REPORT BY THE

Comptroller General

OF THE UNITED STATES

Duplicative Federal Computer-Mapping Programs: A Growing Problem

In recent years many Federal agencies have begun to use the computer to prepare maps and analyze the information on them. Because the principal Federal civilian mapper, the U.S. Geological Survey, has not had enough funds to keep pace with other Federal agencies' demand for computerized versions of its maps, other Federal agencies have had to develop them on their own. This has resulted in duplicative mapping programs and lost savings opportunities. The problem will get worse as computer mapping expands in the Federal Government

GAO is recommending a number of actions to eliminate further unnecessary Federal costs.

GAO/RCED-83-19
NOVEMBER 22, 1982

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-209466

The Honorable John W. Warner
Chairman, Subcommittee on Energy
and Mineral Resources
Committee on Energy and Natural
Resources
United States Senate

Dear Mr. Chairman:

This report discusses the need for action to prevent further duplicative computer-mapping activities in the Federal Government. At your request, we have developed information on the nature and extent of these activities and have made recommendations to the Director, Office of Management and Budget, and the Secretary of the Interior to improve the coordination of Federal computer mapping.

As arranged with your office, we are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Interior; interested congressional committees; and other parties.

Sincerely yours,

Charles A. Bowsher

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT

DUPLICATIVE FEDERAL COMPUTER-MAPPING PROGRAMS: A GROWING PROBLEM

D I G E S T

Through fiscal year 1981, 11 Federal agencies have spent a total of over $45 million to develop computer technology for their mapping programs. (See app. I.) But, because the new techniques have not been adopted in a coordinated manner, duplication has developed among the agencies and opportunities for savings have been lost.

COMPUTER-MAPPING PROGRAMS ARE WIDESPREAD AND EXPENSIVE

Over the last decade Federal civilian agencies have increasingly used the computer to analyze geographic data and reproduce maps. Although several computer techniques are being used or are being developed, the process usually involves using a computer system to "read" a map or other sources of geographic information and store the information in a form which can be retrieved for analysis or for controlling map revision. (See pp. 1 and 2.) For example, the Forest Service, Department of Agriculture, uses a computer to determine likely areas for timber sales by analyzing data on the type and location of timber and the characteristics of the surrounding terrain.

COMPUTER-MAPPING PROGRAMS ARE OFTEN DUPLICATIVE

Duplicative computer-mapping activities have developed because the U.S. Geological Survey, Department of the Interior, the principal civilian mapping agency, has not had enough funds to keep pace with other Federal agencies' demands for computerized versions of the Geological Survey's products.

Under the Office of Management and Budget's (OMB's) Circular A-16, the Geological Survey has lead agency responsibilities for national mapping, but not explicit authority to coordinate Federal computer mapping. The Geological Survey produces several widely used official

map series which cover the Nation at different scales. Among the most widely used is the 1:24,000 scale map series (maps which show ground distance at 1/24,000th of its actual length). Such maps indicate political boundaries, transportation lines, public land surveys, drainage, and terrain.

At least 11 Federal civilian agencies have computerized map information from the 1:24,000 map series. But, if these agencies continue to use different formats, codes, and standards, the Geological Survey will have to redo their work when it carries out its plan to computerize these same maps. The Geological Survey estimates the cost of completing the whole series at $200 million. These costs would be recouped to some extent by sales of products.

Program officials at several agencies GAO contacted said that the lack of a central data base available to Federal users was the principal reason they began their own single-purpose, computer-mapping programs. Most of these officials indicated that although they would have needed computer-mapping programs for their own requirements, the cost of these programs would have been reduced if the Geological Survey could have provided computerized map information to them. The savings could have been realized by reductions in labor and equipment used to computerize the maps. For example, Bureau of Land Management officials estimated savings of about $2.2 million; Census Bureau officials estimated savings of about $2.3 million. Offsetting the agencies' estimated savings would be the costs of acquiring the data from the Geological Survey. (See pp. 6 to 8.)

Action is needed now to control the situation, especially since computer-mapping activities are expected to increase within the Federal Government. Seven of the 11 Federal agencies currently using computer mapping plan to increase their expenditures for this activity in the future. Program officials of four other Federal agencies which are not now involved in computer mapping hope to begin a computer-mapping program in support of their major programs in the future. (See p. 6.)

PROPOSED REMEDIES FOR DUPLICATIVE COMPUTER-MAPPING PROGRAMS

Concern over the increase in duplicative Federal computer-mapping programs has led to a number of actions.

First, an interagency committee was formed by the Interior Department to improve coordination and establish uniform standards for Federal computer mapping. However, the committee's effectiveness is limited by not having a charter from OMB giving it authority to resolve conflicting agency interests. (See pp. 9 and 10.)

Second, the administration drafted legislation that would establish a revolving fund in the Department of the Interior to finance a national computer-mapping data base to be maintained by the Geological Survey. (See app. III.) However, there is insufficient information to conclude that the proposed revolving fund could raise enough funds from user charges to Federal agencies and others to develop a national data base. Doubts about the feasibility of the self-supporting revolving fund center on whether the market for Geological Survey computerized maps is large enough to permit the full recovery of production costs and finance the continued development of a data base. Recent price increases for these computerized maps have been accompanied by decreased sales to Federal agencies and other customers. Representatives of several Federal agencies told GAO that they were unwilling to pay the high Geological Survey prices and that it would be unfair to require them to pay these prices, because Geological Survey computer-mapping products are more precise and detailed than the agencies require. A Geological Survey-sponsored market study scheduled for completion in January 1983 may provide more information on whether the revolving fund can be self-supporting. (See pp. 14 and 15.)

Third, OMB had proposed at one time a circular designed to encourage interagency coordination, enable the Geological Survey to effectively administer the proposed revolving fund, and reduce duplication among Federal computer mappers. The draft circular would have designated the Geological Survey as the

lead agency for computer mapping in the United States, authorized the Geological Survey to administer a national computer data base, and prohibited other Federal agencies from developing duplicative, incompatible data bases. The circular would have permitted agencies to computerize Geological Survey maps that the Survey could not supply in a timely manner, so long as the agencies adhered to prescribed standards. According to Geological Survey officials, surplus computer capacity would not be created in Federal agencies by prohibiting duplicative computer-mapping activities because the equipment used for these activities has many other applications. An OMB directive along the lines of the draft circular is needed; however, OMB has not yet decided on its final form or content. (See pp. 16 and 17.)

RECOMMENDATIONS

GAO recommends that the Director, OMB, issue a circular or other directive requiring the interagency coordination of computer mapping and preventing duplicative programs. The directive should create a rulemaking body to establish uniform standards for Federal computer mapping so that agencies can exchange data and the needs of map users are met at reasonable cost. (See p. 17.)

GAO recommends that the Secretary of the Interior accelerate the production of computerized maps most in demand by other Federal agencies. Accelerated production could be funded by user charges, and if necessary, by reallocating funds within Interior and requesting increased appropriations. Such funding appears justified in view of the long-term potential savings in duplicative computer-mapping costs Government-wide. (See p. 18.)

AGENCY COMMENTS AND GAO's EVALUATION

OMB agreed that it should take action to improve the coordination of Federal computer mapping. OMB said that it was preparing instructions to Federal agencies on coordination but could not say how or when they would be issued.

The Department of the Interior basically agreed with GAO's recommendations. It stated that the Geological Survey should be the focal point for coordinating computer-mapping activities in the Federal Government and that the Survey should be supported by an OMB directive. Interior also stated that the data base would eliminate the need for duplicative efforts and result in an overall savings to the Federal Government.

The Departments of Agriculture, Commerce, Housing and Urban Development, and the Army and the National Aeronautics and Space Administration generally acknowledged that duplicative Federal computer-mapping activities were a problem but were concerned that the attempts to correct the problem might adversely affect their own missions.

GAO believes that the OMB directive it is recommending to reduce duplicative activities can make adequate provisions to protect agency missions. (See pp. 18 and 19 and apps. V through XI.)

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This report was requested by the Chairman, Subcommittee on Energy and Mineral Resources, Senate Committee on Energy and Natural Resources.

Contents

ABBREVIATIONS

OMB	Office of Management and Budget
GAO	General Accounting Office
USGS	U.S. Geological Survey

CHAPTER 1

INTRODUCTION

Over the last decade numerous Federal agencies have developed independent systems for computerizing map data. In general, these systems are used for more rapid and efficient storage, analysis, and reproduction of information needed to manage major Federal programs. Advances in computer technology have ensured that, for the foreseeable future, computer mapping 1/ will be an increasingly valuable tool for managers and planners. However, recent Federal studies have indicated that proliferation of independent computer-mapping programs has led to duplication.

COMPUTER-MAPPING APPLICATIONS AND TECHNIQUES VARY AMONG AGENCIES

By entering data from maps into a computer, agencies can analyze geographic information more quickly and easily. Most agencies use this information to support their main activities. For example, the Forest Service, Department of Agriculture, computerizes maps which show political boundaries, vegetation, terrain, roads, and other features in our national forests. According to Forest Service program officials, computer mapping is the most efficient method of locating and inventorying the natural resources within their jurisdiction. Specifically, the Forest Service can use computer mapping to record and combine data on elevation, slope, and timber types to identify areas for future timber sales and to predict the visual impact these timber cuttings will have from different perspectives in the national forests. The Forest Service can also combine data on terrain, vegetation, and other factors to predict the probable course a forest fire might take and how fast it might move. Following are examples of other applications of computer mapping.

--The Fish and Wildlife Service, Department of the Interior, combines various types of environmental data to determine which areas are environmentally suitable for certain species of fish and wildlife. This information can be used to assess the impact of energy development on wildlife habitats.

--The U.S. Geological Survey (USGS), Department of the Interior, plans to use computer mapping to store and update the information on its major standard national map series. Automated map revision can save time and money over manual revision.

1/Computer mapping is technically known as digital cartography.

