

276

APPENDIX G

**CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED
CENTRAL ARIZONA PROJECT WATER
REALLOCATION PLAN**

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

**CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED CENTRAL ARIZONA
PROJECT WATER REALLOCATION PLAN**

Reclamation Delivery Order No. 99B8322810

Contract No. 1425-7-CS-32-02810

Archaeological Consulting Services, Ltd.
ACS Project No. 99-370
May 1, 2000

Table of Contents

Introduction.....	1
Project Area.....	1
Methodology	1
Culture History	3
Preceramic Period	3
Hohokam	4
Early Formative Period.....	4
Phoenix Basin	5
Tucson Basin.....	5
Late Formative Period.....	6
Phoenix Basin	7
Tucson Basin.....	7
Classic Period.....	9
Phoenix Basin	9
Tucson Basin.....	10
Salado.....	10
Sinagua	11
Anasazi	12
Basketmaker II.....	12
Basketmaker III.....	13
Pueblo I	13
Pueblo II.....	13
Pueblo III.....	14
Pueblo IV and V	14
Protohistoric Period	14
Historic Period	17
Affected Environment	19
Land Jurisdiction and Applicable Legislation.....	20
Entities	20
Indian Sector	20
Gila River.....	21
Tohono O'odham	21

San Carlos Apache	22
Navajo	22
Hopi.....	23
M&I Sector.....	23
Arizona Water Company–Apache Junction.....	23
Town of Superior/ Arizona Water Company–Superior.....	24
AVRA Water Cooperative.....	24
Cave Creek Water Company	24
City of Chandler	25
Chaparral City Water Company	25
Community Water Company of Green Valley	26
Vail Water Company	26
City of El Mirage.....	26
City of Glendale	27
City of Goodyear	27
H2O Water Company.....	27
City of Mesa.....	28
Metropolitan Domestic Water Improvement District	28
Town of Oro Valley.....	29
City of Peoria	29
City of Phoenix.....	29
City of Scottsdale	30
City of Surprise	30
City of Tucson	31
NIA Sector	32
Central Arizona IDD.....	32
Chandler Heights Citrus ID	32
Maricopa-Stanfield IDD	33
New Magma IDD.....	33
Queen Creek IDD.....	33
Roosevelt ID.....	34
San Carlos IDD.....	34
San Tan ID.....	35

Tonopah ID..... 35

Environmental Consequences 35

 Assessment of Impacts..... 35

References 39

CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED CENTRAL ARIZONA PROJECT WATER REALLOCATION PLAN

Introduction

Under contract to the United States Bureau of Reclamation (Reclamation), and at the request of Jon S. Czaplicki, Reclamation archaeologist and Contracting Officer's Technical Representative for Contract No. 1425-7-CS-32-02810, Archaeological Consulting Services, Ltd. (ACS) conducted a cultural resources overview of 35 entities—five tribal sectors, 21 water company service districts, and nine irrigation districts—that could receive new or additional water from a proposed reallocation of Central Arizona Project (CAP) water. The purpose of the overview was to provide Reclamation with an initial summary assessment of known and/or projected cultural resources in the entities that might be affected by the proposed reallocation.

Project Area

The project area consisted of 35 entities scattered throughout the state and encompassing a wide range of environmental and cultural characteristics. The tribal entities are herein collectively referred to as the Indian Sector, the water company service districts as the M&I Sector, and the irrigation districts as the NIA Sector. The affected environment of each entity—including land jurisdiction, known and projected cultural resources, applicable legislation, general assessment of impacts, mitigation measures, and recommendations—is discussed separately below.

Methodology

The first task was to prepare a summary culture history of the project areas to provide a historic context for the cultural resource data. As most of the entities are located within or near the Phoenix and Tucson metropolitan areas, the prehistory section emphasized the Hohokam; however, because the affected environment covers such a diverse area, brief discussions of the Anasazi (who occupied what is presently the Hopi and Navajo territory), and the Salado and Sinagua (whose material culture can be found throughout the northern Hohokam periphery) also were included. The protohistoric section contains brief ethnographic summaries of the relevant cultural groups that comprise the tribal entities. The historic section was structured so as to include as many potential historic contexts as are likely to be encountered in the various entities. It cannot be too strongly emphasized that the culture history section is intended to provide a background for the cultural resource information; in no sense should it be construed as all-inclusive of Arizona's rich and varied past.

Next, site and project maps on file at ACS, the State Historic Preservation Office (SHPO), and the Arizona State Museum (ASM) were checked to determine the extent of archaeological survey coverage and the location of known cultural resources for each entity, including the presence of archaeological and/or historic districts that are listed on the National and/or State Register of

Historic Places. It should be noted that other repositories throughout Arizona (e.g., the Bureau of Land Management (BLM), the Forest Service, Northern Arizona University) maintain their own site and project records, not all of which documentation is duplicated at ASM and SHPO. The cultural sensitivity designations derived from the map check must be understood as being not more than a starting point for estimating the magnitude of potential effects at this stage of the planning process.

The map check focused on non-urban areas, as defined by Reclamation. Information on specific site types and specific surveys were not desired at this stage of the planning process, nor did the limited time frame available to complete this overview allow for assembling data at such level of detail. Site locations were marked on USGS 7.5' topographic quadrangles. The classification system initially sought to identify areas of low (<2 sites per mi²), moderate (3 to 5 sites per mi²), or high (>6 sites per mi²) cultural resource density. However, the nature of human occupation in the project area is such that a single "site" might extend over an entire section; in such cases, the area was classified as having high or moderate cultural resource sensitivity based on the preparer's judgment. The cultural sensitivity data was then marked on entity maps provided by Navigant Consulting, Inc (Navigant).

Because of the highly sensitive nature of the information and confidentiality issues involving the various tribes, no attempt was made to obtain locational data regarding cultural resources or traditional cultural places on tribal lands. It should be noted that some USGS 7.5' topographic quadrangle maps on file at SHPO (e.g., Chuichu) are classified as restricted at the request of various Indian tribes whose lands might extend onto map boundaries; these maps could not be accessed without written permission from the tribes. Additionally, some maps were not on file at either ASM or SHPO (e.g., Arizona City); others were available only at one agency (e.g., Double Peak, available at ASM but not at SHPO). Data for the relevant portions of these entities that could not be found at either ASM or SHPO were derived solely from site and project information on file at ACS.

Surveyed areas were noted to estimate the current level of coverage for each entity. However, a comprehensive evaluation of the adequacy of survey coverage for each entity could not be addressed in the time allotted. Instead, representative examples of the types of archaeological work done in each entity were cited whenever possible. It should be noted that the presence of cultural resources in an area does not necessarily reflect extent of survey coverage; many sites that were mapped and recorded during the late 1800s and early 1900s are in areas that have not been systematically examined.

Planning department officials for each of the entities in the M&I Sector were contacted to ascertain the existence of local laws or regulations pertaining to the preservation of cultural resources. Some municipalities (e.g., Scottsdale, Mesa, Glendale, Tempe) have rules currently in place; others (e.g., Phoenix) are in the process of compiling written historic preservation plans to be implemented in cultural resource compliance projects. When available, this information was included in the entity descriptions.

Impacts were assessed based on known cultural resource density, extent of survey coverage, potential for buried deposits, and information regarding projected uses for the allocated water under each alternative that was provided to ACS. It was assumed that any change in land use (e.g., development of farmland), or ground-disturbing activity (e.g., pipeline construction), would potentially affect cultural resources. All relevant information for each entity is summarized in Table 1.

The overview was prepared by ACS project director Lourdes Aguila. ACS historic archaeologist Karolyn Jackman compiled the Historic period section. Research assistance was provided by ACS archaeologists Jerryll Moreno, Victoria Vargas, Beverly Goodman, and Lynn Scott. Maps were generated by ACS cartographer Christopher Brumfield using digital data supplied by Navigant and the Arizona Department of Water Resources (ADWR). Editorial and administrative supervision was provided by ACS principal investigator Margerie Green.

Culture History

Preceramic Period

The Paleoindian period (10,000–7,500 B.C.) represents the earliest known occupation of North America. Paleoindian lifeways were based on small, nomadic bands that followed megafauna and gathered wild plants. Sites from this period have been documented in southern Arizona (Cordell 1997; Haury 1950; Huckell 1982, 1984a; Mabry 1999). However, sediments dating to this period are generally not exposed in the Salt River Valley. No Paleoindian sites have been reported in the Tucson or Phoenix Basins, although isolated points have been found (Crownover 1994; Huckell 1984a).

The Archaic period (7,500 B.C.–A.D. 300/500) is divided into Early, Middle, and Late phases. Early Archaic (7,500–4,800 B.C.) people followed a generalized hunter-gatherer lifeway and a subsistence-settlement strategy involving high residential mobility, annual procurement rounds, and a wide interaction sphere. Sites of this period are characterized primarily by abundant concentrations of fire-cracked rock and diagnostic artifacts such as ground stone milling equipment—particularly one-hand manos and slab metates—and stemmed projectile points of the Jay, Ventana-Amargosa, San Dieguito, and Bajada types (Huckell 1996a; Mabry and Faught 1999). Few Early Archaic sites have been identified in the Tucson or Phoenix Basins.

The Middle Archaic period (4,800–1,500 B.C.) is perhaps the least understood period in Arizona prehistory (Huckell 1996a; Mabry 1999). In the Southwest, this time was characterized by alluvial cut-and-fill events (Waters 1986), lake desiccation (Waters 1989), hotter summers and cooler winters (Kutzbach et al. 1993), and perhaps lower effective moisture (Mabry 1999, although see Thompson et al. 1993). These processes have helped to destroy or deeply bury many Middle Archaic sites, hindering field identification and discovery. The traditional Chiricahua phase (Sayles and Antevs 1941; Sayles 1983) falls within the Middle Archaic period (Huckell 1996a). Only two sites—the

Arroyo Site and a 4,300 year-old site in the Tucson area—have produced radiocarbon dates associated with Chiricahua phase projectile point types (Bayham et al. 1986; Huckell 1996a, citing unpublished data). Other excavations of Middle Archaic sites in the Santa Cruz River Valley have yielded notched Elko and stemmed San Jose and “Pinto-like” projectile points (Mabry and Faught 1999). Recent ACS excavations of pit structures at AZ U:5:33(ASM) near Pima Freeway and Mayo Boulevard in north Phoenix yielded radiocarbon dates within the Middle Archaic period, the earliest occupation documented to date in the Salt River Valley (Berg et al., in preparation).

Middle Archaic sites include occupational surfaces, thermal or roasting pits, an abundance of fire-cracked rock, and sometimes middens (Bayham et al. 1986; Fish 1967). Only a few structures have been identified in the southwestern Basin and Range province (e.g., Huckell 1984b); several have been found in northern New Mexico. Structures are described as shallow and subcircular, measuring between 2.0 and 4.5 m in diameter, and sometimes containing ashy areas representing possible hearths (Berg et al., in preparation; Irwin-Williams 1973; O’Laughlin 1980). Although recent research has yielded new dates on maize, pushing its presence in the Southwest as early as 1,700–1,900 B.C. (Stevens 1999; Wills 1995), no evidence of corn horticulture has been found in Middle Archaic sites.

In the Late Archaic period (1,500 B.C.–A.D. 300)—also referred to as the Early Agricultural period (Huckell 1996b; Mabry et al. 1997; Mabry 1999)—populations began settling in semipermanent and/or permanent villages or circular pit houses where inhabitants focused on cultivating maize and foraging for wild plants (Fish et al. 1986; Huckell 1988, 1990; Mabry et al. 1997; Roth 1992; Wills and Huckell 1994). Diagnostic artifacts included corner-notched points and dart-point types with contracting stems, triangular knives, flake scrapers, and ground stone milling tools. Significant Late Archaic/Early Agricultural occupations have been reported from east-central and southern Arizona and in the Tucson Basin (Berry and Berry 1986; Clark, in preparation; Doyel 1993b; Haury 1957; Huckell 1984a, 1984b, 1990, 1996a, 1996b; Mabry et al. 1997; Matson 1991; Roth 1989, 1992; Whalen 1971). More recently, sites from this period have been reported along the Lower Salt, Middle Gila, and Lower Santa Cruz Rivers (e.g., Berg et al., in preparation; Hackbarth 1998).

Hohokam

Early Formative Period

The Early Formative period (A.D. 1–700) represents a pan-Southwest transitional stage characterized by a continuation of Late Archaic trends toward increasing sedentism and agricultural dependence, along with the introduction and widespread development of pottery (e.g., Berry 1982; Cable and Doyel 1987; Matson 1991; Wilson et al. 1993). From this basal culture, the distinctive cultural pattern known as Hohokam emerged on the Gila River around A.D. 300. Populations in the Tucson Basin maintained a local expression of this older tradition until about A.D. 700, when the Hohokam pattern flourished and spread its influence throughout most of central and southern Arizona (e.g., Deaver and Ciolek-Torrello 1993, 1995; Di Peso 1956, 1979; Hayden 1970). Because cultural development in

the two regions occurred at slightly different rates and bear different phase designations, they are discussed separately below.

Recent research has shed new light on Hohokam origins, chronology, and community organization (Crown and Judge 1991; Gumerman 1991; Noble 1991). Between 1930 and 1980, scientists hypothesized that the Hohokam immigrated from Mesoamerica and brought with them an economy based on irrigation agriculture (Gladwin 1948; Haury 1976; Schroeder 1966). However, although contacts with Mesoamerica were part of the Hohokam pattern—exemplified by red ware and red-on-buff ware ceramics, figurines, ball courts, mounds, and other objects—evidence now indicates that the Hohokam evolved in situ from the Archaic tradition.

Phoenix Basin

In the Salt River Valley, the transitional Red Mountain phase bridged the Late Archaic to the Vahki phase (Ackerly and Henderson 1989; Cable and Doyel 1987; Kenny 1987; Morris 1969). Cultural characteristics included flexed burials, basin metates, plain ware pottery, large corner-notched projectile points, and small square houses. Settlements were located near the rivers, and small sites occurred in the uplands. Subsistence included agriculture, hunting, and gathering (Doyel 1991a). Szuter and Bayham (1987) suggested that faunal assemblages from Early Formative sites were more similar to Archaic assemblages than those found at Hohokam sites.

Vahki phase traits included well-made plain wares; polished, slipped red wares; and clay figurines. Settlements consisted of large, segmented villages made up of small rectangular houses, square communal structures, and plazas. Both inhumations and cremations were represented. Sites were located near the river. Trough metates and an associated mano grinding complex appeared, suggesting increased reliance on corn agriculture (Cable et al. 1985; Doyel 1991a).

The Estrella and Sweetwater phases were characterized by pit house villages with plazas and red-on-gray, broad-line decorated and grooved ceramics. Use of crushed micaceous schist temper spread from the Gila River, overshadowing the earlier sand-tempered brown ware tradition. Because agricultural activities focused on floodplain farming—possibly incorporating ditch irrigation—riverine settings were favored (Cable and Doyel 1985:297–302). The Early Formative complex of pit house villages, grooved and decorated pottery, and floodplain agriculture was limited to the Phoenix Basin, although similar phases existed elsewhere (Doyel 1993a).

Tucson Basin

In the Tucson Basin, the Agua Caliente phase marked the beginning of the Late Archaic–Early Formative transition (Ciolek-Torrello 1995; Deaver and Ciolek-Torrello 1995; Whittlesey 1993). Emerging architectural and ceramic traditions showed a strong Mogollon-like character that contrasted sharply with later regional developments (Ciolek-Torrello 1995; Deaver and Ciolek-Torrello 1995; Huckell 1987; Whittlesey 1995). Pit houses were circular to oval in shape, with a wide range in size and formality of construction. Most houses had plastered hearths, well-defined

entryways with plastered pillars, and interior storage pits. Both inhumations and cremations occurred at some sites (Ciolek-Torrello 1995). Large communal houses also appeared at this time, suggesting increasing population and residential stability (Halbirt et al. 1993). Settlement patterns, however, continued to reflect the residential mobility characteristic of the Late Archaic period (Huckell 1990; Huckell and Huckell 1984).

Except for the introduction of sand-tempered plain ware ceramics, the material culture also remained very similar to that of Late Archaic farming villages (Chapman 1977; Halbirt 1987; Huckell 1993; Parry and Kelly 1986). Agua Caliente phase “incipient” ceramics were limited in size and form, suggesting a narrow functional range mostly concerned with storage of small quantities of dry seed (Deaver and Ciolek-Torrello 1995; Mabry 1998). Although corn was present in Tucson Basin Early Formative contexts, the continuity of Late Archaic material culture and settlement-subsistence strategies suggest Early Formative populations were not dependent on agriculture (e.g., Gish 1989; Miksicek 1989, 1992; Whittlesey 1995). Hunting and exploitation of a wide variety of wild plants—including agave, amaranth, and acorns—were emphasized (Cairns 1993; Cummings 1993; Huckell 1995; James 1989, 1992).

