
40-60	3	1	3	1	3	1
20-40	8	3	11	4	11	4
0-20	6	2	39	14	39	14
No Answer	8	3	47	17	47	17
TOTALS	100	36	100	36	100	36

As Table 4.1.2.3 (Appendix IV) shows, "Regional Level" CIM information was used/produced by the largest number of respondents (39%; N = 14). CIM information that was "Territorial" in scope was used/produced by 28% of respondents (N = 10); "Local/Site Specific" CIM information was used/produced by 22% of respondents (N = 8); and "National/Trans-boundary" CIM information was used/produced by 11% of respondents.

Table 4.1.2.4 (next page) shows the format of the CIM information used/produced by the respondents.

Table 4.1.2.4: Format of CIM Information

Format of CIM Information

		Frequency	Percent
Valid	Half Electronic/Half Paper/Other	16	44.4
	Mostly Electronic	11	30.6
	Mostly Paper/Other	9	25.0
	Total	36	100.0

The most common format that CIM information was found in was "Half Electronic/Half Paper" (44% N = 16), while other formats – such as "Mostly Electronic" (31% N = 11) and "Mostly Paper/Other" (25%; N = 9) – were less common amongst the respondent organizations. The most common types of "Other" formats included video and audio tapes (mostly of cultural/traditional knowledge CIM).

Table 4.1.2.5 (in Appendix IV) shows the various computer applications used to house the electronic portions of the CIM information used/produced by the organizations. Database programs (69%; N = 25), GIS software (67%; N = 24), Word-processors (64%; N = 23), and Spreadsheets (64%; N = 23) were used the most to store CIM information.

Tables 4.1.2.6 and 4.1.2.7 show the GIS and Database applications used to store electronic CIM information within the organizations who responded.

Table 4.1.2.6: GIS Applications Used

Type of Application	Percent of Organizations	Number of Organizations
ArcView	70	25
ArcInfo	36	13
SPANS	14	5
MapInfo	8	3
Other	8	3

Table 4.1.2.7: Database Applications Used

Type of Application	Percent of Organizations	Number of Organizations
Access	47	17
SQL	14	5
Filemaker	11	4
Oracle	11	4
Other	17	6

The most commonly used GIS program was ArcView (70%; N = 25) and the most commonly used database was Access (47%: N = 17).

Table 4.1.2.8 shows that only a small percentage of the respondent organizations (17%; N = 6) have metadata associated with most of their CIM information. Approximately one-third of the respondents (N = 12) had metadata associated with less than 20% of their CIM information.

Table 4.1.2.8: CIM Data With Associated Metadata

% Data with Metadata

		Frequency	Percent
Valid	0-20	12	33.3
	20-40	4	11.1
	40-60	3	8.3
	60-80	2	5.6
	80-100	6	16.7
	Don't Know	9	25.0
	Total	36	100.0

As Table 4.1.2.9 (Appendix IV) shows, 61% (N = 21) of the organizations that had their CIM information in paper or other formats had some type of a library (or other document management system) in place. These systems ranged from formal library set-up's to simple paper filing schemes.

4.1.3 Information Sharing/Costs

Tables 4.1.3.1 and 4.1.3.2 (next page) show the number and percentages of organizations that had Internet access and their own Webpages (respectively). Ninety-seven percent (97%; N = 35) of the respondent organizations had Internet access, and 89% (N = 32) had their own websites.

Table 4.1.3.1: Internet Access

Internet Access

		Frequency	Percent
Valid	No	1	2.8
	Yes	35	97.2
	Total	36	100.0

Table 4.1.3.2: Own Website

Own Website

		Frequency	Percent
Valid	No	4	11.1
	Yes	32	88.9
	Total	36	100.0

As Table 4.1.3.3 (Appendix IV) shows, the most popular types of Internet access included "High-Speed/DSL/Cable" (44%; N = 16), "Dial-Up" (22%; N = 8), and "T1/T3" (14%; N = 5). Additionally, 36% (N = 13) of the respondents felt their Net access was fast; 58% (N = 21) felt their Net access was of medium speed; and 3% (N = 1) felt their Net access was slow (see Table 4.1.3.4, Appendix IV).