--The Bureau of the Census, Department of Commerce, maintains computer files of roads, drainage, railroads, and other features used as boundaries for census tabulation units within the Nation's major metropolitan areas (approximately 2 percent of the country's land area). Among other applications, the Bureau uses the files to assign mailing addresses on questionnaires to the geographic units in which they are located. Maps will be produced when additional data is computerized.

Many agencies computerize both base map and thematic data. Base map data includes features such as political boundaries, transportation lines, public lands surveys (legal public survey lines), drainage (lakes, rivers, streams, etc.), and terrain. These features are often used as a background on which thematic data is displayed. Thematic data includes any information which is not base map data but which can be presented on a map. Agencies are currently computerizing thematic data ranging from wildlife habitats to population trends.

Map information can be computerized using several different techniques. The most common are (1) following the lines on a map using a hand-held sensor, (2) mechanically scanning maps with light-sensing instruments, (3) scanning the Earth's surface through remote sensing satellites, such as LANDSAT, and (4) automatically computerizing elevation data from aerial photographs. The most popular of these techniques among Federal agencies is manual computerizing using a sensor.

Each of these techniques has advantages and disadvantages. Manual computerizing can accurately capture many of the features shown on a map but is labor-intensive. Scanning technology holds promise for rapidly gathering data from maps but needs further development before it can be used economically for many purposes. Current LANDSAT data, while plentiful, does not meet many accuracy requirements. Computerizing from aerial photographs is effective for capturing terrain information but can only capture those features that are clearly visible from the air. However, as technology advances, these and other techniques will become increasingly useful to Federal agencies.

PREVIOUS STUDIES HAVE INDICATED POTENTIAL PROBLEMS

Since 1973 three major Federal studies have discussed the decentralized nature of Federal civilian mapping activities. In July 1973 an interagency Federal Mapping Task Force chaired by the Office of Management and Budget (OMB) reported that Federal civilian-mapping activities tended to be uncoordinated, decentralized, and inefficient. 1/ The task force noted that 39 Federal

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1/"Report of the Federal Mapping Task Force on Mapping, Charting, Geodesy, and Surveying," Office of Management and Budget (Washington, D.C.: GPO, 1973).

agencies had spent about $305 million for domestic mapping, charting, geodesy, 1/ and surveying activities during fiscal year 1972. A major finding of the task force was that Federal civilian activities in these areas should be consolidated, preferably in one civilian agency patterned after the Department of Defense's Defense Mapping Agency.

In 1980 an Office of Science and Technology Policy study of the need for a centralized digital cartographic data base indicated that many Federal agencies involved in mapping were developing plans to independently computerize map data. 2/ The study maintained that the result of this single-purpose computer mapping would be inefficiency and waste and concluded that USGS should be designated as the lead agency in the digital mapping area. The study warned that, without a centralized data base, " * * * other agencies will begin their own programs which, while individually smaller, will aggregate to much greater cost." (See footnote 2 on this page.)

Finally, a 1981 National Research Council review of Federal surveying and mapping activities reported that, while some progress had been made since the 1973 task force report:

> "The present situation with respect to the proliferation of surveying, mapping, and related activities among the 39 Federal agencies involved is not much different than it was in fiscal year 1972, the year used as the base for the 1973 Federal Mapping Task Force * * * report."[3/]

Regarding Federal computer mapping, the National Research Council noted that the area " * * * merits more attention than it is receiving." 4/ The report also raised questions concerning the possibility of unnecessary duplication and inadequate coordination among the agencies involved.

1/A mathematical process that determines the exact positions of points and the figures and areas of large portions of the Earth's surface and its shape and size.

2/"An Assessment of the Need for a Centralized Digital Cartographic Data Base," Office of Science and Technology Policy, 1980.

3/"Federal Surveying and Mapping: An Organizational Review," National Research Council (Washington, D.C.: National Academy Press, 1981), p. 1.

4/See p. 22 in the above footnote.

PROPOSED LEGISLATION WOULD FINANCE CENTRALIZED COMPUTER MAPPING

Responding to the concerns expressed in the studies on page 3, the Department of the Interior proposed a bill (S. 1280) in 1981 to enable USGS to produce and maintain a national data base of computerized map information financed by a revolving fund. By making the information in the data base available to computer-mapping agencies, the bill would eliminate the need for some single-purpose computer mapping in other Federal agencies. According to the proposal, the fund will eventually become self-supporting through sales of computer-mapping products. As an additional step toward improving the coordination of computer mapping, OMB drafted a circular establishing USGS as the lead agency responsible for managing, producing, and distributing computerized map information for the United States. Neither of these proposals has been finalized. (See ch. 3 for further discussion of the bill and circular.)

OBJECTIVES, SCOPE, AND METHODOLOGY

The Chairman, Subcommittee on Energy and Mineral Resources, Senate Committee on Energy and Natural Resources, asked us to gather and review data on the extent, nature, and cost of Federal civilian computer-mapping activities; the possibility of duplication in Federal computer-mapping programs; and the degree to which the proposed revolving fund has been justified by market analysis. In addition, we contacted several State and private groups to determine the nature of their computer-mapping activities and their views on the need for more centralized Federal leadership in computer mapping. We did not attempt to determine the marketability of USGS' computer-mapping products, since USGS is conducting a market study to obtain this information. We performed this review in accordance with generally accepted government audit standards.

Through reviews of mapping publications and discussions with mappers from Federal, State, and private groups, we compiled a list of 28 Federal civilian agencies most likely to have computer-mapping capabilities. By obtaining program information from each of these agencies, we narrowed our list to 11 civilian agencies which have been computerizing features from USGS maps, such as political boundaries, transportation lines, public land surveys, drainage, and terrain. (See app. I.) The other 17 agencies were computerizing little or no base map data, as a result, they were not included in our review. The 11 agencies selected for further review were the Department of the Interior's USGS, Fish and Wildlife Service, Bureau of Land Management, National Park Service, and Bureau of Reclamation; the Department of Agriculture's Forest Service; the Department of Commerce's Bureau of the Census; the Department of the Army's Corps of Engineers (Civil Works); the

We used various techniques to gather and analyze information on the computer-mapping activities of the selected Federal agencies. Discussions with program officials, followed by review and analysis of program descriptions, budget documents, and statements submitted to us by agency officials, provided most of our information. At all 11 agencies we gathered data on program costs, goals, and standards. The data on program costs is approximate, since some agencies do not maintain separate records of expenditures on computer mapping. Computer-mapping costs are usually recorded as expenses under other programs.

In addition to analyzing individual computer-mapping programs, we reviewed coordination efforts among Federal agencies. We obtained much of our background data by reviewing the minutes of previous coordination meetings and discussing the results of the meetings with the participants. We also monitored the proceedings of the newly formed Interagency Digital Mapping Policy Committee.

We also gathered and analyzed information on selected State computer-mapping programs to determine if any duplication exists between Federal and State activities and if a more centralized Federal computer-mapping effort--including a more effective effort to set standards for computer mapping--would be supported by the States. We obtained this information through discussions with computer-mapping officials from 11 States. The States selected had ongoing computer-mapping programs in various stages of development. Data for our selections was obtained through literature reviews and talks with officials of Federal and State agencies and private organizations. The States were Arizona, Colorado, Iowa, Kentucky, Minnesota, Montana, North Carolina, South Carolina, Texas, Utah, and Washington.

We contacted several private companies to determine whether they believed centralizing Federal computer-mapping activities would be beneficial to private industry. All the companies that we contacted were producers of computer-mapping data. (A list of the private companies that we contacted is included in app. II.)

CHAPTER 2

GROWING COMPUTER-MAPPING ACTIVITIES HAVE LED TO DUPLICATION

Federal computer-mapping programs are increasing in size and number. Duplication has developed in these programs because (1) generally accepted computer-mapping standards which would permit the exchange of data among users have not been developed and (2) a sufficient data base of computer-mapping information available for use Government-wide does not exist. So far, the duplication has been mainly limited to other Federal agencies computerizing USGS' maps. Because these agencies have computerized the maps using standards different from those USGS uses, USGS will not be able to use their data and will have to duplicate these agencies' work. The situation will worsen if Federal agencies continue to use different computer-mapping standards, additional Federal agencies begin computer-mapping programs, and existing programs become entrenched. Unless corrective action is taken soon, the Federal Government will miss opportunities for cost savings.

FEDERAL COMPUTER-MAPPING PROGRAMS ARE NUMEROUS AND GROWING

At least 11 Federal civilian agencies, including USGS, are computerizing USGS map data. Most of these agencies began computer mapping during the mid-1970's, as developing computer technology offered increasingly useful mapping applications. From the time they began computer mapping through fiscal year 1981, these agencies had spent over $45 million on computer-mapping activities. (See app. I.)

The total dollar amounts program officials reported spending on computer mapping varied from $17,238,000 for USGS to about $100,000 for the National Aeronautics and Space Administration. The figures reported by most agencies were estimates, since they viewed computer mapping as a support activity rather than a separate program and therefore did not maintain separate records of computer-mapping expenditures. Personnel and computer hardware involved in computer mapping are often used for other purposes, making it difficult to determine the expenses incurred solely as a result of computer mapping.

Federal civilian agencies' involvement in computer mapping is increasing. Seven of the 11 Federal agencies have plans to increase expenditures for this activity in the future. Program officials of at least four other Federal agencies which are not now involved in computer mapping hope to begin using it in support of their major programs in the future.

SINGLE-PURPOSE COMPUTER MAPPING HAS RESULTED IN DUPLICATION AND LOST SAVINGS OPPORTUNITIES

The growth of independent, single-purpose computer mapping in Federal civilian agencies during the 1970's has led to duplication. Our review disclosed that 10 agencies have been computerizing the same features from the same map series and that USGS will computerize this entire series again as part of its national mapping program.

