FINDINGS AND RECOMMENDATIONS

OF THE

NATIONAL PARK SERVICE GIS PROGRAM

REVIEW PANEL

Denver, Colorado

June 15-17, 1992

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The review panel conducted a thorough evaluation of the issues, plans, and directives associated with GISD and the NPS GIS program. Eight major issues were identified that could benefit from recommended actions and improvements. These issues and recommendations are individually listed below.

1. TRANSITION PLAN

It is mutually recognized that GISD transitioned too quickly from a user support operation to one of Servicewide policy development and program overview, leaving the regional offices without the proper resources in place to take over this GIS user support function.

Recommendations to GISD and Regional Directors:

1.1 A new transition memorandum signed by the Director should be jointly developed by GISD and the Regional GIS coordinators. This memo should extend the transition period through FY-94, or until the FY-94 initiative is received; it should redefine the user support services to be performed during the extended period; and it should identify a long-range vision for geographic information in the NPS (spatial data, geographic-based information technology).

1.2 During the transition period GISD should defer developing any new databases, implementation of the scanner equipment, work on INTERNET, or reviews of park Resource Management and GIS Plans.

1.3 The Regional Offices should look for opportunities to enhance their GIS operation by identifying and reallocating FTE's & funding from other resource areas.

1.4 GISD should purchase a 9-track tape system for the regional office GIS operations.

2. ORGANIZATION AND STAFFING

Although the current staffing of GISD is the minimum necessary to accomplish the proposed mission, some adjustments need to be made to get through the transition period. Overall organization of geographic information within the Service also needs to be addressed.

Recommendations to GISD:

2.1 GISD should continue the implementation of the PPI Branch as presently described, but at a reduced level. Shift the one vacant PPI Branch FTE to provide field GIS user support in the other branches during the transition period.

2.2 Rename the three GISD branches to: Policy and Planning, Data and Applications, and Hardware and Software.

2.3 Develop organization and staffing strategies as part of the regional GIS plans.

2.4 Coordinate activities of the GIS Division with the new GIS Branch in the Denver Service Center.

2.5 Develop a long-range strategy for integration of geographic information into information resources management programs at all levels of the Service.

3. THE ROLE OF REGIONAL OFFICES AND REGIONAL TECHNICAL SUPPORT CENTERS (RTSCs)

GIS has developed rapidly in the NPS. Between 1983 and 1992, the number of automated park data bases has grown from 3 to 111. This creates a technical support and data base construction demand on GISD that exceeds its resources. If the NPS is going to commit to being a major GIS technology user, the Regional Directors must commit to supporting GIS and data development at the regional level.

Recommendations to Regional Directors:

3.1 Regions must recognize and accept their long-term responsibility to support parks and regional offices in implementation of GIS.

3.2 Regions must develop a strategy for implementing the GIS program within the regions during and following the transition period.

4. IMPLEMENTATION STRATEGY FOR REGIONAL TECHNICAL SUPPORT CENTERS (RTSCs)

Regions have submitted requests for support to develop 23 RTSCs around the Service. The Servicewide effort to establish such RTSCs needs to be carefully considered. The review panel feels that the NPS should establish one RTSC per region in an initial

phase, letting demand and workload dictate the need to establish any additional RTSCs in future years. Any additional RTSCs should be requested by the Regional Director on a priority basis in future budget submittals and in accordance with the region's approved GIS plan.

Recommendations to Regional Directors:

4.1 Implement at least one RTSC per region, allocating 3.5 FTEs and $300,000 per center in order to create a critical mass for technical GIS user support.

4.2 Regions should develop implementation plans for RTSCs.

4.3 Additional RTSCs will be created at the discretion of the Regional Directors.

5. PROGRAM DIRECTION

The rapid evolution of the NPS's GIS Program, the proliferation of hardware and software capabilities needed to support the program, and the fact that management of geographically referenced spatial data is a critical ingredient in most park management and protection activities dictates that a significant change must be made in the direction of GISD's activities.

