
**An Integrated Registry for
Provincial Land & Resource Encumbrance Information**

Development Plan

Prepared by

**Registries Department
Registries & Resource Information Division
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Final report

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EXECUTIVE SUMMARY

This report describes a programme for implementing a provincial “integrated registry” for Crown land and resource encumbrance information. Encumbrance information includes legal rights or interests that have been issued by the government to land, minerals, forests, water, oil and gas and other resources, and that affect the availability or use of those lands or resources by others.

At present, legal status information for provincial lands and resources is stored in numerous separate registries. Finding out about all of the rights that have been granted in a particular geographic area can be a slow and complicated process—each separate registry must be checked and there are few user-friendly points of entry into the registries. An integrated registry will provide ready access to all Crown land and resource encumbrance information via a single internet portal. This will enable faster and cheaper decision-making for both public and private sector users.

The integrated registry concept would involve placing key pieces of encumbrance information from the existing separate registries into a registry information “warehouse”. Users would access that information with a user-friendly, web-based GIS viewing tool. This concept is different from physically consolidating all of the existing separate registries into a single, large registry. Replacing the existing separate registries with a single, large registry would be a major undertaking involving very high costs. The registry warehouse option is considered to be a more cost-effective approach at this time that may ultimately lead to full consolidation of the independent registries and associated business practices.

Six projects are identified for implementing the integrated registry concept over approximately the next three years. The projects are:

1. Confirm specific **user requirements and the business case** for an integrated registry;
2. Analyze **data integrity issues and associated risk to government** of providing common access to encumbrance information;
3. Define **corporate standards** (technology, data and process) for registries management;
4. **Design, develop and implement the first phase** of an integrated registry, which involves providing integrated access to Crown land (surface), mineral, and forestry rights;
5. Following an evaluation of the first phase, **expand the integrated registry** by incorporating other encumbrance information “layers” (e.g., water rights, historical sites, private land surveys); and
6. Address associated **management, business practice and policy / regulatory issues**.

The implementation priorities for the remainder of fiscal year 2001/02 are to undertake the first three above projects and begin to address management and business practice issues (project 6 above). The following fiscal year (2002/03) will see integration of government's primary registries for Crown land, mineral and forest resources. In fiscal year 2003/04 secondary registries will be integrated including water, energy, commercial fish and wildlife harvesting, and heritage sites. By the end of fiscal year 2004/05, government's remaining registry information will be integrated including private land titles and surveys and federal lands and titles.

Costs for implementing an integrated registry are difficult to determine at this time because users' specific requirements and business case analyses have not yet been completed. It is expected, however, that costs to implement the first phase of the programme (i.e., integrating Crown land, mineral and forest encumbrance information) will range between \$655,000 to \$2.31 million, depending on the approach taken.

1. REPORT PURPOSE AND SCOPE

In July 2001 the Ministry of Sustainable Resource Management (MSRM) was mandated to “create a central registry for all tenure and other legal encumbrances on Crown land and resources”. This report describes a work programme for achieving that aim. Background information is provided on the kinds of information that would be placed in a central registry; the concept of a central registry (more accurately called an “integrated registry”) is explained; and a number of distinct projects are identified for implementing the integrated registry concept over a multi-year period.

This report is the outcome of a business planning exercise in the MSRM’s Registries Department that occurred between August and October 2001. Planning team participants are identified in Appendix 1.

2. TERMINOLOGY

The following terms are defined for the purposes of this report. Note that these definitions may vary somewhat from strict legal definitions.

Encumbrance – a disposition of a legal right or interest in land / resources; or an official designation on land / resources, that affects the availability or use of those lands / resources.

Registry – a place (i.e., system) where land / resource encumbrance information is systematically recorded.

Integrated Registry – a place (that is accessible via an internet-based ‘viewing tool’) where the land / resource registry information that individual agencies maintain to support their land / resource management responsibilities may be viewed and queried.

Tenure – conditional rights that are granted by the Crown to access and use land / resources.

3. BACKGROUND

The ideal of having all Crown land and resource legal encumbrance information accessible in a single place has been talked about for years by those involved in managing and using the numerous separate registries that house such information. The diverse and unrelated mandates and programs of provincial agencies responsible for generating encumbrance information, and also technological limitations, kept the ideal from becoming a reality.

Recent events, however, have moved the central registry concept closer to fruition. In March 2001 an independent business review of Crown land and resource encumbrance information¹ recommended the development of a consolidated registry to replace the numerous independent registries that house such information. Shortly following that study, the Premier directed the Minister of SRM to proceed with creating a central registry. At the same time, government reorganization established an integrated Registries Department within the MSRM Registries and Resource Information Division to facilitate the Premier's direction. A strategic plan has also been developed for provincial land and resources information that emphasizes the integration of such information and making it accessible to users². These events coincide with technological advancements in recent years, such as internet-based map viewing and query tools, that make the ideal of an integrated registry a feasible proposition.

4. WHAT INFORMATION ARE WE CONCERNED WITH?

4.1. New Era Commitments—Business Drivers for an Integrated Registry

The primary motivation for government's instruction to develop an integrated registry for Crown land and resource encumbrance information is economic development. Government's main priority is getting the provincial economy "back on track", and a number of "New Era" commitments have been made that have a relationship to Crown land and resources. New era commitments that are business drivers for MSRM's Registries Department in general, and the "integrated registry" project in particular, include:

- Faster approvals and access to Crown land,
- Economic development and competitive business climate,
- Open and accountable decision-making,
- Customer service, and
- Leadership in electronic government.

4.2. Information for Economic Decision-making: The Priority

Knowing these commitments enables us to identify the general types of information that must be incorporated into an integrated registry. The priority is Crown land & resource encumbrance information that is vital for *economic decision-making* – in other words, information needed for business decisions by the private sector, and information needed by government agencies to

¹ RLS & Associates Consulting Inc. and Sierra Systems Consultants Inc. "Provincial Government Legal Encumbrance Programs: Business Review – Current Assessment". (Report 1, April 27, 2001) and Future Direction (Report 2, May 15, 2001).

²"Corporate Land and Resources Information and Inventory Strategy", Prepared by QVI Consulting Group, May 31, 2001.

make legally-based decisions about access to land & resources by the private sector. This means that we are interested in providing simplified and ready access to information on:

1. land and resource ownership,
2. existing tenure rights and in-stream applications for new tenures, and
3. other land & resource “designations” (e.g., reserves) that can affect access to Crown land and resources, or that significantly influence or constrain how land & resources may be used.

