NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM

STATUS, PROGRESS, IMPLEMENTATION AND RECOMMENDATIONS

THE FEDERAL ADVISORY COMMITTEE of the NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM and the U. S. GEOLOGICAL SURVEY

1996

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1. MEMBERS OF THE ADVISORY COMMITTEE

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2. EXECUTIVE SUMMARY

This report is a review of the status, and a summary of recommendations, of a Federal Advisory Committee on the National Cooperative Geologic Mapping Program, as authorized by the National Geologic Mapping Act of 1992 (Public Law 102-285). The Advisory Committee met on April 24-25, 1996, to overview the status of the program and its implementation plan, discuss plans for the future, and to form working groups. The working groups made recommendations for the future of the program, revised the Implementation Plan for the Program, revised the Requests for Proposals for the external components of the program, and compiled the resulting components into this report.

The Committee determined that except for an increase in funding, all components of the program, as authorized by Public Law 102-285 have now been implemented. Future plans focus on increasing partnerships between Federal, State, University, and private-sector groups in the production of geologic maps and in the construction of an NSDI-compliant National Geologic Map Database. Recommendations are made on how to integrate National, State and local priorities in the selection and funding of projects, and on ways to address the shortage of trained geologic mappers. These efforts are directed at increasing the effectiveness of geologic mapping and providing geologic map information for the solution of earth science problems that are critical to public safety, and in balancing resource, environmental, and land-use issues.

3. STATUS OF NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM

The National Cooperative Geologic Mapping Program (NCGMP) is authorized through the National Geologic Mapping Act of 1992. Through the Mapping Act, the Program has the mandate to produce multipurpose geologic maps of the country in cooperation with State geological surveys and acting through the American Association of State Geologists. The geologic mapping program is developed in consultation with a Federal Advisory Committee, consisting of representatives from the U.S. Geological Survey, other Federal agencies, State geological surveys, academia, and the private sector.

The NCGM Program has been designed so that the Nation will have the quantitative geologic map data needed to address tomorrow's problems. To this end, the following goals are being pursued:

- Produce geologic maps of the highest quality.
- Continue to ensure that the maps address societal priorities and are produced in forms easily accessible and usable.
- Expand cooperative agreements with the State geological surveys, academic communities, other Federal agencies, and the private sector to enhance the output of map information and data.
- Develop a National Geologic Map database and make the data available through the Internet. Enhance the ability to produce digital as well as analog (paper) map products.

As charged by the Act, the U.S. Geological Survey is the lead Federal agency responsible for planning, developing priorities, coordinating, and managing the geologic mapping program. Under this mandate, a

Federal Advisory Committee was chartered and met on April 24-25, 1996. The Advisory Committee reviewed the draft Implementation Plan and the scientific progress of the geologic mapping program, including progress made toward fulfilling the purposes of the act. This report summarizes the results of the advisory committee's review and makes recommendations toward implementing the Program under reauthorization of the Bill. The revised Implementation Plan to accompany the Reauthorization will be submitted to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate, as required by the Act.

Geologic mapping activities under this program are accomplished through four main subprograms: STATEMAP, a matching-funds cooperative with the State geological surveys to produce geologic maps; EDMAP, a matching-funds cooperative with Universities for training in geologic mapping; and FEDMAP/SUPPORTMAP, the federal geologic mapping and support investigations activities. Geologic maps produced under all elements of the NCGMP address all four USGS themes (hazards, environment, resources, and information) and are considered as the framework for more detailed investigations of local issues by Federal, State, and local governmental agencies and by the private sector. Priorities for the program are established cooperatively with external mapping partners and with cooperators in other USGS programs. Planning and prioritization of program projects and review of the program's four-year implementation plan are guided by the program's public and private sector interagency Federal Advisory Committee.

The program has four major components with the following goals and priorities:

□ FEDMAP/SUPPORTMAP are components whose objectives are to determine the geologic framework of the Nation and to develop a national geologic map database. Mapping priorities are based on national requirements for geologic-map information in areas of multiple-issue needs or areas of compelling single-issue need; and in areas where mapping is required to solve critical earth science problems. Emphasis is placed on areas determined to be vital to the economic, social, or scientific welfare of the Nation. The USGS continues to be active in executing geologic mapping (FEDMAP) and supporting studies (SUPPORTMAP) of paleontology, stratigraphy, geochronology, isotope geology, geophysics, and geochemistry. Over the past two years the USGS geologic mapping program has moved from large numbers of essentially one-person projects to more integrated regional synthesis projects in which clients and cooperators are involved in the planning, implementation, and execution of project work. For this reason, much of the program in geologic mapping has moved from rural and wilderness areas to the "urban corridor" and "urban fringe" areas, where competing land-use decisions benefit from improved geologic information. In 1996, priorities were established through a series of mid-year reviews of all FEDMAP projects in each of the three USGS regions of the Nation. In each case, the review panels consisted of the NCGMP Program Coordinator or Program Scientist, the NCGMP team Chief Scientist from the region, the USGS Regional Geologist or representative, two or more members from other USGS Programs, a representative from a state geologist's office in the region, and a representative from the National Park Service.

