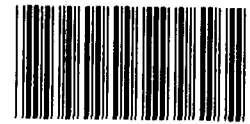


August 1991

# LAND MANAGEMENT SYSTEMS

## Extensive Cost Increases and Delays in BLM's Major Data Base Project



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Information Management and  
Technology Division

B-243938

August 5, 1991

The Honorable John Conyers, Jr.  
Chairman, Committee on  
Government Operations  
House of Representatives

Dear Mr. Chairman:

This report responds to your request for the results of our review of the Bureau of Land Management's (BLM) Geographic Coordinate Data Base (GCDB) project.

For several years, BLM has been planning the development of the Automated Land and Mineral Record System (ALMRS), an information system that will cost nearly \$300 million to acquire. The system is supposed to enhance the management and analysis of data and enable BLM to improve its land-use planning and management.

As a critical component of this system, GCDB is to provide geographic coordinate and land survey data on over 270 million acres of public land. Without the precise coordinate data to be contained in this data base, BLM cannot achieve the goals and full benefits of ALMRS or of many future automation projects for improved land-use management.

Because GCDB is a critical part of ALMRS, we reviewed the progress the Bureau is making in achieving the project's goals. Appendix I describes our objective, scope, and methodology.

## Results in Brief

BLM underestimated the complexities and management demands of collecting data on 36,000 land parcels<sup>1</sup> and developing GCDB. As a result, the project will cost millions of dollars more and be finished years later than expected.

BLM's estimate of the costs of the project has grown from an initial \$19 million in 1985 to \$35 million in 1990. The costs are likely to increase \$12 million more, to \$47 million—247 percent of the original estimate—if per-parcel costs continue at their current level. In addition, another \$12 million will be needed for data collection on certain land parcels

<sup>1</sup>A parcel is an area of land, commonly referred to as a township, that is composed of about 23,000 acres.

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that are the most difficult, time-consuming, and costly to complete. Some of these parcels are located in critical areas where more concerns exist over mineral claims, leases, and the environment.

Through fiscal year 1990, BLM had already spent about \$10.5 million, 30 percent of the current \$35 million cost estimate, but had completed work on only about 1 percent of the parcels and nearly completed work on another 4 percent. The estimated completion date has slipped 3 years and the project will not be finished by 1995, when ALMRS is scheduled to be fully implemented.

Along with cost increases and schedule delays, the project has been affected by managers' not remaining sufficiently informed of project status and problems. Because of this, they have made decisions that increased project risks and costs. BLM has started to more closely monitor the project and take actions aimed at increasing production, correcting problems, and keeping top management more informed. However, many of these actions have only recently been taken; their outcomes are not yet clear.

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## Background

BLM manages over 270 million acres of public lands and related resources, which generate over \$200 million in revenue annually for the government. It is required to develop land-use plans that balance multiple uses and competing demands, such as harvesting timber and developing mineral resources while protecting the environment, including water resources, wildlife, endangered species, historical and archeological sites, and the land's scenic value.

In support of these objectives, BLM surveys land parcels, inventories land and resources, estimates the fair market value of land and resource uses, and analyzes alternative uses. Since 1985 BLM has been automating parts of its records on public lands and resources to improve its management of land use.

BLM has also been planning the development and acquisition of ALMRS to improve its ability to maintain, analyze, use, and disseminate data. As envisioned, ALMRS will eventually contain data on mining claim records, legal land descriptions, land ownership, land and mineral case records, and geographic coordinates of land parcels. Using GCDB, ALMRS will link land and mineral data to specific parcels for land-use planning and environmental analyses. ALMRS is scheduled to be fully implemented by June 1995.

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## GCDB Project Development

GCDB is a nationwide project to create a data base that will contain the coordinates of legal boundaries, lease sites, and other tracts, as well as the survey characteristics of public lands. Determining legal boundaries is complicated and time-consuming. Surveyors must examine land survey records, field survey notes, and title plats to extract data on boundaries and land characteristics. Some of these records are over 200 years old and may conflict with current surveys, making it hard to tell where land boundaries or particular sites fall. Once boundaries are determined, BLM or contractor staff use the Bureau's computer software to obtain the geographic coordinates of these parcels. The initial collection and automation of data from BLM's existing records will cover about 36,000 land parcels.

As part of the effort to develop GCDB, the Cadastral Survey Division, which is under the Assistant Director of Support Services at BLM headquarters in Washington, D.C., is responsible for GCDB's overall project direction, management, policies, and funding. The project and contract offices, located at BLM's Service Center in Colorado, oversee operations and monitor contracts, respectively. Twelve BLM state offices oversee contracts locally and assure that BLM's quality standards are met. These state offices also manage land and resource programs and administer land-use plans in one or more states in their jurisdictions.

