

I29.89/3:977

Clemson University



3 1604 019 680 075

ARCHEOLOGICAL PROGRAMS

GOVT. DOCUMENTS
DEPT. OF THE INTERIOR

MAR 9 1979

CLEMSON
LIBRARY

country nodes: an anthropological evaluation of
archeological overview of lake mead national recreation area. four sag
ey of death valley mining claims. excavations at harmony borax works.
an archeological overview of the verde valley. architecture of the
casa grande and its interpretations.
tuzigoot: an archeological report.
northern channel islands.

1977

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
WESTERN ARCHEOLOGICAL CENTER

Production Assistance

Coordination and Compilation: E. "Essy" Schattilly


Cover Design: M. Brigid Sullivan

Photo Design & Layout: John M. Bancroft & Ellen Horn

ANNUAL REPORT
ON THE
ARCHEOLOGICAL PROGRAMS
OF THE WESTERN REGION
NATIONAL PARK SERVICE

CALENDAR YEAR 1977

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Western Region
Western Archeological Center



Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

<http://archive.org/details/annualreportonar00nati>

TABLE OF CONTENTS

	<u>PAGE NO.</u>
SECTION I - INTRODUCTION -----	1
SECTION II - SUMMARIES	
General Narrative-----	3
Organization -----	8
Budget - Procurement - Travel -----	12
Personnel -----	14
SECTION III - DIVISION REPORTS	
Office of the Chief -----	19
Curatorial Contract -----	23
Library Contract -----	24
Division of External Archeological Programs -----	26
Division of Cultural Properties Conservation -----	34
Division of Internal Archeological Studies -----	45

SECTION I

INTRODUCTION

INTRODUCTION

This is the 1977 Annual Report for the Western Archeological Center, Western Region, National Park Service, U. S. Department of the Interior, and the sixth since the Center was restructured and moved from Globe, Arizona, to Tucson, Arizona, in July 1971.

National Park Service directives require that each area will report annually, through its regional office, the accomplishments, completion of goals, projects and other data relative to the area's respective mission. The report documents expenditures to assure allocated monies have been spent for previously authorized projects, and were used wisely and productively.

In addition to satisfying legal requirements, this report is an historical chronicle of each year's events. It documents knowledge gained in the field of cultural resource management and conservation through surveys, excavations, professional research, and stabilization and preservation of both historic and prehistoric structures, and objects. The report also informs park management of the archeological and materials preservation assistance available to support work of individual parks, the regional offices, and the Denver Service Center.

Included as well are the administrative aspects of managing a cultural resources management and research center including dollar costs, personnel requirements, contracting and procurement of supplies, equipment and professional services, projects involving excavation and stabilization of prehistoric and historic structures; and the organizational breakdown needed to accomplish the Center's mission.

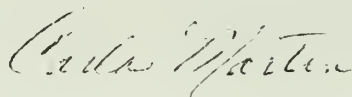
In addition to the Office of the Chief, which includes administrative support, there are three professional divisions dealing with external archeological programs; within-park archeological studies; and cultural resources materials research and conservation. Individual narrative reports for each appear later. Besides the forenamed, there are two Centerwide professional activities under the administrative management of the Office of the Chief. One is curatorial and collections management services; the other the library services. The year's activities of each of these contract services are also reported.

Data for this report was acquired through trip reports, calendar documentation, staff meeting agendas, conference notes and other memoranda of record; and through requested input from each Division or Office. Two organizational charts (1976-1977) illustrate changes in personnel and organization during the past year. Tables list budget expenditures, personnel changes in permanent and temporary assignments; and total training authorized and accomplished.

The Report is separated into four Sections -

1. Introduction
2. Summary
3. Division reports (including narratives from the Office of the Chief, Curatorial Services, Library Services, and each of the three professional divisions.
4. As a new approach this year, the Division of Internal Archeological Studies is being highlighted with photographs as part of their narrative, rather than having pictures in a separate section as before.

Program managers should find the entire report informative, most particularly the Office of the Chief narrative and the summary. Professional and scientific people may be more concerned with information furnished in the Divisional section.



Carol A. Martin
Chief
Western Archeological Center

SECTION II SUMMARIES

SUMMARIES - GENERAL NARRATIVE

When one is immersed in the daily details and complexities of a multifaceted operation, it is easy to lose sight of the whole. Stepping back a bit, as is required by this annual report, and taking a broader look at the ups and downs of 1977, the general pattern is much clearer. For instance:

1. Center activities increased considerably as is shown by the growth of the total budget - up nearly 50% from 1976, from \$1.1 million to \$1.6 million. Biggest growth areas were in the multi-regional materials preservation research program (installation and operations of a Soils Chemistry Laboratory), and external activities (reimbursable funds from the BIA for Indian Assistance).
2. Conception and implementation of a "circuit-rider" archeologist program to help northern California parks with compliance actions for maintenance and operations projects was a real plus for the in-park assistance program.
3. Multi-regional cooperation in cultural resource preservation took a small step forward January 18-20 when this Center hosted a meeting of archeological center Chiefs and the Associate Regional Directors responsible for resource management or professional services from Western, Southwest, Rocky Mountain and Midwest Regions. The goal of the discussions was to find the best ways of making the specialized expertise of each center available across regional lines. While a great deal of work remains to be done to make the idea truly functional, beginning cooperation included:
 - a. Subsurface sensing work at Tumacacori by Midwest Archeological Center as part of its proton magnetometer studies.
 - b. Technical assistance and supervision for a six-year stabilization project in Glen Canyon National Recreation Area by Western Archeological Center in cooperation with Midwest Archeological Center, actual work beginning in 1978.
 - c. Remote-sensing/mapping projects for Western Region areas in cooperation with the Southwest Cultural Resources Center.
 - d. On-going materials preservation and soils studies for Chaco Canyon (Southwest Region), Bent's Old Fort (Rocky Mountain Region) and Indiana Dunes (Midwest Region) by Western Archeological Center's research staff.

- e. Cooperation between Midwest Archeological Center and Western Archeological Center in funding a study by Arizona State University to determine the effectiveness of in situ polymerization of methyl methacrylate to prevent moisture retention in walls and foundations of historic adobe and stone structures.

4. In early summer, the Southwest Region decided to develop its own capabilities to do ruins stabilization projects and terminated the services of Western Archeological Center's Ruins Stabilization Unit in that region. A five-year workload analysis of the stabilization projects in Western Region and the professional expertise needed to properly plan and implement these projects was begun in the fall and a draft report submitted to the Western Regional Office by late December. The final data analysis shows not only the total of Western Region's needs in historic preservation, including type of project, location and professional input from archeologist to historic architect to engineer, but also the expected involvement of Western Archeological Center's preservation research staff in the needs of other regions.

5. A fully operational materials analysis laboratory was established at the Center in mid-July. The laboratory supports ongoing preservation projects at Fort Bowie, Tumacacori, Grand Canyon, Point Reyes, and Chaco Canyon.

6. On June 15-16, Western Archeological Center again hosted a meeting, this one attended by Art Allen, Chief of the Museum Services Division, Harpers Ferry Center; Western Region Curator-to-be David Forgang, Pacific Archeologist Ed Ladd, Center Chief Carla Martin, Division of Cultural Properties Conservation Chief George Cattanach, and Western Archeological Center Curatorial contract staff. Discussions centered on how to improve communication and cooperation among the represented offices on collections management, computerization of artifact inventories, and ways in which Western Archeological Center staff might assist Harpers Ferry Center with its artifact conservation responsibilities in the Greater Southwest and Pacific Culture areas. Again, progress towards communication and cooperation has been very slow with as many steps backward or sidewise as forward. The need for proper care of the National Park Service's large and valuable cultural artifact collections, however, is becoming a recognized Nationwide concern.

7. On June 15-17, Western Archeological Center archeologists were involved in a meeting co-hosted by the Washington Office's Division of Cultural Resources Management, and the Arizona State Museum for concerned Federal agencies and education institutions on data management and information exchange between the different land-managing agencies.

8. On September 19-20, a review and critique of progress on the Tumacacori Mission stabilization project was held. This project has been one of the first to cooperatively use project expertise and staff from several offices: the Denver Service Center, Western Archeological Center, and Tumacacori. While communication and cooperation on this project, too, has not always lived up to initial expectations, the mistakes made have been corrected and most of the project-related work is on schedule.

9. After numerous discussions and battles from the field level all the way to the Secretary of the Interior, the Western Region's program of technical assistance to Western Region Indian tribes through the Bureau of Indian Affairs (BIA) received funding and permanent staff (3 archeologists and 1 clerk-typist) to adequately handle the workload assigned.

10. With the transfer of Todd Rutenbeck from the Bureau of Reclamation, Denver, in July, the preservation research unit at Western Archeological Center is fully functional.

11. With the completion of the Death Valley and Verde Valley reports, more than half of the archeological overviews needed for the Western Region are done.

12. Short-deadline crisis projects to survey the mining claims at Death Valley, and Lake Mead were completed on schedule (in the heat of the summer). Boundary change surveys for Grand Canyon (the North Rim had to be done in winter) were also done on schedule.

13. The last field season of the Canyon del Muerto project (Canyon de Chelly National Monument) was completed and work begun on the final report. The Antelope House report didn't make it to the printers in 1977 as expected. Publication date is now set for sometime in 1978.

14. Western Archeological Center's "Publications in Anthropology" series is growing; seven reports are completed and three are in the final editing stage. The publication on the Harmony Borax Works of Death Valley has received considerable professional praise inside and outside the National Park Service.

15. A respectable number of stabilization projects were completed, including archeological mitigation materials research, etc.; Harmony Borax at Death Valley, Olema Lime Kilns at Point Reyes, Agate House and Puerco Ruins at Petrified Forest, second year of Fort Bowie project, first year of Casa Grande Ruins project, third year of the Tumacacori Mission project.

16. Well-received technical advice and assistance was given by the Division of External Archeological Programs on several highly controversial and politically visible projects: Aliso Water project of Orange County, California, Northshore Outfall project in the City of San Francisco, and Lower Truckee-Carson River Basin, Nevada Irrigation project Environmental Impact Statements.

