

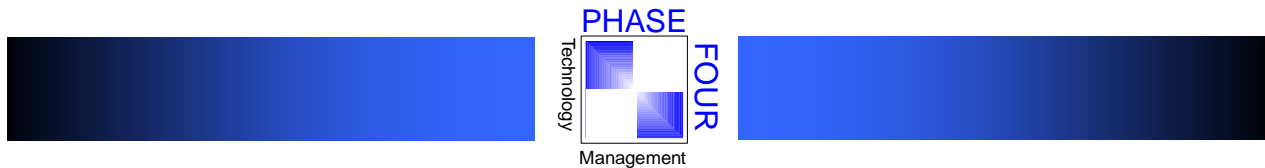
International Joint Commission

RED RIVER BASIN – VIRTUAL DATABASE

Metadata Collection Final Report

Version 1.0 DRAFT

January 6th, 1999



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International Joint Commission

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1. EXECUTIVE SUMMARY

This Metadata Collection Final Report has been prepared for the International Joint Commission (IJC) as part of the first stage of development of the Red River Basin Virtual Database (RRBVDB).

This report presents a summary of the findings during the collection of metadata from source agencies in Manitoba as identified in the Data Assessment stage of this project. A detailed compilation of the metadata is also provided that will be used as input to the Red River Basin Virtual Data Base. One metadata entry was created for each type of data set from each source agency. Duplicate data set entries were eliminated, and the appropriate authority agency was interviewed to obtain the necessary metadata.

Although the focus of this stage in the project was to identify actual data providers and then to collect metadata for each land related information data set within the Red River Basin, a brief technology assessment was also conducted to indicate the agency's level of Internet usage.

In summary:

- 34 agencies were contacted and surveyed
- 121 data sets were catalogued
- 26 agencies have an internet presence in the form of a corporate or departmental web site
- 5 agencies are actively promoting data services over the Internet
- 3 agencies currently use the Internet by way of email and browse access only.

The use of technology within the agencies that were contacted is changing rapidly. As the Internet becomes a stronger vehicle for information sharing and application and services deployment, many of the agencies have indicated plans to move from a passive and static web based environment, to a more interactive and dynamic environment. The next generation of web sites will incorporate facilities in which products and services are offered to business partners, suppliers, contractors and the public at large. Setting the foundation for the Red River Basin Virtual Data Base may be key factor in helping some of these agencies move forward in their plans to capitalize on the benefits of Internet technology.

2. DISCOVERY

2.1 Challenges

During the process of pursuing source agencies for the collection of metadata, a number of challenges were encountered which hindered progress and / or produced results that may not be ideal. These challenges include:

- **Metadata Authority** – in many agencies a number of personnel are involved in the collection and administration of land related information relevant to the Red River Basin Virtual Database project. This made it difficult at times for the agency to determine the best person to provide the metadata characteristics that were needed, and often resulted in time delays, repeat phone calls, repeat visits, and conflicting information that was provided by multiple representatives.
- **Data set Delineation** – in many agencies, custom developed information systems have been created to collect and maintain land related information necessary to support the enforcement and administration of regulations and policies. In these cases, it was often difficult to determine what constitutes a data set, as the data was integrated with a number of other information sets (tabular) or information layers (graphic). In some of these cases, the documented data sets reflect the system(s) in which they are maintained. Information extraction from these systems may not be readily available or may not be possible in a format that is exportable or transferable to another user.
- **Privacy of Information** – some agencies were reluctant to offer any, or much information regarding their operational data sets, citing that these data are proprietary and reserved for internal use only. In some cases it was not possible to obtain any metadata for a given data set. In other cases, this concern resulted in delays in obtaining metadata.
- **Rapidly Changing Technology Base** – many agencies expressed that their current technology base is changing in the near future. The challenge here is in the fact that the metadata collected today, may soon be inaccurate due to technological changes within the source agency in the near future.

2.2 Variances

Since the initial Data Assessment effort was completed in November of 1998, a number of variances have been realized - including the identification of new data sets, the removal of duplicate data sets, and the inability to collect metadata for other data sets originally identified.

2.2.1. New Data Set Entries

As expected, during the interview process with the original 33 agencies that were contacted during the Data Assessment stage of the project, new data sets were identified. Metadata for these data sets have been collected and catalogued as outlined in the following table.