□ STATEMAP: A component of the overall program that supports the States in cooperative agreements to produce geologic maps. The principal objective of the State geologic mapping component is to determine the geologic framework of areas vital to the economic, social, or scientific welfare of individual States. Mapping priorities are determined within individual states by State Advisory Committees and the highest priority proposals are forwarded to a peer panel consisting of representatives of the State surveys that are appointed to rotating terms by the American Association of State Geologists (AASG). Proposals are evaluated, prioritized, and funding levels recommended by the panel, which the USGS coordinates. Federal funding for the State component is matched on a dollar-for-dollar basis with non-Federal funds. In FY 1995 only about six percent of total program funding was available for matching by State geological surveys, whereas in FY 1996 and beyond a minimum of 20 percent of appropriated funds will be apportioned to the STATEMAP component, thereby increasing the amount of high-priority geologic mapping by individual states (Table 1). Additionally, this had a significant impact on both the number and the type of geologic maps

produced. For the first time in FY 1996, the Program supported digital compilation of existing geologic map data in the production of small- and large-scale geologic maps. Also, production of geologic maps based on new field mapping increased four-fold. In FY 1996, forty-two States were funded for approximately 60 mapping projects.

Coordination among many of the State Surveys and the NCGMP Data Base Project was initiated and the framework for building the Federal/State geologic map database is underway. A comprehensive draft document, USGS Open-File 95-525, outlining geologic map standards was distributed to the State Surveys for review. The results of the review will be used to generate a geologic map standards document to be used by the Federal, State and University partners funded by the NCGMP.

At present, the STATEMAP awards are made by a panel of five State Geologists, one each from the eastern, central, and western regions of the United States and two at-large members. The USGS provides one advisor from each of the three regions to assist in coordination of the STATEMAP projects with ongoing FEDMAP projects. The panel is coordinated by the USGS.

- EDMAP provides funding for academic research programs through cooperative agreements, and ensures the training of students in producing geologic maps. This important component of the geologic mapping program was implemented for the first time in FY 1996. Two percent of the total program funding is available for matching by universities. The funding is to help support graduate students to conduct geologic mapping in areas of priority to State or Federal agencies. These studies not only help increase the geologic mapping of high priority areas but also help train the next generation of geologic mappers. In FY 1996 cooperative agreements are being made with 37 universities to support 40 geologic mapping projects recommended for funding by a peer review panel consisting of experts in geologic mapping. The peer panel of five university scientists represents the eastern, central, and western regions of the country, along with two representatives from the State geological surveys and one representative from the USGS. The USGS and State representatives provide linkage to Federal and State projects and priorities, and the USGS representative coordinates and chairs the panel. Panel members selected by the EDMAP subcommittee of the NCGMP Advisory Committee must have a demonstrated strong background in geologic mapping and knowledge of regional geology. Proposals are evaluated, prioritized, and funding levels are recommended by the committee. The State Geological Surveys and the NCGMP Program facilitate the publication and distribution of geologic maps generated in field-based academic research programs. The EDMAP component also contributes to the educational capacity of academic programs that teach earth science students the techniques of geologic mapping and field data analysis that will permit them, as they become professionals, to critically evaluate the quality of geologic map data sets, even if they are not actively making maps as professionals.

Status of Private Sector contributions:

In increasing numbers, both FEDMAP and STATEMAP subprogram activities are working with private-sector firms to help prioritize the objectives and to increase the economic usefulness and relevance of geologic maps. Such activities range from involving the users of geologic maps in the private sector (e.g., aggregate producers, urban planning and environmental planning/remediation firms) to participation of private sector representatives during program planning through the NCGMP Federal Advisory Committee. For example, at the local level, private-sector map users and geologic consulting firms were involved in workshops and planning sessions for the new (FY 1996) Middle Rio Grande Basin Project and in program contributions to two new Bureau-wide Initiatives (pacific Northwest Urban Hazards and Colorado Urban Corridor Infrastructure Initiative). Looking to the immediate future, workshops with private-sector participation are in the FY 1997 project plans for two FEDMAP projects (San Francisco Bay and Geology of Mid-Atlantic Corridor). The Advisory Committee recognizes these efforts of the program, and encourages continued involvement of the private sector in setting project and program goals.