The subsequent Tortolita phase was characterized by the emergence of distinct regional trends. Slipped and polished red wares were added to the ceramic complex. New vessel forms also appeared, suggesting that ceramics were being adapted to a variety of functions besides grain storage. Hallmark Hohokam manufacturing techniques and forms such as flare-rimmed bowls were present at some sites. Larger, more formally constructed subrectangular houses-in-pits replaced earlier, Mogollon-like circular pit houses. Semi-flexed inhumations predominated. A more diverse ground stone assemblage included slab metates, mortars, pestles, axes, polishing stones, manos, and tabular knives, while the chipped lithic artifacts reflected the expedient technology characteristic of later Hohokam assemblages (Bernard-Shaw 1990; Deaver and Ciolek-Torrello 1995; Eppley 1990).

The end of the Tortolita phase is marked by the introduction of brown pottery with broad-line, geometric designs executed in red paint. Local plain and red wares were still primarily sand-tempered, but small-scale local production of wares tempered with crushed gneiss or mica also occurred. The presence of Gila Basin Hohokam types—such as Vahki Red, Estrella Red-on-gray, and Sweetwater Red-on-gray—indicates interregional contact. No substantiated occupations have so far been associated with this (as yet unnamed) phase (Deaver and Ciolek-Torrello 1995).

Late Formative Period

The Late Formative period (A.D. 700–1075) is marked by the appearance and initial expansion of the Hohokam regional system, which culminated in the Classic period complex of ball courts, cremation mortuary rituals, and associated distinct pottery styles (Deaver and Ciolek-Torrello 1995; Wilcox 1979a, 1988; Wilcox and Sternberg 1983). Prior to the Snaketown phase, the Tucson and Gila Basins

appear to have followed parallel but essentially independent trajectories; artifact associations dating to this time suggest reciprocal exchange. However, during the Late Formative period, the growing influence of the Gila Basin Hohokam dramatically altered the pottery traditions and regional cultural dynamics of Tucson Basin populations.

Phoenix Basin

The Snaketown phase was characterized by regional expansion and rapid cultural change (Doyel 1991a). Settlements grew and irrigation systems became more complex. Regional deployment of irrigation technology opened new agricultural lands on the lowlands as well as on the terraces away from the river floodplains. Rockpile sites may have appeared, indicating development of nonirrigated agriculture (Cable and Doyel 1985). Settlement patterns and ceramic types also changed. Trash mounds and capped mounds were established near houses clustered around courtyards (Haury 1976:81; Wilcox et al. 1981:204). Dull red-on-gray decorated pottery gave way to a light, lively red-on-buff ware, and vessel shapes and design styles diversified. Cremation became the dominant burial mode, and worked stone objects and clay figurines were associated with death rituals (Haury 1976).

By the Gila Butte phase, ceremonial ball courts were constructed at villages in southern and central Arizona. Eventually more than 200 ball courts were built, most dating to the Santa Cruz and Sacaton phases (Wilcox and Sternberg 1983). Settlement hierarchies were established along valley irrigation systems. Village structure became more formalized, consisting of central plazas surrounded by mounds, house clusters, and cemeteries (Gregory 1991; Haury 1976; Wilcox et al. 1981). Platform mounds, macaws, copper bells, mosaic mirrors, and shell trumpets, representing a Mesoamerican influence, have been found (Cable and Doyel 1987; Doyel 1991c; Wilcox 1979a).

Similar settlement patterns persisted into the Santa Cruz and Sacaton phases. Some villages grew; others were established. The culture spread into areas where canal irrigation was not possible, a process referred to as “niche packing” (Cordell et al. 1994). Public architecture included small, oval-shaped platform mounds surrounded by palisades (Gregory 1987) and plazas. Villages containing ball courts were found every 5–7 km along canal systems in the Phoenix Basin (Gregory 1991). The ball court system expanded beyond the Phoenix Basin in the Sacaton phase. By the end of the Late Formative period, however, some ancestral villages, including Snaketown, were abandoned and/or reorganized (Doyel 1980, 1981; Gregory and Huckleberry 1995).

Tucson Basin

In the Tucson Basin, the Snaketown phase was marked by the spread of hachure-decorated pottery and an increase in the use of crushed micaceous temper, reflecting increasing influence from the Gila Basin. Few changes were apparent in the flaked stone assemblage, but the ground stone tool kit

included trough metates, plain and carved effigy bowls, and three-quarter grooved axes. Structures ranged from semicircular to rectangular with long vestibule entryways. Standardized cremation rituals were common, with burials often located in special crematory areas (Deaver and Ciolek-Torrello 1995).

The Cañada del Oro and subsequent Rillito phases were characterized by a steady rise in population and increased residential stability. The frequency and diversity of agricultural features also increased (Doyel 1977a, 1977b; Masse 1979; Woosley 1980). Sites on the upper terraces of the Santa Cruz River, in bajadas, and in mountain areas depended on dry farming and other subsistence adaptations, while floodplain sites emphasized reliance on floodwater and irrigation agriculture, and exploitation of riparian resources (Masse 1980a, 1980b; Mayberry 1983; Wilcox et al. 1981). Ball courts—indicating social integration with the Gila Basin Hohokam—first appeared in the late Cañada del Oro and reached their maximum expansion in the Rillito phase. However, although imported red-on-buff wares were present at most sites, most ceramic assemblages were dominated by the local red-on-brown wares, suggesting much of the growth during this time was a result of local demographic processes rather than an influx of populations from the Salt-Gila area (e.g., Doyel 1977a, 1977b; Wasley and Doyel 1980). Intrusive ceramics also point to contacts with Sonora, the San Simon Valley, and the Mogollon culture areas.

The Rincon phase, viewed as the height of the Tucson Basin Hohokam occupation, was characterized by initial population expansion and residential stability accompanied by rapid culture change (Betancourt 1978; Doyel 1977b; Wallace 1986). Population was concentrated mainly on the west side of the Santa Cruz River. The number of sites increased, and many large sites had at least one ball court (Doelle and Wallace 1991). By the Middle Rincon phase, settlement was more dispersed, with many small hamlets replacing the earlier large villages. Increasing independence from the Gila Basin was reflected in decreased buff ware imports and the apparent collapse of the regional ball court system. Late Rincon developments included multi-dwelling walled compounds, a shift toward inhumation burials, production of local polychrome and red wares, and use of geometric motifs in ceramic decoration—yet another divergence from the traditional curvilinear designs of the Gila Basin Hohokam (Doyel 1979; Greenleaf 1975; Kelly 1978; Wallace 1986; Zaslow and Dittert 1977). Settlements spread to the east side of the river and onto the floodplain. Late Rincon phase ceramics have been firmly associated with *cerros de trincheras*, interpreted as possible defensive features.

Classic Period

Phoenix Basin

In the Classic period settlement patterns, site structure, architecture, and material culture changed. By A.D. 1300 many Hohokam characteristics disappeared or were significantly altered. Available data reveal demographic dominance shifted from the Middle Gila to the Lower Salt (Cordell et al. 1994; Wilcox and Sternberg 1983:239). More platform mound communities were constructed along the Lower Salt than the Middle Gila (Gregory 1987). Multivillage communities along irrigation systems were common. House clusters often were grouped within walled compounds. Building styles included aboveground and pit house structures that were post-reinforced, rock-reinforced, or solid caliche-adobe. Mounds, compounds, plazas, and house clusters comprised the large villages, whereas small settlements contained house clusters or compounds, trash mounds, and cemeteries. After A.D. 1300 contiguous room structures and multistoried great houses were built.

Clearly defined settlement hierarchies existed within the Lower Salt and Middle Gila Valleys. Site types included primary and secondary centers containing platform mounds, villages without mounds, hamlets, farmsteads, field houses, and special-function loci such as resource acquisition and processing sites. Public architecture shifted from ball courts to elevated platform mounds topped by structures (Doyel 1980, 1991a). Platform mound villages may have been administrative and ritual centers that also served as hubs for regional interaction (Doyel 1981, 1991c; Gregory 1987). By the late Classic some platform mounds became residential loci that may have housed elite groups; other mounds retained their ceremonial functions (Doyel 1974a, 1991b; Gregory 1987).

Regional interaction patterns altered in the Classic period. Procurement networks for exotic marine shell, pottery, and obsidian underwent restructuring (Doyel 1991c; McGuire and Howard 1987), and ceramic styles changed. Buff ware production dropped drastically, being replaced by polished red wares. Salado polychrome pottery was common after A.D. 1300. Burial patterns diversified and included both cremation and inhumation. Some villages used only one burial method, whereas others used both. These variable patterns may reflect divergent ideologies (Doyel 1981).

The late Classic period (A.D. 1350-1450) was marked by a collapse of the complex Civano phase social system and the abandonment of the extensive Phoenix Basin settlement system (Doyel 1981; Haury 1945). A Polvorón phase has been proposed for the period between A.D. 1350 and 1450 (Crown and Sires 1984; Sires 1984), which is characterized by solid adobe structures and shallow pit houses lacking enclosing compounds. The solid adobe houses might represent reuse of Civano phase structures. Polished red ware and Salado polychrome pottery were abundant, as was obsidian. The distribution of sites suggests varied subsistence strategies, which might have included irrigation. Polvorón components have been identified at many sites in the Lower Salt and the Middle Gila (Aguila, Larkin, and Giacobbe 1998; Andresen 1985; Doyel 1991b; Sires 1987).

Tucson Basin

The sweeping changes that marked the early Classic period in the Phoenix Basin were evident in the Tucson Basin during the Tanque Verde phase (Elson 1986; Fish et al. 1992; Wallace and Holmlund 1984). Many of the changes represented elaborations of earlier local trends, including continued divergence in ceramic decoration, increase in the use of smudging, proliferation of red wares, the spread of walled, multi-structure domestic compounds, the emergence of platform mounds, and variability in burial practices (Doelle and Wallace 1991; Greenleaf 1975; Kelly 1978; Mayberry 1983; Zaslów and Dittert 1977). Household size variation increased. Occupational as well as stylistic continuity are indicated by the presence of sites with both Rincon and Tanque Verde phase components. New sites proliferated on the east as well as the west side of the river, and large roasting pits—associated with agave processing—became a common feature of sites in nonriverine settings (Doelle and Wallace 1991). While the incidence of Gila Basin Hohokam ceramic types steadily decreased, intrusives from other areas increased, suggesting an apparent realignment of interregional exchange patterns.

The Tucson phase was characterized by population aggregation into a few large, integrated central communities with platform mounds. Use of large roasting pits and other nonriverine agricultural features declined. There was strong ceramic continuity; only relatively rare polychrome and intrusive types are diagnostic to this time (Doelle and Wallace 1991). It has been hypothesized that the combination of aggregation and continuity of local traditions were a result of increasing social differentiation—perhaps leading to warfare—both within individual settlements and between groups in different regions of the Hohokam area (e.g., Craig and Douglas 1984; Doelle and Wallace 1989, 1991; Downum 1986; Wilcox 1979b).

Salado

The concept of Salado as a distinct phenomenon was initially conceived by Emil Haury (1932) and Harold and Winifred Gladwin (1935) while conducting early archaeological research in the Tonto Basin—the heartland and “core” of the Salado horizon during the Classic period (Doyel 1976a). Over the next sixty years, the interpretation of *Salado* underwent repeated revisions (Clark 1998). It has been variously described as a local Hohokam derivative (Doyel 1976a; Steen 1962; Wood and MacAllister 1982), an introduction of a nonlocal Puebloan derivative (Gladwin and Gladwin 1935; Whittlesey and Reid 1982), a partial mixture Puebloan and Hohokam (Clark 1997; Haury 1945), an elite material culture overlay (Rice 1990), a mixture of Hohokam and Sinagua (Schroeder 1953), a corporate regional cult (Crown 1994), or a distribution of decorated ceramics (Nelson and LeBlanc 1986). As a phenomenon, Salado crosses and changes previous cultural boundaries (Clark 1998).

Early Classic period (A.D. 1150–1325) settlement in the Salado area is typified by aboveground masonry architecture in dispersed compounds with internally segmented, discrete layouts (Clark

1995:278-285). Sites of varying size and complexity have been recorded, such as farmsteads, hamlets, small villages, and platform mound sites. The latter appear abruptly in the region, overlaying existing settlement composition (Craig and Clark 1994:112-165; Doelle et al. 1995:439).

Late Classic period/Gila phase (A.D. 1325–1400) settlements exhibit marked changes from the Early Classic period. The number of sites decreases and settlement size increases, reflecting a level of aggregation previously unknown in this region (Clark 1998:11). Increased warfare is evidenced by major episodes of burning and hasty abandonment leaving large floor assemblages intact. Overall, settlement locations and site layouts indicate an increased need for defense (Clark 1998:11).

Sinagua

The name Sinagua is used to describe the prehistoric cultural tradition found in the Flagstaff vicinity (Colton 1946; Cordell 1997; Pilles and Stein 1981). Unlike the Hohokam, Anasazi, and Mogollon, the Sinagua tradition does not represent a new inventory of cultural traits but rather was a complex blending of elements that have been variously interpreted. While some Sinagua traits, such as rock-tempered, predominantly paddle-and-anvil finished plain brown pottery and masonry-lined pit houses, appear distinctive from those of their Anasazi, Hohokam, and Mogollon neighbors, others show significant similarities, including Anasazi-like black-on-white painted ceramics, Hohokam ball courts and canal irrigation, and late Mogollon-like pottery and architecture (Cordell 1997).

Colton (1946, 1968) divided the Sinagua into a northern and southern manifestation primarily on the basis of environment. The Northern Sinagua inhabited the area north of the Mogollon Rim; whereas the Southern Sinagua occupied the area south to the Verde Valley. The earliest agriculturalist adaptation of the area was characterized by isolated, small pit houses with plastered floors, formal hearths, and large, bell-shaped storage cists (Breternitz 1958, 1960; Fish and Fish 1977). Artifacts included oval manos, grinding slabs, and a paucity of pottery (Pilles and Stein 1981). Associated ceramic types include Snaketown Red-on-gray, Gila Butte Red-on-buff, Lino Gray, and Lino Black-on-gray (Breternitz 1960; Pilles and Stein 1981; Schroeder 1960).

By A.D. 800, Sinagua-style pit houses appear concurrently with house-in-a-pit structures similar to those of the Hohokam Santa Cruz and Sacaton phases (Breternitz 1960; Fish and Fish 1977; Pilles and Stein 1981; Schroeder 1960). Established agricultural villages—some very large—occur (Pilles and Stein 1981). The largest settlements had mounds, ball courts, and possibly communal structures (Pilles and Stein 1981). Canal irrigation, as well as dry-farming techniques, were used (Breternitz 1960; Pilles 1978; Pilles and Stein 1981). Hunting, and the collection of resources such as freshwater mussels and turtles, also were important activities. Decorated ceramics include Santa Cruz Red-on-buff and northern gray and white ware types. Plain wares include variants of Verde Brown (Breternitz 1960) and Rio de Flag Brown (James 1974).

Although canal irrigation continues, Hohokam-like traits disappear by A.D. 1125, replaced by a variety of traits representing a discontinuity with the previous century. Settlements were moved to elevations above riverine locales. In the uplands, cliff dwellings and large villages such as Hidden House, Honanki, and other sites in the Sedona area, suggest year-round residence in the canyons. Structures identified as "forts" and characterized by thick, sometimes rubble-filled perimeter walls with interior individual or contiguous rooms, often occurred on points at canyon intersections along the Mogollon Rim or on eminences near streams in the lowlands (Pilles and Stein 1981). After A.D. 1200 there is evidence of exploitation of a wider range of plant and animal species (Breternitz 1958, 1960; Shutler 1950), perhaps indicative of regional climatic change triggered by the series of volcanic upheavals, beginning in A.D. 1064, that resulted in Sunset Crater (Breternitz 1960; Colton 1960; Cordell 1997; Pilles 1979).

After A.D. 1300, populations apparently consolidated into a few large, often multi-storied, masonry pueblos—such as Tuzigoot, Montezuma Castle, Sacred Mountain, and Clear Creek Ruins—located primarily in the lowlands, close to rivers and streams (Pilles and Stein 1981). Most of these major pueblos had kivas and a large community room; some major pueblos also had defensive traits such as parapet walls, small doorways, and sealing of outside doors (Pilles and Stein 1981). Major pueblos continued to use irrigation ditches, and large agricultural systems have been documented in the vicinity of Clear Creek Ruins and Sacred Mountain (Midvale 1920-1971). Intrusive ceramics indicate active trade with people in the Hopi, Winslow, and Chavez Pass areas (Colton 1957; Pilles and Stein 1981). Fabric remains found in caves and cliff dwellings indicate the Southern Sinagua were master weavers and probably traded cotton or cloth to other groups (Pilles and Stein 1981).