17. Additional space was rented at the Western Archeological Center warehouse and security and environmental controls were installed to protect collections moved from the First Street building to make room for the Soils Laboratory. Most of the Environmental problems with the space at Arizona State Museum on the University of Arizona campus have been brought under control.

18. The conservation laboratory, operated by the Arizona State Museum contract staff, is fully operational and capable of meeting the majority of the curation needs of the Western Archeological Center collections as well as assisting Harpers Ferry's Museum Services Division in meeting needs of nearby parks. Fort Bowie metal objects are presently being cleaned and waxed to inhibit deterioration. Some emergency work was done on two bronze artifacts exhibited at Tumacacori.

19. Saguaro National Monument has offered itself as a pilot area (and is providing funding support) for development of effective cultural resource management systems.

20. Expertise available through the library contract with Arizona State Museum is becoming widely known and used. A paper given by Ellen Horn on photo collections management at the Federal Interagency Field Libraries Workshop generated acclaim and interest. Requests for library assistance have been coming from various agencies as far afield as Alaska.

21. The Center's cultural resource management programs were the object of review both by the Management Improvement Project contractors August 29 and 30, and the Cultural Resources Review task force of WASO's Management Consulting Division, December 5.

22. John Clonts, Chief, Division of External Archeological Programs, was selected as one of two trainees from the Western Region for the Mid-level Manager Development program.

23. More effective coordination and management of support for the Western Regional Office's external programs on Indian lands has been accomplished.

24. Two members of the permanent staff are now teaching at the University of Arizona: a cultural resource management graduate course for the Department of Anthropology, by Dr. Keith M. Anderson, and an undergraduate course for the Department of Soils, Water, and Engineering, by Dr. Dennis B. Fenn.

25. During 1977 three of the four contracts for library and curatorial services that had been active since FY 75 and 76 were completed and closed. With the one exception, only contracts written for FY 77 and FY 78 are active.

26. World-wide interest in adobe preservation problems and what the National Park Service is doing in this field was evidenced by the invitation to George Cattnach, Dennis Fenn, and Todd Rutenbeck of the Division of Cultural Properties Conservation to help develop the agenda and chair sessions at the Adobe Preservation Working Session October 3-7 in Santa Fe, New Mexico. This meeting was sponsored by the Internal Center for Conservation, Rome, Italy, and US/ICOMOS, and attended by representatives from all over the world.

ORGANIZATION AND STAFFING - CALENDAR YEAR 1977

The Calendar Year 1977 generated more changes; some new management policies and an organizational adjustment to relieve one over-burdened division, increase the productivity potential of another, and assure continuance of Center responsiveness to park needs. The four-unit structure of the Center remained basically unchanged, however. The chart on page 10 shows the organization as of December 31, 1976, and the one on page 11 as of December 31, 1977.

Of the 26 authorized full-time positions, only one is vacant. Staff of the library and curatorial units, which have been consolidated under "University Supervisor," are under contract from the Arizona State Museum, University of Arizona.

The organizational change that moved the library and curatorial contracts from the Division of Cultural Property Conservation to the Office of the Chief was an administrative one, done to consolidate Center support services and assure proper fiscal control of these complex contracts. Input for program development in library and curatorial services is drawn from all three professional divisions.

Briefly, functions of the various units are as follows: Office of the Chief provides overall program development, budget, and personnel management and control, and Center administrative support services. The Administrative unit, within the Office of the Chief, also handles administrative control and maintenance of all Center contracts.

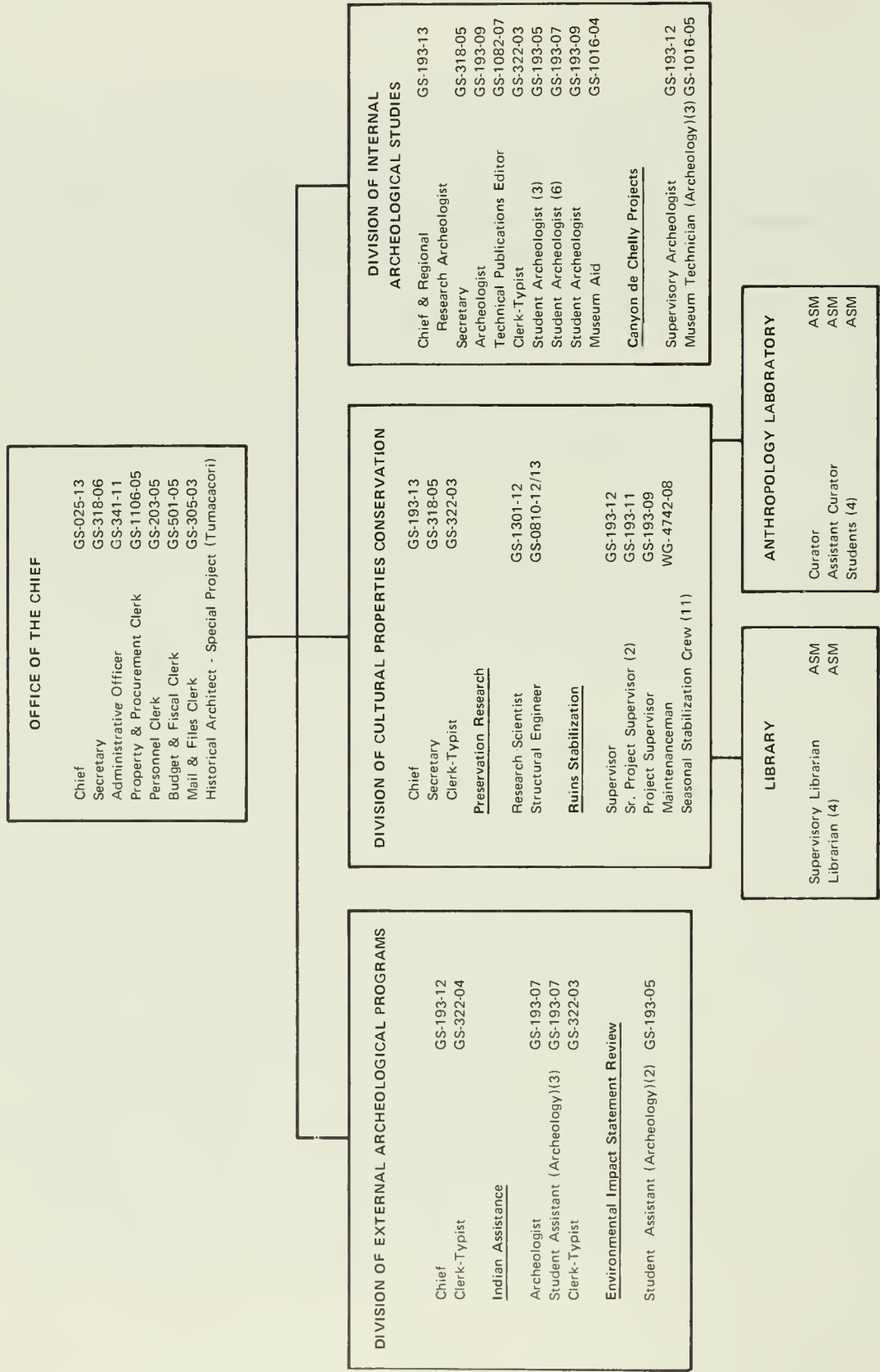
The Division of External Archeological Programs continues to review Environmental Impact Statements for other agencies and assists, on a reimbursable basis, with National Environmental Protection Agency (NEPA) compliance and cultural resource management programs development for other Federal agencies and Indian tribes in the Western Region. The progressively increasing workload in this Division required four new positions, which were approved during 1977 as part of the Bicentennial Land Heritage program.

The Division of Cultural Properties Conservation has continued with its expanded multi-regional program in preservation research with more laboratory equipment installed and additional student technicians in soil chemistry on the rolls. This Division also maintains the adobe structures stabilization expertise for Western Region, and is assisting the Midwest Archeological Research Center in developing its program in the Rocky Mountain Region.

The Division of Internal Archeological Studies continues to handle all archeology in the parks, including conducting surveys and excavations in those parks for planning, construction or other activities that require an archeological clearance before proceeding. The Division also assumed responsibility for preparation of Section 106 actions for the Western Regional Director's signature.