Table 4.1.3.5 shows the willingness of organizations to share CIM information.

Table 4.1.3.5: Willingness to Share CIM Information

Willingness to Share CIM Information

		Frequency	Percent
Valid	Very Willing	12	33.3
	Willing	23	63.9
	Not Willing	1	2.8
	Total	36	100.0

The majority of organizations were either "Willing" (64%; N =23) or "Very Willing" (33%; N = 12) to share their CIM information.

Examples of information that organizations were "Very Willing" to share include:

- public domain data;
- published data; and
- non-confidential information.

Examples of information that organizations were "Willing" to share include:

- data that is not yet published (with the written consent of the author);
- some data collected under data sharing agreements; and
- some unpublished data.

Examples of information that organizations were "Not Willing" to share include:

- data/reports that have not yet been peer reviewed;
- confidential information; and
- any information related to land claims or other sensitive negotiations.

As Table 4.1.3.6 (Appendix IV) shows, the major reasons for not sharing CIM information were: confidentiality concerns (39%; N = 14); quality control issues (19%; N = 7); proprietary data (14%; N = 5) and other concerns (6%; N = 2) – including cost recovery issues, and a lack of resources to share their organization's data.

Table 4.1.3.7 shows the extent to which organizations felt the majority of their CIM information was Internet ready. Fifty-eight percent (58%; N = 21) of respondents felt that the majority of their CIM information was not Internet ready.

Table 4.1.3.7 Majority of CIM Information Internet Ready

CIM Information Internet Ready

		Frequency	Percent
Valid	No	21	58.3
	Yes	15	41.7
	Total	36	100.0

Table 4.1.3.8 shows respondent organizations current capacity to share their CIM information via the Internet.

Table 4.1.3.8 Capacity to Share CIM Information

Capacity to Share

		Frequency	Percent
Valid	High	3	8.3
	Medium	18	50.0
	Low	15	41.7
	Total	36	100.0

Only 8% (N = 3) of organizations felt they currently had a high capacity to share their CIM information over the Internet – compared to 50% (N = 18) who felt they currently had a medium capacity to share their CIM information, and 42% (N = 15) who felt they currently had a low capacity to share their CIM information.

Table 4.1.3.9 (Appendix IV) shows that additional human resources was the first priority needed by organizations in order to get their CIM information ready for sharing; additional financial resources was the second priority; and additional technical resources was the third priority.

Table 4.1.3.10 (Appendix IV) shows where organization's CIM information was produced. The largest number of organizations produced the majority of their CIM information "In-house" (42%; N = 15), while the number of organizations that had the majority of their CIM information as "Mostly Links to Outside Sources" (25%; N = 9) and "Some In-house/Some Links" (28%; N = 10) comprised a lesser portion of the sample.

The major impediments to developing a CIM IMS listed by respondents included:

- high cost;
- compatibility problems between differing systems and data formats;
- capacity of the nodes to maintain CIM information;
- lack of metadata;
- transforming written reports into electronic format; and
- confidentiality issues/data sharing concerns.

4.1.4 Website Information/Costs

Two (2) survey responses were received from possible Hub examples (so the results presented here are not considered statistically valid). However, they do give an indication of some of the

issues faced in putting together and maintaining a central website. Additionally, the EMAN – North organization (though they were not able to formally respond to the survey within the suggested timeframe for completion) did provide valuable input as to how their model works through a personal interview between their Technical Co-ordinator and a Project Team member.

One of the respondents devoted approximately $75,000 to the development of their website ($50,000/year salary for one person for a year and a half), while another devoted approximately $60,000 (1 Full-time Person Year (PY) and 1 Part-time PY for approximately 6 months).

The length of time needed to compile the information for the websites ranged from "6 Months to a Year" to "A Year or 2" to "Over 2 Years" for the Hub models considered.

One of the three Hub models experienced difficulties when setting up their website. These difficulties included:

- lack of availability of data from other organizations; and
- problems with summarizing traditional knowledge into usable CIM formats.

