

# State of Colorado

## Year 2000 Cost Estimates

### Volume I



## I M C

COMMISSION ON INFORMATION MANAGEMENT  
1525 Sherman Street, suite 100  
Denver, Colorado 80203  
(303) 866-3222  
Fax (303) 86602168

## OSP B

OFFICE OF STATE PLANNING & BUDGETING  
200 E. Colfax, Room 114  
Denver, Colorado 80203  
(303) 866-3317  
Fax (303) 866-3044

August 1, 1997

## *Volume I Table of Contents*

1.	Executive Summary .....	1
1.1	Background .....	1
1.2	Scope .....	1
1.3	Approach.....	1
1.4	Key Findings.....	3
1.5	Conclusions .....	8
1.6	Ongoing Efforts .....	9
2.	Introduction.....	10
2.1	What is the Year 2000 Problem? .....	10
2.2	Purpose of this Report .....	10
2.3	Use of this Report.....	10
3.	Scope .....	13
3.1	Dimensions of Scope.....	13
3.2	IMC Year 2000 Project Office Mission .....	13
4.	Approach.....	15
4.1	Estimating Approach.....	15
4.2	Phase One: The Inventory .....	16
4.3	Phase Two: The Assessment .....	16
4.3.1	The Assessment Process.....	17
4.3.2	Other Assessment Considerations .....	17
5.	Cost Findings.....	19
5.1	Cost Estimates by Department .....	19
5.2	Cost Estimates by Cost Category .....	20
5.3	Cost Estimates by Fiscal Year .....	21
5.4	Additional Funding Requirements .....	24
5.5	Cost Estimates by Impact Level .....	27
5.6	Cost Estimates by Mitigation Type and Inventory Category .....	28
6.	Variability .....	30
6.1	Market Labor Rates and Availability .....	30
6.2	Internal Staff Retention .....	31
6.3	Vendor Compliance .....	31
6.4	Business Partner Management.....	31
6.5	Project Management .....	32
6.6	Non-compliant Systems .....	32
7.	Ongoing Efforts.....	33

# **1. Executive Summary**

## **1.1 Background**

The purpose of this report is to meet the requirement of Footnote 141 to the 1998 State Budget Bill – SB 215, that states “Department of Personnel, Information Management Commission, Year 2000 Compliance -- It is the intent of the General Assembly that the Office of State Planning and Budgeting and the Commission on Information Management advise the Joint Budget Committee by August 1, 1997 of the total anticipated cost of "Year 2000" compliance by each state agency”. This report serves to provide the Joint Budget Committee with the total anticipated cost of Year 2000 compliance for each state department or office.

## **1.2 Scope**

Under the supervision of the Commission on Information Management (IMC), the Year 2000 Project Office, in cooperation with the Office of State Planning and Budgeting (OSPB), has reviewed and reported on all State of Colorado departments and offices with the exception of the Department of Higher Education. The Department of Higher Education has not been part of the IMC information technology review process in the past. The IMC Year 2000 Project Office presented the Year 2000 methodology to the Department of Higher Education and has encouraged them to model the processes.

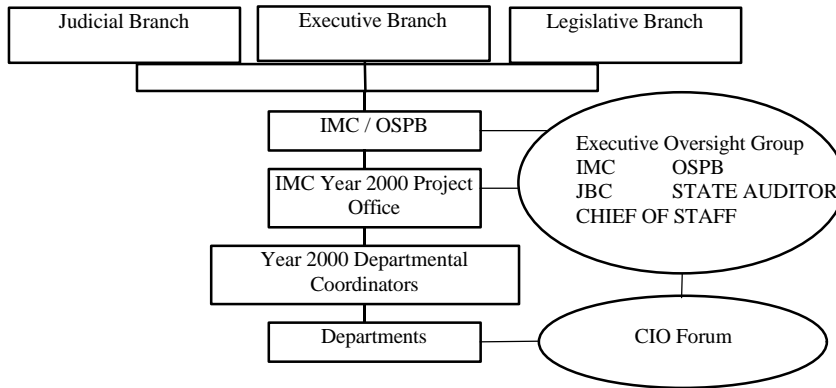
The IMC Year 2000 Project Office analyzed the information systems based on statutory responsibility given the IMC in Senate Bill 87-246. Costs for embedded systems, such as, elevators, hospital equipment, climate control systems, and security access control systems are excluded from this report. The IMC Year 2000 Project Office and the Office of State Planning and Budgeting (OSPB) asked the department’s budget officers to identify and estimate costs for their embedded systems. OSPB will work with the department budget officers to address the embedded system issue. The IMC Year 2000 Project Office has not assumed responsibility for estimating the cost of embedded systems.

The State currently has several initiatives to replace existing information systems. The costs of these initiatives are not included in this report. These initiatives have been justified for business reasons other than Year 2000 issues; albeit Year 2000 problems will be corrected as a result of each initiative.

## **1.3 Approach**

The IMC Year 2000 Project Office was designed to provide leadership and communication for the Statewide Year 2000 effort. The IMC Year 2000 Project Office created the following operational model to facilitate communication among the Statewide communities of interest.

## IMC Year 2000 Project Office Operational Model



The Governor’s Chief of Staff directed each of the departments to designate a Year 2000 project coordinator, in a memo dated January 16, 1997. The coordinators are responsible for organizing department level activities and serve as the primary point of contact for the IMC Year 2000 Project Office. The CIO Forum, an informal group of departmental Chief Information Officers, strategize Statewide information technology initiatives and acts as a liaison to the departments. The Year 2000 Executive Oversight Group has been formed to assist the IMC in resolving issues that relate to the Year 2000 initiative.

The State of Colorado Year 2000 project will follow a six phase lifecycle: Inventory, Assessment, Detailed Planning, Remediation, Testing, and Implementation. The estimating approach of the IMC Year 2000 Project Office followed this lifecycle. The Year 2000 cost estimate is the deliverable from the Inventory and Assessment phases of this project lifecycle.

To estimate costs, the IMC Year 2000 Project Office identified the departments, components, and interfaces making up the systems included in the statewide Year 2000 cost estimate. This estimate process began with a comprehensive inventory of departmental information systems.

After the inventory was completed, the IMC Year 2000 Project Office worked with the departments to complete a standardized, detail cost estimate for their information systems. By standardizing the cost estimates, the IMC Year 2000 Project Office was able to report cost information across the departments. Year 2000 costs were estimated for each system, aggregated to the departmental level, and mapped to the appropriate cost categories. These cost categories are Internal Labor, External Labor, Hardware, Software, Project Expenses, and Other.

A statewide estimate of system costs is subject to a range of variability. The IMC Year 2000 Project Office has recognized this variability by engaging the departments in a confidence factor process. This confidence factor is a qualitative and subjective score designed to identify the presence of variability in the departmental cost estimate. It does not indicate the likelihood of a department becoming Year 2000 compliant by the year 2000.

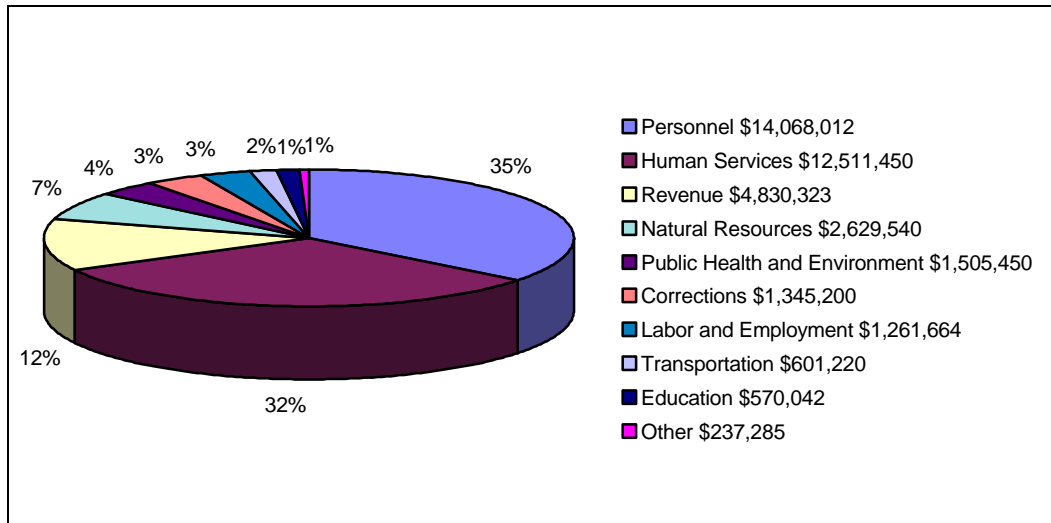
## 1.4 Key Findings

This report provides important information about the Statewide Year 2000 cost estimate summarized below.

- The total estimated cost, as defined in the scope, to achieve Year 2000 compliance for information systems within the State of Colorado is \$39,560,185. This estimate includes:
  - costs already incurred in prior fiscal years
  - costs for existing Year 2000 initiatives already funded
  - costs departments estimate to absorb in their base budgets
  - any additional funds needed for future fiscal years through 2000.