In addition, the NCGMP relies upon the private sector to provide a variety of services and products related to the cost of production and distribution of geologic maps. These services include:

- Acquisition of aerial photography and photographic processing.
- Contracting geophysical surveys, including airborne surveys.
- Contracting for scanning and digitizing maps.
- Acquisition of base map materials and data from the USGS National Mapping Division (much of which is produced by private sector firms). NMD has a goal (established by Congress) of utilizing private sector firms to perform at least 60 percent of the map production workload by the end of FY 1999.

In addition, the NCGMP intends to make increasing use of private sector firms in steps associated with the release and publication of data and information in map and digital forms. The conduct of interpretive field investigations, geologic mapping, and map compilation, for which private sector resources are limited, however, will continue to be performed by USGS geologists and geologists of the State Geological Surveys and academic institutions through cooperative agreements. Geologic maps are basic interpretive products upon which the private consulting industry relies to produce more refined, site-specific, derivative maps.

The STATEMAP subprogram also provides funds to the private sector for a variety of activities. These include:

- Drilling- Several states are doing subsurface mapping and use contract-drilling firms for data acquisition.
- Printing Maps-The cartography and printing of color geologic maps is almost always done by the private sector.
- Digitizing and scanning- Many state surveys use contractors to digitize and scan maps for inclusion in the National Geologic Map Database.
- Contract Mappers- Many state surveys are now using contract geologists to do field mapping. The source of these mappers is limited, and many of the states hire university professors and students for contract mapping during summer months.
- Aerial photography- Almost all geologists who map use aerial photography. All of this imagery is acquired outside of state surveys, with most coming from private contractors.

IMPLEMENTATION PLAN --The Implementation Plan for the 1992 National Geologic Mapping Act was developed by the NCGMP in concert with State Survey geologists appointed by the AASG. Although Congressional appropriations have never met the authorized level, by FY 1996, the Program has fully implemented all other aspects of the Plan. The present Advisory Committee has reviewed the Implementation Plan for the FY 1997 through 2000. The plan is included in this document and will be used in conjunction with the reauthorized 1992 Bill of the National Geologic Mapping Act.

EXTERNAL ADVISORY COMMITTEE --The U. S. Geological Survey sponsored two national workshops, one in December 1994, and a second in February 1995, to begin the process of soliciting advice on the planning and implementation of the geologic mapping program. Workshop participants were producers and users of geologic map information, including representatives from Federal and State agencies, academic institutions, and the private sector. A 16-member National Cooperative Geologic Mapping Program Advisory Committee has been chartered and appointed. It held its first meeting April 25-26, 1996, in Washington, D.C. This report is the results from that meeting and the deliberations of subsequent working groups.

NATIONAL GEOLOGIC MAP DATABASE --A draft of this database design has recently been released for comment via the Internet by creating a site on the World Wide Web (WWW). The Uniform Resource Locator (URL) for this site is "http://wwwflag.wr.usgs.gov/ngmdb"). This web site is also linked to the recently created web site for the National Cooperative Geologic Mapping Program whose URL is "http://ncgmp.usgs.gov". A critical element in database construction is the development, acceptance, and adherence to a certain level of standardization. The USGS is currently working with both producers and users of geologic map information to develop draft format, symbols, and technical attribute standards so that geologic map database information can be accessed, exchanged, and compared efficiently and accurately as required by Executive Order 12906 (59 Fed. Reg. 17,671; 1994), which established the National Spatial Data Infrastructure (NSDI).

OTHER PROGRAMMATIC DATABASES

Geochronologic: Geologic age dates throughout the country have been evaluated and compiled and are available on CD-ROM as Digital Data Series DDS-14. This data is presently being revised and updated to be more inclusive of the different types of geochronologic data.

Geochemical and Geophysical: A variety of geochemical databases have been prepared by the USGS Minerals Resources Survey Program. These include geographically referenced data that include all chemical analyses produced in USGS laboratories. Various geophysical maps for the Nation have been prepared and are available. These data include low-resolution magnetic and gamma ray information.

Paleontologic: Two prototypes exist under the general category of paleontological information. A geologic names database is now available on CD ROM as Digital Data Series DDS-6 and it details the USGS stratigraphic names used in maps and reports. A second database includes fossil designations used by the USGS in all stratigraphic correlations. This database is also available on CD ROM and will be available on the World Wide Web.