Independent programs are often duplicative

OMB Circular A-16 gives USGS lead agency responsibilities for national mapping, but not explicit authority to coordinate Federal computer mapping. USGS produces several widely used official map series which cover the Nation at different scales. Among the most widely used is the 1:24,000 scale map series which shows political boundaries, transportation lines, public land surveys, drainage, and terrain. At least 11 Federal civilian agencies have been computerizing map information from this map series. USGS plans to completely computerize these maps in the future. The total cost cannot be calculated precisely at this time, but USGS estimates it may reach $200 million. 1/ By that time, much of this data will have been computerized already by other Federal and State agencies. However, USGS will be unable to use this data unless USGS and these agencies begin to use common formats, codes, and other standards.

The lack of a centralized Federal computer-mapping data base has already resulted in lost opportunities for savings. Program officials of several agencies said that the lack of a centralized data base available to Federal users was the principal reason they began their own single-purpose computer mapping. Most of these officials estimated that they could have avoided costs in single-purpose computer mapping if USGS had had a computerized file of base map information. The savings could have been realized by reductions in labor and equipment used to computerize USGS maps. For example, Bureau of Land Management officials estimated total savings of about $2.2 million; Census Bureau officials estimated total savings of about $2.3 million. 2/ While many agencies would still computerize their individual thematic data to add to their base map data, only two of the agencies involved in computer mapping maintained that the availability of a centralized data base would not have saved any money.

1/This figure would be offset by sales of computer-mapping products and expected improvements in productivity from automating map production and revision.

2/These savings estimates are based on the agencies' receipt of USGS data free of charge.

Although these figures are only estimates, they do provide some indication of the cost of duplicative computer base map data. USGS' long-range plan for producing a national computerized map data base should help eliminate much of the duplication among agencies. Until a centralized data base is created to meet the major Federal mapping needs, the Federal Government will continue to spend more than is necessary to produce computer-mapping data.

Duplication has been encouraged by the lack of a central data base

Officials of several Federal civilian agencies told us that they began independent computer mapping because they were unable to obtain computerized map data in any other way. Although USGS is the principal mapping agency for the Nation, it has been unable to satisfy requests from other Federal agencies for computer-mapping products. According to USGS program officials, limited funding has prevented USGS from meeting the agencies' needs for timely products.

Most agencies have developed computer-mapping capabilities to meet their own particular needs. In general, the agencies have not followed USGS standards in their own computer mapping because these standards require greater precision and detail than the agencies require and would be more costly.

INTERAGENCY COORDINATION OF COMPUTER-MAPPING PROGRAMS HAS BEEN INADEQUATE

The agencies' inability to exchange computer-mapping data is due in part to the lack of effective coordination among computer-mapping agencies. Although some promising interagency coordination began taking place during our review, much remains to be done in resolving important issues, such as determining what the different agency requirements for computer mapping are, what possibilities for data exchange are available or can be developed, and what common standards for computer-mapping products would be most effective for both Federal and non-Federal users. Since progress in interagency coordination has been slow, an official directive designating a lead agency for computer mapping and delineating Federal agencies' responsibilities for interagency coordination is needed.

Previous studies have cited inadequate interagency coordination

The relative lack of coordination among computer-mapping agencies parallels the fragmented nature of civilian mapping activities in general. The 1973 Federal Mapping Task Force report

noted that interagency coordination of mapping, charting, and geodesy needed improvement:

> "Federal MC&G [mapping, charting, and geodesy] activities are somewhat coordinated, but they are generally marked by insularity, agency competition, some overlap, and shortfall in meeting important national needs in terms of coverage and timeliness." [1/]

The National Research Council's 1981 report on Federal mapping and surveying stated that interagency coordination in the computer-mapping field has some of the same shortcomings that the Federal task force report had described as being characteristic of the overall Federal mapping, charting, and geodesy effort:

> "Coordination is taking place, but on a 'volunteer' basis, so with involvement by several agencies there could be unnecessary duplication of equipment and production effort. Also, the information collected may not be compatible or interchangeable." [2/]

Past coordination efforts have been limited

Interagency coordination of Federal computer-mapping activities has been insufficient to achieve important goals. In 1979 a five-agency committee on classifications and inventories of natural resources set the fall of 1979 as the goal for identifying the member agencies' needs for information management standards, such as those for inputing map information into a computer. The agencies involved were the USGS, the Forest Service, the Bureau of Land Management, the Fish and Wildlife Service, and the Soil Conservation Service. The committee also resolved to formulate all necessary standards by the end of fiscal year 1980. As of July 1982 neither of these goals had been accomplished.

In March 1980 the Interagency Digital Mapping Policy Committee, chaired by USGS and involving the Forest Service, the Bureau of Land Management, and the Fish and Wildlife Service, began a series of meetings to encourage interagency coordination and to formulate standards for computer mapping. The Soil Conservation Service later joined the group. The committee is taking steps toward improving coordination. The member agencies have begun examining each other's computer-mapping products and discussing the possibilities for sharing data and agreeing on standards. For example, USGS has recently begun exploring the possibility of

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1/"Report of the Federal Mapping Task Force on Mapping, Charting, Geodesy, and Surveying," Office of Management and Budget (Washington, D.C.: GPO, 1973), p. 3.

2/"Federal Surveying and Mapping: An Organizational Review," National Research Council (Washington, D.C.: National Academy Press, 1981), p. 22.

other Federal agencies computerizing USGS maps in a way that USGS can build on. However, the history of interagency coordination among civilian mapping agencies indicates that, without an official mandate from a central authority such as OMB, progress will be slow. The effectiveness of the Interagency Digital Mapping Policy Committee is limited by not having a charter from OMB giving it authority to resolve conflicting agency interests. An official directive designating a lead agency and outlining the agencies' coordination responsibilities is needed.

Interagency coordination has not produced computer-mapping standards

Inadequate interagency coordination has contributed to the lack of computer-mapping standards. According to USGS officials, the lack of standards, coupled with hardware compatibility problems, has made exchanging computerized map information costly and time consuming.

The need for standards is widely recognized. Representatives of Federal, State, and private groups we contacted said that they would welcome standards for computer mapping. Interior officials stated that there is a "critical" need for standards to ensure that data can be exchanged. At the same time they recognized that establishing common standards will not be easy because computer mappers have adopted specifications for their own particular needs. The process of developing standards would involve reconciling these individual needs.

MANY STATE AND PRIVATE GROUPS ARE INVOLVED IN COMPUTER MAPPING

The lack of a central computer-mapping data base has led numerous State governments and private firms to independently computerize map information. Many of these groups are computerizing data from USGS maps, but since they are not following USGS' format, coding, and accuracy standards, USGS will not be able to use their work. Officials from a majority of the States and private firms we contacted said that they would like to obtain data from USGS' proposed national computer-mapping data base. In our opinion, future sales of information from this data base may be reduced because States and private firms are now computerizing the information on their own. If the data base could be developed within a relatively short time, the Federal Government would find a market for some of its data, and the States could obtain standard computerized data from a central source. Most State governments and private firms we contacted indicated that there was a need for computer-mapping standards to facilitate information exchange.

State computer mapping is widespread

Many States now have computer-mapping capability. Eleven States we contacted began their programs during the 1970's or early 1980's. By the end of fiscal year 1980, nine of these States estimated that they had spent over $17 million on computer-mapping activities. The other two States were unable to supply any figures for computer-mapping expenditures or did not begin computer-mapping until fiscal year 1981.

The States computerize map data for a variety of applications. For example, Texas has spent about $2 million per year for the last 5 fiscal years preparing county maps for use in transportation planning. State-produced data can be combined with natural resource or demographic data to support State programs ranging from land management to reapportionment.

According to Federal computer mapping officials, most States have not attempted to produce general-purpose computer-mapping products which would be easily usable by others. The State programs are in different stages of development and use different standards, computerizing techniques, and equipment.

Eight of the 11 computer mapping States we contacted were computerizing or planned to computerize base map features from USGS' standard map series. Most of the States also computerized a variety of thematic information, such as natural resources and population densities.

Seven of the 11 States reported that their computer-mapping costs could have been reduced by an estimated $1.9 million if USGS had been able to provide computerized data from its map series. The States were particularly interested in USGS' 1:24,000 scale map series, since many currently computerize data from these maps. USGS also is computerizing these maps and plans to complete the series over the next several years. However, USGS program officials told us that they would probably have to redo the data computerized by the States, since State programs generally do not follow USGS format, coding, and accurary standards.

Almost all of the States we contacted recognized the problems created by the lack of established computer-mapping standards. Ten States believed that standards should be set. For example, the State of Washington is changing its computer-mapping system to accommodate USGS' coding and format specifications. This process should help avoid some duplication between the State and USGS in computerizing map information.

Nine of the 11 States we contacted said that they would be interested in buying computerized map data from USGS. However, since the States are currently producing their own computer-mapping products, the State market for USGS' computer-mapping

products may not last indefinitely, and USGS must move rapidly to take advantage of the growing market.

Private computer mappers favor stronger Federal role

Computer mapping officials of the seven private firms we contacted agreed that common computer-mapping standards are needed. Six of the seven are currently computerizing data from Federal maps but not always at USGS standards. The officials generally agreed that standards are needed to facilitate the exchange of computerized map data.

The private firms we contacted included mineral exploration and mining companies, computer service and consulting firms, and a public utility. The features these firms computerized were largely base map features, such as public land surveys, political boundaries, transportation lines, and drainage. Thematic features included natural resources, land cover, soils, and electrical transmission lines. The mineral exploration and mining companies computerized data primarly for their own use, whereas the computer service and consulting firms produced data for purchase by other firms or as part of their consulting work for their customers. The public utility used the data it produced for planning and routing gas and electric lines.

Private industry may provide a sizable market for USGS' computer-mapping products. The seven private firms we contacted reported that they spent at least $27 million on computer mapping over the last 5 years and that they could have saved more than $3.6 million if USGS had been able to provide digital data from its map series. USGS' 1:24,000 scale maps were most often mentioned as desirable products.