Integrated registry users must be able to go to a map of the area they are interested in to see if there are any existing or pending legal encumbrances (i.e., all types) covering that area and, if there are, to get details about those encumbrances. Questions that an integrated registry should be able to answer are:

- Is the land / resource area that I am interested in owned by the provincial Crown, or are ownership rights held by other interests (e.g., other levels of government, private interests)? If the lands have been alienated, what nature and extent of property rights have been granted to private interests (e.g., Crown grants)?
- For provincially-owned lands / resources, have legal tenure rights been granted, and what is the nature and extent of those rights? (i.e., type and duration of tenure, location, tenure holder contact information),
- Are there any applications for new Crown land / resource tenures “in the works”? If so, what type of tenure, where, to whom, and what is the application status?
- Are there any land / resource designations or administrative allocations (encumbrances) over the land / resources that in any way affect the uses that can be made of those lands / resources or how approval is obtained to use the lands / resources? (e.g., zones, reserves or administrative boundaries that are established by authority of a statutory decision-maker?)

Because land and resource encumbrance information is spatial³, users should be able to ask these questions by querying a map of their area of interest, and the results of their queries should be visible in map form to enable users to relate encumbrance boundaries to known geographic features such as place names or water bodies.

Some users may wish to also be able to access information for Crown land / resource encumbrances (and other locations too) on the *quality and quantity* of resource values. Although an integrated registry system will not itself warehouse inventory information (such information will be warehoused elsewhere), it must be able to provide convenient links to such information

³ At present, not all encumbrance information is in spatial (digital map) form.

and be able to “tier to” it in order to facilitate ease of access to, and utility of, the full range of government land and resource information that may exist.

It is also assumed that the integrated registry will provide users with view-only access to government held encumbrance information, plus the ability to generate reports on encumbrances that exist in the locations of interest. This is distinct from the ability to download a copy of the registry data itself. Users who require access to raw data on encumbrances would continue to obtain it through standard data distribution channels, not via the integrated registry.

Additional assumptions about the registry and how it would work are discussed later in this report. It is important to note, however, that specific users and user requirements have not been confirmed. A project to document user requirements is an early priority to drive subsequent integrated registry design and development decisions (see Project #1, section 7). Note also that encumbrance information that is provided via an integrated registry viewer will be subject to provincial freedom of information laws.

4.3. Where is Land & Resource Encumbrance Information Currently Kept?

Provincial land and resource encumbrance information is housed in various formats on various computer (and also hardcopy) systems throughout government. These are managed by the agencies responsible for issuing and recording rights and designations over land and resources. The information systems that they employ were developed to support the agencies’ unique business requirements. Business applications typically involve a combination of decentralized delivery of land & resource disposition / management programs and headquarters information management and systems support functions. Agencies’ primary information management systems were typically not designed with the needs of external users in mind and this has implications for the design of an integrated registry system that will enable common access to Crown encumbrance information.

There is potentially far more information in agencies’ computer systems than is necessary for responding to the above-listed questions about basic Crown land / resource status. Decisions will be required, based on the results of user surveys that still need to be conducted, on the particular encumbrance information that will be made accessible via an integrated registry.

The types of land and resource encumbrance information that currently exist in agencies’ separate information management (registry) systems are shown in Table 1. Figure 1 summarizes the provincial land / resource encumbrance situation. Note the diverse systems that currently house land and resource encumbrance information, each of which must presently be checked independently if users want a comprehensive picture of “land status” for the area they are interested in. Note also the large volume of encumbrance information that is contained in these systems.

Table 1. Provincial Registry Information

Responsible Organization*	Responsible for managing records on:
MSRM – Registries Department (formerly Crown Land Registry Services Branch of MELP)	<ul style="list-style-type: none"> • Crown land surface rights (e.g., Crown grants; <i>Land Act</i> leases, licenses, permits, easements, rights-of-way. • Reserves, designations & map notations established under <i>Land Act</i> • Cadastre (legal property boundaries) • Administrative Boundaries that are established under various statutes (e.g., school districts, electoral areas, municipalities, etc.)
MSRM – Registries Department (formerly Resource Tenures & Engineering Branch of MOF)	<ul style="list-style-type: none"> • Timber and other tenures issued under <i>Forest Act</i> (e.g., forest licenses, tree farm licenses, special use permits) • Timber marks • Forest roads and road permits • Recreation sites, trails and projects • Range (grazing) tenures issued under <i>Range Act</i> (e.g., range licenses, permits, hay cutting permits) • Forest related administrative boundaries (e.g., TSA's, provincial forests)
MSRM – Registries Department (formerly Mineral Titles Branch and Petroleum Titles Branch of MEM)	<ul style="list-style-type: none"> • Mineral claims, mining leases, placer tenures and no-staking reserves issued under <i>Mineral Tenure Act</i> • Coal tenures issued under <i>Coal Act</i> • Petroleum tenures and reserves issued under <i>Petroleum and Natural Gas Act</i> • Geothermal tenures issued under <i>Geothermal Resources Act</i>
MSRM – Registries Department (formerly Archaeology Branch of MSBTC)	<ul style="list-style-type: none"> • Archaeology sites and heritage sites protected under <i>Heritage Conservation Act</i>
MSRM – Registries & Resource Information Division (formerly Land Titles Branch of MAG)	<ul style="list-style-type: none"> • Certificates of indefeasible title and registration of charges / liens against title, established under <i>Land Title Act</i>
MSRM – Water Branch	<ul style="list-style-type: none"> • Water licenses issued under <i>Water Act</i>
MWLAP – Wildlife, Habitat & Enforcement Division	<ul style="list-style-type: none"> • Guide outfitter certificates / licenses, angling guiding licenses, trapline licenses issued under <i>Wildlife Act</i>
MWLAP – BC Parks	<ul style="list-style-type: none"> • Protected Areas (parks, ecological reserves) established under <i>Park Act</i> or <i>Protected Areas of BC Act</i>
MWLAP – Pollution Prevention & Remediation Branch	<ul style="list-style-type: none"> • Contaminated sites designated under <i>Waste Management Act</i>
MoTH	<ul style="list-style-type: none"> • Provincial highways established under <i>Highway Act</i>
Land Reserve Commission	<ul style="list-style-type: none"> • Agricultural land reserves established under <i>Agricultural Land Reserve Act</i> and Forest land reserves established under <i>Forest Land Reserve Act</i>

* The MSRM Registries Department is primarily an “information steward”, managing encumbrance information access and distribution on behalf of the agencies that have ownership responsibility for the information. For example, MOF will remain responsible for generating and updating forest tenure encumbrance information. Access to that information via an integrated registry viewer will be provided by MSRM’s Registries Department. As the integrated registry concept is implemented over time and additional categories of encumbrance information become accessible via an integrated registry viewer, the role of MSRM as an information steward will expand.