WESTERN ARCHEOLOGICAL CENTER/OFFICE OF RESOURCE MANAGEMENT AND PLANNING/WESTERN REGION

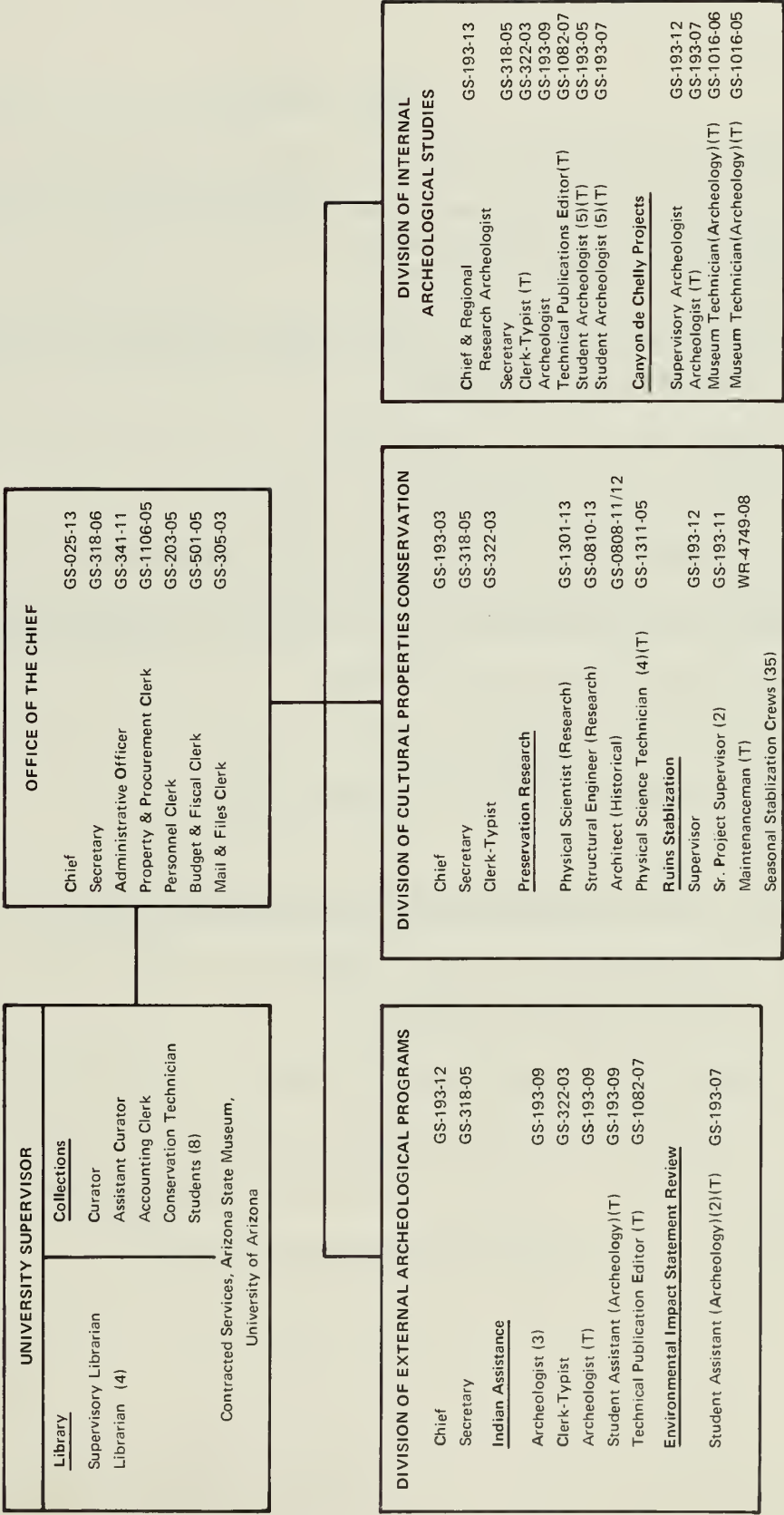
December 31, 1976



ASM-Arizona State Museum, University of Arizona
Contracted Services/Memorandum of Agreement

WESTERN ARCHEOLOGICAL CENTER / OFFICE OF RESOURCE MANAGEMENT AND PLANNING / WESTERN REGION

December 31, 1977



BUDGET SUMMARY

National Park Service funds for operation of the Center and its projects are provided on a fiscal year basis and are not amenable to calendar year reporting. The following data for in-Service activities are for Fiscal Years 1977 and 1978; each fiscal year runs October 1 through September 30.

Proposed Fiscal Year 1977 Budget reported in 1976 Annual Report

1. NPS Operations of Center	\$ 842,600
2. Cooperative Park Studies Unit	54,700
3. Other projects and special studies	<u>43,300</u>
Sub-total	\$ 940,600

Total Fiscal Year 1977 Funds Transferred from other Federal Agencies

1. Bureau of Indian Affairs (BIA)	\$ 128,588
2. Papago Indian Housing Authority	1,289
3. Environmental Protection Agency (EPA)	<u>35,000</u>
Sub-total	\$ 164,877

Fiscal Year 1977 Funds Received After Making 1976 Annual Report

1. NPS Operations of Center (ONPS)	\$ 145,900
2. Cooperative park studies unit	5,500
3. Other projects and special studies	278,914
4. Transferrred from other Federal agencies	<u>35,005</u>
Sub-total	\$ 465,319
Grand Total 10/1/76 - 9/30/77	<u><u>\$1,570,796</u></u>

BUDGET SUMMARY (Continued)

Proposed Fiscal Year 1978 Budget

1. NPS Operation of Center	\$ 788,100
2. Cooperative park studies unit (Separate unit, administratively attached to the Center)	\$ 60,200
3. Other projects and special studies	<u>\$ 372,500</u>
Sub-total	\$1,220,800

Fiscal Year 1978 Transferred from other Federal agencies (as of 12/31/77)

1. Bureau of Indian Affairs Consolidated Working Fund (Indian Assistance)	\$ 137,700
2. Bureau of Indian Affairs - Other	<u>7,809</u>
Sub-total	\$ 145,509
Grand Total 10/1/78 - 12/31/78	<u><u>\$1,366,309</u></u>

TRAVEL AND PROCUREMENT COSTS BREAKDOWN

Total 1977 Travel (Down 9% from 1976)	\$ 86,138.87
ONPS *	\$36,523.57 (Up 10%)
Contracts/Projects	\$47,718.71 (Down 10%)
Parks (Reimbursable)	\$ 1,896.69 (Down 2%)
384 purchase documents were processed totalling	<u>\$ 318,272.63</u>
Grand Total Purchases & Travel	<u><u>\$ 404,411.50</u></u>

* Operation National Park Service funds

PERSONNEL MATTERS

Two hundred eighty-eight Standard Form 52's, Request for Personnel Action, were processed and submitted to the Personnel Office, Western Region, during 1977. They ran the full gamut from recruitment (including the filling of four new positions for the Indian Assistance programs) conversions, transfers, terminations, and retirement.

Four employees were nominated for the Mid-level Management Training program. Of the four nominees, John B. Clonts, Chief, Division of External Archeological Programs, was chosen; one of the two selections from the Western Region.

During 1977 the office processed 100 applications for training courses. Of this amount, seventeen applicants were not selected; eight courses were cancelled by the training institutions; and six employees had to cancel due to schedule conflicts. At the final count twenty-two Center employees and three museum employees undertook 2,444 hours of formal training at a total cost of \$10,872.14 (including tuition, travel, and books). Of this total eight managers/supervisors attended twenty-one courses and fourteen clerical employees went to twenty-nine.

Of fifteen early nominations made for training at the two National Park Service Training Centers, eight were forwarded from Western Region to the Center; three of these had been selected at the time of this report.

John B. Clonts received on-the-job training as Acting Center Chief during the month of July, while Center Chief Carol Martin was on vacation.

Tables on the following pages provide a detailed outline of the varied personnel actions affecting assigned permanent, less-than-full-time, and temporary employees during 1977.

TABULATION OF PERSONNEL ACTIONS DURING 1977

<u>Permanent Full-Time Positions</u>		<u>Authorized</u>	<u>Assigned</u>
Total on January 1, 1977		22*	20
New Positions approved	+4	26	
Appointments	+2		22
Transfers In	+2		24
Transfers Out	-1		23
Retirements	-1		22
Conversions	+3		25
Vacancies 12/31/77	1		25
Total on December 31, 1977		26*	25
<u>Permanent Less-Than-Full-Time Positions</u>			
Total on January 1, 1977		5	4
Appointments	+1		5
Resignations	-1		4
Transfers Out	-2		2
Conversion to Full Time	-1		1
Total Less-Than-Full-Time Positions December 31, 1977		1*	1
<u>Other Than Permanent Positions **</u>			
Total on January 1, 1977			22
Appointments	+94		
Terminations	-70		
Separation/Appointment	- 1		
Resignations	- 9		
Total Other than Permanent Positions on December 31, 1977			<u>36**</u>
Total Permanent and Other Assigned December 31, 1977			<u>62</u>

* Includes personnel working in Cooperative National Parks Resources Study Unit, administered by Western Archeological Center. (CPSU)

** These include term appointments for Division of Internal Archeological Studies, seasonal field crews for ruins stabilization, and graduate students working under the provisions of the Memorandum of Agreement with the University of Arizona.

PERSONNEL ACTIONS

OFFICE OF THE CHIEF

Reinstatement

Loyal K. Enz, Mail-File Clerk, GS-03, Administrative Unit,
Career-Conditional, September 11.

Transfers - OUT

Susan M. Weber, Mail-Files Clerk, GS-03, Administrative Unit, to
Supervisor, Mail & Files, GS-04/05, Yellowstone, July 16.

DIVISION OF EXTERNAL ARCHEOLOGICAL PROGRAMS

Reinstatement

Mary Jo Mills, Clerk-Typist, GS-03, Temporary, Career-Conditional,
April 3.

Conversions

Douglas R. Brown, Archeologist, GS-09, Subject-to-Furlough, to
same Full-Time, Career, June 5.

Mary Jo Mills, Clerk-Typist, GS-03, Temporary, to same Full-Time,
Career, July 31.

New Positions

Clerk-Typist, GS-03 - filled by Mary Jo Mills by Conversion.

Archeologist, GS-09 - filled by George A. Teague from Civil
Service Certificate, effective December 4.

Archeologist, GS-11 - filled by Gary F. Somers from Civil
Service Certificate, at the GS-09/11 level
as trainee, September 11.

Promotions

Hamilton M. Ahlo, Student Assistant (Archeologist), GS-05 to
Archeologist, GS-07, June 5.

Douglas R. Brown, Archeologist, GS-07 to same GS-09, January 30.

Doris M. Russell, Secretary, GS-04 to same GS-05, April 24.

Sandra S. Sobleman, Student Assistant (Archeologist), GS-05 to
Archeologist, GS-07, June 5.

PERSONNEL ACTIONS - DIVISION OF EXTERNAL ARCHEOLOGICAL PROGRAMS (Continued)

Sustained Special Achievement Awards

Eleanore Jane Rosenthal, Archeologist, GS-07, Laboratory Supervisor, Papago Project, August 1.

Resignations

Hamilton M. Ahlo, Archeologist, GS-07, December 31, to accept position with Hawaii State Parks.

DIVISION OF CULTURAL PROPERTIES CONSERVATION

Transfers - IN

Wanda L. Saathoff, Secretary, GS-06, from Farmers Home Administration, Phoenix, AZ to Secretary, GS-05, April 10.