4.2 Survey Analysis

The analysis of the survey data highlight a number of important issues which are important to the development of the options for an MVCIMP IMS. These issues can be grouped into two categories, and include:

- issues which guide the development of the options;
- challenges which must be addressed in order for an MVCIMP IMS to be successfully developed.

4.2.1 Issues Which Guide the Development of the Options for an MVCIMP IMS

The survey results highlight a number of issues which will guide the development of the options of an MVCIMP IMS, and include:

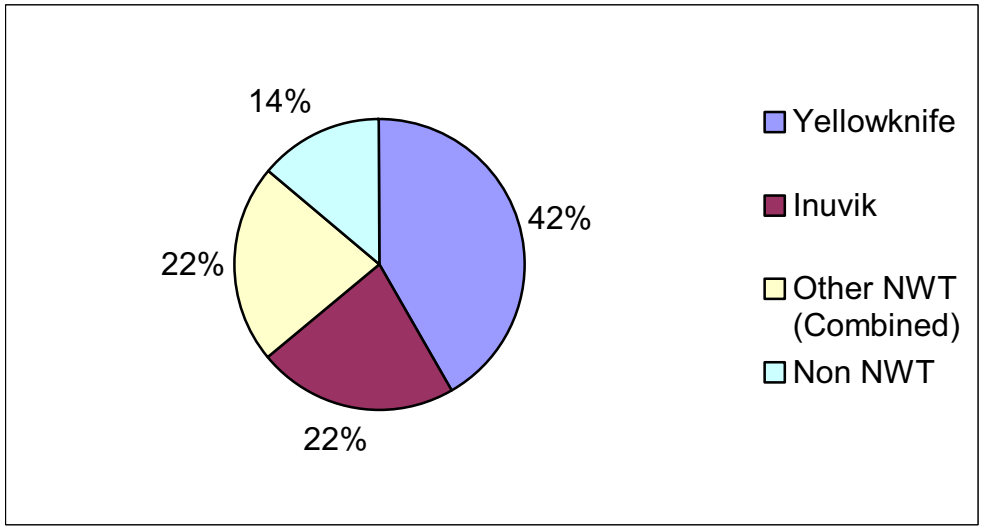
- possible locations for the territorial Hub;
- possible organizations which could host/house the territorial Hub;
- a high level of technical capacity of the potential nodes;
- standardization of programs; and
- the predominance of biophysical CIM.

4.2.1.1 Possible Locations for the Territorial Hub

The locations of the respondent organizations were outlined previously (in Section 4.1.1). What is important about these results is the strong representation of organizations located in Yellowknife and Inuvik.

Figure 4.2.1.1 (next page) shows the location of the respondent organizations.

Figure 4.2.1.1: Location of Respondent Organizations



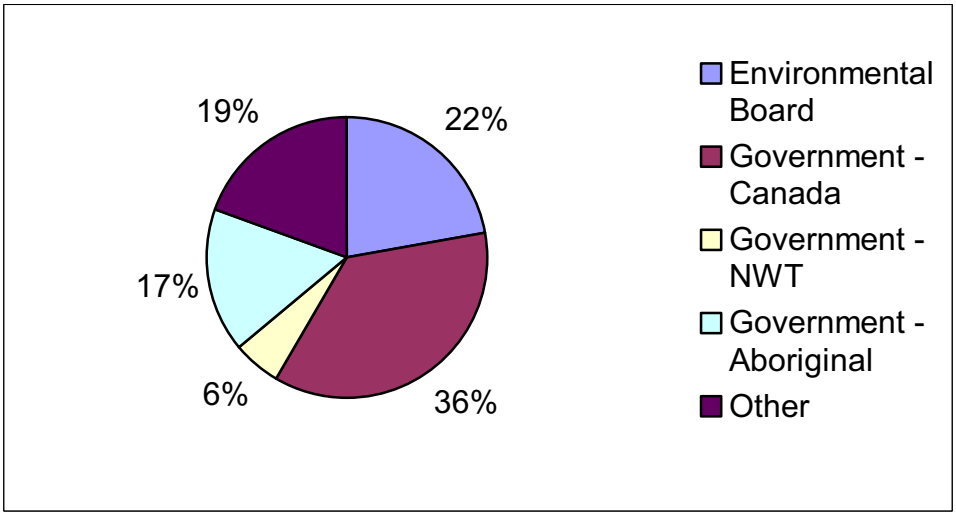
From this distribution - and given the level of activity regarding CIM interest in those two communities compared to other communities in the NWT and those outside the NWT - it would be safe to assume that the territorial Hub should be located in either Yellowknife or Inuvik.

