WRD PROJECT AND REPORT MANAGEMENT GUIDE

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U.S. GEOLOGICAL SURVEY
Water Resources Division

WRD PROJECT AND REPORT MANAGEMENT GUIDE

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1. INTRODUCTION

Purpose of Guide

The Organic Act of the U.S. Congress, which established the U.S. Geological Survey in 1879, requires the Survey to promptly make public the results of its investigations. The written report, when published, fulfills this obligation because it documents and disseminates the findings of our investigations and provides an archival record of our work.

1. Geological Survey Reputation

- In 1979, the Geological Survey celebrated its 100th birthday. Over the years, the Survey established an excellent reputation as a scientific research organization.

- This reputation is due to our tradition of providing quality, timely, and unbiased reports, maps, and data compilations.

- It is also based on the fact that we make available the results of our investigations to the public at the same time.

2. Increasing Workload

o As we move into our second century, our workload is increasing because of the demand for hydrologic information by an ever increasing audience. Yet our workforce is not keeping pace with the workload because of the hiring restrictions of recent years. In 1980, the Water Resources Division had 2,805 permanent employees, funded ~~5,000~~ 1,500 projects, and produced more than 1,100 interpretive reports. This is in sharp contrast with 1970 when we had 2,886 permanent employees, funded 1,500 projects, and prepared 800 reports. Thus, although we can look backward with pride on our accomplishments, we must look forward and seek ways to increase and improve our productivity.

o Change in type of Project

3. Planning

o One way we can increase our productivity and maintain quality publications is to better plan and manage our investigations and our reports.

o The purpose of this guide is to provide a systematic approach to project planning and management and thus improve the productivity and the efficiency of personnel. This, in turn should

lead to improved timeliness, technical quality, readability, and attractiveness of our publications.

4. Organization of Manual

- Problems with projects frequently are not discovered until there are problems with the report. Thus, this manual stresses the point that report planning must begin when the project is planned, and the manual is divided accordingly into two parts: (a) projects and (b) reports. The project part consists of project planning (section 2) and project management (section 3). The report part consists of report planning (section 4) and report policy and management (section 5).

- Each of these sections contain useful examples and forms to aid you in project planning and report preparation, and class exercises. This manual is intended as a class reference and as an office reference manual.

- It is our intent that you will learn techniques that will improve job performance and promote a timely presentation of project results.

Major Factors in Planning and Management

The following summarizes some of the key ideas in the manual.

1. Project and Report Goals - Reports are our most important tangible products.

   o Reports must be:

   - Of highest technical and editorial quality
   - Attractively designed.
   - Completed on time.
   - Show no favoritism or bias.
   - Made available to all at the same time.

   o Philosophy and guidelines are given in the following documents and copies are included in the Section "Report Policy and Management."

   - WRD Policy Statement No. 1 (June 4, 1959).
   - WRD Memorandum 79.43 (December 22, 1978).
   - Survey Manual 500.14 (January 28, 1980).

2. Trends in Division Reports

   o Since 1960, numbers of reports in the WRI and open-file series have increased, whereas those in the Hydrologic Atlas, Water-Supply Papers, and Professional Papers, series have decreased.

This reflects two patterns: (a) a marked increase in number of local studies, and (b) a marked decrease in time and cost to publish camera-ready typescript prepared in the originating office.

- Number of reports has increased almost fourfold since 1950.

1950 = 300 reports	1970 = 800 reports
1960 = 690 reports	1980 = 1,100 reports

3. Project and Report Planning

Failure to plan report content and format at beginning of project leads to serious problems that are difficult to correct. For example:

- Reports are technically poor.
- Reports are not completed on time.
- Organization is haphazard.
- Illustrations don't fit into report.

4. Major Steps in Project Report Management

Project and report planning must begin at the same time, and both should be monitored concurrently.

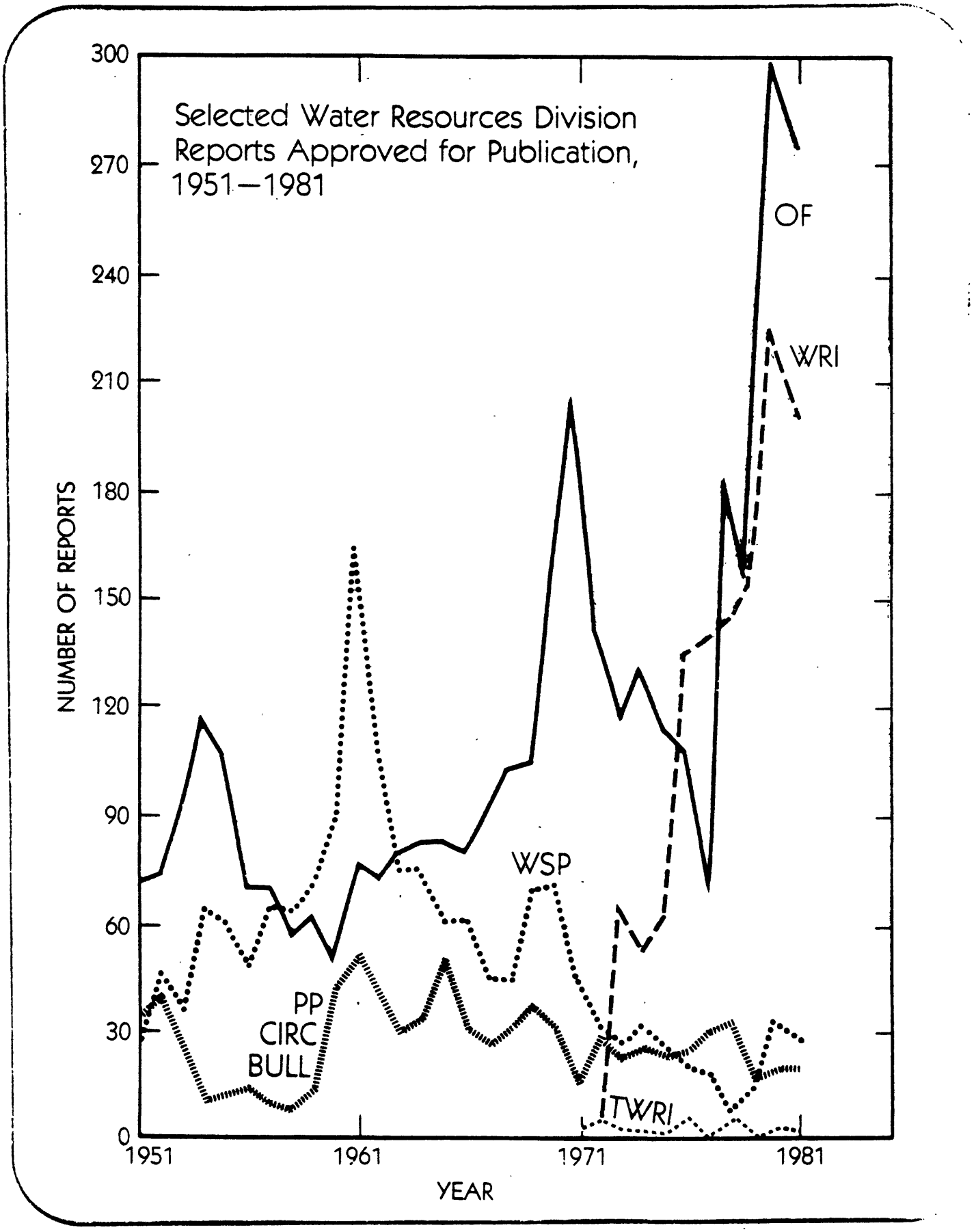
- o Major elements of the report (outline, purpose, scope, and introduction) should be prepared and project milestones established in the first 3 months of the project.
- o Progress on milestones should be reviewed at least quarterly.
- o Interim report should be prepared each year.
- o Completed first draft should be in review 6 months before project-completion date for projects of 3-years duration.
- o Before Headquarters evaluation, the report must undergo review by supervisor, technical colleague review, editorial review, and final evaluation by the District Chief or designated official and regional evaluation.

5. Major Steps Required in Project and Report Management

- o The steps are shown on the flow diagram (example 1A).
- o The diagram lists the major milestones of any project and the person responsible for each milestone.

WRD Project and Management System

	STEPS	Project Chief	District	Region	Reston	Cooperator
PLANNING	LONG RANGE PLAN		●	●		●
	↓					
	PROJECT PROPOSAL	●	●	●		●
	↓					
	PROJECT DESCRIPTION	●	●	●	●	●
	↓					
	PROJECT BEGINS	●				
	↓					
MANAGEMENT	PROJECT FILE	●	●	●		
	↓					
	QUARTERLY REVIEW	●	●			●
	↓					
	COLLEAGUE REVIEW	●	●	●	●	●
	↓					
	REPORT APPROVAL			●	●	
	↓					
	REPORT PUBLICATION		●		●	
	↓					
	RELEASE TO PUBLIC	●	●	●	●	●


Selected Water Resources Division Reports Approved for Publication, 1951—1981
NUMBER OF REPORTS
YEAR
300
270
240
210
180
150
120
90
60
30
0
1951
1961
1971
1981
OF
WRI
WSP
PP
CIRC
BULL
TWRI

2. PROJECT PLANNING

How to Plan a Project

A systematic businesslike approach to project planning can improve the quality of our reports and performance of our employees. A seat-of-the-pants management system is no longer acceptable. The most frequent cause for delayed completion of reports and for technical deficiencies is inadequate planning. Report planning and project planning go hand in hand and should start at the same time. A systematic project planning consists of a long-range plan, project proposal, project description, detailed work schedule and report plan including a detailed outline of report and list of of illustrations. Sound planning should provide the project chief with the tools needed to design and complete the project within the allotted time and budget. Some major considerations in developing a project and report plan are given below.

1. Need for Project and Report

- The stated mission of the Water Resources Division (example 2A) is to provide the hydrologic information and understanding needed for the best use and management of the Nation's water resources for the benefit of the people of the United States.

- o A project must address a specific need, and the results must be presented in a way that will be understandable and useful to decisionmakers.

2. WRD Projects

- o Collecting, on a systematic basis, data needed for the continuing determination and eveluation of the quantity, quality, and use of the Nation's water resources.
- o Conducting analytical and interpretive water-resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface and ground water.
- o Conducting basic and problem-oriented research in hydraulics, hydrology, and related fields of science to improve the scientific basis for investigations and measurement techniques and to understand hydrologic systems sufficiently well to quantitatively predict their response to stress, either natural or manmade.
- o Coordinating the activities of Federal agencies in the acquisition of water data for streams, lakes, reservoirs, estuaries, and ground waters.

- Providing scientific and technical data in hydrologic fields to other Federal, State and local agencies, to licensees of the Federal Energy Regulatory Commission, and to international agencies on behalf of the Department of State.

3. Major Steps in Planning

The long-range plan described below is prepared by the District Chief or equivalent official. The project proposal, project description, and work plan are prepared by the project chief. A detailed project-planning system is depicted in example 2B.

- Long-range plan (example 2C) sets forth objectives for the district program. It represents State and national needs. The plan should be reviewed and updated at least every year.
- Project proposal (examples 2D, 2E, 2F, 2G) presents a clear description of the project. Key elements of a project proposal are title, need, location, objectives, scope, approach, relation to long-range plan, benefits, reports, time frame, manpower, costs.
- Project description (example 2H) is the first step after regional approval and funding of project. It puts the project in the management information system (MIS) and gives the project official status.

- o Work plan - Lists project milestones and date for starting and completing each activity (example 2I).
- o Project file - Contains work plans, financial plan, manpower plan, and quarterly reviews. It should also include the report outlines and publication plan (example 2J, 2K).
- o Annual District program review - All new and significantly changed projects are reviewed annually by the Region. Funds are allocated according to Division priorities.

4. Need for Project

- o Once the project proposal has been prepared, it will be reviewed by the District and the Region. Major aspects to be considered in preparation and evaluation of a project proposal are given in examples 2L, 2M, and 2N.
- o Will the project contribute to high-priority programs of the Division (drought, water use, energy, protection of quality)?
- o Is the manpower available?
- o Will the project answer an urgent regional water problem?
- o Has the principal audience been identified, and are the planned reports appropriate for that audience?
- o Will the project results have transfer value?

5. Project Policy Considerations

- o Does the project fall within the mission of the Survey?
- o Should we make the investigation?
- o Will the project duplicate work done by other agencies or the private sector?
- o Will the project encroach upon the sphere of other agencies or the private sector?
- o Are there political considerations?

6. Project Proposal Steps

- o The initial step in planning a project is to define the hydrologic system. Consider the variability of the water resources in quantity, quality, time, and areal distribution.
- o List the current water problems and problems that are likely to occur in the future as a result of planned or anticipated changes that will affect the hydrologic system.
- o Consider courses of action necessary to investigate alternate solutions to problems.
- o List the kinds of information necessary to accomplish the above.

- o Select the most critical problems - Those that meet Division objectives and will give optimum results.
- o Define clearly and directly the objectives to be reached and identify the scope which controls the limits of the study.

7. Developing the Proposal

- o A project proposal is often considered to be an agreement between ourselves, our supervisors, and cooperators on what we plan to accomplish in our study. It is used also as a document to "sell" the project concept and to seek commitments of funds, personnel, and time for the study.
- o The project proposal is generally developed through "idea" sessions and discussions with the District staff and technical specialists and negotiations with the potential cooperator. Many concepts begin at program review and planning meetings of the District Chief and cooperator(s). Some proposals originate as "spinoff" of ongoing projects and focus on problems beyond the scope of current studies. Ideas for projects may also come from the Region and the Division.

8. Design of Project Proposal

- o A project proposal should be a clear and concise description of the project plan. It should supply to the reader answers to the questions what, where, why, when, how, who, and how much. Whenever possible, the proposal should be prepared by the appointed project chief.
- o Project proposals should follow a general standard format. The elements of a project proposal are given on examples 2D and 2E. The use of these elements should supply the readers (such as District Chief, Cooperator, Regional Program Officer, Reports Specialist, and Discipline Specialists) with clear and direct information necessary for them to review the proposal for adequacy and acceptablity.
- o Although a standard format is advocated, in no way does this imply a mechanical plugging-in of "standard" elements. Instead, the development of elements in a proposal requires careful thought, thorough background study, specific problem identification, precision in describing objectives and scope, and flexibility to consider alternatives for designing the data program or interpretative project.

9. Types of Project Proposals

- o Preliminary "Idea" Proposal An informal, brief proposal of a study idea, a skeletal plan for a study, or a "try it on for size" proposal. The format would be simply limited to problem, objective, scope, general approach, and, if possible, a rough estimate of cost and manpower. A rapid review is given by the District Section Chief and by a specialist in the technical subject of the proposal so that the District can assess whether the "idea" is worth a standard proposal. To assess proposal's chances for later approval by the Region, the District can send this "idea" proposal to the Region. The District is told if it's worthwhile to make a "full blown" proposal. The Region may suggest a consultant.
- o Preliminary "Alternatives" Proposal A brief presentation of alternative plans for obtaining water information needed to solve a problem. Alternatives to consider might be differing scopes of study, parameters to study, approaches to use, duration and intensity of study, personnel available, and costs of study.

- o Project Proposal - A Plan for a Plan - Proposed studies of complex water problems, of complicated hydrology, and of areas having unevaluated data, may have to be preceded by a preliminary study. The objective of such a study would be to develop an effective plan for a study. It could consist of thorough background study; an evaluation of data; and the development of alternatives for approach, time of study, costs, and manpower. Much of the preliminary study material could be used in the report on the project.
- o Project Proposal - A standard project proposal is given in example 2E.

10. Review of Project Proposal

- o The project proposal must be reviewed thoroughly and approved by the District and the Region before the study can be funded and considered a new project. Both offices will be evaluating the proposal for its adequacy and for its acceptibility. Examples of the questions they will be considering are given in examples 2M and 2N.

- The cooperator for the project is not normally brought into the review process of the District and the Region. However, the cooperator should be kept informed of any proposed departures from the preliminary plan.
- The "idea" proposal is reviewed generally by the supervisor of the person originating the proposal and by the District Chief. A decision is made by the District as to whether or not the proposal warrants a "standard" project proposal.
- An "idea" proposal may be sent to the Region office for a rapid technical review by the appropriate discipline specialist.
- The "standard" project proposal receives thorough review in the District by an immediate supervisor, appropriate discipline specialists, the report specialist, the computer specialist, the Administrative Officer, and the District Chief. Many District offices use a routing sheet to record the progress and approval of each person involved in the District review. This routing sheet should accompany the proposal throughout the review sequence. An example of a District routing sheet is given in 2G.

- o Many Districts use a "cover sheet" for each project proposal to record project title, project chief, proposal dates, project number, beginning and end dates, funding by source and fiscal year, and District routing. An example of a cover sheet is given in 2F.
- o After District Chief's approval, the project proposal is sent to the Region for its review and approval.
- o After Region approval of the proposal is received by the District, a copy is sent to the cooperator(s) for final review and approval.
- o The Districts should review ongoing cooperative and other Federal agencies' programs to determine feasibility of modifying, reducing, or terminating lower priority activities.

11. Project Description

- o The project chief must prepare a project description for an approved and funded new project or for a major revision to an ongoing project. An example of a Project Description prepared from an approved Project Proposal is given in example 2H.

- o The Project Description is prepared and sent to the Region (Program Officer) and to Reston (Operations) for approval. Three copies of the Project Description and a copy of the approved Project Proposal should be sent to the Region Office. After Region review and approval, the PD is sent to Reston for MIS review and approval. At this time, the project information is placed in the MIS system where the information on the project will be available for inquiries from WRD management, OMB, Congressional representatives, and others.
- o Approvals of Project Descriptions are often delayed in Region or Reston because of errors made in transferring information from the Proposal and in coding data for the MIS.

12. Information Release on Project

- o Upon receiving approval of the Project, the Project Chief should prepare and have released a press release to inform the public about the project. Often the cooperative agency will desire to release this news report through their customary channels.

- o Release should be sent to daily and weekly newspapers covering the area of the proposed study to develop local understanding and cooperation.

13. Report Plan

- o The report plan should document the content scope, suggest a medium that will both reach the target audience and present the material in the most effective manner, list the amount of time needed for writing, preparation of tables and illustrations, review, and revision.
- o The publication content should be decided during the planning of project.
- o The short outline (example 2J) and annotated outline (example 2K) must be prepared early in the project and must be revised periodically as needed.
- o The publication medium should be determined early and a copy of publisher's requirements obtained.
- o Adequate time should be budgeted for literature review, writing, reviews and revision, typing, and proofreading.
- o Early planning of base maps and illustrations is essential.
- o Introduction and statement of purpose and scope should be written early in the project.

14. Benefits of Project Planning - Project planning, as opposed to haphazard data collection and data analysis followed by hasty report writing without planned organization, has numerous advantages:

- o Helps meet deadlines and honor commitments.
- o Provides a way to measure employee effectiveness.
- o Facilitates delegation of work.
- o Helps to spot duplication of effort or omission of key elements.

15. Summary Comments on Project Planning

- o "The clearer the idea of what one wants to accomplish, the greater the chances of accomplishing it." (Harvard Business Review, November 1971)
- o Nothing can be more significant in planning a project than assurance that the facts are accurate, properly interpreted, and free from bias.
- o A good project planner looks to the past before contemplating the future. Review all previous accomplishments and failures, data, policy, and limiting factors before starting. Requesting technical and planning assistance should give additional insight.

- A thorough background study prior to developing a project plan often reveals difficulties and suggests alternative plans. A recent examination of sketchy proposals and poorly developed plans suggested that they were conceived in haste and lacked the benefit of background study.
- It has been shown repeatedly that successful projects result when project chiefs plan thoroughly what they are going to do before they start. Too often, project objectives are too general, plans are sketchy and shallow, deadlines are indefinite, and difficulties are not foreseen or are minimized. Projects given such a start soon drift into difficulties, and the project chief finds himself at the mercy of circumstances.
- Project failures and delinquent projects might be avoided if all problems could be anticipated or if plans could always bend to accommodate various contingencies. By looking ahead, we can avoid many problems, and sometimes allow for a new course or gain time to rearrange plans. A project chief that looks ahead, anticipating events and deciding how to handle them, soon develops poise and full control of his project.

- Assuming the truth of Parkinson's Law -- our work expands to fill the time available for its completion, we can procrastinate until the project deadline is past, or, plan to meet our deadlines.
- Overorganization of a project plan may strangle the project, and preoccupation with incidental details may blind the project chief to the objectives of the project.
- We cannot plan accurately without knowledge of what is a reasonable expectation of people, time, and cost for every phase of the project and without a measurement of accomplishment.

Planning Project Costs

Lack of adequate funds is probably the major cause of project failure. Project Chiefs tend to be somewhat overzealous in "selling" projects and succumb to the temptation to make the job more attractive to the cooperator by cutting costs to the bone. Financing must be sufficient to achieve stated goals. Symptoms of an underfunded project are cost overruns, slippage of completion date, and substandard technical reports. For a project to meet its objectives in timely and cost-effective manner, a systematic and businesslike approach to every phase is necessary. Some guidelines are given below; a list of cost factors is given in examples 20, 2P.

1. Background study

   - o A thorough analysis of the costs of similar completed projects that reached their objectives is a first approach to obtaining project cost estimates.
   - o Consideration should be given to the objectives, people, time, services, equipment, and other cost factors, and all changes or differences that could alter the expenses should be evaluated.

2. Cost Estimates

- o Cost estimates are based on the analysis of similar projects plus a realistic assessment of the people, time, and cost needed for each phase of the project.
- o The increasing costs of scientific endeavor, such as for new equipment and increased number of analyses as well as for inflation and salary increases, must be factored into project costs.

3. Financial Management System

- o For uniformity and for the later reporting of project costs, the cost estimates for the proposed project must be given in the object classes of the Financial Management System (FMS). The objective of this system is to meet the special accounting and the financial information and reporting requirements of the Geological Survey. Lists of FMS Object Classification Codes and Distributive Object Classes are given in example 20.

4. Project financial planning

- Examples of project financial planning forms used by several District offices for their projects are introduced in example 2P. Included are forms used to plan proposed project salary costs and the costs of laboratory analyses. To assist project planners in estimating costs of hydrologic monitoring operations and maintenance, example 2Q shows a detailed analysis of FY 1981 charges.

Assistance In Planning

Planning projects that deal with today's complex hydrologic problems often need the perspective of others to reveal potential difficulties. Technical and management assistance should be requested from the Region or Headquarters.

1. Benefits of assistance - Obtaining assistance in the planning a project proposal can help the author to:
   - o Profit by the experience of others who have successfully planned and managed projects similar to the proposed project.
   - o Aid in organizing the concepts and in testing the ideas.
   - o Obtain an adequate background of information.
   - o Understand previous accomplishments, failures, data, policy, and limiting factors.
   - o Focus on the essentials and avoid preoccupation with incidentals.
   - o Avoid over organization of a project plan.

2. Sources of assistance

   Listing subjects to investigate and people to contact as sources of assistance is a useful planning approach. For example:

Subjects	Source People
o Local hydrologic system	District technical specialist
o Political and policy considerations	District Chief
o Background information	Colleagues District Project Supervisor Technical File Clerk
o Project objectives	District Chief Cooperators and Concerned agencies Regional Staff
o Technical concerns	Technical Specialists Research Staff
o Duration of project	District Chief District Projects Supervisor Cooperators
o Budget planning	Administrative Officer (District and Region)
o Personnel	District Chief
o Design of plan	Program Officers (District and Region)
o Report planning	Report Specialists (District and Region) District Report Staff Cooperators

3. Use of assistance

- o A thorough background study is essential prior to developing a project plan. Such a study often reveals potential difficulties and suggests alternative plans. District and Region offices can assist such study by having up-to-date and readily retrievable reference material in technical files and library.
- o District and Region Program Officers can furnish reference copies of well-planned project proposals that can be useful in designing new proposals.
- o Personal visits by consultants to the proposed study area may be necessary for some proposed projects. Funds for such visits may be available from the Region.
- o A team approach should be used where appropriate to plan a project.
- o Alternative plans should be discussed.
- o Ample time should be allowed to seek and obtain assistance.

The Ideal Project

The ideal project has a specific objective, limited duration, adequate staffing, and sufficient funding. As a result, it produces a high-quality technical report on schedule. A detailed analysis of the ideal project is given in the WRD Bulletin article entitled "The Ideal Project"--Its Planning and Supervision (example 2R).

1. Objectives--The objectives should point to the solution of specific problems.
   - o If the objectives are not clear, the approach cannot be determined and the merits of each step of the project cannot be evaluated. The project will be in danger of aimless roaming, and the report may fail to satisfy the requirements.
   - o Uncertainty as to objectives frequently leads to time misspent on irrelevent matters and omission or neglect of crucial details.

2. Duration must be limited--Ideally, the length of a project should be 24 to 36 months. Projects that are longer frequently have overruns.

3. Staffing must be continuous--Continuous staffing is essential to efficient project management.

   - o The probability of interruptions by transfer is decreased with shorter projects.
   - o For the project chief to divide his time between projects is inefficient and leads to the temptation to neglect one to manage the other, which can delay completion of both projects.
   - o An interdiscipline team approach is recommended where feasible. Many of the newer projects in the Water Resources Division include assistance from ground-water, surface-water, and water-quality disciplines.
   - o An ideal project team incorporates a wide diversity of experience, interest, and capability. The project leader is responsible for assembling, guiding, and using technical talents of his staff.

4. Funding must be adequate--Lack of adequate funds is a common cause of project failure.

   - o Although the absolute necessity of adequate funding is obvious, inadequate funding is surprisingly common.

- We tend to be overzealous in "selling" projects and succumb to the temptation to make the job seem more attractive to the cooperator by underestimating costs.

5. Progress must be monitored regularly--Regular monitoring is required so that the cooperator can be advised on progress and notified if the original goals cannot be met within budget or time.
   - If financing becomes insufficient for successful completion, efforts should be made immediately to revise the objective or obtain additional support.
   - If the reports become overdue, efforts should be made to allow sufficient time for their completion.
   - Symptoms of an underfunded project are frequent cost overruns, delayed completion, and substandard reports.

6. Report must meet Survey requirements--The report must be technically acceptable, completed on schedule, understandable to the intended audience, have no policy violations, and be released in a series that reaches the intended audience.

page 2.27 follows

BASIC MISSION AND PROGRAM
Water Resources Division
U.S. Geological Survey

The mission of the Water Resources Division is to provide the hydrologic information and understanding needed for the optimum utilization and management of the Nation's water resources for the overall benefit of the people of the United States.

This is accomplished, in large part, through cooperation with other Federal and non-Federal agencies, by:

1. Collecting, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources.

2. Conducting analytical and interpretive water-resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface and ground water.

3. Conducting supportive basic and problem-oriented research in hydraulics, hydrology, and related fields of science to improve the scientific basis for investigations and measurement techniques and to understand hydrologic systems sufficiently well to quantatatively predict their response to stress, either natural or manmade.

4. Disseminating the water data and the results of these investigations and research through reports, maps, computerized information services, and other forms of public releases.

5. Coordinating the activities of Federal agencies in the acquisition of water data for streams, lakes, reservoirs, estuaries, and ground waters.

6. Providing scientific and technical assistance in hydrologic fields to other Federal, State and local agencies, to licensees of the Federal Power Commission, and to international agencies on behalf of the Department of State.

A WRD DISTRICT PROGRAM PLANNING SYSTEM

ACTIVITY	DESCRIPTION	PARTICIPANTS
FIVE-YEAR PROGRAM PLAN	District revises and updates each year a 5-year plan which gives the objectives to be attained to provide water resources information needed to aid in the solution of National, State, and local problems. A study elements-time graph is included.	District Chief District Staff Program Planner Regional Staff
ANNUAL PROGRAM PLAN	District programs proposed for next fiscal year are prepared by District--includes proposed new or significantly changed projects and their relative priorities.	District Chief District Staff
REVIEW OF ANNUAL PROGRAM PLAN	District program and proposed District plan for next fiscal year is reviewed.	District Chief Regional Staff
PROJECT PROPOSAL	Narrative style document of a proposed project giving the major elements--what, where, why, how, when, who, and how much. Regional staff members review proposal for adequacy and acceptability, provide technical comments, and recommend action.	Project Leader District Chief Program Planner Staff Reviewers
FUNDING REQUEST	Approved projects are considered for allocating funds on the basis of District and Regional project priorities.	Regional Hydrologist Program Planner
PROJECT DESCRIPTION	Each proposed new project or major revision to an existing project requires sending three copies of a project description, and a copy of the fully approved project proposal. A project advisor is assigned from Regional staff for duration.	Project Chief Program Planner Project Advisords
PROJECT MANAGEMENT DOCUMENT FILE	An annotated report outline and a detailed work plan, is prepared by the Project Leader within 6 weeks start of project.	Project Chief District Chief Program Planner
	Review and comment of Project Advisor.	Project Advisor Report Specialist

ACTIVITY	DESCRIPTION	PARTICIPANTS
PROJECT	Project review is a continuing quality control function of both the District and Regional staffs.	District Chief Project Advisor Discipline Specialists
REPORT REVIEW	Report review is a continuing process of reviewing, evaluating, and processing all report plans and products of every project.	District Chief Project Advisor Report Specialist

WATER RESOURCES DIVISION - SOUTHEASTERN REGION

GENERAL GUIDELINES

FOR PREPARATION OF

DISTRICT LONG-RANGE PROGRAM PLAN

The Long-Range Program Plan, prepared by the District, will consist of a series of statements that identify program categories supplemented by specific program elements, or hydrologic studies, which include both ongoing studies and proposed studies for the next five fiscal years.

The development of a Long-Range program plan is a revision of the initial part of the System for Program Management in the Southeastern Region (see SR Memorandum No. 74.40, May 17, 1974). This "long-range" plan is really a short-range approach to planning when we consider that many of the ongoing projects are expected by the Districts to be assured funds and to continue into all or most of the planning period.

Continuing restraints and changing needs for water information demand that ongoing studies be annually reassessed for their relative priorities in the District program.

In developing the Plan, consideration should be given to the needs of other Federal agencies, and to the work and missions of the other Federal and State agencies in the water resources field. The needs of other Federal agencies expressed in the OWDC coordination plan should be taken into account.

Each District program category will be defined by a brief statement of its objectives. These District objectives are needs to be attained

and are not necessarily time related. They represent a melding of the water information goals of the nation, region, and state with due consideration to future water problems and factors that dictate priorities and constraints.

Examples of program categories are as follows:

Hydrologic Data Base
Information on Flood Hazard
Improved Communications
Areal Assessment of Water Resources
Quality and Flow Characteristics of Streams
Hydrology of Lakes and Wetlands
Hydrology of Estuaries
Utilization of Subsurface Space
Urban Hydrology
Impact of Land Use on Hydrology
Waste Disposal Effects on Streams and Aquifers
Quality Characteristics of Aquifers
Aquifer and Stream System Evaluation
Erosion and Sedimentation
Water Atlas and Lay Reader Reports
Hydrologic Effects of Energy and Mineral Development
Effects of Alternative Water-Development Plans

The specific program elements, both current and proposed, will provide information to aid in meeting the objectives of each program category. These program elements should be described briefly, preferably in one sentence statements. Particular attention should be given to the planning of elements of the next year's program (1978 FY). These elements should be as realistic as possible because they constitute the framework for consideration of project proposals and for the establishment of priorities.

A suggested format for presenting several of the program categories, their objectives, and specific elements are as follows:

INFORMATION ON FLOOD HAZARD

OBJECTIVE: To define the frequency, duration, and magnitude of floods and delineate the flood plains.

STUDY ELEMENTS:

Flood-Insurance Studies

To investigate the existence and severity of flood hazards in specified communities to aid in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Regional Flood-Frequency

To define the 100-year flood for all State basins larger than 20 square miles--smaller than 20 square miles wherever possible. It will define the 50-year flood for all basins, regardless of size.

Urbanization Effects on Flood Discharge for the Dunwoody River Basin and Other Selected Urbanized Basins

Multiple regression analysis to be used in relating flood peaks to increasing urbanization and to changes in land use.

Analysis of Large Flood Events

To determine cause, frequency, areal extent, profiles, and effects of large floods for possible benefits in future flood warning and flood zoning.

Floods and Water Quality

The study will map the 50- and 100-year flood and monitor water quality at selected sites in the Oconee Riverway.

Watershed Modeling

Develop management level models of critical stream reaches of selected streams for describing and predicting time of travel, critical flows, and waste assimilation capacity.

IMPROVED COMMUNICATIONS

OBJECTIVE: To increase awareness of cooperators, other water-related agencies, and the lay reader of WRD District activities and to improve water data coordination and information exchange of federal and non-federal water agencies.

STUDY ELEMENTS:

Annual Summary Report to DNR

Lay Reader Report on Hydrologic Conditions
A quarterly report in consort with NWS and DNR.

Annual District Program Report
A report to all cooperators on the full range of program activities in the District.

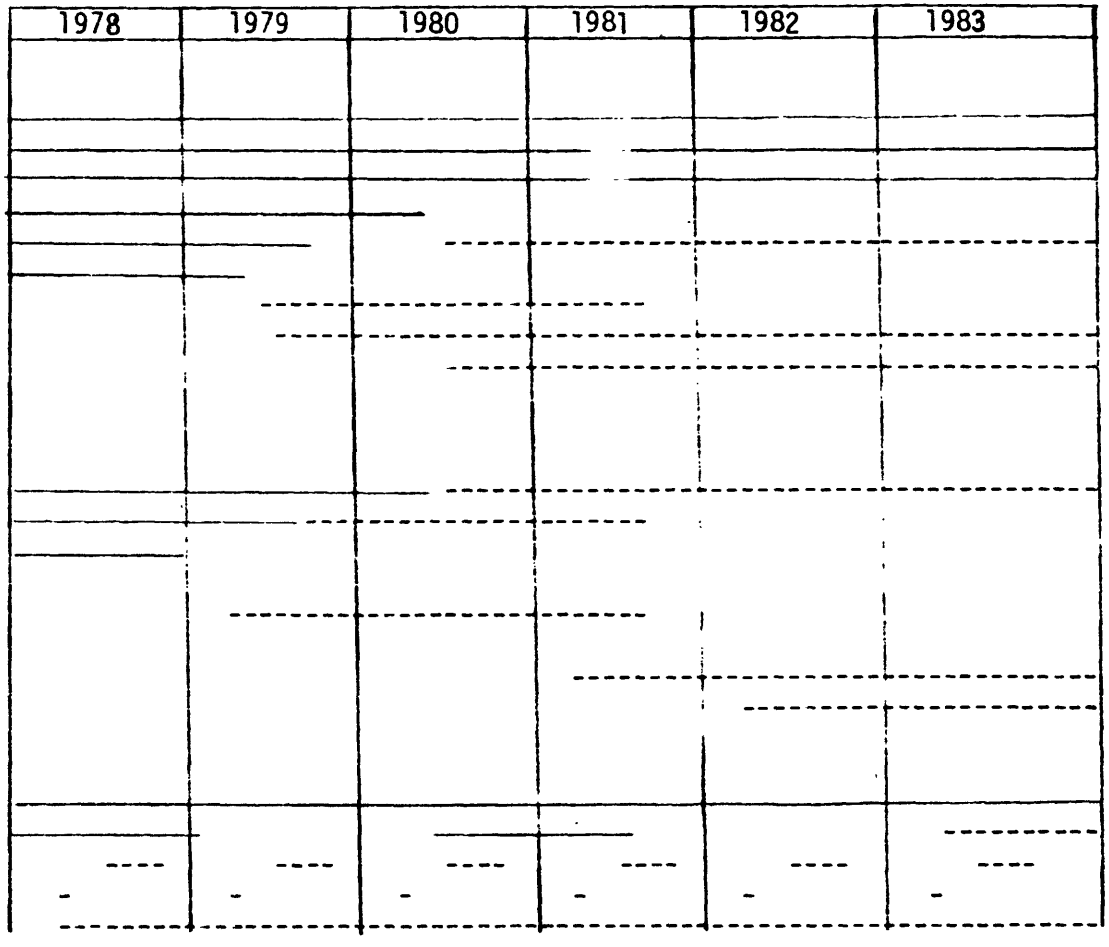
Annual Program Conference
A forum for the interchange of program information between the District, its cooperators, and all other water-related agencies -- Federal, State, and local.

Information Center for Water Data
A coordination and local assistance center for OWDC, NAWDEX, and WATSTORE.

A graphic presentation of the five-year plan shall be prepared by the District as a companion document for the Plan. An example of a segment of such a graph is attached. One purpose for the graph is to unify the objectives and to link the ongoing elements of the program with the proposed elements. Another purpose is to give visible evidence of plans for orderly progression of study elements towards their goals and the relationship of planned study elements in often complex programs. Such a graphical approach should aid the Districts in considering programming alternatives to meet constraints and unforeseen events.

PLAN FOR ACTIVE AND PROPOSED HYDROLOGIC STUDIES IN S R .TRICT, FY 1978-83

Study Element: Active———————
Proposed----------



I. HYDROLOGIC DATA BASE
- SR 00-001 Surface-water records-C
- SR 00-002 Ground-water records -C
- SR 00-003 Quality-water records-C
- SR 70-068 Small streams - DOT
- SR 74-075 Water Use - SEGS
- SR 75-079 Remote data acquisition-DNR
- Proposed Network evaluation - DNR
- Proposed Estuary data - SEGS
- Proposed Small streams - SCS

II. INFORMATION ON FLOOD HAZARD
- SR 73-006 Flood-Insurance Studies-HUD
- SR 74-076 Regional Flood Frequency-DOT
- SR 76-091 Urban Effects on Flooding - DNR
- Proposed Analysis of Large Flood Events - DNR
- Proposed Floods & Water Quality
- Proposed Watershed Modeling-SEPC

III. IMPROVED COMMUNICATIONS
- SR 71-072 Annual Summary-DNR
- SR 76-097 Lay Reader Rept-SRGS
- Proposed Annual Program Report
- Proposed Annual Program Conference
- Proposed Information Center

COOPERATION:
C=Combined Agencies
DOT=Dept of Transportation
DNR=Dept of Natural Resources
HUD=Housing & Urban Development
NWS=National Weather Service
SCS=Soil Conservation Service
SEGS=Southeastern Geological Survey
SEPC=Southeastern Planning Commission

WATER RESOURCES DIVISION - SOUTHEASTERN REGION

Water Resources Investigations

PRIORITY CONSIDERATIONS

I. RELEVANCE - Need

1. Does the proposed program contribute to the objectives of high-priority program areas as identified by the Division?

   For example:

   a. Drought
   b. Water use
   c. Coal related
   d. Other energy
   e. Protection and enhancement of environmental quality
   f. Assessment of environmental impacts
   g. Indian water rights
   h. Land-use planning and management
   i. OFA priorities (identify)

2. Will the program contribute to the solution of urgent local or regional water problems?

3. Is the magnitude of the problem such that immediate solution is needed or is the problem a potential one for which the adverse effects are anticipated for the future?

4. Does the proposed work offer distinct possibilities for solution of problem from the hydrologic point of view?

5. Is the topical area one that has been given less attention relative to other topical areas of comparable urgency (an aspect of program balance)?

II. POLICY - Should we do it?

1. Does the proposed program fall within the accepted mission of the Survey?

2. Does the proposed program raise jurisdictional questions with respect to functions or responsibilities of other Federal agencies?
3. Does the proposed program tend to duplicate work done by other agencies or private institutions? If so, can the duplication be justified?
4. Are there political considerations that would reflect especially on WRD or USGS?
   a. Favorably?
   b. Adversely?
5. Does nature of the work require conclusions (social, aesthetic, etc.) that go beyond "hydrologic feasibility" concept?
6. Is the Survey "best qualified" to do the job?
7. Is the manpower available or can it be obtained?

III. BENEFITS - Payoff

1. Are specific, identifiable, and quantifiable benefits expected to accrue from the proposed work?
2. Will specific information products in form of data or interpretive reports result from the proposed work?
3. Are the anticipated results likely to have transfer value?
4. Can positive results be expected within a reasonable length of time?

page 2.39 follows

ELEMENTS OF A PROJECT PROPOSAL

1. Title and Location:

   Relate to objective, scope, and location.

2. Problem or Needs:

   Describe background. Be specific.

3. Purpose of Project:

   Be clear and direct. Define nature of problem and the objectives; point out solutions to problems or needs.

4. Scope of Project:

   Define areal and technical content of study. Be specific so that the scope will not expand during the study.

5. Project Plans:

   Divide the project plan into major work elements and describe how each will be accomplished.

6. Relation to Long-Range Plan

   Tell how project goals lead toward attaining objectives of long-range plan.

7. Relation to State and WRD Programs

   Explain the appropriateness of the project for WRD undertaking and the priority from a local and national standpoint.

8. Study Benefits:

Tell how results will help State and Nation.

9. Reports:

Describe planned reports, giving preliminary titles and completion dates.

10. Time Frame:

Give deadlines and scheduling of work elements.

11. Manpower:

List manpower needs and responsibilities.

12. Costs:

List costs for each fiscal year. Be sure budget is adequate to achieve work elements stated in Approach.

PROJECT PROPOSAL FL-77Y

1. TITLE AND LOCATION: "Impact of Reduced Freshwater Inflow on the Tidal, Salinity and Biological Characteristics of the Alafia River and Bullfrog Creek Estuaries, Florida." Both estuaries are near the city of Tampa on the west-central coast of the Florida peninsula. The Alafia River and Bullfrog Creek drain areas of 420 and 40 square miles, respectively. Both are tributary to Hillsborough Bay, a major sub-area of Tampa Bay. (See location map attached.)

2. NEEDS: Proposals to reduce the freshwater inflow to both estuaries are presently before the Southwest Florida Water Management District. These proposals include flow diversion to other areas to supply growing industrial, agricultural, and municipal needs. Concern has been expressed that flow reduction may have irreversible detrimental effects on the biological productivity of the estuaries. Productivity of the entire Hillsborough Bay area is already severely stressed because of past large-scale developments related to the growth of the city of Tampa. Adequate data are not known to be available for evaluating the effects of reduced freshwater inflow.

3. PURPOSE OF PROJECT: The primary purpose of the study is to evaluate physical and biological changes that may occur in the Alafia River and Bullfrog Creek estuaries as a result of freshwater inflow reduction. Physical changes are to be evaluated from relations that predict the distribution of salt water within an estuary as a function of natural tide and freshwater inflow conditions. Biological changes are to be evaluated using correlations of naturally occurring invertebrate and vegetation distributions to their frequency of exposure to a saline environment.

4. SCOPE OF PROJECT: The study area includes both rivers as they enter Hillsborough Bay, upstream to a point just beyond the zone of tidal influence (as yet undetermined). Study elements will include tidal characteristics (both stage and velocity) and salinity characteristics (type and location of mixing zone). Biological characteristics will be determined using selected productivity indicators such as abundance and type of benthic invertebrates as well as location and type of attached aquatic vegetation. Freshwater inflow will be measured directly.

5. PROJECT PLANS:

1. Tidal stage - Two to three recording tide gages will be established in each tidal reach. These gages may be of a temporary type for ease of installation and possible transfer to other sites.
2. Salinity - Vertical and horizontal salinity distributions will be determined monthly, using data collected during slack periods of high-water and low-water. Conductivity, dissolved oxygen, temperature and pH will also be measured.
3. Tidal velocity - Determination of flow in each estuary will be made during two 12-hour periods (high and low freshwater inflow) during the year. It is expected that standard flow measuring techniques will be applicable for most reaches. Detection of opposing flows in the vertical and horizontal planes during times of tidal transition periods may require additional manpower for short time periods and sophisticated instrumentation, such as recording current meters or meters capable of sensing flow direction at depth.

4. Biology - Regional or WRD support is requested to assist with this work element design (exactly what to measure, where, and how often). The distribution of benthic invertebrates, particularly in the region of saltwater-freshwater mixing, should give an indication of biological response to flow changes if sampled on a monthly or quarterly basis. Another indicator of biological response is attached aquatic vegetation. Quarterly sampling at a number of sites along the estuary should suffice for this as well.

5. Inflow - Streamflow stations will be established at a point in each estuary just upstream of tidal influence.

6. RELATION TO LONG RANGE PLANS: In general, the products of this study will improve the ability to manage the water resources of the Alafia and Bullfrog Creek River basins. This study also coincides with elements of the Long Range Plan for the Southwest Florida Subdistrict, itemized as follows:

   1. Tidal data gathered in the estuaries will help define tidal-fluvial area flood-frequency relationships.
   2. Background information on the physical, chemical and biological characteristics of the estuaries will be available from this study on which to base assimilative capacity studies.
   3. Saltwater intrusion problems in the Floridan aquifer are similar to saltwater intrusion problems in estuaries whose natural freshwater inflow is reduced. Concern for one problem reflects an inherent concern for the other.

7. RELATION TO STATE AND WRD PROGRAMS: Results of the study have potential for application to other similar estuaries in the state and nation. The Survey has realized for several years that estuaries are an important element in water resource management and planning. The Alafia River and Bullfrog Creek estuary study directly fulfills a local management need and directly responds in an area identified for emphasis by the Survey.

8. STUDY BENEFITS: As a result of this study, the ability to properly manage estuaries will be improved, both locally and possibly countywide. Positive impacts could be felt in improved marine productivity leading to expanded sport and commercial fisheries ultimately improving this country's ability to produce protein, a commodity which may be in short supply in the future.

9. REPORTS:

   1. Progress Report including data October 1978
   2. A final report, "Impact of reduced freshwater inflow on the Alafia River and Bullfrog Creek estuaries, Florida" WRI, March 1980

10. TIME FRAME: September 1977 to March 1980

11. PERSONNEL:

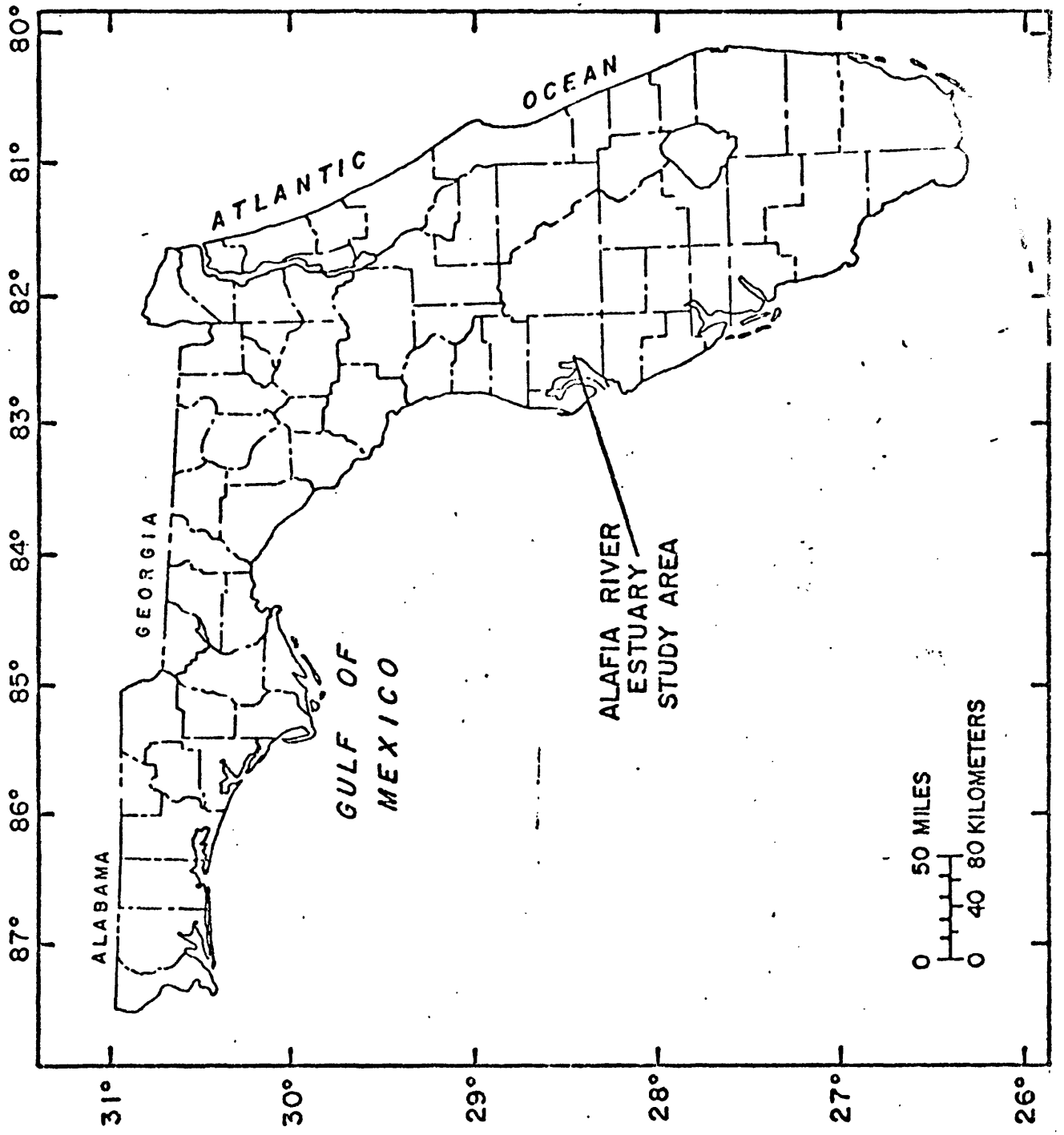
	Percent of Time
Hydrologist GS 13	20
Hydrologist GS 09	58
Technician GS 09	25
Technician GS 04	25

12. COSTS:

	1978	1979	1980
Tide stage	$4,000	$4,000	
Tide velocity	6,700	6,700	
Salinity	5,300	5,300	
Biology	8,000	8,000	
Streamflow	5,300	5,300	
Report	10,700	10,700	15,000
Total	$40,000	$40,000	$15,000

13. PREPARATION:

Carl R. Goodwin 7-13-77


ATLANTIC OCEAN
GEORGIA
ALABAMA
GULF OF MEXICO
ALAFIA RIVER ESTUARY STUDY AREA
0 50 MILES
0 40 80 KILOMETERS
80°
81°
82°
83°
84°
85°
86°
87°
31°
30°
29°
28°
27°
26°

PROJECT PROPOSAL
(cover sheet)

WRD Region:

District or Project Office:

Project Title:

Short Title:

Project Chief:

Proposal No._____

Initial☐ date_____

Revised☐ date_____

Project No._____

Begin date (mo & yr)_____

End date (mo & yr)_____

Research☐ Resources Appraisal☐

Source of funds:	Expenditures by fiscal year: Total	Direct
Fed☐ Coop☐ OFA☐	19__ _____	(_____)
Other☐ _____	19__ _____	(_____)
Cooperating Agency_____	19__ _____	(_____)
_____	19__ _____	(_____)
Customer No(s). _____	19__ _____	(_____)
_____	TOTAL _____	(_____)

Narrative--Attach descriptive statement using (but not limited to) the following heading

1.	Problem or need for study)	Include sufficient detial for technical and priority evaluation
2.	Objective)	
3.	Approach)	
4.	Report plans	Include types and anticipated dates of transmittal to Region
5.	Cost basis	Identify costs such as for project planning, data collection, laboratory analyses, test drilling, report preparation, district support, WOTSC, etc., or explain basis of total cost estimate
6.	Personnel requirements and availability	Identify disciplines, approximate grades, full or part time, etc. Highlight additional needs including consultants.