CONCLUSIONS

At least 11 Federal agencies are currently computerizing map information independently. Millions have been spent on these programs already, and expenditures will increase in the next few years. The number of independent programs will continue to grow as other agencies enter the field.

The growth of these independent programs has led to duplication of work and lost opportunities for savings. Many agencies currently computerize the same base map features from USGS source maps. USGS plans to computerize a large portion of this information for its national data base but will be unable to use much of the agencies' data because they use different format, coding, and accuracy specifications.

The Interagency Digital Mapping Policy Committee has begun to address interagency coordination, but important issues are still unresolved. For example, the computer-mapping requirements of all

civilian Federal agencies have not been determined, the possibilities for data exchange among these agencies have not been fully explored, and clearly defined common standards for Federal computer-mapping products have not been set. Resolving these issues is necessary to create a widely acceptable computer-mapping data base and to reduce or eliminate unnecessary duplication. Major savings for the Federal Government should result from accomplishing these objectives.

State and private computer mappers also may profit from improved Federal/non-Federal coordination. Creating a computer-mapping data base and devising acceptable standards are goals which may involve getting support from State and private groups. If widely acceptable standards are set, these State and private groups may provide a large market for products from the data base.

CHAPTER 3

PROPOSED SOLUTIONS TO DUPLICATIVE COMPUTER-MAPPING PROGRAMS

Concern over the increase in duplicative Federal computer-mapping programs has led to two proposals. First, the administration has drafted a bill--designed to discourage single-purpose computer mapping--that would establish a revolving fund within the Department of the Interior. The proposed revolving fund would authorize a national computer-mapping data base within USGS. (See app. III.) Second, OMB has drafted a circular designed to encourage interagency coordination and to enable USGS to effectively administer the proposed revolving fund. (See app. IV.) Both the bill and the draft circular are significant attempts to deal with a growing problem. However, there is insufficient information, in our opinion, to conclude that the proposed revolving fund could raise enough funds to support a national data base, and while OMB may issue some instructions to Federal agencies on coordinating computer mapping, it has decided not to issue the circular in its present form.

INFORMATION JUSTIFYING THE REVOLVING FUND IS INCOMPLETE

The administration's legislative proposal for reducing duplication among Federal computer mappers was referred to the Subcommittee on Energy and Mineral Resources, Senate Committee on Energy and Natural Resources. The bill, S. 1280, would authorize a self-supporting national computer-mapping data base in the Department of the Interior's USGS. In a statement transmitting the proposal to the Congress, Interior claimed that after the Congress appropriated the initial capital, the fund would be self-supporting. However, whether enough money could be generated by the revolving fund to fully support the creation of a national data base is uncertain because

- --USGS has not completed a study to show the sales potential of computer-mapping products,
- --recent price increases in USGS computer-mapping products have been accompanied by reduced sales, and
- --many Federal and State officials told us that they would not buy USGS computer-mapping products at the new high prices.

OMB approved funds in USGS' fiscal year 1982 budget for establishing a computer-mapping data base but required that the data base eventually support itself through sales of computer-mapping information. OMB also required that USGS

> "* * * conduct a market survey or use other methods of determining potential demand for its products in both the governmental and private sectors, the best method of cost recovery, and the correct price structure for the digital products."

USGS finalized a contract in April 1982 for a market study to meet this condition.

In October 1981 USGS followed OMB's direction to attempt full cost recovery by increasing the price of its computer-mapping products. For example, the earlier price for a tape containing elevation data from one USGS quadrangle map was $26. After the price increase, the tape cost $250. According to a USGS official, the old prices were based on recovering the cost of reproduction and distribution. According to USGS program officials, the new prices represent 100 percent cost recovery based on a small number of sales per unit. Projected sales would be to other Federal agencies, non-Federal users, and other units within USGS. However, USGS officials noted that this formula is only a rough estimate of sales, since full market data is unavailable.

The increased prices for USGS computer-mapping products have been accompanied by reduced sales for some products. For example, in the 4 months preceding the price increase, USGS sold 1,185 tapes containing elevation data, as compared with sales of 3 such tapes in the 4 months following the price increase. If the reference period is extended to 9 months before and after the price increase, the figures are 1,640 sales for $19,680 before the increase and 63 sales for $15,750 after the increase. Officials of several agencies said that they believed a revolving fund based on full cost recovery, as presently conceived, would not succeed because high prices would decrease demand for the tapes. Representatives of several Federal agencies told us that they were unwilling to pay the high USGS prices and that it would be unfair to require them to pay these prices, because USGS computer-mapping products are more precise and detailed than the agencies require. USGS officials acknowledged that they could not make firm estimates of sales from the revolving fund or be certain how large of a data base could be created from sales revenues.

In addition to jeopardizing the fund, high prices may encourage agencies to continue their current unstandardized, single-purpose computer-mapping activities. Officials of some agencies said that the best method of discouraging duplication and encouraging standardization would be to make standard products widely available at marketable prices. However, many Federal and State computer-mapping officials we contacted indicated they would not be willing to pay current prices which were set to fully recover costs from a few sales. Once again, the market study should help indicate what pricing method should be followed.

DIRECTIVE NEEDED ON COMPUTER MAPPING

OMB drafted a circular in March 1981 designed to improve interagency coordination and reduce duplication among Federal computer mappers. 1/ A directive of this sort is needed, but while OMB may issue some instructions to Federal agencies on coordinating computer mapping, it does not plan to issue the draft circular in its present form.

The draft circular would have established USGS as the lead agency responsible for producing and distributing computerized map information for the United States. Toward this end, the circular would have provided for an interagency council, chaired by USGS, which would help coordinate Federal computer-mapping activities and enable USGS to administer the proposed national data base more effectively.

To help reduce duplication, the draft circular directs agencies to

> "Encourage the use of the National Digital Cartographic Data Base in its activities by not developing or maintaining data bases that duplicate the content or the purpose of the base maintained by [USGS] * * * ."

The agencies are directed to obtain the data from USGS' national data base.

Recognizing that, at first, USGS probably would be unable to supply the needs of all agencies in a timely manner, the circular stated that, in these situations,

> "* * * [USGS] may recommend to OMB that the activity be performed in the requesting agency. In such cases the production of such data shall be to prescribed standards with documentation and the data shall be provided to [USGS] at no cost."

This provision would require most of the agencies now computerizing map data to use different specifications than they now use.

We believe that the objective behind this provision of the circular is clear. Standardizing the map data and making it available to several different agencies should eliminate the need for other agencies to computerize the data for their own purposes, resulting in reduced cost to the Federal Government. According to USGS officials, surplus computer capacity would not be created in Federal agencies by prohibiting duplicative computer-mapping activities because the equipment used for these activities has many other applications.

1/The draft circular was revised in July 1981. See appendix IV.

The Chief, Interior Branch, Natural Resources Division, and other OMB officials told us that OMB decided not to proceed with the circular, whose preparation was begun in the previous administration, because the present administration's policy is to restrict OMB's involvement in other Federal agencies' management. However, in the absence of a circular or other OMB directive, there is no official lead or central agency responsible for computer mapping, no Government-wide mandate for improving interagency coordination and reducing duplication in Federal computer-mapping activities, and no standard-setting authority.

CONCLUSIONS

The proposed revolving fund legislation and OMB circular recognize the need to deal with the problems created by the growth of independent Federal computer-mapping programs. However, more information is needed on the feasibility of the revolving fund, and OMB's efforts to control the problem by means of a circular have been halted.

Sufficient evidence is unavailable to demonstrate that a national data base can be established through a revolving fund designed to fully support itself through sales. USGS' current attempt at full cost recovery based on unscientific estimates of potential sales volume has been accompanied by a marked sales decline. Our talks with agency officials indicate strong opposition to purchasing USGS computerized maps at current prices. USGS' market study is scheduled for completion in January 1983. The study may provide further evidence on the feasibility of attempting full cost recovery at this time. If the USGS-sponsored market study, or other evidence, does not indicate that a computerized cartographic data base can be developed through the proposed revolving fund, other methods of financing may be needed, such as reallocating funds within Interior and requesting increased appropriations.

An OMB directive is needed to encourage interagency coordination and reduce duplicative computer-mapping activities. The circular drafted by OMB, correctly in our view, would have given USGS lead agency responsibility for computer mapping and authority to achieve interagency coordination and the formulation of uniform computer-mapping standards through an interagency committee.

RECOMMENDATION TO THE DIRECTOR, OMB

In view of the potential for savings in computer-mapping costs, we recommend that the Director issue a circular or other directive requiring interagency coordination and preventing the establishment of duplicative computer-mapping programs. The directive should create a rulemaking body to establish uniform standards for Federal computer mapping so that agencies can exchange data and the needs of map users can be met at reasonable cost.

RECOMMENDATION TO THE SECRETARY OF THE INTERIOR

We recommend that the Secretary direct USGS to accelerate its production of computerized maps which are most needed by Federal agencies. The accelerated production should help to establish a data base available for Government-wide use and reduce duplicative single-purpose computerizing.

AGENCY COMMENTS AND OUR EVALUATION

OMB agreed that greater coordination between agencies is required and that it should take action to help accomplish this. OMB indicated that it was preparing instructions to Federal agencies on coordination but could not say how or when such instructions would be issued.

OMB believed that the report overstated the severity of the duplication problem somewhat in that no commitment has been made to fund full national coverage for a USGS-maintained data base and therefore USGS might not redo work done by other Federal agencies. Although OMB has not committed funding for full national coverage, our review showed that it is providing significant resources to USGS for computerizing its maps--almost $4 million in fiscal year 1982--with priority attention being given to meeting the needs of other Federal agencies. USGS has already computerized data from about 5,000 of its 54,000, 1:24,000 scale maps. If funding continues at present levels, USGS will eventually computerize all or most of these maps, but perhaps only after much of the data on them has already been compiled by other Federal agencies, States, and private companies.