Todd E. Rutenbeck, Civil Engineer, GS-12, Bureau of Reclamation, Denver, Colorado, to Structural Engineer, GS-13, July 31.

Promotion

Dennis B. Fenn, Research Scientist, GS-12, to Physical Scientist (Research), GS-13, December 4.

Retirement

Homer E. Medlin, Maintenance Worker, WG-08, September 1. (Voluntary) Rehired Annuitant, Temporary, Maintenance Worker, WG-08, November 6.

Resignation

Martha M. Dewey, Secretary, GS-04, March 26.

DIVISION OF INTERNAL ARCHEOLOGICAL STUDIES

Promotions

James A. McDonald, Archeologist, GS-05 to same GS-06, January 16.

Kathleen E. Moffitt, Archeologist, GS-05 to same GS-07, January 30.

Barrie M. Thornton, Museum Technician, GS-05 to same GS-06, January 30.

PERSONNEL ACTIONS - DIVISION OF INTERNAL ARCHEOLOGICAL STUDIES (Continued)

Sustained Special Achievement Awards

John L. Craib, Archeologist, Death Valley Project, November 30.

Patrick L. Harden, Archeologist, Death Valley Project, November 30.

Eric J. Levy, Archeologist, Death Valley Project, November 30.

Kathleen E. Moffitt, Archeologist, Circuit Rider program in Lassen Volcano, Whiskeytown, Yosemite, Sequoia/Kings Canyon, November 30.

Yvonne G. Stewart, Archeologist, Death Valley Project, November 30.

George A. Teague, Archeologist, Harmony Borax Works, Death Valley, and Grand Canyon Projects, November 30.

Resignations

James A. McDonald, Archeologist, GS-07, Temporary to accept Archeologist, GS-05, full-time, career-conditional appointment, U. S. Forest Service, September 10 (voluntary reduction in grade).

Kathleen E. Moffitt, Archeologist, GS-07, Temporary to accept Archeologist, GS-09, full-time, career-conditional, U. S. Forest Service, August 27.

COOPERATIVE NATIONAL PARK RESOURCES STUDY UNIT

(Assigned to Western Region and administered by Western Archeological Center)

Conversion

Lupe P. Henrickson, Clerk-Typist, GS-04 - selected from Civil Service Certificate; converted from Temporary to less-than-full-time, career-conditional appointment, June 5.

SECTION III
DIVISION REPORTS

OFFICE OF THE CHIEF

For the first time in three years the Administrative Office was operating more effectively, sans the rapid and traumatic turnover in personnel. The Administrative Officer initiated a contract program that promises to provide more effective control and assure that legal errors are minimal. Three positions in the office - Budget & Fiscal, Property & Procurement, and Personnel - now have fully qualified and experienced incumbents. The Mail & Files Clerk position was vacated when Susan Weber applied for and received a promotion-transfer to Yellowstone National Park on July 17. This position was filled on September 11 when Loyal E. Enz, U. S. Air Force, retired, was appointed.

The Library and Curatorial contracts were transferred to the Office of the Chief for administrative control. Professional overview and advice for curatorial and library affairs are now attained through bimonthly meetings of involved professional and management staff. Key staff from the Curatorial and Library Services units also meet regularly with the Center Chief to discuss administrative problems, communication gaps or other matters of immediate concern.

Most of the Center collections remaining at the First Street office were moved to newly acquired space at the warehouse, and the alarm system reduced. Employees returning from field trips or needing to finish research after hours now have easier access to their offices. Smoke detectors, and alarms were retained in the remaining collection room, library, laboratories, and main entry areas.

Contracts were negotiated for three word-processing machines; one for each of the three professional divisions. Savings in time and personnel costs have been apparent. Backlogged reports, manuscripts, and correspondence are being completed at a better rate and the workload for current clerk-typists cut to a more manageable level.

Tri-annual Secretary/Typists meetings, initiated in late 1976, have been quite successful. These meetings provide a forum to discuss any unclear correspondence policies, directives, misunderstandings or misconceptions. Opportunity is also given to share ideas and suggestions on better ways to handle respective jobs. Good results are shown in a very definite improvement in office management, and top-line correspondence, as well as revealing where more training is needed.

The first draft of the revision to the "Employees Handbook" is complete, but final typing has been delayed because of higher priority matters.

The recreation committee was discontinued by majority request. The coffee and coke responsibilities are now rotated among the divisions, and social activities are organized on an informal, ad hoc basis.

The Chief's official travel during the year is chronicled below:

February 27 - March 3: Accompanied by the Chief, Division of Internal Archeological Studies, the Chief made a rapid trip to Lassen Volcanic, Yosemite, and Sequoia-Kings Canyon National Parks, and Whiskeytown National Recreation area, to meet with area Superintendents to discuss the Center's plan to provide a "circuit-rider" archeologist. This person would conduct on-site surveys for archeological clearance needs, and advise on planning, 106 actions, interpretive assistance, and other park requests. The idea was enthusiastically received by the Superintendents concerned and was implemented.

March 13-16: The Chief and Chiefs of the Divisions of Internal Archeological Studies, and Cultural Properties Conservation, met with Western Region's Resource Management and Planning, and Budget and Programming people, to discuss ways and means to coordinate responsibilities in cultural resource management and avoid duplication of effort. Western Archeological Center will have primary responsibility for desert and mountain parks, Western Region's Cultural Resource group will be primarily involved in the coastal areas, while Pacific Archeologist Ladd assists Hawaii.

March 25: The Chief, Research Scientist Fenn, and Tumacacori Project Architect Crosby, accompanied members of the Western Region Advisory Committee on a tour of Tumacacori National Monument, Calabazas Mission National Historic Registered Site, and San Xavier del Bac Mission National Landmark. The Committee members were interested in examining preservation problems affecting old Spanish Missions in Arizona; what relative role the Center plays, and what measures have been, or will be, taken to resolve these problems. Participants in the group came from California, Nevada, Phoenix, Arizona, and Hawaii.

March 30: Working relations, programs, and other matters of mutual concern were discussed with Southern Arizona Group people in Phoenix and plans formulated on how best to meet the needs of the SOAR Group areas.

April 6 - 16: In company with Western Archeological Center conservation staff, a series of meetings was held with Hawaiian park Superintendents, the Pacific Archeologist, and the Hawaiian State Director to review on-going and proposed WAC involvement in Hawaiian projects. Matters of concern were: reviewing upcoming preservation and stabilization priorities of the four Hawaiian parks; reviewing City of Refuge ki'i figures and bone collection preservation needs; meeting with officials of the Bernice P. Bishop Museum regarding inventory and computerization of National Park Service collections owned by the Service but held by them. National Park Service areas visited were City of Refuge, Hawaii Volcanoes, and Haleakala National Parks, and the State Director's Office. Enroute home the Chief stopped at the Western Regional Office to attend the April 18-22 Superintendents' Conference. While in San Francisco she also visited John Muir Historic Site to become better acquainted with the area, and its artifact collections.

May 31: Visit to Fort Bowie National Historic Site to review and discuss use of Bicentennial Land Heritage funds for stabilization of the fort ruins.

June 22: At the request of the Regional Director, Western Region, traveled to San Francisco to discuss with him ruins stabilization operations in the Center and how they do, and could, relate to other regions with adobe/stone structures.

August 10-12: Meetings with Regional Director, Western Region, and Associate Regional Director, Resource Management and Planning, regarding mid-level management training, and Center programs and operations.

September 13-16: Revisited Lassen Volcanic, Yosemite, and Sequoia-Kings Canyon National Parks, and Whiskeytown National Recreation Area, to review and evaluate results of the "circuit-rider" program implemented earlier in those parks. Area Superintendents expressed pleasure with the results of the program and a strong desire that it be continued in the future.

September 23: Upon learning that Peggy Morgan (WASO Computer Services Division) was to be in Albuquerque, New Mexico, flew to the Chaco Center to meet with her and discuss computer programming needs of the Center's collections management activities.

October 17: One day to Tumacacori to review on-going work on Mission Church.

October 24-27: Attended General Superintendents' Conference in Estes Park, Colorado. Center Chief Carla Martin was asked by WASO to chair a panel on "Affirmative Actions." In addition, she also served as a panel member of the work session on "Indian, Native and Archeological Parks."

November 28-29: Visited Petrified Forest National Park at the request of the Superintendent, to discuss temporary loan of Navajo ethnographic materials for exhibit in the Painted Desert Inn. While in Flagstaff, Arizona, met with Museum of Northern Arizona officials to learn how they manage their artifact collections, and visited Walnut Canyon National Monument to discuss the Superintendent's ruins maintenance needs and any assistance he might want from the Center.

CURATORIAL

Computerizing information, providing for storage and rapid retrieval information about artifacts continued through 1977, using portions of the SELGEM system. Studies to adapt this stored information to INQUIRE format have been and are being conducted. Existing manual National Park Service catalog records have not been altered or subverted in any way during the computerization efforts.

Conservation Technician Brigid Sullivan has completed an internship at the Bishop Museum in Honolulu, Hawaii and is scheduled for an additional internship at the Canadian Conservation Institute, Ottawa, Ontario, Canada in March, 1978. A condition survey of the entire Western Archeological Center collection has been initiated and will be expanded to determine detailed conservation needs.

The Center Chief has met with, and continues to work with curatorial and conservation personnel in the Western Regional Office and at Harpers Ferry Center to determine how the curatorial and conservation resources available can be of assistance to other National Park Service areas.

Five thousand square feet of secured, climate-controlled, temporary storage space were added to replace space assigned to the Soils Laboratory.

LIBRARY

The Library continues to grow in size and expand its services. Over 800 new books and manuscript reports were received in 1977; circulation reached the 2500 mark despite the "no due date" policy, and inter-library loans were made to government facilities in Western Region, Rocky Mountain Region, and Alaska. Also, a team from the Southwest Regional Office, and several people from the Denver Service Center came to use the Library research facilities. Cooperation with the Arizona State Museum Library continues to increase the demand on the Western Archeological Center Library collections.