In 1988 BLM performed a pilot test in New Mexico to help identify data-collection requirements and determine how to set priorities for each state office. The state offices used a rating scale composed of six categories to indicate how difficult it would be to extract data on legal boundaries and land characteristics from existing records. About half of the parcels were placed in the least complex category. The state offices also prepared their records for project use and set the priority of parcels to be worked on by the contractor.

In September 1989 BLM awarded two contracts to complete GCDB project work in 11 of the 12 state offices. One contract is for work in Alaska, the other for work in 10 state offices. The Oregon State Office was not included in the contracts because it is using its own staff to complete its project work in Oregon. As of March 31, 1991, contract work was underway in or planned for the following states: Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. Contract work is also planned for the Eastern States Office, which covers 31 states with public lands. BLM also included an inspection process in both contracts, in order to ensure data accuracy.

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BLM set annual production goals on the basis of the total number of parcels to be completed and the target completion date. All GCDB contract work was supposed to be done by September 30, 1993--almost 2 years before ALMRS is to be fully implemented.

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## Project Cost Estimate Is Understated

BLM has consistently underestimated the costs of the GCDB effort. BLM developed the current \$35-million estimate in October 1990 by increasing the 1985 estimate of \$19 million for (1) inflation, (2) added work at one state office, and (3) the initial underestimation of the amount and complexity of work required to collect the data. However, actual costs are likely to be at least \$24 million above the current estimate.

Two main reasons account for higher actual costs. First, project costs will grow by an additional \$12 million if the average cost to collect and automate data on each parcel remains at its present level. So far it has cost an average of \$1,300 to complete work on each parcel, according to an April 1991 BLM report. If spending per parcel continues at the same average rate, it will cost about \$47 million to complete the data-collection phase. The project office manager agreed that this average rate would probably hold and, at this point, does not expect the average cost per parcel to drop below \$1,250, which adds up to at least \$10 million more than the current estimate.

Second, BLM will have to pay another \$12 million on top of the estimated \$47 million to finish data-collection work. BLM's estimates for the project have never included the cost to complete work on certain parcels considered to be the most difficult, time-consuming, and costly. These constitute up to 6 percent (about 2,100) of all parcels. According to the project office manager, BLM's estimates have covered only the cost of obtaining the geographic coordinates of parcel and mineral claim boundaries and have excluded coordinates of the interior composition of these complex parcels. The project office estimates that \$12 million more will be needed to obtain the coordinates for the remainder of these complex parcel interiors. The project office manager also said that this estimate does not include any funds for the Oregon State Office because that office is using its existing staff to obtain all geographic coordinate data for complex parcels during initial data collection. According to Oregon project officials, however, they may not be able to complete the task without more resources.

Project officials in three state offices said they would like to finish collecting coordinates for the complex parcels as soon as possible. They said the data are needed because some parcels are located in critical areas, where there are heightened concerns over mineral claims, leases, and the environment.

## Project Will Not Be Completed on Time

As with its estimates of costs, BLM's estimates for completion dates have been overly optimistic. In June 1990 BLM extended the GCDB project completion date 3 years to 1996, more than 1 year after the scheduled date for full implementation of ALMRS. The completion date was pushed back because BLM recognized that it had underestimated the amount of time needed to complete initial data collection. Even though BLM has initiated some corrective actions, the project will not meet the 1996 deadline unless production increases dramatically. Since data collection will not be completed before ALMRS is fully implemented, some state offices will experience delays in realizing some ALMRS benefits, such as the ability to monitor specific acreage, analyze parcels using legal boundaries, or identify the types and numbers of land surveys.