OMB objected to the building of a data base with full national coverage, which would not recover its costs through sales. Our recommendation, however, is that USGS accelerate the production of computer products most in demand by other Federal agencies. This production could be funded by user charges and, if necessary by reallocating funds within the Department of the Interior and requesting increased appropriations.

The Department of the Interior agreed with our recommendations, stating that USGS should be the focal point for coordinating computer-mapping activities in the Federal Government and that USGS should be supported by an OMB directive. Interior also stated that the data base would eliminate the need for duplicative efforts and result in an overall savings to the Federal Government.

The Department of Agriculture supported the designation of USGS as the lead Federal civilian agency for building a national computerized geographic data base. Agriculture believed, however, that individual agency requirements must be recognized in developing computer-mapping standards and that compensation should be

provided to agencies contributing to a national data base. Agriculture also believed that USGS already had sufficient authority for building national geographic data files and that the issuance of a new OMB circular designating USGS as lead agency for computer mapping was unnecessary.

The Census Bureau stated that it supported USGS' efforts to develop and coordinate computer mapping. However, it was concerned that a method be developed to resolve conflicts between agency missions and coordination requirements.

The Departments of Housing and Urban Development and the Army and the National Aeronautics and Space Administration were concerned that their mapping needs would not be fully met by a national data base maintained by USGS. Housing and Urban Development and the Army acknowledged that duplicative Federal computer mapping was a real problem.

We recognize that the concerns raised by the agencies regarding (1) the extent to which Federal agencies, other than USGS, should maintain independent geographic data bases, (2) the possibility of compensation for agency contributions to USGS' data base, and (3) a mechanism for resolving conflicts between agency missions and the need to computerize geographic data at common standards are legitimate considerations. These issues can be addressed in the OMB directive we have recommended. We continue to believe, despite the Department of Agriculture's opinion that a new circular is not needed, that because of the difficulty of coordinating the computer-mapping activities of the numerous Federal agencies, a clear statement of USGS' authority should be promulgated by OMB.

Agency commments on our report and our more detailed response to them are included in appendixes V through XI.

APPENDIX I

INFORMATION SUPPLIED BY 11 FEDERAL AGENCIES

WHICH ARE COMPUTERIZING USGS MAPS

Federal agency	Description of program	FY program began	Expenditures through FY 1981
Department of Commerce			
Bureau of the Census	Computerizes data on streets and water features, such as boundaries for census tabulation units. Computer files are also used to assign mailing addresses on questionnaires.	1970	$ 4,592,000
Department of the Interior			
Fish and Wildlife Service	Maps physical, cultural, and natural features for refuge master planning, impact assessment, management planning, habitat assessment, regional resource planning, and other purposes.	1977	3,500,000
Bureau of Land Management	Computerizes geographic data for land and resource management decisions.	1979	8,701,811
Bureau of Reclamation	Digitizes soils, county boundaries, land use, land cover, hydrographic and water district boundaries, and other items as an aid to land use studies and flood forecasting.	1977	169,000
Total			$ 16,962,811

APPENDIX I

Federal agency	Description of program	FY program began	Expenditures through FY 1981
Geological Survey	Computerizes base map features for map revision and use by Government agencies and private users.	1977	$ 17,238,000
National Park Service	Vegetation, roads, land use, ownership, hydrography, soils, and geology are computerized for suitability and feasibility determinations for land use planning and answering resource management questions about natural resources.	1979	140,000
Department of Agriculture Forest Service	Timber, habitat, soil, ownership, land net, boundaries, etc., are computerized for forest visitor maps and analyzing alternative land management strategies.	Early 1970's	4,174,500
Department of the Army Corps of Engineers	Elevation, water surface, soil type, land use, roads, bridges, etc., are computerized mostly for harbor and navigation channel maintenance and improvement, but also for flood hazard identification, flood damage assessment, water resource planning, environmental impacts, and master planning maps.	1977	6,723,200
Total			$ 28,275,700

APPENDIX I

Federal agency	Description of program	FY program began	Expenditures through FY 1981
Department of Energy Oak Ridge National Laboratory	Map data is computerized for environmental and geographical analysis.	1972	$ 200,000
National Aeronautics and Space Administration	Computerizes base map data for research.	1980	100,000
Department of Housing and Urban Development	Transportation, drainage, culture, and boundaries are computerized to inventory areas owned under the community development program.	1979	150,000
Total			$ 450,000
Total			$ 45,688,511

APPENDIX II

PRIVATE COMPANIES CONTACTED REGARDING COMPUTER MAPPING

1. Pacific Gas and Electric Company--utility; San Francisco, California.
2. Peabody Coal Company--coal mining company; St Louis, Missouri.
3. Woodward-Clyde Consultants--land use, natural resources consultants; San Francisco, California.
4. Exxon Company, U.S.A.--oil company; Houston, Texas.
5. Petroleum Information Corporation--provides map information for mining and petroleum companies; San Antonio, Texas.
6. Utah International, Inc.--provides technical services for mining; San Francisco, California.
7. Amoco Production Company--oil company; Tulsa, Oklahoma.

APPENDIX III

97TH CONGRESS
1ST SESSION

S. 1280

To establish a revolving fund in the Department of the Interior, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MAY 21 (legislative day, APRIL 27), 1981

Mr. MCCLURE (by request) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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A BILL

To establish a revolving fund in the Department of the Interior, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act shall be referred to as the "Digital Cartography Fund Act of 1981".

SEC. 2. DIGITAL CARTOGRAPHY FUND.—(a) There is hereby established, in the Department of the Interior, a "Digital Cartography Fund" (hereafter referred to as the "Fund") to be used as a revolving fund. This Fund shall be available, without fiscal year limitation, for financing the pro-

duction and distribution of digital cartographic data of uniform standards developed by the United States Geological Survey under the direction of the Secretary of the Interior.

(b) The Secretary of the Interior (hereafter referred to as "the Secretary") is hereby authorized to capitalize in the Fund, at cost less depreciation, any real and personal property which the Secretary determines is currently being used in connection with the functions to be carried out by the Fund.

(c) The Fund shall be credited with any appropriation made for the purpose of providing or increasing capital, and, notwithstanding the provisions of section 483a of title 31, United States Code, with all collections from users of digital cartographic data, including any refunds, advance payments made for specific products and services, or other amounts received in connection with activities of the Fund. Amounts received in addition to those amounts which, in the opinion of the Secretary, are excess to the effective operation of the Fund shall be covered into miscellaneous receipts of the Treasury.

SEC. 3. DATA USERS' FEES.—(a) Notwithstanding the provisions of section 552 of title 5, United States Code, and section 483a of title 31, United States Code, the Secretary is authorized to charge all users amounts sufficient to cover the cost of production and distribution of digital cartographic

APPENDIX III

data, including depreciation of equipment and accrued annual leave.

(b) Notwithstanding the provisions of section 552 of title 5, United States Code, digital cartographic data shall be available only under the provisions of this Act. The Secretary is authorized to sell such data subject to agreements which preclude reproduction or further dissemination of the data.

SEC. 4. REGULATIONS FOR CARRYING OUT PROVISIONS.—The Secretary is authorized to make such rules and regulations as he deems necessary and proper for the purpose of carrying out the provisions of the Act.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.—There are hereby authorized to be appropriated $6,034,000 for the fiscal year ending September 30, 1982, and such amounts as may be necessary in subsequent years for capital of the Fund until such time as the Fund becomes self-sustaining.

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APPENDIX IV

APPENDIX C

7/15/81

Proposed OMB Circular

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

Circular No. A __

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: MANAGEMENT OF THE PRODUCTION AND DISTRIBUTION OF DIGITAL CARTOGRAPHIC DATA BASES OF UNITED STATES LAND AREAS

A. PURPOSE: This Circular describes the authorities and responsibilities of Federal agencies with respect to managing, coordinating, and monitoring the production and distribution of digital cartographic data. It establishes the U.S. Geological Survey, Department of the Interior, as the lead agency for management, production, and distribution of digital cartographic data of the United States land areas, and for administering any public enterprise fund established for this purpose. It authorizes the establishment of an interagency council to coordinate Government-wide responsibilities for production and distribution of digital cartographic data.

B. ACTIVITIES COVERED: The management, coordination, and monitoring procedures established by this Circular refer to production and distribution of digital cartographic data of features normally shown on map series of national or regional scope financed in whole or in part by Federal funds. Excluded are digital cartographic activities that are applicable only to a specific mission and are not appropriate for inclusion in the national or regional data bases covered by this Circular.

C. RESPONSIBILITIES OF THE U.S. GEOLOGICAL SURVEY: The U.S. Geological Survey is designated the lead agency for Federal activities related to the management, production, and distribution of digital cartographic data. In carrying out these responsibilities the U.S. Geological Survey will:

1. Establish and chair an interagency coordinating council consisting of the principle Federal agencies having programs for producing or using digital cartographic data, recommend categories of data to be included in the National Digital Cartographic Data Base (NDCDB), review agencies' funding levels for digital cartographic activities, provide broad program guidance, and recommend resolution of policy differences. An annual report of council activities will be provided to OMB.

2. Establish and administer the National Digital Cartographic Data Base to provide storage, access, and distribution of appropriate digital data developed through federally funded programs. The costs of these data are to be reimbursed by the users.

3. Through the interagency coordinating council and in consultation with other Federal and State agencies, eatablish and publish standards and specifications that shall be used by all agencies producing data that will be included in the NDCDB.

4. Develop a national digital cartographic data program which relates the requirements and priorities of Federal and State agencies and other users for digital cartographic data collected on a national or regional basis to the existing or potential production of such data. Where the Geological Survey is responsible for the production of the digital cartographic data but is unable to meet the needs of the user agencies in a timely fashion, the Geological Survey may recommend to OMB that the activity be performed by the requesting agency. In such cases the production of such data shall be to prescribed standards and the data shall be provided to the Geological Survey at no cost.