Agency	Department / Section	Data Set
Environment Canada	Meteorological Section	<ul style="list-style-type: none"> Real Time Public Forecasts Meteorological Computer Models Weather Radar Images
City of Winnipeg	Property and Development Services	<ul style="list-style-type: none"> Assessment and Registered Parcels Boundaries City Owned Land Miscellaneous Data Themes Proposed Subdivisions Street Centre Line Network Street Outlines Topographic Base Map Zoning
Department of Highways		<ul style="list-style-type: none"> Raised Pads
Department of Natural Resources	Remote Sensing Centre	<ul style="list-style-type: none"> Radarsat Composite Map of 1997 RR Flood
Department of Natural Resources (Water Resources Branch)	Surface Water Management Section	<ul style="list-style-type: none"> Daily Flood Forecast Sheets Manitoba Hydrologic Conditions and Outlook Report
MCIC		<ul style="list-style-type: none"> Insurance Subscriber List
Ruraland Consulting		<ul style="list-style-type: none"> Rural Structures and Livestock Operations maps

2.2.2. Removal of Duplicate Data Sets

Several data sets were actually identified as duplicate entries in the original Data Assessment Report. In other cases, it was discovered that the data sets were in fact unique, as the source agency had modified, enhanced, or customized the original data set to suit a particular purpose.

It is important to note that many agencies have acquired a variety of base map products to support their in-house Geographic Information Systems processes. These data sets include the digital topographic map series (at various scales), digital ortho imagery, cadastral maps, quarter section grids, street and road network maps.

In cases where the data sets were clearly duplicate entries, the owner agency was contacted for the collection of metadata characteristics.

2.2.3. Data Sets unable to Catalogue

In a few cases, metadata could not be collected for data sets that were originally identified in the Data Assessment Report for a number of reasons. These reasons include:

1. the source agencies were reluctant to provide metadata for data sets that they believed were clearly proprietary and reserved for in-house use,
2. agency staff were not available or the agency was not timely in response to our requests,
3. the level of effort required by the source agency to compile the metadata was too great.
4. no metadata is available or the data set is not yet complete.

These data sets include:

Agency	Data Set	Reason
Environment Canada Water Survey Section	<ul style="list-style-type: none"> • Stage Discharge Curves 	<ul style="list-style-type: none"> • 1 - proprietary
Department of Natural Resources Water Resources Branch Surface Water Management	<ul style="list-style-type: none"> • Stage Damage Curves • Flood Plain 	<ul style="list-style-type: none"> • 3 – effort • 2 - unavailable
Department of Energy and Mines Geological Services	<ul style="list-style-type: none"> • Red River Historical Flood Studies 	<ul style="list-style-type: none"> • 4 – not complete

In addition, some analogue data sets such as brochures and pamphlets that were originally identified have not been catalogued due to their limited usefulness.

2.3 Relevant Notes

The following notes have been compiled from discussions with the source agencies and are relevant to the continuing efforts of building the Red River Basin Virtual Data Base.

2.3.1. General Notes

Although the primary land related information data sets have been identified and catalogued, it was evident that the task of collecting metadata is a never-ending one. Many personnel that were contacted and interviewed were unaware of all of the data sets that their organization produces and maintains. Some data sets were discovered through further research on the Internet or by cross referencing information supplied by other source agencies.

The enormity of the available land related information suggests that the task of keeping the Red River Basin Virtual Data Base complete and accurate, will be a difficult and time consuming one. This issue must be addressed in the development of the virtual data base environment to ensure that the useful life of the data base is sustainable.

2.3.2. Environment Canada

Environment Canada has some concerns about the use of the information included in the metadata files, and how it will be managed in the long term. Their main concern is that making this information available on the “web” will result in the regional office being inundated by requests by the general public, either correctly or incorrectly. It was explained to Environment Canada that if this situation should arise, it would likely be attributed to inaccurate metadata descriptions for their datasets. In which case, the metadata should be reviewed for content and revised appropriately. Environment Canada accepted this explanation, however they would like to reserve the right to withdraw from participation in the virtual database, at their discretion.