Location and size of area (attach map showing location):

Proposed by_____ _____19____

Endorsed by_____ _____19____

Approved by_____ _____19____

page 2.49 follows

EXAMPLE 2G

PROJECT PROPOSAL REVIEW

ROUTING SHEET

Proposal No.: Project Proposal No.:_____

Proposal Title:_____

Author/Project Chief:_____

This form is to be used for the routing of all project proposals before formal transmittal of the proposal to the cooperator or to the Region.

Section Chief Comments_____

_____ _____
(signature)

Date:_____ _____

Discipline Specialist Comments_____

_____ _____
(signature)

Date:_____ _____

Discipline Specialist Comments_____

_____ _____
(signature)

Date:_____ _____

Report Specialist Comments_____

_____ _____
(signature)

Date:_____ _____

Administrative Officer Comments_____

_____ _____
(signature)

Date:_____ _____

Assistant District Chief Comments_____

_____ _____
(signature)

Date:_____ _____

District Chief Comments_____

_____ _____
(signature)

Date:_____ _____

*Conference of above. Recommendation_____

Date:_____ _____

* Optional

page 2.52 follows

WRD
9-1686-B
975

PROJECT DESCRIPTION - PART B

Project no. ~~FL-17~~ FL-292 (78)

Revision date ___/___/___ (yr mo day)

9) Manpower narrative G◀ Manpower is available in the Southwest Florida Subdistrict to accomplish the investigation. A hydrology GS-13 is need 10% of the time, a project leader, hydrologist GS-9, 50% of the time and a hydrologic technician GS-9, 25% of the time. ▶

10) Type of project - Circle appropriate code (one only).

QA1 Research (QB1) Areal appraisal QB2 Collection basic records QC1 Administrative

(10a) (For MIS use only) Q◀ ▶

11) Field of study - Give percentage of project funds to be expended on each major category listed below. Select from *LIST C* as many fields of study as appropriate. Place codes in boxes.

General hydrology CE◀ 10 %▶ Surface water CB◀ 65 %▶ Ground water CC◀ %▶ Water quality CD◀ 25 %▶

C23 C26 C37 C86 C35 ◀ ________ ▶ Other (Specify)

List single most important code C◀ C23 ▶

WRD and COWWR categories - Select one category from *LIST D* and record code in box provided. Write title of item next to code in space provided.

K◀ P05 ▶ Coastal Waters (Name of category)

12a) (For MIS use only) K K

13) Index terms - Select up to 10 terms that categorize this project (the Water Resources Thesaurus may be used as a reference).

TM◀ estuaries, saline water - freshwater interfaces, currents, benthic invertebrates, submerged vegetation ▶

14) Use to be made of data acquired - Select from *LIST F* the primary and secondary uses to be made of the data acquired. Place codes in boxes.

V 16 ◀Primary▶ Protection and Conservation of Resource (Code / Use)

V 04 ◀Secondary▶ Fish and Wildlife Resources Management (Code / Use)

(14a) (For MIS use only) V◀ ▶

15) General remarks HR ◀

252

7

-WRD
9-1686-E
uly 1975

PROJECT DESCRIPTION - PART E

Project no FL 78-222
1 2 4 9

Revision date ___/___/___
yr mo day

(16) Location B1A ◀ TAMPA BAY, FLORIDA ▶

(17) Total area in square miles ZA ◀ 4 ▶

(18) Areal extent of project (circle only one)

U01	Project headquarters (21 & 22)	U05	Multicounty (19-22)	U08	WRC region (20)
(U03)	Site--less than county (19-22)	U06	Statewide (19)	U11	International (see instructions)
U04	Countywide (19 22)	U07	Multistate (19 22)		

For items 19 - 22 below, complete only those items that are indicated in the parentheses following the description of the U__ code that was circled in item 18

(1 or MIS use only) * 11

(circle only one descriptor) NEW 15 UPDATE 15

(19) State (s), with % of project in each

S	State	%
S	FL	100
S		
S		
S		
S		

11 13 22

(20) Hydrologic unit (s), with % of project in each WRC region

Region	Subregion	Accounting	Catalog	%
03				100

22

Region	Subregion	Accounting	Catalog	%

22

Region	Subregion	Accounting	Catalog	%

22

11 13

Congressional districts, with % of project in each

State	District	%
FL	07	100

11 13 22

State	District	%

11 13 22

State	District	%

11 13 22

State	District	%

11 13 22

(22) Counties within (or partially within) project area

State	County
FL	057

State	County

State	County

State	County

State	County

2.53

71

GS-WRD
rm 9-1686-G
v. July 1975

PROJECT DESCRIPTION - PART G

Project no. FL-78-292

Revision Date
GDATE ◀ [ ][ ]/[ ][ ]/[ ][ ] ▶
yr mo day

(23a) GFDATE ◀ [ ][ ] ▶
FY

(24) Progress and significant results PS ◀ NONE

(25) Plans for ~~next~~ this year PL ◀ Install tide gages at 2 to 3 stations in each tidal reach, collect monthly chloride samples to determine vertical and horizontal salinity distributions, measure tidal flow, measure freshwater inflow to estuary, collect benthic invertebrates.

(25a) Notice of project status (Circle one and give date) (Terminated) (Suspended) (Complete except report) (Completed) ◀ [ ][ ]/[ ][ ]/[ ][ ] ▶
yr mo day

REPORTS Planned reports that are now in process should be added to Section (27) and marked for deletion from Section (26). In the same manner, entries should be deleted from Section (27) and added to Section (28) once the reports have been published or released

(26) Planned

	Code	Year	Pages	
PLN 001 ◀	00	79	150	Progress report including data up to October 1978
PLN 002 ◀	00	80	175	Impact of Reduced Freshwater Inflow on the Alafia River and Bullfrog Creek Estuaries, Florida
PLN [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]	
PLN [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ][ ]	

(27) In Process

	Code	Year	Pages
REP [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]
REP [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]
REP [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ][ ]

(28) Published or Released

	Code	Year	Pages
BIB [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]
BIB [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]
BIB [ ][ ][ ] ◀	[ ][ ]	[ ][ ]	[ ][ ]

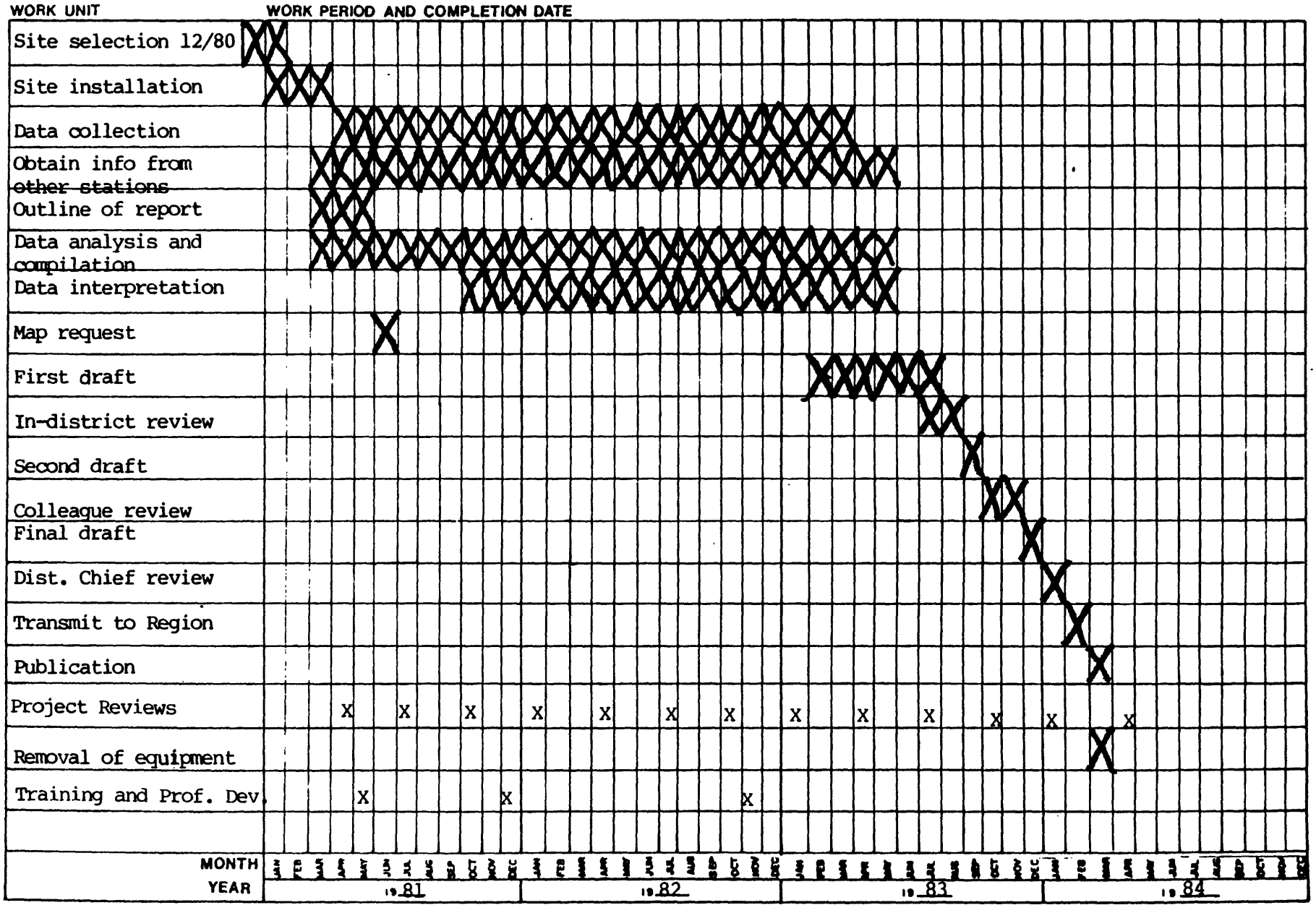
Work Elements	Responsibility	1977 Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1978 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1979 Jan.	Feb.	Mar.
Prepare Planning Document	Goetz	X			O																										
Reconnaissance of Study Area	Goetz/ Michaelis				XO																										
Select Gaging Stations	Michaelis/ Goetz				X	O																									
Select Biological Sampling Network	Goetz																														
Install Tide and Stream Gages	Michaelis						XO																								
Collection and Analysis of Tidal and Streamflow Data	Goodwin/ Goetz/ Michaelis							X																O							
Collection and Analysis of Biological Data	Goetz							X																O							
Collection and Analysis of Salinity Data	Goetz/ Michaelis							X																O							
Draft of Progress Report	Goetz											X	O																		
Review of Progress Report														X						O											
Publication of Progress Report																					X	O									
Draft of Final Report	Goetz																							X	O						
Review of Final Report																										X				O	
Publication of Final Report																														X	O

X = START
O = COMPLETE

2.55

13

PROJECT WORK SCHEDULE



REPORT OUTLINE (FL-292)

INTRODUCTION

A. Estuarine ecosystems

B. Water use

PREVIOUS STUDIES

A. Johnson, Lamar, 1963, A Basic Plan for Alafia River

B. Robertson, A. F., 1978, Flood profiles of the Alafia River

C. Coble, R. W., 1973, The Anclote and Pithlachascotee Rivers as water-supply sources

D. Ippen, Arthur T., 1966, Estuary and Coastline Hydrodynamics

PURPOSE AND SCOPE

A. Predict the physical change in the salt and freshwater mixing zone due to a reduction in freshwater inflow.

B. Predict biological changes associated with the changed position of the salt and freshwater mixing zone due to a reduction in freshwater inflow.

1. Benthic invertebrates

2. Attached aquatic vegetation

C. Description of the study area.

D. Begin and end dates of the study.

DATA COLLECTION

A. Physical data network

1. Tide gaging stations

2. Streamflow gaging stations

3. Chloride sampling stations

B. Biological data network

1. Benthic invertebrates

2. Attached vegetation

SELECTED REFERENCES

Coble, R. W., 1973, The Anclote and Pithlachascotee Rivers as water supply sources: U. S. Geol. Survey Map Series No. 61, Tallahassee, Florida.

Dyer, Keith R., 1973, Estuaries: A Physical Introduction: John Wiley & Sons, London.

Ippen, Arthur T., 1966, Estuary and Coastline Hydrodynamics: McGraw-Hill, New York.

Johnson, Lamar, 1963, A Basic Plan for Alafia River: Lamar Johnson, Consulting Engineer, Lake Wales, Florida.

Robertson, A. F., 1977, Flood profiles of the Alafia River, west-central Florida, computed by step-backwater method: U. S. Geol. Survey open-file report FL77-74, Washington.

ANNOTATED REPORT OUTLINE

Abstract
I. Introduction
    A. Purpose and scope of this report
    B. Geographic setting of the Texas Gulf Region
II. The challenge of meeting future water requirements
III. Ground-water reservoirs in the design of water-resources management and conservation plans
    A. Significance of ground-water resources in the regional water supply
        1. Geographic and geologic distribution of ground-water supply
        2. Quality of the ground water
        3. Quantities of ground water available for development
    B. Opportunities for meeting water requirements by fuller utilization of ground-water reservoirs
        1. Use of ground water as the primary or sole source of water supply
        2. Conjunctive use of ground water and surface water
        3. Artificial recharge
        4. Salvage of water for beneficial use
        5. Use of saline aquifers
            a. Saline aquifers as sources of treatable water
            b. Use of saline aquifers for liquid-waste disposal
            c. Use of saline aquifers for fresh-water storage
    C. Problems associated with ground-water development
        1. Declining water levels
        2. Depletion of streamflow
        3. Deterioration of water quality
        4. Subsidence of the land surface
        5. Salt-water intrusion
IV. Potential for obtaining electrical energy and fresh water from the geopressured reservoirs
V. Constraints associated with the development of ground-water resources and geothermal energy
    A. Water rights
    B. Technological problems
VI. Needs for additional studies of ground-water reservoirs
VII. Summary and conclusions
VIII. References cited

ANNOTATION

THESIS STATEMENT:

Ground water in the Texas Gulf Region is a large, manageable, and beneficially exploitable resource that can be used to provide a more significant percentage of the total water needs of the region. The subsurface reservoirs may be utilized not only as sources of fresh and treatable water, but as storage facilities for other fresh-water supplies, as receptacles for liquid-waste disposal, and as possible sources of geothermal energy.

Large-scale and uncontrolled ground-water pumping may result in such hydrologic and economic problems as declining water levels, streamflow depletion, or land-surface subsidence; while regional and controlled ground-water development is subject to legal and technological constraints. But because such vast amounts of water are economically available, the opportunities for expanded and conjunctive use of the ground-water resources should be thoroughly studied and carefully considered in any regional plans for water management and conservation.

I. INTRODUCTION

A. Purpose and Scope of This Report

To provide information to planners and managers on the unexploited potential of subsurface reservoirs as important elements of water-management and conservation plans.

To emphasize the importance of considering the ground-water and surface-water subsystems as inseparably related and coequal parts of a water-supply system as a whole.

The scope of the report is indicated by the "thesis statement."

B. Geographic Setting of the Texas Gulf Region (Figs. 1 and 2)

Location and areal extent, physiography, climate, and economic geography.

Figure 1.--Map showing geographic features of the Texas Gulf Region.
Figure 2.--Map showing average annual precipitation, streamflow, and net lake-surface evaporation.

STEPS FOR PLANNING A WATER RESOURCES MANAGEMENT PROJECT

1. Consider what is needed to define the hydrologic system

   Objective is a quantitative appraisal of the water resources considering their variability in time and in areal distribution. Seek answers to the questions when, where, how much, how move, how good, how change and why.

2. List the current water problems

   Include hydrologic, legal, economic, political, sociological, biological, recreational, etc.

3. List the problems that are likely to occur in the future as a result of planned or anticipated changes that will affect the hydrologic system

4. Consider investigation of alternative solutions to problems of 2 and 3 that will be compatible with the hydrologic system defined in 1

   This step should provide possible courses of action necessary to achieve optimum management of the water resources. It would inform the manager of the effects of different management decisions.

5. List the kinds of information, data and analyses that are necessary to pursue 1 through 4

   Obviously this list will describe the ultimate in investigational procedures - if we attempted to do all, we could never acquire the funds, time or manpower to do so. We must now consider scope.

6. Redevelop step 1 on the basis of what is known now

   Do not propose an intensive investigation. Plan to develop estimates as intelligent and educated guesses, qualified as necessary.

7. Select from 2 and 3 the most critical problems

   These problems are the ones that will have the biggest "payoff" in dollars and cents to the Federal Government and the local citizenry.

8. Prepare your report outline and plan your data collecting and analyzing with definite emphasis on providing solutions to the selected problems

   In writing the report, acquaint your reader with all problems but provide solutions for the selected ones only. Advise the reader as to the additional work required to solve the remaining problems but be certain that the current report shows the degree of gain over present knowledge.

page 2.63 follows

QUESTIONS TO ASK IN EVALUATING A PROJECT PROPOSAL

For Acceptability:

- What is relative priority of the project in District and in Region?
- What are Federal and State interests in project?
- Will the project cope with a facet of a major national need?
- Can the project contribute significant new information bearing on solving the problem?
- Will results of study have broad transfer value?
- Will data collection sites serve multiple needs?
- Could the study be considered to be in the site specific realm of the consultant?
- Do we have the capability for doing the work?
- Will this project conflict with projects or plans of other Federal or State agencies?
- What are the political concerns related to the project?

For Adequacy:

- What is the technical soundness of approach to project?
- Is the planning and controlling of a large and complex project being done in the easiest and most efficient manner (PERT, CPM, or MBO)?
- How much will it cost?
- How will it be financed?
- Is the need great enough to justify the cost?
- Are proposed funds adequate to accomplish all facets of study, including report and its review?

- What manpower will be needed?
- What experience and training are required?
- Is manpower available in District? In Region?
- How will the personnel ceiling effect the proposal?
- What kind of supervision will be needed?
- Could the study be conducted by manpower other than USGS? -- State agency, consultant, etc?
- Can the personnel needs be reduced by contracting, use of State Direct Services, etc?

PROJECT PLANNING QUESTIONS FOR PROJECT CHIEF

1. Is the hydrologic problem adequately stated and is it significant?
2. What prior work has been accomplished?
3. Have all known sources of pertinent data been thoroughly searched?
4. Have ALL pertinent studies and reports that have a bearing on the problem been collected, examined, and analyzed?
5. Are the objectives clear and will they contribute to the solution of the problem?
6. Are the objectives within the Survey's purview and competence?
7. Has a sound method of solving the problem been formulated?
8. Has a complete conceptual model of the hydrologic system been formulated?
9. What hydrologic data will be required?
10. Is the approach sufficiently detailed to understand exactly what will be done?
11. Will the approach meet the objectives? (can one get there from here?)
12. Is this the best way? Have alternatives been considered?
13. Is the planned staffing adequate?
14. Is the anticipated funding reaonable? Will it cover all work items spelled out in the approach?
15. Are the timing and scheduling realistic?
16. Are the planned products (reports) appropriate and adequate?

page 2.67 follows.

OBJECT CLASSIFICATION CODES

01	Permanent Salaries
04	Intermittent
05	Field Assistants
06	Temporary and Excepted
10	Overtime Pay
20	FICA Contributions
21	Retirement Contributions
22	Insurance Contributions
23	Health Benefits Contributions
41	Travel - Subsistence
43	Travel - Common Carrier
44	Rental of Passenger Vehicles
45	Travel - All Other
48	Rental of Trucks
49	Transportation of Things
50	Postage
51	Local Telephone Service
52	Long Distance Telephone Calls
53	ADP DATA Phone Rental, Telegrams, Cablegrams, Teletype, etc.
55	Utility Services
56	Rental of Equipment Other than ADP
57	Rental of ADP Equipment
59	Printing and Reproduction
60	Other Contractual Services
63	Drilling Contracts
70	Direct State Services
75	Supplies and Materials
80	Equipment

DISTRIBUTIVE OBJECT CLASSES

A2	Reimbursable Billings - Administrative
A3	Reimbursable Billings - Motor Vehicles
A4	Reimbursable Billings - Publications
A5	Reimbursable Billings - Computer Center
A8	Inter- and Intra-Division Billings
B1	Distribution Property Costs, Digital Recorders
B2	ADR Tape Processing
B5	Reimbursable Billings - Central Lab
C1	Bureau/Division Assessment
C9	Cost Center Distributions

PROJECT FINANCIAL PLANNING SHEET

PROJECT NAME _____ SECTION/UNIT _____

PROJECT NO. _____ DATE _____

COOPERATOR _____ COOPERATOR CONTACT PERSON _____

PROJECT CHIEF _____

GROSS FUNDS _____ USGS FUNDS _____

OTHER FUNDS _____

	OBJECT CLASS	FIRST	SECOND	THIRD	FOURTH	TOTAL
Salary (list by person/pp below)	01-23	4,500	5,280			9,780
Indirect	C9	3,697	2,303			6,000
Travel, transportation	41-49	2,100				2,100
Communications rents, utilities	50-57					
Services and supplies	A2,59..All.60-69 75.76.77					
Equipment	80,81,82	700				700
Vehicle	A3	960				960
Computer	A5		800			800
Lab (Central)	B5	1,500				1,500
Lab (District)	A9					
Direct State services	70					
Other						
WOTSC (9% Coop 13½% other Fed agencies)	C1	1,331	829			2,160
Total		14,788	9,212			24,000

PROJECT SALARY PLANNING SHEET

PROJECT NAME_____ SECTION_____
PROJECT NO._____ DATE + INI_____
PROJECT CHIEF_____ COOPERATORS_____

Name and grade	Est. Time	Salary Rate	Total
Professional and technical:			
Support and clerical:			
		Total salaries	

Remarks:

PROJECT LABORATORY PLANNING SHEET

PROJECT NAME_____ SECTION_____
PROJECT NUMBER_____ DATE + INI_____
PROJECT CHIEF_____ COOPERATORS_____
LABORATORIES USED_____

Type of analysis or constituent	Price per unit	No. of samples				Total	Total cost
		1st qt	2nd qt	3rd qt	4th qt		
Totals							

page 2.73 follows

U. S. GEOLOGICAL SURVEY
OHIO DISTRICT

HYDROLOGIC MONITORING OPERATIONS AND MAINTENANCE CHARGES
1981 FISCAL YEAR

		Costs	
1.	Regular gaging stations (GH & Q)	$ 4,300	(OFA $4500)
2.	Stage only gaging stations (GH only)	1,900	
3.	Six-month regular gaging station	2,200	
4.	Crest-state gage (Annual GH & Q)	2,130	
5.	Low flow site (Base, flow measurements and correlation)	400	
6.	Combined crest-stage and low flow site	2,400	
7.	Staff gage with rating to bank full in one year (Including installation)	2,500	
8.	Telemetering Data, BDT, or DARDC	200	
9.	Telemetering Data, Telemark and GOES w/o phone	450	
10.	Telemetering Data, Telemark and GOES w/phone	650	
11.	Recording rain gage	650	(OFA $680)
12.	Water-quality monitor (DO, SC, pH, Temp.)	9,500	
13.	Observation well, water level (recording)	900	
14.	Observation well, water quality sampling (1 sample)	300	
15.	Daily sediment station (sediment only)	10,000	
16.	Periodic sediment station (sediment only)	4,500	
17.	Miscellaneous sediment station (sed. only)	1,500	

Note: Costs include WOTSC and DOTSC

SERVICE CHARGES AND PER DIEM RATES

Service Charges - Percentage of total gross funds - 1980 FY:

(For administrative and planning use only)

Service Charges	Federal Program	Federal State	OFA	Interdivision
WOTSC =	9%	9%	14.5%	9%
DOTSC[1/] =	31%	31%	31%	31%
All Charges =	40%	40	45.5%	40%

1/ Common service. Percentage included for payment of building rents - GSA "SLUC" costs.

Computations for Planning Purposes.-- Determination of Total Gross Funds required when Subtotal (based on known net costs of all items):

Federal Program;
Federal-State; and = Sub-total - 0.60 = Total Gross
Interdivision

OFA - Sub-total - 0.545 = Total Gross

WOTSC SUMMARY
(Percentages of total Gross Funds - 1979 FY)
(For administrative and planning use only)

Type of Funding	Service		Director's Office		FMS Assessment for WOTSC
Federal Program	9%	+	0	=	9%
Federal-State	9%	+	0	=	9%
OFA	9%	+	5.5%	=	14.5%
Interdivision	9%	+	0	=	9%

Figure 17 (cont'd)

Per Diem Rate for Ohio and Area

Per Diem:

Reimbursement for official travel in per diem areas, shall be at a daily rate not in excess of $50.00/day. The per diem rate shall be established by determining average daily lodging costs and adding $23.00 for meals and miscellaneous subsistence expenses. All lodging receipts will have to be sumbitted to B.F.M. in Reston, Va.

Actual Subsistence Cities in Ohio:

Cleveland	$71.00
Toledo	$67.00

Actual Subsistence:

Reston, Va. (Washington, D.C.)	$75.00
Lakewood, Col. (Denver, Col.)	$67.00

Allowance for meals in actual subsistence areas is 45% of the actual subsistence.

Mileage:

Privately owned motorcycle:	20¢ per mile.
Privately owned automobile:	22-1/2¢ per mile.
Privately owned airplane:	45¢ per mile.
Use of privately owned automobile when government furnished vehicle is most advantageous:	16-1/2¢ per mile.

Effective date October 5, 1980. All travel authorizations to be updated by January 1, 1981.

Figur 7A

Fig)e 10

SUMMARY OF EMP 'EE COSTS

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UNITED STATES GEOLOGICAL SURVEY - WATER RESOURCES DIVISION 80/10/02

SUMMARY OF EMPLOYEE COSTS TO DISTRICT

EMPLOYEE NAME	FICA NUMBER	EMPLOYEE NUMBER	GRADE	STEP	TYPE OF APPOINTMENT	LATEST UPDATE
PALCSAK HJ		2071	4	1	P64	80/07/01

HOURLY WAGE	HEALTH PLAN NUMBER	HEALTH PLAN COST	LIFE INSURANCE COST	RETIREMENT COST	TOTAL COST TO DISTRICT HOURLY	TOTAL COST TO DISTRICT YEARLY	
4.83	101	.16	.04	.34	5.37	8,935.68	YEARLY COST BASED ON 1664 HOURS

EMPLOYEE NAME	FICA NUMBER	EMPLOYEE NUMBER	GRADE	STEP	TYPE OF APPOINTMENT	LATEST UPDATE
PFAFF CL		2061	7	3	WAE	80/07/01

HOURLY WAGE	HEALTH PLAN NUMBER	HEALTH PLAN COST	LIFE INSURANCE COST	RETIREMENT COST	TOTAL COST TO DISTRICT HOURLY	TOTAL COST TO DISTRICT YEARLY	
7.14		.00	.00	.50	7.64	13,935.36	YEARLY COST BASED ON 1824 HOURS

EMPLOYEE NAME	FICA NUMBER	EMPLOYEE NUMBER	GRADE	STEP	TYPE OF APPOINTMENT	LATEST UPDATE
RAZEM AC		2037	11	2	FTA	80/07/01

HOURLY WAGE	HEALTH PLAN NUMBER	HEALTH PLAN COST	LIFE INSURANCE COST	RETIREMENT COST	TOTAL COST TO DISTRICT HOURLY	TOTAL COST TO DISTRICT YEARLY	
10.24	462	.38	.08	.72	11.42	23,753.60	YEARLY COST BASED ON 2080 HOURS

EMPLOYEE NAME	FICA NUMBER	EMPLOYEE NUMBER	GRADE	STEP	TYPE OF APPOINTMENT	LATEST UPDATE
ROBBINS ME		2020	1	1	HFA	80/07/01

HOURLY WAGE	HEALTH PLAN NUMBER	HEALTH PLAN COST	LIFE INSURANCE COST	RETIREMENT COST	TOTAL COST TO DISTRICT HOURLY	TOTAL COST TO DISTRICT YEARLY	
3.47		.00	.00	.21	3.68	3,827.20	YEARLY COST BASED ON 1040 HOURS

EMPLOYEE NAME	FICA NUMBER	EMPLOYEE NUMBER	GRADE	STEP	TYPE OF APPOINTMENT	LATEST UPDATE
ROBERTS JW		2058	7	1	P64	80/08/23

HOURLY WAGE	HEALTH PLAN NUMBER	HEALTH PLAN COST	LIFE INSURANCE COST	RETIREMENT COST	TOTAL COST TO DISTRICT HOURLY	TOTAL COST TO DISTRICT YEARLY	
6.69	105	.22	.00	.47	7.38	12,280.32	YEARLY COST BASED ON 1664 HOURS

cumb to the temptation to make the job more attractive to the cooperator by cutting costs to the bone.

Financing must be at a level adequate for achieving stated goals. Continuing surveillance of progress by the district chief is required so that the cooperator can be advised if the original goals are within budget constraints. If financing is a basic problem to successful completion, efforts should be made immediately to revise either the objective or the budget level. Symptoms of an underfunded project are frequent cost overruns, slippage of completion date, and substandard technical report.

Meets Objectives

It goes without saying that the ideal project is completed on schedule, is technically acceptable, and meets the stated objectives. The project should produce reports that reach and are understood by the intended audience.

Is the "ideal" project attainable? Emphatically yes, with proper attention to the details that go into planning, supervision, and report management.

PROJECT PLANNING

There are no hard and fast rules for planning a project. Many planning details depend on the uniqueness or difficulty of the job and the experience available within the district from similar projects. If the project under consideration is a county study adjacent to a just-completed county, the planning phase may be a relatively simple modification of the earlier study, provided the earlier experience was successful and documented. Documentation is a requirement for adequate management and will be discussed under Supervision.

Project planning usually begins when the project proposal is prepared for the cooperator. The proposal should list specific objectives, point out the hydrologic complexities in the area, and list the major water-related problems. The district should obtain assistance from the Regional office, research projects, or other districts for review of these proposals.

Planning Report

Many districts prepare a pre-project planning report before any field work is started. Some districts prepare the report as a separate project while others put aside the first 3 to 6 months of the project to prepare a planning report. A planning report is highly recommended for projects that have had no predecessor in the district, and for those that are above average in difficulty.

The basic planning report should include (as a minimum) a clear statement of objectives, the proposed approach, a conceptual hydrologic description, data available, data needs, work schedule, report plans, and references. The report should receive a detailed review by the cooperator, Regional office, and in some cases Division staff members. Some districts have had success in using a brainstorming technique to prepare parts of the report. For example, a group of hydrologists with diverse interests and background is assembled. They express the possible objectives, approaches, and project priorities. The cost of a project planning report ranges from $3,000 to $8,000 and commonly requires one week to three months to complete.

The North Dakota district recently prepared such a report. Projects that had been routinely requested by the cooperator were the traditional county ground-water reconnaissance studies. Then, the Corps of Engineers came up with plans for a reservoir on the Sheyenne River overlying an important aquifer. The question the Corps asked was what effects the reservoir would have on the local and regional ground-water environment. A secondary question was what would be the effects of the proposed reservoir on nearby seeps and springs.

The district office developed a planning report to prepare for this project. It included the following: introduction, purpose of study, hydrogeology, method of study, available data, data needs, estimated costs, work schedule, selected references, a map showing the location of study area and a hydrogeologic section.

After the report was initially drafted, a meeting was held in Denver involving representatives of the Bismarck office, the Regional staff, and two consultants from the Arkansas district who were chosen because of their experience with a similar problem. The original work plan was then modified on the basis of advice and recommendations obtained at this meeting. The revised work plan served as the basis for preparing (and became a part of) the formal project proposal. About three months elapsed between the inception of the project and its approval. The time could have been shortened considerably, if necessary.

Planning major projects in New Mexico is done in a slightly different way. The method used is a pre-project project. The purpose of this project is specifically for planning. The project chief is assigned the job of assessing the problem, the hydrologic situation, developing the conceptual model, reviewing the literature and the state of the art, assessing the data base, determining data needs, and preparing a work plan. The end product is a highly detailed project proposal that serves as the basis of the agreement with the cooperator as to costs, approach, duration of study, and type of report. The detailed project proposal is abstracted for and becomes a part of the formal project proposal. Such an approach costs in the neighborhood of $6,000 to $12,000, and is money well spent when the final project may cost in the $300,000 to $900,000 range. Moreover, cost overruns from inadequately planned projects may consume several times the cost of detailed planning.

Technical Assistance

The North Dakota district's project report was substantially changed and improved because of consulting assistance provided by the Regional office and by the Arkansas district. Much of the cost of the assistance was paid from the Region's consulting fund. Districts should make use of these funds to review project plans during the formulation stage.

Project personnel should enlist the aid of other district personnel, the Branches, and research spe-

cialists, in the design of quantitative studies. Where predictive models are contemplated the Analog Model Unit, the Hydrologic Systems Laboratory Group, or a similar research group should be consulted for technical advice beginning with the project planning. Where technical expertise in the project needs bolstering, consultations or short assignments by appropriate individuals should be sought. Such needs should be identified during the project planning phase.

Identification of Specific Objectives

The definition of specific project objectives is probably the most important part of planning. It is recommended that a list be prepared of desirable objectives, then select those objectives that are practical to achieve. Finally, the objectives should be balanced with the need for information in the study area. The selection of goals should be based on an awareness of the complexity of hydrologic and water-supply problems. The most critical unknowns should be tackled first. The limits of the project area, the information needed, and the type of report should be established during the first few weeks of the project.

Documentation of Project

The preparation of a formal project description should be made by the project chief. There are times when the project chief is not on board or selected at the time the project is conceived. Ideally, he should be a part of the planning team, but if not, he should be given the opportunity to review, modify, and otherwise imprint the project with his own personal touch. The preparation of project documents as an administrative chore, remote from the project chief, is strongly discouraged. These documents should be used to prepare the work plan and budget.

PROJECT SUPERVISION

The ideal project is now underway and its plan becomes a management tool. The following is a list of general guidelines for the supervision of projects. It includes guidelines for the project chief and district supervisors.

Work Plan

A detailed work plan containing a list of the major items of project work, completion dates, manpower requirements, and expenses should be prepared by the project chief during the first part of the project (1 to 3 months). It is prepared after the needs for data, research support, and special studies have been defined. The work effort should first be subdivided into logical units with realistic completion dates for each. An example of a project work plan is shown in figure 1. The work plan should include a listing of maps, tables, and other items to be generated by the project.

No.	Work unit	Description of work unit	Completion date	Manpower required	Expenses
1.	Project description				
2.	Preliminary report				
3.	Project work plan				
4.	Draft of introduction and objectives for final product				
5.	Base map of study area				
6.	Collation of previous data				
7.	Construction or installation of instruments				
8.	Data collection				
9.	Data processing				
10.	Basic data report				
11.	Data analysis				
12.	Topical outline of final report				
13.	Illustrations and tables				
14.	Draft of report				

Figure 1.--Example of project work plan.

Project	Report	1 Project description	2 Preliminary report	3 Work plan	4 Draft	5 Base map	6 Collation	7 Construction	8 Data collection	9 Data processing	10 Data report	11 Data analysis	12 Outline	13 Illustrations	14 ft of report
Statewide															
Lakes & reservoirs															
Mine drainage	Circ.														
Small watersheds	Open file														
Urban	Open file														
High Plains	HA														
	WSP														
	Circ.														
Mtn Parks	Open file														
Missouri Basin	HA														

Figure 2.--District project progress chart.

Project Control

The project chief should be required to give an oral or written progress report to his supervisor on a regular schedule. Some districts require a report on progress and plans each month. One very useful method of keeping track of progress is to prepare a project progress chart. Actual progress is charted against the listed completion date shown on the work plan. The chart serves two purposes, it provides a visual display of progress and gives an early warning of schedule slippage. Another use of the chart is to provide a basis for estimating cost and time requirements for future projects. An example of a district project progress chart is given in figure 2. A recommended alternative chart would be the same items of work as those in item 29, Part D, of the project description.

Reconnaissance Phase

Reconnaissance work during early phases of project should identify variability of hydrologic systems, data availability, and the principal controls on the occurrence and movement of water. Reconnaissance information should be used to update project work plans, guiding intensity and distribution of field effort to define the significant unknowns.

Technical Quality Control

A systematic technical review schedule is an essential element of effective project management. It is the responsibility of the supervisor to review the technical aspects of the project frequently. The review should consider the progress, plans, and resolution of objectives. If needed, the work plan should be revised and work effort and goals rescheduled.

You've no doubt heard of the district chief who gave a project leader his assignment like this: "Here's your project--now don't let me see you again for three years." It probably never happened, but there are indications of infrequent or irregular internal project reviews within the district. Effective management requires close contact with the project staff. This contact consists mainly of periodic and regular technical reviews. A team approach to review has merit, particularly if the problem is interdisciplinary.

Review at three- to six-month intervals, especially during the first year, is an effective way to sense problems, progress, and to utilize decision points if changes appear to be in order. Such reviews may be a part of regular staff meetings, or at district technical seminar sessions. These reviews not only provide technical guidance, but identify the amount of time

being expended on each part of the project. Some project chiefs frequently expend too much effort on that phase of the project where they personally have the greatest interest or expertise.

The supervisor should also visit the field. There is no substitute for his understanding the field problems. The district chief should seek outside assistance from the Region, the Branches, research, or outside the Survey to assist in technical review. Outside help is especially needed on projects that are a new approach for the district.

Oral Presentation

The project personnal should be encouraged to present talks to cooperators, technical societies, and community groups. The advantages gained from this are many. For example, it provides good public relations for the district, should improve the report, and may result in expansion or change in project objectives.

Professional Environment

It is the basic responsibility of the district chief to provide a productive environment for the employee. Key points here are the opportunity for the project personnel to take an active part in project planning, to freely exercise imagination in obtaining, interpreting, and presenting results, and to communicate freely on technical problems with peers in other projects, districts, and agencies. Stated in a slightly different way, project personnel should be given opportunity for professional growth through assigned responsibility rather than through a tightly restricted set of duties.

Project personnel should be made aware of their responsibilities by frequent consultations with the supervisor, continuing review of project progress by district officials results in commendations, where warranted. Project personnel should be surrounded by an attitude that stresses getting the job done.

REPORT MANAGEMENT

Report management is a subject that should receive separate treatment all its own, however, reports cannot be separated or ignored in project planning or supervision. Reports can be improved by giving more attention to colleague review, making them less stereotyped, releasing them more rapidly, and preparing more reports related to the water user. The following is a list of a few guidelines for improving and better management of reports.

Report Planning

Report planning is continuing process. Some suggestions for planning reports are as follows. A preliminary report should be prepared during the first 10 percent of project life which outlines main hydrologic features of study area (using data available), suggests work needed to eliminate deficiencies, and analytical techniques to be applied. A series of short internal reports covering successive phases of project work are valuable for training in report writing, and can be composited for the final report.

Report preparation should never be handled as a chore to be done just before the project is concluded. Work on the outline and parts of the final report should be done in steps as field work reaches identifiable conclusions throughout the life of the project.

The project chief should submit the first draft of the report not later than six months before the end of the project. Frequently, project schedules allow report preparation to continue up to the time the project money runs out. This almost inevitable leads to cost overruns and delays. The project leader should identify the audience for the report and kind of publication early in the report planning.

Report Outline

The project chief should prepare a report outline, table of contents, and list of illustrations in the first three months of the project. He should refine this outline as necessary based on information obtained during the progress of the study. The report outline should be accompanied by a "thesis statement" that lists purpose and scope.

The plan of study and report outline should be furnished to the district reports specialist to serve as his guide in ordering base-map material, anticipating typing, review, and other reports processing requirements.

Report Review

Ideally, the report should receive two reviews within the district and two outside. The Region will help in the selection of reviewers in other Regions and in research projects. The district should develop a routine for checking tables, illustrations, and text. Some districts have used an internal routing sheet to assist in quality control of manuscripts (see fig. 3).

The author must give review and revisions of his reports top priority over other tasks or interests. This is sometimes easier said than done, especially if the cooperator has what he needs out of the investigation and has little interest in the final report. But, there is a Federal obligation that must be fulfilled, and abandonment or excessive delays in the report jeopardize or void that obligation.

Author(s):	Project No.
Title:	No. pages (incl. tables)
	No. illustrations
Type of Report (WSP, HA, Circ. etc.)	No. tables

Signature	Date in	Date out	Hours spent	Sections reviewed	Purpose and scope of report is clear	Purpose and scope compat. with coop. commit.	Sound hydrologic theory employed	Interpretation valid and complete	Work items were independently checked	Check computations	Illus. complete, correct	Summary covers only material in text	Conclus. supported clearly by info/text	References complete and properly shown	Tables, illus., text cross-checked	Acknowledgments	Enter next routing here

Figure 3.--Intraoffice manuscript routing sheet.

CONCLUSION

The goal for new projects should be to develop studies and present results that give planners the data and analyses they need to make intelligent decisions. More attention to planning and management using the guidelines given in this paper will result in more successful and meaningful projects. The elements that should be emphasized in planning and supervising projects are:

1. Allowance for unforseen problems.
2. Early identification of specific project objectives.
3. Provide adequate funding.
4. Call for technical assistance.
5. Establishment and adherence to deadlines for various phases.
6. Early identification of audience for report.
7. Realistic goals and schedules.
8. Periodic review of progress.
9. Establish a productive working environment for employees.
10. Provide for technical quality control.

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JOHN E. MOORE

HUGH H. HUDSON

Class Exercise in Project Planning

The objective of this exercise is to provide the Project Chief with the opportunity to review and to apply guidelines for improving the planning of projects. Acting as a Project Chief you will do the following:

- o Listen to a District Chief and his principal State Cooperator discuss plans for next year's program, with the Cooperator proposing a new study and the District Chief giving the background and constraints for the study.
- o Prepare a Project Proposal from the information supplied by District Chief and Cooperator, using course guidelines and staff assistance.
- o Present your project proposal to District Chief, Cooperator, and review group for analysis.
- o Join in discussion of project planning problems and solutions.

1. Background

   Most WRD District projects are initialed when a water problem emerges and appears critical enough to consider funding a study to obtain factual data which may contribute to a solution. However, in States having comprehensive water resources plans, which consider demands on the water resource, land and water issues, and management strategies, projects can be planned before problems become critical.

- Who initiates study? State, County, City, Water Management District, Federal agency cooperator
- Who does study? USGS, State, District, Consultant, or others.
- What is given? Background, problems, hydrologic setting, objectives, scope, available information and limitations of funds and time.
- What is needed? A concise, sound, and systematic plan (proposal) which meets the key purpose of the project within the planned time.

Preparation for Role Playing

- The workshop attendees (you) will be divided into project teams which will receive planning information from their District Chief and a Cooperator. Each team will be assigned a conference room.
- Each project team will select a Project Chief to lead planning efforts. A Recorder is recommended.

- Each Team will prepare a brief project proposal based on information given by a Cooperator and a District Chief. You may refer to guidelines to planning given in notebook. We hope to have use of copy equipment to make transparencies of your proposal for overhead projection. Such transparencies will facilitate your later presentation to the review group.

- Each Project Chief, representing his planning team, will present (sell) the Project Proposal to the District Chief, Cooperator, and a group of peer reviewers.

- Notebook References:

  Preliminary Planning.....

  Elements of a Project Proposal.....

  Types of Project Proposals.....

  Project Design.....

  Planning Project Costs.....

- Staff Advisors:

  Staff members will be available in the workshop room to given assistance and suggestions on the following facets of your proposal:

  Objective and Scope.....

  Approach.....

  Work Plan.....

  Report Plan.....

  Estimating Costs.....

  Manpower.....

Role Playing Dialogue

Your District Chief meets with his principal State Cooperator to discuss plans for next year's Fed-Coop program. Essential items they discussed are as follows:

Cooperator: He is especially anxious to have the USGS study the effects of rapidly expanding irrigation on the water resources of the Mooresville area of Newcomb County. He has received appeals from the Commissioner of Agriculture, the Administrator of the Environmental Protection Division of the DNR, and from State Senator Hillier to resolve problems of water supply, water quality, and conflicts of interest.

- City officials of Mooresville have fears about irrigation pumpage lowering water levels and altering quality of water of city wells located about one mile west of western edge of irrigation area.
- However, both farms and city businessmen consider irrigation growth to be important to economic development of area.
- Rapidly expanding agricultural irrigation (supplemental) from wells is lowering water levels in nearby domestic wells in eastern Newcomb County.
- EPA has concern for ground-water supplies and the quality of water in streams.
- State DNR has concern that pumpage for irrigation will reduce flow of streams until they will be inadequate to receive treated waste water from Mooresville Treatment plant.

- o Clearing and leveling of land for irrigation is believed to effect runoff of Trout Creek, accelerate erosion, and add to flooding concern of nearby Mooresville.

- o Fishermen and environmentalists are concerned about effects of irrigation pumping and uses of fertilizers, insecticides, and herbicides.

Although the Cooperator did not indicate which of the problems he considered to be highest priority to resolve, he did state that the DNR must protect the quality and quantity of the municipal water supply, will encourage the growth of irrigated farming, and desires free flowing and good quality water in the streams.

District Chief: He presented a map of Newcomb County and discussed briefly the current knowledge of the hydrologic and geologic setting. This information, shown on figure ~ was obtained during a 1970 reconnaissance study of the Water Resources of Newcomb County. More recent data on streamflow, surface water quality, pumpage of city wells, and water levels of city wells and a few rural wells are in open-file in the District.

A District team of Technical Specialists will have to review and assess all available data. They will prepare a plan to obtain additional data necessary to meet preliminary study objectives (yet to be determined).