5. Monitor activities of Federal agencies that produce or use digital cartographic data and make recommendations through the Department of the Interior to OMB for effectiveness and economy.

6. (Periodically) Inform other agencies of production schedules and program status annually.

7. Administer any public enterprise fund established in the Department of the Interior for the creation of digital cartographic data.

8. Develop procedures for accepting receipts and disbursing funds for digital cartographic data production, and establish charges for distributing data from the National Digital Cartographic Data Base in order to achieve cost recovery.

9. Coordinate meetings, interagency agreements, information and data exchanges, and other mechanisms necessary to carry out its Government-wide responsibility for management of digital cartographic data.

D. RESPONSIBILITIES OF OTHER FEDERAL AGENCIES: Federal agencies or the recipients of Federal funding that require the development or acquisition of digital cartographic data appropriate for entry into the data bases managed under this Circular shall coordinate their data activities through the Geological Survey. Each agency engaged in digital cartographic activities described in Part B will:

1. Encourage the use of the National Digital Cartographic Data Base in its activities by not developing or maintaining data bases that duplicate the content or the purpose of bases maintained by the Geological Survey or otherwise available through the NDCDB.

2. Prepare a fiscal year report by the end of the first FY quarter to the chairman of the interagency coordinating council. This report will describe digital cartographic equipment acquired, data produced either directly or by transfer of funds, and application activities carried out in the preceding fiscal year, work in progress for the current fiscal year, and plans for the following year. The report will tabulate resources expended in digital cartographic activities.

3. Supply to the Geological Survey by June 30 each year pertinent information concerning its anticipated digital cartographic data requirements for the following two fiscal years. Requirements may be submitted by bureaus within a department or establishment and should include both an indication of priorities and the availability of supporting funds.

4. Provide the Geological Survey with current information about digital activities financed by Federal funds through contractors, reimbursable agreements, and grants so that some or all of the data generated may be incorporated into the National Digital Cartographic Data Base.

5. Not distribute digital cartographic data suitable for inclusion in the National Digital Cartographic Data Base.

E. DIFFERENCES AMONG AGENCIES: Major differences which cannot be resolved through consultation among agencies with respect to the coordination of digital cartographic activities covered by this Circular may be referred through the Secretary of the Interior to the Director of the Office of Management and Budget.

APPENDIX IV

APPENDIX 1 to Circular No. A_____.

"Management of the Production and Distribution of Digital Cartographic Data Bases of United States Land Areas."

Description of Terms

PRODUCTION: Preparation of selected base categories of cartographic data in digital form at standard scales, accuracies, and formats suitable for computer based analysis.

DISTRIBUTION: Dissemination to user organizations of digital information contained in the National Digital Cartographic Data Base by means of standard format computer compatible tapes.

DIGITAL CARTOGRAPHIC DATA: Computer readable map data in digital form generated as digital elevation models (DEM) or digital line graphics (DLG); specifically used to distinguish the data in a machine readable form from comparable source material.

DEM: A sampled array of digital elevations for a number of ground positions that are usually, but not always, at regularly spaced intervals.

DLG: Line map information in digital form such as roads, boundaries, hydrography, transportation networks, public-land surveys, and other features normally shown on maps.

INFORMATION DATA BASE: Specialized data, regarding areas of management and responsibilities of organizations, in digital form and stored in computer files. Data have a wide range of information from inventories to statistical.

DIGITAL DATA BASE: A collection of interrelated digital data prepared to serve one or more applications. The data are acquired and stored in formats which are independent of programs which use the data. A common and controlled approach is used in adding new data or in modifying or retrieving existing data. A data base system may consist of a collection of independent data bases each with its own specific content or structure.

NATIONAL DIGITAL CARTOGRAPHIC DATA BASE (NDCDB): Cartographic data of national or regional map series in digital form covering the United States land areas stored in computer files. Primarily used as a geographic reference base for other unique data. Examples of data bases include:

- 1:24,000-scale base categories
- 1:2 million-scale digital cartographic data base
- Geographic names information

APPENDIX IV

- Land use and land cover

PRESCRIBED STANDARDS: Standards prepared by the U.S. Geological Survey, and promulgated through the interagency council, for use by organizations in generating digital data for inclusion in the National Digital Cartographic Data Base.

PUBLIC ENTERPRISE FUND: A fund having a prescribed cost accounting system for receiving and disbursing monies involved in digital data production and distribution.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

September 13, 1982

Mr. Henry Eschwege
Director, CED
Room 6146
U.S. General Accounting Office
441 "G" Street, N.W.
Washington, D.C. 20548

Dear Mr. Eschwege:

Thank you for the opportunity to review and comment on the General Accounting Office draft report entitled "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem." As you are aware, we have been looking at Federal agencies' digital cartographic programs for some time. We are in basic agreement with the conclusions reached in the report that greater coordination between agencies is required and that this office should take action to help bring it about. We disagree with other conclusions. Our views concerning the report and conclusions reached in it are discussed below.

To begin, we suggest that the reproduction of the draft circular in Appendix IV and references to it in the text of the report be deleted. The document in question was a staff-level working paper. As such, it was composed to present ideas for review and discussion. The paper was never reviewed by OMB policy officials, nor was it published for coordination and comment. Therefore, we believe that its publication as an "OMB Circular" and its use to support conclusions drawn in the report are inappropriate.

[GAO COMMENT: We have retained the draft circular in the report because it sets forth possible controls for improving interagency coordination and eliminating duplication in Federal computer-mapping activities. Also, OMB distributed the draft circular to Federal mapping agencies and the draft was discussed extensively at the June 1, 1981, Federal Mapping Coordinating Conference, attended by representatives of 20 Federal agencies, and was published by the Department of the Interior in its report on the proceedings of the Conference.]

As stated above, we agree that OMB guidance to facilitate coordination between Federal agencies would be beneficial. Accordingly, we are now preparing to issue such guidance. We are still in the formative stages of the process and its final form and content have yet to be determined. Thus, we cannot say at this time exactly how or when it will be issued.

We feel that the severity of the duplication problem is somewhat overstated in the report. As Appendix I of the report shows, only $46 million has been spent on digital cartographic programs by all Federal agencies in all years through 1981. Those figures cover both the compilation and use of the digital data, while the area of duplication is in compilation only.

[GAO COMMENT: Appendix I of this report lists agency estimates of expenditures only for those Federal agencies which are computerizing information from USGS maps. The appendix does not include expenditures of other agencies, such as the Defense Mapping Agency and the Department of Agriculture's Soil Conservation Service, which operate computer-mapping programs but do not computerize USGS maps. Therefore, it is incorrect to say that the appendix shows the costs of all Federal agencies. Also, there is no implication in the report that the entire $46 million shown in appendix I represents duplicative costs. Page 7 of the report contains a discussion of the costs of duplicative computer mapping.]

Moreover, the report gives no examples of duplicative coverage by different agencies; it cites only duplication that will occur when the USGS later digitizes its entire map series, including the areas in which the agencies are now working. However, no commitment has been made to fund full national coverage for the data base, so such duplication may not occur.

[GAO COMMENT: Although OMB has not funded full national coverage, it is providing significant resources to USGS for computerizing its maps--almost $4 million in fiscal year 1982 --with priority given to meeting the needs of other Federal agencies. USGS has digitized data from about 5,000 of its 54,000, 1:24,000 scale maps. If funding continues at present levels, USGS will eventually computerize all or most of its maps, but perhaps after much of the data on them has already been done by the other Federal agencies, States, and private companies.]

Finally, the estimates of savings to agencies if they could have obtained their data from USGS are unqualified, in that they do not state the assumed cost to the agencies of the hypothetical USGS data. The magnitude of the savings suggests that the assumed cost may be zero, in which case the expense of USGS compilation should be subtracted from the estimates of savings.

[GAO COMMENT: Since we are calculating the costs of duplicative mapping, it would be incorrect to subtract USGS costs from amounts that the other agencies estimate they would have saved by having USGS' data available to them.]

The report concludes that major savings should result from "...the creation of a widely acceptable national computer mapping data base..." such as that planned by the Geological Survey. We agree that such an outcome is possible, but feel it is by no means assured. Cost savings can be achieved only if the users can be supplied data at a cost below that at which they could produce it themselves. We know of no conclusive evidence that a large, centralized data base necessarily will do that. Also, other methods of compiling and maintaining data could prove to be more effective. It is possible that a suitable data base could be simply a network of the individual agency data bases, compiled to common standards. Also, the private sector could prove to be a suitable source of digital data. We feel that the future of digital cartography is too uncertain at this time to prescribe any single method of providing data, to the exclusion of others. It is also too soon to make a large, long-term funding commitment for a massive data base that may not be necessary. Hence, we disagree with the conclusion that increased appropriations for the Geological Survey data base, at the expense of other programs if required, are necessary.

[GAO COMMENT: We disagree that "Cost savings can be achieved only if the users can be supplied at a cost below that at which they could produce it themselves." We believe that savings would occur by eliminating duplicative mapping between Federal agencies. Also, we are not recommending a "large, long-term funding commitment for a massive data base that may not be necessary." Our recommendation is that USGS production of computerized map data most needed by other Federal agencies be accelerated. It is true, as OMB suggests, that a data base might be started and duplicative mapping avoided if Federal agencies and/or private firms worked at commonly agreed upon standards. OMB action, such as we have recommended, would be needed to bring this about.]