USGS CIRCULAR 1111 --"Societal Value of Geologic Maps", published in 1993, is an economic analysis by the geologic mapping program that describes geologic maps, a benefit-cost model for valuing geologic map information, and the economic issues associated with determining whether or not a geologic map is a public good. Nearly ten thousand copies have been requested since publication. This publication and similar studies are increasing public awareness of the utility (value in use) of geologic map information to issues of land use management.

FEDERAL PARTNERSHIPS --The NCGMP is developing a series of cooperative relationships with various Federal partners, in addition to our State and academic cooperators. The most mature of these is with the National Park Service (NPS). In 1995, the USGS and NPS signed a Memorandum of Understanding that outlined areas of interaction between the two agencies. The geologic mapping program responded by working with NPS during 1995 as part of their "Science in the Parks" initiative to direct a portion of the program's geologic mapping and supporting activities toward priorities established by NPS. The NPS used a national project call and priority system to rank over 100 proposals for geologic work in FY 1996. The geologic mapping program has begun work in FY 1996 with 10 of the 30 top-priority parks. The geologic mapping program is currently in the process of fostering partnerships with other Federal agencies including Bureau of Land Management, U.S. Forest Service, Environmental Protection Agency, and Department of Energy.

IV. RECOMMENDATIONS OF THE ADVISORY COMMITTEE

A. FEDMAP/SUPPORTMAP

I. Prioritization of FEDMAP/SUPPORTMAP projects

a. Process for prioritization and funding

Yes (1) A five-year plan and an annual Program Prospectus that is consistent with the Implementation Plan for the National Cooperative Geologic Mapping Act and with the guidance of this Advisory Committee should be prepared by the Program. The prospectus should outline ongoing project activities within FEDMAP/SUPPORTMAP, opportunities to improve those activities, as well as opportunities for new-start projects. The Advisory Committee recognizes that geologic mapping projects, especially those of national importance, are often of multi-year duration. As a result, opportunities for new-start projects depend either on increases in funding or on the completion, phase-down, or termination of projects. The five-year plan for FEDMAP/SUPPORTMAP should anticipate these changes and set broad program goals for the future.

Project termination or phase out, as well as startup of new projects may be recommended by project reviews (see below).

Yes (2) An important issue facing the program is to develop a prioritization procedure for FEDMAP/SUPPORTMAP projects that is at once consistent with the authorizing legislation of the National Geologic Mapping Act of 1992 and with prioritization and review processes that are being developed within USGS following the 1996 reorganization of the USGS, Geologic Division. The Advisory Committee recommends that reviews of FEDMAP/SUPPORTMAP projects, such as conducted in spring of 1996, be done on an annual basis. As in 1996, these reviews could be conducted in each of the regional centers, or on a national basis and should involve participants from NCGMP as well as partners and client groups such as: other USGS programs and the Regional Geologist's staff, other Federal agencies, and state surveys. Reviews should be coordinated with those of other USGS programs to allow overlapping priorities to be identified and staffing to be optimized. In addition, the Advisory Committee recommends that a representative from private sector partners be included in project reviews. Project reviews should: 1) consider the scientific and societal merit of projects, 2) determine if they are consistent with the objectives and implementation plan of the National Geologic Mapping Act, 3) prioritize the projects within the region and Nation, 4) evaluate progress of projects toward their planned goals, and 5) make recommendations as to whether or not funding should be continued, and 6) recommend steps to improve performance, including shifting of resources from one project to another.

b. Development of new projects

Yes (3) Starting in 1997, it is recommended that proposals for new projects also be submitted to the project review panels. These proposals would be evaluated using the same criteria as for continuing projects (except for progress toward planned goals), as well as to determine if the program should entertain a full proposal for a new project under the subsequent year's FEDMAP funding. The review panel should provide written comments on the proposals, and for those recommended to go ahead to the full proposal stage, recommendations for improvement. It is recommended that budgeting for individual FEDMAP projects, and decisions on funding levels for new start projects take place at a subsequent meeting of NCGMP program managers, to be consistent with the project reviews, recommendations of this Advisory Committee, the Implementation Plan of the Mapping Act, and the annual appropriation from Congress.