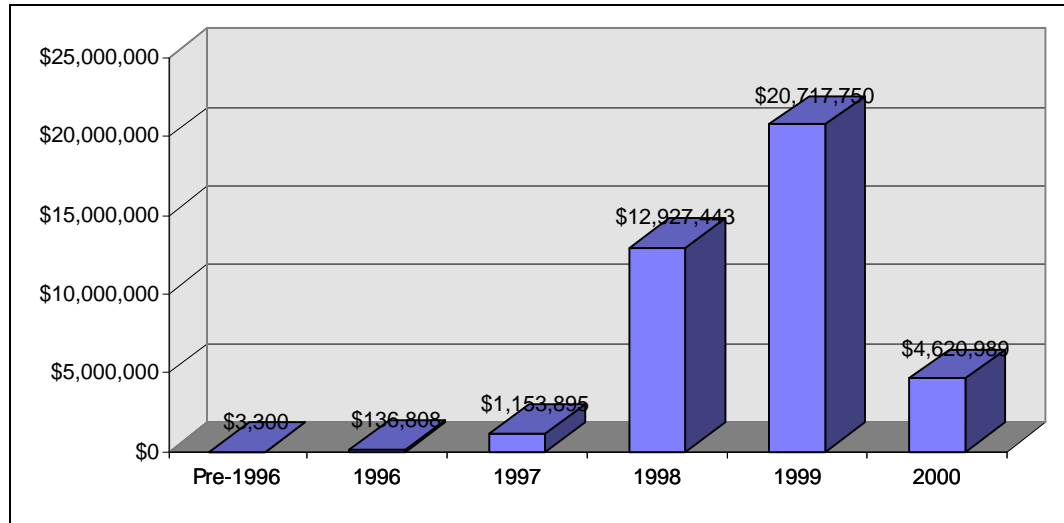
The \$39,560,185 estimate does not include \$2,613,984 of costs estimated from the Department of Higher Education. The estimate from the Department of Higher Education was completed independently from the IMC Year 2000 Project Office.

- Three (3) departments, Personnel, Human Services and Revenue, make up 79% of the Statewide Year 2000 cost estimate. Departmental percentage of costs are illustrated in Figure 1.4-1: Year 2000 Cost Estimates by Department.



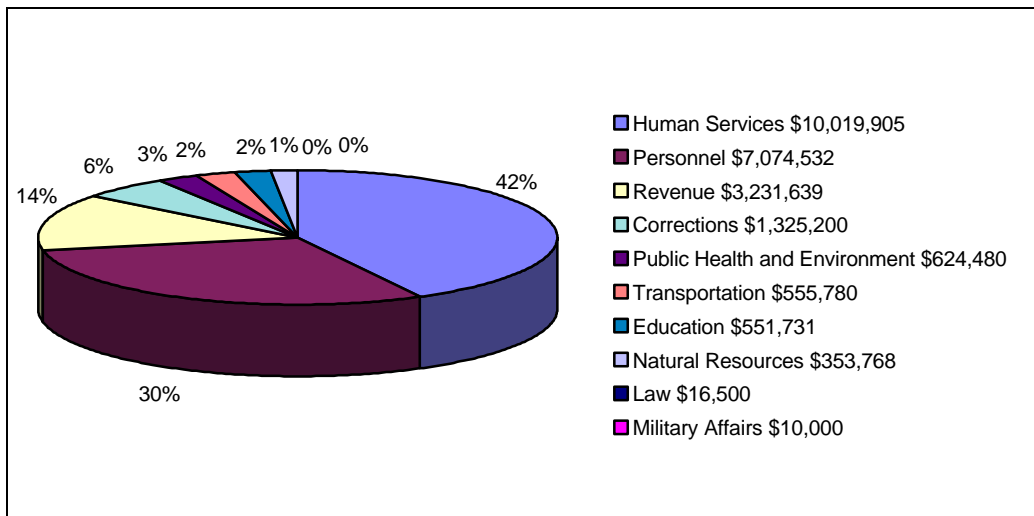
**Figure 1.4-1: Year 2000 Cost Estimates by Department**

- Most departments will begin incurring costs in the current fiscal year (FY 1998). Costs by fiscal year are illustrated in Figure 1.4-2: Year 2000 Cost Estimates by Fiscal Year.



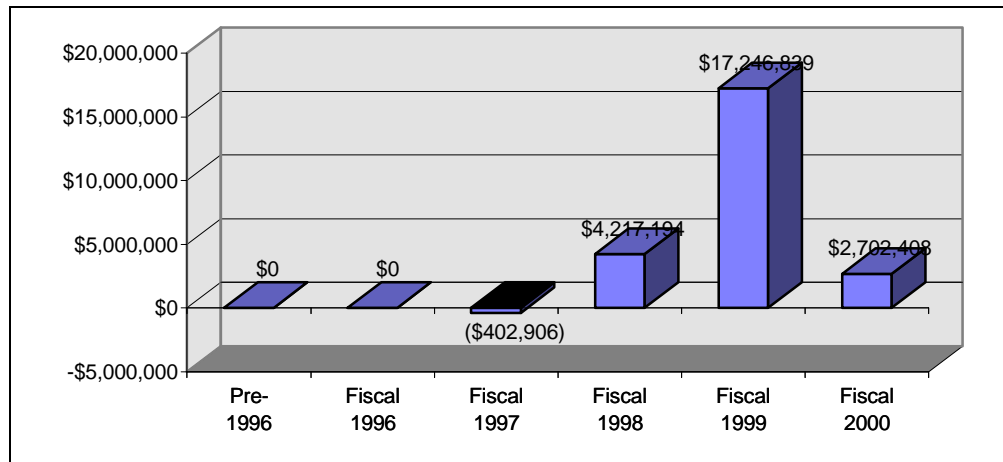
**Figure 1.4-2: Year 2000 Cost Estimates by Fiscal Year**

- The total estimated additional funding, as defined in the scope, required to achieve Year 2000 compliance is \$23,763,534 (net of prior year rollovers of \$402,906). This amount is the total estimated cost, less approved Year 2000 funding, less planned internal contributions from the departments. The internal contributions are preliminary estimates and will be refined through the OSPB budget preparation process. The \$23,763,534 estimate does not include the \$699,173 estimate of additional funding from the Department of Higher Education. The estimate from the Department of Higher Education was completed independently from the IMC Year 2000 Project Office. The departmental percentage of additional funding is illustrated in Figure 1.4-3: Year 2000 Additional Funding by Department.



**Figure 1.4-3: Year 2000 Additional Funding by Department**

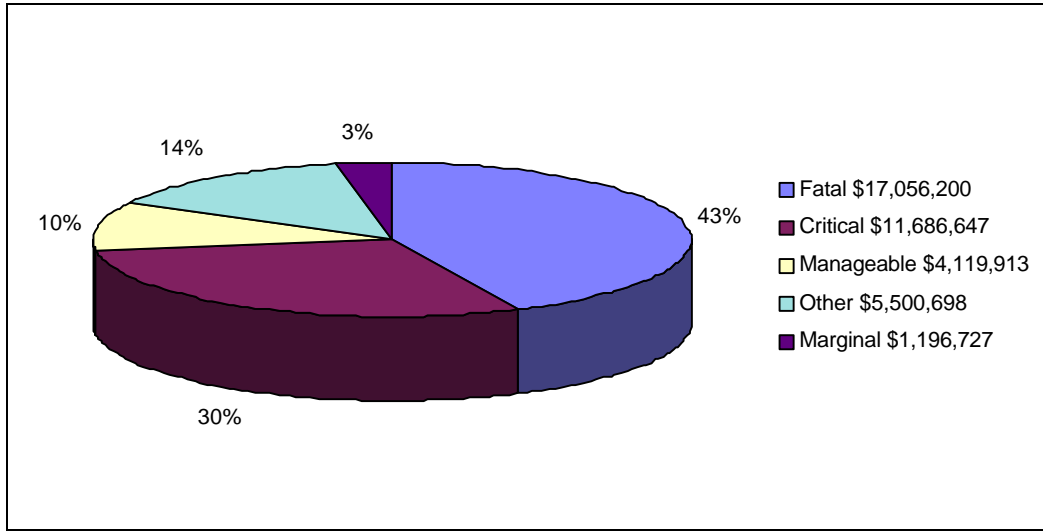
- The majority of the funding requested will be targeted for Fiscal Year 1999 in departmental decision items. Note the negative amount in Fiscal Year 1997 is due to a roll over of funding by the Department of Human Services. Additional funding by fiscal year is illustrated in Figure 1.4-4: Year 2000 Additional Funding by Fiscal Year.



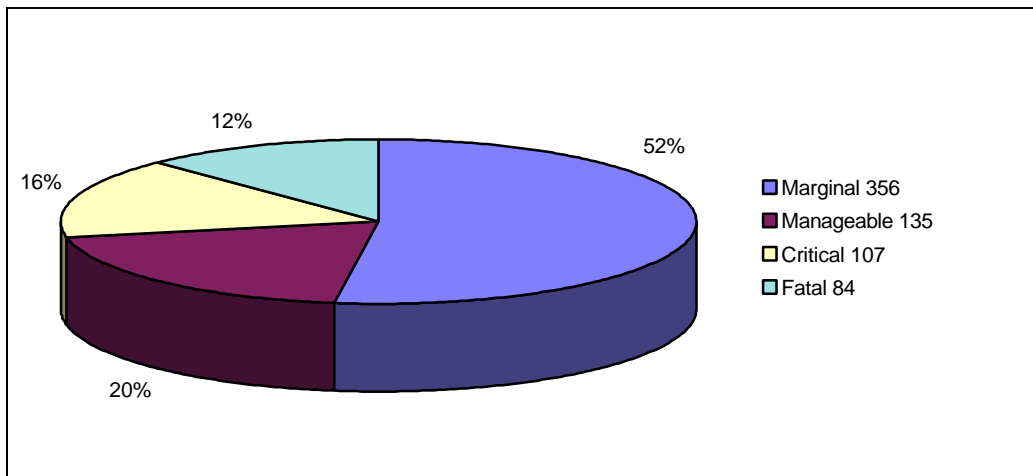
**Figure 1.4-4: Year 2000 Additional Funding by Fiscal Year**



- Fatal and Critical systems, systems that are required by the departments to perform their obligations, account for 73% of the total Year 2000 costs and 28% of the total systems. Costs reported in the Other category include costs needed to support Year 2000 projects, such as Year 2000 project management, including the IMC Year 2000 Project Office. These impacts were reported by the departments and have not been reviewed or linked to core business processes. Statewide cost by impact level is illustrated in Figure 1.4-5: Year 2000 Cost Estimates by Impact. Number of systems by impact level is illustrated in Figure 1.4-6: Percentage of Systems by Impact.