The report notes that the revolving fund proposed by the Administration to finance the Geological Survey data base might not be able to become self-supporting. One reason for requesting the establishment of a revolving fund was that it would provide a measure of the need for the data. We are aware that there is no assurance that such a fund will sell enough data to be self-supporting. (Although the report itself concludes there is a demand for data and money available to buy it.) And while we expect the market study to cast some light on the demand for the data, we do not expect it to give a definitive answer. Rather, under the revolving fund, the demand itself would determine whether it is produced. If the demand were high, the fund would provide money for continued production and/or expansion. If the demand were low, little money would be available, and we could avoid the production of expensive data that no one wants. We therefore disagree strongly with the recommendation that the Secretary of the Interior make more money available to the Geological Survey to produce data if the revolving fund cannot provide resources for data production. We have no information that indicates a need for digital cartographic data so compelling

that it should be produced and given at a subsidized rate to users who do not find it of sufficient value to pay its full cost.

[GAO COMMENT: Minor word changes have been made to our report to clearly indicate that our recommendation is for an accelerated production to USGS computer products most in demand by other Federal agencies. We have not recommended the production of data no one wants.]

To sum up our views, we think it is necessary to take action soon to enhance interagency coordination of digital cartographic activities, and to increase the interchangeability of Federal data bases to promote their multiple use. The question of the best way to produce digital data for Federal agencies and other users remains to be answered; the proposed revolving fund is one way to find that answer. Subsidized data production is neither necessary nor desirable.

Again, we appreciate this opportunity to give you our comments on the draft report. We hope you will find them useful in preparing the final version.

Sincerely,

Joseph R. Wright, Jr.
Deputy Director

APPENDIX VI

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

SEP 10 1982

Mr. Henry Eschwege
Director, Community and Economic
Development Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

Secretary Watt has asked that we respond to your letter of August 13 and review the draft GAO report, "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem." The draft report highlights many of the problems associated with digital cartography in the Federal Government today. We believe that all Federal agencies will benefit from the development of a digital cartographic data base that meets prescribed standards. While individual agencies will continue to produce and utilize digital data meeting the specific thematic information requirements of their programs, a multipurpose digital cartographic data base will greatly reduce the duplication of computer mapping efforts resulting in substantial savings to the Government.

The Department of the Interior recognizes the necessity of strong coordination for digital cartography activities and is making the Geological Survey the focal point for such coordination among bureaus within the Department. Also, we recognize the Government-wide responsibilities of the Department for all mapping activities and have been discussing appropriate coordination mechanisms for digital cartography with the Office of Management and Budget. We believe that the Geological Survey should serve as the focal point for the coordination effort which should be supported by an appropriate mechanism such as the document recommended in the draft report. This would provide a means to establish and maintain uniform, useable standards for digital cartographic data and would help eliminate duplication and preserve the integrity of the data. It should be recognized that the implementation of such standards will require a transition period and that extensive coordination of the digitizing of cartographic data will be necessary to ensure that the programmatic requirements of Federal agencies are met.

The Department strongly supports the recommendation that the Geological Survey be the principal manager, producer, and distributor of base category digital cartographic data. We intend to fulfill that role through the Geological Survey and have requested appropriations to make it possible.

Mr. Henry Eschwege

The Department of the Interior recognizes the problems of operating the proposed revolving fund as detailed in the report, especially if no mechanism exists to prevent unauthorized reproduction of digital cartographic data. However, we are prepared to operate the program on that basis if Congress so directs. It is essential that the data be available on an economical and timely basis to ensure the effectiveness of the program. We are in agreement that full cost-recovery pricing in this field is premature due to the fact that substantial applications of the technology are only now being established. Accordingly, we suggest that the pricing policy for these data be established to properly reflect this situation. We believe that the provision of digital cartographic data by the Geological Survey will eliminate the need for duplicative efforts of other Federal agencies resulting in an overall saving to the Federal Government. Although full cost-recovery pricing does not seem to be supportable by the market at this time, appropriate pricing will make the data available to users and will generate additional revenues that benefit the Government.

Additional comments are enclosed as an aid for preparing your final report. These comments incorporate the views of the several bureaus within the Department who are directly affected by computer mapping. We appreciate having the opportunity to comment on the draft report.

Sincerely,

Dan Miller

Daniel N. Miller, Jr.
Assistant Secretary
for Energy and Minerals

Enclosures (2) /See GAO note./
Additional comments on GAO Draft Report
Report on the proceedings of the Federal Mapping Coordination Conference, U.S. Geological Survey, June 1, 1981

GAO Note: These enclosures are not included in this report.

United States Department of Agriculture | Forest Service | Washington Office | 12th & Independence SW
P. O. Box 2417
Washington, D. C. 20013

Reply to 1420

Date SEP 3 1982

Mr. Henry Eschwege
Director, Community & Economic
Development Division
U. S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Eschwege:

The following are USDA comments on the draft of your proposed report to the Congress entitled "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem."

The report provides a good summary of the level of digitizing activities in the mapping community and the problems associated with directing these efforts towards a standard National digital data base. The problems are very similar to those involving conventional mapping as documented by the previous studies referenced in your report.

We support the designation of the U. S. Geological Survey (USGS) as the lead Federal civilian agency for building a National computerized geographic data base for features such as: political boundaries, transportation and other culture, public land surveys, drainage, and terrain.

We strongly disagree with any attempt to prohibit other agencies from computer mapping and the creation of geographic data files which do not meet the National standards as currently defined. Agency programs require the flexibility to produce computer maps and data files that do not necessarily meet National standards, just as those agencies have to prepare conventional maps that do not meet National standards. The current USGS-imposed standards are too restrictive. Most agencies, both government and private, do not require the existing highly structured formats or tight accuracy limitations for their individual applications. Also, the expense of buying the data, and the cost of reformatting it to fit individual agency hardware and software, make it more practical to digitize only that information needed on a project-by-project basis. It is also unlikely that USGS can provide the required data in a timely manner due to other National Mapping commitments. This is often the case now with conventional map products.

FS-6200-11 (8-80)

APPENDIX VII

Mr. Henry Eschwege

It would seem appropriate to develop a family of interim standards with a goal of eventually achieving the National standard as currently defined. In the near term, this would encourage agency participation without imposing expensive operational procedures. As the National standard files are developed, they could replace the lower order files.

Following are our comments on the specific recommendations in the report:

1. Recommendation to the Director, OMB

   We disagree with the recommendation that a new OMB circular needs to be issued designating USGS as the lead agency for building National geographic data files. USGS has already assumed that role through their authority in OMB Circular A-16. This circular also provides the authority for USGS to solicit agency computer geographic data needs and establish annual programs and priorities to meet agency computer mapping needs. We agree that a committee with authority to recommend standards is needed and should consist of Federal and State agencies, the private sector, and the academic community. USGS should chair this body under the responsibility for the National Mapping Program. USDA, as a primary user of National Mapping products, should be represented on this committee.

   To facilitate exchange between agencies, standards should be published as Federal Information Processing Standards (FIPS) through the National Bureau of Standards as provided in PL 89-306 and OMB Circular A-86.

2. Recommendation to the Secretary of the Interior

   We support this recommendation with the following modification. Agencies who input data to the National data base should receive dollar credits in the amount equal to the value of the data provided, i.e., one quad of standard data provided is worth one quad of data received from the USGS.

In summary, we support the concept of a National digital geographic data base administered by the USGS. We feel, however, that individual agency requirements must be recognized in developing

APPENDIX VII

Mr. Henry Eschwege

standards. OMB Circular A-16 gives the USGS authority to manage this effort as part of the National Mapping Program. No additional circular is needed. Compensation should be provided for agencies contributing to the National data base.

We appreciate the opportunity to comment on this report.

Sincerely,

F. Dale Robertson

For: R. MAX PETERSON
Chief

[GAO COMMENT: The concerns raised by the Department of Agriculture relating to the extent to which Federal agencies other than USGS should maintain independent geographic data bases not subject to National Mapping Standards and the possibility of compensation for agency contributions to the National data base, are legitimate considerations which can be addressed in the OMB instruction we have recommended. We continue to believe, however, that because of the difficulty of coordinating the computer mapping activities of numerous Federal agencies, a clear statement of USGS's authority should be promulgated by OMB.]

APPENDIX VIII

UNITED STATES DEPARTMENT OF COMMERCE
The Inspector General
Washington, D.C. 20230

SEP 8 1982

Mr. Henry Eschwege
Director, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Eschwege:

This is in reply to your letter of August 20, 1982, requesting comments on the draft report entitled "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem."

We have reviewed the enclosed comments of the Under Secretary for Economic Affairs and believe they are responsive to the matters discussed in the report.

Sincerely,

Sherman M. Funk
Inspector General

Enclosure

APPENDIX VIII

UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary for Economic Affairs
Washington, D C 20230

AUG 3 0 1982

Mr. Henry Eschwege
Director, Community and Economic
Development Division
General Accounting Office
Washington, DC 20548

Dear Mr. Eschwege:

Thank you for your letter to Secretary Baldrige requesting comments on the draft report entitled "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem."

The following are some general and specific comments for your consideration:

General Comments

The report does highlight a problem which has been recognized for a number of years.

The Bureau of the Census and the U.S. Geological Survey (USGS) have established an Interagency Task Force to coordinate the efforts of the two agencies in the area of digital mapping. A copy of this agreement is enclosed. However, interagency cooperation preceded this formal agreement.

The proposed Office of Management and Budget (OMB) circular formalizes an arrangement which for the most part already exists between the two agencies; however, we do have some reservations about the proposed circular. The Census Bureau is responsible for taking a census every 10 years. This is a constitutional requirement toward which our resources must be directed. The census cannot be cancelled, postponed, or partially done; absolute deadlines, especially those related to required geography products, must be met. In this context, the Census Bureau must be the judge as to whether or not its mapping program can be modified to conform to National Map Accuracy Standards and be compatible with a national digital data base. The proposed circular does not make it clear as to how and where this type of conflict will be resolved.

[GAO COMMENT: We agree that OMB should establish a mechanism for resolving conflicts on computer mapping issues.]

However, our reservations about the wording of the proposed circular should not be construed as a lack of support for USGS's efforts to develop and coordinate the Nation's digital mapping efforts. We fully support these efforts and will cooperate fully with USGS. We will, up to the point of endangering our ability to accomplish our mission, make every effort to ensure that our digital cartographic data base conforms to or is compatible with national standards.