4.2.1.2 Possible Organizations Which Could Host the Territorial Hub

The types of organizations who responded were outlined previously (in Section 4.1.1). What is important about these results is the strong representation of the Government of Canada (especially by DIAND, DFO, and Environment Canada) and the environmental boards (including the MVEIRB, MVLWB and the co-management boards).

Figure 4.2.1.1 shows the types of organizations who responded.

Figure 4.2.1.2: Types of Organization



From this distribution – and given the level of activity regarding CIM interest in those organizations compared to other types of organizations - it would be safe to assume that the territorial Hub should be housed/hosted by either the Government of Canada (possibly by DIAND, DF O, or Environment Canada) or one of the environmental boards (e.g., the MVEIRB, MVLWB, or one of the co-management boards).

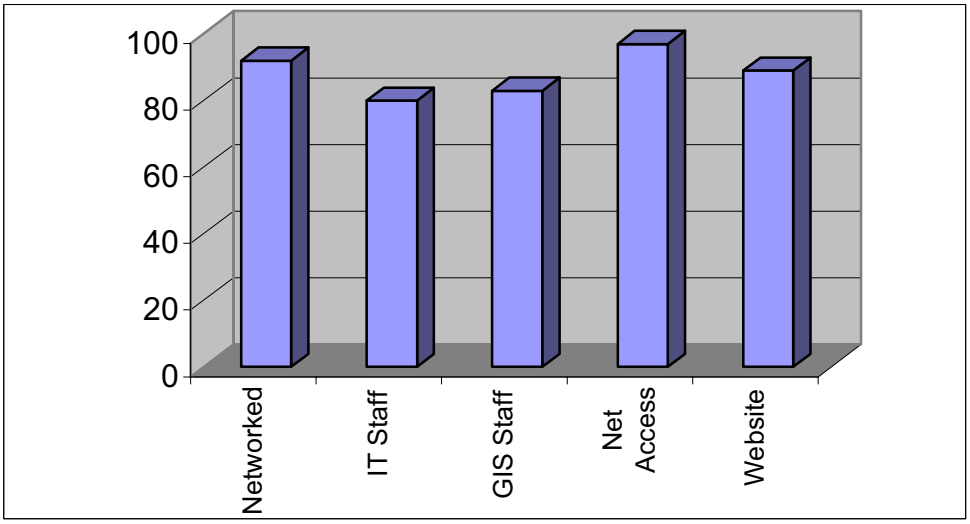
4.2.1.3 High Level of Technical Capacity of the Potential Nodes

The level of technical capacity of the respondent organizations can be seen in the results of the questions regarding:

- the number of organizations that are computer networked (see Section 4.1.1);
- the number of IT and GIS personnel employed by the organizations (see Section 4.1.1);
- the number of organizations that are connected to the Internet (see Section 4.1.3); and
- the number of organizations that have their own Websites (see section 4.1.3).

Figure 4.2.1.3 shows this level of technical capacity.