Cooperator: He agrees to this approach and requests the District to plan a study of the effects of rapidly expanding agricultural irrigation in Newcomb County on the water supply of Mooresville, on the quality and flow of Grover River, and on the other concerns he listed previously. He wants the study to start this calendar year. He would like a preliminary report within six

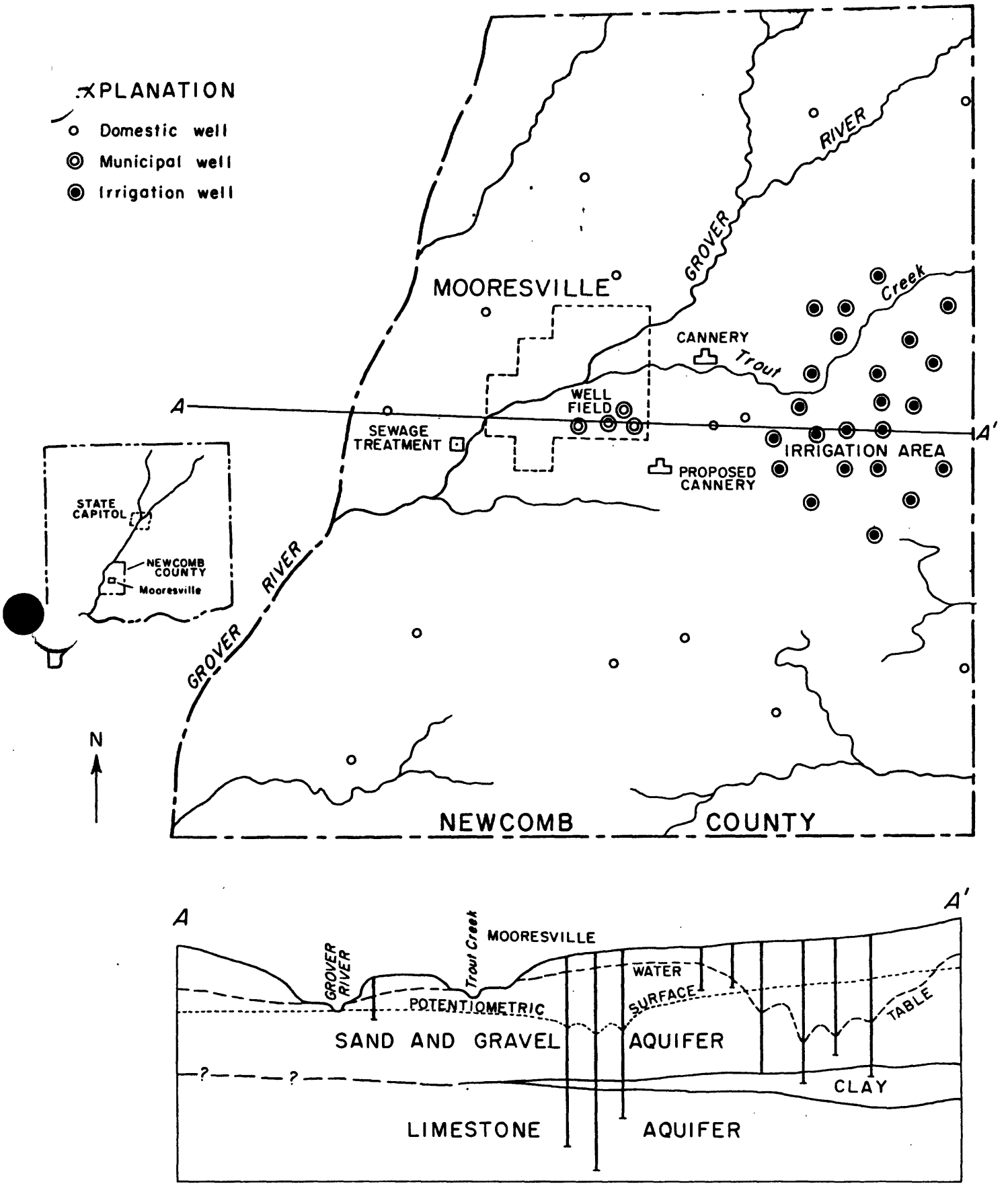
months to guide him in making early management decisions. He wants an approved report no later than 26 months after start of project.

District Chief: He could not have a study team available for the project until several months after the first of the year when another project will be completed.

The 26 months proposed for the study does not allow enough time to collect data pertaining to all the problems discussed by the cooperator. If the completion date is critical to the cooperative agency, the scope of the study would have to entail only those goals which can be reached within the critical time period. The costs of the study cannot be estimated for the cooperator until the District receives a proposed plan of study from the study team.

Cooperator: He believes he can find $60,000 for the State share of the entire study - plus the services of a State-owned drilling rig for 5 months. If State Senator Hillier gets his Bill passed, an additional $50,000 could be made available for the study, if shown to be warranted by the Proposal.

District Chief: The objectives and scope of the proposed study will be influenced by the time available for the study, the manpower available, and the funds available. The Project Chief and his Team will consider each of these matters when preparing a Project Proposal for our review.


EXPLANATION
Domestic well
Municipal well
Irrigation well
MOORESVILLE
GROVER RIVER
Trout Creek
CANNERY
WELL FIELD
SEWAGE TREATMENT
PROPOSED CANNERY
IRRIGATION AREA
A
A'
STATE CAPITOL
NEWCOMB COUNTY
Mooresville
GROVER RIVER
N
NEWCOMB COUNTY
A
A'
GROVER RIVER
Trout Creek
MOORESVILLE
WATER TABLE
POTENTIOMETRIC SURFACE
SAND AND GRAVEL AQUIFER
CLAY
LIMESTONE AQUIFER

3. PROJECT MANAGEMENT

How to Manage a Project

Management by objectives (MBO) is a standard management technique used in government and the private sector. If used properly, MBO can help new and experienced managers to define in advance the objectives to be achieved, and it provides a means to check progress. MBO is a simple and effective approach to management.

1. Steps in project management

- o Set up project management file
- o Finalize plan of action
- o Monitor project and report progress
- o Monitor manpower and costs
- o Make "midcourse correction"

2. Definition of Management

- o Management may be defined as establishing objectives and achieving those objectives with existing people, time, money, and equipment.

3. Functions of Management

- o Recognize problems in time to correct them.
- o Adapt plans or systems to accommodate changing conditions.
- o Direct and monitor performance of subordinates.

4. Need for MBO

- o In the past, many of our projects were run on a trial-and-error basis, and management was haphazard. As a result, many projects were technical failures or were completed long after the funds were exhausted, and consequently, the reports were poor or overdue.

5. Provisions of MBO - MBO defines and documents:

- o What must be done.
- o How and when it must be done.
- o What it will cost.
- o What constitutes satisfactory performance.
- o Documents progress.
- o When corrective action should be taken.
- o MBO requires detailed planning of work elements and costs.

6. MBO Project Management File

- o One of the requirements of MBO is to establish a project management file that contains the documents needed to monitor the progress of projects and reports (see heading "Project Management File").
- o A major element of the management file is a work plan which includes a complete list of milestones (examples 3A, 3B).

7. MBO Project Review

- o An essential element of the MBO system is a quarterly progress report, both written and oral (example 3D).
- o Items to be covered are progress, findings, difficulties and proposed solutions, status, and plans for next quarter.
- o Progress chart is needed for all District projects (example 3D).

8. Value of MBO

- o Defines objectives.
- o Requires a work plan and detailed cost assessment.
- o Produces a realistic schedule that enable timely completion of stated objectives.

- Defines responsibilities of employee.
- Focuses on key problems and priorities.
- Avoids crises and delays.
- Sets performance standards.
- Enables accurate performance evaluation.
- Facilitates project monitoring and progress evaluation.

Project Management File

The project management file, which should be established at the start of the project, sets up the project milestones (see examples 3A, 3B) to monitor the progress of the project and report. The contents of the file are itemized below.

1. Contents of project file

   - o Project proposal and description (example 2E, 2H)
   - o Work plan (example 3C)
   - o Financial plan (example 2P)
   - o Report outline and annotated outline (examples 2J, 2K)
   - o List of illustrations
   - o Routing sheet
   - o Report draft
   - o Quarterly review summaries (example 3D)

2. Guidelines for management of a project:

   - o Milestones set by project chief
   - o Literature search
   - o Preliminary project report (example 3E)

- Outline of report prepared 6 weeks after Regional approval of project.
- Project reviewed and updated quarterly.

FINANCIAL MANAGEMENT OF PROJECT

Sound financial management of a project is an integral part of good project management and without it there is very little chance of success in meeting project objectives. Project control reaches maximum effectiveness when the Project Chiefs, Section Chiefs, Subdistrict Chiefs, and/or District Chiefs have a reliable way to monitor and control project funding.

Basic to sound financial management is a well conceived and thoroughly documented financial plan and an interactive accounting system. This section discusses management of project finances and the usefulness of the financial plan and accounting system in project management.

1. Project Financial Plan

   - Forms the basis of financial management of a project.
   - Initially completed in development of project proposal (see section 2).
   - Refined and modified after project approval, funding secured, and detailed work plan has been prepared.
   - Developed directly from the project proposal and work plan.
   - Costs determined on at least a quarterly basis.
   - Some projects monthly cost determinations are desirable.
   - Used as input to interactive accounting system.
   - Review in detail by Project Chief, Section Chief, Administrative Officer and either Subdistrict, Assistant and/or District Chief quarterly.
   - Project Chief should review on a monthly basis.
   - Is discussed in detail during quarterly project reviews.

2. Interactive Accounting System

- ° Must keep track of expenditures on a continuous basis.
- ° Must be accurate and timely.
- ° Must be understandable by the non-accountant
- ° Must break expenditures down by object class.
- ° Must be able to compare actual and estimated expenditures.
- ° Desirable elements of an interactive accounting system:
  - Summary and source of funding for project.
  - Object class register for estimated expenditures.
  - Object class register for actual expenditures or obligations.
  - Comparison between estimated and actual project expenditures.
  - Service report by project.
  - Manpower comparisons between estimated and actual manpower usage.
  - Graph of estimated and actual project expenditures.
- ° Above elements should be given to and reviewed by the Project Chief on a monthly basis.
- ° Detailed review of above elements by Project Chief, Administrative Officer, Section Chief, and Subdistrict, Assistant, and/or District Chief on a quarterly basis.
- ° Changes or "mid-course corrections," should they be necessary, can be made during these quarterly reviews.
- ° The Financial Management system (FMS) of the Geological Survey can be used at the interactive accounting system.
- ° The FMS does not contain all of the desired elements but it is adequate for financial management of projects.

° District-developed, controlled, and run systems can be used in conjunction with or separate from the FMS as an interactive accounting system.

° District systems may be more useful in financial management of projects for several reasons:

- District has direct and immediate control over the system.
- Can be kept current easier.
- Is generally more accurate.
- Can be updated on a daily basis.
- Designed to meet specific needs of the District.
- Can easily be modified.

° District system requires considerable in-District computer capability; whereas, FMS is run at the headquarters level.

° District Administrative Unit should manage whatever interactive accounting system is used and supply project chiefs and managers accurate and timely financial-management documents.

Review of Project

Periodic reviews are a vital element of any project management system and are an important activity in the Region and the District. Both written and oral reports on progress are needed on at least a quarterly basis as stated in "How to Manage a Project." These quarterly reviews are scheduled individually. However, other opportunities for review are possible at staff meetings, technical seminars, and briefings for the cooperator. Functions of the District and Region reviews are outlined below:

District Review

1. District reviewers examine individual projects to identify technical weakness, training needs and performance, and financial status.
   - o District reviews may be done on an occasional basis or at regular intervals, but each review should contain a written progress report and financial summary.

2. Items to be Covered in District Review - The District review should include, but need not be restricted to, the following items (example 3D):

   - o Progress
   - o Resolution of problems
   - o Report status
   - o Financial status
   - o Future plans

3. Advantages of District Review

   - o Technical quality control
   - o Guidance to Project Chief
   - o Identification cf problems (people, coordination, funds, and delays)
   - o Education of District Management
   - o Improvement of moral

Regional Review

1. Review by the Region is the early step in any project - The Regional review, which begins with an assessment of all current projects in the Region and an identification of priorities, continues throughout the duration of the project.

   o Regional review topics

   - Preliminary project proposal
   - Project proposal
   - MIS (Management Information System) project description and part G (progress)
   - Annual District program plan
   - Discipline reviews
   - District program meetings
   - Review by staff advisor to the project
   - Reports evaluation

2. Items to be Covered in Regional Review - The Regional review should include, as a minimum, the following items:

   o Goals

   o Progress

   o Accomplishments

- o Budget
- o Manpower
- o Problems
- o Plans

3. Objectives of Regional Review - Regional reviews, which are different from the District review, take in a broader perspective and serve to:
   - o Suggest ways to maintain and improve adequacy and acceptability of project.
   - o Anticipate training and manpower needs
   - o Encourage use of good management practices
   - o Provide support at request of District
   - o Provide technical quality control

Problem Solving

Quick decisions sometimes can be costly because of the action taken by people involved and the finances. A systematic and reasoned approach is needed wherever the issue is complex, or the result could have serious consequences. Decision analysis, which is a procedure for analyzing problems, can be used to solve some projects problems quantitatively. Decision analysis enables one to evaluate the accuracy of a choice and determine the consequences of each step to the final decision. It helps assure that a given decision is the best one possible from the available information. It also helps verify that the data upon which the decision is based are adequate. Steps involved in decison analysis are shown as follows:

1. Prepare Decision Statement
    - o State problem or need
    - o List objectives
    - o List resources and constraints

2. Classify Objectives

   - o Identify essential objectives
   - o Identify desirable objectives

3. List Alternatives

   - o Develop alternative courses of action
   - o Compare these against objectives to assess effectiveness

4. List Potential Consequences of Each

   - o Include probability
   - o Evaluate importance of each

5. Make Final Choice

   - o Consult others
   - o Document reasons for decision

6. Reference

Kepner-Tregoe, 1965, The Rational Manager--A systematic approach to problem solving: McGraw Hill

Non-Ideal Project

In spite of good planning and supervision, a few projects will not meet the original schedule and objectives. These projects are known as "non-ideal projects." This section presents a procedure to analyze the cause of failure and to serve as a guide to avoid future problems. Frequent problems and pitfalls are identified and suggestions on how to avoid or correct them are given.

1. Characteristics of Non-Ideal Project

   - o Project exceeds budget
   - o Project is not completed on time
   - o Report is late
   - o Report is technically weak or misses objectives and is rejected by the Region or by Headquarters.

2. Causes of Non-Ideal Projects

   - o Unclear objectives
   - o Inadequate planning
   - o Unreasonable goals
   - o Inadequate supervision

- o Over-optimistic scheduling or budget
- o Inadequate quality control
- o Failure to allow for unforeseen problems
- o Digression (modification of objectives)
- o Failure to take advantage of technical capabilities of colleagues and outside help
- o Diversion to other tasks
- o Delays in outside services
- o Changes in project staff
- o Technical roadblocks
- o Funding cuts
- o Lack of working hypothesis

3. Solutions

- o Request assistance
- o Discuss problem with cooperator and other key people
- o Hold group review

4. Prevention

- o Document previous errors
- o Hold training and planning seminars
- o Evaluate district organization

Management Principles

Effective organizations are based on principles such as unity of command, appropriate span of control, organizational balance, and flexibility. Proper organization is necessary if the office is to remain efficient (examples 3G, 3H). Principles of organization and management are given below.

1. Unity of objectives for organization
   - o The objectives and mission of the organization must be clearly defined.
   - o All members of organization must be reminded about objectives.

2. Limit the number of organizational units (see example 3G)
   - o For maximum operating efficiency, the organizational structure should minimize the number of units through which the work must flow. The least number of layers is preferable.
   - o Flow charts are of considerable value in determining the optimum organizational structure.

3. Report to one boss

- o Responsibilities must be clearly defined and pinpointed, with only one boss for any individual.

4. Limit span of control

- o Ensure proper and reasonable "span of control." Do not expect a supervisor to have sufficient time for both administrative and technical guidance in "too large" a group. Consider how much time is required to answer questions and provide technical guidance in addition to counselling employees on leave, health plans, retirement, performance, awards, etc.
- o A group of 6 to 8 people is recommended; if unit is decentralized, 12 people.

5. Keep line and staff functions separate

- o Maintain a clear-cut separation between line and staff elements.
- o Personnel who contribute to the primary mission or goal of the total activity (organization) are line elements.

- o Personnel who perform in an advisory or service capacity are staff elements.
- o Staff personnel should not have line authority

6. Follow chain of command
   - o Establish clear lines of authority and responsibility, beginning at top and descending to the lowest level.

7. Structure organization around jobs, not people

8. Assure equitable distribution of workload
   - o The workload must be identified, defined, and qualified to determine the manpower needed for a given organizational element.
   - o Begin with the smallest unit required and build up work. Workload distribution charts are valuable for this purpose.
   - o Normally, a reorganization should be justified by major savings and increased efficiency.

9. Delegate authority commensurate with responsiblity

- o Authority is the right to make decisions. It represents the power to direct subordinates.
- o Responsibility is the individual's obligation to carry out assigned duties. Two essential characteristics are adaptability and dependability (example 3I).

10. References

- o Drucker, Peter F., 1974, Management - Tasks, responsibilities, practices: Harper and Row.
- o Musselman, V. A., and Hughes, E. H., 1977, Introduction to modern business: Prentice Hall.
- o Southwest Florida Subdistrict, 1978, Organization and functions (example 3G).

Management of Meetings

Meetings are an important activity in project planning and management. Well-structured meetings can facilitate decisionmaking, progress review, work planning, and report review. The following guidelines are offered for more productive meetings and increased participation of attendees.

1. **Definition of Meeting**

   - Three or more people working together to present information, make plans or decisions, solve problems, and brainstorm.

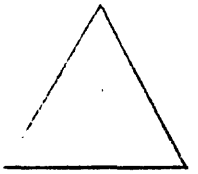
2. **Characteristics of an Effective Meeting** - Meetings are effective only when the following principles are followed:

   - o Agenda is logical and is followed
   - o Environment is comfortable and businesslike
   - o Meeting is on schedule
   - o Right participants are present
   - o Number of participants is appropriate (no more than necessary)

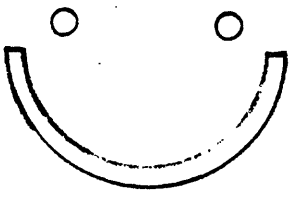
- o Visual aids are adequate
- o Group participation is encouraged
- o Consensus decisions are reached
- o Evaluation of meeting is presented briefly, stating weaknesses
- o Followup statment is issued

3. Types of Meetings - Meetings may take either of the following forms, depending upon objectives and topics.

   o Stratified (led by supervisor)



   o Nonstratified group input and equal participants (led by moderator)



4. Preparation of Agenda - Ideally, the meeting agenda will be prepared from comments and suggestions made by the selected participants and will be distributed well in advance of the meeting. The agenda should:

   - o Define purpose and objectives of meeting
   - o Establish time and place
   - o Describe content (exchange information, decisionmaking, brainstorming)
   - o State time allowed for each item on agenda
   - o Name discussion leader

5. Conduct of Meeting - Meetings need not follow Robert Rules of Order, but should closely follow the agenda and schedule. The moderator should:

   - o Introduce participants
   - o Announce changes in agenda
   - o Encourage but regulate give and take
   - o Allow time for question and answer session
   - o Have well-planned visual aids

Project Milestones

1. Project proposal
2. Project description
3. Planning management document
4. Outline of work plan and report
5. Preliminary report
6. Base-map order
7. Construction of hydrologic stations
8. Data collection and record compilation
9. Data processing
10. Data analysis
11. Illustration preparation
12. Other (this item is at project chief's option)
13. First draft of complete manuscript submitted for editorial revision.
14. Adviser's approval of manuscript or data compilation.
15. Manuscript submitted to colleague for review.
16. Revision to incorporate colleague-reviewer's comments
17. Transmittal of completed manuscript to Headquarters

PROJECT MILESTONE DEFINITION

TITLE:

PROBLEM:

PURPOSE:

SCOPE:

APPROACH:

REPORT:

START: **FINISH:** **DURATION:**

PERSONNEL: **COSTS:**

MILESTONES	RESPONSIBILITY
1. PROJECT PROPOSAL	R.W. STALLMAN
2. PLANNING REPORT	E.A. MOULDER
3. INVENTORY WELLS	J.E. MOORE
4. TEST DRILLING	J.E. MOORE
5. AQUIFER TESTS	R.W. STALLMAN
6. REPORT	J.E. MOORE

PROJECT MILESTONE CHART

TITLE _____ NUMBER _____ DATE _____

	JANUARY 5 12 19 26	FEBRUARY 2 9 16 23	MARCH 6 13 18 25	APRIL 5 12 26 29
PROPOSAL	* ○●			
PLANNING REPORT	*	○	●	
INVENTORY WELLS		*	○●	
TEST DRILLING		*	○●	
AQUIFER TESTS			*	○●
REPORT		*		● ○

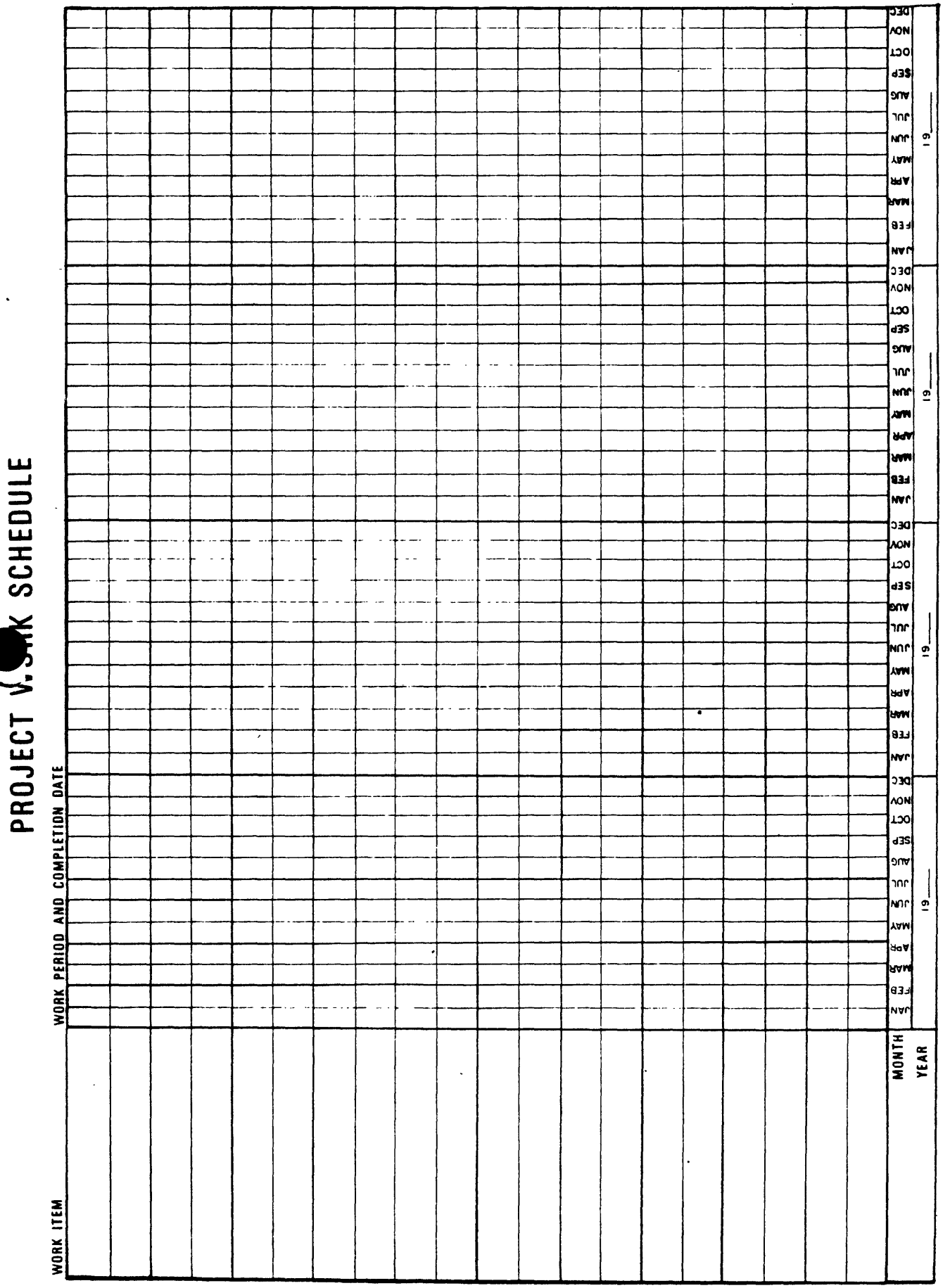
* STARTING DATE
○ PLANNED COMPLETION DATE
● ACTUAL COMPLETION DATE

EXAMPLE 3B

DISTRICT PROGRESS CHART

PROJECT	REPORT	PROJECT DESCRIPT[illegible]	PRELIMINARY REV[illegible]	WORK PLAN	DRAFT	BASE MAP	COLLATION	[illegible]	DATE COLLECTION	DATA PROCESSING	DATA RE[illegible]	DATA ANALYSIS	OUTLINE	ILLUSTRATIONS	DRAFT OF REPORT
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
STATEWIDE															
HUD - Jefferson	0011	7-15-5 [illegible]	NA	COMP	NA	[illegible]	11-14-5	[illegible]	[illegible]	[illegible]	[illegible]	4-30-7	[illegible]	4-30-7	5-31-7
HUD - Palmer	0012	4-15-5	NA	COMP	NA	3-15-5	8-1-5	[illegible]	8-15-5	9-15-5	10-30-5	12-1-5	12-31-5	12-31-5	3-30-6
Highway	0310	COMP	COMP	COMP	NA	COMP	COMP	COMP	CON'T	CON'T	[illegible]	CON'T	NA	NA	NA
Colorado Lakes	0410	COMP	NA	COMP	NA	COMP	[illegible]	[illegible]	[illegible]	6-30-6	[illegible]	6-30-6	12-31-5	[illegible]	7-31-5 4-30-6
Lake Recon	0500	COMP	COMP	[illegible]	12-31-5	12-31-5	NA	NA	3-31-6	6-30-6	[illegible]	6-30-6	NA	NA	NA
Flood Plain Inform	0630	COMP	NA	COMP	8-1-5	9-15-5	COMP	NA	4-30-6	COMP	11-30-5	8-31-5	7-31-5	10-31-5	7-30-5 6-30-6
Lake Eutrophication	0700	COMP	NA	COMP	NA	NA	8-15-5	COMP	8-15-5	NA	10-15-5	10-15-5	NA	NA	NA
Geothermal	0710	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Streamflow Statistics	0810	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6-15-6
Min. Streamflow	082	COMP	1-15-6	COMP	1-15-6	2-76	12-75	NA	5-76	3-76	NA	3-76	3-76	3-76	[illegible]-76
REGIONAL															
High Plains	0320	7-15-5	NA	COMP	NA	COMP	COMP	COMP	[illegible]	2-15-6	3-5-6	COMP	COMP	3-2-6	3-15-6
Front Range	0340	COMP	[illegible]	COMP	[illegible]	NA	12-20-5	12-1-5	[illegible]	[illegible]	2-1-7	4-1-7	8-5-6	4-1-7	4-1-7
El Paso County	0450	NA	NA	COMP	NA	NA	COMP	1-15-5	6-15-6	6-15-6	6-15-7	NA	NA	6-15-6	6-15-6
Park and Teller	0570	COMP	NA	COMP	COMP	11-30-5	11-30-5	NA	10-30-5	[illegible] 2-24-6	NA	2-24-6	2-24-6	2-24-6	3-31-6
SOUTH PLATTE															
South Platte	0210	NA	9-1-5	COMP	9-5-5	NA	10-1-5	NA	10-1-5	10-1-5	NA	1-1-6	1-5-6	2-15-6	2-15-6
Urban Runoff	0310	COMP	COMP	COMP	NA	COMP	COMP	COMP	CON'T	CON'T	[illegible]	CON'T	NA	NA	NA
Urban Runoff - DFC	0311		8-15-5	COMP	[illegible]		10-1-5		CON'T	CON'T		CON'T		8-8-75	12-31-5
Cattle Feedlot	0510	NA	NA	COMP	NA	[illegible]-5-8	NA	NA	[illegible]-5-8	2-15-8	NA	1-5-9	1-5-9	1-15-9	4-15-9
Bijou Recharge	0550	[illegible]	8-30-5	COMP	8-30-5	COMP	10-1-5	COMP	6-30-6	6-30-6	5-30-6	4-30-6	2-30-6	3-15-6	4-30-6
Metro Sludge	0720	NA	NA	COMP	NA	8-15-75	NA	NA	5-15-6	5-15-6	NA	3-15-6	2-15-6	3-15-6	5-15-6
Storm Runoff	0730	COMP	[illegible]-5-5	COMP	8-8-5	NA	1-1-6	8-31-5	5-1-7	2-1-7	11-1-7	11-1-7	8-1-7	11-1-7	11-1-7
GW Jefferson	0760	COMP	COMP	COMP	10-1-5	9-1-5	2-1-6	NA	8-31-5 2-31-5	3-1-6	NA	5-1-6	3-5-6	5-1-6	6-1-6
Boulder County	0780	COMP	10-1-5	COMP	2-1-6	10-15-5	2-1-6	NA	8-15-5 4-30-6	2-1-7	NA	5-5-7	1-1-7	5-15-7	7-1-7
Rocky Mtn Arsenal	0790	COMP	NA	COMP	3-76	NA	NA	NA	NA	NA	NA	3-76	3-76	3-76	4-76
Denver Basin	0800	COMP	4-5-5	COMP	4-10-5	8-24-5	8-24-5	NA	[illegible]	[illegible]	NA	[illegible]-6	[illegible]-6	[illegible]-6	6-30-6
LOWER ARKANSAS															
Lower Arkansas	0160	COMP	COMP	COMP	COMP	COMP	COMP	COMP	6-15-6	NA	6-15-6	NA	NA	NA	NA
Upper Arkansas	0161	NA	COMP	COMP	COMP	COMP	COMP	NA	8-[illegible]-5 9-30-5	10-30-5	NA	10-30-5	10-30-5	10-30-5	1-30-6
T & T Loss	0162	COMP	8-30-5	COMP	8-30-5	NA	NA	8-30-5	11-30-5	6-30-5 3-30-6	NA	8-30-5 3-30-6	4-30-6	4-30-6	5-30-6
Wet Mountain	0164	COMP	COMP	COMP	COMP	COMP	COMP	COMP	4-15-5 5-15-6	6-15-6	NA	6-15-6	6-15-6	1-15-7	1-15-7
Artificial Recharge	0165	COMP	COMP	COMP	12-30-5	NA	COMP	5-30-6	11-30-5	NA	NA	12-31-5	COMP	3-31-6	3-31-6
RIO GRANDE															
San Luis Valley	0210	NA	NA	COMP	NA	COMP	COMP	NA	1-15-6 4-15-6	NA	NA	NA	NA	NA	NA
COLORADO RIVER															
SW - Colorado G.W.	0510	COMP	COMP	COMP	COMP	COMP	COMP	COMP	4-30-5 10-31-5	NA	NA	11-30-5	COMP	11-30-5	12-31-5
Southern Ute	0590	COMP	COMP	COMP	0-31-5	COMP	COMP	NA	1-5-6	2-27-6	NA	2-27-6	1-5-6	1-5-6	4-1-6
Oil Shale - Springs	0600	COMP	COMP	COMP	NA	COMP	COMP	NA	6-30-6	NA	NA	NA	NA	NA	NA
Oil Shale - Ob. Wells	0610	COMP	COMP	COMP	NA	COMP	COMP	NA	[illegible] 6-30-6	NA	NA	NA	NA	NA	NA
Oil Shale - Aq. Test	0620	COMP	COMP	COMP	NA	COMP	COMP	NA	6-30-6 [illegible]	6-30-6	NA	NA	NA	NA	NA
Oil Shale - Geo.Log.	0630	COMP	COMP	COMP	NA	COMP	COMP	NA	6-30-5	2-1-5	NA	NA	NA	NA	NA
Oil Shale - Geo.Chem.	0640	NA	NA	COMP	NA	COMP	NA	[illegible]-15-6	10-5-6	[illegible]-15-7	NA	1-5-7	1-5-7	3-15-7	3-15-7
Oil Shale - Sediment	0650	COMP	COMP	COMP	NA	COMP	COMP	COMP	6-30-6	NA	NA	NA	NA	NA	NA
Oil Shale - Para-Roan	0660	COMP	7-1-5	COMP	12-15-5	NA	3-5-5	4-15-5	4-15-9	4-15-9	NA	9-15-9	3-5-9	3-15-9	6-15-9
Prototype Mine	0670	COMP	COMP	COMP	COMP	COMP	COMP	NA	1-1-5	NA	NA	2-1-6	3-1-6	3-1-6	4-1-6
Coal - BLM	0690	7-18-5	11-6-5	COMP	NA	8-5-75	12-6-5	10-15-5	6-30-6	6-30-6	3-15-6	5-15-6	3-1-6	5-1-6	6-1-6
West Slope Aquifer	0710	COMP	8-24-5	COMP	4-30-5	8-15-5	8-5-5 [illegible]	NA	[illegible] 4-30-6	[illegible] 5-28-6	NA	5-28-6	4-30-6	4-30-6	6-30-6
Yampa River Assess.	0730	COMP	COMP	COMP	[illegible]	10-31-5	10-31-5	7-[illegible]	[illegible]-30-7	7-31-7	[illegible]	7-31-7	4-30-6	4-30-7	12-31-7
Yampa Valley (GW)	0770	[illegible]	[illegible]	COMP	[illegible]	COMP	[illegible]	NA	[illegible]	[illegible]	[illegible]	[illegible]	10-16-5	[illegible]	11-1-5
NARROWS DAM	083	[illegible]	NA	[illegible]	[illegible]	NA	NA	[illegible]	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
METAL MINE-DRAINAGE	084	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AREA WIDE GW [illegible]	086	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

page 3.29 follows



3.29
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QUARTERLY REPORT

PROJECT NUMBER AND NAME: _____

PROJECT CHIEF: _____ SECTION CHIEF _____

REPORT PERIOD: _____ COOPERATOR _____

A. PROGRESS

B. SIGNIFICANT FINDINGS

C. REPORTS

QUARTERLY REPORT (CONTINUED)

PROJECT NUMBER AND NAME _____

PROJECT CHIEF _____

D. PROBLEMS

E. PLANS FOR NEXT QUARTER FROM _____ TO _____

HYDROLOGY OF THE ARAPAHOE AQUIFER IN THE ENGLEWOOD-CASTLE ROCK AREA, DENVER BASIN, COLORADO

Preliminary project report

By Robert E. Brogden and Donald E. Hillier

U.S. Geological Survey

September 1975

Project: Ground-water resources of the Denver Basin

Project : CO 76-080 Start: August 1975 End: June 1976

Project Chief: Robert E. Brogden Funding: $30,000 FY 76

A. Publication media

U.S. Geological Survey Miscellaneous Investigations (I) series approved by the Director. Two sheets; 2,000 total copies, 1,800 folded and inserted into map jackets, 200 flat. Final cartography and printing to be done through regular Publications Division channels. Costs for final cartography and printing to be borne by the Water Resources Division's Publications Fund.

B. Justification

The study area is in the Front Range Urban Corridor. Reports resulting from studies in the Front Range Urban Corridor are published in the I series. At the present time there are no proposed or ongoing studies in the Front Range Urban Corridor Project that will include the bedrock aquifers. Therefore, reports from the Denver Basin Project on the bedrock aquifers in the Front Range Urban Corridor would supplement reports from the Front Range Urban Corridor Project and should be in the same series for maximum utilization by persons concerned with the total water situation in the Front Range Urban Corridor. Also, the only published report (Chase and McConaghy, 1972) resulting from the Denver Basin project was published in the I series.

C. Base maps available

Topographic or planimetric maps at scale 1:100,000; parts of the Greater Denver area and the Colorado Springs-Castle Rock are sheets of the Front Range Urban Corridor series. Northern limit = T. 5 S.; southern limit = T. 8 S.; eastern limit = 104°37'30"; western limit = 105°15'.

D. Proposed report outline

Text to be brief. No abstract required for map series.

Introduction

Purpose

Scope

Acknowledgments

Geologic characteristics

Occurrence -- Regional setting with emphasis on study area

Thickness

Lithology and aggregate sand thickness

Hydrologic characteristics

Recharge and discharge

Hydraulic conductivity and transmissivity

Specific capacity and well yields

Potentiometric surface

Historic (1964)

Present (1974)

Amount of water in storage

D. Proposed report outline--Continued

Water quality

Suitability for various uses

Problems

Summary

References

E. Expanded INTRODUCTION

INTRODUCTION

Purpose

Continued population growth in the Denver Metropolitan area, immediately east of the Front Range, has increased the demand for dependable supplies of water on a long-term basis. Surface-water supplies are negligible and ground water is the primary source of water for municipalities, industries, and new housing developments. In the study area (fig. 1) the confined Arapahoe aquifer has been intensely pumped resulting in a decline of the potentiometric surface as water is removed from storage. Most of the water withdrawn from the aquifer at the present (1975) time is used for irrigation. In order to efficiently manage the ground-water resources in the Englewood-Castle Rock area, the State of Colorado, Office of the State Engineer, in 1975 entered into a cooperative study with the U.S. Geological Survey to determine the availability, occurrence and chemical properties of ground water stored in the Arapahoe aquifer.

Scope

Maps in a report by Romero (1975) were used to define the altitude of the base of the Arapahoe aquifer in the study area. A map by Chase and McConaghy (1972) was used to determine the outcrop areas of the aquifer. Additional information on the geology of the aquifer was obtained from Weimer (1973), Willard Owens and Associates, Inc. (1973), and Reichert (1956).

Some information on the hydrology of the Arapahoe aquifer was obtained from Romero (1975) and from well logs, electric logs, and aquifer-test data available from the Office of the State Engineer. Historical water levels used in constructing the 1964 potentiometric-surface map were obtained from McConaghy and others (1964) and from the files of the U.S. Geological Survey. To complete the hydrologic data base required to analyze the hydrology of the Arapahoe aquifer, the Geological Survey inventoried _____ wells, collected and analyzed water samples from _____ wells, determined the hydraulic characteristics based on aquifer test of _____ wells, and periodically measured the water levels in _____ wells.

Acknowledgments

The authors thank the Office of the State Engineer, especially Messrs. John B. Romer, _____, and _____ for furnishing well logs, electric logs, and aquifer test data. The authors also thank the many well owners who granted permission to inventory their wells, to obtain water samples for chemical analysis, to use their wells for aquifer tests, and to obtain water-level measurements.

F. Sources and reliability of existing data

1. Published

Chase, G. H., and McConaghy, J. A., 1972, Generalized surficial geologic map of the Denver area, Colorado: U.S. Geol. Survey Misc. Inv. Map I-731. Reliability: Good.

McConaghy, J. A., Chase, G. H., Boettcher, A. J., and Major, T. J., 1964, Hydrogeologic data of the Denver Basin, Colorado: Colorado Water Conserv. Board Basic-Data Rept. 15, 224 p. Reliability: Good.

Romero, J. C., 1975, Ground-water resources of the bedrock aquifers of the Denver Basin, Colorado: Colorado Geol. Survey Bull. [In press.]. Reliability: Good.

Weimer, R. J., 1973, A guide to uppermost Cretaceous stratigraphy, central Front Range, Colorado--Deltaic sedimentation, growth faulting and early Laramie crustal movement: Mtn. Geologist, v. 10, no. 3, p. 53-97. Reliability: Good.

Willard Owens Associates, Inc., 1973, Presentation on hydrology of Colorado: Wheatridge, Colo., 42 p. Reliability: Average.

2. Unpublished

Well logs, electric logs, and aquifer-test data on file in the office of the State Engineer. Reliability: Good.

Colorado District ground-water file. Reliability: Good.

G. Geologic names

In the past problems have arisen concerning the geologic names of the various rock units in the Denver Basin. The geologic interpretation used by Romero (1975) is different from that used by Chase and McConaghy (1972). Willard Owens Associates, Inc. (1973) present yet a third interpretation. To avoid potential problems with geologic names, aquifer names will be used instead of formal geologic names. The basal sandstone of the Arapahoe Formation as defined in Romero (1975) will be called the Arapahoe aquifer in the report(s) resulting from this project.

H. Additional data and method of investigation

The geologic properties of the Arapahoe aquifer have been adequately described. Hydrologic data are missing. To complete the investigation and meet the objectives of the report, it will be necessary to inventory at least 50 wells that are finished and completed in the Arapahoe aquifer. These 50 wells will be selected to present a uniform description of the hydrology of the Arapahoe aquifer. Water samples will be collected from 20 to 25 of the inventoried wells and samples will be sent to the Salt Lake City laboratory for complete analyses. To describe the hydrologic properties and aquifer coefficients, approximately 5 to 10 wells will be selected for pump testing. Wells that are selected for pump-test analysis will be wells that are screened only in the Arapahoe aquifer, finished completely so that no vertical leakage occurs around the annulus of the well, and wells that are close together so that one well may be utilized as an observation well. Several of these representative wells will be selected for use as an observation well and periodic measurements will be made of the fluctuation of the potentiometric surface. If no wells can be found that penetrate only the Arapahoe aquifer and meet other criteria, then wells will be drilled and finished to withdraw water only from the Arapahoe aquifer. If this becomes necessary, these wells also will be used as observation wells for the measurement of fluctuations in the water level.

I. Hydrogeologic system

The Arapahoe aquifer is one of four bedrock aquifers underlying the Denver Basin, a structural basin whose major axis trends north and whose maximum depth occurs near Denver. The Dawson and Denver aquifers overlie the Arapahoe and the Laramie-Fox Hills aquifer underlies the Arapahoe.

The Arapahoe aquifer consists of the basal sandstone of the Arapahoe Formation of Romero (1975). The thickness of the sandstone ranges from less than 100 feet (300 metres) in the northern part of the study area to more than 500 feet (1,500 metres) in the southern part of the study area. The sand to shale ratio of the basal sandstone ranges from 50 to 75 percent throughout the study area.

The Arapahoe aquifer is a primary source of water for large-capacity wells in the study area. Well yields range from 100 gallons per minute (6.3 litres per second) to more than 300 gallons per minute (18.9 litres per second) in properly developed wells. Most of the water withdrawn from the aquifer comes from storage resulting in water levels that have declined significantly in recent years. In the study area, the aquifer has undergone intense development, supplying water for industries and housing developments. Water used for irrigation accounts for much of the water withdrawn from the aquifer.

I. Hydrogeologic system--Continued

Recharge occurs where the aquifer crops out and where alluvium in streambeds is in hydraulic connection with the aquifer. Leakage by vertical percolation through overlying and underlying shales is believed by some hydrologists to be another source of recharge to the aquifer. A minor source of recharge is flow through improperly constructed wells from the underlying Laramie-Fox Hills aquifer, which has a greater head than the Arapahoe aquifer.

J. Illustrations

1. Figure 1.--Index map showing location of study area. Column width--4 inches.

2. Figure 2.--Map showing depth to the top of the Arapahoe aquifer. Scale 1:100,000.

EXPLANATION

OUTCROP AREA

--100-- LINE OF EQUAL DEPTH TO TOP OF THE AQUIFER -- Dashed where approximately located. Interval ____ feet (____ metres). Datum is land surface.

• WELL

Topographic base printed in screened black. Outcrop area to be a line or dot pattern printed in brown. Lines of equal depth to be printed in brown. Well symbols to be printed in black.

J. ILLUSTRATIONS--Continued

3. Figure 3.--Map showing total thickness and aggregate sand thickness of the Arapahoe aquifer. Scale 1:100,000.

EXPLANATION

OUTCROP AREA

TOTAL THICKNESS, IN FEET (METRES)

Less than 100 (less than 30) — Lightest tone or white

100 to 200 (30 to 60)

200 to 300 (60 to 90)

300 to 400 (90 to 120)

400 to 500 (120 to 150)

Greater than 500 (greater than 150) — Darkest tone

—100— LINE OF EQUAL AGGREGATE SAND THICKNESS--Dashed where approximately located. Interval ____ feet (____ metres).

WELL

Planimetric base printed in screened black. Outcrop area to be a line or dot pattern printed in brown. Total thickness areas to be printed in gradational tones of brown. Lines of equal aggregate sand thickness to be printed in black. Well symbols to be printed in black.

J. Illustrations--Continued

4. Figure 4.--Map showing specific capacity, hydraulic conductivity, and transmissivity of the Arapahoe aquifer.

Scale 1:100,000

EXPLANATION

OUTCROP AREA

SPECIFIC CAPACITY, IN GALLONS PER MINUTE PER FOOT

(LITRES PER SECOND PER METRE)

Less than ____ (less than ____) Lightest tone or white

____ to ____ (____ to ____)

____ to ____ (____ to ____)

____ to ____ (____ to ____)

Greater than ____ (greater than ____) Darkest tone

200
●6000 WELL--Upper number is hydraulic conductivity, in feet per day. Lower number is transmissivity, in feet squared per day.

Planimetric base map printed in screened black. Outcrop area to be a line or dot pattern printed in black. Specific capacity areas to be printed in gradational tones of blue. Well symbols and numbers to be printed in black.

J. Illustrations--Continued

5. Figure 5.--Map showing altitude of potentiometric surface of the Arapahoe aquifer, 1964. Scale 1:100,000.

EXPLANATION

OUTCROP AREA

—5000--POTENTIOMETRIC CONTOUR--Shows altitude of potentiometric surface. Dashed where approximately located. Contour interval ____ feet (____ metres). Datum is mean sea level.

● Well

Topographic base printed in screened black. Outcrop area to be a line or dot pattern printed in black. Potentiometric contours to be printed in blue. Well symbols to be printed in black.

J. ILLUSTRATIONS--Continued

6. Figure 6.--Map showing altitude of potentiometric surface of the Arapahoe aquifer, 1975, and decline of the potentiometric surface, 1964-75. Scale 1:100,000

EXPLANATION

OUTCROP AREA

DECLINE OF POTENTIOMETRIC SURFACE, IN FEET (METRES)

Less than ____ (less than ____) Lightest tone or white

____ to ____ (____ to ____)

____ to ____ (____ to ____)

____ to ____ (____ to ____)

Greater than ____ (greater than ____) Darkest tone

—5000--POTENTIOMETRIC CONTOUR--Shows altitude of potentiometric surface. Dashed where approximately located. Contour interval ____ (____ metres). Datum is mean sea level.

WELL

Topographic base printed in screened black. Outcrop area to be a line or dot pattern printed in black. Decline areas to be printed in gradational tones of blue. Potentiometric contours to be printed in black. Well symbols to be printed in black.

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J. Illustrations--Continued

7. Figure 7.--Map showing location of wells for which chemical analyses are shown in the table.

EXPLANATION

$\bullet^2$ WELL--Number refers to analysis in table.

Schematic base printed in screened black. Well and number to be printed in blue.

K. Tables

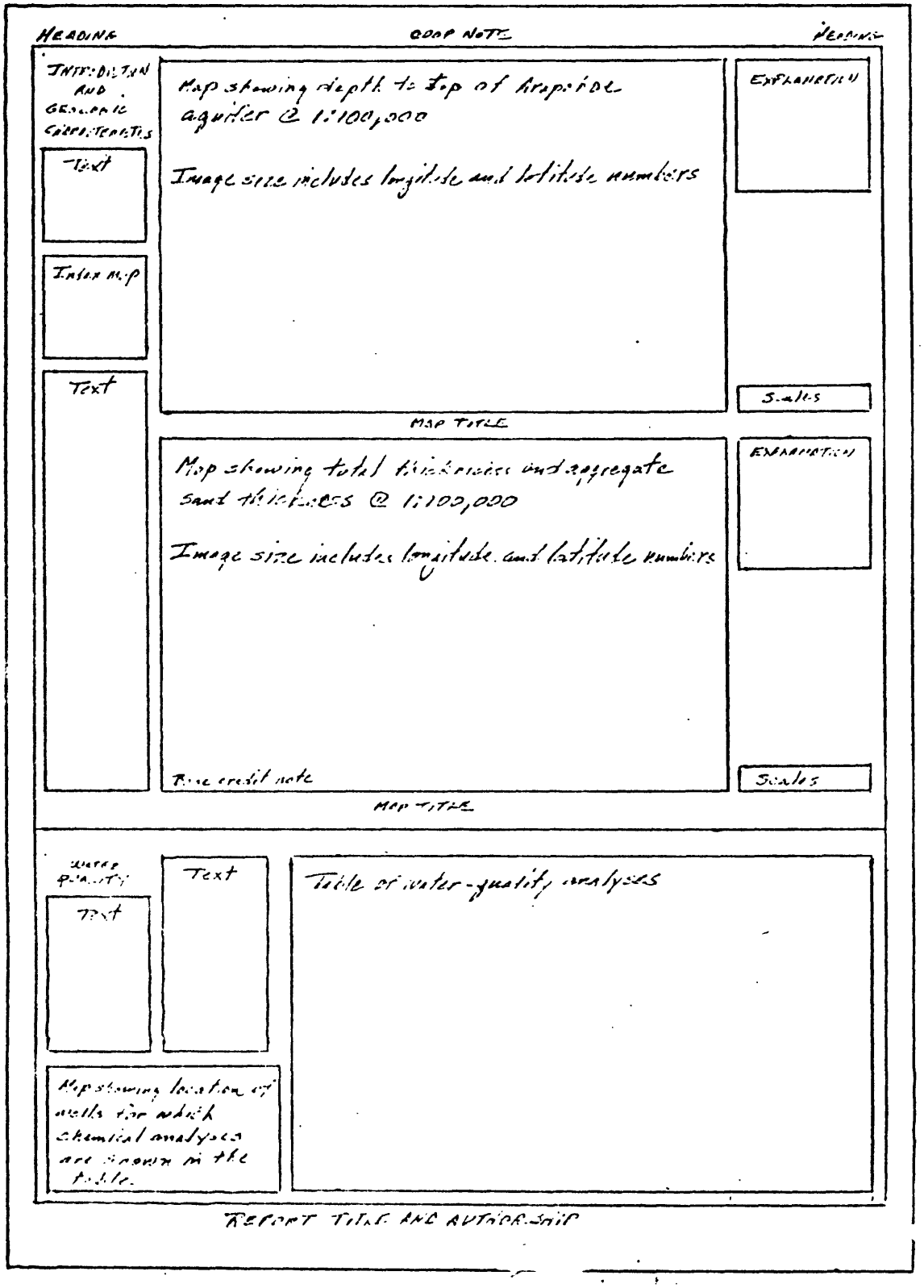
1. Table summarizing specific capacity, hydraulic conductivity, and transmissivity data.