Like other areas of the Southwest, the Verde Valley appears to have been virtually abandoned by A.D. 1425. Various causal factors have been proposed, including drought, water logging, or degradation of soil, disease, invasion, and the dissolution of established trade networks, but no direct explanatory evidence has been discovered. It seems most likely that a combination of some or all of these factors contributed to the eventual abandonment of the Sinagua region.

Anasazi

The Anasazi developed out of the Oshara Tradition (Irwin-Williams 1973) and other late Archaic groups that were practicing incipient agriculture in the northern Southwest. Although local phase sequences have been developed for many areas, the Pecos Classification—the first chronology devised for North America (Kidder 1927)—is still used for consistency.

Basketmaker II

The Basketmaker II period (600 B.C.–A.D. 400) marked the Late Archaic-Early Formative transition in the Anasazi area, characterized by permanent villages, the spread of agriculture, and the use of

ceramics. General traits of the period included the atl-atl, one-hand manos and shallow grinding slabs, cists, corner- and side-notched projectile points, and hard cradleboard burials. Artifacts, known primarily from dry cave sites, included a great variety of basketry and textiles woven from various raw materials. Sites were located on terraces near major drainages and near arable land (Cordell 1979; Hooton 1930; Jennings 1978; Judd 1922; Judge 1982; Vivian 1970, 1984).

Basketmaker III

In the Basketmaker III period (A.D. 400–700) there is evidence of *in situ* continuity from Basketmaker II. Innovations included pit houses, the bow and arrow, two-hand manos and trough metates, gray and early red-slipped ceramics, and an increasing dependence on agriculture (Cordell 1997). Sites ranged from caves and alcoves to villages with multiple room blocks and specialized activity sites (Reed 1999). Pit houses were shallow, had antechambers, and often were located near deep, well-watered soils in alluvial valleys and uplands. Kivas, possibly even Great Kivas, appeared about this time (Cordell 1997; Jennings 1978). The spread of ceramics was accompanied by a decline in basketry manufacture, although twined bags and coiled basketry continued to be produced (Jennings 1978). Modest quantities of painted and unpainted gray ware ceramics, produced by the coil-and-scrape technique, were decorated with incising and corrugation to resemble basketry (Cordell 1979, 1997; Jennings 1978).

Pueblo I

The Pueblo I period (A.D. 700–900) was characterized by the extensive use of surface rooms and masonry pueblos. However, the number of sites remains stable, suggesting little population growth. Kivas became common, and production and use of neck-banded gray ware and early black-on-white painted ceramics – no longer mimicking basketry designs – became widespread (Cordell 1997). Most settlements were small, with large site clusters occurring at higher elevations and associated with large, alluvium-filled valleys (Cordell 1979, 1997; Hooton 1930; Jennings 1978; Judge 1982; Judd 1922; Vivian 1970). Towards the end of this period, the trend in settlement location shifts away from mesa pinnacles toward valley floors, possibly as a response to full-time reliance on domesticated crops (Baker 1991; Cordell 1997).

Pueblo II

The Pueblo II period (A.D. 900–1100) is understood as the peak of Anasazi cultural development; this was also the time of greatest population dispersal in the prehistoric Southwest. There is a dramatic increase in site frequency. General traits included large, complex sites composed of multiple-room masonry structures with associated kivas and formalized middens; elaborately decorated pottery;

and extensive exchange networks and the development of alliances (e.g., the Chacoan Regional System) (Cordell 1997; Judge 1991; Plog 1983). The introduction of a more productive strain of maize coupled with favorable climatic conditions led to more sophisticated agricultural adaptations, including water-control features (e.g., check dams, stone grids), canal irrigation, and reservoirs and ditches for household use (Cordell 1997; Jennings 1978; Judge 1982). Luxury trade items such as turquoise, macaw feathers, and conch shell (*Strombus* spp.) indicate far-reaching contacts and a vehicle for both the assimilation and distribution of new ideas (Cordell 1979, 1997; Jennings 1978).

Pueblo III

During Pueblo III times (A.D. 1100–1300) most of the Colorado Plateau saw the culmination and termination of its Anasazi occupation, marked by the collapse of the Chacoan system around A.D. 1175 (Cordell 1997; Judge 1989; Reed 1999). By A.D. 1250, the cultural continuity that characterized the early part of the Pueblo III period gave way to new trends. Population was consolidated and aggregated into fewer and larger sites. Defensible locations were preferred, suggesting warfare (Cordell 1997; Gumerman and Dean 1989; Haas 1986; Upham and Reed 1989). The end of the period saw widespread abandonment of habitation sites across the Colorado Plateau.

Pueblo IV and V

During the later Puebloan periods, western Anasazi populations concentrated into a few locations in the Hopi, Zuni, and Little Colorado areas (Cordell 1997; Upham 1982). Although the greater region continued to be used, it was not permanently reoccupied until the arrival of the Navajo in the Protohistoric period.

Protohistoric Period

The Protohistoric period (A.D. 1519–1692) is defined as the time between the conquest of Mexico, when European influences were first being felt in the Southwest, to the reconquest of New Mexico after the Pueblo Revolt, which signaled the establishment of a permanent European presence in the New World. The cultural parameters of this definition include the Spaniards and at least 20 Native American groups representing at least six language families. The cultural affiliations of the tribal groups, however, were not fixed entities but changed throughout the Protohistoric period as a result of biological and cultural exchange between groups (Brugge 1963, 1981; Carlson 1965; Gilpin and Phillips 1998).

Comprehensive coverage of the Protohistoric and Historic periods for all the native cultures represented in this project is beyond the scope of this overview. What follows are brief summaries of the early culture history of the major tribal groups relevant to this study, with emphasis on the types of archaeological and historic properties that might be encountered within the various entities.

After about A.D. 1300, prehistoric Arizona populations were affected by many fundamental changes. Many permanent villages were abandoned. Hohokam populations dispersed from nucleated villages to ranchería-style settlements. Immigrant groups—including Apaches, Navajos, Utes, Paiutes, and Spaniards—began to arrive and compete for territory and resources. When Spanish missionaries entered Pimería Alta, they encountered several distinct groups of O'odham people: the Sobaipuri, the Akimel O'odham (Pima), the Tohono O'odham (Papago), and the Hia Ced O'odham (Sand Papago). Various scholars (e.g., Crosswhite 1981; Fontana 1974; Hackenberg 1974) have concluded that the cultural variation and historic distribution of these groups was a result of differential adaptation to various ecological niches.

In Arizona, the ancestral Pima occupied the Salt, Gila, and lower Santa Cruz River Valleys. Although their origins are still the subject of debate (e.g., Hadley and Sheridan 1995:8-10), the Pima or Akimel O'odham are most likely descended from the Hohokam. However, in contrast to the Hohokam, early Piman settlements were characterized by a relatively simple system of nonirrigated agriculture, heavy dependence on hunting and gathering, and dispersed ranchería settlements. At least six Akimel O'odham villages were located along the Gila River west of Casa Grande ruins; another village was established along the Santa Cruz River near Picacho Peak. Villages were made up of a community house and various family compounds that included single-family homes, food storage structures, a ramada, a cooking windbreak, and a menstrual hut (Bahr 1971, 1983; Ezell 1961, 1963a, 1983; Gilpin and Phillips 1998; Gladwin et al. 1938). Early Piman material culture included pottery, basketry, and the weaving and trading of cotton blankets. Long-distance trade—as well as endemic warfare triggered by shifting alliances—was maintained with the Pueblos, the Pi-Posh (Maricopa), Cocopa, Quechan, and other groups (Doelle 1984; Ezell 1983; Kroeber and Fontana 1986; Riley 1987). After Spanish contact, wheat and other introduced elements, including horses, cattle, and other livestock; metal implements; irrigation farming; extensive trade; and slave raiding became common. Epidemics caused by European diseases combined with Apache raids resulted in the abandonment of settlements near Picacho Peak during the early 1700s; these groups appear to have relocated to the Gila and Lower Santa Cruz River areas (Doyel 1989).

An important aspect of Piman settlement was their close alliance with the Maricopa (Pi-Posh), an amalgam of Yuman-speakers from the lower Colorado and Gila River Valleys who moved into and shared a territory with the Pima (Ezell 1963b; Schroeder 1954, 1961). Maricopa villages consisted of loose household clusters. Most domestic activities were conducted under a ramada. Other features included large, central meeting houses; sweat lodges; small, oval pit structures for storage; basket-like granaries on raised platforms; and brush seclusion huts (Bartlett 1854; Spier 1933). Each household cluster was led by a headman; a chief and subchiefs also existed, but had limited authority. War leaders, curers, and historians, the latter keeping calendar sticks, provided additional leadership (Harwell and Kelly 1983). The Maricopa farmed, hunted, gathered wild seeds, especially mesquite, and fished the rivers from boats, using nets and traps. Material culture included cotton weaving, paddle-and-anvil pottery, slab or trough metates (sometimes recycled from prehistoric sites), and stone pestles with log mortars (Spier 1933). Baskets were woven or traded with the Pima (Gilpin and Phillips 1998; Harwell and Kelly 1983).

The Sobaipuri, Eastern and Sand Papago, and Upper Pima of Sonora were the ancestors of the Piman-speaking Tohono O'odham (formerly Papago) (Gilpin and Phillips 1998). The Sobaipuri likely descended from the Classic Hohokam of the Tucson Basin and lower San Pedro Valley (Di Peso 1953, 1956; Doyel 1977a; Seymour 1989, 1997). Early Sobaipuri lived in ranchería-style, year-round settlements, had principal chiefs, and practiced irrigation agriculture (Bolton 1948; Burrus 1971; Doelle 1984; Seymour 1993). Features included roasting pits, small rock rings, and flat cobble platforms. Material culture included plain and unslipped red wares; minimally shaped grinding tools; finely retouched unifacial flake tools; and triangular projectile points with concave bases and serrated edges. Specialized sites—such as roasting pit complexes, burials, and rockshelters—were common. Later developments included subrectangular houses with boulder foundations, adobe structures, and European artifacts such as majolica and metal (Seymour 1993). The Sobaipuri were hard hit by Apache encroachment and Spanish persecution; by 1770, they had disappeared as an identifiable group (Gilpin and Phillips 1998). The Upper Pima of Sonora were archaeologically indistinguishable from the Protohistoric Sobaipuri (Gilpin and Phillips 1998).

The Eastern Papago's material culture and subsistence-settlement system were similar to that of the Pima. Their economy depended on wild plant foods—particularly saguaro, cholla, prickly pear, and mesquite—augmented by ak-chin farming (Fontana 1983). Site types include rock circles, walled corrals, open pit features, and farmsteads or ranchería-style settlements. Most pottery was characterized by thin walls and muscovite temper; a few examples of decorated black-on-buff, white-on-cream, and stuccoed wares are known (Gilpin and Phillips 1998).

The Sand Papago (Hia Ced O'odham) were a small group that eked out a precarious semi-nomadic existence over a wide but mostly inhospitable terrain south and west of the Piman territory. They made use of scattered springs and bedrock tanks, took fish and shellfish from rivers or the Gulf of California, hunted, and gathered wild plants. They probably also relied on neighboring farmers, obtaining food and other supplies in exchange for farm labor (Fontana 1983; Hackenberg 1983). Their simple material culture included brush shelters and chipped lithic tools; pottery was acquired through trade with the Pimas (Bahr 1983; Fontana 1983). Because of the ephemeral nature of their activities, archaeological evidence of the Sand Papago is rare (Gilpin and Phillips 1998).

The Hopi are Puebloan farmers whose oral history traces their emergence to the Sipapu, a spring in the Grand Canyon. From this spring, various clans migrated to prehistoric pueblos throughout the Southwest, eventually settling on the Hopi Mesas around A.D. 1200 (Gilpin and Phillips 1998). Awatowi, the largest of the Hopi towns during the Protohistoric period, was occupied from about A.D. 1250 until its destruction in 1700 as a result of internal strife. The Hopi maintained agricultural fields where they grew maize, beans, squash, and cotton. They made pilgrimages to salt mines in the eastern Grand Canyon, and also mined coal, which they used to fire pottery and as a source of heat. After the establishment of the Spanish missions, they began to acquire livestock. Hopi sites include villages, farms, mines, trails, and shrines. Diagnostic artifacts include the highly distinctive Hopi Yellow Ware (e.g., Jeddito Black-on-yellow) pottery (Adams, Stark, and Dosh 1993; Baldwin 1944; Dobyys 1974a, 1974b; Euler 1958; Moffitt, Rayl, and Metcalf 1978; Mueller et al. 1968; Schaefer 1969), and flaked stone tools (Woodbury 1954).

Historical records indicate the Athapaskan-speaking Navajo were present in the Southwest since the late 1600s, but it is likely they arrived earlier (Begay and Roberts 1996). Most Navajo researchers agree that the Navajo were present in northwestern New Mexico by A.D. 1500 (Reed 1999). The earliest documented Navajo sites in northeastern Arizona—classified as pueblitos, defensive sites, habitations, and specialized sites—date to the mid 1700s (Gilpin 1996). The Navajo were for the most part sedentary agriculturalists and shepherders. Sites were characterized by brush structures and/or forked-pole hogans, light ceramic and lithic scatters, and hearths (Brown and Hancock 1992). Habitation sites exhibit the prescribed spatial patterning of Navajo ritual, with dwellings open to the east or southeast, and trash and floor sweepings placed in ash piles northeast of the hogan entrance (Gilpin and Phillips 1998). Navajo material culture includes colorful woven rugs and silversmithing. Early diagnostic pottery types include Dinétah Gray and Gobernador Polychrome (Brugge 1963, 1981); trade wares from Zuni and Hopi suggest contact with Puebloan groups. It has been suggested (Reed and Reed 1992) that the early exchange relationships established between the Navajo and Puebloan groups provided a means for Puebloan people to seek refuge with the Navajo during the Pueblo Revolt and Spanish reconquest. This high degree of social and economic ties with Puebloan groups manifested itself in later Navajo ceramics (e.g., Gobernador Polychrome), construction of defensive structures, and the appearance of Puebloan-style masked dancers and kachina-like figures in Navajo rock art (Carlson 1965; Eddy 1966; Powers and Johnson 1987; Thiel 1995).

Historic Period

The National Park Service (1986) developed the concept of historic contexts to allow more effective application of the NRHP eligibility criteria to archaeological sites. Each historic context statement consists of a theme (e.g., irrigation agriculture), a place (e.g., the Salt River Valley), and a specific period of time (e.g., the early 1800s). Given the broad scope and limited time frame of the current study, it was impractical to prepare detailed histories for each specific entity. Therefore, the concept of historic contexts was applied to this section to facilitate a summary of the most significant patterns within the overview areas, and to provide examples of historic resource types that might be present in the various entities.

The historic use of the lands covered by this overview dates back to the earliest Spanish explorations. The contexts therefore extend from this early documented time period and on into the more recent historic years. The large number of potential contexts reflects the wide variety of geographic entities and their extensive period of use. Possible contexts include the Protohistoric and Historic period settlement by numerous Native American groups, Spanish exploration and settlement, Mexican settlement, homesteading, United States military activities, transportation, communication, mining, water development, agriculture, and Euroamerican settlement. Many of these early historic sites are traditional cultural places associated with Native American, Spanish, Mexican, and Mormon culture, and are still in use today.

Prior to 1600, Spanish exploration records document the presence of the Pima, Tohono O'odham, Sobaipuri, and Cocomaricopa in the southern portion of the project area (Gilpin and Phillips 1998; Sheridan 1993). The Hopi were living in the northeastern part of Arizona and the Zuni were living to the south of the Hopi settlements, near the New Mexico border (Sheridan 1995). Ranchería sites associated with those groups are expected in those areas. After 1775, much of the north-central area

was inhabited by the Navajo, and the Western Apache ranged throughout the entire west half of Arizona (Gilpin and Philips 1998; Sheridan 1995). Sites in the Hopi, Navajo, and Western Apache project areas relating to this early settlement period might include sheep camps and pueblo villages.

Spanish exploration began as early as 1528 and continued into the late 1770s (Officer 1987; Sheridan 1995). Sites of Spanish influence included presidios, missions, military forts, and communication corridors extending from the Mexican border along the Gila River, and into Hopi country (Gilpin and Philips 1998; Officer 1987; Stein 1994).

The Mexican occupation of southern Arizona continued until the Gadsden Purchase established the present Arizona-Mexico border in 1855 (Officer 1987; Sheridan 1995). Mexican land grants, settlements, missions, and ranches were common as far north as the Gila River (Officer 1987; Sheridan 1995). The cultural influence of this early part of Arizona history continues to the present day. Sites related to this context could reasonably be expected on the Tohono O'odham reservation.