Specific Comments

Pages ii, 7, and 20--The report references $2.3 million expenditures through FY 1981.

It is unclear what this number represents. The creation of the GBF/DIME-Files for use in assigning geographic codes to mailing addresses was done during the 1970's but did not involve digitizing the file. Subsequent to the preparation of the GBF/DIME-Files, the Census Bureau started the process of digitizing these files to provide users with the ability to manipulate them spatially. When this process is completed in 1982, the Census Bureau will have spent about $1 million on the digitizing operation.

In the preparation of the metropolitan map series, the Census Bureau could have realized savings in the preparation of the map base, if a digital map base could have been obtained from USGS. However, given that such a base was not available, the Census Bureau had to organize and implement its mapping program on a slightly different basis. If we had been able to take advantage of the USGS-supplied base, the Census Bureau could have realized savings on the order of $1 to $2 million. It should be kept in mind, however, that this is a rough estimate.

[GAO COMMENT: Our talks with Bureau officials indicated that the above dollar amounts reflect only a portion of the Bureau's computer-mapping activities. Our report continues to show estimated computer-mapping costs and savings the Bureau reported to us during our review. Bureau officials have reconfirmed the reasonableness of these estimates.]

In preparation for the 1990 census, the availability of a digital cartographic data base could result in savings for us. It is impossible to forecast the savings at this time. The Census Bureau is working with USGS to ensure that we receive maximum benefit from the funds the two agencies have available for creating digital map bases.

Page 2, Paragraph starting, "--The Bureau of the Census..."

The Census Bureau prepared computer files of roads, drainage, railroads, and other features for the purpose of assigning geographic classification codes. These files cover only 2 percent of the land area of the country, but one half the population resides in this area. Only when the digitizing process is completed can rough maps be produced. However, considerable resources will be required to upgrade the quality of the digitizing and to integrate the data into the 1990 Census geographic information system.

APPENDIX VIII

[GAO COMMENT: Description revised.]

Thank you for the opportunity to comment on the report. We support the USGS's efforts to develop and coordinate the Nation's digital mapping program.

Sincerely,

ROBERT G. DEDERICK
Under Secretary for Economic Affairs

Enclosure [See GAO note.]

GAO Note: This enclosure is not included in this report.

APPENDIX IX

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410

September 14, 1982

NEW COMMUNITY DEVELOPMENT CORPORATION
OFFICE OF GENERAL MANAGER

Mr. Henry Eschwege
Director
Community and Economic
Development Division
U. S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

The Secretary has asked me to respond to your request for review and comments on your Draft Report, "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem", because the New Community Development Corporation (NCDC) has the only computer mapping capability in the Department. My staff has reviewed the report and their comments are enclosed.

Since our acquisition of a system in 1979 we have found computer mapping to be a vital and cost efficient tool in our asset management and disposition program and we support appropriate use of computer mapping. NCDC uses its system (referred to as IPAS, an acronym for Interactive Planning Analysis System) for property ownership inventory, and planning and environmental analysis in its new community program. At its height the new community program consisted of sixteen communities in ten states with a total of less than 80,000 acres, (a little more than eleven miles square). We have digitized land ownership features, proposed land use features and development features at a scale too detailed to be useful to the U. S. Geological Survey (USGS) in their 1:24,000 map series. We did a cost benefit analysis prior to and after two years of system use and find the use of the system highly beneficial and cost efficient.

We discussed digitized data base information with USGS in 1980, before we began digitizing, but found that the 1:24,000 series did not have the level of detail required for our ownership mapping. We have digitized very little from the 1:24,000 series and since our projects are scattered, it would not have been practical to have USGS give priority to our sites in their digitizing program, and the associated delay would have been costly to HUD.

We suggest that the following issues also be considered in your final report:

- While digitizing the 1:24,000 USGS map series is worthy of serious consideration, we do have concern that it still may not satisfy the majority of possible user requirements. In our operations, for example, the availability of 1:24,000 maps for our project areas would probably have satisfied only 10 percent of our mapping requirement. We would still be required to digitize parcel boundary, project status and other features not available on the 1:24,000 maps. We encourage development of a national digital base map but caution that one map set should not be expected to fulfill all requirements. It may be that maps of other scales and/or features should be added to the national mapping base for some areas before 1:24,000 maps for low priority areas are digitized.

- The report does not address the issue of accuracy in any depth. A massive effort of this type covering the entire country will encounter significant problems of a geodetic and cartographic nature. Fitting maps together to cover a large area requires accurate geodetic control, much of which does not exist at present. The Committee on Integrated Land Data Mapping is addressing this issue and appears to be arriving at different recommendations which should be incorporated in project planning.

- As described in the report, many independent computer mapping efforts are underway and the potential for duplication among these efforts is a valid concern. We would caution however that the recommended OMB Circular not become an unnecessary burden on the mapping operation of government organizations. As mentioned above, the 1:24,000 maps will satisfy only a portion of the digital map requirements of the Federal Government. Many organizations will have legitimate reason to digitize other features or at other levels of detail, such as census tracts, SMSA's, property boundaries etc. even as a complement to a 1:24,000 base. Any controls imposed should recognize that legitimate requirements exist and should encourage coordinated activities. We believe that a coordinating agency is important to this task, but we are concerned that an OMB directive could, if not handled carefully, interfere with legitimate, cost effective, and proper digital mapping activities and in the long run cost the government more than it would possibly save.

APPENDIX IX

- Recognizing the magnitude of the proposed effort and the logistics involved, the program might consider encouraging state, local and private organizations to perform digitizing to USGS standards. Incentives such as matching grant subsidies might be offered to relieve USGS of some of the burden and to encourage other organizations to take on the additional cost and effort of meeting national standards.

- Establishing a revolving fund to repay all front-end costs may not be effective. Recovery of full costs would require relatively high product costs which would impact demand.

- Maintenance and update of the maps will also be necessary and will be expensive. Some or all of the revolving fund might be absorbed in this activity.

- The report does not address the updating/maintenance issue or the value of automated mapping as a tool for productivity improvement in the USGS mapping operations. Automation generally results in significantly higher map drafting productivity, a fact which should be important to the large USGS mapping function.

Computer mapping has been a vital tool in carrying out the mission of NCDC. We would like to cooperate with USGS in providing to them any data we have which they would find useful. We believe that an overall policy encouraging cooperation and coordination in the increased use of computer mapping is valuable.

Sincerely yours,

Warren T. Lindquist
General Manager

Enclosure

APPENDIX X

National Aeronautics and
Space Administration

Washington, D.C.
20546

Reply to Attn of: NSM-23

SEP 7 1982

Mr. Henry Eschwege
Director, CED
U.S. General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Eschwege:

Thank you for the opportunity to review the draft GAO report entitled, "Duplicative Federal Computer Mapping Program: Prompt Action Needed on a Growing Problem."

NASA's need for computer mapping is usually highly specialized and there is some question that a centralized facility could adequately meet our requirements. We also have some concerns about the "revolving fund" approach to cost recovery. Specific agency comments are provided in the enclosure to this letter.

Sincerely,

Walter B. Olstad
Associate Administrator
for Management

Enclosure

APPENDIX X

SEP 2 1982

NASA's Comments on GAO Draft Report,
"Duplicative Federal Computer Mapping Programs:
Prompt Action Needed on a Growing Problem"

I have reviewed the draft report on Duplicative Federal Computer Mapping Programs, and I believe it to be a well-written attempt to deal with the issues. I have a number of reservations, however, and I offer them for your consideration.

From the viewpoint of NASA, the need for various kinds of mapping by computer in R&D projects tends to be highly specialized and somewhat esoteric. For example, the small amount ($100,000) which my office has spent on such activities in the past two years has been directed toward transformation of remotely-sensed data on surface chemistry and mineralogy onto planar displays for analysis. I doubt that the full spectrum of requirements for such projects could even be adequately anticipated, let alone met, by a centralized facility. But, assuming that it could, the small scale economies which might be realized are not obvious. Our projected expenditures on computerized mapping are no greater than $50,000 per year.

A second reservation which I would like to share with you is related to the feasibility of the "revolving fund" approach to cost recovery. The evidence that exists suggests that the increase in prices necessary to maintain solvency of such a fund tends to depress the market, at least in the short term, thus, creating a vicious cycle leading to insolvency. Our joint experience with NOAA in the attempt to recover costs for Landsat data has tended to indicate the same phenomenon may be at work in that area also.

In conclusion, I would not urge the introduction of legislation or an OMB circular at this time, until a considerably greater degree of certainty can be realized with respect to the most efficient way of producing computerized map bases for national needs. My judgment is that far too many errors have been made already in the name of standardization and centralization.

B. I. Edelson
Associate Administrator for
Space Science and Applications

APPENDIX XI

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310

23 SEP 1982

Mr. Henry Eschwege
Director
Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

This is in reply to your letter of August 6, 1982, to the Secretary of the Army transmitting the draft GAO report, "Duplicative Federal Computer Mapping Programs: Prompt Action Needed on a Growing Problem" GAO Code 082115 (OSD Case #6036).

Although the report contains no recommendations specifically directed to the Department of Defense, we have reviewed it and are providing comments as requested. We concur that duplication of computer mapping efforts among agencies should be eliminated to the extent that execution of programs is not adversely affected. Standardization of such mapping and the designation of a lead agency has merit. However, the needs of the various user agencies, such as those of the Army Corps of Engineers, must be accommodated, particularly during initial stages of implementation and until such time as the program is fully operational.

We will participate in interagency efforts to address this issue. In addition, the Corps of Engineers will advise its field offices of the matter and direct them to coordinate computer mapping needs with the U.S. Geological Survey to eliminate duplication where practicable.

Sincerely,

William R. Gianelli
Assistant Secretary of the Army
(Civil Works)

(082115)

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