2. Table summarizing chemical analyses (maximum of 25 analyses).

L. Mockup of proposed sheets

See attachments.

Neatline size = 33 x 44½ inches
Image size = 33 x 46½ inches
Sheet size = 35 x 48½ inches



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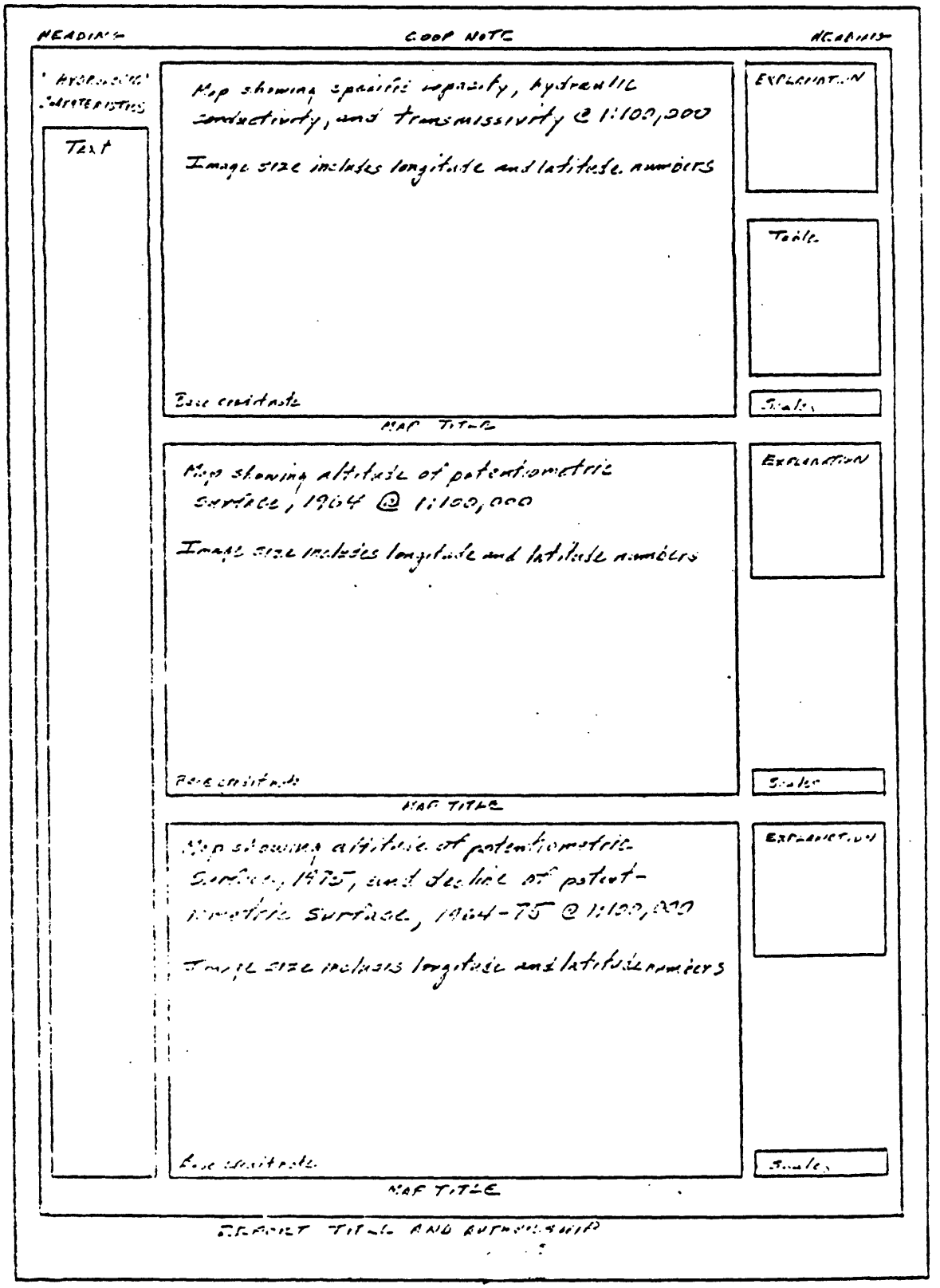
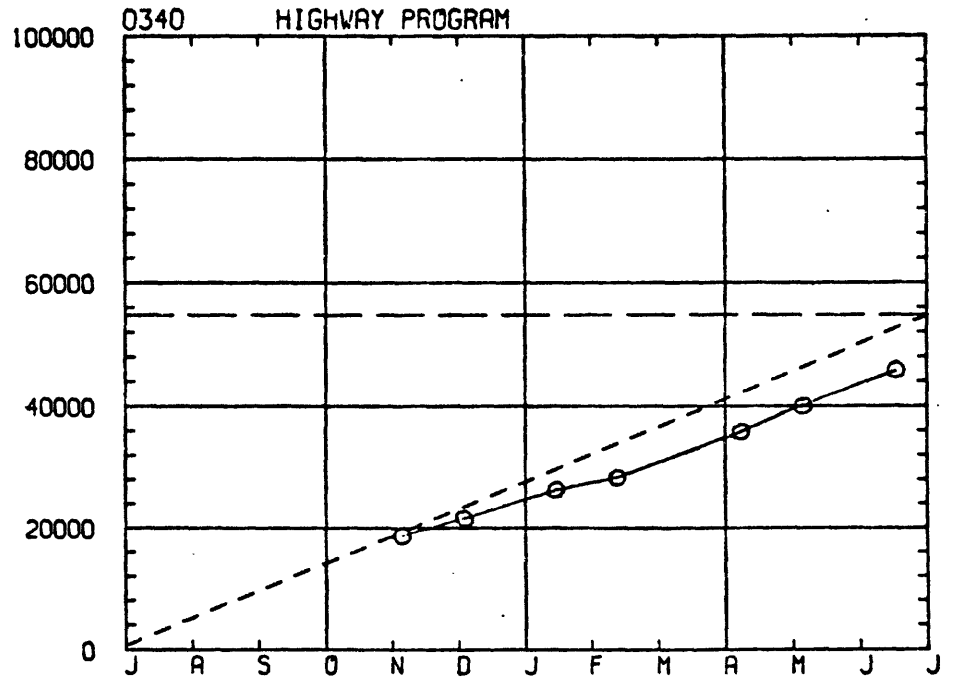
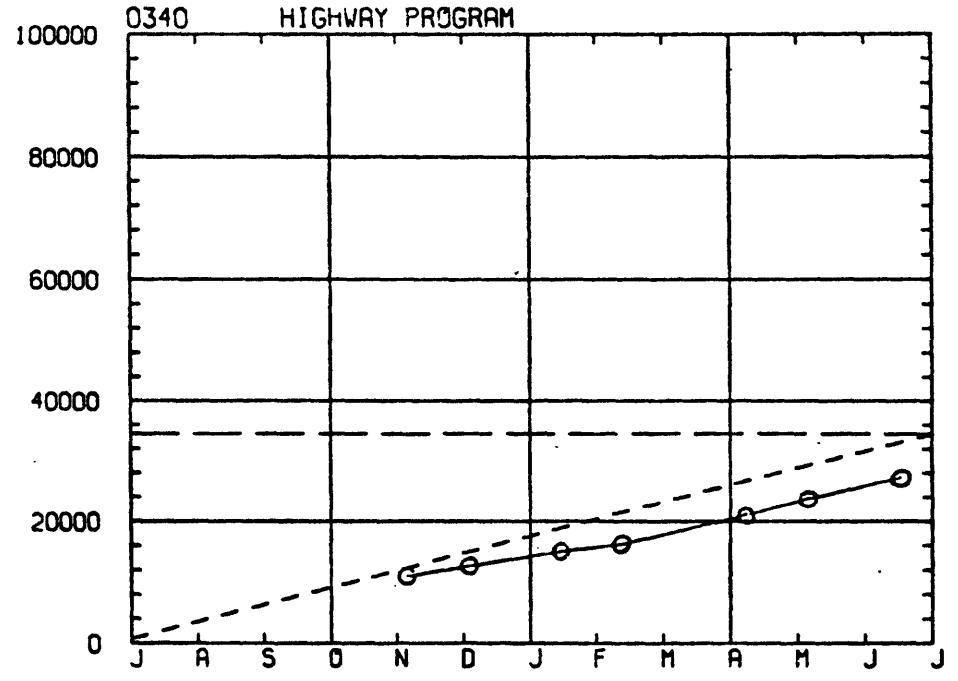




PROJECT EXPENSES - ACTUAL AND ANTICIPATED
GROSS INITIAL FUNDS - EXPENSES INCLUDE WOTSC-DOTC

I.F.	54000
WOTSC-DOTC	20250
REMAINING	33750

KEY ——— ACTUAL EXPENSES
– – – ANTICIPATED EXPENSES
— — — INITIAL FUNDS



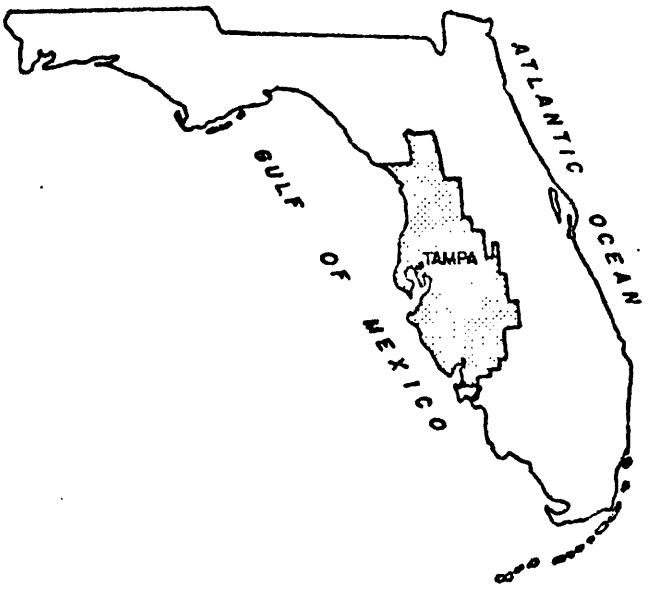
PROJECT EXPENSES - ACTUAL AND ANTICIPATED
NET INITIAL FUNDS - EXPENSES EXCLUDE WOTSC-DOTC

page 383 follows

ORGANIZATION AND FUNCTIONS SOUTHWEST FLORIDA SUBDISTRICT

FLORIDA DISTRICT
SOUTHEASTERN REGION

WATER RESOURCES DIVISION
U.S. GEOLOGICAL SURVEY



MARCH 1978

INTRODUCTION

This report describes the organization and functions of Southwest Florida Subdistrict, Water Resources Division, U. S. Geological Survey. The report contains a description of the mission, cooperative programs, and organization of the Subdistrict office.

The Southwest Florida Subdistrict Office, located in Tampa, is a part of the Florida District, headquartered in Tallahassee. Other major field offices are located in Miami, Orlando, Jacksonville and Tallahassee. The Southwest Subdistrict collects, analyzes, and interprets water-resources information in a 10,000-mi^2 area (10 counties and parts of 6 others) in southwestern Florida. The boundaries of this area coincide with those of the Southwest Florida Water Management District. Investigations are made in cooperation with Federal, State, County and local agencies.

The major mission of the Southwest Florida Subdistrict is as follows:

1. Collecting, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of water resources.

2. Conducting analytical and interpretive water-resources appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface and ground water.

3. Conducting investigations using modeling techniques as tools to further the understanding of hydrologic systems in order to predict quantitatively hydrologic responses to stress, either natural or manmade.

4. Disseminating the water data and the results of these investigations and research through reports, maps, computerized information services, and other forms of public release.

5. Providing scientific and technical assistance in hydrology and related fields to other Federal, State, and local agencies.

WATER-RESOURCES PROGRAMS

The Subdistrict program is diversified and encompasses all aspects of water information needs in the area. The cooperative program for fiscal year 1977 included 41 interpretive investigations. Hydrologic data were obtained at more than 1,000 sites.

The eighteen Federal, State, County, City and local agencies that contributed funds for investigations and data collection are as follows:

Corps of Engineers

Housing and Urban Development

U.S. Geological Survey

Florida Department of Environmental Regulation

Florida Department of Transportation

Florida Department of Pollution Control

Southwest Florida Water Management District

Charlotte County

Hillsborough County

Manatee County

Sarasota County

Pinellas County

Bradenton

Clearwater

St. Petersburg

Tampa

Sarasota

Englewood Water District

Winter Haven Boat Course District

Water-resources investigations undertaken by the U.S. Geological Survey deal with the following types of questions:

1. What are the effects of municipal well field developments?
2. What is the hydrologic relation between ground water, lakes, and wetlands?
3. What areas are suitable for artificial recharge?
4. What areas are affected by inland movement of saltwater?
5. What water-bearing zones are most suitable for subsurface injection?
6. What is the quality of ground water in Florida?
7. What is the effect of dredging on Tampa Bay?
8. What is the impact of irrigation and phosphate development on ground water?
9. How much land is inundated at times of floods?
10. How does urbanization affect runoff?
11. How much does pumping affect ground water levels and lake levels?
12. Is sufficient ground water available to meet projected and present needs?
13. How can streamflow be regulated where water use is intense?

ORGANIZATION OF SUBDISTRICT

The Southwest Florida Subdistrict is organized into two support units and three operating sections (see organization chart). The support units are Reports and Administrative. The operating sections are Hydrologic Records, Hydrologic Section, and Hydrogeologic Section. The personnel assigned to the Subdistrict are shown on the attached organization chart. In March 1978, the Subdistrict consisted of 68 employees based in Tampa and Sarasota.

The three section chiefs assist the Subdistrict Chief in planning and program development. They supervise and train hydrologists in the subdistrict and serve as advisors to the Subdistrict Chief; act for and represent the Subdistrict Chief at meetings with cooperators, the public, and at agency meetings; and review hydrologic reports and other documents for technical adequacy and policy. They supervise and make quarterly reviews of all activities and projects under their supervision. The section chief exercises a wide latitude of independent action to provide adequate technical guidelines, management, and training.

The Subdistrict Chief has on his staff a ground-water, surface-water and water-quality discipline specialist. They are responsible for discipline training, technical review, technical information and liaison with discipline specialists in the District, Region and Reston.

The following is a functional statement for each section. The statements are not intended to be all inclusive and are subject to change as the need arises.

Reports Unit

Is responsible for the technical and editorial adequacy and for policy and format of all interpretive reports prepared by the Subdistrict. Assists the Subdistrict Chief and section chiefs in initial design, planning, production, preparation, and processing of reports to meet the needs of cooperating officials and the public. Insures the technical and editorial quality of reports, and determines adherence of reports to District, Region, and Division policy.

Administrative Unit

Is responsible for all clerical and secretarial activities. Included are handling of telephone calls, reception of visitors, routing of correspondence, processing of mail, and providing secretarial service for the Subdistrict Chief and section chiefs. Also included are the preparation of the following documents: fiscal, personnel, service reports, time and attendance reports, and travel vouchers.

Hydrologic Records Section

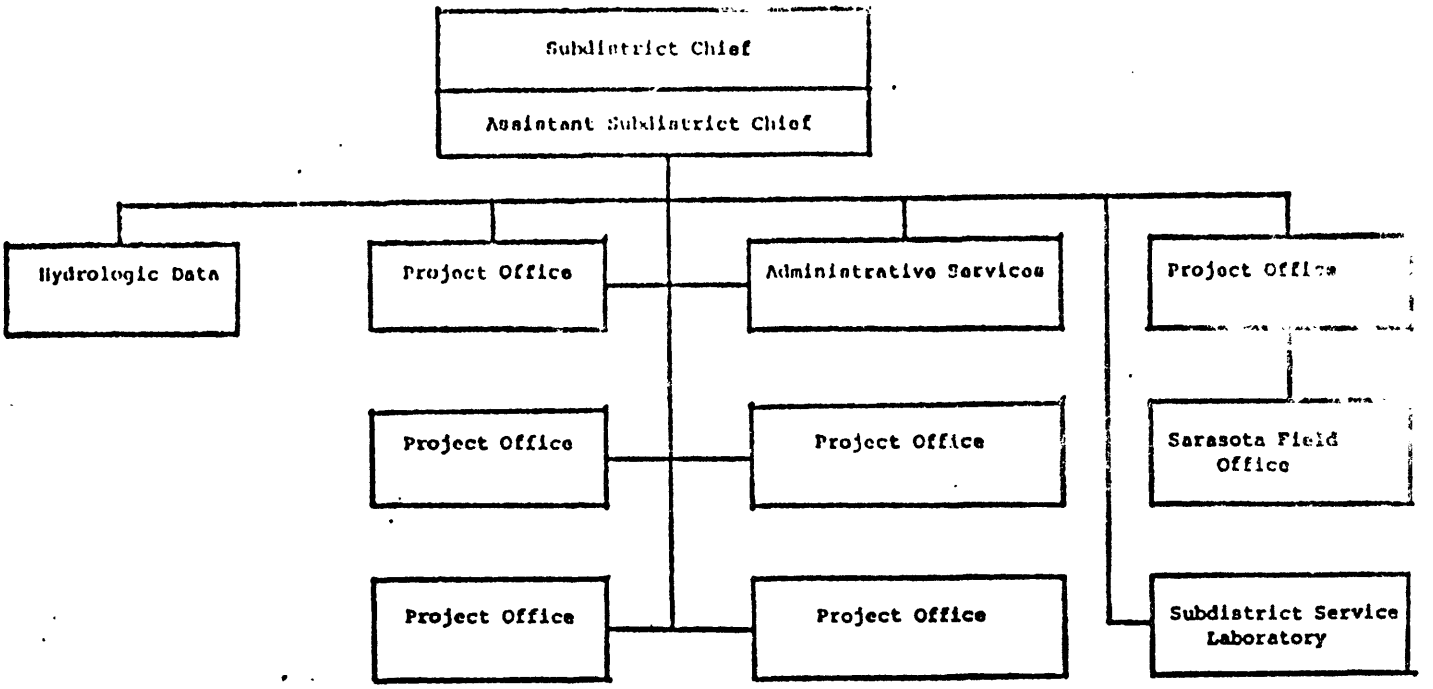
Is responsible for the planning, implementation, and supervision of the hydrologic records program in the Subdistrict. Included are responsibilities for training and technical quality control for collection, analysis, and computer storage of hydrologic data. The design and evaluation of the records program includes contact and coordination with cooperating agencies. The Hydrologic Records Section is organized into North and South Units.

Hydrologic Studies Section

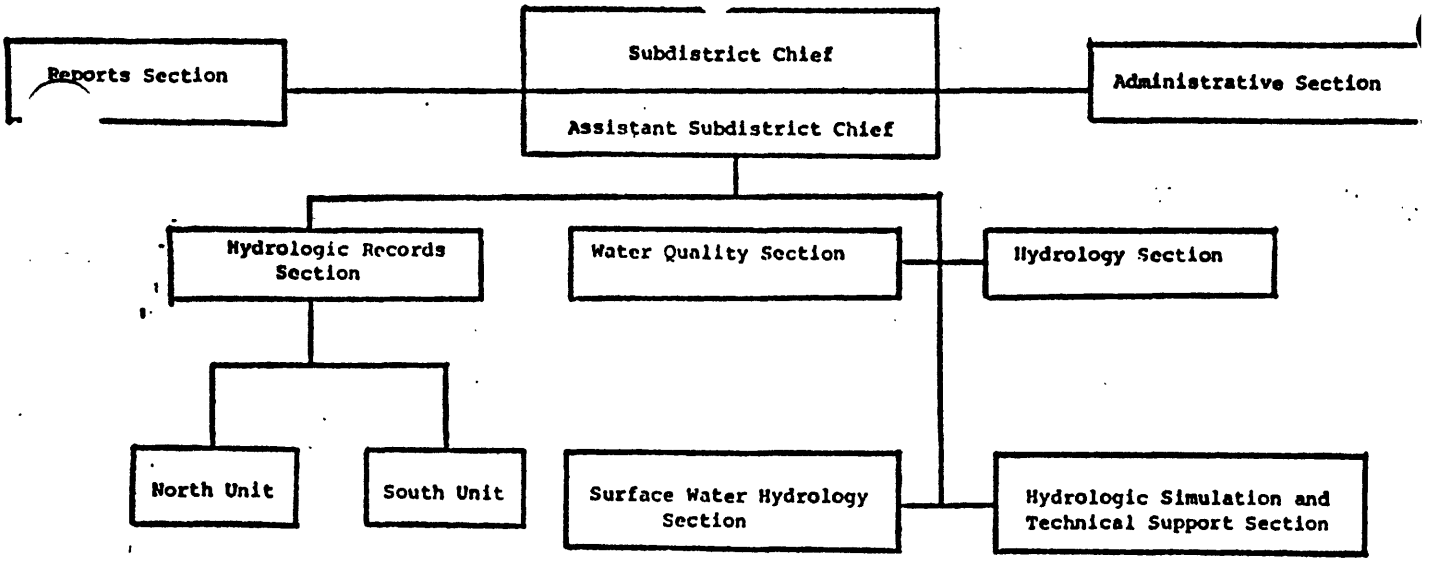
Is responsible for all interpretive surface-water hydrologic investigations in the Subdistrict. The investigations include evaluation of the hydrologic effects of present and future land use, water-supply development, simulation of surface-water systems, flood mapping, remote data acquisition, regionalization of streamflow, water quality of streams and lakes, and estuarine hydrology. Management of the computer terminal facilities and assistance in use of the computer are provided under this section. Provide technical assistance to cooperators on flood mapping, surface-water modeling, and water quality.

Hydrogeologic Studies Section

Is responsible for all interpretive ground-water investigations in the Subdistrict. These investigations emphasize geologic controls on the occurrence, movement, quantity and quality of ground water. Included are evaluations of effects of ground-water development, saltwater encroachment, effects of phosphate mining on ground water, effects of landfills subsurface waste injection, future ground-water supply potential, ground-water use, artificial recharge and aquifer mapping. Aquifer characteristics and effects of hydraulic stresses upon aquifer systems are determined. Makes quantitative hydrologic evaluations which involve the development and calibration of digital simulation models of ground-water and water quality. These models are in use in predictive studies of well fields, hydrologic mapping, simulation of stream-aquifer relations, and design of monitoring networks. Provides technical assistance to cooperators on computer modeling, aquifer testing, and test drilling.

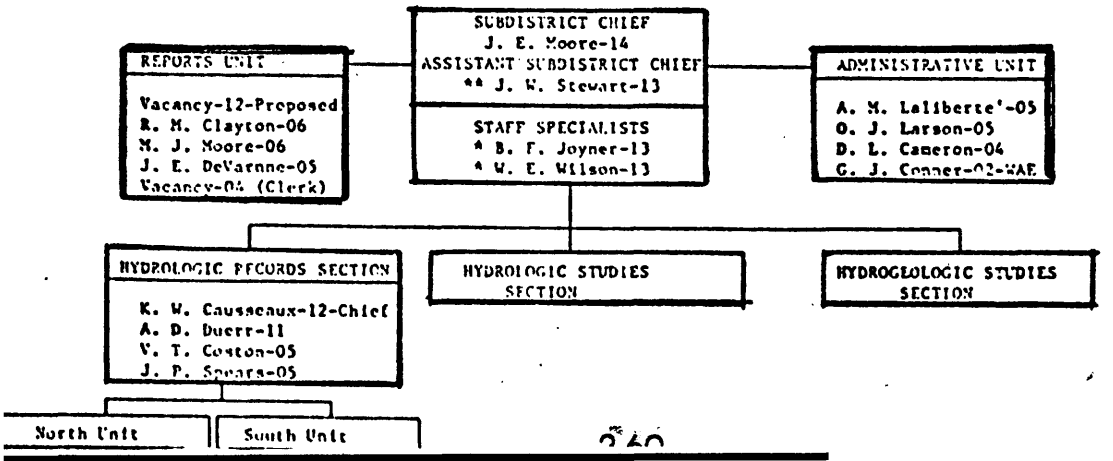


1975-77



1978

SOUTHWEST FLORIDA SUBDISTRICT



SOUTHWEST FLORIDA SUBDISTRICT

SUBDISTRICT CHIEF
J. E. Moore-14
ASSISTANT SUBDISTRICT CHIEF
** J. W. Stewart-13
O. J. Larson-05

STAFF SPECIALISTS
* B. F. Joyner
*** W. E. Wilson-13

REPORTS UNIT
Vacancy-11/12-Rpts.Spec.
R. M. Clayton-06
M. J. Moore-06
J. E. DeVarnne-05
Vacancy-04 (Ed.Clk.)

ADMINISTRATIVE UNIT
A. M. Laliberte'-05
D. L. Cameron-04
G. J. Conner-02-WAE

HYDROLOGIC RECORDS SECTION
K. W. Causseaux-12-Chief
A. D. Duerr-11
S. E. Henderson-07
R. D. Hayes-05
J. P. Spears-05
V. T. Coston-05

North Unit
J. K. Ogle-10 Lead
R. A. Mularoni-08
R. D. Evaldi-07
B. D. Ramsey-07
O. C. Campbell-06
S. L. Wheeler-06
S. D. Gres-06
L. G. Mize-05-WAE
J. M. Todd-05

South Unit
H. C. Rollins-10 Lead
W. L. Fletcher-09
L. D. Windom-07
R. W. Wylie-07
S. L. Lane-06
M. B. Molloy-05
Y. E. Upcavage-05
E. I. Closuit-05-(Stu)
B. A. Bernard-04-HFA

HYDROLOGIC STUDIES SECTION
* J. F. Turner-13-Chief
M. A. Lopez-13
C. R. Goodwin-12
W. R. Murphy-12
C. L. Goetz-11
Vacancy-11(Hydrol.)
W. M. Woodham-11
K. M. Hammett-09
D. M. Michaelis-09
R. F. Giovannelli-07
G. A. Karavitis-07 (C.S.)
Vacancy-05 (Hydro. Tech.)
P. H. Kotsol-05
M. L. Elder-04-(Stu.)
R. L. Rosson-04-(Stu.)
S. C. Stanley-04-(Stu.)

HYDROGEOLOGIC STUDIES SECTION
* Vacancy-13-Chief
J. J. Hickey-12
P. D. Ryder-12
W. C. Sinclair-12
D. P. Brown-11
M. Fernandez-11
L. R. Mills-11
W. C. Steinkampf-11
R. M. Wolansky-11
D. K. Yobbi-09
J. M. Gerhart-09
J. D. Fretwell-07
D. C. Parsons-07
G. L. Barr-06
R. M. Spechler-06
D. M. Johnson-05-(Stu.)
C. E. Tucker-04-HFA
J. D. Witte-04-HFA
(Sarasota Field Office)
H. Sutcliffe-11
G. Bowman-06
L. A. Rusek-04

* Discipline Specialist
** Budget Control Officer
*** Interdisciplinary Modeling

APPROVED BY:

Regional Hydrologist Date

District Chief Date

Subdistrict Chief Date

ER Personnel Office Date

FUNCTIONS DIAGRAM
SOUTHWEST FLORIDA SUBDISTRICT

SUBDISTRICT CHIEF

ASSISTANT SUBDISTRICT CHIEF

ADMINISTRATIVE SECTION

Is responsible for all clerical and secretarial activities. Included are handling of telephone calls, reception of visitors, routing of correspondence, processing of mail, and providing secretarial service for the Subdistrict Chief and Section Chiefs. Also included are the preparation of the following documents: fiscal, personnel, service reports, time and attendance reports, and travel vouchers.

HYDROLOGIC REPORTS SECTION

Is responsible for technical, editorial, policy and format aspects of all interpretive reports prepared by the Subdistrict. Assists the Subdistrict Chief in developing policy and goals on the production, preparation, and processing of reports to meet the needs of cooperating officials and the public. Insures the technical and editorial quality of reports, and determines adherence of reports to district, region, and division policy.

HYDROLOGIC RECORDS SECTION

Is responsible for the planning, implementation, and [illegible] the hydrologic records program in the Subdistrict. Included are the responsibilities for technical training and for technical quality [illegible] in the collection, analysis, and computer storage of hydrologic data. The design and evaluation of the records program includes [illegible] with cooperating agencies. The Hydrologic Records Section is [illegible] into a data-collection unit and a data-processing unit.

1. Data-collection unit - Is responsible for the collection of [illegible] flow, lake stage, ground water, and water quality [illegible]. [illegible] the installation and maintenance of recording instruments.
2. Data-Analysis Unit - Is responsible for the quality [illegible] processing, and storage of surface water, ground water, and quality [illegible] water hydrologic records. Provides expertise to Subdistrict staff [illegible] techniques and methods of data analysis and computation.

HYDROGEOLOGY SECTION

Is responsible for all interpretive hydrogeologic investigations in the Subdistrict. These investigations emphasize geologic controls on the occurrence, movement, quantity and quality of ground water. Included are evaluations of effects of ground water development, effects of phosphate mining on ground water, subsurface waste injection, future ground water supply potential, ground water use, artificial recharge and aquifer mapping. These investigations require a high level of expertise in geology and hydrology to describe the aquifer characteristics and hydraulic stress. The Sarasota Field Office operates under this section.

SURFACE-WATER HYDROLOGY SECTION

Is responsible for all interpretive surface-water hydrologic investigations in the Subdistrict. The investigations include evaluation of the hydrologic effects of present and future land use, water-supply development, simulation of surface-water systems, flood mapping, remote data acquisition, [illegible] of streamflow, and estuarine hydrology. [illegible] of the [illegible] and [illegible] use of the [illegible]

[illegible] SECTION

Is responsible for all [illegible] quality [illegible] and for the water-quality [illegible] in the Subdistrict. The investigations include [illegible] aquifers, [illegible] distribution [illegible] investigations [illegible] service [illegible]

Report Describing Organization of Office

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUMMARY OF U.S. GEOLOGICAL SURVEY INVESTIGATIONS AND HYDROLOGIC CONDITIONS IN THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT FOR 1977

By A. Buono, K. W. Causseaux, and J. E. Moore

Open-File Report 78-331

Prepared in cooperation with the

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Tallahassee, Florida

May 1978

CONTENTS

ILLUSTRATIONS

RESPONSIBILITIES OF A PROJECT CHIEF

A Project Chief can no longer afford the luxury of doing only hydrology. His responsibilities today are greatly expanded from those of a few years ago when data collection, data analysis, and report writing were his main duties. He must now be involved in all aspects of his project. As such, he must not only be a scientist or engineer, but also a part-time economist, politician, and manager. Listed below are eight functions that are now considered the responsibilities of a complete Project Chief. If he is not engaged in these, he is not fully knowledgeable of all the facets of his project.

1. Seed ideas that might be developed into a project, either coop or federally financed. If possible, suggest a preliminary study for planning the project. Meet with possible cooperators. If interest is shown, their objectives and ours must agree. Contact with the cooperators should begin here and be maintained throughout the project.
2. After funding has been found, prepare project proposal (followed by the MIS project description after Regional approval) in the format stipulated by the Northeast Region. A project chief can receive help from his supervisor in preparing proposals. Northeast Region memorandum nos. 78-04, 78-10, and 78-18 provide the necessary guidelines for preparing project proposals.
3. Prepare budget estimates. Your supervisor and Sub-district Chief will review these estimates to assure that the project is adequately funded to fulfill its purpose and scope. If the financing is not adequate, the project should be dropped or modified.
4. Prepare a detailed work plan. Included in the work plan should be a tentative outline of the final report It will sometimes be necessary to alter or update the outline. However, tentative outlines aid in the flow of project work.
5. Oversee the technical conduct of the project, including planning and execution of work tasks. This involves scheduling of work for subordinates on the project and requesting, through proper supervisory channels, people to assist when necessary. An essential and integral part of a project chief's responsibility is to recognize when to ask for technical assistance. If the proper assistance is not available at the local level, District, Regional and Division specialists should be contacted. Each cooperative project is assessed a 9% fee for WOTSC (13.5% if the project is with another federal agency). Part of this WOTSC fee is for providing technical assistance. If you don't take advantage of the help that is available, the project receives very little for the assessment.

6. Stay abreast of the general financial status of your project. The fact that the Administrative Clerk and Subdistrict Chief are monitoring the funds and expenditures in your project does not relieve you of the responsibility. Approval by your supervisor should ordinarily be obtained before acquiring any item of equipment or service, not budgeted for, if it exceeds $200.
7. Schedule termination date of the project so that sufficient time is allowed for report completion. Six months is usually a reasonable amount of time for report preparation completion of the technical aspects of the project.
8. Write the final report. This report is the primary vehicle for distributing and recording results of our projects. It is the project chief's responsibility to prepare such reports. WRD Memorandum 79.43 clearly outlines the Division's policy on reports.

Class Exercise in Project Management

The objective of this exercise is to apply approaches to the solution of a problem in project management occurring in a WRD district. Role playing to permit direct participation by class members will be the basic technique used. Guidelines discussed in other sections of this workshop should be considered in seeking a solution to the problem.

Background

The Alavada district of the Southwest Region has a cooperative program with the Dry Water District (DWD) which includes a quality-of-ground-water project. The DWD has encountered high levels of boron in some of its wells and has entered into a cooperative study with the Geological Survey to make a ground-water-quality appraisal of the area to assist DWD in altering its well system to solve the problem if possible. The project was set up to be accomplished in two years and has been underway for twenty-two months. Phil Flakley, groundwater hydrologist, heads the project. A hydrologic technician assists him half-time. He is also assisted by staff of the District's basic data section who obtain many of the data required for the project.

Andy Atwood, the district chief, received a phone call from the district manager of DWD, who stated that he got word indirectly that the project is behind schedule and that a draft report will not be ready for review for at least two months. It seems that the project chief, Phil Flakley, was discussing some of the technical aspects of the project with a member of the cooperator's staff and mentioned that the project was behind schedule. The cooperator expressed some annoyance at not being informed earlier and more directly, that the project report will not be available on schedule. He emphasized the importance of the results of the project in DWD and their urgent need for the information. Andy Atwood was taken by surprise because he didn't know where the project stood. (He did recall seeing a memorandum from Nee Hold on the regional staff reminding him that the project description indicated that the final report was due in the region.) He promised that he would look into the matter and would take appropriate steps to accelerate the project report, if indeed it was behind schedule.

Immediately after the telephone conversation with the cooperator, Andy Atwood called Mert Dill, Assistant District Chief; Cal Callahan, the chief of the district project section; and Phil Flakley, into his office. He wanted to know where the project stood, why he had not been informed if the project was behind schedule and, of course, expressed his displeasure at having the cooperator learn about the status of the project indirectly from Phil Flakley. Cal Callahan indicated that he was aware that the project was behind schedule and said that he intended to discuss it with Andy but had not gotten to it. Phil apologized for making the

off-hand remark to the member of the cooperator's staff that the project "looks as though it may be a couple of months behind schedule." When Phil was asked why the project was behind schedule he gave the following reasons: (1) The district basic data section had not assigned sufficient manpower to collecting the data he needed to meet his schedule. A small amount of the data was still to be turned over to him by the data section. (2) Flakley had been asked by the district chief to review an EIS statement and perform a couple of other brushfire tasks which diverted him from his project. (3) The QW lab was late in analyzing some samples collected as a part of the project. (4) At the cooperator's request, some additional samples were being taken at sites that they were particularly concerned about. This involved two extra field trips and additional time for the analyses. Phil indicated that although now he had most of the data together and much of the data analysis accomplished, he had not really gotten started on writing the report.

After a brief (and somewhat heated) exchange, a meeting was scheduled on the following day to discuss steps to be taken to accelerate completion of the project and report. Callahan, Flakley, Dill, and Red Shelly, chief of the basic data section, are to participate in the meeting with Atwood.

The meeting the next day is to be dramatized by the technique of role playing. Each member of the cast is to contribute to the discussion what he thinks would be appropriate to the role that he is cast in. The remainder of the class will observe and be prepared to discuss the approaches used after the role playing is terminated.

CAST

Andy Atwood, District Chief (GS-14)_____
Mert Dill, Asst. District Chief (GS-13)_____
Cal Callahan, Chief of Projects Sec. (GS-12)_____
Red Shelly, Chief of Data Sec. (GS-12)_____
Phil Flakley, Project Chief (GS-11)_____

4. REPORT PLANNING

Overview of Report Planning

The major problems noted in WRD reports are late completion, technical deficiencies, inadequate colleague review, incomplete titles, and inadequate abstracts. All of these could be prevented or overcome to some degree through adequate planning. Report planning should be a major component of project planning, and both should start at the same time. A detailed work plan, an adequate budget, and a detailed outline are essential.

1. The Major Elements of Report Planning are:

   - o Well prepared project proposal with report plans (example 4A).
   - o Detailed report schedule (example 4B).
   - o Quarterly review of report plans and progress (examples 4B, 2J).

2. Use Project File

- o The report components that belong in the project file are the work schedule, a short outline and annotated outline (examples 2I, 2J, 2K), a list of illustrations, and a statement of purpose and scope.
- o Report management and project management should operate in close coordination.

3. Use Report-Management Team

- o Each office should maintain a team for report preparation and review.
- o Members of this team should be the District Chief, Section Chief, report specialist, project chief, editor, typist, and illustrator.
- o Report responsibility and authority should be defined for each report-team member.

4. Give Authority to Reports Specialists

- o Reports staff should be given sufficient authority to ensure efficient report preparation, processing, and distribution. They should play a major consulting role in the planning of projects and reports.

5. Improve Colleague Review

- o Ensure that qualified personnel are selected as reviewers.
- o Obtain at least one review from outside the originating office.
- o Send authors and reviewers to training courses.
- o Encourage greater use of review outside the Survey.
- o Use more group review within the originating office.
- o Budget for time and expense of colleague review.

6. Improve Report Format

- o Determine report series early in project and follow publisher's specifications from the start.
- o Improve appearance of reports by planning layout of text, figures, and tables on facing-page basis before final typing and drafting.
- o Minimize use of color and oversize material to reduce printing cost.

7. Obtain Assistance - Assistance in report writing may be obtained from:

   - o District (report specialists).
   - o Region (report and discipline specialists).
   - o SP&DM (see Section 5,"Headquarters Assistance" article).
   - o Technical branches.

8. Recognize Excellence

   - o Proficiency in report writing and review should be a major consideration for promotion and awards.

9. Some Causes for Poor Reports

- o Poorly prepared project proposals.
- o Inadequate project planning.
- o Author not involved in planning.
- o Inadequate funding.
- o Poor supervision (at any level).
- o Lack of interdisciplinary viewpoint.
- o Failure to request consultants when needed.
- o Lack of a well organized annotated report outline, updated as required.
- o Failure to obtain needed field data.
- o Incomplete review of project and report status by District Chief, supervisors, and project chiefs.
- o Poor technical (colleague) review.
- o Failure of author to respond properly to colleague review comments and suggestions.
- o Failure of senior supervisors to closely check report for technical quality of review.
- o Poor training of authors and technical reviewers.

Report Outlines

The recommended first step in compilation of a report is to make an outline. Most authors need to work from a written outline because it helps them to keep their thoughts organized.

1. Preliminary Report Outline

   - o Preliminary report outline should be prepared at beginning of project.
   - o The preliminary outline generally includes only major topics with a preliminary list of illustrations and tables.
   - o It should be reviewed and expanded as the project progresses.
   - o It will serve as a guide for preparing the annotated outline.
   - o A preliminary draft of the "Introduction," including the "Purpose and Scope" should be written early in the project to indicate whether there is a complete understanding of the problem, objectives, scope, and approach.

2. Minimum Of One Annotated Outline Should Be Prepared

- o The preliminary annotated outline should be prepared midway through the study (example 2K).
- o The final annotated outline should be prepared just before writing the first draft of the report.
- o The annotated outlines should contain the topic sentences of all paragraphs that will be in the report as well as all table and figure headings.

Determination Of Audience And Selection Of Publication Series

One of the first considerations in report planning is to identify the target audience in terms of size, technical level, and geographic distribution. This will be a major factor in determining a publication format and series. The following information describes the series available to authors.

1. Choosing Publication Series

   - Identify target audience in terms of scientific level, size, and geographic location (example 4C).
   - Consider publication time, printing quality, and publisher's restrictions on content and format.
   - Be realistic about the significance of report.

2. Publication Series Commonly Used by the Water Resources Division

   - Water-Supply Paper--8 1/2 x 11-inch. Book format, for significant interpretative results of hydrologic investigations of broader than local interest. Some flexibility of internal format. Can use color if justified. May contain maps in packet. Sales item.

- Professional Paper--9 1/4 x 11 3/8. Book format, for significant interpretative results of investigations in any field related to earth sciences. Some flexibility of internal format. Can use color if justified. Sales item.
- Circular--7 7/8 x 10 1/4. Book format, for timely publication of geohydrologic information of ephemeral interest. Flexible internal format. One-color ink only. Free.
- Techniques of Water Resources Investigations--7 7/8 x 10 1/4. Book format, for description of hydrologic techniques. Quality similar to that of Circular. Sales item.
- Leaflets, Booklets, Brochures--"Popular Publication" Series. Simplified presentation of facts about WRD programs, or findings of studies. For education of public. One-color or can use color if justified. Single copies, free. Sold in bulk.
- Hydrologic Investigations Atlas (HA).--Map format for hydrologic and geo-hydrologic information. High-quality illustrations, text. Very flexible format. Color is used as necessary. Sales item.

- Miscellaneous Investigations Map (I).--Map format for geohydrologic and earth science information. Flexible format. Sales item.
- Miscellaneous Field Investigations Map (MF).--Map format for geohydrologic and related information. Limited availability, black and white only. Controlled by Geologic Division. Sales item.
- Water Resources Investigations/NTIS--8 1/2 x 11. Book format. Black and white only. Good to modest quality illustrations and text. Produced by districts. Available to general public through National Technical Information Service. Microfiche/hard copy. Sales items.
- Water Resources Investigations/Open-File. Colored maps or books with illustrations that must be presented in color. Good to modest quality, illustrations and text. Books 8 1/2 x 11, map size flexible. Produced by originating office in limited numbers. Available from origdnating office as stock lasts. Free.
- Open File. Black and white only. Available to general public through OFSS Denver. Book 8 1/2 x 11, map size flexible. Microfiche/hard copy. Sales items.

- State Series.--Usually Circular or Bulletin, book formats. Charcteristics similar to USGS Circulars and HA's. Limited distribution. Usually sales items.
- Technical Journals.--Examples: Geologic Society of America Bulletin, Ground Water, American Water Works Association Journal, Water Resources Research, American Society Civil Engineers Proceedings Journal. Usually short technical papers for peer audience. Peer readership.
- Trade Journals.--Examples: Water Well Journal, Cooperative Farmer, etc. General public audience. Some have broad readership.

Report Design

Designing a book requires the author to think of how the text, illustration, and tables relate to each other. Most reports could be improved by better planning for the design of the book. The following pages outline steps to help authors visualize the appearance of a book as they are writing the report.

Standard book format

The information below applies to all reports; however, most of the information pertains to camera-reader copy prepared by the originating office (WRI, Open File, Cooperator Series). Reports in the formal series (WSP, PP, etc.) follow the same procdure but the steps are handled by Headquarters Book Editors and Illustrators.

1. Description and Layout

   - o Printed books use both sides of the pages.
   - o Odd numbered pages are always on the right, even on the left. Preliminary pages are numbered in roman; text (beginning with abstract), in arabic.

- o Image area (text and illstrations) should be equal on each set of facing pages. White space may be inserted above headings and graphics to achieve balance.
- o There are a number of publications that show procedures and ideas for book design. Consult your local library.

2. Steps in Preparation

- o Prepare a mockup by cutting up a single-spaced draft of text and inserting tables, and rough illustrations as called for.
- o Work on facing-page basis, noting where graphics should be expanded, reduced, or reformatted from original sketch.
- o Paste down all components and add page numbers.
- o Insert page numbers into table of contents.
- o Prepare components for front, inside, and back cover, including backstrip if desired.
- o Obtain author and supervisor approval.
- o Proceed to final typing and drafting of camera-ready copy.
- o Insert all components into camera-ready copy.
- o Inspect, make corrections, and print or duplicate.

STOP Format

1. Description

- The STOP concept helps facilitate the writing and review of a report. It is an adaptation of the storybook format, in which illustrations are used lavishly to support the text, and the headings and topics are displayed prominently.
- STOP is an acronym for Sequential, Thematic Organization of Publication. It was developed by Hughes Aircraft Company, Fullerton, California.
- Reference: Carte, J.A., and Landers, R.A., 1975, STOP: A Path to More Useful Earth Science Reports, Geology, May 1975, p. 405-406 (Example 4D).

2. Layout

- Left page is used mainly for text
- Right page is used mainly for illustrations
- Text page contains
  - Section head (content) or chapter
  - Topic heading (headline)
  - Thesis sentence (summary statement sentence)
  - Main body (text)

- o Graphics page may contain
  - More text.
  - Maps, sketches, photos.
  - Tables or charts.

3. Steps in STOP Writing and Review (example 4E)

- o Prepare outline.
- o Expand to form annotated outline.
- o Sketch STOP units of publication size. Each unit should stand on its own. Consists of conclusion and supporting illustration or information.
- o Prepare the headings, thesis statement, and captions for STOP unit.
- o Hold storyboard conference. Display each STOP unit, sketch, with key points and illustrations, in sequence around the room for group review.
- o As a result of review comments, add, delete, or arrange STOP units. Be sure to evaluate all illustrations for effectiveness, clarity, technical soundness, and relevance.
- o Write text.
- o Colleague reviews.
- o Revise report.

- o Submit text, illustration, and mockup
- o Region and Director's approval.

4. Advantages of STOP

- o Enables efficient use of reviewers and illustrators.
- o Helps authors to criticize their own reports.
- o Facilitates rearranging, adding, or deleting material from report.
- o Focuses on logical organization.
- o Reveals unnecessary illustrations or text.
- o Permits rapid and effective group review.
- o Requires minimum reading (facilitates selective reading).
- o Appropriate for reports having a common theme but containing chapters by different authors.

5. Disadvantages of STOP

- o Requires extreme care in design and page layout.
- o May require extra graphics to fill space.
- o May have tendency to shift topics too abruptly.

Parts of Report

Report Title

The report title is the principal means of attracting readers; therefore, it needs to convey a maximum amount of information in a minimum number of words.

1. The report title should be as accurate and concise as possible.
   - o Title should reflect content of report. It should describe the principal topic(s) of the report.
   - o If multiple topics are listed in the report title they should reflect their order of the presentation in the report.
   - o Title should indicate a precise geographic location, if applicable.
   - o Title should not have a consulting tone. Avoid words such as "recommendations".

2. Title wording should be the same.
   - o Title page, cover, introduction, WRSIC abstract, abstract, routing sheet, and press release--same title wording on all these pages.

Report Introduction

The Introduction should be brief and contain a description of why the study was done, scope and purpose of the study, area, time period, approach, and acknowledgments.

1. Why Study Was Done
   - o Describe in first part of Introduction.
   - o Describe cooperation and source of funds.

2. Purpose and Scope
   - o This should describe the intent and scope of the report, not the study. It should inform the reader of what the report contains.
   - o Describe the physical or hydrogeological setting.

3. Approach
   - o Describe what data, techniques, or methods were used and how they were used.

4. Acknowledgments

- o Credit assistance received.
- o Persons or organizations outside the Geological Survey should be listed first.
- o Geological Survey personnel or groups are acknowledged only if the assistance was not part of normal work.
- o Exceptional technical or colleague review may be acknowledged.
- o Guidelines for acknowledgments are given in "Suggestions to Authors".

Abstract

The abstract is a digest of the report. Because the abstract will appear in abstract journals and indexing services, it should be written to increase the potential audience for the report.

1. Abstract Content

   - o The abstract should indicate geographic location, purpose, and results of the study (example 4F, 4G, 4H).
   - o It may also include the method of study and type of data used.
   - o Abstract should tell what the report contributes, not what it contains.
   - o Abstract should present the essence of a report. Consequently, it should be written last.
   - o Abstract should present major conclusions of report.

2. WRSIC Abstract

   - o The WRSIC (Water Resources Information Center) abstract is required for all WRD reports.
   - o Use double-spaced type.

- o Restrict abstract to 200 words or less (a must).
- o Provide all pertinent information from the text abstract.
- o Use WRSIC thesaurus for key words (descriptors).

3. Abstracts For Seminars and Meetings

- o These types of abstracts are really summaries. They are used by authors to secure a place at the meeting.
- o Abstracts are the only part of the report read by many people; therefore, the significance of the findings should be briefly explained.

Illustrations

Illustrations in a report must be necessary, contribute to the understanding of the report, be complete (able to stand alone), and be at a size or scale commensurate with the data being presented. Illustrations include maps, diagrams, photos, charts, sketches, and graphs.