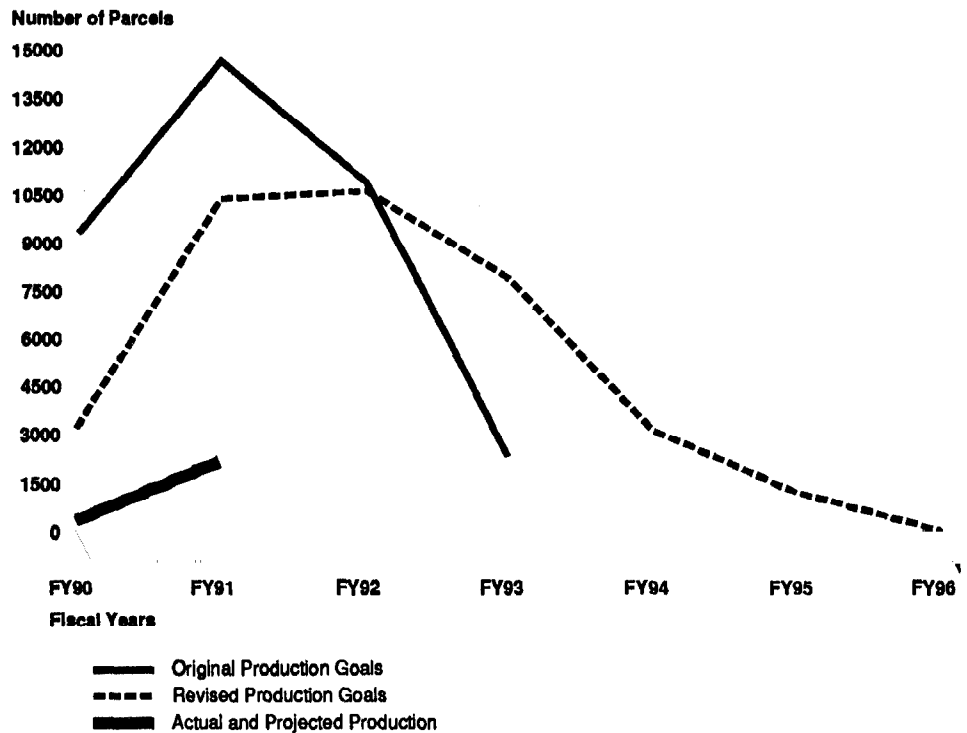
Originally, BLM estimated that the geographic coordinates for all 36,000 parcels would be obtained by September 30, 1993, in time for full implementation of ALMRS in June 1995. However, last year BLM reduced the annual production goals and pushed back the completion date to September 30, 1996. The fiscal year 1990 production goal was cut from 9,276 parcels to 3,170, but BLM still could not meet its goal. During fiscal year 1990, only 321 parcels were completed, and work on 1,540 was nearly complete.<sup>2</sup>

BLM also cut the production goal for fiscal year 1991, from 14,600 to 10,333 parcels. However, to stay on schedule, BLM has to complete work on 13,182 parcels in 1991, to make up for the 2,849 parcels that were not finished in Fiscal Year 1990. Through the first 6 months of Fiscal Year 1991, only about 1,055 parcels were completed, and 632 nearly completed.

Figure 1 shows the original and revised production goals for each fiscal year through 1996, actual production for Fiscal Year 1990, and projected production for Fiscal Year 1991.

<sup>2</sup>A parcel is completed when all required work to extract data from land survey records and determine geographic coordinates has been finished and has passed BLM's inspection process.

**Figure 1: Annual Production Goals, Revisions, and Results for Fiscal Years 1990-1996**



Actual production for FY 1990 was 321 parcels.

Projected production for FY 1991 is based on annualized first half production of 1,055 parcels.

According to project officials, production goals have not been met largely because it has been more difficult than expected to obtain data from old and voluminous land survey records. The contractor's inadequate training and quality control measures also caused numerous errors and delays. To correct these problems, BLM plans to contract for a production efficiency study with the hope of identifying ways to increase production. In addition, the contractor implemented a quality control program in December 1990 to reduce errors and delays, and plans to increase training for project personnel.

Even with these actions, BLM has to meet annual production goals that are much higher than it has achieved so far. Production must increase dramatically if the project is to be completed by 1996. However, current production levels indicate that such an increase is unlikely.



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## Better Oversight and Decisionmaking Needed

BLM managers have not always been sufficiently aware of the project's status and problems, and have made decisions that increased project risks and costs. For instance, BLM expanded the contract to additional states without first finding out how contract work was progressing at existing sites. To minimize risks, BLM project officials were required under the contract to assess contractor performance and progress in Alaska and New Mexico, the initial contract sites, before activating the contract in additional states. However, in April 1990 BLM expanded contract work to four more states without assessing the work in Alaska and New Mexico. BLM officials simply assumed that contractor performance was satisfactory. This was not the case. In New Mexico, for example, the contractor provided little or no training to employees, lacked a quality-control program, and had problems using BLM's software. As a result, the production rate was much lower and data errors were much higher than expected.

Program and project officials said they did not always receive or review the Alaska and New Mexico monthly progress reports. They said they were not aware of the problems when they expanded contract work to the additional states. BLM's deputy director also said that he was not aware of the problems and would have delayed the decision had he known about them.