Figure 4.2.1.3: Level of Technical Capacity of the Potential Nodes



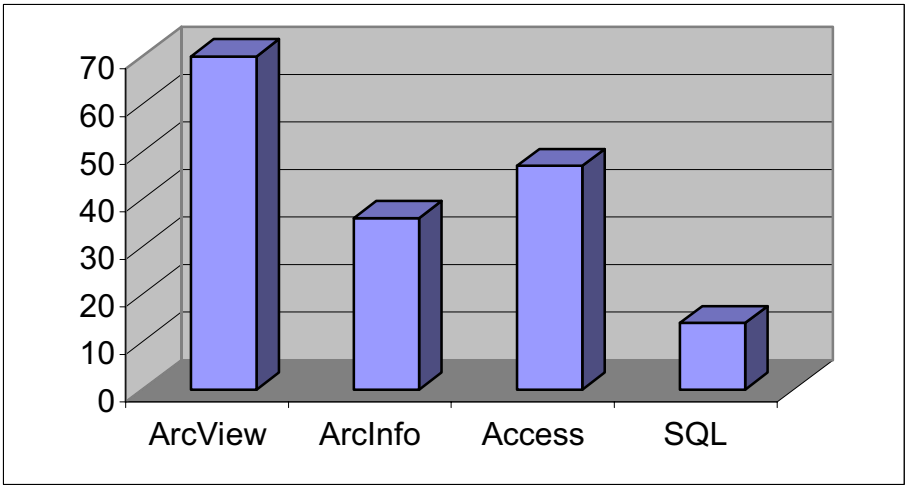
What is important about these results is the high level of technical capacity of the potential nodes. This should make the technical portions of the IMS easier to implement.

4.2.1.4 Standardization of Programs

The types of programs used by potential nodes were outlined previously (in Section 4.2.1). What is important about these results is the emergence of potential GIS and database standards.

Figure 4.2.1.4 (next page) shows the most commonly used GIS and database programs.

Figure 4.2.1.4: Standardization of Programs



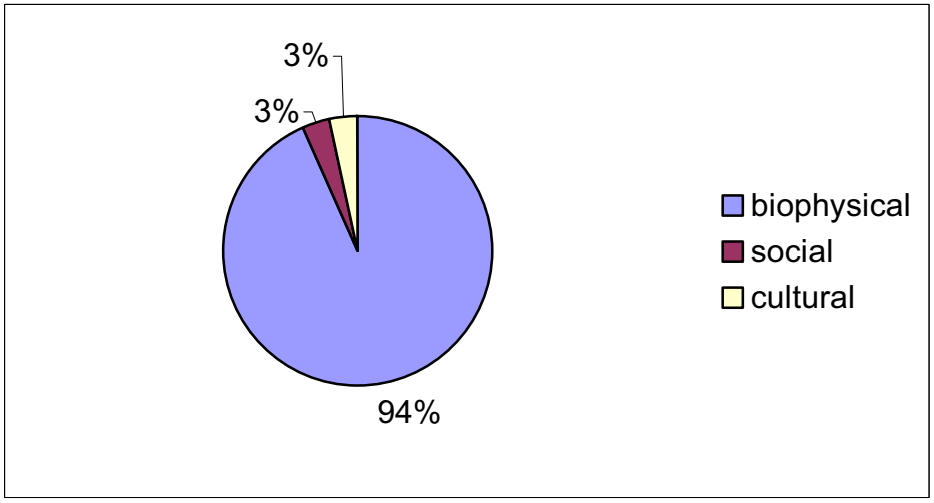
ArcView (ESRI) was the most commonly used GIS program and could serve as the potential standard for GIS software (especially when compared to the next most commonly used program – ArcInfo). Microsoft Access was the most commonly used database program and could serve as the potential standard for database software (especially when compared to the next most commonly used program – SQL).

4.2.1.5 Predominance of Biophysical CIM Information

The amount of CIM information (divided into the biophysical, social and cultural categories) was outlined previously (in Section 4.2.1). What is important about these results is the predominance of biophysical CIM information.

Figure 4.2.1.5 shows the comparison between biophysical, social and cultural CIM information currently used/produced by the potential nodes (where 40% or more of the organization's CIM information is of that category).

Figure 4.2.1.5: Biophysical, Social, and Cultural CIM Information



The predominance of biophysical monitoring information in the nodes is not surprising given the past and current focus of environmental assessment. The inclusion and consideration of both social and cultural impacts in monitoring and assessment is legally mandated and the collection and organization of this type of CIM information should increase in the near-term.