The card catalogue now consists of computer generated author cards, title cards, and monographic series cards. Subject headings have been assigned to one-third of the monograph collections and are in the process of being entered into the computer. Arrangements have been made with the National Natural Resources Library and Information System, Department of the Interior, to join OCLC, (Ohio College Library Center) the national bibliographic data base.

The computer-generated serials catalogue was converted entirely to SELGEM. This project is now current and functioning smoothly. All complete volumes of unbound serials were bound to increase usefulness and shelf life.

The photographic collections projects (FOTOFIL and STAB) were reformed and merged into a single project. At that time, a history/position paper, and recording and data entry manuals were written. The collections continue to grow with 7500 negatives, prints, and slides received this year, including 1500 old Southwest Missions prints received from Harpers Ferry Center. All uncatalogued material has been inventoried and the inventory listing will serve as a location guide to materials as well as provide accurate figures for projection of long-range cataloging and storage needs. Storage conditions have been upgraded to archival standards and a new classification scheme developed to provide improved access to materials.

Attention has recently been given to sorting and weeding the old Southwest Archeological Center separates file. A related project has been the organization and making of contents pages for the Division of Internal Archeological Studies project and field notes.

Knowledge of the library's services and facilities are spreading. A slide show was presented to the Tucson Federal Women's Group; a paper on photographic collections management was presented at the annual Federal Interagency Field Librarians' Workshop in New Orleans; and an article on library services by contract appeared in the Department of the Interior Natural Resources Library Newsletter. In addition, an inhouse newsletter is now being prepared for distribution to Center employees. The two-fold purpose of the newsletter is to keep personnel abreast of new library services and activities, and to provide occasional instructional guides to the use of the library's various collections. Positive and widespread response has been received on all these projects, especially the photographic collections management paper.

The Western Archeological Center Library is moving ahead on all fronts and can pride itself on providing nationwide service to the National Park Service.

DIVISION OF EXTERNAL ARCHEOLOGICAL PROGRAMS

The primary responsibility of the Division of External Archeological Programs is assisting other Federal agencies and Indian tribes in various aspects of cultural resource management. This assistance includes, but is not limited to, comprehensive review and comment on the cultural resource aspects of Environmental Impact Statements and assistance in incorporating cultural resource management programs into the planning process. In addition, the Division of External Archeological Programs provides a total cultural resource management program for the Bureau of Indian Affairs, for tribal groups within the Western Region, and for the Division of External Assistance, Western Regional Office.

Indian Assistance Program

The question of positions needed to carry out the National Park Service's responsibilities was finally resolved. Three permanent positions for archeologist and one permanent secretarial position were allocated to the Division of External Archeological Programs, and were filled during 1977. One of the positions is scheduled to be reclassified as Supervisor of the Indian Assistance Program. The new positions have enabled the Division to deal adequately with an unpredictable workload.

The workload is unpredictable because the Indian Assistance Program responds to requests from various Indian tribal groups, the Bureau of Indian Affairs, and other Federal agencies (such as Indian Health Service and the Department of Housing and Urban Development) to provide assistance with projects on Indian land, and these requests arrive sporadically. Although the number of requests for assistance remained nearly the same as last year (49 in 1977 in comparison to 50 in 1976), several 1977 requests involved large projects. These included a survey of the entire 17,778 acre Round Valley Indian Reservation, Mendocino County, California; the development of a program to mitigate the adverse effects of road construction on 16 significant cultural resources on the Fort Apache Indian Reservation, Navajo County, Arizona; and the development of a program to mitigate the effects of road construction and community improvement projects on a large, multi-phase Hohokam village site on the Gila River Indian Reservation, Pinal County, Arizona.

In general, the assistance provided by the Division enables the agencies and tribes to comply with historic preservation legislation and regulations during the process of project planning and development. The statutory requirements of each project are assessed, and a scope of work is outlined to meet these requirements. Proposals

received from potential contractors are evaluated and submitted to the appropriate agency or tribe along with our recommendations based on each proposal's respective merits. After the agency or tribe selects the proposal most suitable for carrying out the project, the Division awards a contract or issues a purchase order and ensures that the specified work is completed satisfactorily. Occasionally, the tribe or agency procures the work directly, in which case the Division functions as the contractor's reviewing agent.

During 1977, work on one long-term Indian Assistance Program project was completed. In December, editing and preparation of the final draft of The Quijotoa Valley Project report was finished. This provides analysis of the data recorded in the investigations of Papago Indian Roads 1 and 34, conducted on the Papago Indian Reservation, Pima County, Arizona, in 1973-74. Analysis of the data and preparation of the report took place in-house during 1975-77, and publication is scheduled for early 1978.

Technical Assistance

In September 1977, the Western Region of the National Park Service and the Environmental Protection Agency, Region IV, renewed a Memorandum of Agreement whereby the National Park Service provides technical assistance in cultural resource management to the Environmental Protection Agency.

During 1977, the Division of External Archeological Programs continued to provide assistance to the Environmental Protection Agency on the following on-going projects: the Aliso Water Management Agency Project and the Southeast Regional Reclamation Authority Project in Orange County, California, and the North Shore Outfalls and related projects in San Francisco, California. The Division also began to assist in the Reno-Sparks Joint Water Pollution Control Plant, Cross-town Sewer, and Lawton-Verdi Interceptor Extension Project in Washoe County, Nevada.

Technical assistance was provided to the Environmental Protection Agency and assistance was continued at the request of the Department of the Interior in the preparation of the "Draft Environmental Impact Statement for the Proposed Operating Criteria for the Lower Truckee-Lower Carson River Basins." In addition, the Division of External Archeological Programs assisted the University of Arizona Office of Arid Land Studies in the following projects: the Environmental Impact Study of the Havasupai Land Use Plan, and the Environmental Assessment of the IBM Plant Site, Tucson.

The Division also provided assistance to the Western Region's Division of External Assistance on four projects. Archeological surveys were conducted by a Division archeologist on the Barona Indian Reservation, the Sycuan Indian Reservation, and the San Pasqual Indian Reservation, all in San Diego County, California, and on the Walker River Indian Reservation in Mineral County, Nevada.

Environmental Impact Statement Review

The Division of External Archeological Programs continues to review and comment on the cultural resource aspects of environmental impact statements from Federal undertakings within the Western Region of the National Park Service. During calendar year 1977, the Division received 158 environmental statements from Federal, State, and local agencies. This figure represents a 19 percent decrease from the previous year and is the lowest number received since 1974 when the first complete records were available. Although the average number received per week was 2.9 statements, the statements arrived sporadically. The unpredictable receipt pattern caused corresponding irregularities in the workload.

Of the 158 statements received, 69 (44 percent) were drafts, 51 (32 percent) were final reports, and 38 (24 percent) were assessments, proposals, requests for technical assistance, or supplements. The number of days allowed for review ranged from as soon as possible to more than 21 days. Thirty-five percent of the statements received had a review period of five days or less, and an additional 33 percent allowed from six to ten days for review. In general, as agencies have become more aware of cultural resource regulations and compliance procedures, the quality of the environmental impact statements has improved. During 1977, there was less need for the reviewers to request additional information, or to outline procedures that must be followed in order to achieve compliance, because more statements have satisfactorily taken cultural resources into consideration.

Scholar-in-Residence

A scholar-in-residence program was begun in June 1977 with the hiring of Dr. David R. Wilcox, who provides the Division personnel with professional advice. He has assisted in the preparation of National Register forms for two projects, has helped to prepare the scope of work for three large projects, and has reviewed reports submitted to the Division. Dr. Wilcox has also prepared several specialized studies and has participated in many day-to-day discussions of the full range of projects handled by the Division of External Archeological Programs.

DIVISION OF EXTERNAL ARCHEOLOGICAL PROGRAMS

STATUS OF CONTRACTS AND PURCHASE ORDERS CALENDAR YEAR 1977

1. Indian Assistance

a. Requests Received	49	
b. Contract Carry-over	10	\$ 34,841.
c. Purchase Orders Issued	36	44,995.
d. Contracts Issued	1	<u>39,060.</u>
Total		\$118,896.

2. Performed In-house

Environmental Protection Agency		<u>\$ 25,000.</u>
Total		\$ 25,000.

3. Funds Transferred from Bureau of Indian Affairs to National Park Service

a. Reimbursable (from No. 1 above)		\$118,896.
b. Washington Office (Administrative Overhead)		<u>86,900.</u>
Total		\$205,796.

DIVISION OF EXTERNAL ARCHEOLOGICAL PROGRAMS

REPORTS RECEIVED DURING CALANDAR YEAR 1977

Ahlo, Hamilton

Hoopa Summary. Western Archeological Center, Tucson, 1977.

Bell, Daniel A.

Final Report: Archeological Reconnaissance of a Portion of the Santa Rosa Indian Reservation. University of California, Riverside, January 1977.

Benson, James R.

An Archeological Survey of Approximately 286 Acres Located in Humboldt, Trinity and Shasta Counties. Northwest Indian Cemetery Protective Association, Inc., McKinleyville, July 1977.

Benson, James R.

An Archeological Survey of the Henry Blake and Willis Conrad, Jr., Allotments in Del Norte and Siskiyou Counties, California. Northwest Indian Cemetery Protective Association, Inc., McKinleyville, 1977.

Benson, James R.

An Archeological Survey of the Resighini Rancheria in Del Norte County, California. Northwest Indian Cemetery Protective Association, Inc., McKinleyville, July 1977.

Benson, James R.

An Archeological Survey of the Trinidad Rancheria in Humboldt County, California. Northwest Indian Cemetery Protective Association, Inc., McKinleyville, July 1977.

Breslin, Dino

Proposed Sample Survey Research Design and Cost Estimate for the Remaining Uncut Timbered Areas of the Hoopa Valley Indian Reservation, Humboldt County, California. Sonoma State College, Rohnert Park, July 1977.