Yes (4) It is also recommended that proposals, written jointly by USGS geologists and potential cooperators within one or more state surveys, or with other federal agencies (e.g., NPS) may be submitted to the project review panels. To be successful, such proposals should demonstrate a Federal role for the FEDMAP/SUPPORTMAP activity (e.g., activities or scientific issues of national scope, or concerns that involve more than one state). In addition, there would be an expectation that the state surveyor surveys would participate in the project, and would seek separate funding (e.g., from the state, from STATEMAP, or from other sources).

c. Urban focus and Federal role of projects

Yes (5) As noted previously, the FEDMAP/SUPPORTMAP element of NCGMP was reorganized in FY 1996, staff levels were decreased through a Reduction-In-Force, the number of projects was reduced dramatically and the number of staff per project increased. Prior to the reorganization, there were many more small projects in rural areas, and FEDMAP projects were distributed more widely across the nation. In contrast, most projects in the program now focus on urban or urban fringe areas and involve close cooperation with local agencies and state surveys. This poses a concern regarding the uneven distribution of federal mapping resources among the states. This committee recommends that the urban focus of the program be maintained, but that smaller projects in more rural settings, as well as state and national geologic map compilation projects, should not be abandoned or not funded without a careful examination of scientific merit. Such projects should be evaluated using the same criteria of Federal role, national need, as other FEDMAP/SUPPORTMAP projects.

d. Appropriate scale for FEDMAP mapping and compilation.

Yes (6) Individual mapping projects are encouraged to use whatever field-mapping scale is most appropriate for the geologic issues being addressed. The Advisory Committee recognizes that actual working scales and interim map products will typically be at 1:24,OOO-scale or larger, and selection of scale will depend on the complexity of the geology, the issues being addressed, and the needs of users of the geologic map data. However, to maintain the Federal role as a coordinator and compiler of mapping efforts of diverse partners and to facilitate the construction of the National Geologic Map Database, small-scale (1:100,000) compilations are recommended and constitute the preferred compilation product for those FEDMAP projects in which the construction of a regional geologic framework is a project goal.

e. Overlap of FEDMAP/SUPPORTMAP with STATEMAP and EDMAP projects

The Advisory Committee recognizes the benefits in synergy that results from coordinated geologic mapping efforts of FEDMAP/SUPPORTMAP, STATEMAP, and EDMAP projects. Coordinated projects bring more diverse priorities and varied expertise to define and solve scientific problems. Moreover, project coordination should prevent duplication of effort. They also ensure that project goals remain connected to the user community needs and they provide more varied training opportunities for student mappers funded by EDMAP. Project chiefs and proposers of projects for each of the program components are encouraged to coordinate their activities and priorities, and review panels should take these factors into consideration when recommending funding levels.

Yes (7) In the future, the NCGMP Advisory Committee suggests that members of all three parts of the Program (EDMAP, STATEMAP, & FEDMAP) be involved in the review and awards process for these three components. For example, one representative from STATEMAP and EDMAP should be part of the review of projects for FEDMAP.

f. Cooperative projects with NPS and other Federal Agencies -maintaining the geologic mapping mandate

Two million dollars of 1996 FEDMAP funds were identified for geologic mapping related projects done in coordination with the National Park Service. NPS set priorities for geologic projects in lands it administers, then a joint USGS-NPS panel met to merge NPS priorities with available FEDMAP resources. The Advisory Panel recognizes the federal role that the program serves in providing needed geologic data to sister agencies in the Department of the Interior. It also recognizes the significant role that works with NPS serves in providing geologic data directly to a large customer base of taxpayers (the -270 million annual visitors to National Parks and Monuments).

Yes (8) The advisory panel recommends continued funding of cooperative work with NPS, and with other Federal Agencies as part of the FEDMAP component of the program. Creativity and use of nontraditional products are encouraged to facilitate communication with the public through the NPS venue; however, projects should not loose track of the geologic mapping mandate of the program, as authorized by Congress. Cooperative projects should be selected that take into account both NPS priorities as well as NCGMP capabilities and commitments. This committee feels that the level of FEDMAP funding of cooperative projects with NPS is adequate, and recommends that the Secretary encourage the Directors of NPS and USGS to continue to expand the level of cooperation between the two agencies, and to seek additional funding for cooperative geologic projects by other programs within both agencies. Starting in FY 1997, the Committee recommends that draft versions of new-start proposals for work on NPS-administered lands should be submitted jointly by USGS scientists and NPS cooperators to the FEDMAP review panels. FEDMAP scientists are encouraged to work through the three NPS liaison scientists in the three regional USGS centers and through the three regional NPS-project coordinators within the mapping teams to develop proposals for new projects.

2. Planning

The National Geologic Mapping Act, the Implementation Plan, and the need for a new five-year plan for NCGMP.

The National Geologic Mapping Act of 1992 provides the guiding legislation that sets the general goals and objectives of the program, and through the Implementation Plan also provides the structure and methodology to achieve these goals and objectives. In addition, the Strategic Plan of the USGS for the period 1996-2006, provides broad guidelines on the development of core competencies and business activities that are designed to lead the organization into a future in which change and variation in the mission of the agency is anticipated.