Euroamerican settlement dates back to the mid 1800s when the military, miners, and explorers reported on the opportunities available in the open lands of Arizona (Collins 1997; Janus Associates, Inc. 1989a; Sheridan 1995). Many who came seeking economic opportunities stayed on as permanent settlers (Keane and Rogge 1992; Stein 1990). The Mormons established settlements in the greater Phoenix area, along the eastern Gila Valley, and along the Little Colorado River (Sheridan 1995). Mormon missions and small settlements also were built at Tuba City and Moenkopi in the northern portion of the project area. The Chinese, who came to Arizona in the late 1800s to work on the railroad, formed small enclaves in Tucson, Phoenix, and other cities (Keane et al. 1992). Sites reflecting these contexts should be expected throughout the entire project area.

The United States military entered the west in response to the danger posed by the some Native American populations to citizens journeying to the gold fields of California (Collins et al. 1993, 1997). Initially their presence was restricted to exploration of routes across the territory. Both the Kearny expedition of 1846 and the Mormon Battalion of 1846-47 crossed the project areas (Collins et al. 1993, 1997). Forts were later established at strategic points throughout the state. Sites along the Santa Cruz and Gila Rivers and north of the Little Colorado River could relate to this context.

Efficient transportation was vital from the earliest Euroamerican incursions into the territory. The military established some of the first official routes, often following trails earlier established by Mountain men and Spanish explorers (Collins et al. 1993, 1997; Stein 1994). Later the railroad established two transcontinental lines across Arizona, with branch lines extending into the major mining areas (Janus Associates, Inc. 1989b). Sites such as wagon roads, stagecoach routes and stops, construction camps, and abandoned railroad sidings and stations should be expected throughout the entire project area.

Mining was an especially strong lure that attracted both speculators and settlers. Silver, copper, and a little gold were mined in the San Carlos area (Keane and Rogge 1992). Copper was also common in the Tohono O'odham region. In addition, uranium has been mined on Navajo/Hopi lands (Sheridan 1995). Sites related to mining, including the mines themselves, smelters, communities that developed around the mines, and the roads that connected them should be expected in these areas. .

Communication between isolated settlements and the outside world was vitally important to the safety and welfare of the Euroamericans who came to Arizona to stay. Mail routes using the Butterfield and other stage routes, were improved by the construction of the first military telegraph in 1873 (Collins et al. 1993, 1997; Sheridan 1995). Lines linking San Francisco, Yuma, and Florence were among the first. Eventually all telegraph communication was a commercial enterprise of private companies. The military also established an extensive system of heliograph stations, extending from Fort Whipple to Fort Stanton in New Mexico (Collins et al. 1993, 1997). Intermediate stations were located at San Carlos, Fort Grant, Tubac, and Fort Lowell. Sites related to communication can be expected throughout the entire project area.

Agriculture—in conjunction with water development—has been practiced in the valleys of Arizona since prehistoric times (Dart 1989; Doyel 1993b). The earliest Euroamerican visitors to the Pima villages along the Gila River reported that the Pima were growing vast fields of wheat, melons, and cotton (Gilpin and Philips 1998). The Apache had small fields in the Globe area, and the Spanish encouraged agriculture among the Tohono O'odham (Officer 1987; Whittlesey et al. 1994). The Navajo and Hopi were both agricultural peoples. Agriculture brought the first Pima settlers to the Salt River, and the Apache were encouraged to develop their own fields immediately after their settlement on the San Carlos (Gilpin and Philips 1998). The Mormons established agricultural fields and built the necessary accouterments along the Little Colorado River in the mid-1800s (Sheridan 1995). Fields, irrigation canals, dams, and check dams, as well as traditional cultural places associated with Native American, Mexican, Mormon, and other groups who pioneered modern agriculture in Arizona, could be expected in all of the project areas.

Affected Environment

This section describes the cultural resources (affected environment) of each entity in terms of: 1) brief assessment of current survey coverage; 2) assessment of site density/distribution, including discussion of potential site types that might be present in each entity; 3) land ownership; 4) applicable local legislation regarding historic preservation; and 5) tribes claiming cultural affinity. These data are summarized in Table 1.

Land Jurisdiction and Applicable Legislation

Rights-of-way requirements are only generally known at this stage of the planning process; therefore, the relationship between impacts to cultural resources and land ownership within each entity can only be discussed in general terms. Federally funded undertakings that have the potential to affect historic properties are subject to Section 106 of the National Historic Preservation Act; however, other jurisdictions, including state, county, and municipal agencies, often have their own regulations pertaining to cultural resources and historic preservation. The Arizona State Land Department, for example, requires that archaeological surveys be completed under the Urban Lands Act as part of the planning process for projects that cross state land. While privately funded development that takes place on private land might be exempt from the Section 106 consultation process, such projects that take place in areas that could potentially contain human remains would still be subject to cultural resources compliance under the state's burial protection laws (i.e., A.R.S. 41-865 and the Arizona Antiquities Act, A.R.S. 41-841 through 41-847).

Entities in the Indian Sector include federal (Bureau of Indian Affairs) (BIA), reservation or tribal, and allotted lands. Pursuant to the Archaeological Resources Protection Act (ARPA), consultation with the BIA may be required prior to any archaeological field work on Indian lands. Additionally, rights-of-way crossing reservation lands (e.g., highways or utilities) might be administered by various agencies (e.g., Arizona Department of Transportation; Reclamation). Lands in the M&I and NIA Sectors might include portions of federal (BLM), state, county, city, and private property. Other jurisdictions (e.g., Tonto National Forest) might also apply to certain entities.

Entities

Indian Sector

For purposes of this overview, all Indian lands are considered areas of high cultural resource sensitivity. In general, the spatial boundaries of archaeological sites are defined by surface feature and artifact distribution. However, to Native American groups the land itself can be an important symbol of their shared heritage. The natural environment of specific geological landmarks, as well as larger landscapes, is an integral part of Native American lifeways. Many of these are traditional cultural places used for ceremonial as well as secular activities, and are still in use today. Some are tied to origin or creation myths, kinship, and clan affiliations. Others might serve as physical reference points associated with stories and songs used to convey traditional history and detail proper behavior. Thus, not only the preservation of cultural resources, but also the preservation of the natural landscape, plays a vital part in the preservation of traditional historical knowledge (36 CFR §60.4/National Register Bulletin 38).

Since many archaeological sites may be considered traditional cultural places for present-day Native American locational data regarding these properties are often confidential (see American Indian

Religious Freedom Act of 1978); permission to conduct a tribal records check for purposes of compiling such information must be requested from the individual tribes, and sufficient time must be allowed for tribal response. Given the limited time frame involved, this was beyond the scope of the present study. Therefore, no attempt was made to discover site density or degree of survey coverage within the tribal entities. Tribal consultation regarding location of sites, traditional cultural places, and other areas to be avoided should be implemented at a sufficiently early future stage of the planning process to allow adequate opportunity for the tribes to respond and ensure the undertaking meets cultural resource compliance guidelines within these entities.

Because of the complex nature of aboriginal settlement in the Southwest during the Prehistoric and Protohistoric periods (see Culture History section above), various tribes claim cultural affinity with areas outside their currently designated reservation boundaries. To assist the compliance process, maps showing the areas of cultural affinity claimed by the various Arizona tribes are included as Attachment A. It should be noted that these maps, prepared by ASM, do not include information for all tribes. The maps, and the accompanying list of tribal leadership and cultural resource division contacts (prepared by SHPO) should be considered a starting point for identifying all potential consulting parties in this undertaking.

Gila River

The Gila River Indian Community (GRIC) is located in the Middle Gila River Valley, within the heart of the Hohokam “core” area. It has long been the home of the Akimel O’odham (also known as the River Pima) and the Pi-Posh (Maricopa) tribes. Many prehistoric sites—including Snaketown—as well as protohistoric and historic Pima and Maricopa sites, are known to be present within GRIC boundaries. Recent surveys (e.g., Gregory and Huckleberry 1995) suggest a site density of four to five prehistoric and historic sites per m². Of particular importance are sites dating from the earliest phases of the Pima and Pi-Posh occupation, much of which remains undocumented archaeologically. Other prehistoric cultural resources that might be expected in this entity include trails, petroglyphs, artifact scatters, special-use sites, isolated features, and agricultural fields. Historic properties might include individual households, farmsteads, water-control features (e.g., the Hoover irrigation ditch in St. Johns), telegraph lines, and transportation-related sites such as stage stations, railroad features, and roads. The GRIC has a Cultural Resources Division. For more information, contact Dr. John Ravesloot, Cultural Resources Coordinator (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-3.

Tohono O’odham

Cultural resources in the Tohono O’odham Nation reflect the long history of human occupation in the Santa Cruz River Basin. Significant deposits dating to the Archaic (e.g., AZ AA:15:92(ASM)), and

possibly the Paleoindian periods (e.g., AZ AA:16:39(ASM) in the Schuk Toak Archaeological District), and Hohokam sites ranging from large villages with one or more ball courts (e.g., Punta de Agua, Martinez Hill) to small farmsteads and surface scatters associated with resource procurement and processing, have been documented within the reservation's boundaries (e.g., Marmaduke and Robinson 1983). Other prehistoric site types include trails, *cerros de trincheras*, and petroglyph loci. Protohistoric and early historic rancherías and other remains of native cultures—including Pima, Papago, Sobaipuri, and Yaqui—might be expected to occur throughout the entity, as are deposits associated with the area's Spanish occupation (e.g., Mission San Xavier del Bac, Garcia Ranch, Agua Caliente Ranch). Later historic sites related to ranching, agriculture, mining, and transportation also are known. The Tohono O'odham Nation has a Cultural Resources Division. For more information, contact Mr. Peter Steere, Program Manager (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-9.

San Carlos Apache

Known prehistoric site types within this entity include artifact scatters, agricultural features (e.g., canals, waffle gardens, rock alignments, and possible reservoirs), resource procurement/processing loci, small farming villages, and "composite rancherías" consisting of compounds with multistory room blocks, mounds, and ball courts (e.g., Rice Ruin, Epley Ruin, Buena Vista/Curtis Ruin) (e.g., Black and Green 1995). Cultural affiliation of sites range from the Archaic (e.g., Day Mine Rockshelter) to the Salado; the area's prehistoric resources have been particularly important in defining the origin and nature of the Salado culture (e.g., Brown 1973; Doyel 1978). Protohistoric and historic Apache sites include villages (e.g., Old San Carlos), small settlements, isolated wickiup rings, trash scatters, resource procurement/processing loci, burials, and other limited activity sites. Historic sites affiliated with other Native American, Euroamerican, and possibly Hispanic groups also are known. Historic contexts represented include commerce, transportation, mining, the lumber industry, the military, and water management (e.g., camps associated with the construction of Coolidge Dam) (Effland and Green 1985). The San Carlos Apache Tribe has a Cultural Resources Division. For more information, contact Ms. Vernelda Grant, Tribal Archeologist (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-7.

Navajo

The human occupation of northeastern Arizona dates to the Paleoindian period; Paleoindian and Archaic components and isolated finds have been documented throughout the Navajo territory (e.g., Ayres 1966; Nichols and Smiley 1985; Peckham and Wilson 1967; Vogler et al. 1993). Ceramic period sites are primarily affiliated with the Anasazi cultural tradition; resource types include Basketmaker cave and rockshelter sites, early pit house villages, and aggregated Puebloan communities characterized by great kivas, specialized activity areas, and associated agricultural features (e.g., Black Mesa). Important early Protohistoric site types include defensive pueblitos, dating to the

Pueblo Revolt of 1680, which document Navajo-Puebloan interaction; dwellings; trails; resource procurement and processing loci; and other limited activity sites. Historic resources include mining and herding camps, roads, and shrines. The Navajo Nation has an independently acting Tribal Historic Preservation Officer (THPO) who should be consulted regarding any proposed undertaking that could potentially affect cultural resources within Navajo lands. For more information contact Dr. Alan Downer, THPO, or Mr. Ron Maldonado, Program Manager, Cultural Resource Compliance Section (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-5.

Hopi

Cultural deposits dating to the Paleoindian and Archaic periods have been documented in the vicinity of the Hopi reservation (Gumerman 1966). Basketmaker and Puebloan occupations also are known; during the later Puebloan periods, Western Anasazi groups aggregated in a few locations – including Hopi – and large villages were established on the Hopi Mesas (e.g., Walpi, Awatovi, Kawaika'a, Kiskakovi, Sikiatki, Old Mishongnovi, Old Shongopovi, Oraibi, Chacpahu, Chuckovi, Kuchaptuvela) (Cordell 1997; Upham 1982). Although some of these sites had been abandoned by the mid 1500s, some are still in use. Other site types that might occur throughout the area's occupational sequence include artifact scatters, farms, trails, rockshelters, isolated features, petroglyphs, cairns, shrines, coal and salt mines, and agricultural fields (Adams 1981; Ahlstrom and Hays 1991). The Hopi Tribe has a Cultural Resource Division. For more information, contact Mr. Leigh Kuwanwisiwma (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-5.

M&I Sector

Arizona Water Company–Apache Junction

Survey coverage in the project area is generally characterized by long, linear projects and small (averaging 40 to 160 acres) noncontiguous block surveys. Exceptions include the Queen Creek portion of Reclamation's extensive Salt-Gila Aqueduct–CAP survey (e.g., Stein 1979; Teague and Crown 1984), and ACS's survey for the Superstition Mountain Development (Moreno and Macnider 1996). These projects yielded numerous prehistoric sites, including villages, artifact scatters, roasting pits, fire-cracked rock concentrations, bedrock mortars, petroglyphs, and lithic quarries. The majority of sites are affiliated with Archaic, Hohokam, and Salado occupations; protohistoric Yavapai sites also have been documented. Other significant cultural resources – including the Hieroglyphic Canyon Site, a National Register property – have been recorded in the Tonto National Forest, Hieroglyphic Mountains, and other adjacent areas. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-3.

Town of Superior/Arizona Water Company–Superior

Survey coverage of the project area is generally low. The easternmost parcel has been examined only via linear surveys; approximately 10 historic sites, including buildings, roads, trails, and sites related to mining, have been documented near Superior city limits. Camps, prospecting loci, shafts, and other sites associated with the area's gold and silver mines (e.g., Queen Creek, Belmont, Grand Pacific) are abundant in this area. In the high cultural sensitivity areas in the north-central and southeastern portions of the westernmost parcel, linear surveys and small block surveys have identified numerous prehistoric sites, including large Hohokam villages (e.g., Los Montículos), prehistoric agricultural features (e.g., field houses, check dams, terraces), artifact scatters, and special-use sites (e.g., lithic quarries). Historic resources include roads (e.g., AZ U:11:70(ASM), historic U.S. 60/70/80/89), railroads, and associated transportation-related features. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-51.

AVRA Water Cooperative

Only three surveys are documented for the project area, most notably portions of Reclamation's CAP survey (Teague and Crown 1984). No sites have been recorded within the entity's boundaries; however, some portions of the entity border areas of moderate cultural resource density (e. g., Camp Pima, a Civilian Conservation Corps installation) (Allen 1979; Wells 1984). Numerous prehistoric, protohistoric, and historic sites also have been documented to the south (Saguaro National Monument) and northeast (Safford Peak). Prehistoric manifestations consist primarily of lithic scatters and small, special-use sites, although trails, petroglyphs, and multicomponent habitation sites also are present. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-6.

Cave Creek Water Company

A representative sample of the entity has been surveyed (e.g., DeMaagd and Punzmann 1996; Holliday 1974; Madsen 1981; Wright 1993) and numerous sites have been documented, particularly along the banks of Cave Creek and adjacent terraces. The entity's southern boundary extends onto the Cave Creek Archaeological District, a National Register property. Prehistorically, the area was utilized for agriculture. Within areas of high and moderate cultural resource sensitivity, sites range from compound villages with multiple structures (e.g., Spur Cross Ranch) to small, isolated field houses and limited-activity artifact scatters; features include burials, middens, roasting pits, check dams, rock piles and alignments, and "waffle gardens." Other known prehistoric resources include petroglyphs, trails, and shrines. Historic sites are associated primarily with mining. The Cave Creek Mining District was formed in 1874 to represent not only the area's large mines—such as the Golden Star Mine and the Phoenix Mine—but also the hundreds of smaller placer mines in the vicinity that were exploited for a year or two before they were abandoned (RECON 1987). Resources associated with ranching, agriculture and water management (e.g., canals), transportation, and the military also

are present. Because of the nature of the depositional environment and the intensity of human occupation in the area through time, the potential for encountering additional surface and buried sites within this entity is very high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-9.