4.2.2 Challenges Which Must be Addressed

The survey results highlight a number of issues which must be addressed before an MVCIMP IMS can successfully be developed, and include:

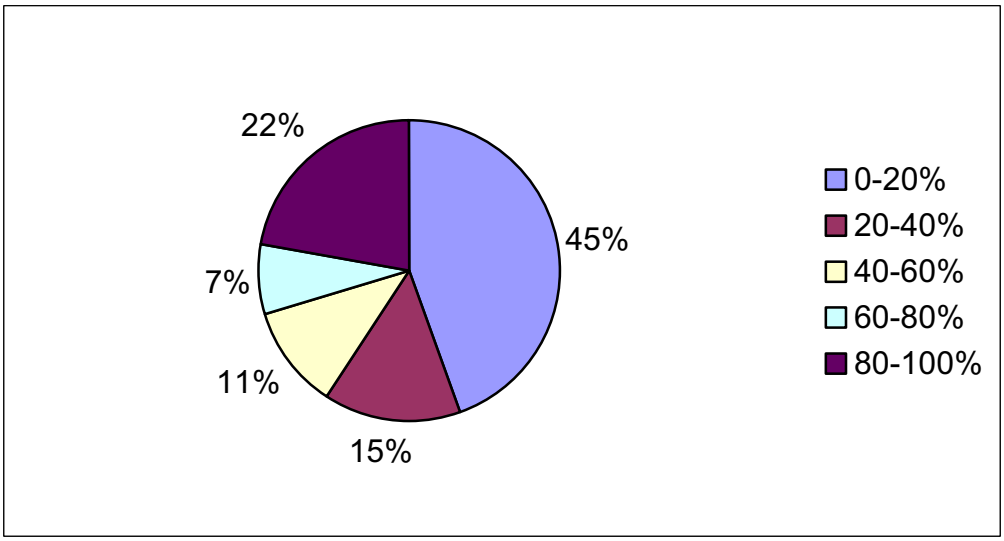
- the lack of metadata associated with CIM information;
- the low capacity of the potential nodes to share their CIM information;
- most of the CIM information at the nodes is not currently Internet ready;
- the need for additional resources at the node level; and
- systemic/structural issues (such as data sharing concerns).

4.2.2.1 Lack of Metadata

The amount of metadata associated with the current CIM information existing within the potential nodes was outlined previously (in Section 4.2.1). What is important about these results is the lack of metadata.

Figure 4.2.2.1 shows the approximate level of metadata at the node level.

Figure 4.2.2.1: Amount of Metadata



By far the most striking result of the survey is the lack of existing metadata. Just over a fifth (22%) of the potential nodes have metadata associated with most of their CIM data. Since the structure of the IMS (predetermined in the Scope of Work) specifies that information be maintained by the authoritative sources, and that the Hub act as a distribution facilitator, this presupposes that the system will be built on metadata. That is to say, the IMS itself will not so much involve the exchange of information, but the exchange of metadata regarding who has what data, and information about that data.

Compilation of metadata does not require sophisticated technology. It requires a standard format and a trained person who knows how to compile metadata correctly. In accordance with the predetermined hub/node model, each authoritative source should have responsibility for compilation of metadata for their own data. The most immediate priority should be to ensure that each node has a person who has the training and time to compile the required metadata. This work should not be done by external consultants, as there has to be a long-term, sustainable process to maintaining metadata “from the inside”.

The hub/node model is based on the premise that each node will be capable of maintaining their own data and metadata, and the technological infrastructure and human resources required to support the IMS. Since there are widely differing capacities at the moment (refer to survey results), the MVCIMP will have to support the development of some of the nodes in order for the system to function. The IMS will only be as good as the nodes that it is based on. It doesn’t matter how good the hub is, if there is no data or metadata to distribute.