Yes (9) To a significant degree, the 1992 Act and Implementation Plan serve as a strategic plan for the program, although, these documents do not substitute for ongoing planning and accounting for technological, scientific, and societal changes that will affect the Mapping Program over the next decade. A five-year plan for NCGMP has been drafted, but is in need of revision and rethinking to be consistent with both changes in organizational structure of USGS and with the National Geologic Mapping Act and Implementation Plan. It is suggested that a major role for the next Advisory Committee, should be to develop a new five-year plan for the program.

3. FEDMAP/SUPPORTMAP Staffing Issues

a. Salary Constraints

Yes (10) One of the major issues facing the FEDMAP program is how to adequately staff new and continuing projects that are prioritized by review panels. A five-year staffing plan for FEDMAP has been constructed. As a consequence of the Geologic Division Reduction-In-Force of FY 1995-1996, the ratio of operating expenses to permanent salary and other fixed costs was increased from about 5% to about 20% and is projected to decline unless funding levels increase or staffing levels decline. The Advisory Panel recommends that the salary load should be reexamined annually, and an acceptable ratio maintained. As a consequence, new permanent hires will have to be offset by losses in permanent staff or increases in program income.

b. Need for Specialists

Yes (11) The change in focus of the program to address problems in urban and surficial geology and responding to customer needs requires a large investment in digital technology and Geographic Information System expertise. These factors require a shift in expertise of employees. This shift can be accommodated in three ways: hiring new staff, retraining existing staff, or partnering with experts in other agencies. The Advisory Committee recommends that all three methods are used.

New specialist hires can be accommodated to a limited degree within salary restrictions, through temporary and term appointments and contract hires.

Retraining of existing staff has rarely been done in a serious manner by the program. The Advisory Committee recommends that the program establish and fund a training project, administered by the Chief Scientist, in each region. The committee recommends funding levels of approximately 5% of available operating expenses be devoted to training, and that training should include funding long-term (month-to-year length) course work at universities or technical training institutions.

c. Shared Facilities/Capabilities Projects and SUPPORTMAP

A shared facilities project has been set up within the program to provide geochronology, paleontology and stratigraphy, and geochemical support to FEDMAP projects. To the degree that excess capacity is available, this project will also provide support to other programs within USGS and to other customers on a reimbursable basis.

V. IMPLEMENTATION PLAN FOR REAUTHORIZATION OF THE NATIONAL GEOLOGIC MAPPING ACT

NATIONAL COOPERATIVE GEOLOGIC MAPPING PROGRAM --**A Plan for Implementation for** a **Coordinated Program of Geologic Mapping of the Nation**

I. PROGRAM DEFINITION

An association of geologic mapping investigations by Federal and State agencies and academia for the purpose of developing geologic map information for the Nation.

II. PROGRAM OBJECTIVES

To expedite the production of geologic maps for the Nation through coordinated geological, geophysical, and geochemical investigations that lead systematically to the following integrated databases that can be applied to resolution of issues related to land-use management, assessment, utilization and conservation of natural resources, ground water management, and environmental protection:

□ **National geologic-map database at** 1:100,000 scale and as original map data, at open-file or archival scale of 1:24,000 for most land regions of the United States as appropriate. Some regions, such as Alaska, will be mapped at smaller scales.

□ **Supplementary earth-science databases,** including
□ National geophysical-map database
□ National geochemical-map database
□ National geochronologic database
□ National paleontologic database

III. PROGRAM INFRASTRUCTURE

A. Program Components

I. Federal geologic mapping component (FEDMAP)
2. Geologic mapping support component (SUPPORTMAP)
3. State geologic mapping component (STATEMAP)
4. Geologic mapping education component (EDMAP)

B. Management Structure

The U. S. Geological Survey (USGS) is the lead Federal agency designated by authorizing legislation to coordinate management of the NCGMP .The USGS and State geological surveys cooperate with other Federal and State agencies, the public and private sectors and academia to develop the geologic map database for the Nation in the manner outlined below.

1. Geologic Mapping Priorities.
   1. Geologic mapping priorities for the National Cooperative Geologic Mapping Program shall be identified through coordination with Federal agencies, State and local governments, and industry.
      ■ The USGS will coordinate priorities for the FEDMAP and SUPPORTMAP components. The USGS will provide these priorities for the nationwide summary.
      ■ Each State geological survey, through a State geologic mapping advisory committee, will coordinate the priorities for the STATEMAP component within State boundaries.
      ■ Each State will provide these priorities for the nationwide summary.
      ■ Mapping priorities for the EDMAP component are those identified by the Federal/State prioritization process.