Recommendations to GISD:

5.1 Continue user support during the transition period.

5.2 Produce and distribute a GIS "sourcebook," and selected comprehensive reports.

5.3 Eliminate the regional liaison roles in the PPI Branch and emphasize policy and planning.

5.4 Formulate standards for selected program-specific, GIS-compatible data bases.

5.5 Prepare "benchmark" GIS Position Descriptions.

5.6 Provide guidelines for park and regional GIS Plans and for the GIS components of park Resource Management Plans.

6. TECHNOLOGY

The NPS does not have a common computing environment for GIS or information technology. UNIX and DOS are both used as operating

systems, on a variety of hardware platforms. Although GRASS is
used as the predominant GIS software package, at least 10 other
GIS software packages are used in NPS. This provides important
flexibility for the parks and regions but makes support
activities such as training, systems administration, information
sharing, and software development much more difficult.

**Recommendations to GISD and Information and Telecommunications
Division (ITD):**

6.1 Pursue a national procurement of hardware and software
that would support the GIS and information technology
needs of the NPS.

6.2 GISD should complete evaluations of the DOS-based GIS
packages that exist within NPS and provide them to the
Regional GIS Coordinators. Support for these DOS-based
packages should be provided by the vendor and/or the
regional offices.

6.3 Assemble a small team to identify the NPS requirements
for a UNIX-based DBMS and evaluate the candidate DBMSs
against these requirements. Prepare an evaluation
report. Investigate methods for a national procurement
versus individual office procurement.

6.4 GISD should develop a procedure for utilizing DOS-based
DBMS data in a UNIX GRASS environment.

6.5 GISD should prepare a report providing information
about why and how the optical scanner was purchased,
and the status of development and use of the scanner.

6.6 ITD should evaluate methods for gaining access to
Internet and make recommendations to NPS on how to
respond to this need.

7.   COMMUNICATION AND COORDINATION

Several of the issues raised by regional and park personnel in
their comments to the review panel can be attributed to
ineffective communication between GISD, the regional GIS
coordinators, park personnel, and other entities such as ITD and
various NPS program offices.

Recommendations to GISD:

7.1 GISD should take a proactive role in establishing
effective and ongoing communications with regional GIS
coordinators.

7.2 A Directorate-level GIS steering committee should be formed to establish and monitor GIS policy and direction for the NPS GIS Program.

7.3 Participation on NPS, Departmental, and Federal GIS Coordinating groups should be made available to NPS GIS users at all levels.

7.4 GISD should cultivate and enlarge upon the newly established relationship between itself and ITD.

8. TRAINING

In evaluating the comments from the field and after discussion with GISD staff, it is apparent that a great deal of time is being spent by the staff responding to operational problems of which many of these could be satisfied through various levels of formalized training.

Recommendations to GISD:

8.1 GISD should work with the Regional GIS Coordinators to develop training prescriptions for GIS operators and other related park GIS positions (system manager, data manager, etc.).

8.2 GISD should develop a training course for the regional GIS Coordinators.

8.3 Continue coordinating the "GIS For Managers" training course.

PURPOSE AND OBJECTIVES

Recent GISD History

In March 1991 the Regional Chief Scientists met with the ADNR in
Ventura, California and strongly recommended that the role and
function of GISD be carefully evaluated. The feeling was that
GISD was rapidly becoming overloaded by database construction
and technical support demands and that the Service would be
better served by more attention being paid to policy and
standards development, software/hardware evaluation, etc. The
ADNR then directed GISD to respond by developing a revised role
and function statement and an associated reorganization plan.
The GISD reorganization plan thus developed, outlined in a June
6, 1991 memorandum from the Associate Director, Natural Resources
to the Regional Directors, is shown in Appendix A.

This reorganization plan and revised role and function statement
called for such dramatic changes in how GISD operated relative to
the parks and regions that it obviously could not be immediately
implemented. Hence, GISD prepared a transition plan that
outlined how the division would function during the period when
the regions were attempting to develop the capability to assume
the database construction and technical support functions
formerly performed by GISD. This transition plan, outlined in a
September 17, 1991 memorandum from the Chief, Geographic
Information Systems Division to the Regional Directors, Attention
Regional GIS Coordinators, is shown in Appendix B.

At a Regional GIS Coordinator's meeting in January 1992 concern
was expressed about reorganization plan. The feeling was that it
transferred work to the regions without providing any additional
staffing and funding to accomplish this workload. The
coordinators also expressed concern that the transition plan
failed to adequately cover the entire period of time required for
them to acquire the funding and FTEs to assume these transferred
duties.