4.4. Phased Implementation of an Integrated Registry

Government has determined that the development of an integrated registry will proceed in distinct phases, as shown in Figure 2. Each phase would be followed by testing and quality assurance before proceeding to the next phase.

The initial priority (Phase 1) is to enable integrated access to government’s “primary” registries that contain encumbrance information on:

- land surface rights,
- Crown land cadastre,
- administrative boundaries / designations,
- timber and range tenures, and
- mineral titles and reserves.

Figure 1: Land & Resource Encumbrances in BC

Provincial Land Ownership	Rights and Designations	Registry Systems	
Provincial Crown Land – 93% of provincial land base	Surface Rights (Legal surveys)	Tantalis, ICI	• Land Act tenures and legal survey information • +/- 1.3 million records
	Mineral Rights	MIDA	• mineral, placer & coal tenures • +/- 2.5 million records
	Timber Rights	INCOSADA, FMAP, FTAS	• forest tenures • +/- 1-1.5 million records
	Energy Rights	PTS	• Petroleum and natural gas & geothermal tenures • +/- 30,000 active records
	Water Rights	WLIS	• water licenses • +/- 62,000 records
	Range Rights	INCOSADA, FMAP, FTAS	• grazing licenses & permits
	Commercial Fish & Wildlife Harvesting Rights	Various systems in MWLAP	• guide-outfitter licenses, trap line licenses, angling guiding licenses • +/- 2,000 records
	Administrative Boundaries	ABMS	• municipal boundaries, school districts, electoral areas, regions/districts, etc.
	Heritage Sites	Heritage Registry	• archaeological / heritage sites • +/- 28,000 records
	Strategic Land Use Plan Zones	Client Services Br., MSRM	• resource management zones • higher level plan designations
	Reserves & Designations	Tantalis, MIDAS, ABMS, INCOSADA & Others	• ALR/FLR, ecological reserves, parks protected areas, no-staking reserves, petroleum reserves, etc.
	Highways & Roads	Digital Road Atlas, MOTH, INCOSADA	• provincial highway system, forest roads, mining roads
	Contaminated Sites (all lands – public and private)	MWLAP System	• sites with industrial contamination
	Federal Lands – 1%	Federal Designations & Ownership	Various federal systems
First Nations Lands <1%	Treaty Settlement Lands	Various Systems	• treaty settlement lands)
Private Lands – 5.5%	Fee Simple Title	Land Titles Registry	• private land ownership records, charges & liens against title
100%			

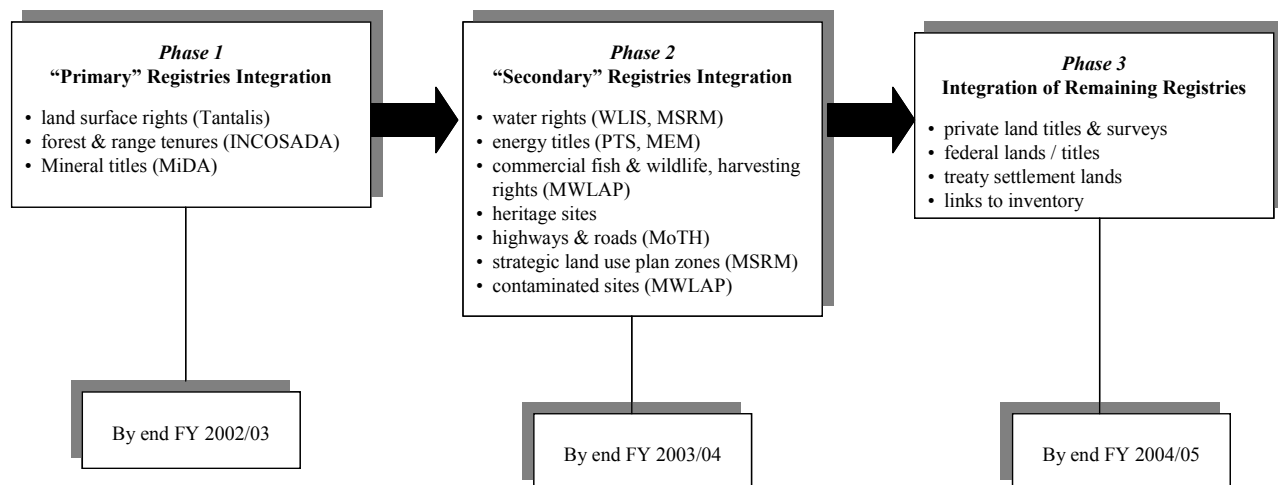
This will be followed by providing integrated access in Phase 2 to the remaining (“secondary”) registries, including:

- water rights,
- energy rights,
- commercial fish and wildlife harvesting rights,
- cultural sites,
- strategic land use plan zones, and
- contaminated sites.

It is envisioned that Phase 3 will entail integration of:

- private land titles and surveys⁴,
- federal lands and titles
- treaty settlement lands, and
- provide appropriate links to provincial land and resource inventory information.

Figure 2. Integrated Registry Development Phases



⁴ Private land survey information is presently housed in an “Integrated Cadastre Initiative (ICI)” system that is a partnership arrangement between the provincial government, utility companies and local governments. Government does not have independent control over this information and any proposals to make ICI data accessible via an integrated registry viewer will require negotiation with these parties.

5. DESCRIPTION OF THE INTEGRATED REGISTRY CONCEPT

5.1. Basic Vision Described

Government's integrated registry of land and resource encumbrance information will serve the needs of a diversity of users including large and small businesses, individuals, and government personnel. Any user with internet access will be able to click onto the province's "Land & Resource Registry" site which allows users to query the encumbrance status of any parcel / area of land or water in BC. This can be done in a number of ways including entering a known map reference or by "fencing off" an area of a provincial map that can be "zoomed into" on the computer screen.