2. The USGS and State geological surveys will exchange results of the priority-setting mechanisms so that all parties can develop funding initiatives to legislatures and funding proposals for appropriate components of the National Cooperative Geologic Mapping Program, all consistent with consensus priorities.

2. Advisory Committee

The President shall appoint members to the advisory committee.

1. Participants (Number of members and representation) Federal agencies (4; one each from the Office of Science and Technology Policy; the Department of Agriculture; the Department of Energy; and the Environmental Protection Agency).
   - The Secretary of the Interior, acting through the Director of the USGS, with the advice and consultation of State geological surveys, shall appoint two members of an advisory committee.
   - U. S. Geological Survey (2, including the Chief Geologist as Chairman). State geological surveys (4)
   - Private sector (3; energy, minerals, hazards, environment). University (3; eastern, central, western regions)

Terms of appointments will be established to provide for an orderly rotation of members

2. Role
   - Review and critique the draft implementation plan prepared by the USGS.
   - Review the scientific progress of the geologic mapping program
   - Submit an annual report to the Secretary that evaluates the progress of the Federal and State mapping activities and evaluated the progress made toward fulfilling the purposes of this Act

3. Proposal Review

Funding proposals to components of the program will respond to identified priorities and will be reviewed by peer panels composed of scientists who both have published geologic maps of recognized high quality and have working knowledge of regional geologic, geophysical, and geochemical problems. The peer panels shall be separate and distinct from the Advisory Group (Item III.B.2 above).

1. Proposals to the FEDMAP and SUPPORTMAP components will be reviewed by a peer panel of qualified scientists from the USGS chaired by the Program Coordinator of those components. Representatives of other USGS Programs, State Geological Surveys, and university professors familiar with EDMAP will serve on the review panels.
2. Proposals to the STATEMAP component will be reviewed by a peer panel composed of five scientists from State geological surveys (one each from the eastern, central, western regions of the country, and two from the Nation at large, selected by ballot of State geologists from a slate proposed by the AASG); and three scientists from the USGS (one of who will be the official responsible for the coordination of the STATEMAP component of the National Cooperative Geologic Mapping Program and who will act as Chair) and one university professor familiar with the EDMAP component of the Program.
3. Proposals to the EDMAP component will be reviewed by a peer panel of five university scientists who represent the eastern, central, and western regions of the country; two representatives from State geological surveys, nominated by the President of the AASG; and one representative from the USGS who will be the official responsible for the coordination of the EDMAP component of the program and one State Survey representative. Each committee member must have a demonstrated strong background in geologic mapping and knowledge of regional geology.

4. Mapping Standards

The National Cooperative Geologic Mapping Program will use the draft scientific and digital geologic map standards developed by the USGS in cooperation with State geological surveys and distributed through the Geologic Data Subcommittee of the Federal Geographic Data Committee.

These standards will facilitate the use, translation, and exchange of geologic information among all sectors of the mapping association and among map users.

5. Annual Report

The Advisory Committee will submit an annual report to the Secretary on the progress of the geologic mapping activities. The Secretary shall, within 90 days after the end of each fiscal year, submit an annual report to the Committee of the House of Representatives and the Committee on Energy and Natural Resources of the Senate describing the status of the nationwide geologic mapping program.

IV. FUNCTION AND MANAGEMENT OF PROGRAM COMPONENTS

A. Federal Geologic Mapping Component (FEDMAP)

1. Primary research objectives

1. Determine the geologic framework of areas that are important to the economic, social, and scientific welfare of the Nation.
2. Develop a National geologic map database at 1:100,000 scale. Geologic maps will be made at larger scales such as 1:24,000, as appropriate, to present more detailed data or to resolve special problems subsequently archived, and compiled at the 1:100,000 scale.

2. Mapping Priorities

Priorities are determined by the USGS through coordination with:

- □ Federal agencies
- □ State agencies
- □ Public and private sectors

3. Mapping Implementation

1. Proposals are developed by scientists of the USGS in response to national priorities.
2. Proposals are reviewed by a peer evaluation panel as described above (Item III.B.3.a).
3. Geologic mapping is conducted by scientists of the USGS.
4. The program component will produce geologic map information to meet standards and formats common to all Federal and State geological surveys.
5. The USGS will publish geologic maps resulting from the investigations.

4. Funding

Line-item appropriation from the U. S. Congress to USGS for expenditure by the USGS

B. Geologic Mapping Support Component (SUPPORTMAP)

1. Primary Research Objective

Provide interdisciplinary support for Federal geologic mapping activities and, as contracted for by States using funds from the STATEMAP Component, for States' geologic mapping. Representative categories of interdisciplinary support include:

1. Research and development that leads to the implementation of cost- effective digital methods for the acquisition, compilation, analysis, cartographic production, and dissemination of geologic map information;
2. Paleontologic studies that provide information critical to understanding the age and depositional environment for fossil-bearing geologic map units.