Purpose of the Review

This review was ordered by the Associate Director, Natural
Resources (ADNR) in response to requests from several regions
that the Geographic Information Systems Division's (GISD) 1991
reorganization and transition plans be reevaluated in context of
the costs and benefits to the regions.

The ADNR charged the review panel with determining the validity
of these concerns and with developing recommended solutions to
any problems noted.

Objectives of the Review

The review panel was charged with meeting the following objectives: 1) evaluate GISD organization and staffing relative to NPS GIS program requirements and recommend any improvements needed; and 2) evaluate regional GIS related issues and recommend any improvements needed.

REVIEW PROCESS

Panel Members

The Associate Director, Natural Resources appointed Dr. Dennis B. Fenn, Deputy Associate Director for Natural Resources, NPS to chair the review panel and serve with the following six experts in conducting this review: Dr. Jan W. van Wagtendonk, Research Scientist, Yosemite National Park; Gale W. TeSelle, Director, Resource Inventory and GIS Division, Soil Conservation Service; Claude J. Christensen, Program Manager, Data Administration and GIS, U.S. Department of the Interior; Philip R. Brueck, Superintendent, Prince William Forest Park; Dr. Donald T. Lauer, Acting Chief, EROS Data Center, U.S. Geological Survey; and, Dr. Sarah L. Wynn, Remote Sensing Specialist and GIS Coordinator, Rocky Mountain Region, NPS.

Pre-meeting Process

The review panel chairman invited each Regional GIS Coordinator to provide comments in writing to the review panel concerning their feelings on the issues to be addressed by this review. They were also encouraged to seek comments from their park areas and submit those comments to the review panel. When comments were received in WASO the chairman immediately FAXed copies to each panel member for their review prior to the meeting. Several park and regional GIS personnel also called one or more panel members for direct discussions on these issues prior to the meeting.

Review Panel Meeting

The review panel met in Denver, Colorado on June 15-17, 1992 to undertake this program review. The first two days of the meeting were spent in detailed discussions with the GISD management and staff. Each branch chief and the division chief made formal presentations to the panel and provided copies of pertinent written material concerning their programs. These formal presentations were each followed by a question and answer session wherein panel members asked questions and sought

information, particularly with regard to specific points raised in the comments received from and through the regional GIS coordinators. The panel then spent the third day in executive session discussing findings, developing recommendations, outlining the final report, and writing a first draft of the report.

ISSUES ADDRESSED BY THE REVIEW PANEL

The review panel conducted a thorough evaluation of the issues, plans, and directives associated with GISD and the NPS GIS program. Eight major issues were identified that could benefit from recommended actions and improvements. These issues are individually discussed below.

1. TRANSITION PLAN

It is mutually recognized that GISD transitioned too quickly from a user support operation to one of Servicewide policy development and program overview, leaving the regional offices without the proper resources in place to take over this GIS user support function.

Recommendations to GISD and Regional Directors:

1.1 **A new transition memorandum signed by the Director should be jointly developed by GISD and the Regional GIS coordinators. This memo should extend the transition period through FY-94, or until the FY-94 initiative is received; it should redefine the user-support services to be performed during the extended period; and it should identify a long-range vision for geographic information in the NPS (spatial data, geographic-based information technology).**

   Discussion: It is evident that the original transition memo was never received by most parks. This accounts for some of the concerns and lack of information relating to the role of GISD. This problem was further compounded by the fact that while GISD undertook a transition out of their former user-support role, the regions were not given the resources to take on this supporting role for the parks. It is recommended that this revised transition plan be completed by September 30, 1992.

1.2 **During the transition period GISD should defer developing any new databases, implementation of the scanner equipment, work on INTERNET, or reviews of park Resource Management and GIS Plans.**

Discussion: Deferring these actions will allow GISD to concentrate on the highest priority areas of their operation, thus maximizing the effective use of their limited staff.

1.3 The Regional Offices should look for opportunities to enhance their GIS operation by identifying and reallocating FTE's & funding from other resource areas.

Discussion: We feel that the regional offices should place the GIS operation much higher in their priorities and that they should demonstrate their commitment by reallocating some of their own resources to meet this need.