City of Chandler

Most of the projects that have taken place within this entity's boundaries have been linear, related to construction of local roads and utilities (e.g., Woodall 1994). The majority of the western portion of the entity was occupied prehistorically by the site complex known as Los Muertos, a series of Hohokam villages (e.g., Los Guanacos, Las Estufas) associated with an extensive irrigation system (Haury 1945; Howard and Huckleberry 1991; Midvale 1966; Turney 1929). Known and expected prehistoric resources in this area include artifact scatters, architectural features, canals, and burials. Protohistoric Pima and early historic Yaqui remains also are possible. Historic resources in this area include sites associated with agriculture, transportation, and the early Mexican settlement of Guadalupe (e.g., Corona Village). In the Chandler vicinity, known historic properties include the San Marcos Hotel, Chandler Park, and the Plaza Historic District. Water-control features significant to the development of modern irrigation agriculture (e.g., the Eastern, Consolidated, and Western Canals and laterals) also are present. Several historic roads (e.g., the wagon road from Sacaton to Tempe, ca. 1892) cross through the central portion of the entity; however, because of the area's urban development, surface evidence of these features is unlikely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-12.

Chaparral City Water Company

Approximately one-third of the entity has been surveyed. Surveyed areas range from small (<40 acres) to large (>640 acres) noncontiguous blocks, principally for urban development projects, and linear surveys, primarily for road and utility rights-of-way. Sites ranging from Archaic lithic scatters to Hohokam villages have been documented in the entity's high and moderate cultural sensitivity areas. Other prehistoric site types known to occur within the project area include resource procurement loci (e.g., AZ U:5:177(ASM)), cleared circles, rock alignments, canals, and small habitation sites. The entity's proximity to the Salt River Pima-Maricopa Indian Community on the south and the Fort McDowell Indian Reservation on the north suggests protohistoric sites might be present. Known historic site types include settlements (e.g., Maryville), homesteads, roads (e.g., Phoenix to McDowell Road), isolated graves, trash dumps, and water-control features. Sites related to mining and ranching also could be present. A Mormon settlement is known to have been located to the west of the entity's boundaries; related deposits, possibly including traditional cultural places, might be expected near the southwest portion of the entity. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-15.

Community Water Company of Green Valley

A few block surveys have occurred within the northern half of the project area; the remainder of the entity has been sparsely surveyed, primarily by linear projects along road, railroad, and pipeline rights-of-way. Cultural resources in high to moderate densities occur along the banks of the Santa Cruz River near the entity's eastern boundary. Site types documented in this area include sherd and lithic scatters, and rock piles. Known historic sites include wells, roads, and early settlements such as Continental (AZ EE:1:82(ASM)), founded in 1914 by the Continental Rubber Co. No other sites are known in the vicinity, although historic sites associated with early commerce, farming, and/or mining are likely throughout the project area. Additionally, because of the nature of the depositional environment, the potential for buried sites is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-18.

Vail Water Company

Survey coverage of this entity has been primarily linear, although a few small block surveys have taken place in the northwest portion of the project area, where numerous sites have been found. This area extends onto the Colossal Cave County Park, a National Register property consisting of more than 20 prehistoric, protohistoric, and historic activity loci; similar remains might be expected in adjacent, unsurveyed portions of the entity. Documented prehistoric resource types include undifferentiated lithic scatters, sherd scatters, and agricultural features (e.g., rock piles, clusters). The Vail Station (AZ BB:14:18(ASM)), a historic site associated with the Union Pacific/Southern Pacific Railroad is within the entity's boundaries. This site, which is characterized by artifacts and features of Anglo, Mexican, and Chinese affiliation, was the main depot for miners working in the Santa Rita Mountains; it is likely that other sites associated with mining and/or transportation might be present within entity boundaries. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-60.

City of El Mirage

Only a few surveys, mostly linear, have taken place within this entity. Two sites were identified northwest of Youngtown; no other cultural resources are known. However, prehistoric cultural deposits are likely in the Agua Fria River floodplain. Historic sites related to transportation, commerce, homesteading, agriculture, and ranching also might be expected. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-21.

City of Glendale

Most of the surveys that have occurred within this entity have been linear; very few moderate-sized (<640 acres) block surveys have taken place. Only one survey is recorded for the southwestern portion of the entity; although this area is currently being used for agriculture, intact subsurface remains are still possible, as suggested by the areas of moderate cultural resource sensitivity that have been identified in the vicinity (e.g., AZ T:7:68(ASM)). In the northeast portion of the entity is an area of high cultural resource sensitivity; numerous prehistoric sites ranging from Archaic lithic scatters to Classic period Hohokam settlements have been documented here, and might be expected to occur in the surrounding areas. The Glendale Townsite/Catlin Court Historic District has been listed on the National Register since 1992 (Graham, Kupel, and Keeling 1997). Other historic resources include roads, commercial and residential structures, farmsteads, and water control features (e.g., the Airline Canal). The City of Glendale has a Historic Preservation Commission. For more information, contact Mr. Larry Harmer, Planning Manager. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-24.

City of Goodyear

Only two small surveys are documented for the southernmost portion of the entity; linear (e.g., Tucson Gas & Electric's El Sol-Vail transmission line) and small block surveys characterize coverage of the remainder of the project area. Many sites have been found in the central portion of the entity between the Gila River and the Estrella Mountain Regional Park. This area of high cultural resource sensitivity has yielded evidence of human occupation from the Archaic to the Late Historic periods. Prehistoric site types include large Hohokam villages (e.g., Coldwater Ruin, Cashion Site, Alkali Ruin), small habitations, artifact scatters, resource procurement loci, bedrock mortars, trails, petroglyphs, and agricultural features. Protohistoric Pima deposits might also be present. Historic resource types include trash deposits, camp sites, farmsteads, water-control features, transportation-related sites, and features associated with ranching. The nature of the depositional environment indicates the potential for buried sites is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-27

H2O Water Company

Only two projects have taken place within this entity's boundaries. These include a linear survey of the Southern Pacific Railroad right-of-way, and survey of various parcels for the Magma ID portion of Reclamation's Salt-Gila Aqueduct, Central Arizona Project (e.g., Bontrager 1986; Marmaduke et al. 1985; Stein 1979). No sites are recorded within the project area; however, the Massera Site, a large Hohokam village with multiple mounds and a probable ball court, was originally documented by Frank Midvale as extending onto the westernmost portion of the entity. Although most of this site has been obliterated by agricultural activities, it is possible that intact subsurface remains might be

present below the plowzone. A second small area to the east of the entity is surrounded by previously recorded prehistoric sites; similar resources might be expected within the entity's boundaries. Historic resources, particularly sites associated with farming and ranching, also are likely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-30.

City of Mesa

Most of the previous survey coverage within this entity has been linear (e.g., Macnider et al. 1999), although many small block surveys have also occurred, primarily for urban development. This entity contains two major areas of high cultural resource sensitivity. The northernmost area, encompassing the banks and lower terraces of the Salt River, is characterized by many significant Hohokam remains, including Pueblo Ultimo, Mesa Grande, Crismon Pueblo, Casa del Omni, Pueblo Moroni, and Las Piedras. Many of these sites, which are associated with major irrigation systems, were documented during the late 1800s and early 1900s (e.g., Turney 1929). Although most have been completely obliterated by urban development, surface remains of these once-extensive sites can still be found; intact subsurface remains, including canals, also might be present (e.g., Dennis 1989). Numerous previously recorded sites also are known to have been present in the southeastern portion of the entity, including Rittenhouse Ruins, the Midvale Site, the Ordinance Site, and El Horno Grande. Prehistoric cultural resource types that might be expected in these areas include artifact scatters, agricultural features, burials, and canals. Protohistoric and early historic Pima farmsteads and artifact scatters also might be present. Areas of moderate cultural resource sensitivity elsewhere within the entity include prehistoric as well as historic sites. Known historic resources include trash scatters, roads, canals, orchards, and buildings associated with the early history of Mesa and the surrounding areas. The City of Mesa has a Historic Preservation Committee. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-33.

Metropolitan Domestic Water Improvement District

Much of this entity has been block-surveyed; numerous linear surveys also have taken place, particularly along Interstate 10 and west of the Santa Cruz River. In the easternmost portion of the entity, sites have been recorded along the banks of Tanque Verde Creek, Sabino Creek, and Ventana Canyon Wash. Fewer surface manifestations have been recorded to the west, probably as a result of urban development. Significant cultural resources—including Archaic and Hohokam artifact scatters, Hohokam villages, and resource-processing loci—also have been documented in the southwest portion of the entity. This landscape, dissected by numerous washes that drain out of the Tortolita Mountains, has a high potential for containing prehistoric sites. Protohistoric Papago and Pima sites also might be expected. Historic trails, roads, railroads, and other transportation-related features are common throughout the project area, as are sites related to commerce, mining, farming, ranching, and other historic activities. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-36.

Town of Oro Valley

This area of high-to-moderate cultural resource sensitivity has been extensively surveyed. On the southeast, it borders the Sutherland Wash Archaeological District, a National Register property containing more than 40 sites. Prehistoric sites also abound along Cañada del Oro, Sutherland Wash, Big Wash, Chalk Creek, and the numerous other arroyos that drain the region. Protohistoric and historic trails, roads, and sites associated with farming, ranching, and prospecting might also be present within this entity's boundaries. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-39.

City of Peoria

Few surveys have occurred in the northwest portion of the entity; elsewhere, survey coverage has been moderate, including both linear (e.g., Green 1984; Hoffman and Green 1988) and large block surveys (e.g., Green 1989; Greenwald and Keller 1988). Numerous sites have been documented along the Lake Pleasant-Agua Fria River portion of the entity, making this an area of high to moderate cultural resource sensitivity. High site density is also identified in a small area between State Route 74 and Saddleback Mountain. The east-central portion of the entity extends onto the New River Dam Archaeological District and the Calderwood Butte Archaeological District, both National Register properties. Documented prehistoric site types include artifact scatters of Hohokam and Sinagua affiliation, resource procurement and processing loci, field houses, petroglyphs, and rock features. Historic resources include water-control features (e.g., the Beardsley Canal), residential properties, transportation-related sites, and camps associated with sheep herding and other ranching activities. The City of Peoria has implemented a comprehensive master plan for future development that includes policies for conserving archaeological resources. For more information, contact Mr. Phil Gardner, Senior Planner. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-42.

City of Phoenix

Numerous surveys have occurred within the project area; however, much remains unexamined. Prehistorically, it was part of the Hohokam "core" area; identified loci of high and moderate cultural resource sensitivity—which extend onto the Cave Creek and the New River Dam Archaeological Districts, among others—reflect only a fraction of this entity's prehistoric occupation density. Many of the large agricultural village sites located in this entity (e.g., Pueblo Grande, Pueblo del Rio, Villa Buena, Las Canopas, Pueblo del Alamo, the Patrick Site, Dutch Canal Ruins, La Ciudad, Tres Aguas) were originally recorded in the late 1800s and the early 1900s by pioneers of Arizona archaeology such as Frank Cushing and Omar Turney; few surface remains are extant today. However, because the site's boundaries were carefully mapped and the material remains meticulously described, the projected location of buried features can be estimated. Significant, intact subsurface cultural deposits

are possible even in areas where all surface integrity has been destroyed by agriculture, urbanization, or other ground-disturbing activities (e.g., Aguila et al. 1999). As might be expected, the area's known prehistoric site types include material remains associated with a primarily agricultural economy (e.g., canals, rock features, ground stone artifacts, and specialized items such as tabular knives). Other items, including shell, turquoise, obsidian, and artifacts of Mesoamerican influence—such as palettes and copper bells—reflect the core area's participation in the Hohokam exchange system. Human remains, both inhumations and cremations, are likely in the vicinity of the major sites. Protohistoric Pima sites also might be expected, although some deposits, particularly agricultural sites and features, might be indistinguishable from those of the Hohokam. Historic resources reflect the area's rich and complex heritage, and include sites associated with early Mexican, Anglo, and Mormon settlements, irrigation agriculture, transportation, and commerce. The City of Phoenix has a Historic Preservation Commission. For more information contact Mr. Todd Bostwick, City Archaeologist. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-45.

City of Scottsdale

In general, the distribution of sites across the entity reflects the extent of survey coverage; however, much remains unexamined or has been inadequately covered for purposes of Section 106 compliance (e.g., RECON 1987). Areas of high and moderate cultural resource sensitivity in the northern portion of the entity consist primarily of prehistoric agricultural and habitation sites and historic mining sites such as are common along Cave Creek and surrounding areas. The central portion of the entity is characterized by numerous sites ranging from small undifferentiated lithic scatters of possible Archaic affiliation to extensive Hohokam villages (e.g., Pinnacle Peak Village/the Herberger Site) associated with trash mounds, agricultural features, trails, and petroglyph loci. Rockshelters, quarries, special-use areas, bedrock mortars, and other isolated features also have been identified (e.g., Atwell 1992). In the southern portion of the entity, from Taliesin West (AZ U:5:15(ASM)) to Gilbert Road are many prehistoric artifact scatters, some associated with surface features (e.g., Crownover 1996; Schroeder 1992). Protohistoric Pima sites, including camps and agricultural fields, are known to be present near the McDowell Mountains area; surface remains might be expected. Historic homesteads, wagon roads, corrals, camps, and related trash dumps also are present in this area (e.g., Crownover 1996; Schroeder 1992). Historic resources in urban areas include commercial and residential buildings, and transportation-related sites such as road and railroad features. The City of Scottsdale has a Historic Preservation Committee and has drafted its own Archaeological Resources Ordinance. For more information, contact Mr. Robert J. Cafarella, Director, Preservation Division. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-48.

City of Surprise

A few linear (e.g., Hathaway 1991; Jensen 1994; Kwiatkowski 1993) and block (e.g., Dosh 1988; Neily 1992b) surveys have taken place within this entity's boundaries; however, the majority of the project

area has not been examined. The vicinity of Morristown, in the northwest portion of the entity, is classified as an area of high cultural resource sensitivity. Numerous historic properties representing most identified historic contexts have been documented therein, including sites associated with homesteading, transportation, mining, ranching, and agriculture. Although the majority of the surface remains identified to date in this area have been historic, prehistoric and protohistoric resources also are known, including Archaic and Ceramic period artifact concentrations, agricultural features (e.g., AZ T:2:50(ASM)), roasting pits, cleared circles, and rock rings. Elsewhere within the entity, other small areas of high and moderate cultural resource sensitivity reflect the noncontiguous nature of the area's survey coverage. It should be noted that the entity's surveyed areas have tended to yield cultural resources, therefore, the potential for additional resources in unexamined areas is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-54.

City of Tucson

Both linear (e.g., Hammack 1983; Rieder and Myers 1996; Slawson 1993; Stephen 1988) and block (e.g., Rozen 1985; Simpson and Wells 1984; Slawson 1994) surveys have yielded sites within this entity's boundaries. Areas of high and moderate cultural resource sensitivity are located primarily at lower elevations along the area's major drainages (e.g., the Santa Cruz Riverpark Archaeological District, a National Register property). Known prehistoric resource types include numerous aceramic artifact and fire-cracked rock concentrations of possible Archaic affiliation, as well as Hohokam sites ranging from small sherd and lithic scatters, to extensive agricultural systems (e.g., AZ BB:14:32(ASM)), to large villages with multiple house clusters, (e.g., the West Branch site, the Valencia Site, Julian Wash, St. Mary's, Punta de Agua, Los Morteros). At higher elevations, camp sites, trails, petroglyphs, and resource procurement and processing sites are common. Although no sites have been reported in the southwesternmost portion of this entity, this area borders the Gunsight Mountain Archaeological District, a National Register property which includes more than 40 sites; similar site types might be expected. Likewise, areas of low cultural resource sensitivity in the east and northeast portions of the entity are surrounded by areas of high site density (e.g., the Saguaro Wilderness area, Colossal Cave County Park, the Sutherland Wash Archaeological District, and the Rincon Foothills Archaeological District, all National Register properties). Protohistoric Pima, Papago, and Yaqui sites also are known; the entity's proximity to the Tohono O'odham and Pascua Yaqui Reservations suggests similar sites might be expected to occur in unsurveyed areas. Historic resources include properties from the area's early Native American, Spanish, Mexican, and Anglo occupations (e.g., San Xavier Mission, Agua Caliente Ranch), and represent every identified historic context, including farming, ranching, mining, commerce, and transportation. The nature of the depositional environment, particularly along the Santa Cruz River floodplain and lower terraces, indicates the potential for buried cultural deposits is high; finds in the nearby Schuk Toak Archaeological District include paleontological remains dating to the Pleistocene, raising the possibility that Paleoindian sites might be present within the entity. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-57.

Valley Utilities Water Company

The southernmost parcel within this entity was previously surveyed; no other projects have occurred within the entity. Although several sites have been documented to the west, none were recorded within the current project area. The Arizona Canal, a National Register-eligible property, borders the entity on the east (Aguila 1998). Historic sites associated with its construction might be expected. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-63.