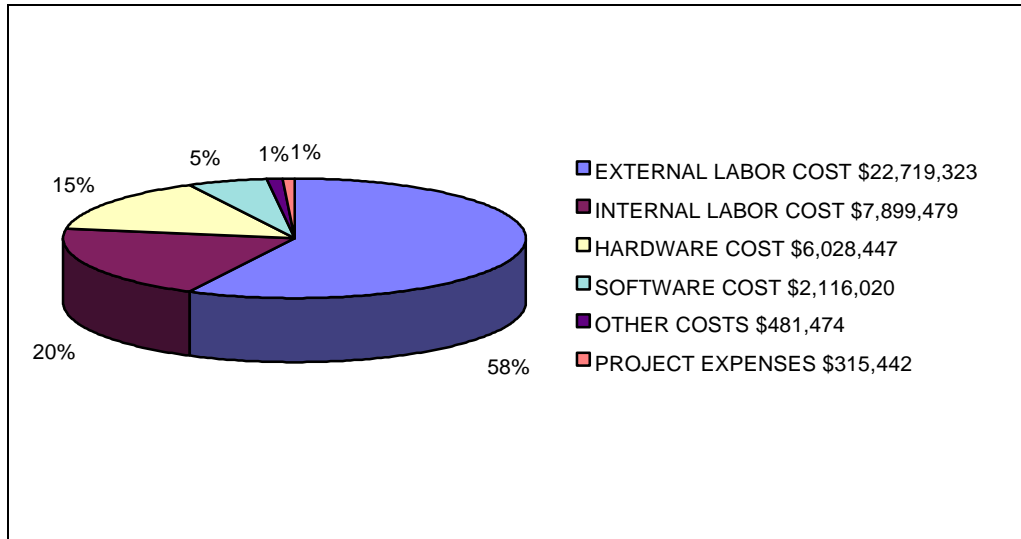


**Figure 1.4-5: Year 2000 Cost Estimates by Impact**



**Figure 1.4-6: Percentage of Systems by Impact**

- Labor costs account for 78% of the total Year 2000 cost estimate. Statewide costs are broken down by cost category in Figure 1.4-7: Year 2000 Cost Estimate by Cost Category.



**Figure 1.4-7: Year 2000 Cost Estimate by Cost Category**

- Fourteen (14) departments or offices reported costs attributable to Year 2000 efforts. The remaining eight (8) departments or offices reported no costs. Reasons for not recognizing any Year 2000 costs include:
  1. No Year 2000 issues. Department systems are already Year 2000 compliant without any associated costs.
  2. Other business initiatives correct Year 2000 issues.
  3. Departments absorbed Year 2000 work within existing maintenance efforts.

Seven (7) of the eight (8) departments that reported no Year 2000 costs have historically had minimal investments in information systems. Therefore, any variability in these seven (7) assessments will be immaterial to the Statewide cost. However, due to Judicial's extensive investment in information technology, it is possible that variability in their assessment may have a significant impact on Statewide cost.

## **1.5 Conclusions**

- Existing departmental budgets may not be adequate to fund all Year 2000 projects. As the countdown to the Year 2000 continues, the finite availability of resources will render departments unable to correct Year 2000 issues. Sufficient funding must be allocated to or by the departments in Fiscal Years 1998, 1999, and 2000.
- The State must be able to retain key staff members in order to ensure Year 2000 compliance by the year 2000. If a department loses key staff members, it loses more

than a valuable technical skill; it also loses the experience and knowledge of the department's environment and applications. These skills can be replaced, but often at a higher cost. The Year 2000 challenge will continue to increase the market value of management and technical resources required to solve Year 2000 issues. The State must consider initiating measures, such as, bonus plans, salary augmentation, and short term contracting to retain key personnel.

- The total anticipated cost for the Statewide Year 2000 project (\$39,560,185) is spread across six (6) fiscal years. As a result, it is difficult to place a confidence level on the total cost estimate. It is more appropriate to group the statewide costs by fiscal year and place a confidence level on the costs for each year. Fiscal years prior to 1998 account for 3% of the total Year 2000 cost estimate.
  - For Fiscal Year 1998, which represents 33% of the total Year 2000 cost estimate, the IMC Year 2000 Project Office is confident that departments have adequately identified Year 2000 project costs. This confidence is based on the expectation of stable external labor rates, modest attrition of internal staff, and adequate time to correct new found problems.
  - For Fiscal Year 1999, which represents 52% of the total Year 2000 cost estimate, the IMC Year 2000 Project Office is moderately confident that the departments have adequately identified Year 2000 project costs. Reasons for this reduced confidence include uncertain external labor rates and availability, higher attrition among key internal staff, and less time available to correct new problems. Supplemental requests may be needed during this fiscal year to compensate for the variability of the estimate.
  - For Fiscal Year 2000, which represents 12% of the total Year 2000 cost estimate, the IMC Year 2000 Project Office is minimally confident that the departments have adequately identified Year 2000 project costs. The IMC Year 2000 Project Office is less confident in the estimate of external labor rates, attrition of internal staff, and external labor availability.

## **1.6 Ongoing Efforts**

Now that the costs are identified, the State's focus will be how best to use the limited time remaining to correct the Year 2000 problem. The IMC Year 2000 Project Office is drafting a plan to sustain Statewide Year 2000 efforts. One aspect of this plan includes detailed planning with the departments and continuous adjustment of the cost estimates. Over time, the quality of the cost estimates are expected to improve (i.e., the relative uncertainty in the total costs of each system will decrease). Another aspect of the plan includes project tracking and budget tracking. This tracking provides the IMC Year 2000 Project Office with the data to do periodic progress reporting on a departmental basis. The final aspect of the plan is verification of Year 2000 compliance for each department.

## **2. Introduction**

### **2.1 What is the Year 2000 Problem?**

Few of the millions of computer applications built over the last 40 years were designed to be used beyond the Year 2000. This problem arises from two simple issues. The first and most widespread is that many systems represent years with only two digits instead of four. This was done to accommodate the limited storage and memory capabilities of earlier computer systems. Computer applications that rely on two-digit year fields are unable to determine whether a given year is in the 1900s or 2000s. As we approach the Year 2000, many of these systems will begin to fail or, worse, to produce incorrect results.

The second issue arises in the determination of leap years. Computing leap years is more complex than commonly realized. The Year 2000 is a leap year, and applications that treat it otherwise are likely to fail.

Computer hardware and software throughout the world is at risk for Year 2000 problems, including those operating in state government. Even hardware and software installed during the past few years have Year 2000 problems. Few compliant products are available from the majority of vendors today. Without Year 2000 compliance, vital State functions and services may fail. This is also true of the State's trading partners (providers of products and services) with whom the State exchanges data: other governments, private industry, and citizens.

It seems logical to assume these date change failures will not begin to appear until January 1, 2000. But in fact, it affects many applications today. A number of applications now use timetables that extend beyond the Year 2000. These applications, such as those that handle tax collection, license renewals, client eligibility, financial projections, and expiration dates are candidates for failure. The likelihood of failure will continue to increase in the years leading up to January 1, 2000.

### **2.2 Purpose of this Report**

The purpose of this report is to meet the requirement of Footnote 141 to the 1998 State Budget Bill – SB 98-215, that states “Department of Personnel, Information Management Commission, Year 2000 Compliance -- It is the intent of the General Assembly that the Office of State Planning and Budgeting and the Commission on Information Management advise the Joint Budget Committee by August 1, 1997 of the total anticipated cost of "Year 2000" compliance by each state agency. Additionally, the Commission on Information Management will be responsible for certifying that each state agency is "Year 2000" compatible.” This report serves to provide the “Joint Budget Committee... of the total anticipated cost of Year 2000 compliance by each state agency.”

### **2.3 Use of this Report**

This report provides the reader with an understanding of the Year 2000 problem from a cost perspective. The report and its associated appendices provide a best estimate, on a department by department basis, of the extent of the Colorado Year 2000 compliance

costs. This report covers information processing systems and specifically excludes embedded systems. (Please refer to *Appendix A: Glossary*, for a definition of embedded systems and Section 3: Scope, for a more complete discussion of the scope.)

This report is divided into two volumes. Volume I provides the cost estimate and describes the estimation process. Volume II contains appendices of supporting data to Volume I. The remainder of Volume I contains:

- Section 3: Scope. This section discusses who was included and what systems were included in the cost estimate.
- Section 4: Approach. This section details how the project office collected data and how the assessments were performed to arrive at the cost estimate.
- Section 5: Cost Findings. This section provides a cost estimate and analysis by department.
- Section 6: Variability. This section discusses the factors that introduce variability that will continue to have an effect on the State's Year 2000 compliance cost estimates.
- Section 7: Ongoing Efforts. This section outlines the ongoing efforts planned by the departments and the IMC Year 2000 Project Office.

Volume II of this report contains the detailed appendices. The appendices provide documented insight into the cost factors and calculations presented in the report. Figure 2.3-1: Table of Contents for the Appendices Volume II, provides an overview to the data contained within the appendices.

<b>Appendix Letter</b>	<b>Title</b>	<b>Explanation</b>
A	Glossary	Definition of terms used in this report
B	Embedded System White Paper	More complete list of embedded systems
C	Executive Order D 0002 97	Reprint of executive order
D	Inventory Detail Structure	Detailed explanation of information contained in the Year 2000 inventory database
E	Cost Confidence Factor White Paper	Description cost confidence factor process
F	RFP and Associated Data	RFP for contract labor for information processing and Year 2000 skills and price bids from 42 vendors
G	Rate Calculation	Explanation of external hourly labor rate calculation used in report estimates
H	System Level Estimating Instructions	Instruction to departments on how to complete cost estimates
I	Departmental Cost Estimates	Detailed departmental cost estimates
J	Other States' Data	Comparison of Colorado to other states' Year 2000 costs

**Figure 2.3-1: Table of Contents for the Appendices Volume II**

### **3. Scope**

This section describes the scope of the IMC Year 2000 Project Office's efforts to derive the Statewide Year 2000 cost estimate. The scope describes the departments that were investigated and the type of systems analyzed.