A metadata entry for the “Stage-Discharge curves” has been omitted from the cataloguing effort on the request of Environment Canada. PHASE FOUR explained that these data are of particular importance to the project and carry significant

interest to the project stakeholders, but Environment Canada politely declined. Their reasoning is that these curves are created and used for internal purposes only, by Water Survey of Canada in deriving flow records from water levels. The use of the data is highly subjective and requires technical interpretation of water level records used to apply to them. They have made these available to other agencies in the past and encountered problems due to incorrect usage. In addition, since they require interpretation and analysis, the curves are only used under normal operating conditions and not during flood situations. During flood events, they will manually go and measure flow directly, to obtain the most accurate reading. Therefore, Environment Canada does not feel that including these curves will provide any additional information to be used during flood events.

2.3.3. Water Resources Branch

During an interview session with the Water Resources Branch it was noted that the City of Winnipeg operates 3 gauging stations for monitoring water level on the Red River. However, no direct contact was made with the City of Winnipeg to capture this information in a separate metadata file. Water Resource Branch does compile and include the data collected by these 3 city operated stations in its operations.

It is noted here that the metadata file “Hydrometric and Meteorological Data Archive” which contains meteorological and hydrometric time-series data does not list specific monitoring stations. The number of stations is approximated where it was known. However, specific names of stations and accurate numbers of “active” stations was not available at the time of cataloguing. Water Resources Branch expressed a willingness to supply this information but would have been unable to do so in time for publication of this report.

2.3.4. LINNET – The Land Systems Company

Under contract to the Province of Manitoba, LINNET has created and currently operates a spatial data warehouse for the purpose of centralizing the collection, management and distribution of land related information in the Province of Manitoba. LINNET operates the spatial data warehouse, known as the ‘Land Information Navigator’ as a brokerage operation. Many of the datasets that were catalogued as originating from the Department of Natural Resources, of the Province of Manitoba, reside in the spatial data warehouse. Periodic maintenance and enhancements may be carried out by LINNET on a project specific basis, even though the data sets are owned by the Province.

2.4 Technology Assessment

Although the focus of the interview sessions with each source agency was to obtain metadata for each land related information data set, a brief technology assessment was conducted where possible. The objective of the technology assessment was to ascertain the capability of the agency to utilize the Internet as a means to make data available to the public, either in present day or in the future.

This technology assessment should not be taken as a comprehensive analysis of the agency's technical capability, technology direction, technical vision or otherwise. In most cases, this assessment was given by a user of a department of the agency other than the Information Technology department, or has been interpreted from facts and statements obtained during the interview process.

The manner in which the technology assessment is used in this report is merely to help categorize the agency's potential level of participation in a virtual data base environment that uses the Internet as a means to facilitate information requests, and data delivery.

Where appropriate, specific and relevant comments regarding a particular agency's technology capability have been noted.

2.4.1. Use of Internet Technology

Of the agencies that were contacted during the metadata collection process, the manner in which the agency utilizes the Internet is categorized as follows:

Internet Use	Characteristics	Number of Agencies
No Internet Access	<ul style="list-style-type: none"> No access to Internet at all 	0
Email and Browse Only	<ul style="list-style-type: none"> Communicate using email Browse the World Wide Web 	3
Web Presence	<ul style="list-style-type: none"> Communicate using email Browse the World Wide Web Maintain an agency web site 	26
Online Services	<ul style="list-style-type: none"> Communicate using email Browse the World Wide Web Maintain an agency web site Enable transactions to be carried out over the Internet such as FTP services, online purchasing, order processing, and interactive applications. 	5

No Internet Access

All of the agencies have access to the Internet in some fashion, including employees using the Internet via personal email accounts that are established on external Internet Service Provider systems.

Email and Browse Only

Three of the agencies that were contacted appeared to limit their Internet usage to Email and Browse only.

These agencies include:

The Manitoba Conservation Data Centre

The Historical Resources Branch of the Department of Culture, Heritage and Citizenship

Ruraland Consulting Ltd.

Web Presence

The majority of the agencies contacted have a web presence in the form of a corporate web page.

Many of these agencies also operate a sophisticated Intranet (internal applications running on Internet technologies) that includes data distribution to internal department, and / or data viewing capabilities using browser plug-ins to support the graphical display and manipulation of geographic data.

