

**NATURAL and CULTURAL
RESOURCES MANAGEMENT PROGRAM**

TUMACACORI
National Monument/Arizona


JUNE 1985 REVISION

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NATURAL AND CULTURAL RESOURCES

MANAGEMENT PROGRAM

JUNE, 1985 REVISION

AN ADDENDUM TO THE
NATURAL AND CULTURAL RESOURCES MANAGEMENT PLAN
FOR
TUMACACORI NATIONAL MONUMENT
ARIZONA

Prepared by
TUMACACORI NATIONAL MONUMENT
NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR

NATURAL AND CULTURAL RESOURCES MANAGEMENT PROGRAM


JUNE 1985 REVISION

TUMACACORI NATIONAL MONUMENT, ARIZONA

PREPARED BY:

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CONCURRED BY:

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APPROVED BY:


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SUMMARY

NATURAL AND CULTURAL RESOURCES MANAGEMENT PROGRAM

JUNE, 1985 REVISION

A Service-team completed a Natural and Cultural Resources Management Plan (N/CRMP) for Tumacacori National Monument in November, 1976. The Superintendent and staff worked with a team under the direction of Dr. Milton C. Kolipinski, Western Region Office and in primary consultation with Dr. Keith Anderson and other specialists from the Western Archeological and Conservation Center. That N/CRMP included an addendum, the Management Program. The Management Program was revised in December, 1980, and again in December, 1984.

This June 1985 edition represents the third revision of the original Management Program. The following items comprise this revision:

1. Cultural and Natrual Resources Projects Programming Sheet, listing each project's priority, requested funds, and work schedule for a five-year period.
2. Status List of Resources Projects.
3. Cultural Resources Overview and Needs.
4. Comments on Air Quality.
5. Project Statements.

The Management Program proposes projects for fiscal years 1985 through 1989. The Management Program will be revised and updated for a new five-year period by January 31 annually.

It was determined through public and National Park Service review of the 1976 N/CRMP, Environmental Assessment, and Management Program that proposed actions lacked potential to cause significant impacts on the human environment. In carrying out projects proposed in this 1985 revision of the Management Program, provisions of the National Enviromental Policy Act, National Historic Preservation Act, and Endangered Species Act will be complied with as they have been in the past. Because projects in this document were considered in the 1976 Environmental Assessment, no further consultation and/or documentation of enviromental impacts is necessary prior to project implementation.

Proj. No.	Project Title	Proj. Type	RMP Pri	SOAR Pri	10-237 No.	10-238 No.	Five Year Program Costs (in \$1000) and Fund Sources				
							Funded/New	Funded/New	Funded/New	Funded/New	Funded/New
							Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1	Mission Church Dome Rehab	CCyM	1	1	85-141	85-141	0/0	0/56 (CCyM)			
2	Rehab Visitor Center, Restroom, and Res. #1 Roofs	CCyM	2		85-142	85-142	0/0	0/86 (CCyM)			
3	Agricultural Study	S			83-800	83-800	0/0	0/8			
4	Communications & Trade Study	S									
5	Social Structures Study	S									

Note to reviewer:-
 These three historic study proposals, (Formerly 10-238#s 800, 801 & 802) were combined into a single 10-238 at the request of WR Historian, Gordon Chapell.

CCyM = Cultural Cyclic Maintenance Program

j.	Project Title	Proj ^t Type	RMP Pri	SOAR Pri	10- 237	10- 238	Five Year Program Costs (in \$1000) and Fund Sources ¹												
							No.	No.	Funded/New Funded/New	Funded/New Funded/New	Funded/New Funded/New	Funded/New Funded/New	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5		
1	Animal Control	Mit	1		N/A		1,85	2	2.23	2.48	2.23	2.48	2.7	2.7	2.7	2.7	2.7	2.7	2.7
2	Vegetation Maintenance	Mit	2		N/A		2.46	2.7	2.98	3.27	2.98	3.27	3.6	3.6	3.6	3.6	3.6	3.6	3.6

Notes: Natural Resource project types: MIT = Mitigation
Fund Sources: PB = Park Base