1. Specifications For Illustrations

   - Almost all instructions regarding the preparation of illustrations for Geological Survey reports are found in the WRD Publications Guide.

2. Quality

   - Author-prepared illustrations are usually suitable for all review and approval steps.
   - Review illustrations must be an exact replica, with the exception of color, patterns, and final cartography and typography, of what the author wishes to be published.
   - Review copies must be legible.

- Photographs: One glossy print at publication size or larger must be included for Region and Division review.

Tables

Tables may be typed or computer-generated. Machine copy reductions are permitted for Region and Division review.

1. Format is flexible
   - Examples may be found in recent publications by the Geological Survey.
   - Review copies need not be double spaced except where extensive editorial work is likely.

Abbreviations And Chemical Symbols

The use of abbreviations and chemical symbols tends to decrease reader comprehension. Therefore, their use in reports must be judicious.

1. Purpose

   - The reason for using most abbreviations and chemical symbols is to decrease amount of text and reduce typing or type-setting time and costs.

2. Use

   - Use of acronyms, abbreviations and chemical symbols should be avoided in report titles, abstracts, and illustrations.
   - They are permitted in tables where needed to save space as long as they are explained in a footnote.
   - They are permitted in abstracts if repeated frequently and if explained after the first use.
   - Some publishers permit free use of abbreviations and symbols.

Writing Aids

References that editors refer to most frequently are discussed below. Authors also must become familiar with these references to avoid delays in preparation and publication of their reports.

1. Suggestions to Authors

   - All authors (whether new or experienced) should read, then study, this book to learn Survey policy and the mechanics of report preparation. Suggestions to Authors is used extensively outside the Survey.

2. WRD Publications Guide

   - All authors should brief themselves on the table of contents to learn what topics are covered and where to find specific articles.
   - Revised Publication Guide will become available late in 1981.

3. GPO Style Manual

   - o This book gives information on typographic style and can save editors and typists a great deal of effort.
   - o The GPO manual is more useful than most style manuals because it provides a large number of examples.
   - o Authors should review the sections on capitalization, compounding, spelling, abbreviations, and numbers.

4. Glossary of Geology (Bates and Jackson, editors, 1980, American Geological Institute)

   - o Gives geologic terminology and the sources from which terms were derived.

5. Thesauruses and dictionaries

   - o Useful in determining the meaning and spelling of words and finding synonyms.

6. The Elements of Style - (W. Strunk and E. B. White, 1959, McMillan)

   - o An entertaining booklet that has been a bestseller for 50 years. It explains the common phrases to avoid and gives

suggestions for developing concise sentence structure and logical paragraph organization.

7. Geowriting - (Cochran, Fenner, and Hill, 1979, American Geological Institute,)
   - o A guide to book publication. Mainly for people outside the Survey.

8. List of common proofreaders marks - (example 4J)
   - o Helps authors, editors, and typists understand each other's margin notes. A complete list is given in Suggestions to Authors the GPO Style Manual, and may also be found in many dictionaries.

9. Definitions of Selected Ground-Water Terms - (Lohman and others, 1972, Water-Supply Paper 1988)

10. General Introduction and Hydrologic Definitions - (Langbein and Iseri, 1960, Water-Supply Paper 1541-A)

11. Study and Interpretations of the Chemical Characteristics of Natural Waters, (Hem, 1970, Water-Supply Paper 1473)

WRD Publications Guide

The WRD Publications Guide supplements Suggestions to Authors. After several year of use, the Guide is being revised to make it more useful to authors and support staff. The preliminary table of contents is given in example 4I and a summary table below.

1. Survey Policy
2. Publication media to WRD authors
3. Obtaining approval to publish or release USGS manuscripts
4. Use of numbers in WRD reports
5. Editorial considerations for USGS manuscripts
6. Preparing manuscripts for Division review
7. Preparation of camera-ready copy
8. Distribution final copies
9. Illustrations
10. Base maps
11. Information on related offices
12. Obtaining bibliographic search
13. Map reports

14. Book reports

15. Open-file report

16. WRI report

17. Administrative reports

18. Reports for publication outside

19. Press releases

20. Pertinent memos

Editorial Considerations

Before turning over a completed manuscript draft for review, run through a checklist such as shown in example 4K.

1. Publisher's Specifications and Style

   - Before typing the manuscript or preparing illustrations, obtain the publisher's style sheet to determine typographic requirements such as position of headings and indication of rank; use of abbreviations; use of metric vs English units; bibliographic style, illustrations size. Also determine whether publisher will set report in type or expects camera-ready copy.

2. Grammar and Expression

   - Refer to Suggestions to Authors and the Elements of Style.
   - Use the active voice.
   - Put most important idea first, not in the middle or near end of the paragraph.
   - Avoid stringing "ly" words together.

- o Avoid piling up adjectives before a noun.
- o Use parallel construction when comparing two or more items or listing a series of items.
- o Develop strong topic sentence for each paragraph.
- o Present material clearly.
- o Develop technical-writing skill through practice.
- o Avoid jargon and "flowery" verbiage.

3. Illustrations

- o Plan size and position of lettering.
- o Determine final size early.
- o Determine whether color or screened base will be needed.
- o Consider whether each figure is adequate (would two show the material more clearly, or could two be consolidated into one?)
- o Start with an appropriate base that shows area in adequate detail but is no larger than necessary.
- o Be sure the text refers to each figure and that each caption describes the figure accurately.

4. Tables

- o Headings must be as concise as possible.
- o If the material that has been reduced does not fit the page, redesign layout material to fit on facing pages.
- o Similar tables should be similar in design.
- o Footnote references on values should precede the value or they will be mistaken for exponents.

5. The manuscript should be given careful editorial review

(examples 4J, 4K)

Procedures for Obtaining a Bibliographic Search

To keep abreast of pertinent literature and to obtain the documents needed for preparation of scientific reports, Survey authors should obtain a bibliographic search early in the project. This can be done either manually or by computer depending on the availability of local resources and on the scope of the topic.

1. Manual Search

   - Define the topic and scope of the literature desired and select 5 to 10 key words, or index terms. These may be obtained from a thesaurus such as the WRSIC Water Resources Thesaurus (1980), which is the source book for descriptors used on the WRSIC information sheet that accompanies all manuscripts. Every District and field office should have copies.
   - Obtain an abstracting or indexing guidebook that contains references (with or without abstracts) to literature on the topic. The one used most commonly in WRD studies is "Selected Water Resources Abstracts," published by U.S. Water

Resources Scientific Information Center and issued twice a month. Cummulative author and subject indexes are issued yearly. Copies of the biweekly index must be retained indefinitely because the annual cumulative indexes do not repeat the abstracts. All Districts receive this publication free. Additional indexes such as "Chemical Abstracts," "Biological Abstracts," "Pollution Abstracts," etc., are available at college and State libraries. These listings contain full bibliographic references and abstracts.

2. Computerized Search

This type of search retrieves information from hard-copy indexing guides that have been converted to machine-readable tape. This type of search is more efficient than a manual search because it is done by a computer. The basis for this system is that commercial information-retrieval services purchase machine-readable tapes from the owners of indexing guides such as "Chemical Abstracts," and manipulate and add the tapes to a central computer. Thus, the original index becomes part of a

data base, sometimes referred to as a file. Online retrieval from the file can increase the number of access points (or indexing terms) by an order of magnitude over individual hard-copy indexes.

The three types of data bases, or files, are (1) bibliographic, (2) directory-type, and (3) statistical.

3. To obtain a computerized search:

   - o Define the topic and choose 5 to 10 key words, then prepare a list of other information that may help define the research topic, such as time and geographic limits. The "Water Resources Thesaurus" may be used in selecting key words; however, most data bases have their own thesaurus.
   - o Write or phone the nearest regional Geological Survey Library reference desk to place the request for a literature search. Provide the key words and describe the topic.
   - o The search is conducted through an online information-retrieval system. References with or without abstracts (depending on the data base) are printed out wherever the computer is located and are mailed to the requester.

4. Sources of Documents

o It is the author's responsibility to obtain the actual documents. Most government-produced documents (except open-file reports*) are available through National Technical Information Services (NTIS**) or the Superintendent of Documents. NTIS reports are sold on a cost-per-page basis. For example, cost of a 10-page report in 1981 was about $5; cost of a microfiche copy of any report was $3.50. The simplest way to obtain documents through NTIS is to have the District office set up a deposit account against which material can be charged on a continuing basis.

---

* USGS Open-file reports may be obtained through the originating office or purchased at cost from:

Open-File Services Section
Branch of Distribution
U.S. Geological Survey
Box 25425, Federal Center
Denver, Colorado 80225

** Most government-produced documents may be purchased in paper or microfiche copy at cost from:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

5. Documents not available through Superintendent of Documents, NTIS, or the Open-File Services Section can often be borrowed from the USGS Library or obtained through interlibrary loan. To arrange for an inter-library loan, phone or write the nearest Regional Survey Library reference desk.

   o In a few cases, the only way to obtain a document will be to purchase it directly from the publisher.

page 4.39 follows

EXAMPLE 4A

PROJECT REPORT REVIEW SHEET

PROJECT NUMBER: _____ DATE: _____

PROJECT TITLE: _____

PROJECT CHIEF: _____

WORK ITEMS	DEADLINE	COMPLETED	NOTES
1. PROPOSAL			
2. WORK PLANS			
3. REPORT OUTLINE REVIEW			
4. EQUIPMENT AND INSTRUMENTS			
5. CONSTRUCTION			
6. BASE MAP			
7. ANNOTATED OUTLINE REVIEW			
DATA COLLECTION			
9. DATA ANALYSIS			
10. ILLUSTRATIONS REVIEW			
11. TABLES REVIEW			
12. REPORT COMPLETED			
13. SECTION CHIEF REVIEW			
14. REPORT SPECIALISTS REVIEW			
15. COOPERATOR REVIEW			
16. DISTRICT CHIEF REVIEW			
17. COLLEAGUE REVIEW			
18. DISTRICT TRANSMITTAL			

COMMENTS: _____

NEW PROJECT REVIEW DATE: _____

page 4.41 follows

PROJECT REPORT SCHEDULE

Project _____

Report Title _____

Author(s) _____

Conference Attendees _____

Intended Audience _____

Report Type and Publication Media _____

Report Schedule	(Target Date/Completion Date)
Planning and Prewriting	
Preliminary Report Outline	____/____
Base Map Request	____/____
Initial Annotated Outline or Preliminary Report	____/____
Illustration Plan	____/____
Final Annotated Outline or Preliminary Report	____/____
Writing, Self-Editing, Rewriting	
First Draft	____/____
Author's Review and Revision	____/____
First Typing	____/____
Editing and Review	
Editorial Review	____/____
Author's Revision	____/____
Discipline Specialist or Section Chief Review	____/____

PROJECT REPORT SCHEDULE

Report Schedule (Continued)	(Target Date/Completion Date) (Continued)
Editing and Review (Continued)	
Author's Revision	/
Section Chief or Discipline Specialist Review	/
Author's Revision	/
Assistant District Chief or District Chief's Review	/
Author's Revision	/
First Colleague Review	/
Author's Revision	/
Second Colleague Review	/
Author's Revision	/
Final Typing and Editing	/
District Chief's Review	/
Approval and Publication	
Transmittal to Region	/
Report Approval	/
Report Publication	/

Support Needed

Maps_____

_____

Typing_____

_____

PROJECT REPORT SCHEDULE

Support Needed (Continued)

Drafting_____

_____

Consultations_____

_____

Special Illustrations_____

_____

Report Reviews

Technical_____

_____

Editorial_____

_____

Suggested Reviewers_____

_____

Report Status_____

_____

_____

Other_____

_____

_____

_____

page 4.45 follows

CONSIDERATIONS FOR SELECTIONS
OF PUBLICATION SERIES

Limit on number of pages

Publication Turnaround time (urgency)

Page fee

Maximum image size (page size minus margins)

Use of color

Use of oversize paper (foldout, plate)

Circulation and distribution

Size of audience

Duration of interest

Technical level of intended audience

Need for cover

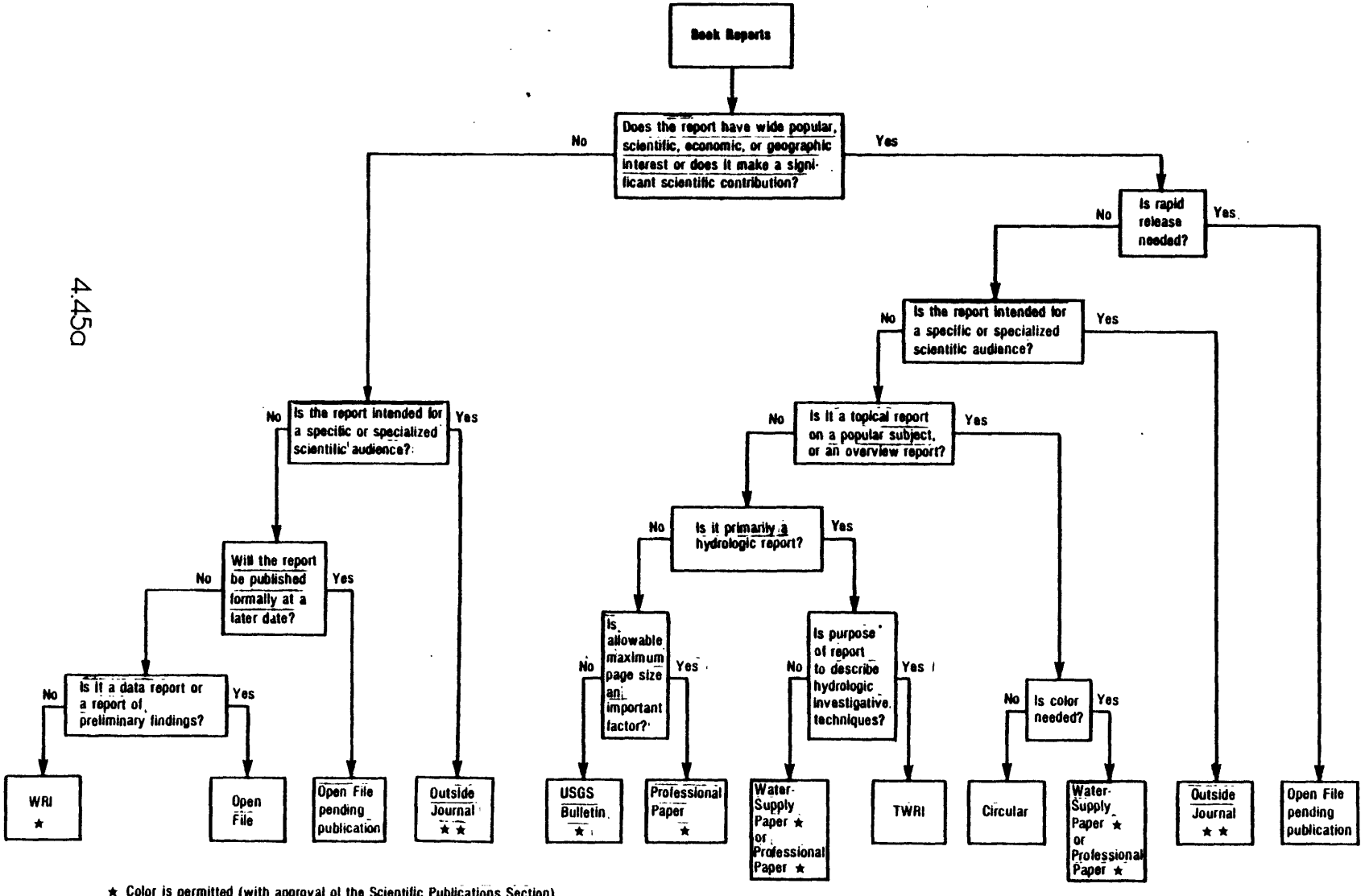
Desired printing quality (typesetting, glossy paper)

Prestige

Effective: July 1, 1982

DECISION TREE FOR SELECTING PROPER OUTLET FOR WRD-PREPARED BOOK REPORTS

(Any book or map report released to the public may be published by a cooperating agency. The quality and distribution of book and map reports published by cooperating agencies may equal or surpass that of equivalent USGS publications.)



★ Color is permitted (with approval of the Scientific Publications Section)

★★ Use of color, plates, or oversize illustrations optional with publisher

Prepared by: Office of Assistant Chief Hydrologist for Scientific Publications and Data Management
440 National Center, Reston, Virginia 22092

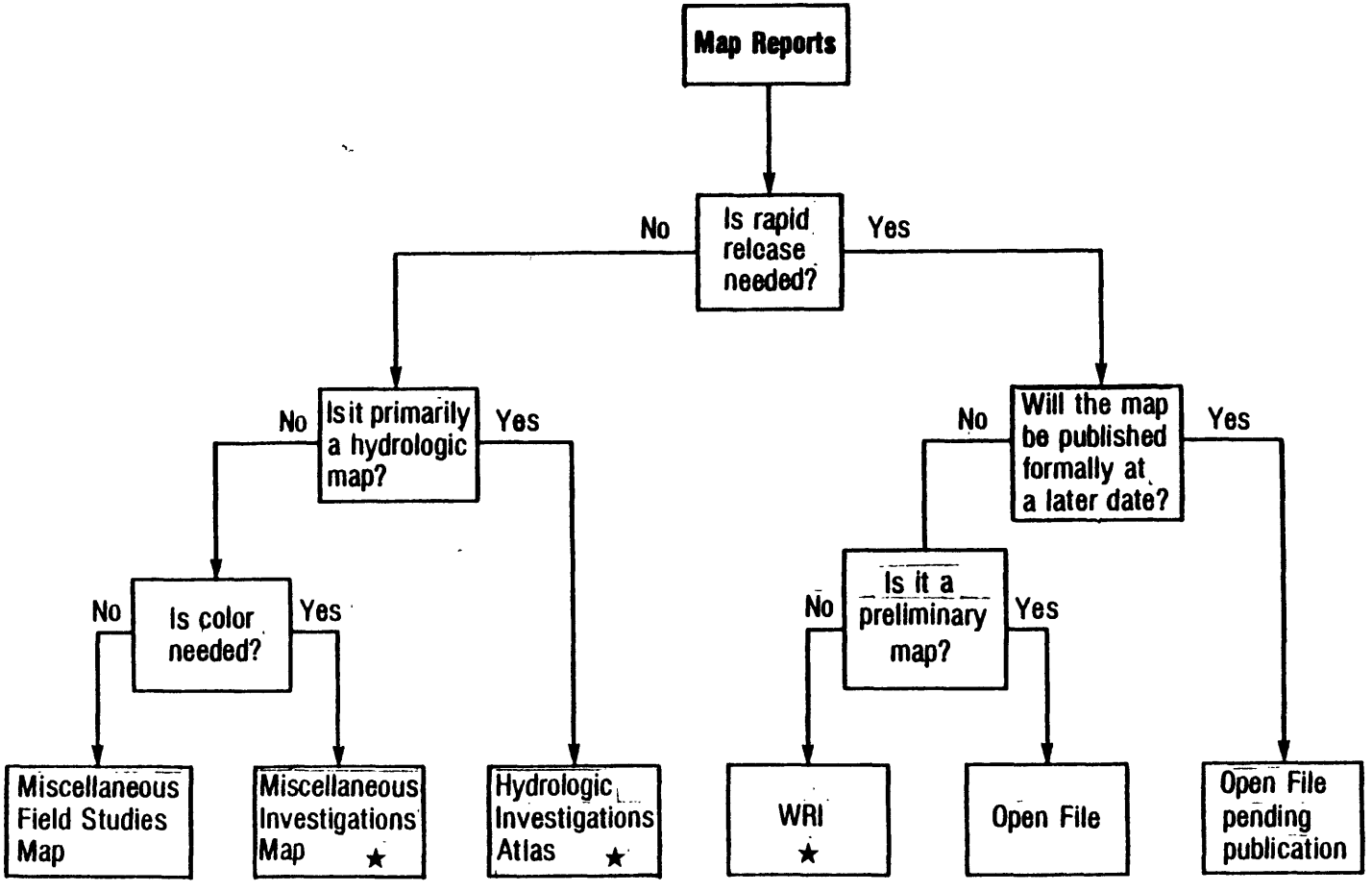
4.45a

EXAMPLE 4CC

Effective: July 1, 1982

DECISION TREE FOR SELECTING PROPER OUTLET FOR WRD-PREPARED MAP REPORTS

(Any book or map report released to the public may be published by a cooperating agency. The quality and distribution of book and map reports published by cooperating agencies may equal or surpass that of equivalent USGS publications.)



★ Color is permitted (with approval of the Scientific Publications Section)

Prepared by: Office of Assistant Chief Hydrologist for Scientific Publications and Data Management
440 National Center, Reston, Virginia 22092

4.45b

Page 4.4.13 follows

STOP: A path to more useful Earth science reports

James A. Carte, Ronald A. Landers
West Virginia Geological and Economic Survey
Morgantown, West Virginia 26505

EXPLANATION

During the past year and a half, we at the West Virginia Geological and Economic Survey have been experimenting with a report-writing and publication technique we feel presents basic Earth science data in a concise form that is easily understood by all types of readers. The technique—known as Sequential Thematic Organization of Publications (STOP)—also maximizes the efficiency of the authors, editor, and reviewers. STOP was developed at Hughes Aircraft Company, Fullerton, California (Tracey, 1974), and later was used in the electronics industry. As far as we know, however, we are the first to apply the technique to Earth science documents. Sections 1.0 and 2.0 below are in the STOP format, consisting of two units that would each be presented on facing pages of a standard STOP report.

1.0 "STOP" FORMAT

"STOP" Consists of Essentially Independent Two-Page Presentations of Text and Graphics

STOP (an acronym for Sequential Thematic Organization of Publications) is a report-writing and publication technique that presents a technical report in a series of essentially independent, two-page presentations called STOP units. The left page of each unit contains a minimum of text consisting of (1) section heads and (or) subheads at the top of the page, (2) a thematic heading similar to a newspaper headline, (3) a thesis sentence similar to the lead paragraph of a news story in a newspaper, and (4) the main body of text. The right page of each unit generally consists of graphical information that illustrates the text or that conveys the primary message.

The *section heads and subheads* of a STOP unit are in the same general form as those used in standard reports. The remaining three textual elements are an adaptation of the inverted-pyramid news-story format used by professional journalists (a writing format in which the most important paragraph is the first one and the least important paragraph is the last). The *thematic heading* is comparable to a headline in a news story, the *thesis sentence* (which, in fact, can be two or three sentences) is comparable to the lead paragraph of a news story, and the *main body* is comparable to the inverted-pyramid text of a news story.

The right page of a STOP unit generally consists of graphical information that supports the corresponding text or is the principal point of the unit. Graphics can be line drawings (such as graphs, schematic diagrams, and outline drawings), photographs, tables, equations, or even a list of important points.

Modifications of the STOP format may be made to accommodate special needs. Figure 1 illustrates the standard "text-on-the-left/graphic-on-the-right" format as well as five modified

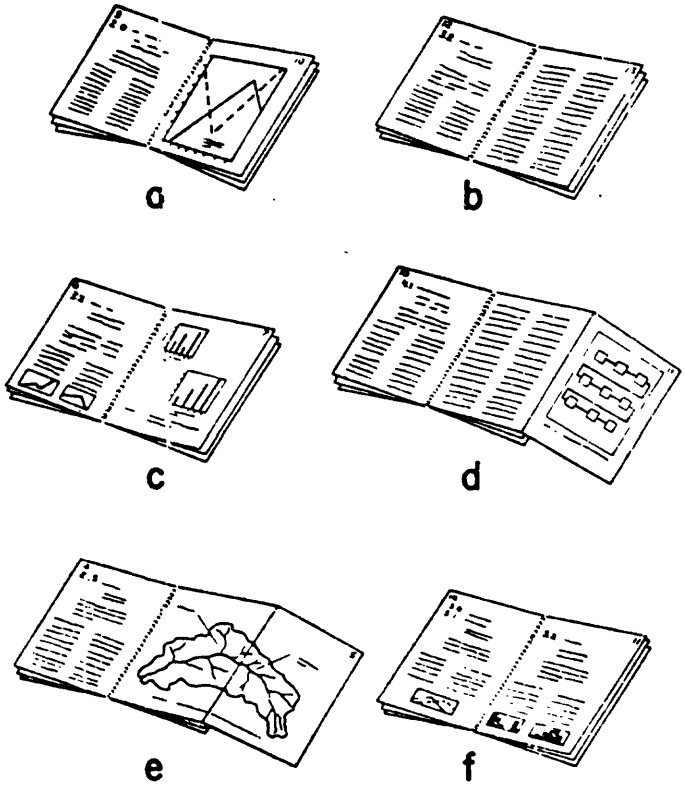


Figure 1. STOP formats: a, standard format with text on left, graphics on right; b, text only on both pages; c, text plus graphics on left page, graphics only on right page; d, text running over to apron of foldout page; e, graphics only on right foldout page; f, two complete STOP units on [illegible] pages (after STOP, a procedure for effective publications, 1970).

formats. In any case, all textual and graphic material for a given two-page STOP unit *must* be presented to the reader on facing pages, so he is not forced to turn a page to view supplemental information.

Since some graphics may be required to support more than one section, a given illustration can appear more than once in a STOP report. Appendixes can still be used at the end of the report for large amounts of data that are summarized in a corresponding STOP unit. If a graphic illustration cannot be developed—even if it only consists of a list—the unit probably is not significant enough to be separated from, and should be combined with, another STOP unit. If all required text and graphics do not fit into a two-page unit, the unit should be subdivided into two or more STOP units.

2.0 "STOP" PRODUCTION PROCEDURE

"STOP" Involves Simple 14-Step Procedure; First 5 Steps Are Common to Standard Reports

> The procedure used to produce a report in the STOP format involves a relatively simple 14-step process (see Fig. 2). The first 5 steps should be familiar to most authors, as they are commonly used to develop standard reports; the remaining nine steps are described below.

To produce a STOP report, we at the West Virginia Geological Survey follow the 14-step procedure shown in Figure 2. Steps 1 through 5 are commonly used in developing standard reports and are not discussed in this article. After these first 5 preliminary steps are taken, the next step is to formulate STOP units, keeping in mind that each unit should be a self-contained, two-page presentation that explains and illustrates one complete theme. Each STOP unit consists of (1) a unified statement, conclusion, or recommendation; (2) all necessary supporting information; and (3) graphics or illustrations that substantiate or supplement the text or that serve as the focal point for the entire STOP unit.

The seventh step is to list specific and factual key points for each STOP unit. Next, profiles are prepared for each unit by combining the list of key points with all necessary graphics to present the essence of each unit as it will appear to the readers.

The ninth step is to hold a "storyboard" conference, which brings together the authors, technical editor, professional colleagues, and agency director or executives. The entire publication is mounted on a wall and each STOP unit is presented in its proper order by the authors. During the conference, technical, policy, and editorial comments are immediately considered for each unit; reviewers assess the entire publication as the reader will see it; STOP units are added, deleted, or re-ordered; and all graphics are evaluated for effectiveness, clarity, and relevance.

During the tenth step, the authors make all necessary changes and the technical editor makes a final check and gives instructions to the typist or composer operator. In the next step, final layout work, illustrating, and drafting are done while, at the same time, final typing or composition is in progress.

The twelfth step consists of a final proofreading review of the text and graphics by the authors and technical editor. The next step is to make final minor corrections and changes, followed by the last step—actually publishing the report.

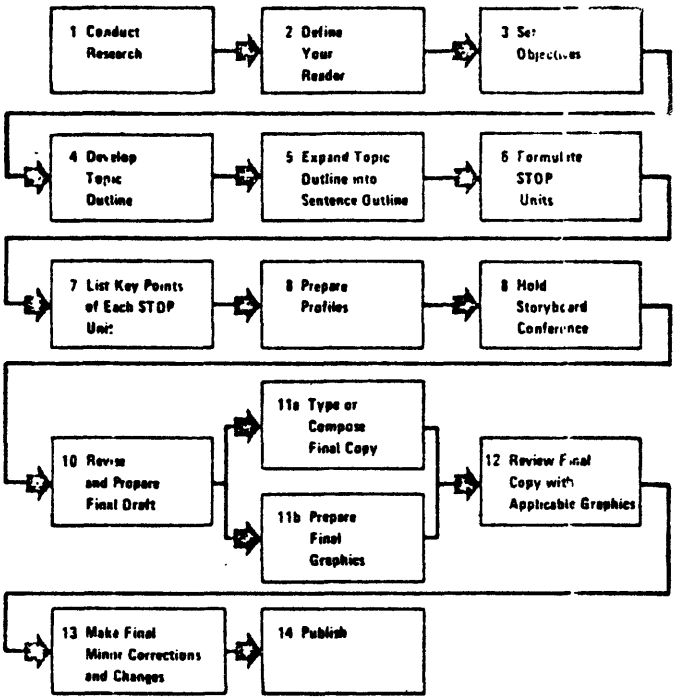


Figure 2. Fourteen-step flow chart for typical STOP report.

SUMMARY

The STOP format and the production procedure described in the above two STOP units have a number of significant advantages. First, the overall approach maximizes the efficiency of the authors, editor, reviewers, and reader. For the authors and editor, the technique's tremendous flexibility permits rapid shifting, addition, or deletion of entire STOP units. In addition, the format forces the authors to think graphically, which generally results in a report that is more useful to the reader. For the reviewers, the use of a "storyboard" conference permits rapid and meaningful input with a minimum of conflicts. The reader's efficiency is maximized because the STOP-unit concept is developed around a natural topical unit consisting of a minimum of text accompanied by well-planned graphics. Furthermore, the reader can get the essence of the report after reading only the thematic headings and thesis sentences.

A recently completed example of a STOP report is available free from the West Virginia Geological and Economic Survey, P.O. Box 879, Morgantown, WV 26505. The report—titled "Improving Stream-Water Quality in the Elk River Basin" by Ronald A. Landers and Richard A. Smosna—recently won an "Award of Excellence" in an international technical writing contest sponsored by the Society for Technical Communication.

REFERENCES CITED

STOP, a procedure for effective publications, 1970: Martin Marietta Corp., Orlando Rept., no. OR-988, 29 p.

Tracey, J. R., 1974, Managing-editing a STOP proposal - The technical editor as a bookbuilder, *in* 21st Internat. Technical Communications Conf., St. Louis, Proc.: p. 157-164.

ACKNOWLEDGMENTS

Reviewed by W.D.E. Cardwell, Hunter P. McCartney, Robert B. Erwin, James A. Barlow, and Richard A. Smosna.

MANUSCRIPT RECEIVED MARCH 24, 1975

MANUSCRIPT ACCEPTED MAY 6, 1975

STOP PROCEDURES

REPORT WRITING AND REVIEW

1. PREPARE TOPIC OUTLINE

2. EXPAND TO ANNOTATED OUTLINE

3. PREPARE STOP UNITS

   - o CONCLUSION AND SUPPORTING ILLUSTRATION
   - o EACH UNIT STANDS ON ITS OWN

4. HOLD STORYBOARD CONFERENCE

   - o POST CONCLUSIONS AND ILLUSTRATIONS
   - o GROUP REVIEW
   - o ADD OR DELETE INFORMATION
   - o EVALUATE ALL ILLUSTRATIONS FOR EFFECTIVENESS

5. COMPLETE REPORT

6. COLLEAGUE REVIEW

7. REVISE REPORT

8. REGION AND HEADQUARTERS APPROVAL

EXAMPLE 4EE

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA 22092

In Reply Refer To:
EGS-Mail Stop 439

December 8, 1981

WATER RESOURCES DIVISION MEMORANDUM NO. 82.27

Subject: PUBLICATIONS—Guide for Preparation of Abstracts

The large number of articles and reports prepared by the U.S. Geological Survey each year makes it increasingly important that the basic content of the literature is quickly and accurately identifiable. This ready identification is greatly aided if the author begins with a complete title and a well-prepared abstract.

The importance of a well-prepared abstract cannot be overstressed. Abstracting services are a principal means of disseminating information on new publications in the United States and throughout the world. The abstract serves to lead the reader to the report. It enables him to rapidly identify the report content, and thus, helps him to decide whether to read the document in its entirety. To some busy scientists, abstracts are the only means by which to keep informed on the work of their colleagues. For these people, the abstract is the report, and it should be written so that the reader can learn, from the abstract alone, the important results of the investigation.

Each Survey author is required to abstract his work and to supply copies with the report when it is submitted for approval. The attached guidelines for preparing abstracts should be followed by all WRD authors. Keep in mind that the abstract is a digest of the report, and should be a concise, but accurate description of the findings. An abstract that conveys a maximum of information with a minimum of words requires more writing and rewriting than the preparation of other parts of the report. Preparation of a good abstract is a skill that can only be acquired by diligent practice, but it is a necessary skill for all Survey writers—one that will enhance the usefulness of our reports and help publicize our accomplishments to scientists and water managers worldwide.

Robert J. Dingman
Assistant Chief Hydrologist
for Scientific Publications
and Data Management

Attachment

This memorandum supersedes no existing memorandum.

WRD Distribution: A, B, S, FO, PO

GUIDELINES FOR PREPARING ABSTRACTS

Although abstracts need not conform to any standard format or content, the following general guidelines should be used when preparing an abstract:

(1) The abstract is a digest of the report and should be written after completion of the report.

(2) The abstract should not include information not contained in the body of the report.

(3) The abstract should contain the same basic information and tone (balance, emphasis) of the report.

(4) Authors should describe findings as concisely and informatively as possible, but should avoid being cryptic or obscure.

(5) When findings are too numerous for all to be included, give priority to significant discoveries, findings that contradict previous theories or results, findings relevant to a practical problem, or findings that the author knows are important to a cooperator or other funding agency.

(6) With the exception of data reports (see item 7 below) do not state what the report contains, but rather what it contributes. Be informative and include the essential factors of the original document. The following examples do <u>not</u> meet the requirements of a suitable abstract:

> "Problems caused by pumping for public-water supply are discussed," "Effects of commercial pesticides on ground-water quality are described," "Methods of ground-water recharge are compared," "Results are given for water-quality analyses."

(7) The abstracts of data collections generally cannot be informative because conclusions are lacking and because of the large amount of tabulated information. A suitable abstract for these reports should include a statement of purpose, a short list of the types of data in the report, and as much information as possible about the source and quantity of data. For example, "Discharge measurements were collected since 1978 at 55 gaging stations in 13 Adirondack Lake watersheds.

(8) The abstract should include the following:

(a) An initial topic sentence that is a central statement of the report's major thesis (subjects covered), but avoid repeating the words of the document's title;

(b) The geographic location (for reports describing or referring to a particular location);

(c) The problems, primary objectives and scope of study, or the reasons why the report was written (unless these are already clear from the title or can be derived from the remainder of the abstract);

(d) The type of report, when this is not evident from the title or publication outlet of the abstract—e.g., water-quality study, case history, hydrologic reconnaissance, state-of-the-art report, report of original research, areal investigation, etc.;

(e) The experimental plan or methodology used, including new techniques, or special procedures, tests, and equipment;

(f) The type and accuracy of data collected and used;

(g) Whether numerical values are new or derived, and whether they are the result of a single observation or of repeated measurements;

(h) The principle findings, including newly observed facts, conclusions of an experiment, theoretical results, obtained relationships and correlations noted, new compounds or minerals, new geologic or hydrologic units, etc.;

(i) Conclusions, including whether the results meet the objectives of the study, how the results can be applied, suggestions for further study, etc.

(9) There is no set order for incorporating the above items in the abstract. The abstract may start with a statement as to what new method, result, or theory is reported or it may begin with the purpose of the study and set the stage for results and conclusions. Other abstracts may start with conclusions. Whatever the arrangement, the abstract should present a smooth flow of thought from one part to the next.

(10) Avoid a comparison of the present work with the work of others or with what has been known previously about the topic. Rarely, an abstract may require reference to a published work if the present work is a development from other work and it is necessary to show the basis from which the development was made. Then, the complete citation should be given in parenthesis, not just the usual text reference to author and year of publication. Citations in abstracts for scientific journals should conform to standards of the journal for which the paper is written.

(11) The nomenclature used in the abstract should be meaningful. Use standard nomenclature and avoid unfamiliar terms, acronyms, abbreviations, or symbols. Units of measurement should not be abbreviated unless they are long or complex, in which case they may be abbreviated after they are spelled out where they first appear.

(12) The abstract should be a complete unit, independent of the text, and for this reason, references to tables, illustrations, or other material in the body of the report should be avoided.

(13) Limit most abstracts to a single paragraph, except those for long reports.

(14) Use complete, connected sentences. The active voice is preferred over the passive voice. Write "The author collected water from New River," and not "Water from New River was collected by the author."

(15) The abstract may be written in either the present or the past tense, depending on the type of report. Abstracts for reports describing the results of research or experience should be written in the past tense, whereas some parts that are independent of time such as conclusions, may be written in the present tense.

(16) The Survey sets no specific limit on abstract length in its publications, either by total number of words or by percentage of length of text, although WRSIC abstracts are limited to 200 words, and journals or other non-Survey publication outlets may set their own limits. (See WRD Publication Guide articles 1.07.1 and 1.07.2 on WRSIC Abstracts.) Authors should remember, however, that the shorter the abstract, the more likely it is to be read and to be included in abstract journals.

ABSTRACT

Except for certain statistical reports and composite group efforts that may be unsuitable for the usual informative type of abstract, any but the briefest published scientific paper is preceded by an abstract; a proposal to present a paper orally must also be accompanied by an abstract.

The abstract is a digest of the report, and on its adequacy will depend much of the report's impact, durability, and usefulness. The busy reader may not read the text at all unless he has been led to it by the abstract. Too, the abstract will appear in abstract journals and indexing services and will thus increase the potential audience and the reference value in the literature. For an oral presentation, the adequacy of the written abstract will probably determine whether the author is even permitted to give his paper and, if so, whether he will draw an audience.

Some water-resources reports by their nature require a descriptive abstract, but for most Survey reports the abstract should specify the problem or the project and should briefly state the conclusions or results. It should be informative rather than descriptive; "• • • are discussed," "• • • was investigated," "conclusions are given" are generally inappropriate phrases for an abstract. What the report tells should be stated, not what it is about. For example:

Write "Holocene movement along the late Mesozoic faults occurred • • •," not "Subsequent movements along old faults are identified • • •."

Write "By this sensitive method, 10^{-6} g of uranium can be detected," not "The sensitivity of the method is high."

Write "A gravity high of 25 milligals suggests that • • •," not "The gravity anomalies in the area are discussed."

Write "The Cretaceous rocks yield 50 to 150 gpm of moderately mineralized water to wells 800 to 1,200 feet deep," not "Ground water in the Cretaceous rocks is described."

The abstract should indicate the method of attack and the type of data used and should clearly orient the paper in place and in function. It should supplement, not duplicate, the title in this respect and should not be merely an expression of the table of contents.

Few abstracts will be long enough or complex enough to need center headings, and few will need to be amplified by examples.

The abstract should be a complete unit, independent of the text. For this reason, reference to text tables, illustrations, and bibliography should be avoided. Rarely, an abstract may require reference to a published work; then the complete citation should be given in parentheses, not just the usual text reference to author and year of publication. No information should be given in the abstract that is not discussed in the report.

Except for papers in the Journal of Research, the Survey sets no specific limit on length for the abstract in its publications, either by total number of words or by percentage of length of text, but the

shorter the abstract the more likely it is to be read and to be included in abstract journals in its entirety and in the author's original words. Rigid limits on words or on space used are generally imposed for abstracts offered to scientific meetings; to exceed the stated limits is to risk rejection of the proffered paper.

Early rough-draft summaries are probably helpful to the author in the planning phases of report writing, but the final abstract can only be written after the manuscript is complete. Production of a good abstract—one which summarizes all the important content of the report and nothing else—deserves more care and more rewriting and polishing than any other part of the author's job.

Landes (1966, p. 1992) has written some relevant and readable paragraphs on construction of an abstract.

Reference

Landes, K. K., 1966, A scrutiny of the abstract: Bulletin of the American Association of Petroleum Geologists, v. 50, no. 9, 8 p.

TEXT

Like all forms of well-written composition, well-written Survey textual reports have a beginning, a middle, and an end—an introduction, a discussion or presentation of data, and a conclusion. These parts may appear under different names, or under no names at all if the report is short; they may also appear in many different formats and lengths. Texts that accompany maps generally consist only of discussion or presentation of data; they seldom require abstract, introduction, or conclusion.

The beginning

The introduction of book reports will include, as needed, (a) a statement of the purpose of the investigation, (b) the conditions under which the work was done, (c) the plan of treatment of the subject matter, (d) acknowledgment of cooperation and help, (e) a summary of previous work in the field, and (f) notes on the most important prior publications.

The introduction may call attention to the author's outstanding conclusion on local or regional problems or on the further development of current theories and to any noteworthy differences between his conclusions and those expressed in earlier publications.

If geographic description of an area being studied is needed, a brief statement of the location, routes of approach, topography, climate, vegetation, and other features will suffice. Detailed information on these subjects will be needed in very few reports.

BULLETIN OF THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
VOL. 35, NO. 7 (JULY, 1951), PP. 1680-1680, 10 FIGS., 1 PLATE

GEOLOGICAL NOTES

A SCRUTINY OF THE ABSTRACT[1]

KENNETH K. LANDES[2]
Ann Arbor, Michigan

ABSTRACT

The behavior of editors is discussed. What should be covered by an abstract is considered. The importance of the abstract is described. Dictionary definitions of "abstract" are quoted. At the conclusion a revised abstract is presented.

Presumably new editors, like new senators and small children, should be seen and not heard. But unfortunately the Association has elected (the electorate had no choice) an editor who is a non-conformist. For many years I have fretted over the inadequate abstract, and now perhaps I can do something about it—but not by keeping quiet.

Many of the abstracts appearing in the publications, including the meeting programs, of the A.A.P.G. can best be described by the use of a homely word that refers to an infestation by certain minute organisms. The abstract appearing at the beginning of this note is in that category. I regret to say that it is not an extreme case. My collection contains several that are worse. Dean Russell of Louisiana State refers to such abstracts as "expanded titles." They could also be looked upon as a table of contents, in paragraph form, with "is discussed" and "is described" added so as to furnish each subject with the verb necessary to complete the sentence. The reader is left completely in the dark not as to what the paper is about but as to what it tells! The information and the interpretation contained therein remain a mystery unless the reader takes the time to read or listen to the entire paper. Such abstracts can be likened to the "teasers" which your local movie manager shows you one week in the hope of bringing you back next week. But the busy geologist is more likely to be vexed than intrigued by the coy abstract.

To many geologists, especially to the tyros in exposition, the writing of the abstract is an unwanted chore required at the last minute by a rule-ridden editor or insisted upon even before the paper has been written by a deadline-bedeviled program chairman. However, in terms of market reached, the abstract is *the most important part of the paper*. For every individual who reads or listens to your entire paper, from ten to five hundred will read the abstract. It is much better to please than to antagonize this great audience. Papers written for oral presentation should be prepared with the deadline the abstract date instead of the delivery date. Later discoveries can be incorporated within the paper—and they would miss the program abstract anyway.

My dictionary describes an abstract as "a summary of a statement, document, speech, etc." and "that which *concentrates in itself the essential qualities of anything more extensive* or more general, or of several things; essence." The definition I like best has been set in italics. May all writers learn the art (it is not easy) of preparing an abstract containing the *essential qualities* of their compositions! With this goal in mind I append an abstract that I believe to be an improvement over the one appearing at the beginning of this discussion.

ABSTRACT

The abstract is of utmost importance, for it is read by 10 to 500 times more people than hear or read the entire article. It should not be a mere recital of the subjects covered, replete with such expressions as "is discussed" and "is described." It should be a condensation and concentration of the *essential qualities* of the paper.

[1] Manuscript received, May 5, 1951.

[2] Editor of the *Bulletin*.

BULLETIN OF THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
VOL. 50, NO. 9 (SEPTEMBER, 1966), P. 1992-1999, 2 FIGS.

EXAMPLE 4H

GEOLOGICAL NOTES

A SCRUTINY OF THE ABSTRACT, II[1]

KENNETH K. LANDES[2]
Ann Arbor, Michigan

ABSTRACT

A partial biography of the writer is given. The inadequate abstract is discussed. What should be covered by an abstract is considered. The importance of the abstract is described. Dictionary definitions of "abstract" are quoted. At the conclusion a revised abstract is presented.

For many years I have been annoyed by the inadequate abstract. This became acute while I was serving a term as editor of the *Bulletin* of The American Association of Petroleum Geologists. In addition to returning manuscripts to authors for rewriting of abstracts, I also took 30 minutes in which to lower my ire by writing, "A Scrutiny of the Abstract."[1] This little squib has had a fantastic distribution. If only one of my scientific outpourings would do as well! Now the editorial board of the Association has requested a revision. This is it.

The inadequate abstract is illustrated at the top of the page. The passive voice is positively screaming at the reader! It is an outline, with each item in the outline expanded into a sentence. The reader is told what the paper is about, but not what it contributes. Such abstracts are merely overgrown titles. They are produced by writers who are either (1) beginners, (2) lazy, or (3) have not written the paper yet.

To many writers the preparation of an abstract is an unwanted chore required at the last minute by an editor or insisted upon even before the paper has been written by a deadline-bedeviled program chairman. However, in terms of market reached, the abstract is *the most important part of the paper*. For every individual who reads or listens to your entire paper, from 10 to 500 will read the abstract.

If you are presenting a paper before a learned society, the abstract alone may appear in a preconvention issue of the society journal as well as in the convention program; it may also be run by trade journals. The abstract which accompanies a published paper will most certainly reappear in abstract journals in various languages, and perhaps in company internal circulars as well. It is much better to please than to antagonize this great audience. Papers written for oral presentation should be *completed prior to the deadline for the abstract*, so that the abstract can be prepared from the written paper and not from raw ideas gestating in the writer's mind.

My dictionary describes an abstract as "a summary of a statement, document, speech, etc. . . ." and that which *concentrates in itself the essential information* of a paper or article. The definition I prefer has been set in italics. May all writers learn the art (it is not easy) of preparing an abstract containing the *essential information* in their compositions. With this goal in mind, I append an abstract that should be an improvement over the one appearing at the beginning of this discussion.

ABSTRACT

The abstract is of utmost importance, for it is read by 10 to 500 times more people than hear or read the entire article. It should not be a mere recital of the subjects covered. Expressions such as "is discussed" and "is described" should *never* be included! The abstract should be a condensation and concentration of the *essential information* in the paper.

[1] Revised from K. K. Landes' "A Scrutiny of the Abstract," first published in the *Bulletin* in 1951 (*Bulletin*, v. 35, no. 7, p. 1660). Manuscript received, June 3, 1966; accepted, June 10, 1966.
Editor's note: this abstract is published together with The Royal Society's "Guide for Preparation and Publication of Abstracts" to give *Bulletin* authors two viewpoints on the writing of abstracts.

[2] Professor of geology and mineralogy, University of Michigan. Past editor of the *Bulletin*.

EXAMPLE 4I

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (Continued)

TYPE OF RELEASE	NUMBER OF COPIES TO BE DISTRIBUTED									
	Departmental Natural Resources Library	Open-File Services Section[2]	Publications Management Unit	Geological Survey Libraries[3]	Library of Congress	Geologic Division, mail stop 919 (for Sup. Docs.[a][b])	Principal cooperating agencies	Publications Planning Unit	Public Inquiries Office	Author(s) copies[c]
Administrative report			4				[d]			
Annual data report	3					1	[d]	22		
Bulletin							[d]			[e]
Circular							[d]			10
Cooperative (State) report	3		4	2	2					
Hydrologic Investigations Atlas							200			10
Journal article or abstract			4[g]				[d]			
Miscellaneous Field Studies Map							[d]			10
Miscellaneous Investigations Map							200			10
Open File (basic data)	3	1[f]	4	6[i]		1[j]	[d]		1[k]	
Open File (interpretive)	3	1[f]	4	6[i]		1[j]	[d]		1[k]	
Open File (interim pending publication)			1[j]	1[l]			[d]		1[k]	
OWDC[a] report (not administrative)	3		4			1	[d]			
Proceedings of meetings or symposiums			4[g]				[d]			
Professional paper							[d]			[e]
Speech (oral only)			4[l]				[d]			
Speech (handout or publication)			4							
Techniques of Water-Resources Investigations										10
Water-Supply Paper										[e]
WRI	3	1[f]	4	6		1	[d]		2[m]	5-10

Footnotes

[a] OWDC, Office of Water Data Coordination (WRD); Sup. Docs., Superintendent of Documents.

[b] Memorandum to Geologic Division, MS 919, should indicate where copies are available.

[c] Copies are sent to the originating office for distribution to the author(s).

[d] Number determined by originating office, if release to agencies is appropriate.

[e] Number varies depending on size of report and number of authors (see article 3.01.1).

[f] Copy must be suitable for microfilming.

[g] Copies or reprints are preferred. Complete bibliographic citation may be substituted if copies or reprints are not available.

[h] Includes only new versions of pages retyped after approval.