NIA Sector*Central Arizona IDD*

Few block surveys have occurred in the project area, but linear surveys along major roads, railroads, and/or pipelines have yielded a few prehistoric sites ranging from small undifferentiated lithic scatters to extensive Hohokam villages dating to the Colonial and Sedentary periods. Protohistoric Pima and historic Anglo occupations also have been documented. South of the entity's boundaries lies the Los Robles Archaeological District, a National Register property. The proximity of this area of high cultural resource sensitivity suggests similar site types might be present within the entity's unsurveyed areas. A series of Reclamation's CAP surveys identified numerous sites just east of the entity's boundaries (e.g., Quillian 1985). Because some of these sites extend onto the entity's northeastern portion, this area's cultural resource sensitivity is classified as high. Additionally, because of the high potential for sediment deposition near the Santa Cruz River floodplain and adjacent terraces, the potential for buried sites in most of this entity is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-3.

Chandler Heights Citrus ID

Only one archaeological survey has taken place, and no previously recorded sites are located within this entity. Although herein classified as an area of low cultural resource sensitivity, it is worth noting that archaeological sites are known to be present in the surrounding areas. Pozos de Sonoqui, a major Hohokam village complex with a ball court and platform mound, is located to the east, suggesting the possibility of additional associated cultural deposits—such as artifact scatters, isolated features, and agricultural fields—within the entity's boundaries. Protohistoric and/or historic Pima and Pi-Posh remains also might be present. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-5.

Maricopa-Stanfield IDD

Very few surveys, most of them linear (e.g., Neily 1991), have been performed within this entity's boundaries. Areas of high and moderate cultural resource sensitivity are primarily associated with various tasks pertaining to Reclamation's Salt-Gila Aqueduct-CAP surveys (e.g., Teague and Crown 1984). Prehistoric sites are mainly related to non-irrigation agriculture and resource processing, and include rock features, roasting pits, fire-cracked rock concentrations, artifact scatters, and small farmsteads. There is evidence that sites to the south (e.g., Shelltown, the Hind Site) were involved in the Hohokam shell exchange system (Marmaduke and Martynec 1993); sites with evidence of shellcraft in this entity would be particularly important to answer questions about the nature of prehistoric trade networks. The entity's vicinity to the Ak-Chin Indian Community also suggests that protohistoric and historic Pima and Maricopa sites—including petroglyphs and pictographs—might be present (e.g., Berry and Marmaduke 1980; Marmaduke et al. 1983). Historic sites related to water control (e.g., canals) and transportation (i.e., roads, railroads, and associated features) also are likely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-7.

New Magma IDD

Several projects have taken place in this entity's northern half, including most prominently Reclamation's CAP survey (Marmaduke et al. 1985); several isolated occurrences, mostly ceramic sherds, were noted, but no sites were found. No projects or sites have been documented in the southern half; however, numerous sites, ranging from Archaic scatters to Hohokam villages (e.g., Escalante Ruin), have been recorded between the entity's southern boundary and the Gila River. Additional prehistoric sites have been recorded to the northwest, within the Queen Creek Archaeological District. It is likely that similar cultural resource types might be present within this entity, particularly intact buried deposits below the existing plowzone. Historic resources, including National Register properties (e.g., the Florence Townsite Historic District), transportation routes, and commercial as well as residential structures, also are known. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-9.

Queen Creek IDD

Less than one-third of this entity has been surveyed, with linear surveys comprising approximately 75 percent of the area examined. Most surveys have been negative, although numerous sites were documented in the northern half of the entity by various surveys associated with Reclamation's Salt-Gila Aqueduct-CAP (e.g., Stein 1979; Marmaduke et al. 1985). This area of high cultural resource sensitivity includes Hohokam artifact scatters—some including mounds—ranging from the Sedentary to the Classic periods (e.g., the Southwest Germann Site; Las Ollas Oriente); as well as architectural sites recorded by Omar Turney, Frank Midvale, and others (e.g., Rittenhouse Ruins) during the 1930s and 1940s. Given the rate of development that has occurred in this area since then, it

is likely that some of these sites are no longer visible; however, intact subsurface deposits are still possible below the plowzone. It is also likely that surface remains—such as field houses, canals, and other agricultural features—associated with some of the larger sites might be present in the surrounding areas. A second, smaller parcel in the south half of the entity also is classified as an area of high cultural resource sensitivity, as it encompasses two large Hohokam architectural sites, Sonoqui Pueblo and Pozos de Sonoqui. Areas of moderate sensitivity contain small, dispersed artifact scatters or border areas of high sensitivity, such as the archaeology-rich landscape around the CAP canal. Historic resources that might be present throughout the entity include homesteads, orchards, roads, canals, and railroad features. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-11.

Roosevelt ID

No large block surveys have taken place, and very few sites have been recorded, within the project area. Given the sparse survey coverage, it is possible that undocumented sites could be present within the entity's boundaries. Site types known to occur within the surrounding WhiteTanks-Hassayampa region range from small lithic scatters of unknown affiliation to large Hohokam villages associated with canal irrigation systems (Gladwin and Gladwin 1929, 1930; Johnson 1963; Midvale 1920-1971; Turney 1929). Other possible site types include Patayan and Yavapai sherd scatters, rock rings, petroglyphs, and rockshelters. Historic roads, canals, and sites associated with mining also are possible. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-13.

San Carlos IDD

Much of the project area has been surveyed, and numerous sites are documented within entity boundaries. The Casa Grande Ruins National Monument, an area of high cultural resource sensitivity, extends onto the northwest portion of the entity just north of Coolidge city limits. This extensive Hohokam site complex—which includes the Casa Grande Site, the Grewe Site, and other National Register-eligible properties—contains habitations, mounds, canals, a ball court, and cremation areas. It is likely that associated cultural remains (e.g., artifact scatters, agricultural features) could be present in the surrounding moderate-sensitivity areas. Several additional prehistoric properties in the vicinity have been recommended for inclusion on the National or State Register, including Adamsville Ruin, Poston Butte, and the Blackwater Archaeological District. Other resource types that might be expected to occur within this entity's boundaries include protohistoric Pima sites, historic farmsteads, irrigation features, roads, and features associated with the Phoenix & Eastern, the Southern Pacific, and other early railroad routes. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-15.

San Tan ID

Four archaeological surveys have been conducted within this entity's boundaries; no sites have been recorded. However, the area's proximity to Pozos de Sonoqui, a major Hohokam village complex with a ball court and platform mound, suggests associated cultural resources—such as artifact scatters, rock piles, and agricultural fields—might be present. The area's western boundary borders the Roosevelt Canal, a historic canal that is presently in use. The Roosevelt Canal, part of the Roosevelt ID, has been in operation since 1926 and is eligible for inclusion on the NRHP. Although the Roosevelt Canal is not expected to be impacted by the proposed undertaking, it is possible that sites related to its construction might be present in the area. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-17.

Tonopah ID

Only one linear survey (O'Brien et al. 1987) has taken place within this entity. The northeastern portion borders an area of moderate cultural resource sensitivity which includes agricultural rock features associated with artifact scatters (e.g., AZ T:5:13 and T:5:13(ASM)). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-19.

Environmental Consequences

Assessment of Impacts

At this stage of the planning process, only general information exists regarding the portions of each entity that might be affected by the proposed allocation and contract execution. Therefore, no entity-specific recommendations can be made. The following assessment of potential impacts to the cultural resources is by necessity expressed in general terms and might be applied to all entities.

Impacts to the cultural resources within the areas of individual entities are expected to be similar under all proposed alternatives, although the acreage of new agricultural lands on Indian Reservations varies among the alternatives. Since any ground-disturbing activities have the potential to impact known and/or as yet undiscovered cultural resources, cultural impacts can be anticipated in any undertaking involving 1) urbanization of farmland, an action which has the potential to adversely impact intact cultural deposits that might still exist below the plowzone; 2) subjugation of natural desert for agriculture, an action which has the potential to adversely impact intact cultural deposits presently on the surface and within the plowzone; and 3) any related ground-disturbing activity that might result from implementation of the proposed allocation.

As stated in the introduction to this chapter, direct impacts would be those impacts that would occur as a direct result of the proposed allocation and contract execution, an example being land-disturbing activities associated with the construction of facilities needed to take, treat, and deliver CAP water.

Construction-associated impacts to archaeological resources would result from such anticipated activities as excavation, temporary stockpiling, and disposal of earthen materials; manufacture or delivery of concrete; construction of concrete-lined canals, turnouts, siphons, flood protection berms, dikes, reservoirs, pipelines, water-treatment plants, wells, and pumping stations; and modifications to existing canals and equipment.

No additional adverse effect is anticipated to cultural resources located in currently agricultural acreage that is to remain under cultivation or allowed to go fallow and abandoned. An exception would involve the construction of new field irrigation features like laterals on sprinklers that would require excavation beneath the existing plowzone. However, subjugation of previously undisturbed (desert) land for agriculture would directly impact surface cultural remains and might impact buried deposits within the plowzone. Likewise, urbanization of land presently used for farming could potentially impact any intact cultural deposits that might be preserved below the plowzone.

Adverse effects are also expected to occur from activities that have the potential to alter the landscape, such as mineral extraction and the construction of permanent features such as recharge basins. Direct impacts to archaeological sites resulting from any of these activities would be long-term and permanent.

5. Indian Sector

a. No Action Alternative

No additional CAP water is provided to the tribal entities under the No Action Alternative. No additional impacts to the cultural resources would result.

b. Settlement and Non-Settlement Alternatives

The potential for delivery facilities and agricultural development on the reservations that could occur as a result of proposed allocations is summarized by Indian tribe as follows (see Appendices G and L for additional detail):

(1) GRIC

Under the Settlement Alternative, Non-Settlement Alternative 2, and Non-Settlement Alternative 3, the GRIC would receive additional CAP water. Under the Settlement Alternative, an estimated 20,800 acres would be used for subjugation of natural desert for agriculture. Under Non-Settlement Alternative 2, an estimated 16,700 acres would be used for subjugation of natural desert for agriculture. Under Non-Settlement Alternative 3, an estimated 38,000 acres would be used for subjugation of natural desert for agriculture. The lands to be developed, and the appurtenant

facilities to be constructed, are identified in the PMIP PEIS (US Department of the Interior, 1997). Under Non-Settlement Alternative 1, the GRIC is the only tribes to receive an allocation, and would receive an additional 17,000 AF of water, which would be used for irrigation as part of PMIP PEIS. Under Non-Settlement Alternative 1, an estimated 8,000 acres would be used for subjugation of natural desert for agriculture. Reclamation is directly involved, and National Historic Preservation Act (NHPA) Section 106 compliance is being carried out as part of the PMIP.

(2) TON

Under the Settlement Alternative, Non-Settlement Alternative 2 and Non-Settlement Alternative 3, the TON would receive additional CAP water. Under the Settlement Alternative, and estimated 4,000 acres would be used for agriculture. Under Non-Settlement Alternative 2, an estimated 4,000 acres would be used for agriculture. Under Non-Settlement Alternative 3, an estimated 4,000 acres would be used for agriculture. It is also anticipated that the balance would be made available for recharge on reservation; facilities associated with this use include infiltration basins, pipelines, and pumps. Other possible uses include growing mesquite, habitat enhancement, river restoration, recreation, and mining. Because Reclamation is directly involved in implementing the CAP distribution facilities (through funding) for both tribes, NHPA Section 106 consultations would be carried out, and mitigation plans developed.

(3) Navajo/Hopi

The Navajo/Hopi would receive additional CAP water only under Non-Settlement Alternatives 2 and Non-Settlement Alternative 3. CAP allocations would be diverted to users via the Western Pipeline or the Lake Powell Pipeline. It is estimated that construction of the necessary distribution lines to supply the water would impact between 1,100 acres (Western) and 2,000 acres (Lake Powell).

(4) SCAT

The SCAT would receive additional CAP allocation only under Non-Settlement Alternative 2 and Non-Settlement Alternative 3. Under Non-Settlement Alternative 2, an estimated 4,700 acres would be used for agriculture or developed. Under Non-Settlement Alternative 3, an estimated 8,000 acres would be used for agriculture or developed. Additionally, some of the allocated water could be used for aquaculture, fish hatchery, livestock grazing, mining of peridot and gypsum, and maintenance of a minimum pool within the San Carlos Reservoir; these uses would reduce the amount of agricultural acreage accordingly. Facilities would include construction of pump stations and pipelines, disturbing approximately 750 acres.

6. M&I Sector

a. No Action Alternative

Under the No Action Alternative, urban growth is expected to continue. An estimated 239,700 acres would be converted from desert to urban uses and 68,200 acres from agricultural to urban uses within the 21 M&I planning areas over the 50-year study period. Such growth would have impacts on the cultural resources, as outlined above. The level of growth is identical under all proposed alternatives, discussed below.

Reclamation would consult under NHPA Section 106 only for those actions that are directly related to taking CAP water deliveries (i.e., facilities necessary to tie into the CAP canal and take and treat the water). Impacts to the cultural resources resulting from urban growth are not a consequence of the proposed allocation. They would occur regardless of the allocation decision. Avoidance or mitigation of cultural resource impacts would be the responsibility of the local jurisdictions. Information on local ordinances with respect to the cultural resources is outlined in Appendix L.

b. Settlement and Non-Settlement Alternatives

Same as under the No Action Alternative.

7. NIA Sector

a. No Action Alternative

Under the No Action Alternative, an estimated 226,103 acres of farmland are expected to be urbanized within the nine NIA districts over the 50-year study period. An additional 40,926 acres are expected to be fallowed and left undeveloped as a result of economic conditions. Avoidance or mitigation of cultural resource impacts associated with urbanization would be the responsibility of the local jurisdictions. Information on local ordinances with respect to the cultural resources is outlined in Appendix L.

b. Settlement and Non-Settlement Alternatives

Same as under the No Action Alternative.

References

- Ackerly, Neal W., and T. Kathleen Henderson, eds. 1989. *Prehistoric agricultural activities on the Lehi-Mesa Terrace: perspectives on Hohokam irrigation cycles*. Flagstaff: Northland Research, Inc.
- Adams, E. Charles. 1981. The view from the Hopi Mesas. In *The protohistoric period in the North American southwest, A.D. 1450-1700*. D. R. Wilcox and W. B. Massey, eds. Tempe: Arizona State University.
- Adams, E. Charles, Miriam T. Stark, and Deborah Dosh. 1993. Ceramic distribution and exchange: Jeddito Yellow Ware and its implications for social complexity. *Journal of Field Archaeology* 20(1):3-21.
- Aguila, Lourdes. 1998. *Cultural resources survey of the Salt River project canals, Maricopa County, Arizona (Revised)*. Cultural Resources Report No. 100. Tempe: Archaeological Consulting Services, Ltd.
- Aguila, Lourdes, Holly DeMaagd, Vicki Erhart, Gina S. Gage, Margaret Glass, Sharon Hurlbut, Karolyn Jackman, and Bruce G. Phillips. 1999. *Results of testing along the EPNG 2039 Line, southwest Phoenix, Maricopa County, Arizona*. Cultural Resources Report No. 110. Tempe: Archaeological Consulting Services, Ltd.
- Aguila, Lourdes, Robert A. Larkin, and John A. Giacobbe. 1998. Cultural resource investigations at Sun City Grand, the City of Surprise, Maricopa County, Arizona. Unpublished manuscript. Phoenix: Stantec Consulting, Inc.
- Ahlstrom, Richard V. N., and Kelley A. Hays. 1991. *Hopi cultural resources inventory: phase I*. Tucson: SWCA, Inc., Environmental Consultants.
- Allen, Donna. 1979. A preliminary survey of Camp Pima. Unpublished manuscript. Tucson: Western Archaeological and Conservation Center.
- Andresen, John M. 1985. Pottery and architecture at Compound F, Casa Grande Ruins National Monument, Arizona. In *Proceedings of the 1983 Hohokam Symposium part II*, Alfred E. Dittert, Jr., and Donald E. Dove, eds. Occasional paper no. 2. Phoenix: Arizona Archaeological Society.
- Atwell, Karen. 1992. Pinnacle Peak Village survey. Unpublished manuscript. Tempe: Office of Cultural Resources Management.
- Ayres, James E. 1966. *A Clovis fluted point from the Kayenta, Arizona area*. Tucson: Arizona State Museum.
- Bahr, Donald M. 1971. Who were the Hohokam? Evidence from Pima-Papago myths. *Ethnohistory* 18(3):245-266.
- Bahr, Donald M. 1983. Pima and Papago social organization. In *Southwest*, Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10, William C. Sturtevant, gen. ed. Washington D.C.: Smithsonian Institution Press.
- Baker, Larry L. 1991. Anasazi settlement distribution and the relationship to environment. In *Anasazi puebloan adaptation in response to climatic stress: prehistory of the middle Rio Puerco Valley*. Cynthia Irwin-Williams and Larry L. Baker, eds. Albuquerque: Bureau of Land Management.