STATUS LIST OF RESOURCES PROJECTS

<u>Reference Number</u>	<u>Project Title</u>	<u>Status of Project</u>
H-1	Mission Church Dome Rehabilitation	Funding requested for FY86
H-2	Rehabilitation of visitor center, restroom, and residence #1 roofs	Funding requested for FY86
H-3	Agricultural Study	Unfunded
H-4	Communications and Trade Study	Unfunded
H-5	Social Structure Study	Unfunded
RM-1	Animal Control	On-going
RM-2	Vegetation Maintenance	On-going

CULTURAL RESOURCES OVERVIEW AND NEEDS

Beginning with an extensive archeological excavation in 1934-35, the subsurface ruins have been explored, but poorly documented until about 1970. However, recent salvage archeology associated with the historic structures preservation project has shown much remains to be learned from areas thought to have been damaged by early treasure hunters. An additional 5.86 acres were added to the monument in 1979. A surface survey of this property indicates deep plowing associated with farming activities has likely disturbed the provenance and thus the value of any remaining cultural resources. An excellent paper, "Archeological Assessment and Management Recommendations," prepared by Fratt in 1981, does much to place the subsurface resources in proper perspective.

A multi-disciplinary stabilization project which included considerable basic research on building materials by the National Bureau of Standards and others was begun in 1976 and completed in 1982. This \$450,000 project also funded extensive repair and minor restoration work. The primary goal of the project was to eliminate moisture from the adobe walls, and remove all Portland cement which was trapping moisture in the adobes. Protective shelters over the church corridor and the granary were removed during the project, and the remaining shelter over the extant portion of the convent was modified. During the last two years, nearly twice the normal amount of precipitation fell on these now unprotected structures. The result was the loss of as much as 7.5 to 10 cm of material from some areas of the corridor and granary. Regional cultural cyclic funding has been obtained, and repair work is on-going.

The unusually heavy precipitation of the last two years has taken a toll on the mission church dome. In spite of continual efforts by local maintenance forces to seal the exterior of the dome, moisture continues to enter. Obviously, this problem must be solved, and a recommendation has been made to erect a light weight covering over the dome to allow it to dry out before further attempts are made to treat the exterior. A 10-238 requesting funds for this project has been submitted for review.

The visitor center, restroom and residence #1 are all on the list of classified structures. All three buildings were reroofed with foam a decade ago. This foam has begun to deteriorate badly, and leaks are ever increasing. Again, a 10-238 has been submitted for review for new, built-up roofs for these structures.

Except for those items on display in the museum, nearly all collections have been moved to the WACC for proper storage. The collections statement is current, as is the museum catalogue.

The area's Historic Structures Preservation Guide has been completed and is in use. The Historic Structures Report is scheduled for printing by July 1, 1985. The stabilization specialist from the WACC will assist the area in inspections and follow up maintenance requirements.

Three socio-cultural studies have been identified which would add significant details to the interpretive base of the mission complex. The 10-238s are long-standing, and a better source for funding may be our cooperating association (Southwest Parks and Monuments Association.)

The General Management Plan identifies the need to acquire a small parcel of land outside the present boundary on a willing seller/buyer basis. This parcel contains faint surface ruins of the original mission garden wall.

A new 10-237 requesting the conversion of the WG-2 maintenance worker from six months subject-to-furlough to permanent, full-time has been submitted for review. This conversion would allow more time for the two more highly skilled maintenance workers to concentrate their efforts on maintenance of the historic structures on a year-round basis.

NATURAL RESOURCES OVERVIEW AND NEEDS

WATER RESOURCES NARRATIVE STATEMENT

This sixteen-acre monument contains no streams, lakes or wet lands. The terrain is nearly flat with only four meters difference in elevation as the land gently slopes from west to east. However, the monument is located only 900 meters from the Santa Cruz River, just above the flood plain. All potable water comes from a single well which is 46 meters deep.

Although we are rightly concerned about water quality, another obvious concern in the upper Sonoran desert environment is water quantity. In fact, the availability of water will likely be the single most limiting factor in the growth of this area in the next several decades.

Over-grazing of cattle on marginal federal, state, and private lands has contributed to increased water runoff during summer storms. Increased runoff is also accelerated by the loss of natural ground cover as paved roads, houses, parking lots, etc. continue to encroach on the 55,000 acre Rio Rico development which extends for twelve miles along the Santa Cruz River east and south of this monument.