Brooks, Richard H., Daniel O. Larson, Annie Cunningham, Richard Wilson, Joseph King, and Katherine Olson

A Cultural Inventory of Five Indian Reservation Areas--Lone Pine, Fort Independence, Big Pine, Bishop, and Adjacent Benton Springs--in Owens Valley, California. Nevada Archeological Survey, Southern Division, Las Vegas, February 1977.

Brown, Douglas R.

An Archeological Survey for Proposed Road Improvements on the Santa Ysabel, Los Coyotes and Barona Indian Reservations, San Diego County, California. Western Archeological Center, Tucson, 1977

Brown, Douglas R.

Cultural Resource Investigations on Five Indian Reservations in Southern California. Western Archeological Center, Tucson, August 1977.

Cayer, Lynna

The Archeological and Historical Survey of the Berry Creek Rancheria and Indian Cemetery. California State University, Sacramento, December 1977.

Elston, Robert and Cameron Covington

An Intensive Archeological Investigation of Bridgeport Indian Reservation 40-Acre Housing Sites, Final Report. Nevada Archeological Survey, Northern Division, Reno, February 1977.

Ferg, Alan and Lawrence Vogler

An Archeological Survey of Route P.I.R. 21: Kom Vo to Papago Farms, Papago Indian Reservation, Arizona. Arizona State Museum, Tucson, April 1977.

Fowler, Don D.

Evaluation of the Cultural Resources of the Fort Bidwell Indian Reservation, Modoc County, California. Nevada Archeological Survey, Desert Research Institute, Reno, January 1977.

Fredrickson, David A.

Final Report: A Cultural Resource Survey of the Dry Creek Rancheria, Sonoma County, California. Sonoma State College, Rohnert Park, October 1977.

Fredrickson, David A. and Peter M. Banks

A Cultural Resource Survey of the Middletown Rancheria, Lake County, California. Sonoma State College, Rohnert Park, July 1977.

Hoover, Robert L.

Archeological Survey and Cultural Resources Evaluation, Santa Rosa Rancheria, Kings County, California. California State Polytechnic University, San Luis Obispo, 1977.

Jensen, Peter M. and Donald Manuel

Archeological Reconnaissance of the Jim Bender Allotment, Siskiyou County, California. California State University, Chico, May 1977.

Johnson, Keith L.

Archeological Survey of the Cedarville, Alturas, Lookout Rancherias, Modoc County, California. California State University, Chico, May 1977.

Leonard, Nelson and James Swenson

Final Report: A Cultural Resource Evaluation of Four Parcels of Land on the Agua Caliente Indian Reservation, Palm Springs, Riverside County, California. University of California, Riverside, July 1977.

Lipp, Donald E.

Final Report: Archeological Evaluation of Lands Belonging to the Agua Caliente Indian Reservation, Riverside County, California. University of California, Riverside, April 1977.

Manuel, Donald

The Analysis of Cultural Materials Recovered During the Construction of Route 96, Fort Bidwell Indian Reservation, Modoc County, California. California State University, Chico, February 1977.

Meade, Dudley

An Ethnohistorical and Archeological Evaluation of the Cultural Resources to be Affected by the Ak-Chin Farm Improvement Project. Central Arizona College, Coolidge, 1977.

Roberts, Larry D.

An Archeological Reconnaissance of Grindstone Indian Rancheria, Glenn County, California. California State University, Chico, May 1977.

Rosenthal, E. Jane

Arizona AA:14:21, a Prehistoric Activity Area Near Modern Comobabi Village. Western Archeological Center, Tucson, 1977.

Russo, Marianne

An Archeological Survey and Cultural Resource Evaluation of Tuolumne Rancheria, Tuolumne County, California. California State University, Sacramento, December 1977.

Stearns, Steven

The Archeological and Historical Survey of the Shingle Springs Rancheria. California State University, Sacramento, May 1977.

Stone, Lyle M.

An Archeological Survey of an Indian Health Service Water Delivery System Near Alchesay Flat, Fort Apache Indian Reservation, Arizona. Archaeological Research Services, Inc., Tempe, October 1977.

Taschek-Ball, Jennifer

An Archeological Survey of Some Discontinuous Parcels of Land on the Agua Caliente Indian Reservation, Riverside County, California. San Diego State University, San Diego, 1977.

Varner, Dudley M. and C. Alan Davis

A Survey of Archeological Resources on the Tule River Indian Reservation, Tulare County, California. California State University, Fresno, March 1977.

Wilcox, David R.

Assessment of Cultural Resources Subject to Direct or Indirect Impact by the Proposed Route 48, Fort Apache Indian Reservation. Western Archeological Center, Tucson, 1977.

Wilcox, David R.

On the Limits of Historic Preservation: A Position Paper. Western Archeological Center, Tucson, 1977.

Yablon, Ronald K.

An Archeological Survey of Additional Areas Associated with the Proposed Vaiva Vo-Kohatk Road, Papago Indian Reservation, Pinal County, Arizona. Arizona State University, Tempe, March 1977.

DIVISION OF CULTURAL PROPERTIES CONSERVATION

SUMMARY

Since the Division consists of several units doing a wide variety of work, major activities and accomplishments of the Division are listed below. Many items are discussed more fully by activity and project in the body of the narrative.

1. Todd Rutenbeck joined the staff as Structural Engineer (Research).
2. Dr. Dennis Fenn, Physical Scientist (Research), was appointed Adjunct Assistant Professor of Soils, Water, and Engineering by the University of Arizona.
3. A fully operational materials analysis laboratory was established at the Center and used to support ongoing preservation projects at Fort Bowie, Tumacacori, Grand Canyon, Point Reyes, and Chaco Canyon.
4. Field research into techniques and materials for consolidating adobe and certain other historic building materials, and making them more water resistant, was conducted at Fort Bowie, Tumacacori, Casa Grande Ruins, Chaco Canyon, and Bent's Old Fort, primarily through the use of environmentally monitored test walls.
5. Division field research was augmented by contract studies undertaken by Arizona State University in electrochemical hardening of adobe and in situ polymerization of methyl methacrylate, using test walls in three areas.
6. Contract studies were completed at the University of Arizona to determine the suitability of soils from 13 parks for use in soil-cement mixes for ruins maintenance stabilization.
7. Major progress was made on the comprehensive adobe research being conducted by the National Bureau of Standards, with all work completed and the final report being written for four of the five sections.
8. Preliminary evaluations of engineering problems were made at Casa Grande Ruins, Tuzigoot, and Tonto, and field inspections conducted at Bent's Old Fort, Fort Bowie, and Tumacacori in conjunction with ongoing projects.

9. Design of relatively inexpensive equipment for monitoring structural movement in ruins was started.

10. Ruins stabilization--basic and emergency--was carried on in Death Valley (Harmony Borax Works), Tumacacori (Mission Church), Petrified Forest (Agate House and Puerco Ruin), and Point Reyes (Olema Lime Kilns); stabilization needs were assessed at Montezuma Castle, Tonto, Organ Pipe Cactus, and Glen Canyon.

11. Three Bureau of Land Management archeological sites near Safford, Arizona, were inspected and specific protective measures recommended. At Glen Canyon, the stabilization needs of several additional sites were assessed for both the BLM (adjacent to recreation area lands) and Bureau of Reclamation (at water's edge).

12. Joint Western Archeological Center-Denver Service Center preservation projects were continued at Tumacacori (Mission Church) and started at Fort Bowie.

13. The Division supplied major input on the agenda and selection of foreign and United States representatives for the Adobe Preservation Working Session held in Santa Fe last October, and sponsored by the International Center for Conservation, Rome, and US/ICOMOS. In addition, Cattanach, Fenn, and Rutenbeck presented papers on the scope of adobe preservation problems in this country and the research needs.

14. Comprehensive workload statistics for the Division--including work in two other Regions--were developed for consolidation with those of the Division of Cultural Resources, Western Regional Office, and the State Director, Hawaii. The data will be used by the Regional Director in determining the need for major organizational changes in the Center.

15. The Division Chief discussed preservation problems, needs, and assistance we can provide (primarily in materials and structural preservation) with Superintendents and other park officials during visits to 21 field areas (13 in Western Region, 7 in the Southwest Region, and 1 in Rocky Mountain Region).

Contracts and Purchase Orders for Professional Services: During the Calendar Year 1977, two preservation research purchase orders were issued totaling \$7,030, and two preservation research contracts were issued totaling \$33,605. Seventeen contracts and purchase orders were active during the year; ten were closed.

MATERIALS PRESERVATION RESEARCH

Under the direction of Dr. Dennis Fenn, Physical Scientist, the preservation research program became fully functional, and capable of providing Park Managers with the field and laboratory data they need for planning major ruins stabilization and maintenance work.

The Fort Bowie adobe preservation research project established in 1976 continued in 1977. Some of the treatments applied last year are still performing very well after 16 months of exposure; many, however, have failed to provide adequate protection. The annual research report that will soon be completed will give the effectiveness of each product.

A major research study area was established at Casa Grande Ruins this year for two purposes: (1) to develop chemical amendment techniques that will control the erosion rate of rammed earth or turtleneck structures such as Casa Grande Ruins; and (2) to develop an erosion resistant wall capping material that is more natural appearing than soil-cement. Fourteen promising chemicals are now undergoing accelerated field testing. Water is applied to the base of each test wall by drip irrigation for four hours a week to provide a continual source of destructive capillary moisture.

We received a joint request from the Rocky Mountain Regional Office and the Denver Service Center for research assistance in solving very serious erosion problems at the newly reconstructed Bent's Old Fort. An extensive field research program in mud plaster stabilization was initiated at the Fort in July, and over 33 different chemical products are being tested. Two research reports on the project have already been prepared and distributed, and monitoring of the treatments continues. Additional treatments and techniques of application will be tested in 1978.

The Chaco Canyon ruins preservation research project finished its second full year of operation with completion of the modern test "ruin" to its full design capacity. A drip irrigation system was installed to add water regularly to the basal portion of all test walls to accelerate erosion and provide a stringent test of treatment effectiveness. A full report on the progress and results of this research was prepared and distributed.