1.4 GISD should purchase a 9-track tape system for the regional office GIS operations.

Discussion: Part of the current backlog at GISD is involved in their effort to convert existing data for the parks. Acquisition of the 9-track equipment would allow the data to be distributed directly to the regional offices for their conversion of the data, thus reducing GISD's lower priority workload while providing the tools necessary for the regions to carry out this function.

2. ORGANIZATION AND STAFFING

Although the review panel felt that the current staffing of GISD is the minimum necessary to accomplish the proposed mission, some adjustments need to be made to get through the transition period. Overall organization of geographic information within the Service also needs to be addressed.

Recommendations to GISD:

2.1 GISD should continue the implementation of the PPI Branch as presently described, but at a reduced level. Shift the one vacant PPI Branch FTE to provide field GIS user support in the other branches during the transition period.

Discussion: The review panel fully supports the Policy, Planning, and Implementation (PPI) role and function statement and agree that this branch should move ahead with its current objectives during the transition period. However, since GISD must extend their user-support functions throughout this new period, it is important that the one vacant PPI position be temporarily reallocated to the other branches to assist in this function rather than being filled as currently described in the GISD staffing plan (see the Organization & Staffing Recommendations).

2.2 Rename the three GISD branches to: Policy and Planning, Data and Applications, and Hardware and Software.

Discussion: These name changes more accurately reflect the functions we feel the branches serve, parallel the practices of other bureaus, and remove the confusion that the results from repetitive use of the term "technologies," as in the current branch names.

2.3 Develop organization and staffing strategies as part of the regional GIS plans.

Discussion: The regional GIS plans should include short-term and long-term strategies for organization and staffing, including full integration of information services.

2.4 Coordinate activities of the GIS Division with the new GIS Branch in the Denver Service Center.

Discussion: The establishment of a new GIS branch in the Denver Service Center raises concerns about coordination. The Service can ill afford duplication of effort. We feel that the option of having DSC be responsible for Servicewide data development and archiving should be explored.

2.5 Develop a long-range strategy for integration of geographic information into information resources management programs at all levels of the Service.

Discussion: Geographic information is not the sole domain of the Natural Resources Directorate. A strategy must be developed to fully integrate all NPS information needs across all functions and program offices at the Washington, region, and park levels.

3. THE ROLE OF REGIONAL OFFICES AND REGIONAL TECHNICAL SUPPORT CENTERS (RTSCs)

GIS has developed rapidly in the NPS. Between 1983 and 1992, the number of automated park data bases has grown from 3 to 111. This creates a technical support and data base construction demand on GISD that exceeds its resources. In March 1991, GISD was redirected at the request of the Regional Chief Scientists to develop Servicewide GIS policy and standards. As a result, GISD has organized itself into three branches--policy, planning and implementation; hardware and software technologies; and geographic data technologies. Technical support and database construction responsibilities were passed to the regions. While it is appropriate that these user support responsibilities have been passed to the regions, only meager resources have followed to support these activities. Furthermore, more substantial

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resources will not be available to the regions until at least FY 94. If the NPS is going to commit to being a major GIS technology user, the Regional Directors must commit to supporting GIS and data development at the regional level, even if it is at the temporary expense of other existing programs.

Recommendations to Regional Directors:

3.1 **Regions must recognize and accept their long-term responsibility to support parks and regional offices in implementation of GIS.**

Discussion: Through FY 91, GIS development (including data development) within NPS was largely the responsibility of GISD and individual parks. If the NPS wants to implement GIS in all the parks who presently have use for the technology, Regional Directors must commit to allocating and/or acquiring sufficient resources and FTEs to support this endeavor.

3.2 **Regions must develop a strategy for implementing the GIS program within the regions during and following the transition period.**

Discussion: The Regions are currently in a transition time (FY92 - FY94), during which the responsibilities of data base construction and technical support have been handed to the Regions but without the necessary resources to support these activities. GISD agreed to continue support activities through FY 92 (Refer to GISD memos A6427(470) and N16(472)). This review panel recommends that GISD continue their technical support activities through FY94.

An NPS GIS budget initiative has been put forward for FY 94 which should, if it is approved, provide funds to establish RTSCs in all 10 regions. Each RTSC has been estimated to require $300,000 and 3.5 FTEs to operate successfully. Each region should develop a transition and post-transition strategy for implementing GIS as part of their regional GIS plan.