Many hydrologists believe these factors have contributed to the increased frequency of flooding on the Santa Cruz River in the last fifteen years. Although the monument has never been threatened with inundation, there is a potential threat of ground water contamination as the Nogales sewage treatment plant is only eight miles upstream.

In October, 1977, a meter-wide sewer main at the treatment plant was washed out and raw sewage poured into the river for two weeks before repairs could be made. Monument well water was not used for drinking purposes during this period until several bacteriological tests could be made.

During the summer of 1949 and 1981, unusually heavy rains resulted in flooding of the monument grounds from the west as an arroyo overflowed. In both instances, water entered the visitor center lobby door and covered the floor. The flooding in 1949 left thirty centimeters of water on the basement floor and damaged the furnace.

With installation of a new water system in 1968 the quality and dependability of the monument's water supply was greatly improved. The new system included a new forty-six meter deep well, a 180,000 liter concrete reservoir, three new pumps, and a new distribution system. This system serves about 60,000 visitors annually and three families residing on the monument. Of the six million liters of water pumped each year, two thirds go for irrigation purposes. All water is chlorinated. The static water level of the aquifer underlying the monument is generally three to four meters below the land surface. This level is being monitored at three sites on the monument by the Service and the State of Arizona. All three wells (two inactive) were registered with the state in May, 1982.

A review of bacterial analysis of water samples (242 during the past ten years), shows there have never been two consecutive bad samples. The last

detailed chemical analysis was done in 1984. All primary drinking-water regulations were met.

The monument's sewer system was rehabilitated in 1976. A failing leach field was replaced with a new evapotranspiration system. A single 3,800 liter septic tank was not able to handle the entire system, so an abandoned 12,000 liter septic tank was rehabilitated and placed back in service.

Management will continue to monitor the depth of the water table and the quality of ground water as outlined in this narrative. Employees will be alert to possible sources of external contamination such as the 1978 flooding. Chlorination of the system and bi-monthly bacterial analysis will continue with immediate repeat sampling if a bad sample is detected.

AIR QUALITY NARRATIVE STATEMENT

This statement considers existing and potential impacts of deteriorating air quality on the monument's resources. It concludes with proposed objectives and actions to mitigate this external threat to the monument. A Project Statement will be prepared in the next revision of the Management Program.

I. The Significance of Park Resources - Air Quality Related Values

A. The importance of air quality to the monument

On this sixteen acre site there are obviously no panoramic vistas, but maintenance of air quality is essential in enhancing the visitor's experience.

The most important vista on the monument is from the "view room" containing a model of the mission community structures. Visitors standing around this model are afforded a dramatic view of the Franciscan church 200 feet to the north through the arched opening on the north wall of the "view room".

There have been a few days during the past year when strong east winds have carried sand and silt from the Santa Cruz River bed 0.5 miles to the east on to the monument scene. Not only is visibility reduced, these fine particles could be carried into the visitors eyes with unpleasant irritating results.

Wind-borne dust tends to settle on the walls of the historic structures, and over a long period of time, may have a minor deteriorating effect on the remaining original plaster.

B. Ambient air quality - existing and historic

Visibility in this general area has been and continues to be good. The exceptions have been during the last two years and are related to extensive flooding of the Santa Cruz River. Since the fall of 1977 when the river flooded extensive areas from Nogales to north of Tucson, the river has widened six fold in many areas. Large amounts of water-borne silt and fine sand were left in the greatly expanded river bed. When the wind blows in excess of 35-40 mph, these fine materials are carried as high as 500 feet into the air. Fortunately for the monument, the prevailing winds are from the south and southwest. As a result, only a few days during the year is this material carried into the monument's corridor. However, there are days when the vistas of the foothills of the Santa Rita Mountains to the east are partially obscured by these river bed dust storms.

Until 1968, trash was burned on-site. When this practice was discontinued and all refuse was hauled to the Tubac landfill, a major on-site source of air pollution was eliminated.

The two residential fireplaces, two oil-fired and four LPG furnaces, which are operated from November through March are the only on-site sources of air pollutants. The fireplaces and furnaces are responsible for emitting small amounts of particulate matter, carbon monoxide, nitrogen oxides, and

The State of Arizona has designated all Santa Cruz County for Class II Attainment status. There are no serious pollution sources which would require abatement in order to attain Class II status for the county.