#### **3.1 Dimensions of Scope**

The IMC Year 2000 Project Office surveyed, analyzed and correlated efforts and dollars on a Statewide, department by department basis.

This report presents cost estimates for all State departments with the exception of Higher Education. Within the departments, the scope was reduced to include only the systems whose decision items are reviewed by the Commission on Information Management (IMC). Examples of types of systems included in the report are: application software, hardware, system software, networks, personal computers, and system tools.

Embedded systems were specifically excluded from the scope. Examples of embedded systems are: automobiles (Engine management/service interval prediction systems), climate control systems (HVAC), Correctional Facilities Access Control Systems, Electronic Time Management Systems (e.g. personal organizers), Elevators, and Facilities Management systems. Refer to *Appendix B: Embedded System White Paper*, for a more comprehensive list of excluded embedded systems.

#### **3.2 IMC Year 2000 Project Office Mission**

Governor Roy Romer has recognized the Year 2000 compliance issue as the top Information Technology priority in the State (Refer to *Appendix C: Executive Order D0002 97*). The IMC has an interest in ensuring that the State's business needs, as supported by information systems, are viable and uninterrupted into the next century. In response to the Executive Order, the IMC established a Statewide Year 2000 Project Office with a mission to provide assistance and coordination to departments in their efforts to ensure that systems will correctly handle the year 2000 date change. The IMC will oversee the operation of the Statewide Year 2000 Project Office. A partial list of the IMC Year 2000 Project Office responsibilities include:

1. Analyze the State's systems to determine the changes that need to be made.
2. Provide accurate status on the State's efforts to convert its systems to handle the Year 2000 date change.
3. Assist departments by serving as a broker for appropriate and adequate resources and funding to complete the Year 2000 changes in a timely manner.
4. Ensure that methodologies, tool sets, and other solutions are shared among the departments.
5. Act as the catalyst to move and provide resources in a timely manner for and between departments to address common problems and issues.

6. Educate and inform all stakeholders by heightening awareness and reporting on the progress of the Year 2000 issue to an appropriate level.
7. Review departmental requests for funds for technical soundness and cost effectiveness.



## 4. Approach

This section describes the approach used by the IMC Year 2000 Project Office to produce the cost estimates contained in this report. All data provided in this report was obtained using this approach.

### 4.1 Estimating Approach

The State of Colorado Year 2000 project will follow a six phase lifecycle: Inventory, Assessment, Detailed Planning, Remediation, Testing and Implementation. The estimating approach of the IMC Year 2000 Project Office followed this lifecycle. The Year 2000 cost estimate is the deliverable from the Inventory and Assessment phases of this project lifecycle. Figure 4.1-1: Year 2000 Project Lifecycle describes the purpose, activities and deliverables of the project lifecycle.

<b>Lifecycle Phase</b>	<b>Purpose/Activity</b>	<b>Deliverable</b>
Inventory	Determine the size and scope of the problem. Survey systems, languages, files, technologies and business partners.	Detailed system by system inventory
Assessment	Determine the cost of the problem based on type of system, project constraints, availability of resources, remediation type, feasibility and a high level plan.	<p>Deliverable 1: A system by system cost estimate taking into account department specific issues. The individual estimates roll up to a department and organization-wide estimate including organization wide project costs.</p> <p><b>Year 2000 Cost Estimate Report Delivered August 1, 1997</b></p> <p>Deliverable 2: A high level plan to bring each system to compliance prior to the millennium.</p> <p><b>The presence or absence of a department high level plan influenced the confidence factor process.</b></p>
Detailed Planning	Determine the exact schedule and plan the work to remedy each system by department.	Detailed plan showing phases, milestones, deliverables and reflecting departmental detailed task schedules for each system confirming the initial cost estimate.
Remediation	Fix the problem by renovating, replacing, or retiring the system.	Systems compliant and ready for system level test.
Testing	Ensure the fixed system works by testing with day to day clients, interfaces, external business partners.	<p>Deliverable 1: Completed system level test.</p> <p>Deliverable 2: Completed department wide test.</p> <p>Deliverable 3: Completed interface test.</p>

Lifecycle Phase	Purpose/Activity	Deliverable
Implementation	Place the compliant systems into production and support on a day to day basis with adequate support.	Uninterrupted day to day operations with compliant systems. Completed Year 2000 verification process.

**Figure 4.1-1 Year 2000 Project Lifecycle**

#### **4.2 Phase One: The Inventory**

This phase determined the size and scope of the Year 2000 problem. The deliverable from this phase was a detailed system by system inventory of computer systems, interfaces, and critical dates for each department. This detailed inventory was the basis for the estimates produced in the following assessment phase. The inventory permits the departments and the IMC Year 2000 Project Office to track future activity, budgets, progress and impact on a system by system basis. The inventory is stored in a database with the ability to produce a variety of reports. These reports are a valuable tool to track and manage the ongoing Statewide Year 2000 effort.

The inventory of information systems statewide commenced April 1, 1997 and was completed May 19, 1997. A total of 682 systems were inventoried. The detailed layout of the inventory format can be found in *Appendix D: Inventory Detail Structure*.

#### **4.3 Phase Two: The Assessment**

Once the inventory was complete, the departments, in conjunction with the IMC Year 2000 Project Office, prepared a cost assessment for each inventoried system. Next, the IMC Year 2000 Project Office worked with the departments to assess departmental plans and cost estimates to bring each inventoried system to compliance. For each system within a department, the assessment phase attempted to confirm and validate four items:

1. the problem solving method selected by the department
2. the estimated cost
3. the planning priorities by system impact
4. the existence of a project plan.

Finally, the IMC Year 2000 Project Office and department staff determined the variability of the estimate and set a confidence factor. The deliverable from this phase is a cost estimate to fix each system in the State. The estimate was categorized by business level impact with a subjective confidence factor to describe the variability of the estimate.

There are four types of business level impacts that may result if an information system becomes non-functional.

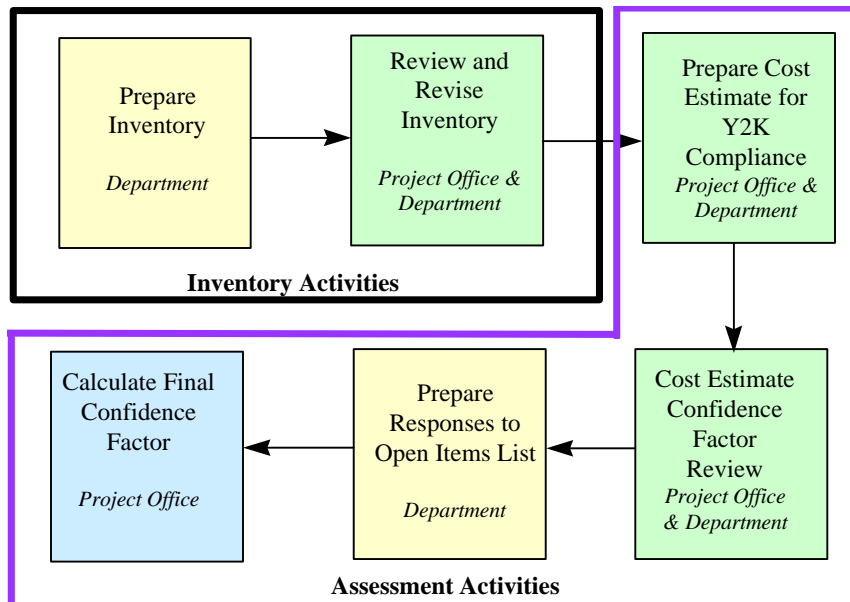
1. Fatal - Department will be unable to complete required legal obligations or business functions. Many people would be affected, either inside and/or outside the department. Potential legal liability is a possibility.

2. Critical - Workarounds are short-term, unsustainable and highly invasive until the problem is resolved.
3. Manageable - Workarounds are less invasive and could be sustained for a longer period of time.
4. Marginal - Minor inconvenience, annoyance or irritation. Business will continue to function.

All information systems in the inventory were classified according to impact by the departments.

### 4.3.1 The Assessment Process

The assessment process contained four activities. Figure 4.3.1-1 Inventory and Assessment Activities, shows the relationship of the activities that occurred in each step leading to the creation of the Statewide Year 2000 cost estimate.



**Figure 4.3.1-1 Inventory and Assessment Activities**

A confidence factor is a subjective estimate made by the IMC Year 2000 Project Office and department staff on the likelihood of variability in the cost estimate for Year 2000 related work. It is meant to reflect the likelihood that the cost estimate will change between now and the end of the project. This process was followed and a confidence factor was set for each department regardless of whether or not the department identified Year 2000 related costs. For a detailed description of how confidence factors were determined refer to *Appendix E: Cost Confidence Factor White Paper*.

### 4.3.2 Other Assessment Considerations

Working with department staff, the IMC Year 2000 Project Office considered several factors to assess cost estimates and establish confidence factors.

- Department plans and estimates of hours to complete the Year 2000 work. The Year 2000 Project Office provided a preliminary estimate worksheet to standardize results.
- Market research about the cost of contract labor needed to complete the Year 2000 changes. The price in the recent award for contract services was the primary source of research for Fiscal Year 1998. Gartner Group predictions on the future of labor rates for IT projects between now and calendar 2000 were used to construct estimating rates for later fiscal years. For more information on labor rates refer to *Appendix F: RFP and Associated Data*, and *Appendix G: Rate Calculations*.
- Key events pertinent to department business (e.g., tax deadlines, fiscal year ends, legislative schedules, federal mandates, etc.).
- The availability of supporting documentation. Each department completed their estimates using departmental standards and guidelines. The IMC Year 2000 Project Office reviewed departmental supporting documentation in an effort to understand the nature and completeness of the departmental estimate.
- The IMC Year 2000 Project Office focused its attention on systems estimated that have a fatal and critical business impact. Please refer to *Appendix D: Inventory Detail Structure*, for a detailed discussion of the system business impact and risk as it pertains to Year 2000 activities.