FY 93 becomes an opportunity for each region to concentrate on the up-front portions of GIS development for multiple parks. GIS scoping and informational meetings, park GIS plan development, park and adjoining lands data review and acquisition, and manuscript and data documentation guidance are just some of the activities that can take place during this time.

The Regional Directors are encouraged to support the GIS budget initiative for FY 94. Equally critical to successful GIS implementation in the Service is availability of

resources with which to develop data. An Inventory and Monitoring initiative has also been prepared for FY 94. This effort will provide for collecting missing natural resources data and for monitoring activities. The inventory and monitoring program is funded at $2 M in FY 92 and FY 93. It is designed to reach a $25 M level by FY 97 and continue at that level through FY 2002. The Regional Directors are encouraged to support this important initiative as well since it will be a key to gathering the data needed for an effective GIS program.

4.   IMPLEMENTATION STRATEGY FOR REGIONAL TECHNICAL SUPPORT CENTERS (RTSCs)

Regions have submitted requests for support to develop 23 RTSCs around the Service. The Servicewide effort to establish such RTSCs needs to be carefully considered. The review panel feels that the NPS should establish one RTSC per region in an initial phase, letting demand and workload dictate the need to establish any additional RTSCs in future years. Any additional RTSCs should be requested by the Regional Director on a priority basis in future budget submittals and in accordance with the region's approved GIS plan.

Recommendations to Regional Directors:

4.1   Implement at least one RTSC per region, allocating 3.5 FTEs and $300,000 per center in order to create a critical mass for technical GIS user support.

Discussion: Each region should plan on placing all RTSC resources that result from the FY 94 budget initiative at one center in order to create a functional unit that can provide technical support and data base construction services to the region's parks. This includes placing all 3.5 FTEs at that center rather than spreading them around the region.

4.2   Regions should develop implementation plans for RTSCs.

Discussion: Each region should develop an RTSC implementation plan as part of their regional GIS plan. On the basis of these plans, GISD should develop a process and work with the regions to determine where to place the first 10 RTSCs, should the FY 94 budget initiative be funded.

4.3   Additional RTSCs should be created at the discretion of the Regional Directors.

Discussion: Should more technical support centers be needed within a given region, they should be funded at the

discretion of the Regional Director, as demonstrated by a high priority being given to such a need in the annual budget proposal from the region.

5. PROGRAM DIRECTION

The rapid evolution of the NPS's GIS Program, the proliferation of hardware and software capabilities needed to support the program, and the fact that management of geographically referenced spatial data is a critical ingredient in most park management and protection activities dictates that a significant change must be made in the direction of GISD's activities.

GISD's Strategic Plan, dated February 1992, defines the mission of the Division, identifies a set of goals and specifies activities to be conducted--all of which suggest the need for a change in direction for the Division. That GISD plan calls for a focused effort in three areas: (1) policy and planning, (2) data management and applications development, and (3) hardware and software technologies. However, given the scarcity of available resources to support program expansion, there is a general feeling among the key players in GISD, the regional offices, and parks that user support has already started to suffer and will continue to be neglected if this change in direction is implemented immediately.

The Review Panel supports the change in direction as called for in the GISD Strategic Plan (and in the Role and Function statements which support the Plan), but recognizes that the Transition Plan noted above must first be put into place and that selected priority shifts in planned activities must then occur. Furthermore, the Review Panel believes that reassignment of GISD staff to the regions would be counterproductive to accomplishing the significant Servicewide functions needed by a growing NPS GIS program. Likewise, the reviewing of Resource Management Plans or, for that matter, Park GIS Plans, should not be a priority activity for GISD.

Recommendations to GISD:

5.1 Continue user support during the transition period.

Discussion: The Review Panel believes that the highest priority activity during the transition period is to continue to provide user support to the regions and parks. The Panel recognizes that this activity tends to consume a large portion of available resources within GISD and will cause delays in carrying out some of the other responsibilities identified in the Strategic Plan, but this cannot be helped at this time.