Adjacent to the map image will be a number of expandable tabs that users can click onto, depending on the type of information they are interested in. For example, if a user is interested in finding out about existing timber tenures in the area they have "fenced off", they would click on an expandable tab for "forest tenures". The various types of forest tenures would appear and the user would tick-off the ones of interest (e.g., tree farm licenses, forest license, timber sale license) and request the system to display the result. There would be expandable tabs for other categories of encumbrance information such as surface tenures, mineral titles, water rights, petroleum rights, protected areas, etc. that could also be ticked-off.

The search result would display coloured boundaries of the encumbrances on the map screen. For example, green-outlined shapes (polygons) might be forest licenses, and blue boundaries might be mineral claims. Each tenure shape could be "double-clicked" to find out some more basic information about the individual tenure, such as the date the tenure was issued. If more detailed information is needed about a particular tenure, a hot link may be provided to take the user to the source registry where further attribute information may be found, or an individual contacted for further information. The user would be able to request the system to plot a map of the query and to generate a spreadsheet report that lists all of the encumbrance types that have been searched in the "fenced area".

Integrated Registry Vision From a User's Perspective: Hypothetical Example

Jill supervises a research group in a pipeline company that is planning the route of a possible new natural gas pipeline between two centres in the central interior. Her unit has been asked to investigate and recommend a preferred route alignment. She has done this before and knows that the task can be challenging because of the difficulty and delay in getting access to government information about land and resource values and encumbrances. But this time, she is optimistic because she is aware of the availability of new internet-based tools for accessing government land & resource information and is intending to use them for this project.

Jill's team starts by looking at topographic maps and resource inventory information and selecting three possible routes that meet initial physical design and environmental criteria. They then turn their attention to investigating land and resource encumbrance status on the route options. They go to the provincial integrated registry web site and transfer their first route alignment alternative onto the map screen. They are interested in researching potential legal conflicts with the route alignment and ask the system to search for the presence of surface rights tenures and in-stream applications, timber tenures, mineral tenures, protected areas and First Nations lands. They also ask the system to show all legal survey boundaries and associated land owners that intersect the alignment. They look at these different levels independently and lain on top of one another, and request the system to generate a summary spreadsheet listing all of the encumbrances that exist.

They do this for all three route alternatives and determine that one route stands out as having the fewest conflicts. They then begin to investigate that route more thoroughly by hot-linking to other registry sites that supply greater detail on the conflicting encumbrances and by making contact with provincial registry staff to obtain information about specific encumbrances.

Jill's group concludes their assignment on-time by writing up their research results and submitting their report with a recommended route alternative. They are able to report on all of the potential conflicts along their recommended route and the implications of overcoming those conflicts.

Some time later, they get the company go-ahead to proceed to obtain regulatory approvals for the route. The first thing they do to register their interest in the route is to go on-line to the provincial integrated registry site and file an "investigative permit" application. They do this by plotting their application alignment onto the screen map and providing the necessary information that the system prompts them to answer (e.g., company name, contact, land use purpose). The system advises them of the procedures that will be followed to process their permit application and provides contact name information for other regulatory agencies that they must deal with.

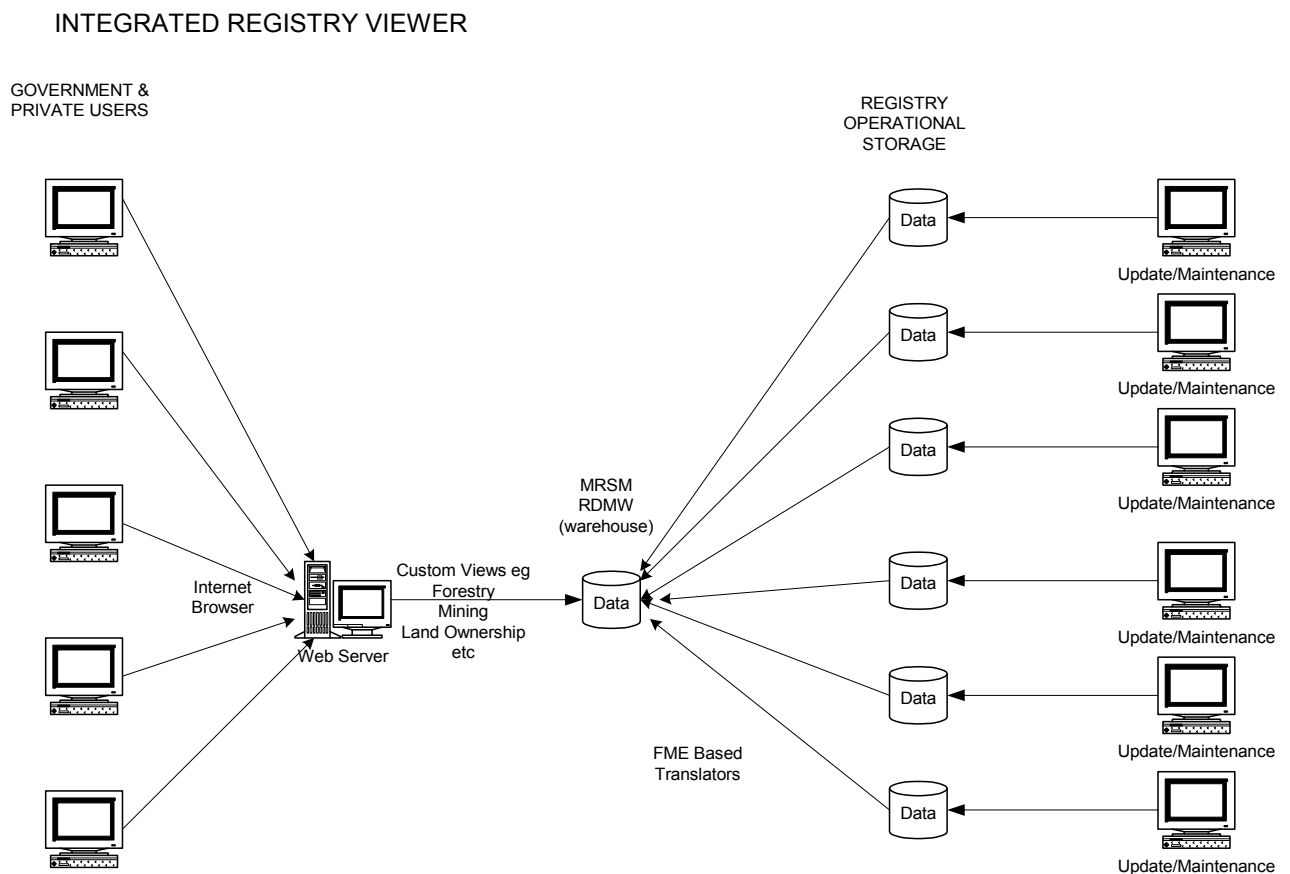
5.2. How Would it Work?