## **5. Cost Findings**

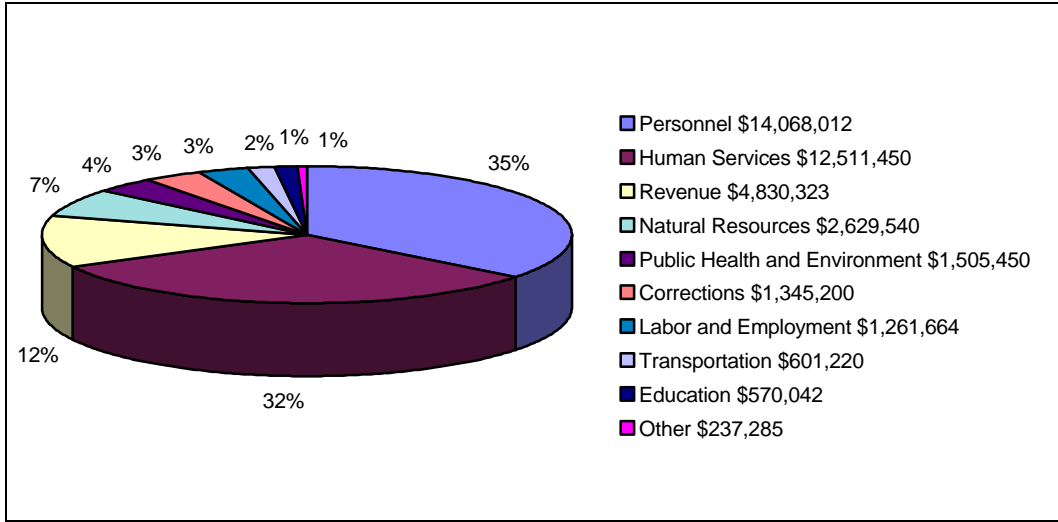
The database created by the IMC Year 2000 Project Office currently contains data items and cost data for 682 information systems within 22 departments and offices. Each department's designated Year 2000 coordinator (Refer to *Appendix H: List of Department Year 2000 Coordinators*) along with key personnel knowledgeable in each system were responsible for providing this data to the IMC Year 2000 Project Office.

A definition of the inventory data items can be found in *Appendix D: Inventory Detail Structure*. A description of the data collected during the cost assessment process is contained in *Appendix I: System Level Estimating Instructions*. Actual costs for pre-1996, 1996, and 1997 fiscal years and projected costs for each quarter of Fiscal Years 1998, 1999, and 2000 were collected. This cost data was collected at the system level. A report summarizing these costs by department is provided in *Appendix J: Departmental Cost Estimates*.

This section of the report presents charts and tables that summarize the findings from analysis of the cost data.

### **5.1 Cost Estimates by Department**

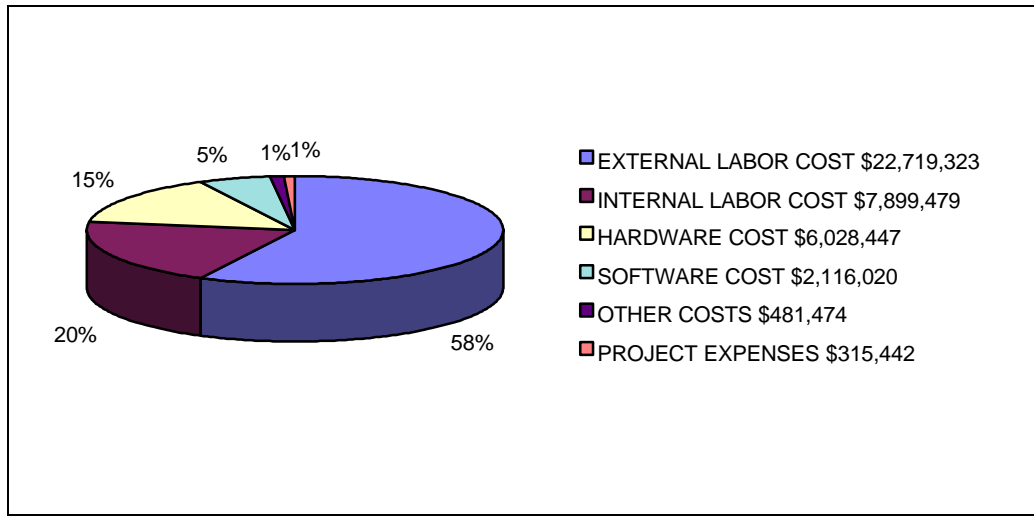
Figure 5.1-1: Year 2000 Cost Estimates by Department, shows the Year 2000 costs in percentage by department. Note that 79% of the costs are associated with three departments, Human Services, Personnel and Revenue.



**Figure 5.1-1: Year 2000 Cost Estimates by Department**

## 5.2 Cost Estimates by Cost Category

Figure 5.2-1: Year 2000 Cost Estimates by Cost Category, represents the breakdown by cost category. Note that 78% of the costs are associated with labor costs.



**Figure 5.2-1: Year 2000 Cost Estimates by Cost Category**

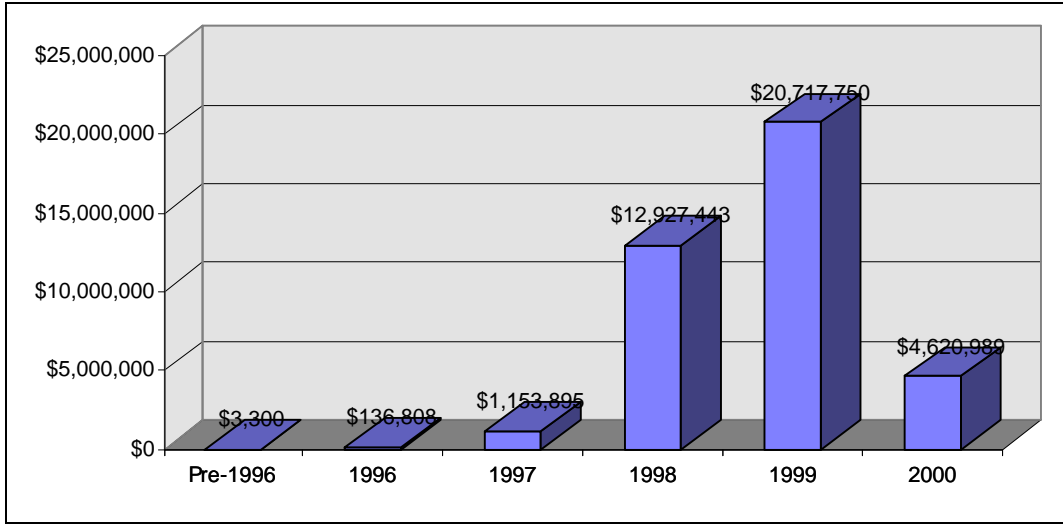
Figure 5.2-2: Year 2000 Cost Estimates by Department and Cost Category, provides departmental and Statewide Year 2000 cost totals segmented by six cost categories. Note that eight departments report no Year 2000 costs.

DEPARTMENT NAME	CONFIDENCE FACTOR	INTERNAL LABOR COST	EXTERNAL LABOR COST	SOFTWARE COST	HARDWARE COST	PROJECT EXPENSES	OTHER COSTS	TOTAL YEAR 2000 COSTS
Agriculture	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corrections	80%	\$0	\$130,000	\$73,000	\$1,142,200	\$0	\$0	\$1,345,200
Education	90%	\$18,311	\$551,731	\$0	\$0	\$0	\$0	\$570,042
Governor	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Health Care Policy and Financing	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Human Services	80%	\$701,505	\$8,432,190	\$183,938	\$2,962,632	\$130,267	\$100,918	\$12,511,450
Judicial	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Labor and Employment	90%	\$1,021,040	\$240,624	\$0	\$0	\$0	\$0	\$1,261,664
Law	90%	\$34,535	\$104,660	\$500	\$2,000	\$5,850	\$3,800	\$151,345
Legislature	70%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Local Affairs	90%	\$705	\$0	\$0	\$0	\$0	\$0	\$705
Military Affairs	60%	\$0	\$2,000	\$8,000	\$0	\$0	\$0	\$10,000
Natural Resources	80%	\$1,099,815	\$911,878	\$293,190	\$254,656	\$70,000	\$0	\$2,629,540
Personnel	85%	\$3,887,267	\$6,778,994	\$1,509,392	\$1,666,959	\$10,500	\$214,900	\$14,068,012
Public Defender	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public Health and Environment	70%	\$522,260	\$983,190	\$0	\$0	\$0	\$0	\$1,505,450
Public Safety	90%	\$3,360	\$21,125	\$0	\$0	\$0	\$0	\$24,485
Regulatory Agencies	90%	\$50,750	\$0	\$0	\$0	\$0	\$0	\$50,750
Revenue	80%	\$514,492	\$4,007,150	\$48,000	\$0	\$98,825	\$161,856	\$4,830,323
State	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transportation	70%	\$45,440	\$555,780	\$0	\$0	\$0	\$0	\$601,220
Treasury	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>STATEWIDE TOTALS</b>	n/a	\$7,899,479	\$22,719,323	\$2,116,020	\$6,028,447	\$315,442	\$481,474	\$39,560,185

Figure 5.2-2: Year 2000 Cost Estimates by Department and Cost Category

### 5.3 Cost Estimates by Fiscal Year

Figure 5.3-1: Year 2000 Cost Estimates by Fiscal Year, depicts the breakdown of cost by fiscal year. Even though most of the Year 2000 effort will be concentrated in Fiscal Year 1998, the costs are estimated to be much higher in Fiscal Year 1999. There are two primary reasons for higher cost estimates in Fiscal Year 1999. The cost of external labor is projected to be much higher and most computer hardware expenditures are targeted for Fiscal Year 1999.