- Baldwin, Gordon C. 1944. An occurrence of Jeddito Black-on-yellow pottery in northwestern Arizona north of the Grand Canyon. *Plateau* 17(1):14-16.
- Bartlett, John R. 1854. *Personal narrative of exploration and incidents in Texas, New Mexico, California, Sonora, and Chihuahua*. 2 vols. New York: D. Appleton.
- Basso, Keith H. 1983. Western Apache. In *Southwest*. Alfonso Ortiz, ed. Handbook of American Indians, vol. 10. William C. Sturtevant, gen. ed. Washington D.C.: Smithsonian Institution.
- Baugh, Timothy G., and Frank W. Eddy. 1987. Rethinking Apachean ceramics: 1985 Southern Athapaskan Ceramics Conference. *American Antiquity* 52(4):793-799.
- Bayham, F., D. F. Morris, and M. S. Shackley. 1986. *Prehistoric hunter-gatherers of south central Arizona: the Picacho Reservoir Archaic Project*. Anthropological field studies no. 13. Tempe: Department of Anthropology, Arizona State University.
- Begay, Richard M., and Alexandra Roberts. 1996. Early Navajo occupation of the Grand Canyon region. In *The Archaeology of Navajo origins*. Ronald H. Towner, ed. Salt Lake City: University of Utah Press.
- Berg, Gregory E., Bruce G. Phillips, and Barbara S. Macnider. In prep. Data recovery at AZ U:5:33(ASM), Maricopa County, Arizona. Tempe: Archaeological Consulting Services, Ltd.
- Bernard-Shaw, Mary. 1990. *Archaeological investigations at the Lonetree Site, AA:12:120(ASM), in the northern Tucson Basin*. Technical report no. 90-1. Tucson: Center for Desert Archaeology.
- Berry, Claudia F., and Michael S. Berry. 1986. Chronological and conceptual models of southwestern Archaic. In *Anthropology of the desert west: essays in honor of Jesse D. Jennings, C. J. Condie and D. D. Fowler*, eds. University of Utah anthropological papers no. 10. Salt Lake City: University of Utah.
- Berry, Claudia F., and William S. Marmaduke. 1980. An archaeological survey of the Ak-Chin reservation, east half. Flagstaff: Northland Research, Inc.
- Berry, Michael. 1982. *Time, space, and transition in Anasazi prehistory*. Salt Lake City: University of Utah Press.
- Betancourt, Julio L. 1978. *An archaeological synthesis of the Tucson Basin: focus on the Santa Cruz and its river park*. Archaeological series 116. Tucson: Arizona State Museum, University of Arizona.
- Black, Andrew T., and Margerie Green, eds. 1995. *The San Carlos Reservoir Cultural Resources Survey*. Cultural Resources Report No. 87. Tempe: Archaeological Consulting Services, Ltd.
- Bolton, Herbert Eugene. 1948. *Kino's historical memoir of Pimeria Alta: a contemporary account of the beginnings of California, Sonora, and Arizona, by Father Eusebio Francisco Kino, S.J., pioneer missionary, explorer, cartographer, and ranchman, 1637-1711*. vol. 1. Reprinted. Berkeley: University of California Press. Originally published 1919, Cleveland: Arthur H. Clark.
- Bontrager, Daniel R. 1986. A cultural resources survey of fourteen parcels for the CAP and Magma Irrigation District, south of Apache Junction, Pinal County, Arizona. Unpublished manuscript. Tempe: Archaeological Research Services, Inc.

- Bradley, Bruce A., and Alan Ferg. 1980. An archaeological survey of a portion of the Wagon Draw Fuelwood area. Oracle, Arizona. Unpublished manuscript. Cortez: Complete Archaeological Service Associates.
- Brandes, Raymond S. 1957. Archaeological survey within Gila County, Arizona. Unpublished manuscript. Tucson: Western Archaeological and Conservation Center, USDI National Park Service.
- Breternitz, David A. 1958. The Calkins Ranch Site, NA2,385. *Plateau* 31(1):19-20.
- Breternitz, D. A. 1960. *Excavations at three sites in the Verde Valley, Arizona*. Bulletin no. 34. Flagstaff: Museum of Northern Arizona.
- Bronitsky, Gordon, and James D. Merritt. 1986. *The archaeology of southeast Arizona: a class I cultural resource inventory*. Cultural resource series monograph no. 2. Phoenix: USDI Bureau of Land Management, Arizona State Office.
- Brown, Gary M., and Patricia M. Hancock. 1992. The Dinétah Phase in the La Plata Valley. In *Cultural diversity and adaptation: the Archaic, Anasazi, and Navajo occupation of the upper San Juan Basin*. L. S. Reed and P. F. Reed, eds. Santa Fe: Bureau of Land Management.
- Brown, Jeffrey L. 1973. The origin and nature of Salado: evidence from the Safford Valley, Arizona. Unpublished Ph.D. dissertation. Tucson: University of Arizona.
- Brugge, David M. 1963. *Navajo pottery and ethnohistory*. Window Rock: Navajoland Publications..
- Brugge, David M. 1981. *Navajo pottery and ethnohistory*. Navajo Nation papers in anthropology no. 4. Window Rock: Navajo Nation Cultural Resource Management Program.
- Burrus, Ernest J. 1971. *Kino and Manje: explorers of Sonora and Arizona*. Sources and studies for the history of the Americas no. 10. Rome: Jesuit Historical Institute.
- Buskirk, W. 1949. Western Apache subsistence economy. Unpublished Ph.D. Dissertation, University of New Mexico.
- Buskirk, Winfred. 1986. *The western Apache: living with the land before 1950*. Norman: University of Oklahoma Press.
- Cable, John S., and David E. Doyel. 1985. Hohokam land use patterns along the terraces of the lower Salt River Valley: the Central Phoenix Project. In *Proceedings of the 1983 Hohokam Symposium*, Alfred E. Dittert and Donald E. Dove, eds. Occasional paper no. 2. Phoenix: Arizona Archaeological Society.
- Cable, John S., and David E. Doyel. 1987. Pioneer period village site structure and settlement patterns in the Phoenix Basin. In *The Hohokam village: site structure and organization*. David E. Doyel, ed. Glenwood Springs, Colorado: American Association for the Advancement of Science.
- Cable, John S., Karen S. Hoffman, David E. Doyel, and Frank Ritz, eds. 1985. *City of Phoenix, archaeology of the original townsite, block 24-east*. Soil Systems publications in archaeology no. 8. Phoenix: Soil Systems, Inc.
- Cairns, Kelly. 1993. Analysis of faunal remains and canid burials. In *The Houghton Road Site: archaeological investigations at an early Formative period settlement in the Tucson Basin*. Richard Ciolek-Torrello and Chester Shaw, eds. Tucson: Statistical Research, Inc.

- Carlson, Roy. 1965. *Eighteenth century Navajo fortresses of the Gobernador District*. Studies in anthropology no. 10, Earl Morris Papers no. 2. Boulder: University of Colorado Press.
- Castetter, Edward F., Willis H. Bell, and Alvin R. Grove. 1938. *The early utilization and distribution of agave in the American Southwest*. University of New Mexico bulletin no. 335. Albuquerque: University of New Mexico.
- Chapman, Richard C. 1977. Analysis of the lithic assemblages of the lower Chaco River. In *Settlement and subsistence along the lower Chaco River: The CGP Survey*. Charles A. Reher, ed. Albuquerque: University of New Mexico Press.
- Ciolek-Torrello, Richard. 1995. The Houghton Road Site, the Agua Caliente phase, and the Early Formative period in the Tucson Basin. *Kiva* 60(4):531-574.
- Clark, Caven P., Bruce G. Phillips, Walter R. Punzmann, Lourdes Aguila, and Gina Gage. In prep. Data recovery at AZ V:13:201(ASM), Pinal County, Arizona. Tempe: Archaeological Consulting Services, Ltd.
- Clark, Jeffery J. 1995. Domestic architecture in the Early Classic period. In *The Roosevelt Community Development Study: new perspectives on Tonto Basin prehistory*. M.D. Elson, M.T. Stark, and D.A. Gregory, eds. Anthropological papers no. 15. Tucson: Center for Desert Archaeology.
- Clark, Jeffery J. 1997. Migration and integration: the Salado in the Tonto Basin. Unpublished Ph.D. dissertation. Tucson: University of Arizona.
- Clark, Jeffery J. 1998. Introduction to the Tonto Creek Archaeological Project. In *Tonto Creek Archaeological Project: archaeological investigations along Tonto Creek, vol. 1*. Jeffrey J. Clark and James M. Vint, eds. Anthropological papers no. 22. Tucson: Center for Desert Archaeology.
- Collins, William S. 1997. *Cattle ranching in Arizona*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Tempe: Arizona State University.
- Collins, William S., Melanie Sturgeon, and Robert M. Carriker. 1993. *The United States military in Arizona 1846-1945*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Tempe: Arizona State University.
- Collins, William S., Melanie Sturgeon, and Robert M. Carriker. 1997. *The United States military in Arizona 1846-1945*. Revised and updated. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Tempe: Arizona State University.
- Colton, H.S. 1946. *The Sinagua, a summary of the region of Flagstaff, Arizona*. Bulletin no. 22. Flagstaff: Museum of Northern Arizona.
- Colton, H.S. 1957. Stoneman's Lake. *Plateau* 29(3):56-58.
- Colton, H.S. 1960. *Black Sand: prehistory in northern Arizona*. Albuquerque: University of New Mexico Press.
- Colton, H.S. 1968. Frontiers of the Sinagua. In *Collected Papers in Honor of Lyndon Lane Hargrave*, A. H. Schroeder, ed. Papers of the Archaeological Society of New Mexico No. 1. Santa Fe: Museum of New Mexico Press.

- Cordell, Linda S. 1979. *Cultural resources overview of the middle Rio Grande Valley, New Mexico*. Washington, D.C.: U.S. Printing Office.
- Cordell, Linda S. 1997. *Prehistory of the Southwest*. New York: Academic Press.
- Cordell, Linda S., David E. Doyel, and Keith W. Kintigh. 1994. Processes of aggregation in the prehistoric Southwest. In *Themes in Southwest prehistory*. George J. Gumerman, ed. Santa Fe: School of American Research Press.
- Craig, Douglas B., and Jeffery J. Clark. 1994. The Meddler Point Site, AZ V:5:4/26 (ASM/TNF). In *The Roosevelt Community Development Study: vol.2, Meddler Point, Pyramid Point, and Griffin Wash sites*. M.D. Elson, D.L. Schwartz, and D.B. Craig, and J.J. Clark, eds. Anthropological papers no. 13. Tucson: Center for Desert Archaeology.
- Craig, Douglas B., and John E. Douglas. 1984. Architectural variability and community structure at Cerro Prieto (AZ AA:7:11). Presented at the 49th Annual Meeting of the Society for American Archaeology, Portland.
- Crosswhite, Frank S. 1981. Desert plants. Habitat and agriculture in relation to the major pattern of cultural differentiation in the O'odham people of the Sonoran desert. *Desert Plants*. 3:47-76.
- Crown, Patricia L. 1994. *Ceramics and ideology: Salado polychrome pottery*. Albuquerque: University of New Mexico Press.
- Crown, Patricia L., and W.J. Judge, eds. 1991. *Chaco and Hohokam: prehistoric regional systems in the American Southwest*. Santa Fe: School of American Research Press.
- Crown, Patricia L., and Earl W. Sires, Jr. 1984. The Hohokam chronology and Salt-Gila Aqueduct Project research. In *Hohokam archaeology along the Salt-Gila Aqueduct: synthesis and conclusions*, L. S. Teague and P. L. Crown, eds. Archaeological series no. 150(9). Tucson: Arizona State Museum.
- Crownover, C. Scott. 1994. Archaeological resource assessment of the North Landfill project, Biscuit Flat, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Crownover, C. Scott. 1996. An archaeological survey of the Gliege-Globe/MCO Suncor Development, northeast Scottsdale, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Cummings, Linda Scott. 1993. Pollen analysis. In *the Houghton Road Site: archaeological investigations at an early Formative period settlement in the Tucson Basin*. Richard Ciolek-Torrello and Chester Shaw, eds. Tucson: Statistical Research, Inc.
- Dart, Allen. 1989. *Prehistoric irrigation in Arizona*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Tucson: Center for Desert Archaeology.
- Deaver, William L. and Richard Ciolek-Torello. 1993. *Archaeological testing in the 100-year floodplain at 49ers Country Club, Pima County, Arizona*. Technical report no. 93-13. Tucson: Statistical Research, Inc.

- Deaver, William L. and Richard Ciolek-Torello. 1995. Early Formative Period chronology for the Tucson Basin. *Kiva* 60(4):481-530.
- DeMaagd, Holly S., and Walter R. Punzmann. 1996. Archaeological investigation of the Amberjack property, north Scottsdale, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Dennis, Carolyn K. 1989. Archaeological resources assessment of the 111th air traffic control flight facility, Williams Air Force Base, Arizona. Unpublished manuscript. Phoenix: Air National Guard of Arizona.
- Di Peso, Charles C. 1953. *The Sobaipuri Indians of the upper San Pedro River Valley*. Dragoon: Amerind Foundation.
- Di Peso, Charles C. 1956. *The Upper Pima of San Cayetano del Tumacacori: an archaeo-historical reconstruction of the O'otam of the Pimería Alta*. Dragoon: The Amerind Foundation.
- Di Peso, Charles C. 1979. Prehistory: O'otam. In *Southwest*, Alfonso Ortiz, eds. Handbook of North American Indians, vol. 9. W. C. Sturtevant, gen. ed. Washington D.C.: Smithsonian Institution.
- Dobyns, Henry F. 1974a. *Hualapai Indians, I: Prehistoric Indian occupation within the eastern area of the Yuman complex: a study in applied archaeology*. 3 vols. New York: Garland Press.
- Dobyns, Henry F. 1974b. The Kohatk: oasis and ak-chin horticulturalists. *Ethnohistory* 21(4)317-327.
- Doelle, William H. 1984. The Tucson Basin during the Protohistoric period. *The Kiva* 49(3-4):195-211.
- Doelle, William H., David A. Gregory, and Henry D. Wallace. 1995. Classic period platform mound systems in southern Arizona. In *The Roosevelt Community Development Study: new perspectives on Tonto Basin prehistory*. M.D. Elson, M.T. Stark, and D.A. Gregory, eds. Anthropological papers no. 15. Tucson: Center for Desert Archaeology.
- Doelle, William H., and Henry D. Wallace. 1989. The transition to history in Pimería Alta. In *Proceedings of the first Southwest Symposium*. Paul Minnis, ed. Boulder: Westview Press.
- Doelle, William H., and Henry D. Wallace. 1991. The changing role of the Tucson Basin in the Hohokam regional system. In *Exploring the Hohokam: prehistoric desert peoples of the American Southwest*. George J. Gumerman, ed. Albuquerque: University of New Mexico Press.
- Donaldson, Bruce R., and John R. Welch. 1991. Western Apache dwellings and their archaeological correlates. In *Mogollon V: proceedings of the Fifth Biannual Mogollon Conference*. Patrick H. Beckett, ed. Las Cruces: COAS Publishing and Research.
- Dosh, Steven G. 1988. An archaeological sample survey of Bureau of Land Management lands at the foot of the Hieroglyphic Mountains and west of Picacho Wash, Maricopa County, Arizona. Flagstaff: Unpublished manuscript. Tempe: Northland Research, Inc.
- Downum, Christian E. 1986. The occupational use of hill space in the Tucson Basin: evidence from Linda Vista Hill. *The Kiva* 51:219-232.
- Doyel, David E. 1974a. *Excavations in the Escalante Ruin Group, southern Arizona*. Archaeological Series No. 37. Tucson: Arizona State Museum, University of Arizona.