[i] Timing of distribution depends on public-release mechanism (see Section II).

[j] Required only if duplicated or reproduced in quantity exceeding 100. Books only.

[k] Placement of open-file reports in Public Inquiries Offices is optional.

[l] Required only if speech was approved by the Director.

[m] Two microfiche copies to each PIO serving the geographic area of report.

[1] Mailing addresses and information on distribution are given in the following pages.

[2] With memo and accession cards. Copy must reproduce legibly.

[3] Two copies each for Reston, Menlo Park, and Lakewood libraries.

COMMON PROOFREADERS MARKS*

EXAMPLE 4J

usa	capitalize
~~USA~~	use lowercase
~~in the author's opinion~~	delete all this
	delete (margin note)
groundwater	insert 1 space
~~due to~~	delete
°F	delete
non~~-~~stop	delete and close up
non stop	close up
~~MONEY~~	lowercase all but first letter
In the beginning	indent 5 spaces
tomato plum	aline left
muffin pie	aline right
¶ In the beginning	indent; new paragraph
No¶ In the beginning	don't indent; no paragraph
prodirity	transpose
tr) ale and steak	transpose
at too late the show	transpose
.., they said. As a result it...	run on (continue on same line)
sp NYS	spell out
~~early~~ warning	stet (Latin = let it stand); disregard correct
ok?. ~~extra~~ verbiage	ok as revised?
ital) Come here.	set in italics (no underscore)
ctr) Purpose & Scope →	center
↑Purpose & Scope	move up

*These are the marks used commonly in Survey typescript; a complete list for galley proofs is given in STA (1978), p. 114.

CHECKLIST FOR EDITORIAL REVIEW

Policy violations (e.g. avoid: advocacy, recommendations, reference to future publications, naming of industrial culprits)

Acknowledgements are complete and expressed correctly (See STA for guidelines)

Writing is coherent and in reasonably standard English

Abstract is consistent with report and conclusions, tells what report contributes, not what it contains

Introduction states problem, physical setting, time period and approach

Purpose & Scope section is consistent with report and conclusions

Conclusions follow from text and contain no new ideas or surprises

Organization of topics is logical

Publication series is appropriate, affordable, feasible

References are complete and meet publisher's requirements

Typographic style is consistent and follows publisher's requirements

Title and all headings are explicit and concise; catchy and imaginative where appropriate

Figures and table meet publisher's specifications, are page size, reproducible, and neatly lettered--shading patterns are clearly distinguishable

Oversize figures (plates) are no larger than necessary and contain no more information or colors than needed

Data in tables match those in illustrations and text

All tables and figures are referred to in text

Table of contents lists all headings and captions

Conversion table contains all units used in text, tables and illustrations

Computer tables are preceded by adequate explanation (use of abbreviations, units of measure, site location and period, etc.)

Pagination is consecutive beginning with cover as 1 (not i)

All copy is double spaced

DESIGN AND PREPARATION OF REPORTS

Title--Analyze it to insure that it truly tells what report is about.

Abstract--Keep it short. Give the major findings or conclusions. Don't tell what report contains, except in the case of a basic-data report.

Introduction--For a short report no subheadings may be needed.

Keep location description clear and concise. Back it up with an adequate map.

Word the purpose carefully, Give the application of the report to the problem that caused it to be written. Be sure purpose is satisfied in the conclusions or state here that it wasn't. Reader can thus decide on reading further.

If scope is given, word it carefully so that what is given is not really the approach. There is seldom a need for description of the approach or method of study.

Always mention other reports that bear on area or subject.

Keep acknowledgments short and simple, and leave fellow employees out. If they did specific pieces of work of substantial proportions, state this at the end of the introduction. Don't add them to authorship unless they prepared part of the report.

If geology, geography, water use, and other technical or quasi-technical descriptions are included in introduction, keep them short and as general as possible. If necessary to go into detail, probably they should occupy positions in main text of report. This is a good place to give a stratigraphic table, but don't duplicate the information by giving it in text and table.

Well-numbering description should be short and clear. It makes no sense to have a six-page introduction containing three pages of well-numbering description. Diagram not always necessary.

Main text--Have an outline that allows a logical and smooth progression from one part to the next. Don't jump back and forth. Strive for parallelism and consistency in organization and expression. Choose headings that fit well with one another. Avoid wordiness and redundancy in headings. Try very hard to avoid headings that have only one subhead. Where this occurs, a little thinking will nearly always show one of them to be unnecessary.

After writing a section, go back through it to see how many words can be left out, especially "The's" starting sentences and "about's" before numbers.

Ending--Always have a summary or concluding section. Be sure of which it is when labeling it; it could be a combination. Check conclusions against stated purpose of report. If report did not fulfill the purpose, tell why it didn't. Keep this section short and to the point.

Selected references--Select references that truly could be expected to help the reader understand the subject of your report. Don't throw in everything that could remotely be deemed applicable. Annotated bibliographies are useful in certain kinds of reports.

Illustrations--Combine them where possible without clutter. Design them to stand by themselves. Keep titles short and clear--elaborating statements can be added after titles. Make sure that explanations are complete, but keep them concise. Avoid "continuing" illustrations where possible.

Tables--Make sure that column explanations are technically correct and that you have not included columns that are not necessary just because they are on the computer printout. Check tables against maps and text for completeness and consistency.

RN 10/77

42 t
24 c pp

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

In Reply Refer To:
EGS-Mail Stop 440

March 13, 1981

WATER RESOURCES DIVISION MEMORANDUM NO. 81.54

Subject: PUBLICATIONS--Acknowledgments in U.S. Geological Survey Publications

The U.S. Geological Survey has a long-standing policy of acknowledging in its publications the contributions made by non-Geological Survey persons or organizations. Geological Survey personnel also are acknowledged if their contributions are above and beyond expected performances.

The purpose of this memo is to remind you that the Water Resources Division strongly endorses this policy. We believe that generous acknowledgments contribute to continued and improved cooperation with our peers and the public.

In the acknowledgments section of our publications, all persons and organizations that have assisted the author(s) should be acknowledged. We also encourage the acknowledgment of Survey personnel for exceptional colleague review or for other contributions that materially improve the comprehension and technical accuracy of the report. Supervisory support from the project chief, district chief, regional hydrologist, etc., usually is not acknowledged because this is one of their duties. As a matter of courtesy, authors should acknowledge contributions of non-Survey personnel or organizations before citing Survey personnel.

For help in preparing acknowledgments see "Suggestions to Authors," 6th edition, pages 21, 34, 44, and 54; and WRD Memorandum 80.73 "Credit statements in reports prepared in cooperation with other Government agencies." WRD Publications Guide article 1.13.1 is being revised to reflect the statements of this memo.

If you have questions on the suitability or desirability of acknowledgments, please consult with the office of the Assistant Chief Hydrologist for Scientific Publications and Data Management.

R. H. Langford
Acting Chief Hydrologist

"This memorandum supersedes no existing memorandum."

WRD Distribution: A, B, S, FO, PO

5. REPORT POLICY AND MANAGEMENT

Overview of Report Policy and Management

The major problems noted in reports are inadequate colleague review, report preparation progress not monitored, inadequate verification review, and violations of Survey policy.

1. Report Policy Guidelines

- o Maintain impartiality, objectivity, and integrity.
- o Do not compete with private sector.
- o Equal release of report.
- o Give proper credit.
- o Prepare accurate report on time.

2. Report management problems (example 5A)

- o Author diverted to other work.
- o Environment not suitable to writing or reviewing.
- o Report unit understaffed.
- o WRD memorandums not circulated to report personnel.
- o Reports plans and progress are not discussed at quarterly review.
- o Author waits until end of project to write report.
- o Supervisors sign off on report assuming someone else has evaluated it.

3. Report review problems

- o Review adds editorial errors.
- o Lack of training of reviewers.
- o Authors slow in response to comments.
- o Report not ready for technical review.
- o Author responds only to review comments (there is a ripple effect).

Report Policy

Widespread respect for the Geological Survey's integrity and impartiality has been built on the fulfillment of its obligation to make the results of its scientific investigations available in a manner that serves the whole public rather than the interest of any special group or individual.

1. References on Reports Policy

   - The Act of Congress (Organic Act) that created the Geological Survey in 1879 established the Survey's obligation to make public the results of its investigations and research. The Organic Act also stated that the Director and members of the Geological Survey shall execute no surveys or examinations for private parties.
   - WRD Policy Statement No. 1, June 4, 1959, by Luna B. Leopold (example 5B) lists report attainment goals and report responsibility.
   - Water Resources Division Memorandum 79.43, "Policy of Water Resources Division Regarding Written Reports," December 22, 1978 (example 5C), updates but does not change Policy Statement No. 1.

- "Suggestions to Authors" (example 5D) describes Survey publications policy and defines author responsibility.
- Geological Survey Manual 500.9, July 15, 1976, "Outside Publication and Oral Presentation - Clearance from the Director" (example 5E). All writings in which the Survey affiliation is shown should be submitted to the Director for approval prior to release for outside publication.
- Geological Survey Manual 500.14, January 28, 1980, "Safeguard and Release of Geological Survey Information" (example 5F) enumerates policy and requirements regarding release of Geological Survey information. Known previously as Survey Order 202, September 25, 1950.
- Geological Survey Manual 500.5 policy on release of written information to the news media (example 5G).
- WRD Publications Guide, provides detailed information on report preparation and processing (example 4I).

2. Policy Guidelines

- o Maintains impartiality, objectivity, and integrity.
  - Do not make recommendations. Give alternatives.
  - Do not show bias in data or interpretations.
  - Do not make statements of what must or should be done.
  - Do not criticize cooperator, consultants, sister agencies, other hydrologists.
- o Do not compete with private sector.
  - Site-specific "consulting type" reports should be avoided.
  - Do not compete, or give the appearance of competition with private, State, or municipal sector.
- o Equal Release of Report
  - Notification of availability of a report should be given to all at the same time. This is commonly done by press releases.
  - Widespread respect for Geological Survey's integrity and impartiality rests with equal release of our data and reports.

3. Policy Recommendations

- o The Geological Survey leadership in the field of water resources is due to a well balanced publication program.
- o The number of administrative and open-file interpretive reports should be kept to a minimum. In general, such reports could be published in the WRI series. Material of major importance and having transfer value should be published as a Water-Supply Paper, Professional Paper or in a technical journal.
- o Well written, timely reports result from detailed report planning and work scheduling. Enough time must be allowed for data evaluation, report writing, and report review.
- o Author should remain on project assignment at least until a first draft manuscript is complete.
- o Personnel must give first priority to report preparation, review, and revision.
- o Colleague review should be thorough and prompt.
- o The Project Chief is responsible for report management, which includes staying within allocated funding and completing a technically and editorially acceptable report on time.

- o The District Chief or program manager has primary responsibility for obtaining adequate colleague reviews. Supervisors share the responsibility for assuring that reports prepared under their supervision are accurate, well written, impartial, and in conformance with Survey policies.
- o District Chief should review, thoroughly, every report before it goes to colleague review, and again before it goes for Director's approval.

4. Acknowledgments

- o Give cooperator credit on cover and title page.
- o Acknowledge all significant assistance.
- o Acknowledge all copyrighted material.

5. Prepare Accurate and Readable Report On Time

- o Make editorial and technical verification review after colleague review and after Headquarters evaluation.
- o Cross check data in tables, illustrations, and text.
- o Verify all references.
- o Proofread carefully.

District Report Management

The internal review process will differ from office to office, depending on staff available, number of reports processed annually, and District or office policy. The process may also differ from report to report, depending on the complexity, urgency for release, and publisher's requirements.

1. Basic requirements for review

   - o Section Chief's approval of first draft.
   - o General editorial review for coherence, internal consistency, and adherence to Survey publication and editorial policies.
   - o At least two technical reviews of revised draft, with author's written response to comments. For interpretive material, at least one reviewer must be outside the originating office.
   - o Proofreading and verification review for coherence, accuracy, internal consistency, and adherence to Survey format requirements.
   - o District Chief's approval.

2. Steps to Improve Report Quality - The following procedures have proved useful to many offices in meeting publication deadlines and improving the technical, editorial, and esthetic quality of reports:

   - o Hold a planning session soon after the project is approved to discuss report content, scientific significance, intended audience, potential publication series, and publication costs.
   - o Establish target dates for completion of the various manuscript components. The first draft should be completed and submitted to the Section Chief 6 months before project-termination date.
   - o Prepare a detailed outline early in the project and revise it periodically to reflect changes in the course of the study.
   - o Write the introduction, purpose and scope, methods, list of references, and table of contents early in the project. Like the outline, these will help keep the author from going astray during the project and will result in fewer last-minute chores for author and reviewers alike.

- Neatly sketch and hand letter the illustrations at publication size in pencil on mylar. For graphs, use only blue-ruled paper. On maps, use only patterns or a color code unless the final version is to be colored. Avoid final drafting until after Director's approval.
- Have the entire manuscript and illustrations reviewed for coherence, consistency, and accuracy before obtaining colleague reviews. This will save the reviewers time.
- Hold training sessions to instruct and refresh reviewers and authors in Survey policy and publication requirements as well as in principles of organization, expression, illustration, and layout.
- Establish a publications group to coordinate editorial, typing, drafting, layout, and distribution services. Encourage regular contact between authors and the publications group.

- Be sure that reports are reviewed by qualified people. Select no more reviewers than are needed to guarantee complete review of all topics covered. At least one reviewer (not necessarily a Survey employee) should be outside the originating District.
- Obtain simultaneous reviews to save time and enable the author to evaluate all responses at once.
- Have Section Chief review the manuscript after suggestions of colleague reviewers have been incorporated to ascertain whether coverage by reviewers and response by author is adequate.
- Give a final verification review to ensure adherence to Survey requirements and completeness of all supporting documents.
- Ensure that all staff members carrying reports responsibilities understand their purpose and goals and have ready access to the standard references (Suggestions to Authors, WRD Publications Guide, Glossary of Geology, GPO Style manual, dictionary, glossary of geologic terms, and a thesaurus).

3. An annual report seminar should be held in the District

4. New authors should receive a report briefing

   o Report planning, management, policy and review should be discussed in detail.

   o Office procedure for report processing.

   o Authors should be given a copy of

      - Division policy statements.

      - Suggestions to Authors.

      - WRD Publications Guide

5. Read report aloud to anyone who will listen and discuss

Report Review

The high standard of excellence in reports of the Geological Survey is the result of a group effort. The technical colleague reviewer is, next to the author, the most important member of this group (Review and approval steps, example 5H).

1. Review Guidelines

   - o The only objective of technical review is to improve the report ("Philosophy of Review" by Henry Barksdale, example 5I)
   - o Reviewing a report is a privilege and is an indication of the professional reputation of the reviewer (STA example 5J).
   - o Technical review should be a part of the duties and performance standards of all professionals.
   - o Ability to perform a good review is learned by practice. Beginning or lower grade hydrologists should have an opportunity to review the work of more experienced hydrologists as a part of their training.
   - o Alternative plans should be discussed.
   - o Ample time should be allowed to seek and obtain assistance.

2. Need for Review

- o Thorough and competent technical review is the surest way to guarantee the quality of the final report.
- o Approximately 40 percent of reports reaching the Regional Reports Specialists are returned to the Districts--most returns are for technical reasons.
- o Approximately 10 percent of reports reaching the Scientific Publications Section are returned because of technical problems or policy violations.
- o No report ever reaches perfection. Therefore, any report can be improved.
- o Although the author has final responsibility for the report, each technical reviewer must share responsibility for the technical accuracy of the final report.

3. Types of Review

- o Editorial.
- o Technical (example 5I, 5J).
- o Verification (example 5P).
- o Policy.

4. Three Methods of Review

- o Concurrent review--reports sent to all reviewers simultaneously.
- o Consecutive review--report sent to one reviewer at a time.
- o Group review.

5. Suggestions for Reviewers

- o Read Heindl "Suggestions to Reviewers" (example 5L).
- o Adopt some system for review and follow it (Shipley colleague review summary, example 5M).
- o Remember that the author is a friend and colleague. Give him the type of review that you would like to receive for one of your manuscripts.

6. Suggested Colleague Review Procedure (example 5N)

1) Read or scan the entire report.

2) Review the following components.

- o Table of Contents: this is the easiest way to see if organization is logical.
- o Abstract: Does the abstract tell what the report contributes, or does it only describe the report?
- o Introduction: Does the introduction include a clear statement of the need or problem? The purpose of the report? Scope of report? Acknowledgments? Location of study? Time period represented?
- o Text: Is the necessary background information included? Is the scientific approach valid? Are the data adequate to support the analysis used?
- o Conclusions: Are they sound and properly documented? Do the conclusions answer or respond to the scope or purpose indicated in the introduction? Are all conclusions discussed in the text?

- o Illustrations and Plates: Are they legible and necessary to the report? Are they designed to fit the publication size? Should some be reduced and grouped together on a page?
- o Tables: Are they clear, understandable, and necessary?
- o Is the title correct and concise?

3) Reexamine the report.

- o Are there Survey policy violations?
- o Is the report readable by the intended audience?
- o Is the organization logical?

4) Communicate with the author.

- o Telephone to discuss questions.
- o Provide written copy of all comments and questions.
- o Short comments may be written in margin.
- o Major comments should be given in a memorandum.
- o Give the author a compliment, by now he needs it.

7. Summary of Manuscript Review Process

- o Author: Read and edit your own work and be critical. Read it to your spouse (if he or she will listen). Your report must be understandable.
- o Editorial Review: Should cover consistency of terminology and usage, clarity of expression, agreement of table of contents with headings and captions, adherence to publisher's typographic style, completeness of all components and support documents, suitability of illustrations for publication series.
- o Verification Review: Should include check of arithmetic in tables, consistency in use of units, consistency in figure titles, agreement of cited references in text with list of references, correct pagination, agreement of title on all components and support documents.

- Colleague Technical Review: should include a reviewer from outside the author's District or office.
- District Chief Review and Approval: Varies greatly from District to District. At a minimum, should review for satisfaction of project objectives and preliminary policy review.
- Regional Review: by Regional Reports Specialists and the Regional Discipline Specialists.
- Policy Review (SP&DM): If necessary, further discipline review by specialists in the branches.
- Director's approval.
- Having a report "bounce" is no disgrace. The more a report presents new ideas or advances in hydrologic science, the more likely it is to be returned to the author.
- Reports of adequate quality but lacking new ideas are the only ones likely to sail through the system. Bad reports and very good reports bounce.

Verification Review

The final editorial and technical verification review should be made after colleague review. A final, final review should be made after Headquarter's approval.

1. Principal elements of review

   - When report is completed, reread and compare the abstract, conclusions, press release, and purpose and scope section to ensure that they are in agreement and that each emphasizes its material in appropriate manner.
   - Check for inconsistency between text, tables, and figures.

2. Review check list (example 50)

   - Title--wording should be the same on title page, cover, introduction, WRSIC sheet, press release, routing sheet, and all other support documents. Cooperator on cover and title page.
   - Values in tables, text, and figures--these should be cross-checked and in the same units of measurements.

- o Rank of headings--rank in the text must agree with that indicated in the table of contents, and wording must be identical.
- o Wording in list of illustrations and tables--this should agree with that on caption sheets and tables. (Parenthetical material may be omitted in table of contents.)
- o Figure captions--All captions should be on caption sheets, not the figure itself, and should not include the phrase "map showing."
- o Cross-checking of reference--spelling in text and reference lists, pagination in text and reference list, and dates.

3. Manuscript Routing Sheet (example 50)

- o District Routing Sheet--used to document routing and time spent in District report preparation.
- o WRD Routing Sheet--used to document history of report. Required for Headquarter's approval. Sheet should be started when report is submitted to District or project chief for colleague review. Sheet should be accurate, complete, and legible.

Region And Headquarters Approval

The Region and Headquarters objectives are to evaluate the technical quality, conformance to Survey policy, and adequacy of colleague review. The Headquarters evaluation is the last quality check for the report. The authority to approve the release or publication of Survey reports rests with the Director. For selected reports he has delegated the authority, but approval rests with the Director. The approval of a report starts with project approval because the objectives and scope of the report are decided at that time.

1. WRD Report Evaluation System

   - o Region - report is evaluated for technical quality, editorial quality, and conformance to Survey policy.
   - o Headquarters - report is evaluated for technical quality and adequacy of colleague review, and conformance to Survey policy. A check is also made for adherence of the report to standards given in the Publications Guide (illustration, maps, text and, geologic names).
   - o Headquarters (Director) - primarily an evaluation for conformance to Survey policy (example 5Q).

2. Reasons for Disapproval

- Technical problems - 70%; Editorial problems - 20%; Policy problems - 10%.

3. Method Used to Evaluate Reports in Headquarters

- Read correspondence, colleague review, and response to review.
- Look over routing sheet.
- Carefully read title, abstract, introduction, conclusions and press release.
- Review illustrations.
- Scan entire text.

4. Some Frequent Problems

- Report title - Does it clearly describe subject of report. Does it contain a complete geographic location? Does it have a site specific consulting tone?
- Abstract - Does it adequately describe purpose of investigation and results?

- o Press Release - Does it stick to the facts or is it sensationalistic in tone? Is it written in a nontechnical style? Is it supported by report?
- o Routing Sheet - Is method of publication suitable? How long has report been in review? Was report bounced by Region? Was report evaluated by the District Chief and Section Chief? How many reviewers? Was review inhouse or outside District? Who evaluated in Region (discipline specialist)?
- o Colleague Review - Has review introduced errors in report? Have reviewers spent enough time on report? Were comments technical or editorial? Were the technical disciplines represented by the reviewers appropriate for the report content? Were all comments answered adequately? Has author taken a constructive approach to criticism? Was a review summary written?
- o Content - Is the need for the report stated? Are results, purpose, and scope defined? Is the approach described? Are results described?
- o Approach - Were the methods appropriate and techniques valid?
- o Clarity - Can the report be readily understood by its intended audience? Is the report readable and attractive? Does it contain jargon and cliches?

- o Conclusions - Are they adequately supported by the data? Do they follow logically from material presented in text? Is the report technically sound? Are assumptions and limitations adequately stated?
- o Tables and Figures - Are they necessary, complete, and understandable?
- o References - Are unpublished reports included? Are there any obvious errors, such as misspelled names of authors?
- o Trade Name Disclaimer - Are brand names given?
- o Bias - Avoid such words as should and must. Report should point out alternatives. Look for bias in introduction and suggestions for additional work.
- o Is report free of speculative statements? Avoid advocacy and tactless criticism of colleagues or other agencies.
- o Verification Review - Has that report had a technical and editorial verification check?
- o Credit - Is acknowledgments given for all previous work on which ideas, illustrations, tables, or data are based? Is appreciation expressed for non-Survey cooperation?
- o Method of Release (example 5R) - Defines the difference between interpretive and non-interpretive reports.

WRD Report Tracking System

In 1980, a computerized system was implemented in the Division to track all reports from colleague review to Director's approval.

1. Tracking system can tell:
   - o How a report moves after it enters the review system.
   - o Where the bottlenecks occur.
   - o How long each step took.

2. When a report is first received at Headquarters, information from the routing sheet (example 50) is added to computer data base.

3. Uses of a computerized tracking system.
   - o Provides nationwide retrieval.
   - o Provides data for Headquarters management summaries.
   - o Enables Regional and District monitoring of reports.
   - o Enables statistical evaluations.

- o Districts can search the system to find who reviewed reports, on what date, and how long they kep the report.
- o Identify bottlenecks.
- o Time for review and approval.

4. How can the system help authors?
   - o Locate his report and learn of approval date by accessing the computer file.
   - o Provide instant retrieval of author's bibliographic information (MIS transfer of file to tracking system).
   - o Perform search of "Key" words in titles.

5. Present status and planned expansion - All reports that were reviewed in Headquarters in 1980 are in the file, which:
   - o Is being kept current.
   - o Is accessible by all WRD personnel.
   - o Will include MIS bibliographic information for all WRD authors.
   - o Will include Region approved reports that do not enter the Headquarters review system.
   - o Will continue tracking reports after Director's approval until the report is published.

6. History of WRD Publication (1951-80) - Shown in example 5S.

Announcing Availability of Report

The Geological Survey announces the availability of reports to all interested individuals on equal terms. The Survey does not make manuscripts approved by the Director available to requesters until copies are available in depositories and have been advertised by news release or monthly list of new publications.

1. Hydrologic Data

   - o May be released after a check for accuracy.

2. Interpretive Report

   - o Send copy to cooeprator for review, but they cannot release it.
   - o Once approved, must be released to all on equal terms.

3. Announcement of Availability - Responsibility of District Chief or Project Chief to ensure timely and equal release.

   - o News release.
   - o Monthly list of Geological Survey new publications.

4. Distribution of Report

   - o Depositories
   - o Open-File Service Section (OFSS) in Denver
   - o National Technical Information Service (NTIS)
   - o Superindent of Documents

News Releases

The news release is used to communicate the results of our investigations to millions of people through the news media. These releases are not just publicity tools, but are an integral part of our mission - "to publish and disseminate information." They are a means of reaching the general public.

1. Major elements of a news release

   - Example guide to follow is given in Suggestions to Authors, 6th edition, page 203-205 (example 5T).

2. First draft news release

   - Should be written by the author to emphasize features or factors of greatest significant.

3. Special attention should be focused on the headline--make sure it is eye catching without breeching Survey policy.

   - o First paragraph should contain the essential most important findings discussed in the report. Many times only the first paragraph survives the news editor's ax.
   - o Second paragraph should identify the author, title, series of report, and should contain more information in the report.
   - o Succeeding paragraphs should present details of the important findings listed in paragraph 1 and 2).

4. The news release must be included with report--sent to Region Director's approval.

5. News releases must stick to the facts and conclusions given in reports--opinions of the author are not to be used.

6. Some news releases are revised--SP&DM's Hydrologic Information Unit, or the Director's Information Office.

Headquarters Report Assistance

The Scientific Publication Section of SP&DM is the Division's focal point for all report activity and provides leadership for the preparation, improvement, and publication of interpretive and data reports (example 5U).

1. Publications Planning Unit

   - o Improve quality of reports
   - o Coordinate report training
   - o Provide assistance in report design
   - o Advise report specialists
   - o Update State data report guidelines
   - o Revise WRD Publications Guide

2. Publications Management Unit

   - o Management of Division's publications fund
   - o Reports tracking systems (recording and processing)
   - o Hydrogeologic map review

3. Hydrologic Information Unit

- o Prepare press releases
- o Respond to general and Congressional Inquiries
- o Nontechnical releases
- o Director's yearbook
- o Edit and publish
  - WRD Bulletin
  - State Water Folders
  - Water Resources Review
- o Hydrologic events and hazards
- o Significant happenings reports
- o Exhibit panel design and construction
- o Congressional briefing boards

page 5.35 follows

EXAMPLE 5A

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

4251 0014
ACH/SP&DM

March 4, 1977

WATER RESOURCES DIVISION MEMORANDUM NO. 77.61

Subject: PUBLICATIONS--Processing of Reports

You are all aware of the Division's continuing objective--that our reports must be timely and excellent in technical content. The purpose of this memorandum is to emphasize my deep concern for both objectives and to reiterate Division report-preparation practices established to ensure high-quality reports.

I would like to reemphasize a long-standing principle with regard to the technical and editorial quality of our reports; no distinction should be made between the different series of reports. The reputation that the Survey has enjoyed for almost 100 years derives in large part from the quality of its reports. We must make every effort, despite the increasingly heavy workload, to maintain this quality.

To address the problem of report preparation and review as they affect timeliness and quality, District Chiefs, with the assistance of other personnel should take the following steps to improve report management at the District level:

1. Utilize a reports-management program:

   A. Maintain a system for project review, control, and report processing using sound management techniques. Frequent monitoring is required, especially in the post-review stage.

   B. Train writers and reviewers, in-house and through the Denver Training Center.

   C. Train support personnel for special typing, drafting, and editing requirements.

   D. Ensure that all personnel carrying reports responsibilities understand and fulfill them.

   E. Ensure that personnel involved with reports, including support personnel, have ready access to standard references, such as "Suggestions to Authors," "GPO Style Manual," and "WRD Publications Guide."

2. Implement and emphasize quality control over mechanical errors. Mechanical errors can be virtually eliminated.

3. Use pre-project reports. Define the existing data base before planning field work and prepare a report containing information available and work plans for achieving the objectives of the project.

4. Ensure that reports are reviewed by qualified personnel. Select no more reviewers than are needed to guarantee complete review of all topics covered in the report.

5. Be sure that technical and editorial reviews are both thorough and prompt. Ascertain that author's responses are adequate and prompt.

6. Above all, involve key District personnel in the report preparation and review process. District personnel must understand that the Division supports and encourages report-preparation activities. Also, emphasize the necessity and desirability of serving as a technical reviewer.

7. The manuscript-routing sheet should reflect only technical and management review and processing after the report has reached the finished manuscript stage. Manuscript routing sheets should not be cluttered with records of editorial mechanics and other routine handling in the originating office. Intra-office records showing reports processing prior to technical and management review should be reflected on a separate routing sheet in the originating office.

This memorandum highlights some steps to improve report preparation and review at the District level. We will also strive to sharpen report handling procedures at Regional and National Headquarters. Reports are one of the principal tangible products of the Water Resources Division. It is imperative, therefore, that we all strive for the goals of quality and timeliness.

J. S. Cragwall, Jr.

J. S. Cragwall, Jr.
Chief Hydrologist

WRD Distribution: A, B, S, FO, PO

EXAMPLE 5B

UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey
Washington 25, D. C.

WRD POLICY STATEMENT NO. 1

June 4, 1959.

Memorandum

To: All Professional Personnel

From: Chief Hydraulic Engineer

Subject: PUBLICATIONS--Policy of the Water Resources Division

The effectiveness of the Water Resources Division depends largely on its ability to produce reports that meet the great variety of needs for water information. The solution to present and future water problems may well hinge upon the availability, quality, and timeliness of reports. Therefore, we must emphasize the production of reports that will appraise the Nation's water resources, describe techniques and methods to meet water problems, and inform the public generally about water.

Our reports should have the content, quality, and timeliness necessary to establish and maintain leadership in the field of water. Those who are responsible for project planning and execution should plan to use fully all publication media, including the Survey series, publications of cooperating agencies, journals of scientific organizations, and communications outlets to the lay public, such as newspapers, magazines, radio, and television. We must learn 1) to select from our water facts those that are newsworthy, and 2) to present those facts in a manner that will stimulate public interest and satisfy public curiosity.

Much of the success of the Division results from the composite effort of individual authors; therefore, we must continue to recognize the importance of authorship in the Division, and make every effort to aid individuals in their training and growth in proficiency as authors.

Scope of Reports

Goals for reporting during the next decade should reflect the program goals outlined in the Division memorandum, "PROGRAMS AND PLANS: Policy Guides," dated March 27, 1959. The report aspects of those goals are summarized below:

1. Publication of basic data generally will be in one of the following types of presentation:

   (a) Supporting evidence in a technical report. A technical report will not be used as a vehicle for publishing data in bulk form.

   (b) In reports designed specifically for the release of basic data, as exemplified by "Surface Water Supply of the United States." For extensive data tabulation, this form is to be used, whether the data are discharge records, well logs, chemical analyses, or others.

2. Comprehensive appraisal reports by basins, aquifers, or regions.

3. Reports on principles and techniques. Publication of these reports would partly fulfill our responsibility for leadership in hydrology. These reports ordinarily would be published in the Survey series, but some might be published in professional journals.

4. Long-range plans for water-resources investigations in a State may be published by the Survey if their contents have general interest.

5. Interim or progress reports may appear either in the Survey's series or in series of the cooperating agencies. These reports would be written for many different readership levels and developed to fulfill better the needs for timely reports for our cooperating agencies.

6. Technical handbooks and manuals describing current investigation methods used in the Division. Would include those for educational and training purposes.

7. Lay-reader reports summarizing, by States, basins, or regions, the Nation's water situation.

8. Nationwide summary reports presenting generalized hydrologic data in map or graphic form to meet general public needs. The National Atlas Series has advantages for this type of material.

9. Hydrologic almanacs, or gazetteers, for each State.

10. Books on hydrology and related fields.

11. News releases, "popular" articles, speeches, and special topics of public interest, using all effective means of communications with lay audiences.

Attainment Guides

Achievement of goals will depend on the willingness of each individual in the Division to accept fully his responsibility. Each individual must also discipline his energies and actions, using the following guides in planning and executing work:

1. Reports are the principle tangible product of the Division; therefore, in the promotion of individuals whose duties include or are related to report preparation, great weight will be given to achievement in report production. In the case of an individual not directly participating in report preparation, report production in his unit and his effectiveness in report review will be considered in promotion. The Division will examine the record of such production in considering any promotion or transfer.

2. Leadership in the field of water is in great part related to our ability to achieve a well-balanced publication program. Therefore, the number of administrative and open-file reports not designed for publication should be kept to a minimum. An administrative report usually will be abstracted from material being prepared for publication.

3. The production of timely, well-written reports results from adequate project planning and scheduling of work to allow time for evaluation of basic data and report writing. It is imperative that an author develop a report outline early in his project, preferably before results and conclusions are available--before work begins, if possible. It is imperative also that maximum use of planning aids (project description, yearly work plan) be made in developing a well-thoughtout publication schedule. This schedule should include as many as possible of the various forms of reports, such as lay-reader reports, progress reports, journal articles, and final reports.

4. The responsibility as project chief and as author must be assigned at the beginning of a project and administrative controls should be exercised to assure that the assigned responsibility is fulfilled according to plan.

5. The principal author or authors of a report must remain on their assignment at least until they have completed a manuscript which has had adequate technical review and acceptably meets editorial standards.

6. Work related to manuscript preparation, review, and revision has first priority over most other duties. All personnel who are competent to review manuscripts are expected to do some manuscript review on request. Once review responsibility is assigned, a reviewer must apply himself immediately and diligently to the review task and must meet the deadlines mutually agreed upon.

7. The immediate supervisor of an author is responsible to assure that the author's report adequately meets standards before transmitting it to higher levels for review. The Division policy is to provide an author with the assistance and constructive criticism of specialists who are qualified in the subject matter of his report.

8. The effectiveness of a supervisor in generating and handling reports will be judged on the quality of the reports that come out of his office, and this factor will be considered in appraisals of the supervisor's qualifications for greater responsibilities.

9. Within the general policy of the Geological Survey, it is the intent of the Water Resources Division to provide an author with the opportunity to publish his individual ideas, whether or not they are accepted by his colleagues. The author must, however, show that he is acquainted with previous work by others, present a clear and logical argument in defense of his own ideas, and show that he has responded constructively to the comments, suggestions, and criticisms of reviewers.

Responsibility of Author, Supervisor, and Review Personnel

We aim to release from the office of origin only those reports that meet reasonable technical and editorial standards. We intend to accomplish this by providing an author and his supervisor with a workable and constructive procedure for quality control. The basic element in this scheme is to place on the supervisor from whose office a report originates the principal responsibility for these standards. A definition of responsibility at all levels is described in the following paragraphs:

1. It is an author's responsibility to keep his supervisor informed and to seek his help in planning for a report as the project proceeds.

   An author bears the primary responsibility for the content of his report, but he is expected to seek and judiciously use the advice of his supervisor, of his colleagues, and of technical advisors recommended by any administrative level.

   An author is expected to keep himself informed on correct editorial practices and to prepare his report conscientiously in accordance with high editorial standards. Review at higher levels shall not be depended upon to compensate for poor work on the part of an author.

   When a manuscript is considered to be ready for review, the supervisor will arrange for review by one or more qualified professionals within the Survey (in some cases from outside the Survey). The author may assist his supervisor by suggesting appropriate reviewers. Comments by the reviewers must be considered in the preparation of a final draft to be presented to the author's supervisor for subsequent transmittal through channels toward ultimate publication. The manuscript should be accompanied on its movement to all administrative levels by a brief summary of the comments of each reviewer and of the changes that were made in response to the reviewer's suggestions. This summary should be matter-of-fact and dispassionate. If necessary, the supervisor will prepare the summary. If any significant suggestions made by the reviewers are not accepted, the author will present reasons why he found the suggestions unacceptable.

   Regardless of where an author may be during the final stages of the review and publication of his paper, he has the responsibility to do whatever work on his manuscript that may be necessary at any time. Supervisors should assure that commitments on new projects will allow for work on unpublished manuscripts from previous projects.

2. The principal administrative responsibility for the technical and editorial adequacy of an author's report rests with his immediate supervisor. It is not the intent of this policy, however, to make an editor out of a supervisor. Nevertheless, a supervisor will be held accountable if he forwards to higher level a report that clearly is inadequate in any important respect. This responsibility requires that a supervisor will give each report passing through his hands sufficient review to assure himself of the worth of its content, the adequacy of the technical review it has recieved, and the editorial quality of the manuscript. It cannot be too strongly emphasized that if a supervisor has properly consulted and advised with an investigator throughout the progress of a project and in the planning of the report, little additional burden is imposed by the responsibilities outlined above.

The immediate supervisor of an author shall transmit a manuscript to the next highest administrative level along with his comments and recommendations on type of publication.

3. Branch Area Chiefs will receive report manuscripts from originating offices, or project chiefs where appropriate. They will give sufficient review to reports to satisfy themselves that they are adequate in quality. Suitable reports will be forwarded with Area Chiefs' recommendations to the Branch headquarters through channels specified by the Branch Chief. Report appraisals will be a principal source of information on the performance of District Chiefs and Project Supervisors. A Branch Area Chief, having received a report deemed inadequate either by himself or by the Reports Section of his Branch, will inform himself fully on the nature of the inadequacies and give whatever help he can to the supervisor and to the author in preventing future recurrences of deficiencies, as well as in improving the report in question.

4. The principal purpose of review by the Branch Reports Sections is to judge the scientific and technical quality and the overall adequacy of the reports received, to make editorial and technical improvements of modest character, and to keep adequate records and control of report production and progress. The Branch headquarters will provide Branch Area Chiefs and the Division Chief with quarterly summaries showing the status of reports.

   Reports found by a Reports Section to require more than minor adjustments shall be returned promptly to the originating office through appropriate channels.

   A Reports Section should make only such technical review of a manuscript as is necessary to judge the overall quality, except in cases where, because of the nature of the subject, a member of the Reports Section staff is a logical technical reviewer. A Reports Section is expected to depend largely on the technical reviews made before the report is submitted. A Reports Section, however, must satisfy itself that the technical review has been competent and thorough. In the case of a report which has had inadequate technical review, the Branch should see to it that further review is arranged for. A Branch has the responsibility for setting up standards for appraising the adequacy of technical review, including prior approval of proposed reviewers, if appropriate.

   Reports having met all requirements, including those of a Reports Section, [they] shall be forwarded to the Division Publications Officer, through channels prescribed by the Branch.

5. The Division Publications Officer is responsible to assure himself of continuing adequate quality of reports submitted for release or publication. Although the Publications Officer does not have

routine technical review functions, he will review reports to the extent necessary to discharge his responsibilities. He will devise and maintain records and control documents needed for constant surveillance of the quality, progress and production schedule of reports.

Reports for which release or publication is desired will be channeled through the Division Publications Officer, who is the central and principal contact with units outside the Division in all matters pertaining to reports. He transmits reports to the Director's Office, for example, and they are routed back through him from that office. Printer's proofs of reports also pass through the Division Publications Officer.

The Division Publications Officer will make summary quarterly reports to the Office of the Division Chief on the status of reports, and will furnish copies of this report to Branch Chiefs.

Luna B. Leopold

Luna B. Leopold

page S.45 follows

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

December 22, 1978

WATER RESOURCES DIVISION MEMORANDUM NO. 79.43

Subject: PUBLICATIONS--Policy of the Water Resources Division Regarding Written Reports

This memorandum updates WRD Policy Statement No. 1 (June 4, 1959) and amendment (March 7, 1963). My purpose is to reemphasize the importance of the written report, to review and emphasize the placement of responsibility and credit for reports, and to reiterate that authorship enhances professional development and career opportunity.

I have refrained here from discussing the planning and writing of reports, the publications media available for Survey authors, and the organizational and hierarchical responsibilities and procedures for review and publication. These are important, but they are addressed in the several editions of Suggestions to Authors culminating in the Sixth Edition, recently published--and in the Publications Guide and technical memorandums of the Water Resources Division, with which you should be familiar.

The Written Report

The Act of Congress which created the U.S. Geological Survey in 1879 established the obligation to make public the results of its investigations. The written report (cartographic or textual) fulfills this obligation for the Survey's program of investigation and research. It serves to archive our findings and to disseminate them.

Three developments during the past dozen or so years--the advent of the computer age, the enlargement and diversification of the user audience, and the effects of inflation on the cost of the traditional Survey book publications--have influenced attitudes toward the written report. These developments have led to a reevaluation of the most suitable form for presenting the results of our work, and have engendered a feeling by some that the written report is being deemphasized as the principal product of the Division. Indeed, the computer printout and computer program are new forms of products, and others are likely to come. However, the written report will continue as a primary vehicle for disseminating and archiving results of research and investigations. Well-written, timely reports are more important than ever because of the enlarged user audience and increased relevance of our work to real world problems.

Responsibility and Credit for Reports

It is Geological Survey policy that its investigators bear primary responsibility for their findings and be credited publicly for their work. This policy stems from recognition that the success of the Survey in carrying out its mission is entirely reliant upon the skill and dedication of its employees. Implementation of this policy requires that Survey investigators document their work and findings, and that authorship of reports be displayed clearly.

The Geological Survey has a proprietary interest in, and is accountable for, the work performed by its employees. Accordingly, supervisors at all levels share the responsibility for assuring that reports prepared under their supervision are accurate, well-written, impartial, and in conformance with Survey policies.

Procedures exist to provide support to authors in the preparation, review, and publication of reports, and to facilitate the carrying out of supervisors' responsibility. Of particular note, because it is part of the nucleus of our system of assuring technical excellence, is the practice in the Water Resources Division of technical reviews by colleagues. As an integral part of their Survey responsibilities, all employees are expected to participate in technical review when asked. Participation in such reviews has priority over other duties, within realistic management constraints. The colleague should take responsibility for technical reviews as seriously as he does his responsibility for his own reports. The District Chief or Program Manager has primary responsibility for assuring the adequacy of colleague review--at both ends, the author's office and colleague reviewer's office.

Authorship

I emphasize here the benefits of authorship to the individual. Authorship credits professional achievement for it associates, on the record for all to see, the individual and his contribution. There are, of course, other expressions of professional achievement, but none so clear and lasting in our kinds of work as that expressed by authorship. Careers are not made by bibliographies, but professional reputations are enhanced by good work as expressed in high-quality reports. The aid to career advancement should be self-evident.

Summary

The written report will continue to serve the Survey as a most important medium of information transfer to the public. The timeliness and high quality of the written report brings credit to the Survey and enhances

the professional reputation and chances for career advancement of the author. All levels of project and program supervision share the responsibility for assuring the timeliness and quality of our written reports.

J. S. Cragwall, Jr.

J. S. Cragwall, Jr.
Chief Hydrologist

Distribution: A, B, S, FO, PO

page 5.49 follows

SOME MATTERS OF ETHICS AND GOOD PRACTICE

A high standard of excellence in the form and content of the reports of the Geological Survey is a constant goal in all its endeavors. Because the author is a member of the Survey, he shares with it the responsibility for attaining high quality in its reports; conversely, the author and the Survey share the responsibility for unsound conclusions, misstatements, errors, and other blunders. Each person who works on a manuscript--the author, the reviewer, the editor, the illustrator--should devote his best efforts to assure a creditable report; expended effort that is less than the best from each person is unworthy and is a waste of time and labor. Furthermore, essential qualities of the teamwork of all persons engaged in the preparation and publication of the Geological Survey's reports include (a) the prompt performance of the duties of each person and (b) a constant maintenance of mutual respect on the part of all persons. The employment of these qualities of teamwork will facilitate and assure a safe and uninterrupted journey of the manuscript report, starting with its initial preparation by the author and ending with its publication....

The responsibility for the prompt completion of a report does not rest solely with the author. It is shared in large measure by his supervisor, who should plan clearly and concretely with the author the one or more reports that will present the results of the investigation. This planning should be done before fieldwork or laboratory study is begun and should not be modified except for justifiable reasons that arise during the investigation or from other circumstances. By such planning, the author has both his goal and his duties in mind at all stages from the beginning of the study until the manuscript report is completed. Good administration leads to effective performance at all times and avoids wasted effort and time. Also, the scientist's or engineer's progress on a project or manuscript should not be interrupted by assignment to new duties except under unusual circumstances. Such interruptions delay and may prevent the completion of planned manuscripts.

After the author completes a manuscript, the responsibility of handling the manuscript and its review fall squarely on the author's supervisor and on other supervisors. These supervisors have the immediate responsibility of keeping the manuscript moving and of avoiding inordinate delays on the desks of the author and the reviewers.

FROM: SUGGESTION TO AUTHORS
5th ed., p. 16

page 5.51 follows

Department of the Interior

GEOLOGICAL SURVEY MANUAL

.1 Purpose and Scope. This chapter provides policy and procedures for obtaining clearance of the Director for publication and oral presentation outside of the USGS.

.2 Policy.

A. All writings in which the USGS has a proprietary interest, and all writings in which the author's title and USGS affiliation will be shown, must be submitted to the Director for approval or clearance prior to release for outside publication.

B. The USGS is considered to have a proprietary interest in all manuscripts based on research or investigations conducted under USGS auspices, or on data obtained under those auspices which have not already been released to the public.

C. Some writings shall include acknowledgment of official authorization, using the wording "PUBLICATION AUTHORIZED BY THE DIRECTOR, U.S. GEOLOGICAL SURVEY," to be determined during the review process.

D. Abstracts that are to be published alone must be cleared with the Director in the usual manner, but clearance for an abstract is not required when the paper abstracted has been previously approved for publication.

.3 Oral Presentations. The rules for clearance by the Director apply in a more limited way to oral presentations before societies or other groups. Speakers must recognize their responsibility for safeguarding the USGS against embarrassment; must use discretion in discussing controversial topics; must not discuss unsettled or unannounced Department or USGS plans and policies, or prematurely disclose the results of investigations. If there can be any doubt as to the propriety of the content or tone of a proposed speech, the statements should be reduced to writing and submitted in advance for review and decision by Division officers and the Director. Divisions may set up internal requirements for clearance of oral presentations for which referral to the Director is not considered necessary. For procedures regarding the use of Form 9-1185, Notice of Intention and Certificate of Compliance - Nonofficial Expression, refer to SM 370.735.4.

.4 Administrative Reports. Reports prepared by the USGS for other governmental agencies for which it is doing work (Federal agencies

only), or with which it is cooperating (Federal, State, or municipal), are released to cooperating agencies in recognition of the proprietary interest those agencies have in them, usually as a result of financial expenditure. Frequently such reports are submitted informally to the cooperating agency for review before they are submitted to the Director for approval and formal transmittal to the other agency. Even though a cooperating agency is entitled at all times to results available from an investigation, it should be made clear to that agency that all results and reports made available to it in the form of administrative reports must not be released to the public in any form and must also be regarded as preliminary until approved by the Director. Exceptions to this provision are reports that contain only factual data normally released to the public without formal approval of the Director (e.g., streamflow records).

.5 Other Manuscripts. Manuscripts in which the USGS has no proprietary interests and in which the author's official connection with the USGS is not to be shown do not require approval by the USGS prior to publication. For example: employees of USGS may wish to publish the results of some investigation carried on by them under other auspices prior to joining the USGS, and they have prepared the manuscript on their own time and wholly without cost to the USGS. However, the authors should send to their Division Chief (or equivalent supervisor) a memorandum briefly outlining the intention and the circumstances. This course will serve to make the intention a matter of record so as to prevent or lessen the possibility that the propriety will later be questioned.

Department of the Interior

GEOLOGICAL SURVEY MANUAL

.1 Purpose. Survey Order No. 202, issued on September 25, 1950, enumerates general policies and requirements regarding release of Geological Survey information, including proprietary information received from private sources. The purpose of this chapter is to incorporate Survey Order No. 202, with appropriate revisions, into the Survey Manual.

.2 Background. As a Federal agency dedicated to public service, the Geological Survey is under obligation to conduct its activities and to make the results of its scientific and engineering investigations available in a manner that will best serve the whole public, rather than the interest and benefit of any special group, corporation, or individual.

The widespread respect for Geological Survey's integrity and impartiality, and its consequent value to the Nation, has been built, and will continue to rest, largely upon its careful fulfillment of that obligation.

For guidance of the Survey staff members in their day-to-day tasks and in their dealings with outside groups or persons, certain policies and requirements have been established for practical application of the general ethical standards and of the provision in the Organic Act that "the Director and members of the Geological Survey *** shall execute no surveys or examinations for private parties or corporations."

.3 Safeguarding of unpublished Survey information. All information (particularly information of economic significance) gathered through investigations and observations by the staff of the Geological Survey or by its contractors must be held confidential and not be disclosed to others until the information is made available to all, impartially and simultaneously through Director-approved formal publication or other approved means of public release, except to the extent that such release is mandated by law. (The term "confidential" in these cases is not to be confused with security classification, but merely means protection from disclosure before release to the general public.)