In the interest of maintaining the project schedule yet contrary to the procedure prescribed in the contract, BLM project officials decided to authorize some work in four states before negotiating the cost to complete the work. According to the contracting officer, BLM then basically accepted the contractor's estimate as the total price to be paid for this work. The contracting officer stated that in some cases the contractor's costs were higher than BLM's estimates would have been. As a result, BLM will pay more for this work than if it had negotiated the price in advance, as the contract provided.

Since we initiated our review of GCDB, BLM has taken some action to more closely monitor the project and keep top management informed about it. The project office is completing progress reviews of each state office working on the project. BLM clarified the oversight role of the assistant director of support services in managing the GCDB project, and in February 1991 established an information resources management review committee to monitor Bureau-wide data-collection projects, such as GCDB.

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In October 1990 the project office evaluated contractor performance and the progress of the project in New Mexico. As a result, the project office required the state office and contractor to address problems such as inadequate communications, inadequate contractor training, and the lack of a quality-control program as required by the contract.

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## Conclusions

GCDB is the cornerstone of an information system that is intended to help BLM improve environmental analyses and land-use planning and management. However, BLM has not met its cost or schedule goals because it substantially underestimated the complexities and management demands of developing GCDB. As a result, the project will cost millions more and be finished years later than expected. Further, some of BLM's state offices will be delayed in realizing the full benefits of ALMRS since GCDB data collection will continue at least 1 year after ALMRS is fully implemented.

The cost increases and schedule delays are likely to continue unless BLM managers can make dramatic changes in the average cost per parcel and in production rates. However, BLM managers have not always remained sufficiently informed of the project's status and problems, and have made decisions that increased project risks and costs. BLM managers have begun to take steps to solve problems that have adversely affected the project. Many of these corrective actions have been taken only recently and the outcomes are not yet clear. It is clear, however, that continued management attention is essential. We are not making any recommendations at this time because of the actions BLM has taken on the matters discussed in this report.

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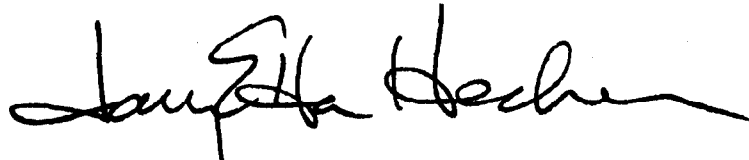
As requested, we did not obtain official agency comments on a draft of this report. However, we discussed the factual information with responsible BLM officials. These officials agreed with the facts, and we have incorporated their views as appropriate. We conducted our review between June 1990 and July 1991, in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this letter. At that time, we will send copies to the Chairman of the Senate Committee on Governmental Affairs; the Secretary of the Interior; the Director, Bureau of Land Management; and other interested parties. We will also make copies available to others upon request.

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Please contact me at (202) 275-9675 if you have any questions concerning this report. The major contributors to this report are listed in appendix II.

Sincerely yours,

A handwritten signature in black ink, appearing to read "JayEtta Hecker". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

JayEtta Z. Hecker  
Director, Resources, Community,  
and Economic Development  
Information Systems

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Figure 1: Annual Production Goals, Revisions, and Results  
for Fiscal Years 1990-1996

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## Abbreviations

ALMRS	Automated Land and Mineral Record System
BLM	Bureau of Land Management
GAO	General Accounting Office
GCDB	geographic coordinate data base
IMTEC	Information Management and Technology Division



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# Objective, Scope, and Methodology

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The objective of our work was to determine whether BLM is meeting the objectives of the GCDB project. To do this, we determined whether BLM was meeting project cost and schedule goals and would complete the project in time for ALMRS. As part of our work, we also examined whether BLM was following contract requirements. We conducted our work between June 1990 and July 1991 at BLM's headquarters office in Washington, D.C.; the Service Center in Lakewood, Colorado; and the Colorado, New Mexico, and Oregon state offices, where data are being collected for GCDB.

Our work included reviewing BLM's plans, cost estimates, schedules, progress reports, information technology policies, and other documents related to the GCDB project, and analyzing contract and contract cost data. We met with program and project officials charged with planning and implementing the GCDB project and state office personnel who collect GCDB data and who are responsible for contract oversight, to obtain information on the management and execution of the GCDB project. We also discussed all contract matters with BLM's contracting officer and met with contractor officials to discuss the progress and problems of the GCDB project.

Our work was performed in accordance with generally accepted government auditing standards. We discussed the factual information contained in the report with responsible BLM officials. These officials agreed with the facts presented, and their views have been incorporated into the report as appropriate. On June 18, 1991, we were requested to report the results of our review to the Chairman, Committee on Government Operations, House of Representatives. As requested, we did not obtain official agency comments on a draft of this report.

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