B. Regional Influences

The infrequent visibility problem resulting from the expanded Santa Cruz River bed has been addressed. Another, more distant and less frequent source of particulate matter which can adversely affect visibility are the open pit copper mines north of Green Valley. After the ore has been processed the remaining materials are carried by conveyor belts to the top of enormous piles surrounding the processing plant. When the wind velocity exceeds 35-40 mph, these materials are carried into the air corridor for miles in a direction and to a distance depending on the direction and velocity of the wind. Attempts by the mining companies to establish control through vegetation and wetting have been minimally successful.

There are times when air inversion causes a pall of smoke and other particulates over the many square miles of greater Tucson. Only very infrequently would either of these sources have an adverse effect on this area's air quality. Only when the wind blows with a sustained velocity of 30+ mph from the north for several days does the visibility in this general area deteriorate. Because of the distance involved, twenty-six miles to the mines and fifty miles to Tucson, and the few times a year the wind blows hard enough and long enough from the north, these sources are not considered significant to adversely affect the resource.

Because of the prevailing wind direction out of the south and southwest any appreciable source of air pollution between the monument and Nogales, which is nineteen miles south, would have a detrimental effect on air quality. Most of the industry in Nogales is virtually free of serious air pollution problems and is currently dominated by assembly plants for components manufactured elsewhere.

The Rio Rico Development Corporation continues to make capital investments on a 55,000 acre tract east and south of the monument. As the area begins to grow with the population center eight miles directly to the south, the potential threat to the monument's air quality will increase. The deteriorating effect will be gradual and minor because the entire area has residential zoning except for the shopping center which will also expand as more lot owners begin to build on this property.

Farmers and ranchers occasionally burn off their fields, but this is not considered a significant contribution to decreased air quality.

Unless the monument's air quality should deteriorate considerably which could happen over an extended period of time as this area continues to grow as a population center, there would be no adverse effects on the natural or cultural resources. Any appreciable increases in toxic air borne pollutants could have an adverse effect on the remaining original interior plaster and painted decorations on the mission church.

III. Management Objectives - Air Quality Related Values

Maintenance of Class II designation within Santa Cruz County should assure a level of visibility and resource protection which is acceptable to management and the visitor. Management will have a continuing responsibility to monitor planned activities within the county which could have any negative effect on the air quality of the monument.

IV. Outline of Planning Requirements Summary

Because of the small size of this monument (10 acres; 18 acres as per the Omnibus Bill) air quality is obviously influenced in a large part by factors in the region. Management will take advantage of any monitoring done in the area by the EPA or state and county air pollution control agencies. Baseline data will be counted as part of the current stabilization project. These figures will be entered in the cultural and natural resources management plan when they are available. Also as a part of the stabilization project, conservators will make a recommendation concerning the potential threat to remaining original plaster and paint from appreciable increases in toxic air pollutants. If these identifiable pollutants are shown to increase in the future, more specific research could then be started.

PROJECT
STATEMENTS

CULTURAL RESOURCES PROJECT STATEMENT

PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.

PROJECT NAME AND NUMBER: Mission Church Dome Rehabilitation (TUMA-H-1)

STATEMENT OF PROBLEMS: With the completion of the major stabilization project in 1979, area maintenance forces followed the recommendation of the project architect in applying whitewash to the exterior of the church dome. During the first three years when precipitation was at normal or below, this treatment appeared satisfactory. However, during the last two years, with precipitation levels nearly twice the normal amount (including nine inches of rain in one three day period), moisture has entered the dome, causing deterioration of the interior surface. Architects from both WASO and the regional office have discussed the problem with WACC ruins specialists as well as management.

WHAT HAS BEEN DONE: Area maintenance forces have applied several white wash formulations following the various recommendations from specialists in the field of plaster conservation.

DESCRIPTION OF WORK TO BE UNDERTAKEN: A temporary scaffold type roof will be placed over the dome to allow the dome to dry before the dome is replastered under carefully controlled conditions to assure a water tight surface before the temporary roof is removed.

LENGTH OF TIME NEEDED: One year.

WHAT WILL HAPPEN IF NOT UNDERTAKEN: The National Park Service stands to lose not only a substantial investment in preservation work and money, but could lose as well, this element of an important historic structure.