With approval of the Director, the following types of information have been excluded or excepted from the requirement to hold unpublished information confidential:

A. Water Resources Division. Hydrologic measurements resulting from field observations and laboratory analyses, after they have been

reviewed for accuracy by designated Water Resources Division personnel.

B. National Mapping Division. Copies of unpublished or partially completed topographic maps, image products, and associated cartographic data in graphic and digital form including geodetic control survey data, elevation data, reproductions of space and aerial photographs, and copies of color feature separates.

C. Conservation Division. Administrative maps, well information, subsurface interpretations, and related data released to lessees, permittees, and contractors as necessary for enforcement of the mineral leasing laws and promotion of sound prospecting and development practices.

The phrase "disclosed to others," as used in this chapter, does not include cooperative or other Federal, State, and local governmental agencies and their staffs, to whom, under joint funding agreement or in the public interest, the observations and results of the investigations should be made available. However, it is important that when the results of an investigation are made available to such an agency prior to general release to the public, the Geological Survey shall make it a condition of the release to the other agency that the report must not be released to the public in any form until the report has been released by the Geological Survey or until the Director has authorized release by the other agency.

To satisfy the public need for timely information, formal publication or other approved methods of release should be accomplished as promptly as possible. When there is an immediate demand for Survey data and prompt publication is impossible or unlikely, open-file releases should be appropriately announced, and where applicable, the reports thus released should contain an adequate statement of their preliminary nature and of the fact that they are subject to change.

A long-standing but limited exception permits Survey members to communicate orally with the owner or manager of a mineral property during the progress of its investigation, provided that the information relates to geologic results and observations that may be of value in the development of the property; however, written statements must be avoided, lest they be used for promoting or unduly enhancing values. The propriety of disclosing any such information orally must of course be appraised while considering local conditions and the possibility of misuse of

information; no data that might be detrimental to a neighboring property owner should be released under this authorization. Individual Survey members must not leave notes or sketches that could be used for promotional or other purposes that could be judged unethical.

Geological Survey policy definitely precludes the making of any promise to the owner or lessee of any property, as a prerequisite condition under which he/she will permit access to and study of that property, that the written report of the observations and conclusions reached about the property will be submitted to him/her for review and will not be published except in a form and with a content approved by the owner or lessee. As an impartial fact-finding and fact-issuing agency, the Survey cannot accede to private censorship over the results of its own official work.

There is no Federal law authorizing employees of the Geological Survey to enter on private land against the wishes of the owner or his/her representatives, and only a few of the States have enacted laws giving such authority. Although fieldwork of the Survey cannot be done without entering on such land, Survey field representatives must bear in mind that in this regard, as well as in the use of information about private properties, they must always respect the rights of the individual. Fieldworkers should respectfully request of the property owner or his/her representative permission to enter on the property as representatives of the U.S. Geological Survey to perform an investigation, the results of which are to be used in the preparation of official reports and maps to be published by the Geological Survey for the benefit of the public. In the experience of the Survey, objection to requests for entry has been rare.

.4 Safeguarding proprietary information received from private sources.

Proprietary information such as geological and geophysical data, mine maps, drill records, estimates of reserves, and figures on various categories of production and utilization of water and production of power is supplied by private persons and corporations to the Geological Survey through the following procedures:

(1) in a volunteer manner,

(2) in accordance with proprietary terms of contracts, and

(3) in fulfillment of submittal requirements set forth in appropriate laws such as OCS Land Act, the Mineral Leasing Act of 1920 as amended, and the related regulations.

This information, to the extent it may be exempted from disclosure under the Freedom of Information Act, 5 U.S.C. 552(b), must be carefully safeguarded in accordance with Survey standards for the transmittal and storage of proprietary data. Proprietary information supplied voluntarily, and information acquired through regulations and contracts (during their proprietary term), must not be disclosed to other Federal Agencies except according to established standards. Proprietary information must not be published or otherwise disclosed outside of the Federal Government unless specific written permission is obtained from the person or organization that furnished the information or unless specific statutes require disclosure. If disclosure is required by statute, the person or organization receiving the information must agree to protect the proprietary nature of the information as required by the statute. (See SM 450.2 for procedures for protecting such information if a Survey member is called upon to testify in court.)

If proprietary information is supplied voluntarily, it is desirable to obtain at the same time a memorandum of agreement which should be explicit in describing the material and the nature of its permissible use. If a letter is written to any supplier of proprietary information requesting permission to include or use that information in a report to be published or otherwise released, a similar procedure should be followed. However, except with specific prior approval of the Director, Survey representatives may not submit to any person or organization the written text of a report or even the part of it based on the information supplied by that person or organization prior to public release of the report.

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

In Reply Refer To:
EGS-Mail Stop 439

August 18, 1981

WATER RESOURCES DIVISION MEMORANDUM NO. 81.116

Subject: PUBLICATIONS--Mechanisms for Assuring Release of U.S. Geological Survey Findings on Equal Basis to All Interested Parties

In recent months, we have received several inquiries at Headquarters regarding the release of manuscript materials to requestors (including Freedom of Information Act (FOIA) requestors) after the materials have been approved for release by the Director, but before formal publication or open-file release has been achieved.

This memorandum provides background information on the Geological Survey's policy and guidance in assuring that all information approved for release by the Director is made available on an equal basis.

U.S. Geological Survey Order No. 202, issued on September 25, 1950, and Geological Survey Manual Chapter 14, Number 500.14 dated January 28, 1980, discuss Survey policy regarding the release of information. These documents describe the philosophy by which the Survey releases information and mention several vehicles for release of information to the public following approval for release by the Director. Those vehicles include formal publication or other approved methods such as release to the open-file. Geological Survey Order No. 202, and Geological Survey Manual Chapter 14, No. 500.14 state:

> "...the Geological Survey is under obligation to conduct its activities and to make the results of its scientific and engineering investigations available in a manner that will best serve the whole public, rather than the interest and benefit of any special group, corporation, or individual."

> "All information...gathered through investigations and observations by the staff of the Geological Survey or by its contractors must be held confidential and not be disclosed to others until the information is made available to all, impartially and simultaneously through Director-approved formal publication or other means of public release..."

Formal Publication. Formal publication is a recognized means of releasing Geological Survey information and includes Professional Papers, Water-Supply Papers, Circulars, Bulletins, Water-Resources Investigations, Hydrologic Atlases, Miscellaneous Investigations Maps, professional society or technical journals, and cooperator-published series. With the exception of professional society or technical journals, a news release or other public announcement, such as listing in the monthly list of "New Publications of the Geological Survey," is considered a valid mechanism for informing the public of the availability of the information on an equal basis.

Professional society and technical journals generally reach readerships with a strong interest in topics covered, and restrict their contents to topics they judge appropriate for that readership. Because they are published on a regular basis, and because they presumably reach the "interested public" most concerned with the topics covered (nearly always results of scientific inquiry), the Survey considers publication in a journal to also be a valid mechanism for informing the public of the availability of information on an equal basis.

In order to insure equality of release, following Director's approval, manuscript materials must not be supplied to the public before formal publication, unless the materials have also been approved for release to the open file.

Open-File Release: Many basic data reports, reports judged largely of local interest, and reports (book and map) containing high interest, sought after information destined for ultimate formal publication are released to the open file. Such release may be announced by news release, and is listed in the Survey's monthly list of new publications.

In order to insure impartial and simultaneous release following Director's approval, manuscript materials for open-file reports must not be supplied to the public before the issuance of a news release in which the places and conditions of the availability of the information is publicly announced. It is incumbent upon the originating office to insure that advertised depositories, libraries, and offices are supplied copies of open-file reports in advance of the announcement of a report's availability.

The policy regarding the release of information to Federal, State, or local cooperating agencies is outlined in detail in Survey Manual Chapter 14, No. 500.14.

Philip Cohen
Chief Hydrologist

This memorandum supersedes no existing WRD memorandum.

WRD Distribution: A, B, S. FO, PO

.1 Purpose and Scope. This chapter establishes USGS policy and procedures for the release of written information to the news media.

.2 Policy.

A. The USGS Information Office, through established channels of review and clearance within the USGS and the Department, prepares and distributes most of the USGS's press releases.

B. Authorization for others to issue statements to news media is limited to field and staff employees at supervisory levels located outside of the national headquarters area. It applies to statements or information given to news media representatives: reporters, editors, or writers for newspapers, magazines, trade, scientific, or technical publications; and radio or television stations. It also applies to statements requested by cooperating agencies for their use in drafting such statements to be released by them. In general, statements issued to local or regional media should be factual, noncontroversial, and brief (usually not more than a page or two in length), avoiding highly scientific or technical terminology. Statements that discuss broad policy matters or that are flavored with editorial, endorsement, or similar characteristics, should be referred to higher levels of authority for decision.

C. Statements should not be used as vehicles for the premature disclosure of new scientific and technical information. Information about results of current USGS programs that has not been incorporated in reports already available to the public must be brief, general, and properly qualified as preliminary and tentative.

.3 Procedures.

A. Copy Identification. A copy of each statement shall be sent to the Information Office through channels, with copies of the statement furnished as required to applicable USGS Offices. Each statement should be identified by the name of the person who released it, the name of the person(s) to whom it was released, the name of the newspaper, magazine, publication, or the radio or television station represented, and the date of preparation.

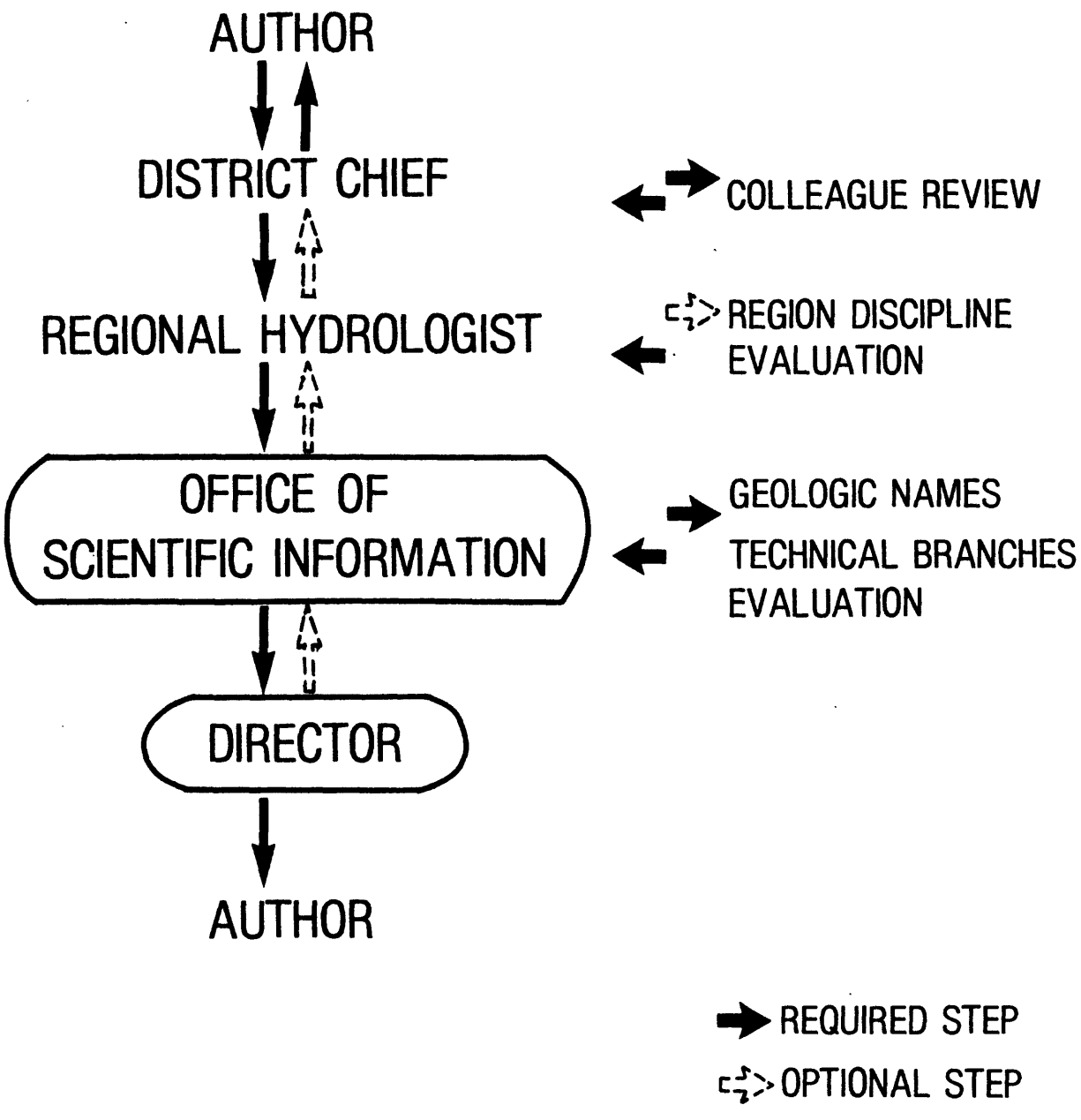
10-07-77 (Rel. No. 1599)

B. Release. Press releases of all USGS Offices will be issued on the regular USGS letterhead of those offices unless otherwise prescribed by the Information Office and will include the name and phone number of the spokesman for the release and release date, or date of mailing.

C. Liaison. Employees should be aware that each USGS Division or Office has named a specific person at headquarters to act as liaison to the Information Office. Such liaison helps in the orderly and timely process of assessing subjects or circumstances that require news coverage, reviewing and clearing releases, and, in general, working with the Information Office so that news services can be carried out in an effective manner. If there are questions relating to the issuance of press releases at USGS offices outside the National Center, employees are urged to contact such organizational liaison, or the Information Office, for guidance on subject matter, press release format, content, and distribution.

REPORT REVIEW AND EVALUATION

Routing Steps



EXAMPLE 5HH

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

In Reply Refer To:
EGS-Mail Stop 439

January 26, 1982

WATER RESOURCES DIVISION MEMORANDUM NO. 82.43

Subject: PUBLICATIONS--Importance of Colleague Review

The importance of the colleague review in the preparation of quality su reports cannot be overemphasized. Although the system has been discusse detail in Suggestions to Authors, the WRD Publication Guide, the WRD Bu and in several Survey courses, a reiteration of the principles may refr the memories of experienced personnel and help in the indoctrination of new hydrologists.

Two colleague reviews are mandatory for all reports. Whenever possible the reviewers should be selected on the basis of special knowledge or interest in the subject material of the report. At least one colleague reviewer should be selected from outside of the originating District. A report submitted for colleague review must be complete in all aspects including press release, WRSIC abstract, manuscript, legible illustrations, and a routing sheet.

A colleague review should concentrate on the technical adequacy of the report, but any apparent editorial discrepancies, particularly in organization, should be pointed out. Specific items that should be considered during review include:

1. Is the problem or need for the report clearly stated?

2. Are the objectives of the report clearly spelled out and does the report deal with stated problem and objectives?

3. Is the organization of the report appropriate?

4. Were appropriate and valid techniques used in the study?

5. Are formulas correct and are they correctly used?

6. Were the data properly and thoroughly analyzed?

7. Can the report be understood by the intended reader (or in some cases, by anyone)?

8. Are the conclusions sound and properly documented and do they satisfy the objectives of the report?

9. Are tables and figures clear, understandable, and necessary to the report?

10. Are any Survey Policies violated?

11. Is proper recognition given for the work of others?

12. Are all appropriate technical references included?

The colleague reviewer should summarize his overall impressions and make recommendations for improvement of the report in a memorandum to the author. Brief, clear, and legible review comments should be entered directly on the manuscript. The reviewer should maintain objectivity and refrain from humor, witticism, or sarcasm in his comments.

The author should objectively evaluate all review comments and make changes if appropriate. All review comments should be answered and initialed by the author. Reasons should be given if comments are not accepted.

Colleague review responsibility should be assigned to new and inexperienced hydrologists for additional in-house review or for training. Colleague review is an integral part of a hydrologist's duties and it should be mastered early in his/her Survey career.

Regional and District offices should evaluate and continually update their colleague review procedures. A strong District report review program is the best assurance of quality reports. Please contact me if you have any suggestions that will improve the system.

Robert J. Dingman

Robert J. Dingman
Assistant Chief Hydrologist
for Scientific Publications
and Data Management

This memorandum supersedes no existing WRD memorandum.

Distribution: A, B, S, FO, PO

page 5.61 follows

Philosophy of review

(Henry Barksdale 1960)

The following comments, which are modeled after suggestions expressed in 1960 by Henry Barksdale, discuss the philosophy of review: Be objective! Be direct! Be careful! Be reasonable! Be considerate!

1. Be objective.--Examine your attitude carefully before you begin a review. Examine it at frequent intervals as the review is being made. Are you sincerely trying to improve the report, as part of a team effort, or are you trying to show how smart you are?

Comments made before reading all of a statement are apt to be the result of overeagerness to inflict criticism. When this type of comment is not corrected after the reviewer has (presumably) read the balance of the statement, it becomes obvious that the reviewer is more occupied (enamored) with what he has just said than he is with what the author is saying.

There is no proper place for sarcasm on the part of any reviewer.

2. Be direct.--Avoid vagueness. Ask your questions clearly. Make your comments clear and complete. If you can't do these things perhaps you don't understand the situation; so, be doubly careful before you criticize. If there isn't room on the page to ask an intelligent question or make an intelligent comment use a separate sheet of paper.

Isolated question marks do not constitute intelligent questions.

3. Be careful.--Are you helping to solve the problem or are you becoming a part of the problem? The author and District Supervisor certainly have a responsibility to submit a report as free from errors as they can possibly make it, and it should be realized that they have eliminated most of the errors before the report is submitted for review. From that point on, the review should be comparatively easy (in most cases). If reviewers compound the troubles by making more errors, or by introducing erroneous or unimportant concepts, nothing is gained by review.

If a reviewer is uncertain about something in a report he should do a little research of his own. If he fails to define any error in the report he should not mark up the report. By implication the reviewer is a person of knowledge and authority. So, it behooves him to be sure of himself before he marks up a report. Too much time is spent by authors in educating reviewers after reports have been bounced.

4. Be reasonable.--Constructive suggestions should be appreciated--and most of them are--but it should be obvious to the reviewers that by the time the report gets to Branch review, the work has been done and the allotted time and money have been spent.

5. Be considerate.--Put yourself in the author's shoes.

(From: "SUGGESTIONS TO AUTHORS," 6th ed., p.11)

EXAMPLE 5J

Given specific advice as to his paper's deficiencies, the author should be able to do a better job of revision than can anyone else, and he will learn from the experience.

Authors seldom believe it until they become technical critics themselves, but the fact is that nearly all critics are people of good will, genuinely trying to help the author. Criticism is at best a thankless job, done by people who would much rather pursue original research than review manuscripts by others. Rarely, the critic may run across a gem of new thought in his own specialty; if he does, he will be grateful for the critical assignment. More often, his job will be a sterile one for him personally, done in the knowledge that his help is as likely as not to upset or antagonize the one he is trying to help.

The author, then, should approach the critics's comments on his manuscript with an open, cool mind. He must realize every comment deserves his thorough and objective consideration. Some critical comments may seem at first to be so wrong as to imply gross carelessness, if not downright stupidity, on the part of the critic. Such implications are almost certainly wrong. The author must assume that the more "stupid" a critic's comments, the more the original manuscript deserves careful restudy. Surely something in the expression, the facts presented, or the reasoning led the critic astray and caused him to make the "stupid" comment or mark. The critic has read the manuscript more carefully and with more background knowledge than will the ultimate reader; if he missed the author's point, so too will the reader of the published report.

Most differences between author and critic can be resolved by frank discussion face to face, if possible, but in writing if not. Should differences persist, it may be necessary to go to higher authority, to ask for a new review by a disinterested party, or to arrange for a joint study of the original field or laboratory evidence.

Papers by Survey authors that are submitted to outside journals for publication are commonly given an additional round of technical review by the outside organization. The journal editor usually receives many more manuscripts than he can publish, and he must choose those papers that best fit the needs of his particular audience and that fit within the policies and restrictions of his organization. To help him in his decisions, the editor may seek the advice of one or more critics who are specialists in the subject matter of a particular manuscript. The author will be well advised to accede gracefully to the journal editor's policies. If his research and conclusions are sound, they will stand up to additional technical review. And if his paper is accepted, it will probably be published promptly and will be seen by the audience most interested in it.

page 5.65 follows

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

EXAMPLE 5K

TO : Professional Staff, New York District **DATE:** August 8, 1969

FROM : District Chief, WRD, Albany, N.Y.

SUBJECT: PUBLICATIONS -- Colleague (Technical) Reviews

As a part of our commitment to our cooperators, there are a number of reports in the district that are rapidly approaching the review stage. Many of you will be requested to assist by making a technical review of these reports. It would, therefore, seem to be desirable to define what is expected of the technical reviewer and his relation to the work of the editorial staff of the Publications Unit.

The technical review, as the name suggests, should be concerned primarily with the technical aspects of the paper. Items to be considered would include:

1. Is a problem or need for the report clearly stated?
2. Does the report deal with the stated problem or need?
3. Are the techniques used valid?
4. Are formulas correct and are they correctly used?
5. Were the data properly and thoroughly analyzed?
6. Can the report be understood by the intended reader (or in some cases, by anyone)?
7. Are the conclusions sound and properly documented?
8. Are tables and figures clear, understandable, and necessary to the report?
9. Are the illustrations legible?
10. Is proper recognition made of the work of others?

The above list contains examples of the types of questions to be considered by the technical reviewer; it is not intended to be all inclusive.

Very little time should be spent on editing. Much of the report may be rewritten, so time spent editing material that later may be discarded is obviously time wasted. The editorial staff in the Publications Unit is responsible for checking the details -- checking for proper usage, grammar, etc. They are capable of doing a rapid and efficient job of this phase of report preparation.

A small word of caution from one who has been on both sides. Please remember that the author is a friend and fellow colleague. Refrain from the use of humor, witticism and sarcasm in your comments. No matter how funny it seems to you at the moment, you can be sure the author will misunderstand and be resentful of even the most well-meant barbs of this type. Please be thorough, brief, and courteous in your remarks. Remember that your reports will also be reviewed soon and treat your colleagues' reports as you would like to have yours treated.

Robert J. Dingman

Robert J. Dingman

page 5.67 follows

SUGGESTIONS TO REVIEWERS

By L. A. Heindl

(Geologist, Office of the Area Hydrologist, ACA, Arlington, Va.)

INTRODUCTION

The Water Resources Division's report-improvement program was initiated to fill the breach left by the elimination of the old Branch Review Sections. With those sections gone, the full weight of responsibility for the quality of our reports was shifted back to the districts--particularly to the District Chiefs or District Supervisors, and to the authors. Simultaneously, the Division realized that with the disbandment of the Review Sections, the districts would need assistance to develop techniques and habits that would help them turn out reports at least equal to the quality of those the districts prepared with the aid of the Review Sections. The report-improvement program represents the Division effort in this regard, and this discussion of techniques of review is a part of this effort.

The report-improvement program initially had--and still has--one principal goal: to improve our reports. The program is working towards this goal along several different lines concurrently--through various training devices, improvement of report-planning techniques, assistance to districts and authors during preparation stages, salvage of completed but inadequate reports, and through facilitated communication between all individuals and sections dealing directly with reports. To implement the program, each Area Hydrologist has a Staff Assistant for report improvement, and each district has--or will have shortly--at least one specially trained Reports Specialist or Reports Advisor.

The process basic to the improvement of reports is review to insure that they meet certain standards of content, style, and format. "Suggestions to Authors" puts review in the framework of the Survey's responsibilities: "The Survey generally exercises its proprietary interest only to the extent of seeing that a report is scientifically and technically sound, will reach the proper audience, and will reflect credit on both the Survey and the author. To these ends, each report is reviewed by the author's fellow workers, supervisors, and staff officials, who bring to bear upon it their specialized knowledge, skill, and judgment to assure a sound product. In its final form each Survey report is the product of team effort in which many persons do their share--even though most of them remain anonymous." Thus, review in the Survey includes critical evaluation of the technical content and the editorial quality of the text, illustrations, and tables, and of the proposed medium of publication.

Because review involves both technical content and editorial quality, and because opinions on editorial quality are always somewhat subjective, the questions of how far editorial review should go and how to distinguish between technical and editorial review are frequently argued among--and between--reviewers and authors. In practice, however, the two are closely related, as described in the following quotation from "Suggestions to Critics," a pamphlet issued in 1949 by the Geologic Division.

"The quality of any scientific manuscript is a function of two commonly unrelated variables--the quality of the research, and the effectiveness of the presentation. The criticism of a manuscript is an equally two-sided problem--examining the soundness of the data, reasoning, and conclusions (reviewing); and helping the author to transmit his ideas into the mind of the reader with a minimum of distortion (one definition of editing). Everyone agrees that the critic's chief duty is to review, in the sense above defined. *** Such editing as the critic feels impelled to do *** should make it possible for the average, even nongeologic, reader to understand what the author is trying to say. *** If editing is defined as making 'more intelligible,' this function is legitimate and should be one of the duties of the critic ***."

The close relationship is put more bluntly by the semanticist, Wendell Johnson: "***clarity is a prerequisite to validity***. (Writing) can be clear without having validity, but if it is unclear its validity cannot well be determined."

For our purposes, editorial review is limited largely to making a report grammatically correct; it includes attention to details such as spelling, punctuation, and word order, and more importantly, to clarity, syntax, and the proper use of words. When done by nonprofessional colleagues, it can be valuable for suggestions as to how to clarify and simplify technical explanation in a report intended for nontechnical readers. But in general, editorial review is mostly a mechanical application of the customs of good English usage and typographical style appropriate to the publication medium. By and large, editorial review should be completed before a report is submitted for technical review.

Technical review, in contrast, has the broader responsibility of making certain that the report is technically sound and will reach and be clear to its intended audience. Consequently it involves attention

to the validity of both the technical data and its use, to the effectiveness of the organization, and to the clarity of its presentation of the material. Thus technical review includes many editorial functions. These editorial functions, however, should supplement and refine what is already an editorially adequate manuscript.

But how does one review? What is a good report? How does one assure a "sound product"? How does one know that a reviewer has been effective? These questions, and others, are discussed in this summary of review practices, which also recapitulates principles, outlines some techniques, and offers a few criteria for reviewing reports and for evaluating their review.

What Is a Good Report?

A good report, first and most importantly, has something to say to the intended reader. To do this it must be presented at a level of explanation suitable to the intended reader and in the proper publication medium. Other characteristics of a good report are outlined below in the general order of importance:

1. It is technically sound.

2. It is well organized.
   a. The title indicates clearly the subject.
   b. The purpose is expressed clearly and explicitly.
   c. The data are pertinent to the purpose.
   d. The reasoning by which the interpretations and conclusions are reached are given adequately and clearly.
   e. The conclusions are valid.
   f. The important factors are properly emphasized and supporting factors are subordinated.

3. It is timely.

4. It is brief, consistent with soundness and clarity.

5. It is attractive.

When Is a Manuscript Ready for Review?

A manuscript is ready for review when an author has done everything possible to make it meet generally accepted standards of technical soundness and editorial adequacy. This implies that he has taken an objective view of the report, made it a rational development of and contribution to the current state of knowledge in its field, and made all the mechanical checks necessary to make the text, tables, and illustrations accurate and mutually consistent. In addition, the manuscript presented for review should be reasonably clean and clear, and it should be accompanied by the background information that is pertinent to the review, including previous reviewers' comments or a digest of them.

PRINCIPLES OF REVIEW

Purpose

The purpose of review is to maintain high quality by suggesting needed technical and editorial changes that will improve the report and that will eliminate errors which may lead to the embarrassment of the author and the Survey. In addition, review should help an author improve his subsequent reports, and should acquaint him with procedures he can use himself in the review of the reports of others.

Qualifications of Reviewers

Reviewers should be, as "Suggestions to Authors" puts it, "specially qualified by their knowledge of, and interest in, the problems discussed." These certainly are the main prerequisites. But they also should have the confidence to pass judgment on the quality and validity of a report, and to point out deficiencies and suggest improvement. They should remember that their principal objective is to improve the report, and they should do this willingly. Their attitude towards a report should be objective, but nonetheless careful and considerate. Perhaps the attitude is best summed up by the term used somewhere by Robert Louis Stevenson, "respectfully skeptical." In addition, a reviewer should be able to state his opinions clearly, be firm but tactful, and to be willing to accept responsibility for his suggestions. Last but not least, his comments should be legible.

Responsibilities of Reviewers

All professionals are expected to make a certain amount of time available and to assume responsibility for critically reviewing and discussing a colleague's reports as a normal part of their duties. As a reviewer, the professional's first responsibility is to assure the technical soundness of the report. To do this best, all suggested changes should be constructive and specific, and the reviewer should give reasons for and be prepared to justify his suggestions. He should keep in mind the purpose of the report and whether the report will fulfill its purpose. He, of course, has the responsibility of being professionally honest, regardless of how considerate he may wish to be personally. As far as possible, he should leave the author's "style" alone, commensurate with accuracy, clarity, and brevity.

Amount of Review

The amount of review needed by a report will depend on the quality of the report. Probably it is not so much a matter of how much review as of how thorough are the reviewers. In general, a report can benefit from comments made by several technical reviewers, and certainly each report should have at least enough objective review to assure its technical soundness and editorial clarity. If a technical reviewer spots major faults in a report, such as misuse of basic concepts, he should note these and return the report to the author without spending time on details. A report may need editorial review twice--once, when it is the author's final draft; and again, after it has been revised following the final technical review.

Alternate Methods of Review

Review may be concurrent or consecutive. That is, a number of copies may be sent out to several reviewers simultaneously, or one copy may be sent to several reviewers in turn. The advantage of concurrent

review is that it is faster, and the author has an opportunity to compare different reviewers' comments before making his revision; the main disadvantages are that the author may be faced with conflicting suggestions, and the reviewers' time is wasted because several may make the same suggestions; also, usually none of the original reviewers see the revised report. The advantage of consecutive review is that each reviewer, except the first, sees a draft that has been revised with the benefit of earlier reviews; disadvantages are that the method is time-consuming and the author may waste time making unneeded revisions of revision to satisfy successive reviewers' comments.

Review also may be done individually, by small groups, or by small groups including the author. Review is rarely done by a group that does not include the author unless the author is completely unavailable. The advantage of review by individuals is that it is the quickest; the small group has the advantage of bringing together several reviewers' opinions simultaneously; and by including the author the group has the advantage of working out problems with the author as they arise and in effect revising the report as it is reviewed. In addition, review by groups is an excellent mechanism for training reviewers.

Regardless of whether review is concurrent or consecutive, and whether it is done individually or by small groups, critiques should be prepared by the reviewers.

TECHNIQUES OF REVIEW

Many techniques are involved in the process of review. Guidelines are offered here for two important aspects--mechanics and criteria--which are used concurrently.

Mechanics of Review

Review should follow logical procedures as an aid to the reviewer and to assure the author of the most perceptive possible criticism. The procedure suggested here is for the review of a long report and is stylized into steps for convenience of presentation. The procedure can be condensed for short reports and will vary with different reviewers.

1. Acquaint yourself with the background of the report as detailed in the accompanying letters, memos and critiques of previous reviewers, which should accompany the report.

2. Skim through the whole report to get an overall impression by means of the introduction, conclusions, and abstract in that order; the section headings, tables, and illustrations and their titles; and the topic and terminal sentences of paragraphs and sections.

3. Study and compare the abstract, introduction, and conclusions; are they consistent?

4. Read the body of the report carefully. Check for:
   a. Technical soundness, including the significance of the precision of quantitative data.
   b. Consistency between text, illustrations, and tables.
   c. Presentation--organization, coherence, pertinence, clarity.
   d. Expression--effectiveness and acceptability.

5. Give the report a second quick scanning to put the report and your comments into perspective and to refocus your attention on the principal problems. Reread the critiques of previous reviewers and prepare your own.

The review of a long report usually results in three types of comments: (1) brief marginal notes and interlinear changes on the manuscript; (2) more extensive comments on separate sheets; and (3) a critique which summarizes general comments and discusses the principal suggested changes. These may be consolidated for short reports, but--except for abstracts--a critique is a must.

Marginal comments should be kept to a minimum; it is far better to indicate the questioned material with a reference number or letter in the margin and to make the comment on a separate sheet. Few things are more discouraging to an author than to see page after page nearly obliterated by comments. The reviewer also should avoid writing with too hard, or too soft, pencils, and using too small a handwriting--combined they lead only to eyestrain, fatigue, and irritation.

Some reviewers and authors believe that the reviewer probably can best aid the author by raising questions rather than making changes. For example, a statement such as, "This sentence seems to imply such and such. Is this consistent with your previous statement on page so-and-so?", is preferred to a direct revision. Other reviewers and authors prefer the changes. The advantage of the question method is that it does not presume to speak for the author and permits the author to work out his own solution to the problem. The disadvantage is that it slows down revision; the author must think through the reviewer's question--which might be unclear or misinterpreted--and devise his revision accordingly. The advantage of the "revision" method is that it is quicker; the reviewer usually has a ready solution for most questions he raises and has the revision at his pencil point even as he makes his comment. The disadvantage, of course, is that he may not present the author's point of view or may change the author's meaning. Both systems are widely used, and usually the system depends on the subject matter and on the reviewer.

In general, however, technical reviewers should take care that they review rather than revise. If detailed comments and editorial changes become excessive, the report should be returned to the author for additional revision necessary to complete the preparation phase of the report. Whenever possible the reviewer should correspond, or better yet, confer with the author, particularly when extensive changes are suggested.

Criteria for Technical Review

Criteria for technical review encompass all aspects of a report--technical soundness, editorial quality, and appropriateness to the intended audience. The principal responsibility of a reviewer, however, lies in making certain the technical quality of a report is high. The criteria are presented in the form of questions because review is basically a questioning process and because it would take far more room to spell out even the main answers.

These questions, and the more specific ones to which they lead in the review of individual reports, provide an idea of the scope of technical review. These questions should be used by authors and their supervisors, as well as by reviewers, in the evaluation of reports, and as will be discussed subsequently--in the evaluation of the reviews themselves. The questions are not in an order of rank, nor are they in the order in which they might present themselves in the review of any particular report.

1. Is the statement of purpose clear and explicit? Can the purpose be fulfilled through the concepts and with the methods available? If not, does the report offer new concepts and methods or does it clearly establish the limitations of the available means? For example, perennial yield of a basin could only be estimated, and then only with the use of empirical and arbitrary assumptions.

2. Is the information worth a report of the type planned? For example, most well-site reports do not warrant the effort needed to make them Water-Supply Papers. On the other hand, is the report adequate for the stated purpose? Will the proposed publication medium reach the intended reader group? A comprehensive river-basin study should not be buried in a short open-file report.

3. Are previous studies adequately referred to and are the methods used and concepts presented up to the current "state of the art"?

4. Are the data adequate to cope with the stated purpose, and has the author done as much with the data as could be done within the scope of the stated purpose?

5. Are proper methods used to reduce the data--that is, to condense, simplify, or abstract pertinent parameters from the raw records? Are the concepts and qualifying assumptions, and the statistical and graphical methods appropriate to the reductions presented? For example, averaged well yields without reference to source rock or geographic distribution cannot be presented as a meaningful index of the potential yield of an area.

6. Are phenomena classified and defined correctly and completely? For example, well yields cannot be equated with formation yields without specific qualification regarding the conditions under which the well yield data were collected.

7. Are data properly weighted as to their reliability and are the limits of reliability presented unequivocally. Are numerical data rounded off to their proper significant figure, particularly in their use in interpretations and conclusions? Are arithmetic and mathematical presentations correct, complete, and limited to their proper scope?

8. Are analogies, extrapolations, and interpolations made within the scope of the data presented? Are abstract concepts made pertinent by being illustrated by concrete examples from the data?

9. Has the method of multiple working hypotheses been used, or has the author restricted himself only to those facts that support single hypothesis?

10. Do the data support the conclusions? Do the data support the inferences and interpretations drawn from them, particularly to the degree implied? Are the assumptions, opinion, and interpretations properly identified and qualified as to accuracy and completeness? Is each conclusion weighted on the basis of the reliability of the individual components which make up the conclusion? For example, the reliability of a water budget should be clearly related to the reliability of the weakest assumption that went into its computation.

11. Are all the data necessary to support or corroborate the conclusions presented adequately?

12. Are the recommendations made for further studies justified on the basis of deficiencies in knowledge that showed up during the investigation?

13. Has the author looked beyond the bounds of his particular problem to indicate its relationship to the subject as a whole?

14. Is the report unified? Does all material relate to the purpose? Do text, illustrations, and tables supplement each other? Are all the illustrations and tables necessary? What is irrelevant? superfluous? parenthetic? digressive? just plain padding? Do spot checks indicate consistency of text, tables, and illustrations?

15. Is the report coherent? Is its development, from purpose through data and interpretations to conclusions, rational and thorough? Does the report progress logically from point to point and topic to topic with enough transitional material to show the relationship of its several parts?

16. Does the report emphasize its contents realistically and appropriately in keeping with its stated purpose? Do the principal facts and findings stand out clearly, or are they buried by a wealth of detail describing minor features?

17. Does the report communicate effectively with--gets its message across to--the intended reader? Is it expressed clearly enough so that its validity can be judged fairly? Do the titles of illustrations and tables indicate their purpose and significance, or just list their component parts; do the illustrations and tables show what the author says they do? Is the form of expression, regardless of originality and style, within the bounds of ordinary English grammar, accepted definitions, and the understanding of the intended reader?

18. Does the report present what the title states, and do the section headings outline a representative organization of the material?

19. Does the abstract include the significant findings and present the main contributions of the report? Is it specific in what it offers?

20. Does the report comply with Survey policy?

EVALUATION OF REVIEW

Because review is used to assure quality in reports, the quality of the review itself may influence the quality of the report. Consequently, reviews themselves need to be evaluated so as to assure those with the responsibility to forward and approve reports that the reports have received competent professional criticism.

Reviews fall short of being as good as they should be for three general reasons. First, the reviewers concentrate on only a part of their responsibilities; for example, they may revise and pick editorial or arithmetic nits but fail to evaluate the technical concepts or the completeness of the presentation. Second, reviewers may be cursory and complaisant, and fail to give a report the close study a technical review demands. Some reviewers are so familiar with the project or the report that they fail to miss what the report has omitted or unconsciously supply steps that the report has skipped. Third, reviewers may fail to be objective in their evaluation and condemn the report because it is not in accord with their views or revise it because its style is personally unacceptable.

An author's evaluation of a review, of course, is immediate and direct, but he should summarize his acceptance or rejection of a reviewer's principal comments to facilitate further evaluation of his revised report. District Chiefs and Area Hydrologist, however, have the responsibility of determining whether individual reviewers have fulfilled their responsibility. It should be just as reasonable to reject an unacceptable review as it is to return an unacceptable report.

ACKNOWLEDGMENTS

This summary is largely the result of many discussions with the three other Area Staff Assistants, W. L. Burnham, P. E. Dennis, and C. J. Robinove--particularly C. J. Robinove. It is also an outgrowth of my experience working in the Ground-Water Reports Section with C. L. McGuinness, G. H. Davis, and W. D. E. Cardwell, and of many informal exchanges with my colleagues in the Division.

REQUEST FOR COMMENTS AND SUGGESTIONS

This report is preliminary and is not to be considered as a statement of review policy. We--the four Area Staff Assistants--need and would appreciate your comments and suggestions so that eventually we can put out a practical guide to review techniques. Please send them directly to me, Atlantic Coast Area office, Arlington, Virginia, or through the Water Resources Bulletin.

page 5.73 follows

EXAMPLE 5M

SUMMARY OF A COLLEAGUE REVIEW

STEP 1 Acquaint yourself with the report's pertinent background information.

STEP 2 Skim and scan the entire report.

STEP 3 Study the introduction for purpose, scope, and methods.

STEP 4 Study the terminal section for purpose, scope, findings, and conclusions.

STEP 5 Study the table of contents to make a preliminary assessment of the organization of the report.

STEP 6 Study the first (second, third, etc.) section of the body of the report for technical accuracy.

STEP 7 Reevaluate the introduction, the conclusion, and the organization.

STEP 8 Study the abstract.

STEP 9 Study the press release.

STEP 10 Cool the report and your notes for a while.

STEP 11 Reread all of your notes.

STEP 12 Reread the entire report and rewrite (add, delete, modify) your notes as you go.

STEP 13 Write your review memorandum to the author.

page 5.25 follows

Suggestions for Reviewers

Read or scan

Review the components

- Table of Contents
- Abstract
- Introduction
- Text
- Conclusions
- Illustrations and Plates
- Tables
- Title

Reexamine

- Policy violations?
- Readable by the intended audience?
- Logical organization?

Communicate

- Telephone
- Written copy of comments

page 5.77 follows

U.S. GEOLOGICAL SURVEY
New York District

November 1980

MANUSCRIPT CHECKLIST FOR AUTHORS

Title_____

Authors_____

Publication Series_____ Project no._____

This form must be completed by the author and signed by his supervisor before the report is submitted to the Publications Unit for processing. The author writes in each box either his initials to indicate OK or a dash if the item is not applicable. The author is expected to be familiar with the pertinent sections of STA and WRD Publications Guide.

MANUSCRIPT

Purpose of study is stated in introduction; report fulfills stated objective	
Publisher's specifications have been obtained and followed; copy of specification sheet for non-Survey reports is included with manuscript.	
Preliminary pages and support documents are in correct format. (Refer to Pub. Guide and published samples; cross out those that do not apply) ☐ cover ☐ conversion table ☐ title page ☐ text abstract ☐ table of contents ☐ press release ☐ list of illustrations & tables ☐ WRSIC sheet	
Title of report is as short and explicit as possible	
Wording of title is same on cover, title page, abstract, and support documents	
Cooperating agencies are named on cover, title page, and in introduction	
List of illustrations identifies each figure as map, graph, photo, etc.	
Conversion table contains all units of measure used in text, illustrations, and tables; conversion factors have been verified	
Use of metric or U.S. Customary units is consistent in text, tables, and figures	
Acknowledgments are in accordance with STA guidelines (6th ed., p. 44)	
Abstract is written in accordance with Pub. Guide, sec. 1.07.2	
Abstract and conclusions contain only information that is given in text; abstract tells what report contributes	
Pagination is consecutive with cover page as 1 (not i)	
Headings and subheads are in publisher's style (see published reports); their rank is indicated by indention in table of contents	
Each illustration is referred to in text; its location in text is indicated by a "cut-in" following principal reference	
Caption sheet follows the principal reference to each figure, multiple captions are listed on same sheet	

Wording on caption sheets agrees with that in list of illustrations except that phrase "map showing" is deleted	
Entire manuscript is double spaced to allow editorial work	
Routing sheet is complete and up to date	
WRSIC sheet is double spaced and contains 200 words or less	
Press release (if needed) is lively and written in accordance with Pub. Guide, sec. 17	
Letter of permission to publish has been requested from cooperator (needed from Federal cooperators only	

ILLUSTRATIONS

Final illustrations will be done by: ☐ District draftsman ☐ Publisher Number of figures _____ Number of plates _____	
Special presswork (color, oversize, foldout) is within publisher's capability	
Each illustration is essential and is referred to in text	
Illustrations are designed in accordance with Pub. Guide, sec. 3	
Similar illustrations are consistent in format and wording	
Explanations within figures and plates are complete and in accordance with Pub Guide	
All illustrations (except plates) are page size and reproducible	
Final lettering will not need to be smaller than 8 point (This is 8 point.)	
All maps show lat., long., and scale	
General location map is included in first appropriate figure	
Base maps have been discussed with draftsman to determine manner of data presentation. Same base is used wherever possible	
Figures are together at end of report, not within text	
Each figure is clearly numbered; caption is attached on a separate page	

TABLES

All tables are essential and are referred to in text	
Table headings are as short and descriptive as possible	
Similar tables are consistent in format and wording	
Data in tables have been cross checked against figures and text	
Tables conform to Survey style (STA and recent Survey pubs. contain examples)	
Regular tables follow principal reference in text; lengthy tables and computer printouts are at end of report	
Principal reference to each table is followed by a cut-in notation	

Author's supervisor _____ Date _____

DISTRICT MANUSCRIPT ROUTING SHEET

This form is for District review of all reports before they are given to cooperators or to colleagues. A report should be transmitted to the next step only when there is a "yes" in the "Ready for publication" column.

Signature	Date in	Action taken				Date out	Step					Ready for publication	Action required	Next routing
		Revision	Hours	Review	Hours		Author	Other	Section Chief	Report Specialist	District Chief			

Proposed colleague reviewers	Name	Location

WRD No._____

EVALUATION SHEET

Report Title

Evaluator_____ Technical grade_____ Editorial grade____

_____ Title of report is appropriate and accurately describes report content.

_____ WRSIC abstract, press release, cover page, title page, and back title page are there and are correctly formated.

_____ Table of contents, list of illustrations and list of tables are properly formated and agree with text headings, and figure and table titles.

_____ All illustrations have been checked for technical content, compatability with text, and corrections marked or deficiencies noted.

_____ A list of conversion factors and abbreviations is included which list those used in report and no others. Factors are correct to four significant figures and no scientific notation is used. All metric or all inch pound units are used throughout the manuscript.

_____ A statement on altitude datum is included if altitude is referred to in report. "Sea level" is used in book reports and National Geodetic Vertical Datum of 1929 (or "NGVD of 1929" if space is limited) is used on map reports.

_____ Trade-name disclaimer in proper footnote for the first use of a trade name.

_____ Title, press release, abstracts, purpose, table of contents, and conclusions reflect a uniform train of thought. Conclusions answer purposes and these main thoughts are brought out in title, abstract, press release and body of report.

_____ Spot check verifies consistent use of words, numbers, titles, and tables, figures, list of references, table of contents, and manuscript.

Brief evaluation of report and technical or editorial notes to Assistant Chief, Scientific Publications Section.

FORM 9-1531 (OCTOBER 1983) U.S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
MANUSCRIPT ROUTING SHEET

WRD NO. (ASSIGNED BY HDQRS.)

AUTHOR(S) (LAST NAME FIRST)

PROJECT NO. (Example VA099)

TITLE

NO. PAGES (INCL. TABLES)

NO. ILLUSTRATIONS

(CHECK ONE)
☐ INTERPRETIVE REPORT ☐ DATA REPORT ☐ ABSTRACT ☐ OTHER

TABLES
NO. _____ NO. PAGES _____

TYPE OF PUBLICATION (WSP, HA, OPEN FILE, JOURNAL, STATE PUBLICATION, ETC.)

COOPERATING AGENCY

DOES REPORT CONTAIN GEOLOGIC NAMES?
☐ YES ☐ NO

	SIGNATURE	DATE IN	DATE OUT	TOPICS REVIEWED	NO. HRS SPENT	CHECK STEP COMPLETED: AUTHOR	EDITORIAL REVIEWER	*TECHNICAL REVIEWER	DIST/PROJ CHIEF	REGIONAL HYDROL	GEOLOGIC NAMES	ADDITIONAL EVALUATION	SCI PUB PROG SP&DM	DIRECTOR	ENTER NEXT ROUTING HERE (Print or type)
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CONTINUE ON ADDITIONAL FORMS, IF NECESSARY.

*See instructions for technical reviewers on back of page.

INSTRUCTIONS FOR TECHNICAL REVIEWERS

A thorough and competent review is essential to maintain the technical quality of Water Resources Division reports. The purpose of the review is to give a technical evaluation that will improve the report and eliminate errors that may lead to the embarrassment of the author and the Division. The following guidelines summarize critical policies and procedures in the report-review process.

Number of reviewers – At least two technical reviews are mandatory for all interpretive reports. Whenever possible, reviewers should be selected on the basis of special knowledge or interest in the subject material of the report. At least one reviewer should be outside the District or Research Project office.

Role of reviewers – The role of the technical reviewer is to ensure the technical adequacy of the report. However, significant editorial discrepancies, particularly in organization, should be identified.

Specific items to consider during review –

- *Technical correctness* – Is the report technically valid? Are conclusions properly supported by correctly interpreted data? Are all computations correct? Are assumptions reasonable and clearly stated?

- *Readability* – Is it written for the intended audience, and with correct grammar, syntax, and a minimum of scientific jargon? Are illustrations and tables legible and readily understandable?

- *Title* – Is it explicit and does it reflect the objectives of the report? Generally the title should not exceed 12 words and, if appropriate, should give the project location and study period.

- *Abstract* – Does it state the purpose of the report? Is it informative? Does it describe the study and summarize pertinent results and conclusions? See pages 267–270, WRD Publications Guide (1982), Volume 1.

- *Introduction* – Does it clearly describe the problem(s) addressed by the report, state the objectives and scope of the report, present pertinent background information, and acknowledge significant help? See pages 265–266, WRD Publications Guide (1982), Volume 1.

- *Methods* – Were appropriate techniques used in the study? New methods should be described.

- *Body of manuscript* – Is it organized and presented in a logical sequence that contains the basic information, interpretation of that information, and the results or conclusions of the interpretations?