A fully operational materials analysis laboratory was established in 1977, thus providing the capability for complete and thorough analysis of soils, soil-cement, and stone as related to cultural resource preservation and stabilization. The laboratory has been used extensively to

support the field research and stabilization work at Fort Bowie, Tumacacori, Grand Canyon, Point Reyes, and Chaco Canyon. Several State and city agencies have also requested assistance from the laboratory during the year. Its staff is presently involved in a thorough laboratory study of the effects of water-proofing chemicals on soil materials under controlled conditions. The study will help us understand and interpret the results of the field projects presently underway.

Another area of in-house research effort in 1977 was in the testing of new techniques of stabilization materials application. At the suggestion of Dave Battle, Southwest Cultural Resources Center, a grouting machine was purchased and tested at Casa Grande Ruins, where an overcoat of chemically amended mud was sprayed on both the test walls and the old soil-cement caps on many of the walls in Compound B. The method shows great promise for rapid application of rough-textured mud plaster on ruin walls needing such a treatment.

Several contract research projects were continued during the year. The largest and most comprehensive is with the National Bureau of Standards, Center for Building Technology. The project contains five major sections:

1. Evaluate selected waterproofing materials for adobe by laboratory and field methods. The work was subcontracted to Dr. Erhard M. Winkler of Notre Dame University. Dr. Winkler has completed his research and is currently writing his final report.
2. Evaluate methods for establishing in situ moisture barriers beneath extant adobe walls. This important phase of the contract was initiated in late 1977 and will be completed in 1978.
3. Prepare a list of recommended procedures for fully characterizing samples of adobe and stone. This phase of the contract was completed during 1977 and a preliminary draft submitted to the Center for review. We have made several suggestions about the draft, and the Bureau is presently preparing a final draft for review and publication.
4. Thoroughly characterize, as a function of weathering and deterioration, the properties of selected adobe samples from several parks. The work was completed in 1977, and a preliminary draft report submitted to the Center. The final report is presently being prepared by the Bureau.
5. Measure the mechanical properties of selected adobe samples as affected by temperature, relative humidity, and moisture content. The work was completed in late 1977 and the preliminary draft report

is currently in preparation by the Bureau.

The results of this extensive project will enable the NPS to quantify adequately the important properties of each adobe structure in its care and to understand how those properties are affected by the prevailing conditions at the site. The evaluation of potential ameliorative practices is critical to the long-range protection of each site.

Research was also continued last year under contract with Dr. Charles E. O'Bannon, Arizona State University Engineering Research Center, for the analysis of electro-osmosis and base exchange of ions techniques in adobe stabilization and preservation. Dr. O'Bannon installed treatment plots on four test walls at Casa Grande Ruins to evaluate the results of the 1976 laboratory research and development work on a larger and more practical scale. He will now monitor the results for one year. Final reports on the 1976 laboratory research were received in early 1977.

A third research contract, being done in cooperation with the Midwest Archeological Center, is with Dr. William J. Burke, Arizona State University, Department of Chemistry. It is for the establishment of field studies in the use of in situ polymerization of methyl methacrylate to stabilize and waterproof stone and adobe. Dr. Burke has installed field plots on test walls at Casa Grande Ruins, Tumacacori, and Chaco Canyon, and is now monitoring the treatments for long-term effectiveness.

The final 1977 research contract was with Dr. Hassan A. Sultan of the Department of Civil Engineering and Mr. Ted W. McCreary of the Soils, Water and Plant Tests Laboratory, both at the University of Arizona. This was to provide the physical, chemical and mechanical analytical data required to evaluate the suitability of soil from 13 National Park Service areas in making soil-cement mixes for ruins maintenance stabilization. Final reports have been received from both men, and the data is now being evaluated and summarized for final publication and distribution by the Center in 1978.

ENGINEERING

Todd Rutenbeck, Structural Engineer, transferred from the Bureau of Reclamation in Denver to the Western Archeological Center in July. During the summer he spent about three weeks in Europe fulfilling a previous commitment to lecture on shotcrete technology in England, while at the same time using this opportunity to meet people involved in historic preservation work and observe techniques they use to preserve ancient buildings and monuments. Among his

stops were the Victoria and Albert Museum and the Department of the Environment, both in London; the International Council of Monuments and Sites, Paris; the International Centre for Conservation, Rome; and the Pompeii Ruins, Italy.

Todd made and reported on preliminary evaluations of engineering problems at Casa Grande Ruins, Tuzigoot, and Tonto, and also visited Bent's Old Fort, Fort Bowie, and Tumacacori in connection with ongoing preservation projects. On the basis of structural problems observed at these sites, he is designing equipment that would be economical enough for widespread use in monitoring structural movement in prehistoric and historic ruins. Without such data, it will be impossible for Park Managers to plan intelligently for the preservation of cultural remains and the safety of visitors and staff.

RUINS STABILIZATION

During the 1977 field season from January 24 to September 30, we accomplished four stabilization projects--two emergency, two cyclic maintenance--in National Park Service areas in Western Region, stabilizing a total of five sites. Some planned improvements in continued services were deferred to accomplish this high priority work.

Death Valley National Monument - Harmony Borax Works

The last phase of basic stabilization at Harmony Borax Works, Death Valley National Monument, began January 24 and was completed March 16. The project, funded by a generous donation from the Death Valley '49ers, Incorporated, accomplished the following: drainage system for two dissolving tanks installed; deteriorated wall sections repaired or replaced; retaining wall rebuilt; erosion furrows and visitor trails obliterated from the west tailings; metalwork preserved; and adobe walls given temporary cap. The stabilization crew, made up of members of the California Ecology Corps, was supervised by Senior Project Supervisor George J. Chambers.

Petrified Forest National Park - Agate House and Puerco Ruin

Emergency and cyclic maintenance stabilization of Agate House and Puerco Ruin, the park's two prime interpreted archeological sites, began May 9 and was completed July 23 through reprogramming of WAC funds.

At Agate House, the structural deterioration reached emergency proportions when a low wall collapsed onto the trail. Although the site

was excavated in 1934 and reconstructed with cement mortar, the knoll on which it lies was eroding and undermining walls on three sides. After consultation with a Denver Service Center structural engineer, the corners were provided with concrete footings and soil fill was hauled in and compacted around the ruin to form a buttress against undercutting. Cyclic maintenance of Agate House consisted of resurfacing the roof on Room 7 and repointing all walls with a weak soil-cement tinted to match local soil.

Cyclic maintenance at Puerco Ruin included extensive repointing of all walls, reduction of amount of room wall exposed by partial backfilling, removal of conjectural architectural features, and construction of replica walls on two backfilled kivas. Lintels that could not be substantiated by the archeological record had been built across all interior doorways in the south and east complexes. These were removed to approximate the appearance of the ruin as it was when excavated. The collapsed south wall vent of Kiva 1, which had been improperly rebuilt in 1967, was dismantled and reconstructed to blend with the aboriginal masonry. Low replica walls were built over excavated and backfilled Kivas 2 and 3 to enhance interpretation of the ruin. The walls, of tinted soil-cement, were laid on the present plaza surface and may be removed at any time without injury to archeological features. The crew members for the project were recruited locally, and were supervised by Senior Project Supervisor William E. Sudderth.

Tumacacori National Monument - Tumacacori Mission

Preliminary field work on the Tumacacori preservation project began June 20 and was completed September 14. During the initial stage of this three-year project designed by Tony Crosby, Historical Architect, Denver Service Center, adobe test walls were constructed, subsurface polyvinyl sheeting was removed, extensive testing was carried out to determine thickness of cement plaster, approximately 1,500 soil adobe bricks were made, and cement plaster was removed from cobblestone foundation walls. Field activities were supervised by Senior Project Supervisor George J. Chambers.

Point Reyes National Seashore - Olema Lime Kilns

The emergency stabilization of the historic Olema Lime Kilns was funded by the Center and carried out from September 6-30. The List of Classified Structures survey team had noted serious structural problems at the site in 1976 caused by a huge, dead Douglas fir tree that had grown in the fill between Kilns 1 and 2, and a living elm tree growing

on the east lip of Kiln 2. A second large Douglas fir was growing in the center of Kiln 3; it had caused no discernible damage, however. Once brush was cleaned from the site, two problems obscured during the survey were discovered: Failure of the upper portion of the west wall facade of Kiln 1, and total collapse of the south wall of Kiln 2. The trees were removed and enough masonry work done to ensure the integrity of the ruin until basic stabilization can be programmed and performed. The four crew members for the project were recruited locally, and were supervised by Senior Project Supervisor William E. Sudderth.

Participation in WAC Research Programs

George Chambers and Dr. Dennis Fenn collaborated in a study of soil and soil-cement mortars used in ruins maintenance work. Stone and soil from 13 National Park Service areas were subjects of laboratory tests to determine the best soil-cement ratios for repair mortar for each park.

Ed Sudderth supervised the production of replica adobes for test walls construction at Tumacacori.

Martin Mayer assisted Dr. Dennis Fenn in the design and construction of caliche adobe test walls and replica Tumacacori-type test walls at Casa Grande Ruins for field testing of chemicals and electro-osmosis.

Assistance to National Park Service Areas

At the request of area or group Superintendents, we inspected ruins to assess stabilization and preservation needs and make recommendations and estimates for stabilization projects at Montezuma Castle, Tonto, and Organ Pipe Cactus National Monuments, and Glen Canyon National Recreation Area.

Assistance to Other Agencies

In April we assisted the Bureau of Land Management by inspecting three sites near Safford, Arizona, and recommending specific protective measures.

In conjunction with the above work in Glen Canyon, we also determined the stabilization needs of sites on adjacent Bureau of Land Management land and of the water-edge sites controlled by the Bureau of Reclamation. Recommendations for stabilization, with cost estimates, were prepared for consideration of a multiagency ruins preservation program.