It is not expected that an integrated registry would at this time replace the separate "production systems" such as Tantalus, INCOSADA, or MiDA that presently house registry data and which support the unique business functions of provincial land and resource management agencies. Replacing all existing systems with a "mega" system that consolidates all business functions and resultant land / resource encumbrance information would be a very large undertaking that is not considered feasible at this time⁵.

⁵ This does not mean, however, that business practices for managing the separate registries do not need to be better harmonized. For example, establishing common standards for base mapping, technology platforms, data updating protocols, etc. is necessary to optimize an integrated registry concept. The design concept for an integrated registry may shift following experience and learning gained from Phase 1 implementation.

An integrated registry system would instead use contemporary, off-the-shelf map viewing GIS software (such as that supplied by ESRI, Oracle Spatial, GeoMedia, Map Guide) that can import encumbrance information “layers” from any location. For example, mineral claims would constitute a layer, *Land Act* leases another layer, provincial parks another layer, etc. The user would click onto the layers of information they are interested in and request the system to query those layers in relation to the map area they have defined. The system would immediately “go to” the computer server where that information is located. Some (or all) layers could be located on a common server in a data warehouse, or they could reside on the agencies’ separate registry systems (typically located behind a “firewall” of some sort that protects the integrity of the original “production” data⁶). The layers would be refreshed regularly (probably overnight) so that users have access to reasonably current encumbrance information. Figure 3 shows how an integrated registry viewer might be configured.

Figure 3. Example of Integrated Registry View Configuration



⁶ The optimal system configuration (i.e., where the source data resides) and the selection of map viewing software that would be employed are not recommended here. Answering these questions requires investigation as part of a discrete implementation project to develop and design the integrated registry – see Project #4 below.

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An integrated registry initiative will contribute to increased efficiencies in the way that registry information is managed. Currently, there is some overlap in the number of agencies that store and upgrade the same information sets. For example, most existing registry systems contain administrative boundary information. A more corporate approach to managing encumbrance information will help eliminate overlaps and redundancies. Information custodians will be clarified and their information will be available for sharing with other agencies without the need for those agencies to develop or maintain such information.

It is also expected that the integrated registry tool would be used to make Crown land approvals processes faster and cheaper for both applicants and government. This could be done by integrating “red-lining” capability that allows Crown land / resource applicants to file their applications on-line. For example, if a forest company wanted approval to harvest Crown timber in a particular location within their license area, they could outline that area in red on the map screen and submit it on-line to MOF. Once approved, the Ministry would integrate that line work and the resulting cutting approval into the MOF “production” system (i.e., the INCOSADA system). That information would then become viewable via the provincial integrated registry system. Pilot project work on “red-lining” capability is already being conducted in MEM and MOF, and internally by BCALC. Other enhancements may be introduced over time (e.g., electronic filing of survey plans) that enable traditional Crown land / resource administration and registry business practices to be streamlined, with cost-savings for both Crown land / resource applicants and government land / resource managers.

5.3. Management Responsibilities

The MSRM Registries Department has been set up to ensure that government’s independent “source” registries work effectively together from a corporate perspective, and to oversee the development of an integrated registry tool. A question remains, however, of whether or not a

⁷ The optimal system configuration (i.e., where the source data resides) and the selection of map viewing software that would be employed are not recommended here. Answering these questions requires investigation as part of a discrete implementation project to develop and design the integrated registry – see Project #4 below.

public—private partnership is possible (or desirable) for delivering integrated registry information. There are successful precedents for this in the form of BC Online where, for example, government’s land titles and BC Assessment Authority information is accessible via the internet, with the information distribution service provided by a private sector partner.

Naturally this implies a requirement to charge users a fee for encumbrance information and there are a number of implications of such a policy. For example, the mining sector currently has free internet access to mineral title information. Introducing fees to view this information may discourage use of titles information and this may dampen mineral exploration activity. Also, some Crown land / resource encumbrance information does not have the same completeness / accuracy levels as LTO or BCAA information and asking users to pay for information that is not completely reliable for final decision-making purposes may be difficult to justify (see section 6.2 for further explanation).

Bringing the private sector in as a distribution partner really only makes sense if government’s motive is to generate revenue from the sale of Crown land and resource encumbrance information, or to reduce costs to government. Certainly, government has a monopoly on land & resource encumbrance information and revenue generation is a possibility. This question, however, requires further focused consideration. Decision-makers need to be presented with options and implications as a basis for making informed choices on the merits of integrated registry public private partnership arrangements. This work is proposed to occur under Project #6 – see section 7 below).

5.4. Existing Examples of Integration

There are several existing provincial examples of land and resource encumbrance information integration that can serve as potential models for the integrated registry project. It is too early to say, however, if any one of these should provide the model that an integrated registry tool will be built from. Work is still needed to assess these (and possibly other external) integration examples in relation to user requirements, as a part of designing an integrated registry system (see Project # 4, section 7 below).

The first example is the Ministry of Energy & Mines “MapPlace” site where internet users currently have access to mineral titles, selected forest tenure, and selected administrative boundary information. Using “Audodesk Map Guide” viewing software, users can query the presence of these encumbrances for defined spatial areas. Reports can also be generated. This facility is fully operational and is presently used extensively by the mining sector.

Another example is the provincial Integrated Cadastre Initiative where local governments, utility companies and the province have partnered to integrate legal survey (Crown and private land) and associated attribute and administrative boundary information into a data warehouse. The system is currently under development with complete information available for selected regions. Access is available to partner subscribers.