For example, both the City of Winnipeg and Manitoba Hydro use MapGuide (AutoDesk) as a vehicle to display digital map information through a web browser interface. Intranet applications have been built to facilitate data sharing amongst departmental users. These agencies expressed a desire to expand their Intranet mapping capabilities in a limited fashion to external Internet users at some point in the future. This extended reach of data sharing would be meant to enhance the efficiencies of dealing with suppliers, contractors, and the public at large. In some cases, this extension represents opportunities for revenue generation through data sales and information queries on a fee for service basis.

In another example, Ducks Unlimited uses an ESRI map server to provide geographic data display and distribution over their Intranet.

Online Services

Several agencies that were contacted maintain web sites that offer online services in some capacity that include:

1. Online catalogues
2. Online ordering (via email)
3. Online purchasing (via secure transaction processing)
4. Data and application delivery using FTP services
5. Interactive query and response applications

The following table outlines online services that are provided by agency according to the numbered list above:

Agency	Internet Services				
	1	2	3	4	5
Environment Canada http://www.cmc.ec.gc.ca	X	X		X	
LINNET – Land Information Navigator http://www.land-nav.com	X	X			
Manitoba Crop Insurance – (Management Plus Program) http://www.mmpp.com				X	
Manitoba Government (Statutory Publications) http://www.gov.mb.ca	X	X			
Natural Resources Canada (Geographic Names) http://geonames.nrcan.gc.ca					
PFRA http://www.agr.ca/pfra	X	X		X	
Statistics Canada http://www.statcan.ca	X	X	X	X	X

2.4.2. Future Directions

In general, the use of Internet technology by the industry is maturing rapidly.

- Traditional usage of the Internet consisted of creating static web sites to announce the existence of an organization, and to provide the public with general information about products and services offered, and a mechanism to contact

appropriate personnel. Costs to develop these web sites are generally low; benefits are minimal.

- Web sites have become more interactive as technology matured and organizations learned that users were demanding multi-media features, and applications and services to fulfill information requests. Costs to develop these web sites range widely; benefits increase as functionality increases.
- E-Business and E-Commerce technology is advancing the capability of web sites by permitting users to transact business with an organization over the Internet. Financial transactions are processed using secure transaction technology and encryption software. The key to E-Business web sites is in the integration of front end web applications and legacy systems to carry out service request fulfillment, billing, account management, etc. Costs to develop these web sites can be substantial; benefits can be significant.

It was made clear from several agencies (including the City of Winnipeg, Manitoba Hydro, and MTS Communications) that their near future plans include offering services to the public or selected customers and business partners using Internet technology. The objectives of doing so include:

- Providing special service capabilities to selected customers, or business partners in the form of data and information sharing, and customer self service transactions.
- Providing simple services to the public to reduce inbound communications response handling.
- Capitalizing on opportunities for revenue generation through data, information and product sales.
- Capturing market analysis information, and generating leads.
- Simplifying deployment of technical services through the use of industry standard web browsers.

Many of the business drivers behind the move to Internet based services hinge on cost reduction, revenue generation, and improvements to customer satisfaction.

The implementation of the Red River Basin Virtual Data Base will help many of these agencies achieve some level of their immediate objectives.

3. DATA CATALOGUE

3.1 Data Set Index

The following listing represents the data sets that have been catalogued as part of the Red River Basin Virtual Data Base metadata cataloguing effort.

Metadata has been captured using the ‘CORPSMET95’ metadata collection and generation software, developed by the US Army Corps of Engineers. The metadata has been compiled in accordance with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata, version 19940608.

The actual metadata entry for each data set in this list is presented in the following section. Each numbered tab corresponds to the Agency # that is presented in the following list.