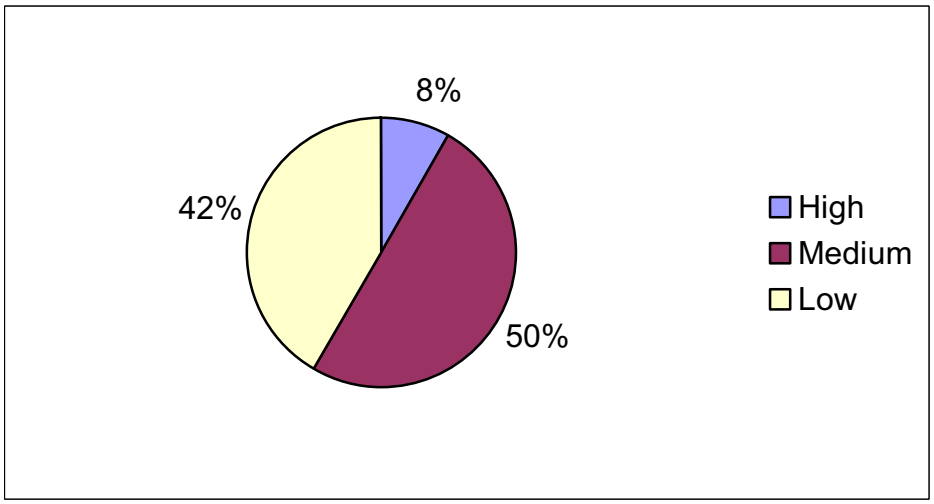
Standards for metadata need to be implemented as part of the IMS. For GIS data, the suggested standard should be the ESRI ArcGIS metadata standard, which is based on the U.S. Federal Geographic Data Committee (FGDC: www.fgdc.gov/) standard. Since the vast majority of Microsoft Access data will have some spatial reference anyway, it is suggested that metadata for database files also follow the same standard. Hardcopy documents, and audio and videotapes should follow the U.S. Library of Congress standard. Adopting these standards will ensure that organizations within the NWT and worldwide will be able to rapidly assess and evaluate IMS data and compare it with data from other sources and geographic regions.

4.2.2.2 Low Capacity of the Potential Nodes to Share Their CIM information

The capacity of the potential nodes to share their CIM information was outlined previously (in Section 4.3.1). What is important about these results is the current low capacity of the potential nodes to share such information.

Figure 4.2.2.2 (next page) shows the capacity of the nodes to share their CIM information via the Internet.

Figure 4.2.2.2: Capacity of Potential Nodes to Share CIM Information



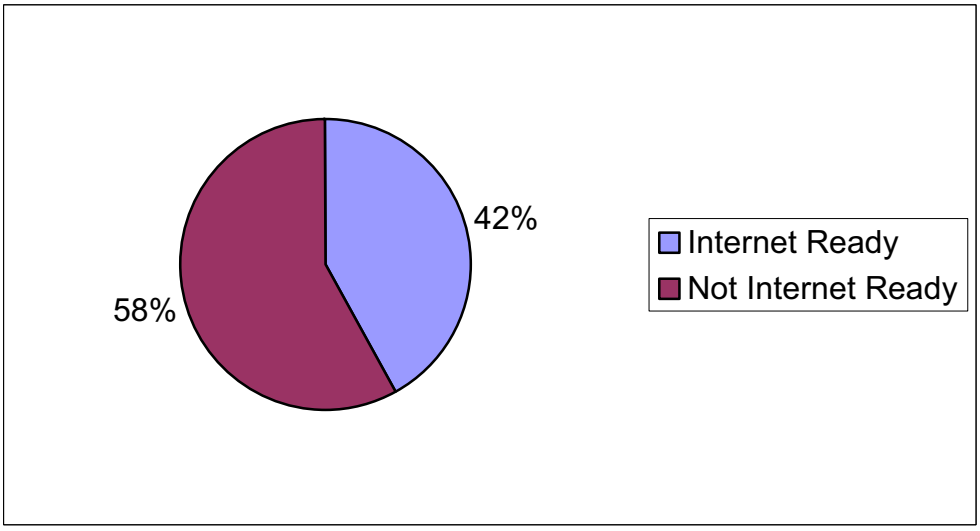
The high percentage of potential nodes who have a “Low” capacity to currently share their CIM information must be addressed if the MVCIMP IMS is to succeed.