**Figure 5.3-1 Year 2000 Cost Estimates by Fiscal Year**



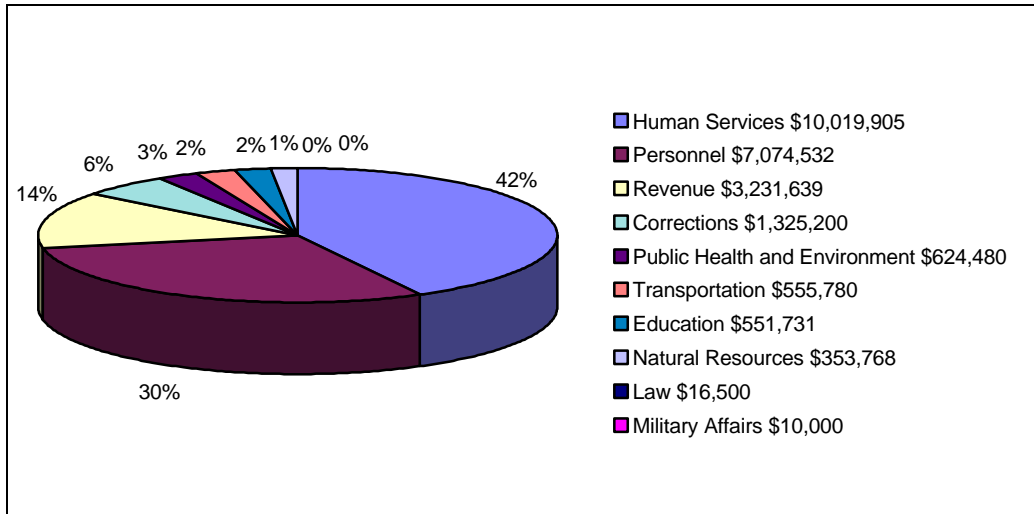
Figure 5.3-2: Year 2000 Cost Estimates by Department and Fiscal Year, provides departmental and Statewide Year 2000 cost totals by fiscal year.

DEPARTMENT NAME	CONFIDENCE FACTOR	Pre-1996 Fiscal Yrs	Fiscal 1996	Fiscal 1997	Fiscal 1998	Fiscal 1999	Fiscal 2000	TOTAL YEAR 2000 COSTS
Agriculture	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Corrections	80%	\$0	\$0	\$0	\$591,100	\$754,100	\$0	\$1,345,200
Education	90%	\$0	\$0	\$0	\$147,649	\$406,150	\$16,242	\$570,042
Governor	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Health Care Policy and Financing	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Human Services	80%	\$0	\$0	\$462,512	\$3,409,137	\$8,474,165	\$165,636	\$12,511,450
Judicial	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Labor and Employment	90%	\$0	\$27,552	\$100,877	\$770,760	\$296,775	\$65,700	\$1,261,664
Law	90%	\$3,300	\$2,520	\$2,160	\$108,140	\$28,925	\$6,300	\$151,345
Legislature	70%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Local Affairs	90%	\$0	\$0	\$705	\$0	\$0	\$0	\$705
Military Affairs	60%	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000
Natural Resources	80%	\$0	\$0	\$0	\$1,391,228	\$761,678	\$476,634	\$2,629,540
Personnel	85%	\$0	\$100,576	\$425,156	\$3,509,777	\$6,194,266	\$3,838,237	\$14,068,012
Public Defender	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public Health and Environment	70%	\$0	\$6,160	\$61,205	\$570,720	\$815,125	\$52,240	\$1,505,450
Public Safety	90%	\$0	\$0	\$0	\$5,995	\$18,490	\$0	\$24,485
Regulatory Agencies	90%	\$0	\$0	\$3,500	\$47,250	\$0	\$0	\$50,750
Revenue	80%	\$0	\$0	\$97,780	\$1,909,467	\$2,823,076	\$0	\$4,830,323
State	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transportation	70%	\$0	\$0	\$0	\$456,220	\$145,000	\$0	\$601,220
Treasury	90%	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>STATEWIDE TOTALS</b>	n/a	\$3,300	\$136,808	\$1,153,895	\$12,927,443	\$20,717,750	\$4,620,989	\$39,560,185

**Figure 5.3-2: Year 2000 Cost Estimates by Department and Fiscal Year**

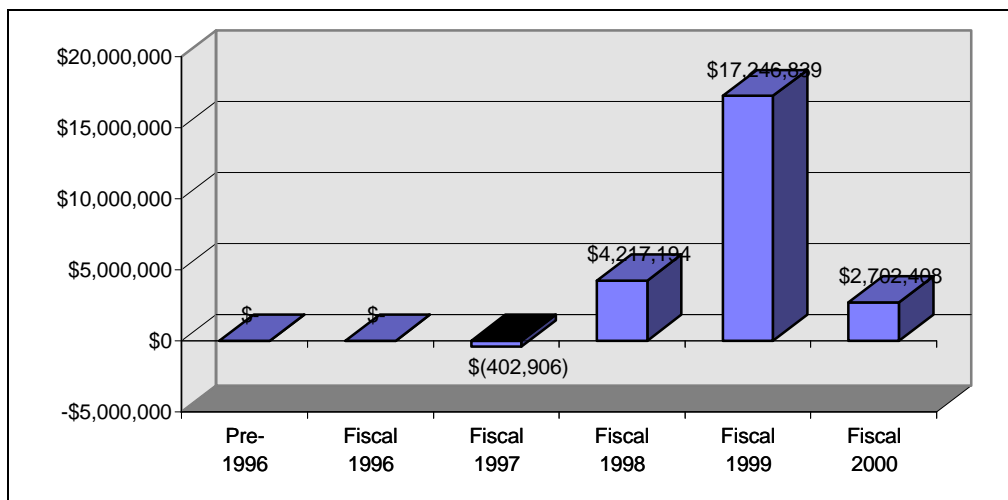
## 5.4 Additional Funding Requirements

- The total estimated additional funding (net of prior year rollover) required to achieve Year 2000 compliance is \$23,763,534. This amount is the total estimated cost, less approved Year 2000 funding, less planned internal contributions from the departments. The internal contributions are preliminary estimates and will be refined through the OSPB budget preparation process. Source of funds will be determined through OSPB during August 1997. Departmental percentage of additional funding is illustrated in Figure 5.4-1: Year 2000 Additional Funding by Department.



**Figure 5.4-1: Year 2000 Additional Funding by Department**

- The majority of the funding requested will be targeted for Fiscal Year 1999 in departmental decision items as illustrated in Figure 5.4-2: Year 2000 Additional Funding by Fiscal Year. Note the negative amount in Fiscal Year 1997 is due to a roll over of funding by the Department of Human Services.



**Figure 5.4-2: Year 2000 Additional Funding by Fiscal Year**

- Additional funding for each department by fiscal Year is detailed in Figure 5.4-3: Year 2000 Additional Funding Detail.

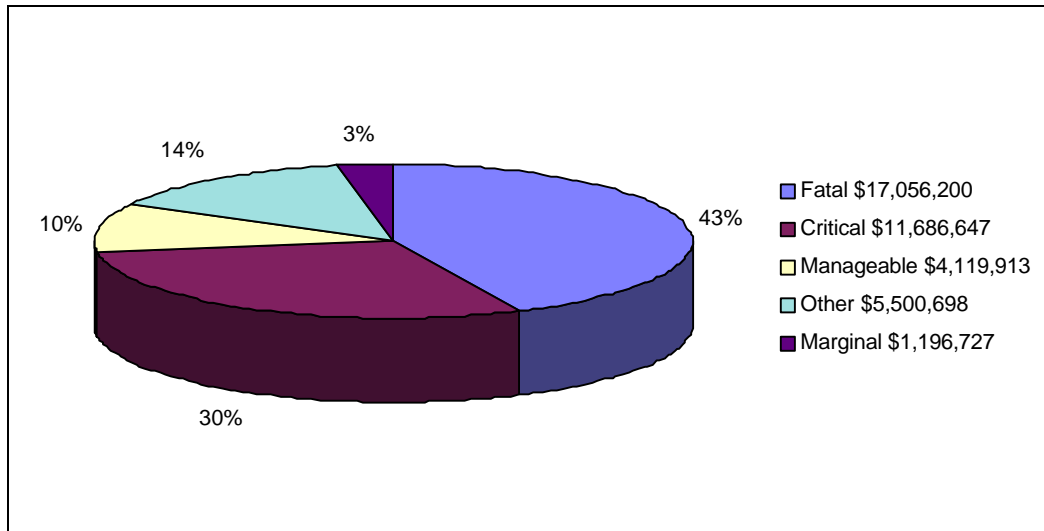
DEPARTMENT NAME	Pre-1996 Fiscal Yrs	Fiscal 1996	Fiscal 1997	Fiscal 1998	Fiscal 1999	Fiscal 2000	TOTAL
<b>Agriculture</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Corrections</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$591,100	\$754,100	\$0	\$1,345,200
Less Department Internal Funding	\$0	\$0	\$0	\$20,000	\$0	\$0	\$20,000
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$571,100	\$754,100	\$0	\$1,325,200
<b>Education</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$147,649	\$406,150	\$16,242	\$570,042
Less Department Internal Funding	\$0	\$0	\$0	\$8,336	\$9,594	\$380	\$18,311
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$139,313	\$396,556	\$15,862	\$551,731
<b>Governor</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Health Care Policy and Financing</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Human Services</b>							
Total Department Y2K Costs	\$0	\$0	\$462,512	\$3,409,137	\$8,474,165	\$165,636	\$12,511,450
Less Department Internal Funding	\$0	\$0	\$124,961	\$333,459	\$230,580	\$30,240	\$719,240
Less Funding Received	\$0	\$0	\$740,457	\$1,031,848	\$0	\$0	\$1,772,305
Additional Funding Required	\$0	\$0	-\$402,906	\$2,043,830	\$8,243,585	\$135,396	\$10,019,905
<b>Judicial</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Labor and Employment</b>							
Total Department Y2K Costs	\$0	\$27,552	\$100,877	\$770,760	\$296,775	\$65,700	\$1,261,664
Less Department Internal Funding	\$0	\$27,552	\$100,877	\$770,760	\$296,775	\$65,700	\$1,261,664
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Law</b>							
Total Department Y2K Costs	\$3,300	\$2,520	\$2,160	\$108,140	\$28,925	\$6,300	\$151,345
Less Department Internal Funding	\$3,300	\$2,520	\$2,160	\$6,830	\$12,425	\$6,300	\$33,535
Less Funding Received	\$0	\$0	\$0	\$101,310	\$0	\$0	\$101,310
Additional Funding Required	\$0	\$0	\$0	\$0	\$16,500	\$0	\$16,500
<b>Legislature</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Local Affairs</b>							
Total Department Y2K Costs	\$0	\$0	\$705	\$0	\$0	\$0	\$705
Less Department Internal Funding	\$0	\$0	\$705	\$0	\$0	\$0	\$705
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Military Affairs</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$10,000	\$0	\$0	\$10,000