A third example is a “prototype integrated registry” that is currently being developed as part of the integrated registry project itself. Crown land registry (Tantalis), forest tenure registry (INCOSADA) and mineral title registry (MiDA) information is being integrated for the Cranbrook Forest District and will be viewable using ARC IMS viewing software. It is being developed to demonstrate the integrated registry concept for purposes of soliciting information from prospective integrated registry users and their specific information requirements.

A fourth example is the “Gator interface” that provides external users with internet access to Crown land registry information that is stored in the Tantalis system. Although this tool is currently limited to showing surface rights and Crown cadastre information, it serves as one model for providing outside users with access to encumbrance information. Subscribers pay a fee for downloading information through Gator.

6. ISSUES

6.1. User Requirements and Benefits

A fundamental issue that needs attention as a first priority is that we do not have a precise fix on who we are building an integrated registry for, and what their specific information needs are. Existing registry managers naturally have an approximate idea of users and user requirements—certainly they know their own requirements as internal users; and some previous work has been done to survey external users about their needs (e.g., as part of MEM’s Phase II map design–TRIM-based mapping, and the former MELP’s development of the Gator interface). It will be essential, however, to do comprehensive surveys of potential integrated registry users and their specific requirements to ensure that the integrated registry tool is client driven and provides the benefits envisioned. Surveys must include internal provincial users and external users.

Some threshold level of effort is also needed to document the benefits of an integrated registry tool relative to the costs of developing and maintaining the tool—i.e., a business case analysis. Knowing the approximate magnitude of anticipated economic benefits that will flow from an integrated registry tool is needed as a basis for decisions on the size of investment into an integrated registry development and associated data improvement initiatives that is warranted / prudent. Re-engineering business practices (e.g., electronic document filing) should also speed approvals decision-making and lower costs to applicants and government. These benefits must be factored into a business case analysis that sees the integrated registry project as more than just a computer systems initiative.

6.2. Information Reliability and Interpretation

The information that exists in government’s various registries is of variable quality. For the most part, it is accurate and relatively up-to-date, however, there are anomalies that can affect the level of confidence that can be placed in it for final decision-making / investment purposes.

All of today's computerized registries originate from old hard-copy registries and in some cases their conversion process resulted in "less than perfect" information capture. In other cases, the historical record-keeping procedures themselves resulted in information weaknesses (e.g., lands in the E&N railway land grant). Specialized knowledge is required to appreciate these issues and to understand the limitations of the information being viewed. Expertise is similarly required to understand how legislative and policy changes over time have affected the types of information that is stored in the registries.

Registry staff that work continuously with the information and understand its history and limitations possess this knowledge; outside users, however, would not. The implication is that unless efforts are made to clean and upgrade all "problem areas", there will always be limits on the extent to which integrated registry information should be used for final decision-making and investment purposes, without first obtaining professional assistance (e.g., from a lawyer, land surveyor, registry expert) to help interpret and verify the information.

The types and locations of existing data issues are generally known to staff who work regularly with the registries, but the precise nature and extent of the "information reliability" problem across all of government's separate registry systems has not been documented. There is, therefore, no solid basis for assessing the level of risk (i.e., liability) that government would bear in putting its encumbrance information out to the general public and business community.

Aside from some potential liability risk to government, a primary implication of providing wide access to information with reliability concerns is that the underlying goal that lies behind an integrated registry system—i.e., to stimulate economic development through quicker and cheaper access to information—is potentially hampered. If users feel that they must verify that the information they are downloading is correct by speaking to a registry expert, then we may not really have gained that much. Another potential implication is that the economic value of the encumbrance information may be reduced in the event that government or a private sector partner wishes to charge users a fee for accessing the information.

Again, the real extent of this issue is presently not well understood and a project is needed to define the specific nature and extent of information reliability concerns, to assess the associated risks, and define options for addressing the risks.

6.3. Data Incompatibility

Government's existing separate registry systems are far from static. They continue to evolve as new technology and products become available and as business functions shift with legal and policy changes. Several of the primary registries that we are concerned with are in the process of converting old information into new formats in efforts to improve their business functionality. For example, old forest tenure information (Forest Atlas information) is being upgraded and converted into their INCOSADA system. MEM is also transferring old tenure mapping onto

government's new (TRIM) mapping standard. Still other systems are antiquated (e.g., water rights) and do not meet current standards for "GIS'able" information.

Registry systems have evolved independently without a broader corporate perspective and without common standards for things like:

- the basic systems technology, architecture, and software that are used,
- a common base map for draping encumbrance information onto,
- procedures for capturing 'cleaned' data in the system of origin, or
- standards for data currency.

The implication is, firstly, that not all encumbrance layers may be presently available for incorporation into an integrated registry without first being "cleaned-up" and put into a "GIS'able" format. This means that there may be gaps or 'holes' in registry coverage, at least in the short- to mid-term. Secondly, when integrated registry users want to overlay multiple encumbrance layers to understand relationships, some line work (i.e., boundary information) that is depicted may not accurately represent where the boundaries are actually located in relation to other boundaries (e.g., heights-of-land boundaries).

These are technical issues that can be overcome with data conversion and cleaning over the longer-term, however, in the immediate term they will have some affect on the overall integrity and utility of an integrated registry system. If we are content to provide sufficient qualifiers and caveats on the information, this may not prove to be a large issue. As with the above "information reliability" issue, the nature and extent of this problem needs more careful scoping to understand the limitations that this issue imposes on developing a quality integrated registry tool, and cost-effective ways of overcoming the issue need investigating.

6.4. Resources

The costs of implementing government's integrated registry commitment are difficult to estimate at this stage. Front-end costs (i.e., Phase 1 costs, see section 8 below) are thought to be lower than longer-term costs of addressing registry data reliability and incompatibility issues.

Although the initiative is expected to generate economic benefits in the form of economic development spin-offs, reduced administrative costs to government, and potentially cost-recovery revenues from user fees⁸, there will be challenges in delivering the project in the current (and foreseeable) environment where resources are constrained.

⁸ These benefits need to be scoped as part of a basic business case analysis – see Project #1, section 7.

7. GETTING FROM HERE TO THERE: INTEGRATED REGISTRY IMPLEMENTATION PLAN

Section 5 in this report describes the vision of an integrated registry tool and the preceding section identified some of the major issues standing between the vision and our present ability to deliver it. To address these issues and fulfil the vision, a number of discrete projects need to be undertaken.