4.2.2.3 CIM Information at the Node Level is Not Internet Ready

The amount of CIM information at the node level that is currently Internet ready was outlined previously (in Section 4.3.1). What is important about these results is the current high percentage of potential nodes that felt that the majority of their CIM information was not Internet ready.

Figure 4.2.2.3 shows the Internet readiness of the majority of the potential nodes CIM information.

Figure 4.2.2.3: Internet Readiness of Majority of Potential Nodes CIM Information



The high percentage of potential nodes that felt that the majority of their CIM information was not Internet ready will need to be addressed if the MVCIMP IMS is to succeed.

4.2.2.4 The Need for Additional Resources at the Node Level

The survey data indicated that the amount of resources that would be put into an IMS is critical to the success of the project.

As noted previously in Section 4.1.1, the majority of organizations placed a medium or high importance on contributing to/receiving information from a CIM IMS. Additionally, a large part of the CIM information which would contribute to an MCIMP IMS is produced "In-house" by the organizations themselves.

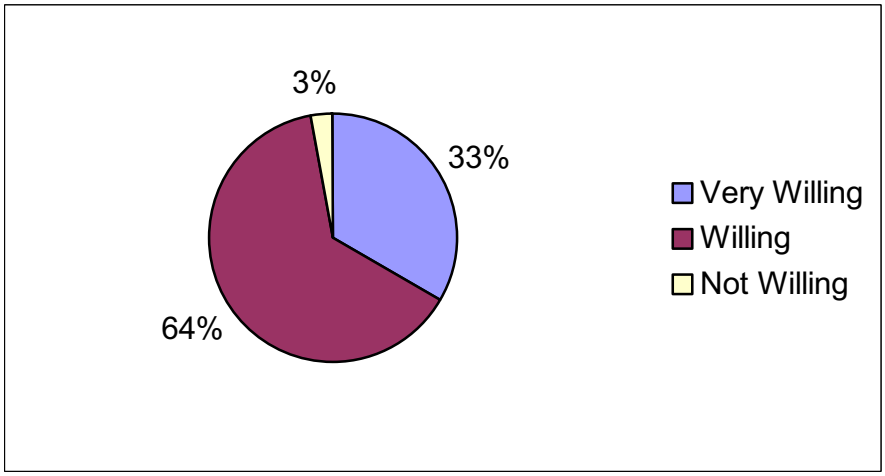
However, all of the organizations surveyed noted that additional resources (especially human and financial resources) would be needed in order for those organizations to properly produce CIM information that could be effectively used for the MVCIMP IMS.

4.2.2.5 Systemic/Structural Issues

A few systemic and structural issues must also be considered critical to the successful development of an MVCIMP IMS.

The survey data indicated a high willingness on the part of the organizations to share CIM information (which is represented in Figure 4.2.2.5).

Figure 4.2.2.5: Willingness to Share CIM Information



However, systemic/structural issues such as confidentiality, quality control, and the proprietary nature of some of the data (see the results for Question # 26, Section 4.3.1) raise legitimate concerns about the ability of the prospective partners to act on that willingness to co-operate.

4.3 Limitations

There are two limitations to this study which must be noted, and which include:

- the scope/length of survey; and
- the lack of industry participation.

4.3.1 Scope/Length of Survey

The scope and length of the survey limited the amount of data that could be collected and the analysis that was possible. Although both the Nodes Survey (33 Questions) and the Hubs Survey (37 Questions) provide for a fairly extensive level of detail and analysis, they are in no means a substitute for the level of detailed information that will be required to implement the MVCIMP IMS. That higher level of detail will only be obtained through on-site visits to the potential nodes.

4.3.2 Lack of Industry Participation

Although every attempt was made to include representatives of the mining, and oil and gas industries in this study, the fact that they were unable to participate limits the report's findings. The participation of those industry segment would have strengthened this report