5.2 Produce and distribute a GIS "sourcebook," and selected comprehensive reports.

Discussion: Clearly, there is a critical need at all levels of the NPS for a comprehensive reference book on GIS policies and procedures. This book should be prepared jointly with the Regional Coordinators and should be issued in segments as they are completed rather than waiting until there is a completed document. Since each segment will require frequent updates and additions, mechanisms for electronic distribution of the document should be explored. Two "technology" reports, one on PC DOS-based GIS and the other on RDBMS, also are considered high priority items (see section on Technology).

5.3 Eliminate the regional liaison roles in the PPI Branch and emphasize their policy and planning functions.

Discussion: Partitioning of the country into regions (or groups of regions) and assigning liaison responsibilities for the partitioned areas to individual GISD-PPI staff members is not judged to be the highest priority use of limited staff time during the transition period. Regional Coordinators should serve as the parks' point-of-contact in each region and can provide liaison directly with the parks. GISD-PPI priorities should be placed on formulating Servicewide GIS policies and program plans, effective immediately.

5.4 Formulate standards for selected program-specific, GIS-compatible data bases.

Discussion: To allow maximum compatibility among NPS users and ensure cost efficiencies, GISD staff must formulate standards and guidelines for capturing data, describing data sets (i.e., metadata), and building data bases. These standards will apply to databases developed by staff within NPS and those under contract to NPS. A recognized priority task is to establish a "locational" data base policy for the NPS. Part of this policy must address mapping standards, and among the most critically needed mapping standards is one that addresses park boundaries.

5.5 Prepare "benchmark" GIS Position Descriptions.

Discussion: NPS will never fulfill its vision of routinely using advanced information systems technologies for handling and analyzing spatial data without skilled personnel to carry out the work. Scarcity of experienced people in the federal workforce and competition among bureaus and agencies for that limited talent pool, both inside and outside government, requires GISD to carefully craft a set of

position descriptions that ensures a competitive advantage for NPS when recruiting new personnel.

5.6 Provide guidelines for park and regional GIS Plans and for the GIS components of park Resource Management Plans.

Discussion: Rather than reviewing individual park RMPs or park and regional GIS plans, GISD staff should focus their activities on developing Servicewide guidelines which relate to broad program goals and reflect consistency in topics to be addressed. GISD should ensure that such plans are produced in a timely manner but should leave plan reviews to the regions.

6. TECHNOLOGY

The NPS does not have a common computing environment for GIS or information technology. UNIX and DOS are both used as operating systems on a variety of hardware platforms. Although GRASS is used as the predominant GIS software package, at least 10 other GIS software packages are used in the NPS. This provides important flexibility for the parks and regions but makes support activities such as training, systems administration, information sharing, and software development much more difficult.

The review panel found that most of the issues raised by the regions and GISD dealt with insufficient support. Many of these issues would be reduced if some degree of standardization occurred in NPS.

Recommendations to GISD and Information and Telecommunications Division (ITD):

6.1 Pursue a national procurement of hardware and software that would support the GIS and information technology needs of the NPS.

Discussion: This procurement should be based on a requirements analysis of NPS needs and take into account the diversity in size and resources of the parks and the NPS organization. The procurement should include the basic hardware needs for GIS and integrated information management, database management systems, word processing, spreadsheet, etc. Information support programs such as training, application software development, systems administration, database standards and administration, and data sharing should thereby be simplified.

6.2 GISD should complete evaluations of the DOS-based GIS packages that exist within NPS and provide them to the Regional GIS Coordinators. Support for these DOS-based

packages should be provided by the vendor and/or the regional offices.

Discussion: Because of the increased capabilities of DOS-based GIS systems, various parks are now using DOS GIS packages instead of the nationally supported UNIX-based GRASS GIS. Many regions and parks are asking for assistance in evaluating the various DOS GIS packages in order to guide their decisions about GIS software. Many of the parks are also asking for support once they have installed a DOS-based GIS system. GISD has been criticized for not providing an evaluation of these DOS-based GIS packages and for not providing technical support.

This evaluation of DOS-based GIS systems should include the development of NPS criteria and standards in order to minimize biases and criticisms in the process. The regions and park GIS users should be included in this criteria development. The ability to transfer data, both raster and vector files, in a standard format should be a NPS requirement. These evaluations will not necessarily make recommendations on what to purchase but will be useful in making procurement decisions at the regional and park level.