This section describes six projects in an integrated registries “development plan”. This plan should be seen as a general blueprint for action over the next approximately three year period. The sequence of projects should occur roughly in the order they are presented, however, some projects will need to be undertaken concurrently. The results of any one project may influence the nature and scope of subsequent projects.

For each project in the development plan, basic project purpose and scope is identified and key activities and deliverables are defined. A preliminary estimate of Phase 1 costs is also supplied—subsequent phases are not costed. Given costing uncertainty a cost range is provided. It is expected that all costing estimates will need to be revisited at the time that terms-of-reference for individual projects are developed. Specific responsibilities for performing the six projects in the integrated registry development plan are not defined. It is assumed that project teams will be established primarily comprising MSRM staff in the Registry and Resource Information Division and the Business Information and Services Division, with consultant support playing a major role in project delivery.

7.1. *Project 1. Confirm User Requirements & Business Case*

Project Purpose

- To confirm who the users of an integrated registry are / would be, and identify their functional requirements for access to land & resource encumbrance information—as the logical basis for designing and developing the integrated registry tool.
- To confirm the business case for an integrated registry tool and associated re-design of registry-related business practices.
- To see if there are lessons from other jurisdictions that we should be applying here.

Key Activities / Deliverables

- Review past agency initiatives to survey users’ requirements.
- Design and apply appropriate survey techniques to assess internal and external users’ requirements (e.g., questionnaire, interviews, focus groups, workshop).

- Complete development of a demonstration prototype(s) for use in soliciting user responses on specific requirements.
- Research selected jurisdictions to determine their progress, motivations and approaches for supplying integrated registry information to internal and external users.
- Develop a business case (i.e., cost-effectiveness analysis) to serve as a basis for deciding the appropriate scale of public investment into integrated registry development.
- On the basis of documented findings / conclusions, make recommendations on basic integrated registry design criteria / parameters.

Preliminary Cost Estimate

Users' requirements study	\$25,000 to \$50,000
Prototype development & user reaction / evaluation	\$10,000 to \$20,000
Review of other jurisdictions	\$5,000 to \$10,000
Business case analysis	\$20,000 to \$30,000
<i>Total</i>	\$60,000 to \$110,000

7.2. Project 2. Analyze Data Integrity Issues

Project Purpose

- For Phase 1 information sets, to define the current extent of land and resource encumbrance information “deficiencies” (i.e., inaccuracies, gaps, incompatibility issues), and how concerned government should be about providing open access to such information because of potential legal risks, and because such information may fall short of users’ requirements for decision-making.

Key Activities / Deliverables

- Document areas (e.g., topic areas and geographic areas) where data quality is questionable, where data gaps occur, and where data incompatibility is a concern. (Phase 1 information sets only – i.e., surface, forestry, mineral rights information). Assess the magnitude of these issues.
- Identify risks (e.g., legal liability) to government of providing external access to registry information that is known to contain errors and / or which requires expert knowledge to interpret properly.
- Identify implications to registry users of data integrity issues in relation to their stated information needs and expectations (as determined from Project 1).
- Develop a “corporate action plan” for responding to risks to government and client needs, including the identification of action priorities and costs to implement the actions. The

action plan should be based on an assessment of options and implications. Short-term responses might include: placing caveats on registry information; providing “reliability ratings” for some registry information; providing help desk service; conducting training workshops on what the registry information means and its limitations. Ongoing initiatives over the longer-term would include data cleaning / improvement projects for priority areas.

Preliminary Cost Estimate

Data integrity / incompatibility & risk assessment study	\$20,000 to \$30,000
Development of corporate action plan (options & implications assessment) for addressing priority data reliability & incompatibility problems (Note: this does not include implementing the action plan).	\$5,000 to \$10,000
<i>Total</i>	\$25,000 to \$40,000

7.3. Project 3. Standards Definition

Project Purpose

- To identify corporate standards (technology, data, and process) for registries management so that when the separate registry layers are imported to the integrated registry viewer they fit properly in relation to each other, and so that the various information layers that users are viewing is of a similar quality.

Key Activities / Deliverables

- Identify the ‘topic areas’ where differing standards are currently being applied by registry managers (e.g., differing systems software, base mapping, data updating protocols).
- Analyze how much of a problem having differing standards creates in relation to achieving the integrated registry vision.
- Based on the problem analysis, develop recommendations on the common standards that should be applied across government’s registry systems.
- Develop procedural recommendations for implementing the common standards that are being proposed across the various registry systems in government.

Preliminary Cost Estimate

Registry standards study, including recommendations on specific standards and procedures for implementing standards	\$30,000 to \$60,000
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7.4. Project 4. Integrated Registry Design, Development & Phase 1 Implementation

Project Purpose

- To proceed to design, build and test an integrated registry viewer (province-wide information for the three, Phase 1 information sets), based on the requirements that users have expressed.

Key Activities / Deliverables

- Assess options for integrated registry viewer software (e.g., ARCIMS, MapGuide, other). As part of this, review existing viewing tools (e.g., MapPlace) to determine their potential to meet the requirements of a comprehensive integrated registry. Make viewer software selection.
- Satisfy software licensing requirements.
- Determine specific information layers and associated attribute information that will be viewable (i.e., the sub-set of information from “primary” registries—i.e., surface, forestry, minerals).
- Customize viewing software as appropriate, and create capability to generate status reports.
- Obtain legal advice on appropriate wording of caveats / qualifiers on encumbrance information.
- Develop appropriate explanatory / help screens to advise users on what they are viewing.
- Establish procedures for managing / administering / supporting the system (i.e., User ID’s / passwords; put into place help desk resources, establish procedures for monitoring usage, technical support).
- Develop and release integrated viewing tool and communicate its availability to users / potential users.
- Following predefined trial period, solicit user feedback, evaluate performance against pre-defined performance criteria (e.g., user satisfaction surveys).
- Document evaluation results and identify recommendations for adjustments, and for system expansion to integrate other registry layers.

Preliminary Cost Estimate

System design, development and trial period evaluation (Phase 1 information sets only)	\$300,000 to \$1.5 million*
Ongoing maintenance and support	\$200,000 to \$500,000 / year
<i>Total</i>	\$230,000 to \$2 million

* This broad range reflects the options that are available. The low-end option reflects a system that leverages from an existing registry viewer to provide expanded access to other “as-is” registry information sets. The higher-end option reflects a newly constructed, more stable / reliable registry system, but which still employs “off-the-shelf, contemporary viewing software that accesses a warehouse of registry information that is obtained from independent source registries.