PERSONNEL: The proposed work will be done on contract with a professional architectural and engineering firm being responsible for the design and construction aspects of the project. Oversight will be done by the historic architect from the Western Regional Office.

WHAT ARE THE ALTERNATIVES: On an interim basis, the exterior surface of the dome will be coated with a high quality, breathable masonry paint to protect it from the entry of moisture during the summer rains. This is not an acceptable long-term solution.

ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL	56,000				
Funds available in park base:	0				
Funds requested from Regional Office:	56,000				

On Form

Date Submitted

10-238

May 1, 1985

MANAGEMENT AND ASSESSMENT NEEDS: Structure is on the List of Classified Structures and the National Register, proper compliance procedures will have to be followed.

REFERENCES AND CONTACTS:

Hugh Miller, Historic Architect, WASO
Rick Borjes, Historic Architect, Western Regional Office
George Chambers, Ruins Stabilization Specialist, WACC
Tom Mulhern, Cultural Resources Preservation, Western Regional Office

DATE OF ORIGINAL SUBMISSION: May 1, 1985

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region

2. PROJECT NAME AND NUMBER: Rehabilitation of visitor center, restroom and residence #1 roof (TUMA-H-2)

3. STATEMENT OF PROBLEMS: Nearly twelve years ago, these roofs were coated with polyurathane foam. Even though they have been sealed continuously on a two year cycle since, the foam has begun to deteriorate badly. In some areas, water has penetrated the roof and seeped into the adobe walls, resulting in staining and possibly deterioration of the structural integrity of the walls.

4. WHAT HAS BEEN DONE: Area maintenance forces have removed several large sections of deteriorated foam, and replaced it with rolled roofing. This, however, is not a long-range solution.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The deteriorated foam will be removed from the three roofs, and replaced with built-up roofing and proper flashing.

6. LENGTH OF TIME NEEDED: One year.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: The foam will continue to deteriorate, allowing water to penetrate the roof in more places. This will further threaten the structural integrity of the buildings.

8. WHAT ARE THE ALTERNATIVES: No action. This is not an appropriate consideration for historic structures according to service preservation policies.

9. PERSONNEL: The proposed reroofing will be done on contract with a professional architectural and engineering firm being responsible for the design and construction aspects of the project. Oversight will be done by the historic architect from the Western Regional Office.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL	86,000				
Funds available in park base:	0				
Funds requested from Regional Office	86,000				

On Form

10-238

Date Submitted

May 1, 1985

MANAGEMENT AND ASSESSMENT NEEDS: Structures are on the List of Classified Structures and the National Register; proper compliance procedures will have to be followed.

REFERENCES AND CONTACTS:

Hugh Miller, Historic Architect, WASO
Rick Borjes, Historic Architect, Western Regional Office
George Chambers, Ruins Stabilization Specialist, WACC
Tom Mulhern, Cultural Resources Preservation, Western Regional Office

DATE OF ORIGINAL SUBMISSION: May 1, 1985

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.
2. PROJECT NAME AND NUMBER: Agricultural Study (TUMA-H-3).
3. STATEMENT OF PROBLEMS: A study of agricultural practices to provide interpretive information about life in this mission community. The study would attempt to determine the crops that were grown, the types of trees which comprised the orchard, the techniques and tools that were used in planting and harvesting, water supply and water use, the ways in which the produce was stored, etc. The research would determine what exotic plants were brought into the area during the mission period.
4. WHAT HAS BEEN DONE: Nothing.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The project will involve detailed historic and ethnographic research. Information will be presented in report form.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Failure to implement project would result in a lack of needed interpretive data. A complete and accurate picture of mission life could not be interpreted.
8. WHAT ARE THE ALTERNATIVES: No action.
9. PERSONNEL: The research will be conducted by a professional ethnohistorian from a qualified institution.
10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL:	2,500				
Funds available in park base:	0				
Funds requested from Regional Office:	2,500				

<u>On Form</u>	<u>Date Submitted</u>
10-23 ⁸	October 15, 1976

11. MANAGEMENT AND ASSESSMENT NEEDS: None.
12. REFERENCE AND CONTACTS:

Bernard L. Fontana, PhD; Arizona State Museum, Tucson, AZ.

Rev. Charles Polzer, S.J., PhD; 2844 E. First St., Tucson, AZ.