- *Illustrations and tables* – Are all necessary; do they clearly present basic information and emphasize relationships? Illustrations and tables should be interpreted and referred to in the text, but should be understandable without the text.

- *Conclusions or results* – Do they summarize the principal findings of the study and answer each of the objectives described in the introduction? Are they sound and properly documented? No information should be given that was not discussed in the body of the report. See pages 271–272, WRD Publications Guide (1982), Volume 1.

- *References* – Are all references cited in text included in this section? Are they cited correctly? Were pertinent references omitted in preparing the report?

- *Policy considerations* – See pages 23–24, WRD Publications Guide (1982), Volume 1.

U.S. GOVERNMENT PRINTING OFFICE : 1984 O - 428-776

EXAMPLE 5P

PRINCIPAL VERIFICATION REVIEW[1]
NEVADA DISTRICT

Author(s)_____

Short title_____

*(Initial each item when complete. Items marked * deserve special attention; they did not appear on "Initial Verification" form. Resolve non-* items for parts of manuscript that have been changed or added since "Initial Verification.")*

EDITORIAL STAFF'S RESPONSIBILITY

___ *Text headings versus "Contents" list:* Wording, rank, and page numbers agree.

___ *Illustrations list:* Type of illustration is indicated (Graph showing---, etc). For figures, this applies only to list, not to titles beneath figures themselves. In other respects, titles in list are complete or condensed versions of titles beneath illustrations. Page numbers in list are those of principal references in text. Footnote in review manuscript indicates that the page numbers denote location of principal (not necessarily first) references.

___ *Tables list:* Duplicates titles above tables, omitting units of measure. Page numbers in list generally are those of principal references in text. Footnote in review manuscript indicates that the page numbers denote location of principal (not necessarily first) references.

___ *Units of measure:* Except for QW, geophysical, and related units, use all metric or all inch-pound, not a mixture of both. For QW, geophysical, and related items, use metric only. Units of measure are spelled out everywhere, except as follows: abbreviations can be used in tables and illustration "explanations" where space is limited; they also can be used if the unit of measure is lengthy (for example, mg/L for milligrams per liter, acre-ft/yr for acre-feet per year) and appears frequently in a specific manuscript. Where abbreviations are needed, use proper format (for example, ft^3/s, not cfs).

___ *List of conversion factors and abbreviations:* Includes all units of measure used in report, and no others. Format correct (plural, etc). Conversion factors correct (to four significant figures). No scientific notation (1.193×10^{-3}). Proper descriptions of QW, geophysical, and related units of measure (include only those used in text, tables, and illustrations).

___ *Altitude datum:* Explanation is included only if text, tables, or illustrations refer to altitude. Be sure "mean sea level" is replaced with "sea level" throughout manuscript. Exception: on plates, refer to "National Geodetic Vertical Datum of 1929" (or "NGVD of 1929" if space is limited).

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[1] For use before transmittal to Regional Hydrologist.

___ *Illustrations and tables:* Illustrations and tables themselves are grouped separately, rather than interleaved with text, for easier review. Titles, explanations, column headings, and footnotes are double spaced to facilitate editing. Data within body of table can be single spaced, often with a double space every five lines or so.

___ *References:* All references in text--including those in illustrations and tables--are in list; all references in list are in text (except in list of "Selected references"). Authorship and year of publication agree between text and list. Format in text is correct ("and others" for more than two authors). Format in list is correct (only allowable abbreviations aside from those in title: U.S., v., no., p., and State names).

___ *Manuscript format:* Conforms with that of intended publication medium (for example, Water-Supply Paper, open-file report, State bulletin series, journal).

___ *Editorial aids:* Left margins of text, illustrations, and tables show letters identifying references to illustrations, tables, bibliographic citations, and other pages in the manuscript.

___ *Numerical values in text:* Verify agreement with data in tables, illustrations.

___ *Geographic names:* All names in text, tables, and non-map illustrations are shown on a map, unless they are outside the study area and outside the areas covered by maps in the report.

___ *Trade-name disclaimer:* Proper footnote, for first trade name only.

*___ *Year of publication:* Last-minute verification of correctness (title page).

AUTHOR'S RESPONSIBILITY

___ *General quality control:* The author has a general responsibility for the integrity of his or her work. Maintenance of integrity requires continuous, vigilant review and checking at each step of the study. Were proper field procedures followed? Were data properly analyzed? Were the data sets that were input to models or other interpretive computer programs checked for accuracy? Were the computer programs themselves, and procedures for programmable calculators, properly verified for intended results?

___ *Report title:* Adequately identifies study topic and study-area location (not just "Nevada," unless study is statewide; however, avoid county names if study area includes more than two counties). Title is as brief as possible, avoiding "the" or "an" as first word. For example, "Ground-water quality in the Talapoosa area, west-central Nevada," rather than "An evaluation of ground-water quality in the Talapoosa area, Nevada."

*___ *Cooperation:* Properly expressed credit for cooperation with other Federal or State agency(s) is included on report cover, title page, and, in certain instances, in acknowledgment section (for example, specific individuals), as well as on separate illustrations (plates).

___ *Contents list:* Rank of headings and subheadings is correct. Single subheadings are avoided except in unusual circumstances (for example, stratigraphic discussions).

*___ *Illustrations list:* If more than 2 consecutive figures are of the same type, their titles are combined in the following manner:

7-9. Photographs of Lake Abert showing:
7. Maximum level attained in June 1958 ---------
8. Beach line at an altitude of 4,269.7 feet ---
9. Anchored instrument raft ----------

Titles in list are properly modified versions of titles beneath the illustrations themselves.

*___ *Abstract:* Contains nothing that isn't in report. Gives all pertinent results (facts) and conclusions, but preferably contains less than 500 words (about 2 typewritten pages, double spaced). No abbreviations used for units of measure.

___ *Illustrations and tables:* Each illustration and table is (1) pertinent to the objectives of the report, (2) worthy of inclusion, and (3) understandable by the intended audience.

___ *Illustrations and tables:* References in text--including those in illustrations and tables themselves--are correctly numbered.

*___ *Illustrations and tables:* Titles and explanations of similar illustrations have similar wording; likewise for titles and column headings of similar tables. Geographic area is not included in figure and table titles if it is about the same as that given in the report title.

___ *Plates:* Title identifies type of illustration and geographic location. For example: "MAP SHOWING CANDIDATE SITES FOR WATER-QUALITY NETWORK, LAS VEGAS VALLEY, NEVADA."

___ *Maps:* Scale included (Publications Guide 3.09.1).
Land grids (latitude-longitude, township-range) included (3.09.2). Show at least two values each for latitude and longitude.
North arrow included when required (3.09.6).
Base-map credit included when required (3.09.4).
Topographic contour interval and altitude datum included when appropriate.
Proper credit for geology or hydrology included when appropriate (3.09.5).
Title and "Explanation" typed, double spaced, on separate sheet attached to map for review purposes.
Data and site locations proofed against basic-data tabulations.

___ *Map explanations:* Format and wording conform with guidelines (Publications Guides 3.06.3, 3.10.2). Proper sequence of items (3.10.2, page 1).

___ *Photographs:* Credit if photographer is not author. Date of photograph included as part of title.

___ *Tables of computer output:* Abbreviations and symbols are explained in headnotes or footnotes.

___ *Page numbers:* References to other specific pages in text [for example, "The amount of lake-surface precipitation (page 17) is ---" or "Recharge estimates are discussed on page 23"] checked for correct page number. Generally, such references should be avoided to reduce the possibility of inadvertent errors.

___ *Calculations:* Computed values in text and tables checked for correctness (for example, computed ground-water flow, streamflow averages, dissolved-solids tonnages, etc). Checking preferably not done by person who made original calculations.

___ *Data and statements in text:* Agree with material shown in tables and illustrations, whether specifically referenced or not.

*___ *Significant figures:* Calculated values in text, tables, and illustrations shouldn't indicate more significant figures than are justified (365.3 x 25 = 9,100 rather than 9,132.5). Round off properly.

___ *Non-USGS material:* Written permission to publish, and proper credit, are required for photographs, copyrighted material, and unpublished data supplied from outside Survey.

___ *Written or oral communications:* Acknowledged properly, including affiliation of communicator. For example, "--- according to B. F. Jones (U.S. Geological Survey, written commun., 1975)."

*___ *Quotations:* Proofed against original source, word by word (also, verify page numbers in original reference).

*___ *Ground-water site designation:* Proper format must be used for the "local" (Nevada) identification. Complete designation is 108 N13 E25 05ABBB1 (note the zero for sections 1 through 9). Abbreviated designations (for example, N13 E25 05ABBB1, if report discusses only one hydrographic area, or even 5AB or ABBB1, etc., on a map) can be used in all places except well-data and spring-data tables. Fifteen-digit site ID's should be included along with the "local" identifications in the data tables.

*___ *Organization:* The structure of the report should be carefully checked as follows: Does each sentence relate to the topic of its paragraph? Does each paragraph have a topic sentence? Does the overall topic of each paragraph relate logically to the subject of the section within which the paragraph is located? Do subordinate sections relate logically to superior sections? Do all the sections relate to the objectives of the report (no extraneous material)? Does the text avoid needless repetition of material? Unless each question can be answered affirmatively, some editing, rewriting, or deleting is required.

*___ *Advocacy:* Report does not include biased statements and recommendations; beware of words such as "should" and "must."

*___ *Criticism:* Report does not include criticism of organizations or individuals. Naming of specific "culprits" is avoided wherever possible.

___ *Conclusions versus objectives:* Objectives of the report, as outlined in "Purpose and Scope," are properly accounted for among the conclusions.

___ *Conclusions, Summary:* All statements and data agree with material shown elsewhere in manuscript (including illustrations and tables). All material in Summary also appears elsewhere in manuscript.

___ *References:* For references cited in text, tables, and illustrations, always include a specific page number (or table or illustration number), unless you are referring to the article or book as a whole, or unless an alternative format is required, as in a journal manuscript. Reference to an administrative report is not permitted except in another administrative report; instead, use "written commun." format.

*___ *Changes resulting from colleague and editorial review:* Verify that all such changes have been completely and accurately transferred to revised manuscript.

*___ *Entire manuscript:* Read carefully, word by word (including illustrations and tables), looking for typographical errors, awkward wording, etc., before transmittal to Regional Hydrologist.

*___ *WRSIC abstract, press release:* Items, in proper format, prepared after colleague review for transmittal to Regional office. Neither contains anything that isn't in report. See Reports Section for guidelines.

*___ *WATSTORE:* If the report states that basic data are available in WATSTORE, the data should in fact be entered, and the entries should be checked for accuracy, prior to publication or release of the report.

AUTHOR AND EDITORIAL STAFF

*___ *Proofing basic data:* For typed (non-printout) tabulations of basic data, proof orally against originals (well logs, laboratory analytical sheets, etc.).

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page 5.89 follows

United States
Department of the Interior

EXAMPLE 5Q

GEOLOGICAL SURVEY

NO. 724 ADMINISTRATIVE DIGEST March 19, 1976

THIS DIGEST IS PUBLISHED FROM TIME TO TIME AS A PART OF THE MANAGEMENT IMPROVEMENT PROGRAM

CONFLICT OF INTEREST

A year has passed since the General Accounting Office audit on the apparent conflicts of interest in the Geological Survey was made public. I believe a report to all members of the Survey on the progress we have made in fully responding to the proposals for improvement made by the Congress and GAO, and on our own independent actions, is in order. At the same time, I would like to affirm that no real conflicts of interest have been found and none is believed to exist.

We have now received U. S. Geological Survey Employee Certifications--completion of which is a requirement for Geological Survey employment--from virtually all employees. The few outstanding exceptions are related to other action in progress which will ultimately permit completion of the form. We have greatly increased the requirements for full financial disclosure by requesting that employees whose positions are deemed potentially sensitive in terms of conflict of interests (about 10 percent of our full-time personnel) complete the detailed Confidential Statement of Employment and Financial Interests (Form DI-212).

As a result of these actions--and the fine cooperation of Survey employees in making them effective--I believe that we are now above criticism even on apparent conflict.

Interpreting the Laws and Regulations

During the last several months we have gained experience in the application of the legal and policy provisions governing nonconflict of interest, and we are now in a position to provide some general guidance useful to Geological Survey personnel in the future.

The Organic Act. -- This statute (43 Code of Federal Regulations 20.735-12(b)(3)) states in part:

> "The Director and members of the Geological Survey shall have no personal or private interests in the lands or mineral wealth of the region under survey . . ."

The Solicitor's Office has given us an interpretation of the Act which perpetuates its viability in a greatly changed society nearly 100 years after its enactment. The critical phrase in the first clause is "the lands . . . under survey." This is deemed to mean the Public or Federally-held Lands whose title is held by the United States Government, including lands "acquired," annexed, or otherwise obtained by the Federal Government. This determination relates in part to the time at which the Organic Act was written (1879)--during the period of westward expansion when the bulk of the work carried out by the four precursor Surveys

WATER RESOURCES DIVISION
PUBLICATIONS GUIDE

Replaces:	14.01.1	Effective		Article No.:	14.01.1
Dated:	9-27-74	date:	12-18-78		

Subject: OPEN-FILE REPORTS--Approval

The results of investigations by the U.S. Geological Survey must be made available to the public on equal terms and at the earliest possible date. Special interest groups or individuals must not be given any advantage over the general public by premature disclosure of results. Policy dictates that results of the Survey's work are not to be released to individuals or organizations until the results have been formally published or otherwise officially released to the open files for public use. This does not preclude advance release of information to cooperating government agencies (Federal, State, or local) for their official use and (or) comment. See Geological Survey Manual Section 500.9.1, par. 4, Administrative Reports, which authorizes and spells out conditions for advance release of a report to a cooperating agency. If the District Chief chooses to release information to his cooperator in advance, he must inform the cooperating agency that the report should not be released to the public. If the cooperator wishes to release the report to the public, the report must be approved by the Director, U.S. Geological Survey, for open filing.

Information received in confidence from private sources (such as geological, geophysical, or production data) must be safeguarded; it should not be released to the open file without specific written permission from the source.

Open-file reports or maps are released for public consultation, with little or no distribution beyond selected depositories. The Survey established the open-file system as a means of promptly releasing the results of investigations and studies. Material appropriate for open-file release includes (1) reports of limited interest that do not warrant publication in an established report series but which may be of interest to the public; (2) progress reports; and (3) reports intended for subsequent publication whose preliminary release is desirable for administrative reasons or because it is in the public interest.

There are two categories of open-file reports:

1. Data reports

2. Interpretive reports

After colleague review, reports intended for open-file release receive final approval either by the Regional Hydrologist or the Director, depending on the material included. Data reports are approved by the Regional Hydrologist. All reports containing interpretive material, statements concerning Survey policy, material to be used in litigation, or descriptive text or data relating to hydrologic or hydrogeologic events of national concern or political interest must be approved by the Director.

Data reports are diagrams, tables, and maps with noninterpretive text that describe events and call attention to certain data without defining the cause-and-effect relations. The term "data" refers to direct measurements, standardized statistical and arithmetic analysis or measurements, and noninterpretive plots of data such as hydrographs and data-site maps. Any analysis used must conform to established procedures.

Data reports generally include a brief text that supplements the data in tables or on illustrations. The accompanying text should include: purpose and scope of the report; acknowledgments; a description (type, number, and format of presentation) of the data; a description of the location system used for the data-collection sites presented in the tables or on the illustrations; and references to published and (or) open-file reports, if applicable. Proper credit must be shown for material borrowed from others. The text may also have sections describing how the data were collected, how the data were analyzed, and how the data can be used. A summary of the data (extremes, means, and other statistical factors) may also be included. Tables generally constitute the largest proportion of the content of data reports.

Illustrations in a data report may include either manually or computer-drawn maps, sections, graphs, and diagrams. These illustrations should show the location of data-collection sites and indicate the numerical values for data used as controls for constructing contour maps or profile sections. Data illustrations may also include contour maps of a routine, repetitive nature, drawn manually or by computer, that were prepared by use of well-established principles and procedures. However, in order to establish routine, repetitive maps as a series, the initial map must be approved by the Director. The maps may show, by line or pattern, equal values of geohydrologic variables, such as annual or periodic changes in water level. Graphs and diagrams may show continuous records of point numerical values or plots of geohydrologic data. Illustrations may also include photographs, unannotated geophysical logs, lithologic logs, and drillers' logs, and properly credited maps compiled from published or open-file geohydrologic maps. The above examples should be considered representative, not exhaustive. If a report contains illustrations that cannot be identified clearly as noninterpretive, the report should be approved by the Director. If a map series has been established as a data series but a subsequent map shows major changes so that it is no longer a routine presentation, then the map should be approved by the Director.

Data reports may contain interpretive material from published or open-file reports but must not contain new interpretive material. The concept of the use of accepted methods, such as published computer programs, is emphasized. Reports containing unusual illustrations prepared by nonstandard methods must be approved by the Director.

Reports containing the following types of data may be classified as data reports. If a report does not fit any of the types discussed here, the report should be approved by the Director. The categories listed are intended to serve as examples from which one can determine by analogy whether data are noninterpretive.

1. Surface water

   a. Measured and calculated values of hydrologic variables, such as water-surface elevations, flow rates, storage volumes, and standard hydrologic characteristics, such as drainage areas and channel cross sections, are noninterpretive data.

   b. Values computed by routine statistical procedures are noninterpretive data. For example--

      (1) Values of discharge and statistical summaries of discharge that are published in Annual State Data Reports are noninterpretive data.

      (2) Results from statistical analysis of daily or unit data files by selected computer programs, as follows:

      Computer program J407 - Flood-frequency analysis based on Water Resources Council guidelines in WRC Bulletin 17A* - uses generally accepted assumptions and is considered noninterpretive data.

      Computer program A969 - Daily values statistics, except the log-Pearson analysis. The statistical parameters are noninterpretive data, but the low flow and flood volume probability tables and curves that require assumptions about type of frequency distribution, independence of events, and adequacy of sample are interpretive values.

      Reports containing the probability items must be approved by the Director.

*U.S. Water Resources Council, 1977, Guidelines for determining flood flow frequency. Bull. 17A: 2120 L Street, N.W., Washington, D.C. 2003?

Computer program W4422 - Monthly and annual statistics are noninterpretive data.

c. Reports documenting extreme events of local interest only and limited to presentation of noninterpretive data are data reports.

d. Summaries of drainage-basin characteristics, wherein the characteristics are defined by standard techniques, are noninterpretive.

2. Quality of water

a. Measured and calculated values of chemical constituents, physical properties, sediment concentrations and loads, chemical characteristics of sediment and bottom material, bacterial populations, and abundance and diversity of aquatic organisms, are noninterpretive data.

b. The modeling or simulation of hydrologic processes is highly subjective. Accordingly, reports that involve selection of models and their application to field conditions are considered interpretive and require approval by the Director.

c. Standard statistical parameters produced by computer analyses of data from Watstore files are noninterpretive. However, results of digital models or modification of models are to be treated as interpretive data and require approval by the Director.

3. Ground water

a. Measured values of water levels, calculated changes in water levels, pumpage, flow of springs, and similar values are noninterpretive data. However, calculated values of hydraulic characteristics, such as transmissivity, hydraulic conductivity, and storage coefficients, are interpretive data and must be approved by the Director.

b. Records of wells and springs, and unannotated geophysical and lithologic logs are noninterpretive data.

c. The modeling or simulation of hydrologic processes is highly subjective. Accordingly, reports that involve selection of models and their application to field conditions are considered interpretive and require approval by the Director.

d. Standard statistical parameters produced by computer analyses of data from Watstore files are noninterpretive. However, results of digital models or modification of models are to be treated as interpretive data and require approval by the Director.

e. Hydrographs, repetitive routine potentiometric maps, and reports on changes and status of ground-water levels that are descriptive and do not involve interpretation as to cause-and-effect relations are noninterpretive data.

The following interpretive reports have conditional blanket approval from the Director for release as indicated:

Bridge-site reports	Approved by Regional Hydrologist for Administrative Release to cooperator. If a bridge-site report is controversial because of technical approach, potential national concern, or political interest, or is to be used in litigation, it must be approved by the Director. A bridge-site report approved as an administrative report must <u>not</u> be released to the public or used as a reference. A bridge-site report approved by the Director for open filing may be used as a reference.
Flood-Insurance studies . . .	Approval by Regional Hydrologist for Administrative Release to Federal Insurance Administration, Department of Housing and Urban Development. Study report must not be released to the public or be used as a reference.
Flood-Prone-Area Maps	Approval by Assistant Chief Hydrologist, Scientific Publications and Data Management, for publication and release to the public. Map may be used as a reference.

Open-file reports may be reproduced inhouse or through the Regional Procurement Office of GPO. Inhouse reproduction generally is cheaper than GPO reproduction. The originating office may, however, contact the Regional Procurement Office of GPO for cost estimates. The least expensive medium should be used for reproducing a report. Refer to Article 14.05.1 for addresses of GPO regional offices.

Open-file reports may also be reproduced by a cooperator, provided that appropriate credit is given to the U.S. Geological Survey.

Director-approved open-file reports fall into one of two broad categories: open file only and open file pending publication.

1. Open file only

This category is intended for reports that will have limited distribution, such as to the cooperator and a few other people. Also included in this category are reports previously approved for Adminis trative Release that now need to be released to the public because o changing circumstances, reports open filed for use in litigation, and graduate school theses; these three types of reports are discussed in the following paragraphs.

Administrative reports prepared by the Survey are released to either Federal agencies for which it is doing work or Federal, State, or local governments with which it has a cooperative agreement for exclusive use within the other agency. They are not for public release or consultation in any form, owing to their preliminary nature. The Director must approve any administrative report for open filing before it can become available for public release or inspection. An administrative report resulting from work financed by another Federal agency must be accompanied by a letter of clearance from that agency before the Director will approve the report for open-file release. Fundamentally, the results of our investigations and background data resulting from OFA-funded work (Other Federal Agency) should be released to the public. Therefore, in general, there should be formal agreement with OFA at the inception of the cooperative program to open file or publish a report.

The U.S. Geological Survey may be requested by the U.S. Department of Justice to prepare reports for use in civil action. Release of such reports to the public should be in the form of open filing or publication. All reports that will be used in litigation and thus become part of the court record and available for public inspection must be approved for open-file release and announced to the public. However, the Justice Department may request that a report not be released for public inspection or may request distribution only to opposing counsel or other government agencies. In those instances whereby distribution is restricted, the report should be approved by the Director as an administrative report for release only to the Justice Department. A letter of clearance from the Justice Department must accompany the request for Director's approval for Administrative Release just as is required for open-file release. As in all cooperative programs, the mode of release of a report administratively for restricted distribution and for open filing or publication must be incorporated in the formal agreement between the Justice Department and the Geological Survey.

An open-file report must be announced to the public. Cancellation of open-file status is not possible except when the open-file report is superseded by formal publication.

A report to be used as a thesis should be submitted for Director's approval for release to the open file (or other publication) before it is submitted to a university. In special situations where time is not sufficient for normal review and approval by the Survey, and the District Chief or Project Chief believes the report is technically sound, an author can provide the university with copies of the thesis and can defend the thesis with the definite understanding that the university will keep the thesis in a closed-file status until it is approved for release to the public by the Survey. This condition should be discussed by the author with university officials before transmittal of the thesis and must be mentioned, in writing, when the thesis is submitted to the university. If the university is unwilling to accept this condition, then the author must arrange for special handling leading to review and approval by the Survey before submitting the thesis to the university.

2. Open file pending publication

This category is intended for reports to be published in a formal Survey report series or by a cooperator, but that require immediate release for interim use until the report is published. A request for this type of release should be reserved for reports where publication will require more than a few months. In general, journal articles, program abstracts, proceedings articles, and guidebook articles will be published rapidly enough to make open filing unnecessary. Many journals and organizations have firm policies against publication of articles if copies have previously been distributed. If there is an urgent need to open file an article in advance of publication, the memorandum of transmittal from the originating office must include appropriate justification. An example of an urgent need is a request for information under the Freedom of Information Act. The report in the open-file status pending publication should not normally be distributed to the extent that the final report will have little demand when it is published.

Approval for open-file release of a report in advance of publication is permitted if justification is adequate. A report for which open-file release has been requested should be of a quality suitable for review and approval for publication when first submitted. If release to the open file is necessary, approval for both purposes will be given at the same time. This does not, however, eliminate the possibility of obtaining Director's approval, with sufficient justification, for formal publication of a report previously released to the open file.

A report submitted for approval for open-file release must be suitable for public inspection. It should be credible and well prepared; it should have received careful scientific and editorial scrutiny; and it should have been verified before, during, and after technical review to ensure that the facts and statements in the text and illustrations are not contradictory.

The stratigraphic nomenclature in open-file reports or maps submitted for Director's approval will be reviewed by the Geologic Names Committee. Open-file reports or data approved by the Regional Hydrologist normally will not be reviewed by the Committee, but in preparing these reports the author(s) should use only previously accepted geologic nomenclature. If the report is to be published at a later date, it should receive review by the Committee. Review can result from direct contact between the originating office and the Geologic Names Committee, or, preferably, during normal review and approval at the National Center. Open-file reports and data containing other than accepted geologic nomenclature and not reviewed by the Geologic Names Committee should carry the disclaimer: "Not reviewed or edited for conformity with U.S. Geological Survey stratigraphic nomenclature."

The term "data report" applies to the type of material included within a report; it does not specify a particular Survey report series. Therefore, a Survey report that consists of data and that is approved by the Regional Hydrologist or the Director will be approved as an "open-file report," not a "data report." This approval applies to open-file reports of the Survey only and does not preclude approval of reports to be published by a cooperating agency and labeled "data report."

A standard format must be used in preparing cover page, title page, and other parts of an open-file report. The format is described in Publications Guide Article 14.04.1.

SUMMARY OF WATER RESOURCES REPORTS APPROVED FOR PUBLICATION, 1951-80

Year	Total	WSP	Cir.	Bull.	Prof. Paper	Open File	WRI	TWRI	Admin.	Maps	Jour. Res.	Out-Side 1/	Abs.
1951	305	27	33	0	0	74	-	-	30	0	-	138	3
1952	709	47	40	0	0	72	-	-	392	0	-	149	9
1953	351	36	25	0	0	94	-	-	37	0	-	155	4
1954	467	64	9	0	1	116	-	-	64	4	-	186	23
1955	486	60	11	0	1	107	-	-	68	3	-	212	24
1956	353	48	10	1	3	70	-	-	45	3	-	164	9
1957	478	64	7	1	2	70	-	-	54	0	-	233	47
1958	432	63	6	1	1	57	-	-	11	0	-	265	28
1959	525	71	8	2	4	62	-	-	53	6	-	260	59
1960	691	89	21	6	14	51	-	-	54	35	-	334	87
1961	762	163	20	9	22	76	-	-	58	21	-	335	58
1962	799	107	17	3	20	73	-	-	46	23	-	425	85
1963	777	75	9	3	18	79	-	-	46	54	-	398	95
1964	765	75	6	8	21	82	-	-	51	46	-	410	66
1965	831	60	18	7	25	82	-	-	49	31	-	459	100
1966	849	61	11	2	17	79	-	-	50	45	-	489	95
1967	892	44	6	2	18	92	-	-	62	46	-	521	101
1968	852	43	15	1	15	102	-	-	62	60	-	432	122
1969	801	67	15	1	21	104	-	-	51	55	-	403	84
1970	800	69	12	0	19	158	-	-	56	39	-	346	99
1971	826	43	3	3	10	203	-	2	0	39	-	463	118
1972	695	30	5	0	23	141	6	4	2	59	16	379	59
1973	867	25	3	2	17	116	63	2	0	68	21	530	132
1974	834	31	8	1	15	129	51	2	0	62	21	490	122
1975	770	25	2	0	20	113	61	1	0	43	27	464	133
1976	995	18	10	0	13	107	134	4	26	34	28	502	119
1977	951	17	6	0	13	68	136	0	23	21	19	543	105
1978	1,121	7	6	1	24	180	144	4	12	30	13	553	147
1979	816	13	4	1	9	153	151	0	12	29	-	310	134
1980	1,121	32	8	1	9	295	222	2	16	35	-	341	160

1/ Includes journal articles, state publications, and private sector publications

page 5.100 follows

PRESS RELEASES

By Donovan B. Kelly

The writing and distribution of reports fulfill only part of the Survey's general mission to publish and disseminate information about the Nation's natural resources and natural hazards. Another product, the press release, is used regularly to communicate earth-science information to millions of people through the wide variety of print and electronic news media.

In a practical sense, press releases are good for the Geological Survey. In the course of natural events, the Survey is bound to get some bad press. A constant flow of releases can help to explain the wide range of good work we are doing and help to dilute the occasional dose of bad press and misunderstanding.

Press releases are not, however, just publicity tools. They are an integral part and means of fulfilling the Survey's mandate "to publish and disseminate information." They are the major means of reaching the larger lay audience beyond the tight circle of our fellow scientists. They force us to write and explain our technical research and findings in terms that our bosses—the general public, the Congress, and the cooperators—can understand and appreciate. For many citizens, they are the only source of information on the role of the earth sciences.

Press releases are not limited to announcing the results of new reports issued by the Information Office, part of the Director's Office at the U.S. Geological Survey National Center. Authors of Survey reports have a responsibility to keep the Information Office apprised of upcoming reports or other significant events, to help draft words when necessary, and even to issue local basic-data releases through appropriate channels as outlined in the Survey Manual (SM 500.5).

Press releases are not limited to announcing the results of new reports but can announce anything potentially newsworthy for which the Survey is the logical spokesman: new projects, changes in personnel, or the occurrence of natural events, such as floods or earthquakes, to name a few. Additional information or guidance is available from the Information Office.

The release date on the front of the release is an important part of news-media format and operations. Most editors appreciate a set date of release and will honor that date. The set date also lets the reporters know how much time they have to expand on your story before the news will break. If the story is too hot to allow lead time—such as

when you report current drought conditions—then give the date of preparation. The editors at least know then how old the story is. (If the story is even hotter—today's earthquake magnitude or flood peak—then it should probably be phoned in.)

The following example of a press release format outlines some of the needs, mechanics, and reasons for writing press releases.

United States Department of the Interior

GEOLOGICAL SURVEY
(Your address here)

(Your name here)
PHONE: (Your phone number here)

For release: (Put here a date at least 3-5 days after mailing)
or
For release: UPON RECEIPT (Prepared: Put here date of mailing)

BANG! BANG! BANG!
(Short, catchy, but honest title summarizing the herd news)

Again bang bang bang--catch the editor with the first paragraph: catch him by telling him why this press release is of interest to his reedere; why the information is timely and should be ueed now. You have to do this with fects, not with exuberent adjectives. The editor has bee around too long to be impresaed by ballyhoo, and he is too busy to read paregraph after paragraph searching for the meat of the release. Catch and hold the editor with the firat ten words of the first eentence, and then finish the sentence by giving credit to the U.S. Geological Survey, Department of the Interior.

Now that you have the editor's attention, expand on the newe presented in the first paragraph; start filling in the particular who, why, what, when, whera, or how that will convince the editor that his readers will want and need to read the hard news contained in the prese release.

The second or third paragraph is a good place to acknowledge your cooperators. But don't loee the editor with a lot of backecratching.

According to most prese-release writers, "By the time the editor reaches the fourth paragraph, he's looking for some single authority he can quote. Someone who can present the facts in e short pithy way as if he were talking directly to the reeder. Someone who cen add human interest to the release. Someone who can give the editor quotable--and believable--quotes."

(more)

The releese should be written at a level that your wife, your teenage son, and the accountant next door can understand. Read the release aloud to yourself, to your wife, to your secretary. Can they understand your words? Write in short paragraphs. Write in short sentences. Use familiar words. Write to be read.

By now you have given the editor the heart of the story. In the remaining paragraphs you can expand on the hard news, but don't save any vital facts to last. From here on the peragraphs are more and more expendable and may be sacrificed to fit the space available.

To help prevent errors in retyping, completa your paragraphs on a page and don't split words at the end of a line. Double space the first paragraphe to give the editor room to adit and rewrite.

If appropriate, at this point you would liet tha title, authors, series, end number, and availability of any report: Copies of the ___-page report, "Title of Report," by Author'e Name and published ae U.S. Geological Survey whatever No., are available from _____.

If you have a collection of interasting facts you would lika to cram into the releaee, run them as separete fillar items at the end:

* Whenaver possible, include illustrations with a releaea. Simplified mape and photographs showing scientists in action or visiting dignitaries are a few poeeibilities.

* To be fully used, a release must reach all the right editors or desks. Do not send a story just to your favorite reporter; you will lose mora media friends than you will make. Do work with the Information Office to develop a good mailing list.

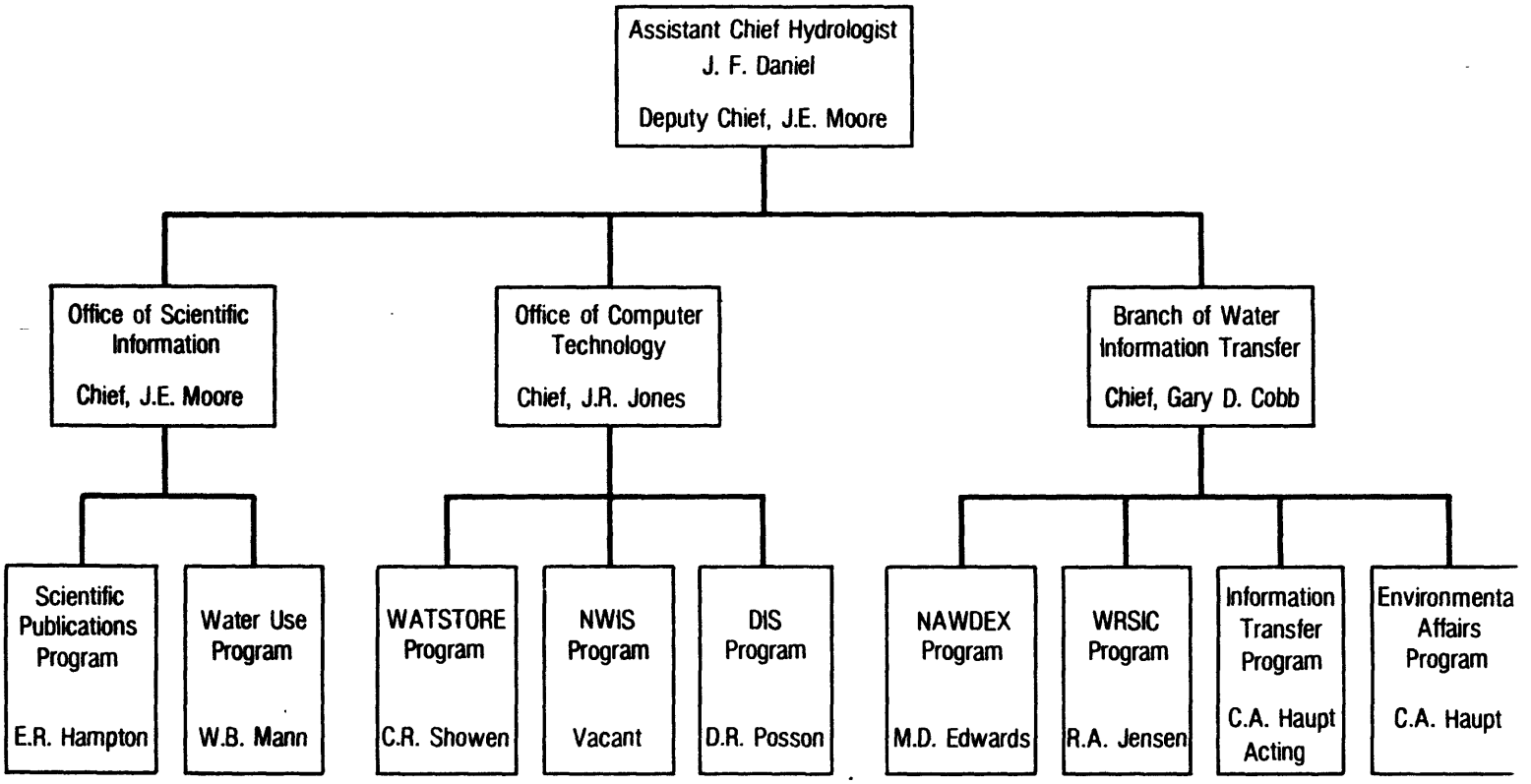
* If a page ie to be followed by another page, put "(more)" et the bottom of the page. And finally, end the release with a mark that lets the editor know that you ara done:

# # # #

(Note to Editore: Sometimee in this space, between parentheses, there is a "Note to Editors" that might advise them of the availebility of a photo or a special contact for additional information.)

page 5.105 follows

ORGANIZATION
OFFICE OF SCIENTIFIC PUBLICATIONS AND DATA MANAGEMENT



page 5.107 follows

Personal business A BUSINESS WEEK SUPPLEMENT

EXECUTIVE GUIDE

How to polish your writing

If you labor hopelessly over every piece of prose, from a letter of condolence to a new business proposal, maybe you need some help. If you use verbs such as "maximize" and then manufacture nouns such as "maximization" out of them, then you certainly need help. If the subject of your sentence is most often "it," or if the sentence starts with the word "there" or loops on for 30 or 40 or 50 words, the situation may be desperate (page 107). And if you get so involved that no reader really knows what you're trying to say, and wouldn't believe you anyway, your condition may be perilously close to fatal—both to your career and to your social self-esteem.

The ability to write simple, direct prose that says precisely what you want it to say in the fewest words has always been the mark of an educated person. But that ability has become rare—just when business and social organizations have grown too large for anyone to be effective face-to-face. "I suppose it has always been a problem," comments William F. May, dean of New York University's Graduate School of Business Administration and former chairman of American Can Co. "But there used to be more tolerance. The pace is faster now, and more is at stake." Like most other business schools, NYU is offering remedial help in writing—egged on by students under pressure from recruiters.

And if writing clearly and persuasively is perceived as a factor in business success, it's also of some importance outside the office. "People do a lot of volunteer stuff," argues Allan S. Dayton, a partner in charge of professional development at Peat, Marwick, Mitchell & Co. "I'm involved in the newsletter for the country club. I do it in routine report fashion, organized with side heads. You can't imagine the praise people heap on it. It's embarrassing."

As a result of widespread concern that the relaxation of educational standards during the 1960s is producing a nation of television-drugged semiliterates, there's plenty of help available if you want to polish up your writing skills. Every city has its quota of training consultants, and nearly every company of any size offers access to outside seminars or to internal training sessions. They range from courses stretching over several weeks to two- and three-day quick fixes by such organizations as the American Management Assns., the University of Pennsylvania's Wharton School, and by management consultants and communications firms. Time-Life Films Inc. even markets a six-session videotaped course taught by TV star Edward Asner.

If you can't get your company to pay your way, several seminars offer open enrollment for individuals. Both Wharton and Communispond Inc., a major communications trainer, sell intensive two-day writing training for a little more than $600. They concentrate on promoting good organization, brevity, and clarity, with a few tips on the most glaring errors in grammar and sentence structure. You are taught to prune the gobbledygook and inflated language that makes your reader's head spin.

Learning the basics

The ability to write clear, serviceable, unadorned prose is not easily acquired. Nor is it easy to predict whether you will be able to pick up the basics without undue agony. The only people who are a dead cinch to write competently after a little refresher coaching, says Karen M. Schimpf, a writer at Peat Marwick who teaches client companies' internal auditors the basics of writing, are graduates of Catholic high schools. "They have a very good grounding in grammar and composition," explains Schimpf.

Her judgment is confirmed by other writing teachers. Says Lewis Spence, who has been in the business of teaching writing to executives for 30 years: "Catholic high schools still teach something called rhetoric, which is the art of organizing material." Spence thinks that engineers pick up the elements of writing skill swiftly and efficiently, although they start without much in the way of formal training to build on. The reason: They are taught to be logical. "Engineers have a bad name in this field," adds Spence. "But they do better than people with a background in finance."

If you majored in English or another of the liberal arts in college, you may have a slightly better grasp of sentence structure and grammar than your roommate who ended up as an MBA. But the experts don't see any significant gain in the key writing talent: constructing paragraphs and organizing them into a rational and persuasive whole. Says Robert G. Hawkins, vice-dean of New York University's Graduate School of Business Administration: "Just because you can write well-structured English doesn't mean you can communicate."

Nor do people who teach writing see any strong connection between writing and reading. The culture demon whose nose is always in a book is not necessarily a better writer than the executive whose out-of-the-office reading is limited to the sports pages and the television program listings. By the same token, writing experts don't see much value in studying the popular books on the nuances of language—the kind of thing that Edwin Newman and William Safire specialize in. Exploring the byways of vocabulary and English usage is always fun and often enlightening. But the experts dismiss the exercise as "word snobbery," and advise the neophyte struggling to make himself understood to forget it.

Douglas Mueller also counsels against taking one of the myriad vocabulary-building courses. "You just learn words no one else knows," he says. "It's awkward." A better trick for building vocabulary: Whenever you come across a word that you more or less understand in con-

text but that you can't actually define, look it up (*Webster's New Collegiate Dictionary* is the most widely used standard reference) That way, says Mueller, "you make the word your own."

You don't really need all that many words to communicate effectively, by the way. The average English-speaking person commands a vocabulary of about 10,000 words, twice what's needed to get you through life if you make no real demand on your brains. A professional writer probably has a vocabulary of 30,000 words—20,000 fewer than a professor of English and 5,000 to 10,000 more than the average college-educated business executive.

But knowing words doesn't necessarily mean using words. Truman Capote, the novelist, is a prodigy of word knowledge, says Mueller, with a vocabulary of nearly 60,000 words at his disposal. Yet he writes like an angel at a level that a 10th-grader can understand.

Organization is the key

If you write badly, teachers of writing are virtually unanimous in their diagnosis: poor organization. Most people who have trouble communicating effectively don't put their case in any rational order. "People tell a story chronologically," says Lewis Spence, "in the order in which they did the work. That's not really the way to do it." Some trainers, such as Communispond, offer students formats for different kinds of communication. "It's fairly mechanical," admits Robert D. Lilien, senior vice-president of Communispond, "but it does help us teach organization." For example, Communispond has developed an outline format for a business proposal. What are the objectives of the proposal? What's the background, the problem to be solved? What's the proposal? What's the evidence that this is the solution? How should the project be implemented and by whom? What will it cost? Then the format provides a brief summary, followed by a series of action steps.

If you force yourself to think through what you want to say and to whom you want to say it, the writing task becomes infinitely easier. One thing it helps with, by the way, is the bugbear of the amateur (and the professional, too): writer's

Scott Ferguson

Translations from the bafflegab

We solicit any recommendations that you wish to make and you may be assured that any such recommendations will be given our careful consideration
Translation: Please give us your suggestions. We will consider them carefully.

This is our second request for reply to our delinquent-invoice notice dated June 4, a copy of which is attached for your reference. It is imperative that we have your early reply to this communication.
Translation: We may owe you money, but we can't pay you until you send us a bill. This form may help you. Please send the bill to us at once.

Consumer elements are continuing to stress the fundamental necessity of a stabilization of the price structure at a lower level than exists at the present time.
Translation: Consumers keep saying that prices must go down and stay down.

The finance director claimed that substantial economies were being effected in his division by increasing the time interval between distribution of data-eliciting forms to business entities.
Translation: The finance director said his division was saving money by sending fewer questionnaires to employers.

Measure your 'fog index'

Is your writing hard to understand? Do eyeballs glaze after a glance at your prose? Experts have devised measurements of reading ease, and you can rate your own performance.

One of the simplest and most consistent tests is the "fog index" developed by the late Robert Gunning. Here's how it works: Choose at random a medium-length paragraph of your own writing. A paragraph of about 120 words is ideal, says Douglas Mueller, president of the Gunning-Mueller Clear Writing Institute in Santa Barbara, Calif. Dates and other number combinations are single words. Count the number of words in your sample, then the number of sentences. Divide the word total by the sentence total to obtain the average number of words per sentence.

Step two is slightly more complex. Skim your sample and note each word of three or more syllables. Don't count words that are made by combining common short words, such as butterfly. And don't count verbs that acquire their extra syllable from tense endings—es or ed. Don't count words that begin with capital letters—place names, for example. And exclude the first word of any sentence. "I don't know why, but it works," says Mueller. "If you start a sentence with a polysyllable, it lowers the fog index. Magazines such as *The New Yorker* do it constantly."

Saying it simply. Once you have your polysyllable count, add it to the word average and multiply the total by 0.4. The product will be a number corresponding to a reading comprehension grade level. A nine means that a ninth-grader can understand what you write. If you score 17 or more, then your prose is so densely wrapped in fog that only a graduate student will be able to grope through it. The Gettysburg Address has a fog index of 10. Most news magazines manage 11 (BUSINESS WEEK averages 10). The article that you are now reading scores eight.

If you want to know whether your prose is interesting to read, Rudolph Flesch, one of the most eminent of reading and writing specialists, has devised a human-interest score. Using a sample of 100 words, count the personal words, which Flesch defines as pronouns—I, you, he, she, them, but not it or a plural pronoun referring to a thing. Count all words with gender, such as father or sister, actress, businessman, and proper names. And count collective nouns such as people and folks.

Attracting the reader. Next, count up your sample's personal sentences: any sentence containing speech, set off by quotation marks or by references such as "she said"; sentences addressed directly to the reader as a question, a command, a suggestion; a sentence cast as an exclamation; any incomplete sentence of a conversational nature (Flesch's examples: "Doesn't know a word of English. Handsome though." Those are two incomplete but comprehensible sentences.).

Once you have done all this, the arithmetic is a little complicated. Multiply the number of personal words in your 100-word sample by 3.635. Multiply the number of personal sentences by .314, and add the two products. The total is your human interest score, which runs from dull at 5, through interesting at 30, to dramatic at 80. What you have been reading, by the way, scores about 21: mildly interesting.

block. If you're like most people, the horror of writing is sitting down and figuring out how to start. If you have a jotted outline, you're independent of that kind of thing. You can start with whatever is easiest. Do point No. 3 first if that will get you going. Put the thing together in pieces and write the beginning last. Whenever you do write the beginning, make sure that you keep it simple and direct. Answer the question: "Why do I want someone to read this? Why is it important to read this?" Don't keep the folks in suspense. Corporate auditors, for example, are taught to begin their reports with the bad news. And if you're writing to a friend to tell him that your daughter is engaged to be married, don't horse around. Put it in the first sentence. What is most interesting and compelling comes first.

Be precise, be lively

The basic building block in writing is the paragraph, and the toughest thing to learn is to keep the paragraphs from running on endlessly. Lewis Spence demands that no paragraph run more than the length of the top joint of your index finger in single-spaced typed copy. Mildred O. Saunders, a staff course leader for the American Management Assns., uses what she calls "the old tell-them-what-you're-going-to-tell-them, then-tell-them technique" in structuring paragraphs: Make a point, give a reason, give an example, repeat the point.

Beyond the serious problems of organization, good writing depends on awareness of certain principles.

- Use the active voice. If you begin sentences with such locutions as "it is considered that . . ." or "it is recommended that . . .," you wind up with a statement that fixes responsibility somewhere in midair. If you really want to avoid the need to identify whose opinion or whose recommendation, O. K. Writing teachers believe that ducking responsibility and protecting your flank is the unconscious reason for writing this way. But it's weak and irresolute writing.
- Don't nominalize. Adding "tion" or "ment" to verbs drives writing teachers crazy. They believe, quite rightly, that saying "utilization of" when you mean "use" is just a lot of stuffing designed to make the sentence sound "elegant."
- Don't dangle. What makes your readers giggle is the common habit of hopelessly splitting the subject of a sentence from the verb or the verb from its object: "The document was filed by the employee who had been working on it in the wrong drawer." A sentence like that is very funny—so funny that it's hard to take seriously once you write it.
- Avoid weak language. As E. B. White, one of the great stylists of his generation, has written, words such as rather, very, little, pretty, ". . . are the leeches that infest the pond of prose, sucking the blood of words." And, he goes on to say: "We should all try to do a little better, we should all be very watchful of this rule, for it is a rather important one and we are pretty sure to violate it now and then." See?
- Use active verbs. Stay away from forms of the verb to be, to make, to do, to have. A sentence beginning "There are . . ." is a sure tip-off that you are falling into bad habits. Begin sentences with a noun and follow it with a verb, in order to stay out of trouble. Why write, "There are sheets of paper covering the desk," when you can write, "Sheets of paper cover the desk"?
- Write tightly. Endless simple sentences connected by and, and, and toll like bells in the reader's head. Vary your sentence structure. If you don't know how, get a book and learn. Buy *The Elements of Style*, by William Strunk Jr. and E. B. White, probably the best and most concise manual on the subject. Or get Rudolph Flesch's *The Art of Plain Talk* or Robert Gunning's *The Technique of Clear Writing*.

If you're really lucky, you will begin to experience the pleasures of editing yourself, of exerting the peculiar kind of self-discipline that makes bad writing into good writing. Pruning a sentence of 20 dull words into a sentence of five interesting words is a joy that only a few can experience. It's time to make the start.■