□These studies will be focused on determination of the paleontologic, systematic, and stratigraphic information required to support the production of geologic maps. The resulting data will be incorporated into a National Paleontologic Database.

3. Geochronologic and isotopic studies that (I) provide radiometric dates for geologic map units and (2) fingerprint the geothermometry, geobarometry, and alternation history of geologic map units;

□These studies will create geochronologic data that will be incorporated into a National Geochronologic Database.

4. Geophysical investigations, using potential-field and remote-sensing techniques that assist in delineating and mapping the physical characteristics and three-dimensional distribution of geologic materials and geologic structures-

□These studies will create geophysical information that will be incorporated into a National Geophysical map Database.

5. Geochemical investigations and analytical operations that characterize the major- and minor-element composition of geologic-map units, and that lead to the recognition of stable and anomalous geochemical signatures for geologic terrains.

□These studies will create geochemical information that will be incorporated into a National Geochemical Map Database.

2. Investigation priorities: Linked to FEDMAP priorities and, as contracted for under funds from the STATEMAP component, to STATEMAP needs.

3. Investigation Guidelines

1. Proposals are developed by scientists of the USGS in response to national priorities.
2. Proposals are reviewed by a peer-evaluation panel as described above (Item III.B.3.a).
3. Investigations are conducted by scientists of the USGS.
4. Funding

Line-item appropriation from the U. S. Congress to the USGS with expenditure by the USGS.

C. State Geologic Mapping Component (STATEMAP)

1. Primary Research Objectives

1. Produce geologic maps of areas that are important to the economic, social, and scientific welfare of the State and the Nation.
2. Contribute geologic mapping to the National geologic map database at a uniform scale (1:100,000) and format used by all Federal and State geological surveys. Geologic maps at a scale of 1:24,000 are appropriate for development of data for archiving or for resolution of special problems, and for compilation as part of 1:100,000 scale published maps.

2. Mapping Priorities

1. Priorities for investigation within a State are determined by each State geological survey through internal mechanisms, including State geologic mapping advisory committees, that identify specific intra-State needs.
2. Determination of State investigations to be supported from among all proposals made to the STATEMAP component will be by a peer-review panel (Item III.B.3.b above).

3. Investigation Implementation

1. The component will produce geologic map information to meet standards and formats common to all Federal and State geological surveys.
2. State geological surveys will publish the geologic map data resulting from investigations in the STATEMAP component. State surveys can contract with the USGS to publish geologic map data developed in the program. Cost of publication will be included in the funding proposal.

4. Funding

1. Line item appropriation from the U. S. Congress to the USGS that will coordinate the nationwide program through cooperative agreements with States. The USGS retains only administrative overhead costs necessary for managing the program. Such costs can be reviewed by the Advisory Committee (Item III.B.2, above).
2. Distribution of funds to States shall be determined by priorities established by the process described in item IV.C.2, above.

3. State geological surveys shall match Federal funds with non-Federal funds.

D. Geologic Mapping Education Component (EDMAP)

1. Objectives
    1. Develop opportunities for training students in the fundamental principles of geologic mapping and field analysis.
    2. Provide support for graduate-level field studies involving geologic mapping and field analysis directed toward program priorities.
2. Management
    1. Graduate students through their institutions make application to the program for support of geologic mapping.
    2. Graduate student geologic mapping must be integrated with priorities and technical guidelines of FEDMAP and/or STATEMAP components. The program will produce geologic map information to meet standards and formats common to all Federal and State geological surveys.
    3. A committee of 5 scientists from universities (one each from the eastern, central and western regions of the country and two at-large), two representatives of State geological surveys, nominated by the President of AASG, and a representative of the USGS who will also serve as committee chairman, will comprise the peer review committee for the EDMAP component.
3. Funding Priorities
    Priorities for funding are established by a peer review panel as specified in item m.B.3.c above.
4. Funding
    1. Line-item appropriation from the U. S. Congress to the USGS that will coordinate the nationwide program through cooperative agreements with universities. The USGS retains only administrative overhead costs necessary for managing the program. Such costs can be reviewed by the Advisory Committee (Item m.B.2, above).
    2. Distribution of funds to universities shall be determined by priorities established by the process described in item IV.D.2.c, above).
    3. Universities shall match Federal funds with non-Federal funds.

APPENDIX 1 Can be found in NCGMP FACA files

FY **-1996 FEDMAP PROJECTS AND PLANS FOR** FY **-1997**

Program Management Project
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