13. DATE OF ORIGINAL SUBMISSION: June 30, 1974.

14. DATE OF THIS REVISION: June 20, 1985

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.
2. PROJECT NAME AND NUMBER: Communications and Trade Study (TUMA-H-4).
3. STATEMENT OF PROBLEM: A communications and trade study is an area of needed research at Tumacacori. Such a study would add valuable information to the interpretive program and enhance the story told at the monument. This type of information is necessary if a true awareness of Spanish colonial history is to be imparted to the visitor.
4. WHAT HAS BEEN DONE: Nothing.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The purpose of the project is to determine the types of communications, trade and supply routes and methods of transportation used by the Spanish colonists in the Pimeria Alta between 1700 and 1821 A.D. Included in the study will be information on sources of supply, items involved, how requests were determined and made, payment, frequency of travel, what special problems were involved and the distribution of articles. Special emphasis will be placed on the Santa Cruz Valley.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Failure to implement this project would detract from the interpretive program at the monument and deprive the visiting public of a fuller understanding of the complexity of the Spanish colonial frontier.
8. WHAT ARE THE ALTERNATIVES: No action.
9. PERSONNEL: By contract.
10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL:	3,500				
Funds available in park base:	0				
Funds requested from Regional Office:	3,500				

<u>On Form</u>	<u>Date Submitted</u>
10-23 8	October 15, 1976

11. MANAGEMENT AND ASSESSMENT NEEDS: None.

12. REFERENCES AND CONTRACTS:

Bernard L. Fontana, PhD; Arizona State Museum, Tucson, AZ.

Rev. Charles Polzer, S.J., PhD; 2844 E. First St., Tucson, AZ.

13. DATE OF ORIGINAL SUBMISSION: June 30, 1974.

14. DATE OF THIS REVISION: June 20, 1985

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.
 2. PROJECT NAME AND NUMBER: Social Structures Study (TUMA-H-5).
 3. STATEMENT OF PROBLEM: Due to lack of information, the visitor is not aware of Spanish colonial influence and especially the role played by the mission community. This study will provide the information needed to help the visitor obtain a better understanding of the history of the area.
 4. WHAT HAS BEEN DONE: No complete or detailed work on this subject has ever been done at Tumacacori.
 5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The study will attempt to determine the types of interaction among the native inhabitants, colonists, military and mission community residents during the period from 1700 to 1821 A.D. It will discuss the composition of the class structures with all of its various members, levels and derivations.
 6. LENGTH OF TIME NEEDED: One year.
 7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Failure to implement this project will result in the lack of important interpretive information required to give the visiting public a better understanding of the Spanish colonial frontier.
 8. WHAT ARE THE ALTERNATIVES: No action.
 9. PERSONNEL: By contract.
 10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL:	3,000				
Funds available in park base:	0				
Funds requested from Regional Office:	3,000				
- | <u>On Form</u> | <u>Date Submitted</u> |
|----------------|-----------------------|
| 10-23 8 | October 15, 1976 |
11. MANAGEMENT AND ASSESSMENT NEEDS: None.
 12. REFERENCES AND CONTRACTS:
Bernard L. Fontana, PhD; Arizona State Museum, Tucson, AZ.

Rev. Charles Polzer, S.J., PhD; 2844 E. First St., Tucson, AZ.

13. DATE OF ORIGINAL SUBMISSION: June 30, 1974.
14. DATE OF THIS REVISION: June 20, 1985

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.
2. PROJECT NAME AND NUMBER: Animal Control (TUMA-RM-1).
3. STATEMENT OF PROBLEM:
 - a. Burrowing animals cause structural damage to archeological ruins and subsurface remains.
 - b. Burrows accelerate soil erosion problems.
 - c. Boring insects damage original structural woodwork.
 - d. Bats cause interior damage to plaster and painted walls.
 - e. A few animals may be hazardous to the health and safety of the park visitor.
4. WHAT HAS BEEN DONE:
 - a. Some control measures have been used on burrowing mammals:
 - 1) live-trapping
 - 2) sulfur bombs
 - 3) treated bait.
 - b. Church windows and doors have been screened or otherwise closed to eliminate entrance of bats.
 - c. Professional termite fumigation techniques.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN:
 - a. When feasible, live-trap rock squirrels and pocket gophers with removal from sites where potential damage may occur to standing and subsurface ruins, or cultivated plant species in the formal garden.
 - b. When live-trapping of pocket gophers is not successful, they will be controlled through use of snap-traps.
 - c. Termite control in historic wood will be maintained through use of appropriate termiticides.
 - d. Professional treatment of original woodwork in historic structures will be used to aid control of termites when necessary.
 - e. Species potentially hazardous to the health and safety of park visitors (especially black widow spiders) will be eliminated from high visitor use areas.