GISD should not be asked to provide technical support to these DOS packages because of the extra support staff requirements this would entail. User support for DOS-based GIS should be provided by the vendors and by establishing multi-park user group consortiums.

6.3   Assemble a small team to identify the NPS requirements for a UNIX-based DBMS and evaluate the candidate DBMSs against these requirements. Prepare an evaluation report. Investigate methods for a national procurement versus individual office procurement.

Discussion: One of the basic problems in the use of GRASS is the lack of DBMS support; however the next version of GRASS will include such support. Most of the GRASS users want to purchase a UNIX-based DBMS to manage their attribute files. The NPS does not have a UNIX-based DBMS procurement mechanism in place nor has NPS identified UNIX DBMS requirements. Several parks and regions have asked for support in transferring DOS-based DBMS data to GRASS for use in analysis, data display, and map preparation.

The evaluation report should be made available to the regional offices and others within the NPS as guidance in purchasing a UNIX-based DBMS. The intent of this evaluation and the procurement method is to foster the adoption of a consistent UNIX DBMS for the entire NPS.

6.4 GISD should develop a procedure for utilizing DOS-based DBMS data in a UNIX GRASS environment.

Discussion: This procedure would assist those offices that are operating in both a DOS DBMS environment and a UNIX-based GRASS environment. The procedure would be provided to the regions to assist the parks that require this capability.

6.5 GISD should prepare a report providing information about why and how the optical scanner was purchased, and the status of development and use of the scanner.

Discussion: A number of regional comments identified concerns and misunderstandings about the Tangent scanner purchased by the GISD. Questions were raised about why it was bought, as well as when and what kind of scanning services will be provided by GISD.

This report should diffuse much of the concern about the scanner and its' potential use.

6.6 ITD should evaluate methods for gaining access to Internet and make recommendations to NPS on how to respond to this need.

Discussion: A number of offices have asked for access to Internet, which is an international computer communication network commonly used by the university and scientific community. A number of different technical methods could be used to provide such access.

The ITD is in a better position to respond to this need than is GISD. Since GRASS is available over Internet as well as software fixes and innovative uses of the software, it is important to GISD to gain this capability.

7. COMMUNICATION AND COORDINATION

Several of the issues raised by regional and park personnel in their comments to the review panel can be attributed to ineffective communication between GISD, the regional GIS coordinators, park personnel, and other entities such as ITD and various NPS program offices. The panel discovered that incomplete, inaccurate, or non-communication of information contributed to a number of misunderstandings regarding issues raised in connection with this review. Clearly, all parties involved can and should do more to communicate information regarding their GIS activities. At least a part of this lack of communication relates to workload demands, the reorganization of

GISD, and the accompanying role changes brought about by that action.

Recommendations to GISD:

7.1 GISD should take a proactive role in establishing effective and ongoing communications with regional GIS coordinators.

Discussion: Under the new GIS program structure, regional GIS coordinators will become the primary clients of GISD. This relationship should be encouraged by management and cultivated by GISD. The initial components of this ongoing effort should include:

    a. Regular planning and coordination meetings with regional GIS coordinators and other key GIS officials;

    b. GISD and the regional GIS coordinators jointly developing a revised GISD transition plan and a long range vision statement for the NPS GIS program;

    c. Regular and increased use of CC:MAIL communication facilities by GISD, the regional GIS coordinators, ITD, and other key NPS GIS users.

Clearly, positive business partnerships need to be formed between GISD and all other components of the NPS GIS user community. This is particularly true for GISD and the regional GIS coordinators, and for regional GIS coordinators and the park-level GIS users. There is no more effective way to build the kind of partnerships needed for NPS to implement an effective GIS program than regular, personal contact between GISD and its primary clients, and the regional GIS coordinators and their primary clients. Coordination meetings between GISD and the regional coordinators should be regular, well planned, well conducted, and held as often as needed to address issues pertinent to GISD and the regions. Meeting agendas should be jointly developed by GISD and the regions. The location should be rotated between GISD and the regional offices or other locations appropriate to the proposed agenda items.