DEPARTMENT NAME	Pre-1996 Fiscal Yrs	Fiscal 1996	Fiscal 1997	Fiscal 1998	Fiscal 1999	Fiscal 2000	TOTAL
<b>Natural Resources</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$1,391,230	\$761,678	\$476,632	\$2,629,540
Less Department Internal Funding	\$0	\$0	\$0	\$326,818	\$407,910	\$476,632	\$1,211,360
Less Funding Received	\$0	\$0	\$0	\$1,064,412	\$0	\$0	\$1,064,412
Additional Funding Required	\$0	\$0	\$0	\$0	\$353,768	\$0	\$353,768
<b>Personnel</b>							
Total Department Y2K Costs	\$0	\$100,576	\$425,156	\$3,509,777	\$6,194,266	\$3,838,237	\$14,068,012
Less Department Internal Funding	\$0	\$100,576	\$334,012	\$2,437,893	\$2,048,766	\$1,320,289	\$6,241,536
Less Funding Received	\$0	\$0	\$91,144	\$660,800	\$0	\$0	\$751,944
Additional Funding Required	\$0	\$0	\$0	\$411,084	\$4,145,500	\$2,517,948	\$7,074,532
<b>Public Defender</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Public Health and Environment</b>							
Total Department Y2K Costs	\$0	\$6,160	\$61,205	\$570,720	\$815,125	\$52,240	\$1,505,450
Less Department Internal Funding	\$0	\$6,160	\$61,205	\$264,390	\$171,465	\$19,040	\$522,260
Less Funding Received	\$0	\$0	\$0	\$306,330	\$52,380	\$0	\$358,710
Additional Funding Required	\$0	\$0	\$0	\$0	\$591,280	\$33,200	\$624,480
<b>Public Safety</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$5,995	\$18,490	\$0	\$24,485
Less Department Internal Funding	\$0	\$0	\$0	\$5,995	\$18,490	\$0	\$24,485
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Regulatory Agencies</b>							
Total Department Y2K Costs	\$0	\$0	\$3,500	\$47,250	\$0	\$0	\$50,750
Less Department Internal Funding	\$0	\$0	\$3,500	\$47,250	\$0	\$0	\$50,750
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Revenue</b>							
Total Department Y2K Costs	\$0	\$0	\$97,780	\$1,909,467	\$2,823,076	\$0	\$4,830,323
Less Department Internal Funding	\$0	\$0	\$97,780	\$207,268	\$212,126	\$0	\$517,174
Less Funding Received	\$0	\$0	\$0	\$1,081,510	\$0	\$0	\$1,081,510
Additional Funding Required	\$0	\$0	\$0	\$620,689	\$2,610,950	\$0	\$3,231,639
<b>State</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Transportation</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$456,220	\$145,000	\$0	\$601,220
Less Department Internal Funding	\$0	\$0	\$0	\$35,040	\$10,400	\$0	\$45,440
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$421,180	\$134,600	\$0	\$555,780
<b>Treasury</b>							
Total Department Y2K Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Department Internal Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Less Funding Received	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Additional Funding Required	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>STATEWIDE TOTALS</b>							
Total Department Y2K Costs	\$3,300	\$136,808	\$1,153,895	\$12,927,443	\$20,717,750	\$4,620,989	\$39,560,185
Less Department Internal Funding	\$3,300	\$136,808	\$725,200	\$4,464,039	\$3,418,531	\$1,918,581	\$10,666,460
Less Funding Received	\$0	\$0	\$831,601	\$4,246,210	\$52,380	\$0	\$5,130,191
Additional Funding Required	\$0	\$0	-\$402,906	\$4,217,194	\$17,246,839	\$2,702,408	\$23,763,534

Figure 5.4-3: Year 2000 Additional Funding Detail

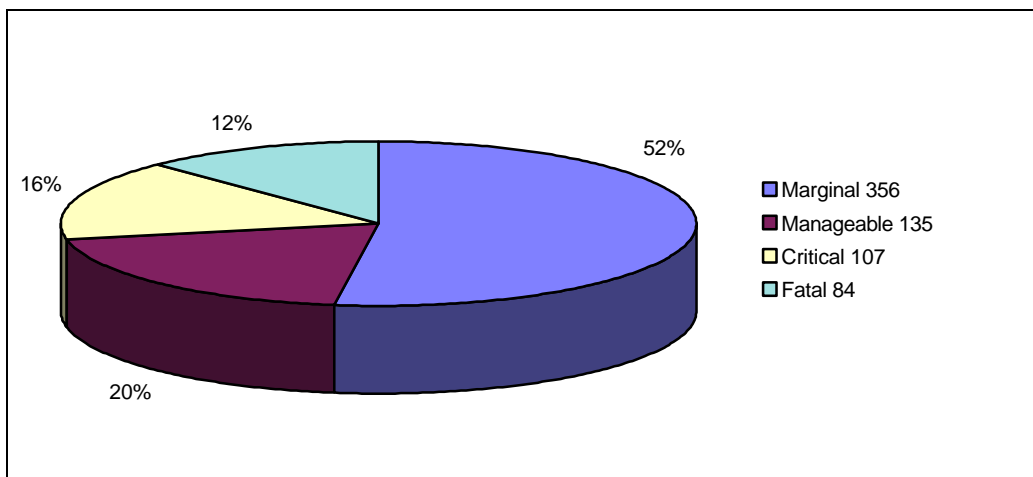
### 5.5 Cost Estimates by Impact Level

Figure 5.5-1: Year 2000 Cost Estimates by Impact, illustrates the percentage of Year 2000 costs associated with each Impact Level. The designation Other, represents costs not associated with a particular information system. Other costs are comprised of labor expenses related to Year 2000 project management of departmental systems, including Fatal and Critical systems.



**Figure 5.5-1 Year 2000 Cost Estimates by Impact**

Figure 5.5-2: Percentage of Systems by Impact, shows the percentage of Information Systems assigned to each impact level. Note that the Fatal and Critical systems account for 28% of the total number of systems and 73% of the total Year 2000 costs.



**Figure 5.5-2: Percentage of Systems by Impact**

Figure 5.5-3: Year 2000 Cost Estimates by Department and Impact, provides departmental and Statewide Year 2000 cost totals segmented by the impact level of the

information systems. Each information system in the inventory was assigned one of four impact levels: fatal, critical, manageable or marginal.

DEPARTMENT NAME	CONFIDENCE FACTOR	Fatal	Critical	Manageable	Marginal	Other	TOTAL YEAR 2000 COSTS
Agriculture	90%	\$0	\$0	\$0	\$0	\$0	\$0
Corrections	80%	\$0	\$50,000	\$1,142,200	\$153,000	\$0	\$1,345,200
Education	90%	\$280,252	\$195,194	\$90,813	\$3,783	\$0	\$570,042
Governor	90%	\$0	\$0	\$0	\$0	\$0	\$0
Health Care Policy and Financing	90%	\$0	\$0	\$0	\$0	\$0	\$0
Human Services	80%	\$5,077,865	\$4,206,805	\$2,153,176	\$0	\$1,073,604	\$12,511,450
Judicial	60%	\$0	\$0	\$0	\$0	\$0	\$0
Labor and Employment	90%	\$0	\$759,406	\$20,382	\$481,876	\$0	\$1,261,664
Law	90%	\$0	\$71,365	\$76,210	\$3,770	\$0	\$151,345
Legislature	70%	\$0	\$0	\$0	\$0	\$0	\$0
Local Affairs	90%	\$0	\$0	\$0	\$705	\$0	\$705
Military Affairs	60%	\$0	\$10,000	\$0	\$0	\$0	\$10,000
Natural Resources	80%	\$0	\$2,626,539	\$3,000	\$0	\$0	\$2,629,539
Personnel	85%	\$7,668,979	\$2,953,614	\$17,930	\$168,483	\$3,259,006	\$14,068,012
Public Defender	90%	\$0	\$0	\$0	\$0	\$0	\$0
Public Health and Environment	70%	\$480,305	\$391,050	\$154,825	\$309,010	\$170,260	\$1,505,450
Public Safety	90%	\$0	\$0	\$24,485	\$0	\$0	\$24,485
Regulatory Agencies	90%	\$26,250	\$21,000	\$0	\$3,500	\$0	\$50,750
Revenue	80%	\$3,110,849	\$390,634	\$331,012	\$0	\$997,828	\$4,830,323
State	90%	\$0	\$0	\$0	\$0	\$0	\$0
Transportation	70%	\$411,700	\$11,040	\$105,880	\$72,600	\$0	\$601,220
Treasury	90%	\$0	\$0	\$0	\$0	\$0	\$0
<b>STATEWIDE TOTALS</b>	n/a	\$17,056,200	\$11,686,647	\$4,119,913	\$1,196,727	\$5,500,698	\$39,560,185

**Figure 5.5-3: Year 2000 Cost Estimates by Department and Impact**

### 5.6 Cost Estimates by Mitigation Type and Inventory Category

Year 2000 estimated costs, other than \$5.5M for project management, are directly associated with inventoried information systems. Each inventoried item is assigned a mitigation type and an inventory category type. Mitigation type is the action planned to fix an inventoried item's Year 2000 problem. Inventory Category type describes the type of inventoried item. Figure 5.6-1: Cost Estimates by Mitigation Type and Inventory Category, shows the estimated costs associated with the mitigation and category

designations. Note that 50% of the total estimated cost is to renovate or fix State application systems.