6. LENGTH OF TIME NEEDED: Continuous .
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:
- Gradual soil erosion.
 - Deterioration of historic resources.
 - Potential hazards to visitors.
8. WHAT ARE THE ALTERNATIVES:
- No action.
 - Use of other residual poisons.
9. PERSONNEL: Maintenance staff.
10. ADMINISTRATION AND LOGISTICS:

Funded from ONPS base

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL:	1,560	1,720	1,850	2,030	2,230
Funds available in park base:	1,560	1,720	1,850	2,030	2,230
Funds requested from Regional Office:	0	0	0	0	0

On Form

Date Submitted

Annually

11. MANAGEMENT AND ASSESSMENT NEEDS: None.
12. REFERENCES AND CONTACTS:
- Department of Zoology and Entomology; University of Arizona, Tucson, AZ.
- U.S. Department of Agricultural; Wildlife Management Specialist.
- Arizona Fish and Game Department.
13. DATE OF ORIGINAL SUBMISSION: June 30, 1974.
14. DATE OF THIS REVISION: June, 1985

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Tumacacori National Monument, Southern Arizona Group, Western Region.
2. PROJECT NAME AND NUMBER: Vegetation Maintenance (TUMA-RM-2).
3. STATEMENT OF PROBLEM: Control of grasses in the visitor use area is needed for fire hazard reduction and visual restoration. Removal of trees and large woody plants is necessary to preserve and protect the standing and subsurface historic structures.
4. WHAT HAS BEEN DONE: For the past 56 years the monument has pursued a program of routine mowing of grass in specified areas; cutting of dying trees to ground level; and sporadic hand pulling of weeds in visitor use areas.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: In areas known to contain subsurface remains and visible historic structures, trees will be removed and stumps chemically treated. Mowing the grass to a height of four or more inches will be accomplished by hand operated machinery to avoid unnecessary soil compaction. The remaining areas will be mowed and no trees will be removed unless dead or exotic. Aggressive measures will be taken to stop the encroachment on monument lands by the exotic Russian Thistle. Plants will be hoed or hand pulled before reaching seeding maturity.
6. LENGTH OF TIME NEEDED: Continuous.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:
 - a. Root damage to subsurface ruins.
 - b. Root damage to foundations of visible historic structures.
 - c. Penetration of PVC sheeting protecting church foundation.
 - d. Visual interference.
 - e. Fire hazards.
8. WHAT ARE THE ALTERNATIVES:
 - a. No action.
 - b. Use of herbicides and soil sterilant.
 - c. Mow entire area.
 - d. Cultivate walled garden as done by the Indians.
 - e. Restore historical irrigation ditch to working order.
9. PERSONNEL: Maintenance staff.

10. ADMINISTRATION AND LOGISTICS:

Funded from ONPS base

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
GRAND TOTAL:	2,040	2,240	2,460	2,710	2,980
Funds available in park base:	2,040	2,240	2,460	2,710	2,980
Funds requested from Regional Office:	0	0	0	0	0
<u>On Form</u>					<u>Date Submitted</u>
					Annually

11. MANAGEMENT AND ASSESSMENT NEEDS: None.12. REFERENCES AND CONTACTS:

Ruins Stabilization Unit, Western Archeological Center; Tucson, AZ.

13. DATE OF ORIGINAL SUBMISSION: June 30, 1974.14. DATE OF THIS REVISION: June, 1985

INTERPRETIVE ACTION TO SUPPORT RESOURCE MANAGEMENT PROGRAMS

All guided walks now include and will continue to include statements about the Service's commitment to continued preservation of the cultural resource through a variety of techniques and methods.

Included are the animal control project, and that portion of the vegetation maintenance project (some mechanical mowing) currently in operation. All other projects proposed are directly related to interpretation, and shall form an integral part of all future published materials and talks.