#	Agency	Branch / Section	Metadata Entry
1	Culture, Heritage & Citizenship	Historic Resources Branch	<ul style="list-style-type: none"> • MB CHC HRB - Archaeological Sites Inventory.met • MB CHC HRB - Historic Buildings.met
2	Cantel AT&T		<ul style="list-style-type: none"> • Cantel AT&T - Cellular Tower Locations.met
3	City of Winnipeg	Hydro	<ul style="list-style-type: none"> • CofW - Hydro Distribution Network.met
4	City of Winnipeg	Property & Development Services	<ul style="list-style-type: none"> • CofW - Applications & Permits.met • CofW - Assessment and Registered Parcels.met • CofW - Boundaries.met • CofW - City Owned Land.met • CofW - Miscellaneous Data Themes.met • CofW - Property Address.met • CofW - Property Assessment.met • CofW - Proposed Subdivisions.met • CofW - Street Centre Line Network.met • CofW - Street Outlines.met • CofW - Topographic Base Map.met • CofW - Water Ways Air Photos.met • CofW - Zoning.met
5	City of Winnipeg	Water and Waste	<ul style="list-style-type: none"> • CofW - As-Builts.met • CofW - Flood Risk Maps.met • CofW - Primary Line of Defense.met

			<ul style="list-style-type: none"> • CofW - Water and Sewer Network.met
6	City of Winnipeg	Underground Structures	<ul style="list-style-type: none"> • CofW - UGS Approval Applications.met
7	CN Rail		<ul style="list-style-type: none"> • CN - Condensed Track Profile.met • CN - Railway Network.met • CN - Real Estate Records.met
8	Conservation Data Centre		<ul style="list-style-type: none"> • CDC - Threatened and Endangered Species Sitings.met
9	Ducks Unlimited Canada		<ul style="list-style-type: none"> • Duck Unlimited - Air Photos.met • Duck Unlimited - Construction Plans.met • Duck Unlimited - Habitat Inventory.met • Duck Unlimited - Project Inventory.met
10	Emergency Preparedness Canada		<ul style="list-style-type: none"> • EPC - Cross Border Agreements.met
11	Environment Canada	Atmospheric Environment Branch (Meterology)	<ul style="list-style-type: none"> • EC MET - Climate Station Catalogue.met • EC MET - Meteorological Computer Models.met • EC MET - National Climate Data Archive.met • EC MET - Real Time Weather Forecasts.met • EC MET - Real Time Weather Observations.met • EC MET - Timely Climate Monitoring.met • EC MET - Weather Radar Images.met
12		Atmospheric Environment Branch (Water Survey)	<ul style="list-style-type: none"> • EC WSC - Discharge Measurements.met • EC WSC - HYDAT CD.met • EC WSC - Water Level Records.met
13	Fisheries and Oceans	Small Craft Harbours	<ul style="list-style-type: none"> • Fisheries & Oceans - Small Craft Harbours Transfer Plans.met • Fisheries & Oceans - Small Craft Harbours Map.met • Fisheries & Oceans - Small Craft Harbours Engineering Files.met
14	LINNET Geomatics		<ul style="list-style-type: none"> • LGI - Quarter Section Boundary Index Map.met • LGI - Street Network Files.met • LGI - Survey and Ownership Parcel Maps.met
15	MCIC		<ul style="list-style-type: none"> • MCIC - Agency District Boundaries.met • MCIC - Agricultural Risk Areas.met • MCIC - Agro-Ecological Resource Areas.met • MCIC - Crop Production.met • MCIC - Crop Yield Data.met • MCIC - Fertilizer Data.met • MCIC - Fungicide and Insecticide Application.met • MCIC - Herbicide Application.met • MCIC - Insurance Subscriber List.met • MCIC - Soil Classification.met • MCIC - Tillage Data.met