7.5. Project 5. System Expansion and Phase 2 & Phase 3 Implementation

Project Purpose

- Based on experience gained through the trial implementation project, to expand the integrated registry to include other (secondary, Phase 2 and other, Phase 3) registry information.

Key Activities / Deliverables

- Incorporate the “fixes” that were recommended from the results of the Phase 1 implementation.
- Assess the Phase 2 and 3 information sets for data reliability / incompatibility issues.
- Develop a schedule of integrated registry viewer expansions to provide access to other registry layers (e.g., petroleum, water, archaeological sites, private cadastral fabric, etc.) – as opposed to a single “mass” enhancement project. This schedule will be required to identify any technical upgrades to source data that may be needed before the data is released via the integrated registry.
- Add access to other registry layers through periodic enhancements, per the expansion schedule.
- Keep users / potential users notified of expanding access to registry information.
- Continue to support the integrated registry tool (i.e., help desk support, technical support).
- Monitor usage on an ongoing basis and make refinements / upgrades, as needed.

Preliminary Cost Estimate

This project has not been costed at this time--it will be possible to identify relatively accurate costing estimates following completion of Phase 1 registries integration.	Costs not estimated.
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7.6. Project 6. Address Management, Business Practice, and Policy / Regulatory Issues

Project Purpose

- In parallel with the five above projects, to identify management, financial and administrative support mechanisms needed to develop and implement the integrated registry. The “project” will include a number of aspects, including: a review of department organizational structure; business practices review; policy and procedures development; identification of needed legislative change and deregulation; and development of public-private partnerships.

Key Activities / Deliverables

- Develop an organizational structure for the Department that will support the development and maintenance of the integrated registry. Define staff responsibilities for design, development and ongoing maintenance of the integrated registry. Review the Department staffing allocation and job descriptions, as necessary.
- Investigate what changes to business practices and / or land & resource disposition / management regulations / procedures are needed to bring about increased efficiency and effectiveness in registry management: For example, look at ways to:
 - (1) reduce volume of land & resource encumbrance data that is generated;
 - (2) capture information that clients submit on-line as part of official registry information (e.g., through red-lining, electronic filing) as opposed to having staff re-enter that data;
 - (3) ensure that data that is “cleaned” by one agency is returned to the originating agency so that the updated data makes its way into the official registry;
 - (4) replace regulations that require archaic business practices to be followed by applicants or within government; etc.
- Develop policies / procedures and inter-agency protocols as necessary for development and delivery of the integrated registry (e.g., with BCALC, MOF, others).
- Review and reconcile pricing policies / practices for accessing registry information in relation to:
 - (1) corporate pricing policy for acquiring land & resource (raw) data and for viewing on-line information; and
 - (2) existing viewing facilities that may or may not charge for access to registry information (i.e., MapPlace, Gator, ICI).
- Consider the merits of a public-private partnership(s) to distribute integrated registry information (e.g., BC Online expansion).

Preliminary Cost Estimate

Individual aspects of project have not been costed separately.	\$25,000 to \$50,000 / year
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8. IMPLEMENTATION TIMING AND PHASE 1 COST SUMMARY










Table 2 below summarizes integrated registry development plan projects (Phase 1) by fiscal year. Figure 4 below shows project scheduling by fiscal year.

Table 2. Timing and Phase 1 Cost Summary

Fiscal Year & Phase	Projects		Preliminary Cost Estimate
2001 / 2002 (Phase 1)	Project 1.	Confirm User Requirements and Business Case	\$60,000 - \$110,000
	Project 2.	Analyze Data Integrity Issues	\$25,000 - \$40,000
	Project 3	Standards Definition	\$30,000 - \$60,000
	Project 6	Address Management, Business Practice and Policy / Regulatory Issues (selected aspects only, not entire project)	\$25,000 - \$50,000
<i>2001 / 2002 total</i>			<i>\$130,000 - \$260,000</i>
2002 / 2003 (Phase 1)	Project 4.	Integrated Registry Design, Development & Phase. 1 Implementation	\$500,000 - \$2 million
	Project 6.	Address Management, Business Practice and Policy / Regulatory Issues	\$25,000 - \$50,000
<i>2002 / 2003 total</i>			<i>\$525,000 - \$2.05 million</i>
<i>Phase 1 cost estimate (2001/02 & 2002/03)</i>			<i>\$655,000 - \$2.31 million</i>
2003 / 2004 (Phase 2)	Project 5.	System Expansion & Phase 2 Implementation	
	Project 6.	Address Management, Business Practice and Policy / Regulatory Issues	not costed
2004 / 2005 (Phase 3)	Project 5.	System Expansion and Phase 3 Implementation	
	Project 6.	Address Management, Business Practice and Policy / Regulatory Issues	not costed

Moneys required to deliver the projects in this development plan are expected to come from a combination of base budgets and other special appropriations (e.g., “InfoSmart Funds”) that have been earmarked to implement government’s stated priorities for meeting “new era” commitments related to electronic government.

Figure 4. Project Schedule by Fiscal Year

Project	Phase 1	Phase 2	Phase 3
Project 1 Confirm User Requirements & Business Case			
Project 2 Analyze Data Integrity Issues			
Project 3 Standards Definition			
Project 4 Integrated Registry Design, Development & Phase 1 Implementation			
Project 5 System Expansion and Phase 2 / Phase 3 Implementation			
Project 6 Address Management, Business Practice, and Policy / Regulatory Issues			
	FY 2001 / 02	FY 2002 / 03	FY 2003 / 04

APPENDIX 1: PLANNING TEAM PARTICIPANTS

The following individuals participated in team meetings to prepare the integrated registries development plan.

Godfrey Archbold, Chair	Don Howes
Justine Batten	Evert Kenk
Sue Bergin	Olga Kopriva
Ken Bowen	Gord Lloyd
Daryl Brown, Consultant	Scott Macphail
Scott Clark	Blair Matheson
Darlene Cockle	Rosa Munzer
Adam Dewey	Jill Picard
Stan Hoffmann	Eric Partridge
	Chuck Salmon