The revised transition plan, also recommended in this report, should be jointly developed by GISD and the regional coordinators, as should a proposed long-term vision statement for the NPS GIS program. This should ensure products that are responsive to both national and local program needs, and provide a consensus agreement on long-term directions for GISD and the NPS GIS program. Frequent informal communications and sharing of ideas and timely information could be achieved by expanded use of existing and planned CC:MAIL capabilities.

7.2   A Directorate-level GIS steering committee should be formed to establish and monitor GIS policy and direction for the NPS GIS Program.

Discussion: Because GIS-related technologies have significant potential for use by most NPS resource management program areas, it is important that all NPS functions be involved in establishing and monitoring major GIS activities. The anticipated level of investment in GIS technologies for the foreseeable future indicates that many senior NPS managers should be involved in the major decisions regarding the level and direction of GIS activities.

7.3   Participation on NPS, Departmental, and Federal GIS Coordinating groups should be made available to NPS GIS users at all levels.

Discussion: GISD participation on Department of the Interior and Federal Geographic Data Committees has been extensive. This involvement is both necessary and appropriate. However, limiting participation mainly to GISD personnel inhibits the involvement of other valuable NPS GIS talent and their exposure to other, wider points of view. It also imposes a significant burden on GISD to cover the wide variety of committee meetings that go with this level of participation. Involvement of regional GIS coordinators and perhaps even selected park personnel would spread the workload and widen the opportunities for contribution, throughout NPS. Participants would have increased personal involvement and additional opportunities to contribute to the overall direction of the GIS program. Expanding participation on coordinating committees would have the additional benefit of reducing the "meetings" burden on GISD, thereby freeing up some additional time for GISD personnel to apply to other projects.

7.4   GISD should cultivate and enlarge upon the newly established relationship between itself and ITD.

Discussion: ITD recently assigned one of its staff members to act as a liaison with GISD. Significant areas of common concern exist between these two organizations. Establishing effective and ongoing communications and a positive working relationship between GISD and ITD should prove highly beneficial to both divisions. These common areas of activity and issues can be shared and coordinated, thereby clarifying the roles of each division and reducing the potential for any duplication of effort.

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8.   TRAINING

In evaluating the comments from the field, and after discussions with GISD staff, it is apparent that a great deal of time is being spent by the staff responding to operational problems, many of which could be satisfied through various levels of formalized training. These training needs occur at both the regional and park levels. The review panel notes, however, that GISD does not currently have the staffing or the time to properly provide the increased training needed by the regions and the field.

Recommendations to GISD:

8.1   GISD should work with the Regional GIS Coordinators to develop training prescriptions for GIS operators and other related park GIS positions (system manager, data manager, etc.).

Discussion: We recognize that the NPS does not have the capability to provide the level of training needed by the parks to develop fully operational GIS operations, nor do we see the Service ever providing training to the extent or level needed. We also acknowledge that there are many institutions, both private and governmental, who regularly provide training in many of the skills areas needed by the NPS.

These training prescriptions should be developed so as to provide a park employee with a basic understanding of the appropriate computer operating system (DOS or UNIX) as well as the actual GIS software itself. The prescribed training should be identified to also provide an opportunity for each person to develop the understanding and minimum skill levels needed to form and implement park applications.

The training prescription should identify the levels of training needed for GIS operations, recommend specific training courses, identify the name & location of institutions offering the recommended training, and detail the approximate costs. This type of prescription will not only assist parks in developing cost projections, but will also assist managers in identifying what is needed to fully support a GIS and one or more operators.

8.2   GISD should develop a training course for the regional GIS Coordinators.

Discussion: As GISD transitions from providing park support to providing national policy development and regional support, it is important that regional GIS coordinators become capable of providing direction to the field GIS operations. This training (it may be several courses)

should provide each of them with a basic knowledge of GIS operations, data management techniques, and other necessary skill levels to facilitate their support and overview role for the parks and RTSCs. Technical support to park GIS users should be provided by the RTSCs.

8.3   Continue coordinating the "GIS For Managers" training course.

Discussion: As GIS operations continue to expand in the NPS, it is important that new and existing managers are oriented not only to the benefits of using geographic information, but also to the costs and requirements (equipment, labor, acquisition of data, etc.) of operating and supporting a GIS.

APPENDIX A

1991 GISD REORGANIZATION PLAN

APPENDIX B

1991 GIS PROGRAM TRANSITION PLAN