MITIGATION TYPE	Application System	Hardware	Project Mgmt	System Software	Vendor Application	TOTALS
Re-engineer	\$ 2,399,832	\$ -	\$ -	\$ -	\$ -	\$ 2,399,832
Renovate	\$ 19,685,181	\$ 2,350,737	\$ -	\$ 1,647,700	\$ -	\$ 23,683,618
Replace	\$ 2,752,099	\$ 4,283,273	\$ -	\$ -	\$ 50,000	\$ 7,085,372
Retire	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Review	\$ 3,500	\$ -	\$ -	\$ -	\$ -	\$ 3,500
Test for Compliance	\$ 397,830	\$ 20,000	\$ -	\$ -	\$ -	\$ 417,830
Unknown	\$ 61,400	\$ -	\$ -	\$ -	\$ -	\$ 61,400
Vendor to Comply	\$ 77,135	\$ -	\$ -	\$ 10,000	\$ 320,800	\$ 407,935
Other	\$ -	\$ -	\$ 5,500,698	\$ -	\$ -	\$ 5,500,698
STATEWIDE TOTALS	\$ 25,376,977	\$ 6,654,010	\$ 5,500,698	\$ 1,657,700	\$ 370,800	\$ 39,560,185

**Figure 5.6-1: Cost Estimates by Mitigation Type and Inventory Category**

## **6. Variability**

The Year 2000 cost estimates that resulted from the assessment process are subject to variability. This section discusses the sources of cost estimate variability the IMC Year 2000 Project Office identified and actions taken to limit that variability. The variability of the final cost of Year 2000 related work in the State of Colorado is primarily found in market labor rates, internal staff retention, and project management. Other sources of variability are discussed to ensure that efforts to mitigate these issues are initiated.

### **6.1 Market Labor Rates and Availability**

Year 2000 projects are labor intensive. In the Statewide Year 2000 cost estimate, 58% of the project cost is for external labor. Rates for skilled computer professionals are rising. Many national vendors are no longer taking contracts for Year 2000 work due to a shortage of staff. The departments will feel the direct impact of labor rate inflation. In order to construct a multi-year estimate, it was necessary to construct a firm hourly rate for estimating Fiscal Year 1998 and make assumptions about following years.

Recognizing external labor cost and availability as a priority issue, the IMC Year 2000 Project Office assisted by the Division of Purchasing, tendered a Request for Proposal (RFP) to replace the existing overflow staff award for information technology professionals. The resulting award to 42 firms, will better ensure a source of vendors to supply contract labor during the project. The vendors bid commits them to a fixed hourly rate for Fiscal Year 1998. The IMC Year 2000 Project Office used the bid prices to construct the estimating rate for Fiscal Year 1998. For a detailed list of computer professional rates listed by skill and experience profile, as bid by the awarded firms, refer to *Appendix F: RFP and Associated Data*.

The IMC Year 2000 Project Office used the recommendation of the Gartner Group, a leading technology advisory and reference service, to construct an estimating rate for subsequent years. Based on Gartner's advice, the IMC Year 2000 Project Office estimates Fiscal Year 1999 rates 100% higher than Fiscal Year 1998 rates. Fiscal Year 2000 rates are estimated to be 200% higher than Fiscal Year 1998 rates. The State has experienced, an increase in the average costs for external labor from \$36/hr in Fiscal Year 1997 to \$65/hr in Fiscal Year 1998. This 80% cost increase was the result of a recent request for proposal. The driving factors behind this cost increase appear to be a reduction in the low-bid labor market traditionally favored by the State in the face of strong demand for computer professionals in the region. Therefore, Gartner's forecast of rate increases in future years appears to be reasonable. For a detailed description of how these estimating rate were constructed for Fiscal Year 1998 through Fiscal Year 2000 refer to *Appendix G: Rate Calculations*.

The Department of Law and the division of Colorado Information Technology Services within the Department of Personnel had specific project bids. Excepting these two departments, the estimating rates were recommended by the Year 2000 Project office were used consistently throughout all department estimates that roll up to the Statewide



cost estimate. Variation in the market labor rates will result in variability in the Statewide cost estimates.

## **6.2 Internal Staff Retention**

Internal staff retention is another source of variability in the Statewide cost estimate. Many departments have chosen to staff project teams with external labor, reserving internal staff for supervision and other key roles. This practice leaves the departments vulnerable should a staff person depart. If a key project resource is lost and knowledgeable supervision cannot be supplied in a timely manner, the cost of the team will be higher. The IMC Year 2000 Project Office estimates the State will start to experience this risk in the third quarter of Fiscal Year 1998 when the competition for Y2K related skills is expected to increase.

The loss of internal staff is a risk that can be mitigated by the State. There are examples of private and public sector firms taking active measures to retain staff through such steps as retention bonuses, completion bonuses, special training plans and unique compensation arrangements. The IMC Year 2000 Project Office recommends that the state undertake active management of the staff retention issue immediately to avoid Year 2000 cost escalation resulting from losing key internal staff.

## **6.3 Vendor Compliance**

Many departments with vendor supplied systems have relied on representations made by the vendor that these systems are now or will be made compliant by a promised date. In many cases, these representations are made by large, reputable firms, such that, a reasonable person would rely on them. The IMC Year 2000 Project Office has taken most vendor representations at face value for cost estimation purposes. Should these representations change or vendor project schedules slip, the impacted department may need to take remedial action. These remedial actions will result in increased cost. At this time the IMC Year 2000 Project Office cannot quantify this risk. This issue will be managed through the testing and verification process later in the project.

## **6.4 Business Partner Management**

The State of Colorado has many business partners: banks, the Federal government, local counties, a number of large commercial suppliers and a host of smaller suppliers and customers. Many business partners have been identified in the inventory as interfaces. Currently each interface/business partner will be managed by the department who owns or originally reported that system interface. This solves the technical issue of getting data across to that business partner. However, it does not guarantee that the business partner will have their internal systems operational and Year 2000 compliant.

The de Jager Year 2000 Website, a leading information service on the Year 2000 problem, conducted a survey of approximately 600 commercial firms in late May, 1997. They found only 18% of organizations have completed an assessment. The National Association of State Information Resource Executives (NASIRE) reports that only 19 of 50 or approximately 40% of state governments have completed a Year 2000 assessment.

In short, although the State is able to do business, some of the State's business partners may not be able to run their business operations through the millennium.

This is a source of variability to the Statewide cost estimate. The State may have to change business partners and adapt systems for new business partners on short notice. Due to the public nature of State business relationships and the restrictions of the procurement process, business partner management is an activity that will require advance planning and management for the State to avoid additional cost of dealing with inevitable business partner problems.

### **6.5 Project Management**

The Statewide Year 2000 project is a massive effort requiring superior project management, continuous communications, and support from the highest level. The IMC Year 2000 Project Office anticipates there will be approximately 232 person/years of labor valued at \$30.6M. There are 191 fatal and critical systems in the state that must be completed before an immovable deadline. The cost of resources is forecast to grow at a significant rate as we approach the millennium. Rigorous project management is an area where the State has the best chance of actively controlling variability of the Statewide Year 2000 cost estimate. The IMC Year 2000 Project Office recommends State project managers be trained in specific Year 2000 project management skills or external project management be hired to augment ongoing projects.

### **6.6 Non-compliant Systems**

In the course of collecting the inventory, many departments claimed that their systems were Year 2000 compliant. Departments with internally constructed systems who claimed compliance need to complete a test process to demonstrate compliance. The process to demonstrate compliance will be established later in the project. Any system that was assumed during the assessment phase to be compliant and is later found not to be compliant will increase the cost of the Year 2000 project. The IMC Year 2000 Project Office will implement a compliance process. When the compliance process is implemented, it will be possible to estimate the cost to remediate newly discovered, non-compliant systems.

## **7. Ongoing Efforts**

This report documents the results of the first two phases of the Colorado Year 2000 project lifecycle. The next phase is detailed project planning with the departments. The resulting plans will enable the IMC Year 2000 Project Office to refine the cost estimates contained in this report. Over time the quality of the cost estimate will improve.

The IMC Year 2000 Project Office is currently developing a Statewide plan to provide better feedback on the status of Year 2000 projects. Planned activities include developing standards for detailed department planning, project planning, project tracking, and cost tracking. The information provided at the system and department level will enable the IMC Year 2000 Project Office to report project and budget variances on a periodic basis. This tracking plan will be critical to quick identification of problem areas and reduce the risk of systems failing to make the Year 2000 deadline.

The IMC Year 2000 Project Office will develop and provide a verification process for each department's use. This process will be used to review the State's systems for Year 2000 compliance.