JOINT WESTERN ARCHEOLOGICAL CENTER - DENVER SERVICE CENTER PROJECTS

Tumacacori National Monument - Mission Church

Tony Crosby, Historical Architect assigned by the Denver Service Center to supervise the project under the overall direction of the Western Archeological Center, continued work using Denver, Tucson, and the Tumacacori area as his operating bases. The National Bureau of Standards installed the equipment needed to monitor crack motion and propagation in the church walls and dome. Although the Center paid for installation, the rather expensive instruments were loaned by the Bureau. The cause-and-effect relationship of moisture intrusion into the church walls was studied through the use of implanted moisture sensors. Both Harpers Ferry Center and private consultants continued to be involved in the project, primarily for pendentive conservation. By the end of the year, the bulk of the investigative and data gathering work for the Historic Structure Report had been completed. As mentioned previously in more detail, George Chambers began removal of extraneous materials that were a part of past stabilization work and had a deleterious effect upon the historic structure.

Fort Bowie National Historic Site

Historical Architect John Robbins, beginning work under an arrangement with the Denver Service Center similar to that for Tumacacori, moved forward quickly in determining the nature and extent of the preservation problems that exist, in budgeting and programming proposed work, and in arranging or coordinating arrangements for historical studies, Section 106 clearance, soil survey, materials studies, photogrammetry, and the like. At various times, he worked out of Denver, Tucson, Chiricahua, and Fort Bowie.

Contract Research Reports Received Calendar Year 1977

Clifton, James, R., Paul W. Brown, and Carl Robbins
The Physicochemical Properties of Adobe Building Materials -
draft, National Bureau of Standards, October 1977

Clifton, James, R., and Paul W. Brown
Methods for Characterizing Adobe Building Materials - draft,
National Bureau of Standards, October 1977

McCreary, Ted
Data on Routine Water Analysis on 1:5 Soil Extract/Solution
University of Arizona, April 1977

Martin, Charles E.
Test Results for Subsurface Investigation for Tumacacori National
Monument, Marco Soil and Foundation Engineers, November 1976

Nielsen, H. Norby
Consultation Regarding Puukohola Heiau Stabilization - one-
page report, University of Hawaii

O'Bannon, Charles E.
Stabilization of Prehistoric Adobe Architecture by Electro-
Osmosis and Base Exchange of Ions (A Feasibility Study -
(Final Report), Arizona State University (Tempe), October 1976

O'Bannon, Charles E.
Development of Weatherometer Apparatus and Testing Procedure
(Final Report), Arizona State University, April 1977

Sultan, Hassan A.
Evaluation of Soil-Cement Mortar Mixes, University of Arizona,
March 1977

National Park Service Research Reports Received Calendar Year 1977

Fenn, Dennis B.
Initial Report on Mud Plaster Preservation Research, Bent's
Old Fort National Historic Site, Western Archeological Center,
July 1977

Fenn, Dennis B.

Second Report on Mud Plaster Preservation Research, Bent's
Old Fort National Historic Site, Western Archeological
Center, November 1977

Fenn, Dennis B.

Second Annual Report on Chemical Stabilization of Pre-
historic Structures at Chaco Canyon National Monument,
Western Archeological Center, December 1977

D I V I S I O N
O F
I N T E R N A L A R C H E O L O G I C A L S T U D I E S
(WITH PHOTOGRAPHS)

Two archeological overviews have been completed, one for Death Valley, and the other for the Verde Valley. The Verde Valley report includes Tuzigoot, Montezuma Castle and Montezuma Well. Overviews provide background for the archeology of the parks, and can be used for evaluating future archeological needs, new archeological data and programming needs. The Western Archeological Center and the Regional Office have now completed 13 overviews and three more are in progress. Thirteen remain to be done in the Region.

Archeological surveys of mining claims in Lake Mead (4,261 acres, 55 sites) and Death Valley (11,500 acres, 80 sites), required by the new mining law, have been the biggest jobs of the year. Survey crews working out of the Western Archeological Center did most of the work. Only two relatively small areas were surveyed under purchase orders. In order to meet legal deadlines, most of this work had to be done in the summer.

Extensive surveys were done in



Helicopters ferried archeologists to and from otherwise inaccessible canyons.



Even on flat land, getting to the site could be a challenge.



On the shifting sands of Death Valley, Shanks Mare proved the most reliable transportation.



Pre-stabilization archeology at
Harmony Borax Works.



Recording a plateau site on land
adjacent to the Grand Canyon.

lands adjacent to Grand Canyon and Lake Mead for proposed boundary changes. Survey required by park enlargement at Grand Canyon totaled approximately 5 percent of 730 sections; 171 sites were recorded. A total inventory of sites (140) was made for 10,560 acres of National Park Service and Bureau of Land Management land adjacent to Lake Mead near Katherine Landing and Bullhead City. The survey was done to provide recommendations for boundary changes.

Last summer was the final field season for a sampling survey covering 15 percent of Canyon del Muerto at Canyon de Chelly National Monument. Eight hundred sites have now been recorded. The report will be completed by next summer.

The Division continued to provide archeological studies prior to stabilization. A full, detailed architectural study of the Great House at Casa Grande Ruins National Monument was completed as a basis for determining future approaches to stabilization. The author, David Wilcox, submitted the report in modified form as his Doctoral dissertation

at the University of Arizona. A full contour map of Tumacacori was made as part of the drainage plan and base map of the monument. The excavation report for Harmony Borax Works was completed and distributed.

The Division is devoting more time to cultural resource and data management, using information from recent surveys and overviews. An experiment in park support was begun this year by assigning a "circuit-riding" archeologist to Yosemite, Sequoia-Kings, Lassen Volcanic, and Whiskeytown during the maintenance and visitation season. The archeologist coordinated with park staff, giving orientation and training sessions, and providing archeological clearances. The purpose of this was to establish an effective system of

compliance and archeological services during the peak time of need. For these parks, the number of clearances increased from 10 for calendar year 1976, to 61 for calendar year 1977. Many of these, as well as recent survey data, are being used in the cultural resource management plan for Yosemite. In all of the parks of the Western Region 101 clearances were given, compared with 37 for last year. While very few projects examined could not be cleared, this shows an increasing awareness in all parks of the potential for impact on archeology by construction and maintenance. The efficiency of the clearance system is continuously improving and project schedules generally have not been disrupted.

Saguaro National Monument is being used as a pilot area to develop



A prehistoric site discovered by the Grand Canyon Adjacent Lands Survey.



An historic site: Keys' Ranch, Joshua Tree National Monument.



Surveying a baseline in preparation for aerial photography of Navajo Fortress, Canyon de Chelly National Monument; (below) describing a site discovered in a canyon above Death Valley.



effective procedures for cultural resource management. The Superintendent allocates operating funds annually for this purpose. In return, the Western Archeological Center provides clearances, regular monitoring of specified sites in heavy-use areas and detailed mapping of sites, and is developing a simplified manual system of maintaining accumulated records and maps of cultural resources. Students from the University of Arizona cultural resource management graduate program provide some of this work for credit at minimal cost to the Service. A purchase order has been issued to Pima College for survey of roads and trails in the Tucson Mountain section.

Fifteen National Register nominations have been drafted, or are being reviewed. University of Arizona graduate students have drafted four of these nominations for class credit.

A continuous activity is the preparation of reports for publication. Seven titles have been published in the Western Archeological Center series, Publications in Anthropology.

Three more, An Archeological Over-
view of Redwood National Park, An
Overview of the Historical Archeo-
logy of Joshua Tree National Monu-
ment, and Excavations at Antelope
House, are in final editing.

Ten new purchase orders were writ-
ten for a total of \$42,689. Eight
purchase orders and contracts,
totaling \$40,719, were closed.
Twenty-six contracts and purchase
orders, totaling \$134,830, were
active at the close of the year.
This is a 26 percent decrease in
contract work. In-House work, on
the other hand, increased approxi-
mately 200 percent, totaling
\$155,300.



Reports Received Calendar Year 1977

Brooks, Richard H., et al

A Historic and Prehistoric Reconnaissance of Four Mining Claims in Death Valley National Monument. University of Nevada, Las Vegas.

Curriden, Nancy T.

An Archeological Survey of Two Areas under Consideration for Proposed Boundary Revisions in the Lake Mead National Recreation Area: the Vicinities of Katherine Landing and Bullhead City. Western Archeological Center.

Fish, Paul R. and Suzanne K. Fish

Verde Valley Archaeology: Review and Prospective. Museum of Northern Arizona, Flagstaff.

Holmer, Richard N.

Archeological Survey of Exxon Leases, Grand Canyon National Park. University of Utah, Salt Lake City.

Johnson, Keith L.

Test Excavations at the Old Tower House Site (CA-SHA-192). California State, Chico.

McClellan, Carole and George A. Teague

Archeological Survey of Wahl-Yee Lease Properties, Lake Mead National Recreation Area. Western Archeological Center.

McDonald, James A.

Canyon del Muerto Survey Interim Report. Western Archeological Center.

McGuire, Randy

An Interpretive Summary of the Archeology of Organ Pipe Cactus National Monument. Western Archeological Center.

Schwartz, Douglas W.

The School of American Research Grand Canyon Archeological Project 1967-70: A Synthesis of Results. The School of American Research, Santa Fe.

Shenk, Lynette O.

Historical Archeology in Death Valley National Monument: Potentials for Further Research. Western Archeological Center.

- Teague, George A. and Carole McClellan
Archeological Reconnaissance of Lands Adjacent to Grand Canyon. Western Archeological Center.
- Teague, George A. and Lynette O. Shenk
Excavations at Harmony Borax Works: Historical Archeology at Death Valley National Monument. Western Archeological Center.
- Teague, Lynn S.
Letter Report: Archaeological Survey and Mapping, Quitobaquito Springs, Organ Pipe Cactus National Monument. Western Archeological Center.
- Wallace, William J.
Death Valley National Monument's Prehistoric Past: An Archeological Overview. Los Angeles County Museum, Los Angeles.
- Wilcox, David and Lynette O. Shenk
The Architecture of the Great House. Arizona State Museum, University of Arizona.