16	MB Dept of Agriculture	Soils and Crops Branch	<ul style="list-style-type: none"> • MB AB SCB - Detailed Soil Survey Maps.met • MB AB SCB - Lab Analysis of Soil Samples.met • MB AB SCB - Reconnaissance Soil Survey Maps.met • MB AB SCB - Soil Surveys Point Data.met
17	MB Dept of Highways		<ul style="list-style-type: none"> • MB HWYs - Bridge and Culvert Openings.met • MB HWYs - Provincial Highways Map.met • MB HWYs - Raised Pads.met • MB HWYs - Road Alignment and Elevations.met • MB HWYs - Road Inventory.met • MB HWYs - Transportation Network Map.met
18	MB Dept of Natural Resources	MB Geographical Names	<ul style="list-style-type: none"> • MB NR - Geographic Names.met
19	MB Dept of Natural Resources	Parks and Natural Areas Branch	<ul style="list-style-type: none"> • MB NR PNB - Geological Mineral Map.met • MB NR PNB - Geological Surface Features Map.met
20	MB Dept of Natural Resources	Remote Sensing Centre	<ul style="list-style-type: none"> • MB NR RSC - Landsat TM Land Cover Maps.met • MB NR RSC - NOAA Land Cover Map.met • MB NR RSC - Radarsat Composite Map of 1997 RR Flood.met • MB NR RSC - Radarsat Imagery of the 1997 Flood.met
21	MB Dept of Natural Resources	Surveys and Mapping	<ul style="list-style-type: none"> • MB NR SMB - Aerial Photographs.met
22	MB Dept of Natural Resources	Land Information Centre	<ul style="list-style-type: none"> • MB NR LIC - Digital Elevation Model.met • MB NR LIC - Digital Ortho Images 60K.met • MB NR LIC - Digital Ortho Images 6K.met • MB NR LIC - DLS and Parish Survey.met • MB NR LIC - Manitoba Administrative Boundaries.met • MB NR LIC - Manitoba Spatial Reference Network.met • MB NR LIC - Topographic Base Maps 1M.met • MB NR LIC - Topographic Base Maps 20K.met • MB NR LIC - Topographic Base Maps 2M.met • MB NR LIC - Topographic Base Maps 500K.met • MB NR LIC - Topographic Base Maps 50K NTS Series.met
23	MB Dept of Natural Resources	<p>Water Resources Branch (Water Planning & Development Section) (Ground Water Management Section) (Surface Water Management Section)</p>	<ul style="list-style-type: none"> • MB NR WRB - Aquifer Maps.met • MB NR WRB - Daily Flood Forecast Sheets.met • MB NR WRB - Daily Water Level Records.met • MB NR WRB - Discharge Measurements.met • MB NR WRB - Flood Frequency Curves.met • MB NR WRB - Flood Proofing Inventory.met • MB NR WRB - Ground Water Well Observations.met • MB NR WRB - Ground Water Wells.met • MB NR WRB - High Water Marks.met • MB NR WRB - Hydrogeological Information.met

			<ul style="list-style-type: none"> • MB NR WRB - Hydrologic Conditions Report.met • MB NR WRB - Hydrometric and Meteorological Data Archive.met • MB NR WRB - River Cross Sections.met • MB NR WRB - Water Chemistry.met
24	MB Dept of Natural Resources	Wildlife Branch	<ul style="list-style-type: none"> • MB NR WLB - Critical Wildlife Habitat Boundaries.met • MB NR WLB - Critical Wildlife Habitat Vegetation Analysis.met
25	MB Emergency Management Organization		<ul style="list-style-type: none"> • MB EMO - Emergency Plans.met
26	Manitoba Environment		<ul style="list-style-type: none"> • MB Environment - Environmental Monitoring and Inspection System.met • MB Environment - Dangerous Goods Integrated Information System.met • MB Environment - Water Quality.met • MB Environment - Petroleum Storage.met
27	Manitoba Hydro		<ul style="list-style-type: none"> • MB Hydro - 20K Topographic Maps.met • MB Hydro - Cadastral Maps of Major Towns.met • MB Hydro - Transformer Stations.met • MB Hydro - Transmission Lines Network.met
28	MTS Communications	Network Engineering	<ul style="list-style-type: none"> • MTS – Guide to MTS Site Locations.met
29	MTS Mobility		<ul style="list-style-type: none"> • MTS Mobility - Cellular Tower Locations.met
30	PFRA		<ul style="list-style-type: none"> • PFRA - 1997 Building Elevations Survey.met • PFRA - Enhanced Manitoba Soils Map.met
31	Rural Land Consulting		<ul style="list-style-type: none"> • Ruraland – Rural Structures and Livestock Operations Maps.met
32	Statistics Canada		<ul style="list-style-type: none"> • Statistics Canada - Manitoba Demographic Profile.met • Statistics Canada - Manitoba Economic Regions.met • Statistics Canada - Manitoba Enumeration Areas.met • Statistics Canada - Manitoba Street Network Files.met

3.2 Catalogue Entries

Each numbered tab corresponds to the Agency # that is presented in the previous list.