- Doyel, David E. 1974b. *The Miami Wash Project: a preliminary report on excavations in Hohokam and Salado sites near Miami, central Arizona*. Arizona highway salvage preliminary report no. 11. Tucson: Arizona State Museum, University of Arizona.
- Doyel, David E. 1976a. *The Miami-Globe Project: Hohokam and Salado in the Globe-Miami area, central Arizona*. Contribution to highway salvage archaeology in Arizona no. 52. Tucson: Arizona State Museum.
- Doyel, David E. 1976b. Revised phase system for the Globe-Miami and Tonto Basin areas, central Arizona. *The Kiva* 41(3-4):241-266.
- Doyel, David E. 1977a. *Excavations in the middle Santa Cruz Valley, southeastern Arizona*. Arizona State Museum Contributions to highway archaeology 58. Tucson: Arizona State Museum.
- Doyel, David E. 1977b. Rillito and Rincon period settlement systems in the middle Santa Cruz River Valley: alternative models. *The Kiva* 43(2):93-110.
- Doyel, David E. 1978. The Miami Wash Project: Hohokam and Salado in the Globe-Miami area, central Arizona. *Contributions to highway salvage archaeology in Arizona No. 52*. Tucson: Arizona State Museum.
- Doyel, David E. 1979. The prehistoric Hohokam of the Arizona desert. *American Scientist* 67:544-554.
- Doyel, David E. 1980. Hohokam social organization and the Sedentary to Classic transition. In *Current issues in Hohokam prehistory*, David E. Doyel and Fred Plog, eds. Anthropological research papers No. 23. Tempe: Arizona State University.
- Doyel, David E. 1981. *Late Hohokam prehistory in southern Arizona*. Contributions to archaeology 2. Gila Press, Scottsdale.
- Doyel, David E. 1989. The transition to history in northern Pimería Alta. In *Columbian quincentary*, vol. 1. D.H. Thomas, ed. Washington D.C.: Smithsonian Institution Press.
- Doyel, David E. 1991a. The Hohokam: ancient dwellers of the Arizona desert. In *The Hohokam: ancient people of the desert*. D. Noble, ed. Santa Fe: School of American Research.
- Doyel, David E. 1991b. Hohokam cultural evolution in the Phoenix Basin. In *Exploring the Hohokam: prehistoric desert peoples of the American Southwest*. G. Gumerman, ed. Albuquerque: University of New Mexico Press.
- Doyel, David E. 1991c. Hohokam exchange and interaction. In *Chaco and Hohokam: prehistoric regional systems in the American Southwest*. Patricia L. Crown and W. James Judge, eds. Santa Fe: School of American Research Press.
- Doyel, David E. 1993a. Interpreting prehistoric cultural diversity in the Arizona desert. In *Culture and contact: Charles C. Di Peso's Gran Chichimeca*. A. Woosley and John Ravesloot, eds. Albuquerque: University of New Mexico Press.
- Doyel, David E. 1993b. *Prehistoric non-irrigated agriculture in Arizona*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Estrella Research, Inc.

- Eddy, Frank W. 1966. *Prehistory of the Navajo Reservoir District, northwestern New Mexico*. Museum of New Mexico papers in anthropology 15. Santa Fe: Museum of New Mexico.
- Effland, Richard W., Jr., and Margerie Green. 1985. *Archaeological and Historic Cultural Resource Investigations for the Western Area Power Administration Liberty-Coolidge Rebuild Project*. Cultural Resources Report No. 25. Tempe: Archaeological Consulting Services, Ltd.
- Elson, Mark D. 1986. *Archaeological investigations at the Tanque Verde Wash Site, a middle Rincon settlement in the eastern Tucson Basin*. Anthropological papers no. 7. Tucson: Institute for American Research.
- Eppley, Lisa G. 1990. Lonetree chipped and ground stone analyses. In *Archaeological investigations at the Lonetree Site, AA:12:120(ASM), in the northern Tucson Basin*. Mary Bernard-Shaw, ed. Technical report no. 90-1. Tucson: Center for Desert Archaeology.
- Euler, Robert C. 1958. Walapai culture history. Unpublished Ph.D. dissertation, University of New Mexico, Albuquerque.
- Euler, Robert C., and Henry F. Dobyns. 1985. *The ethnoarchaeology of upland Arizona Yuman ceramics. In Southwestern culture history: collected papers in honor of Albert H. Schroeder*. C. H. Lange, ed. Santa Fe: Ancient City Press.
- Ezell, Paul H. 1961. *Hispanic acculturation of the Gila River Pimas*. American Anthropological Association memoir no. 90. Menasha: American Anthropological Association.
- Ezell, Paul H. 1963a. Is there a Hohokam-Pima culture continuum? *American Antiquity* 29(1):61-66.
- Ezell, Paul H. 1963b. *The Maricopas: an identification from documentary sources*. Anthropological papers of the University of Arizona no. 6. Tucson: University of Arizona Press.
- Ezell, Paul H. 1983. History of the Pima. In *Southwest*. Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10, William Sturtevant, gen. ed. Washington D.C.: Smithsonian Institution Press.
- Ferg, Alan. 1992. Western Apache and Yavapai pottery and features from the Rye Creek Project. In *The Rye Creek Project: archaeology in the upper Tonto Basin: synthesis and conclusions*. Mark D. Elson and Douglas B. Craig, eds. Anthropological papers no. 11, vol. 3. Tucson: Center for Desert Archaeology.
- Fish, Paul R. 1967. Gila Dunes: a Chiricahua stage site near Florence, Arizona. Unpublished manuscript. Tucson: Arizona State Museum, University of Arizona.
- Fish, P. R. and S. K. Fish. 1977. *Verde Valley archaeology: review and perspective*. Museum of Northern Arizona research paper no. 8. Flagstaff: Museum of Northern Arizona.
- Fish, Paul R., Suzanne K. Fish, Austin Long, and Charles Miksicek. 1986. Early corn remains from Tumamoc Hill, southern Arizona. *American Antiquity* 51(3):563-572.
- Fish, Suzanne K., Paul R. Fish, and John H. Madsen, eds. 1992. *The Marana community in the Hohokam world*. Anthropological papers no. 56. Tucson: University of Arizona.
- Fontana, Bernard L. 1974. The Papago tribe of Arizona. In *Papago Indians: Vol. III*. D. A. Horr, ed. New York: Garland.

- Fontana, Bernard L. 1983. Pima and Papago: introduction. In *Southwest*. Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10, William Sturtevant, gen. ed. Washington D. C.: Smithsonian Institution Press.
- Gerald, Rex. 1968. *Spanish presidios of the late eighteenth century in northern New Spain*. Research records no. 7. Santa Fe: Museum of New Mexico.
- Gifford, E. W. 1932. The southeastern Yavapai. *University of California publications in American archaeology and ethnology* 34(4):177-252.
- Gifford, E. W. 1936. The northeastern and western Yavapai. *University of California publications in American archaeology and ethnology* 34(4):247-354.
- Gifford, James C. 1980. *Archaeological explorations in caves of the Point of Pines region, Arizona*. Anthropological papers of the University of Arizona no. 34. Tucson: University of Arizona Press.
- Gilpin, Dennis. 1996. Early Navajo occupation west of the Chuska Mountains. In *The archaeology of Navajo origins*. Ronald H. Towner, ed. Salt Lake City: University of Utah Press.
- Gilpin, Dennis, and David A. Phillips. 1998. *The prehistoric to historic transition period in Arizona, circa A.D. 1519 to 1692*. Flagstaff: SWCA, Inc.
- Gish, Jennifer. 1989. A pollen evaluation of the Las Acequías Canal system. In *Prehistoric agricultural activities on the Lehi-Mesa Terrace: perspectives on Hohokam irrigation cycles*. Neal W. Ackerly and T. Kathleen Henderson, eds. Flagstaff: Northland Research, Inc.
- Gladwin, Harold S. 1948. *Excavations at Snaketown IV: review and conclusions*. Medallion Papers No. 38. Globe: Gila Pueblo.
- Gladwin, Winifred, and Harold S. Gladwin. 1929. *The red-on-buff culture of the Gila Basin*. Medallion Papers No. 3. Globe: Gila Pueblo.
- Gladwin, Winifred, and Harold S. Gladwin. 1930. *The western range of the red-on-buff culture*. Medallion Papers No. 5. Globe: Gila Pueblo.
- Gladwin, Winifred, and Harold S. Gladwin. 1935. *The eastern range of the Red-on-Buff culture*. Medallion Papers no. 16. Globe, Arizona: Gila Pueblo.
- Gladwin, Harold S., Emil W. Haury, E. B. Sayles, and Nora Gladwin. 1938. *Excavations at Snaketown: material culture*. Medallion papers no. 25. Globe: Gila Pueblo.
- Goodwin, Grenville. 1935. The social divisions and economic life of the western Apache. *American Anthropologist* 37(1):55-64.
- Goodwin, Grenville. 1942. *The social organization of the western Apache*. Chicago: University of Chicago Press.
- Goodwin, Grenville. 1969. *The social organization of the western Apache*. Tucson: University of Arizona Press.

- Green, Margerie. 1984. Castle Hot Springs Road relocation cultural resource survey. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Green, Margerie, ed. 1989. *Settlement, subsistence and specialization in the northern periphery: The Waddell Project*. Cultural resources report no. 65. Tempe: Archaeological Consulting Services, Ltd.
- Greenleaf, J. Cameron. 1975. *Excavations at Punta de Agua*. Anthropological papers of the University of Arizona no. 26. Tucson: Arizona State Museum.
- Greenwald, David H., and Donald R. Keller. 1988. Archaeological inventory survey of the Hieroglyphic Mountains Tract federal land exchange, Maricopa County, Arizona. Unpublished manuscript. Flagstaff: SWCA, Inc., Environmental Consultants.
- Gregory, David A. 1987. The morphology of platform mounds and the structure of Classic period Hohokam sites. In *The Hohokam village: site organization and structure*. D. E. Doyel, ed. Glenwood Springs, Colorado: Southwestern and Rocky Mountain division, American Association for the Advancement of Science.
- Gregory, David A. 1991. Form and variation in Hohokam settlement patterns. In *Chaco and Hohokam: prehistoric regional systems in the American Southwest*. Patricia L. Crown and W. James Judge, eds. Santa Fe: School of American Research Press.
- Gregory, David A., and Gary Huckleberry. 1995. *An archaeological survey in the Blackwater area: the history of human settlement in the Blackwater area*. Cultural resources report no. 86(1). Tempe: Archaeological Consulting Services, Ltd.
- Gumerman, George J. 1966. A Folsom point from the area of Mishongnovi, Arizona. *Plateau* 38:79-80.
- Gumerman, George J., ed. 1991. *Exploring the Hohokam: prehistoric desert peoples of the American Southwest*. Albuquerque: University of New Mexico Press.
- Gumerman, G. J., and J.S. Dean. 1989. Prehistoric cooperation and competition in the western Anasazi area. In *Dynamics of Southwestern Prehistory*. L. Cordell and G. J. Gumerman, eds. Washington D.C.: Smithsonian Institution Press.
- Haas, Jonathan. 1986. Warfare and tribalization in the prehistoric Southwest. Unpublished manuscript. Santa Fe: School of American Research.
- Hackbarth, Mark R. 1998. *Archaic and Hohokam occupation of the Mayo Boulevard project area in northeast Phoenix, Arizona*. Phoenix: Pueblo Grande Museum.
- Hackenbergh, Robert A. 1974. Aboriginal land use and occupancy. In *Papago Indians: Vol. I*. D. A. Horr, ed. New York: Garland.
- Hackenbergh, Robert A. 1983. Pima and Papago ecological adaptations. In *Southwest*. Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10, William Sturtevant, gen. ed. Washington D. C.: Smithsonian Institution Press.
- Hadley, Diana, and Thomas E. Sheridan. 1995. *Land use history of the San Rafael Valley, Arizona (1540-1960)*. Fort Collins: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.

- Halbirt, Carl D. 1987. Ground stone implements. In *Archaeology of the Mazatzal piedmont, central Arizona*. Richard Ciolek-Torrello, ed. Research paper no. 33. Flagstaff: Museum of Northern Arizona.
- Halbirt, Carl D., Kurt Dongoske, and T. Kathleen Henderson. 1993. Coffee Camp: a Late Archaic site on the Santa Cruz flats. In *Archaic occupation on the Santa Cruz flats: the Tator Hills Archaeological Project*. Carl D. Halbirt and T. Kathleen Henderson, eds. Flagstaff: Northland Research, Inc.
- Hammack, Nancy S. 1983. Cultural resources assessment, Tucson-Apache 115kV transmission line. Unpublished manuscript. Cortez: Complete Archaeological Service Associates.
- Harwell, Henry O., and Marsha C. S. Kelly. 1983. Maricopa. In *Southwest*. Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10, William Sturtevant, gen. ed. Washington D.C.: Smithsonian Institution Press.
- Hathaway, Jeffrey B. 1991. Cultural resources surveys of three Highway 93 right-of-way segments in northwestern Maricopa County and southwestern Yavapai County, Arizona. Unpublished manuscript. Tempe: Archaeological Research Services, Ltd.
- Haury, Emil W. 1932. *Roosevelt 9:6 a Hohokam site of the Colonial period*. Medallion papers no. 1. Globe, Arizona: Gila Pueblo.
- Haury, Emil W. 1945. The excavation of Los Muertos and neighboring ruins in the Salt River Valley, southern Arizona. *Papers of the Peabody Museum of American Archaeology and Ethnology* 24(1). Cambridge: Harvard University.
- Haury, Emil W. 1950. *The stratigraphy and archaeology of Ventana Cave*. Tucson: University of Arizona Press.
- Haury, Emil W. 1957. An alluvial site on the San Carlos Indian Reservation. *American Antiquity* 23(1):2-27.
- Haury, Emil W. 1976. *The Hohokam: desert farmers and craftsmen*. Tucson: University of Arizona Press.
- Hayden, Julian D. 1970. Of Hohokam origins and other matters. *American Antiquity* 35(1):87-94.
- Hoffman, C. Marshall, and Margerie Green. 1988. A cultural resource assessment of the additional internal park roads proposed for Lake Pleasant Regional Park, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Hohmann, John W., and Charles L. Redman, eds. 1988. *Continuing studies in Payson prehistory*. Anthropological field studies no. 21. Tempe: Office of Cultural Resource Management, Arizona State University.
- Holliday, William G. 1974. *Archaeological investigations in the Cave Creek drainage, Tonto National Forest, Arizona*. Archaeological report no. 1. Albuquerque: USDA Forest Service, Southwestern Region.
- Hooton, Earnest Albert. 1930. *The Indians of Pecos Pueblo: a study of their skeletal remains*. Andover: Yale University Press.
- Howard, Jerry B., and Gary Huckleberry. 1991. *The operation and evolution of an irrigation system: the east Papago canal study*. Publications in Archaeology No. 18. Phoenix: Soil Systems, Inc.

- Huckell, Bruce B. 1978. *The Oxbow Hill–Payson Project*. Arizona State Museum contributions to highway salvage archaeology in Arizona no. 48. Tucson: University of Arizona.
- Huckell, Bruce B. 1982. *The distribution of fluted points in Arizona: a review and an update*. Arizona State Museum archaeological series no. 145. Tucson: University of Arizona.
- Huckell, Bruce B. 1984a. The Paleo-Indian and Archaic occupation of the Tucson Basin: an overview. *The Kiva* 49(3-4):133-145.
- Huckell, Bruce B. 1984b. *The Archaic occupation of the Rosemont area, northern Santa Rita Mountains, southeastern Arizona*. Cultural Resource Management Division, Archaeological series no. 147 (1). Tucson: Arizona State Museum, University of Arizona.
- Huckell, Bruce B. 1987. Summary and conclusions. In *The Corona de Tucson Project: prehistoric use of a bajada environment*. Bruce B. Huckell, Martyn D. Tagg, and Lisa W. Huckell, eds. Archaeological series 174. Tucson: Arizona State Museum, University of Arizona.
- Huckell, Bruce B. 1988. Late Archaic archaeology of the Tucson Basin: a status report. In *Recent research on Tucson Basin prehistory: proceedings of the second Tucson Basin Conference*. W. H. Doelle and Paul R. Fish, eds. Institute for American Research anthropological papers no. 10. Tucson: Institute for American Research Anthropology.
- Huckell, Bruce B. 1990. Late preceramic farmer-foragers in southeastern Arizona: a cultural and ecological consideration of the spread of agriculture into the arid southwestern United States. Unpublished Ph.D. dissertation, University of Arizona.
- Huckell, Bruce B. 1993. *Archaeological testing of the Pima Community College new campus property: the Valencia North Project*. Technical report no. 92-13. Tucson: Center for Desert Archaeology.
- Huckell, Bruce B. 1996a. The Archaic prehistory of the North American Southwest. *Journal of World Prehistory* 10(3): 305-373.
- Huckell, Bruce B. 1996b. Middle to Late Holocene stream behavior and the transition to agriculture in southeastern Arizona. In *Early Formative adaptations in the southern Southwest*. Barbara J. Roth, ed. Monographs in world archaeology no. 25. Madison: Prehistory Press.
- Huckell, Bruce B., and Lisa W. Huckell. 1984. Excavations at Milagro, a Late Archaic site in the eastern Tucson Basin. Unpublished manuscript. Tucson: Arizona State Museum.
- Huckell, Lisa W. 1995. Plant remains from the Houghton Road Site. In *The Houghton Road Site: archaeological investigations at an Early Formative period settlement in the Tucson Basin*. Richard Ciolek-Torrello and Chester Shaw, eds. Tucson: Statistical Research, Inc.
- Irwin-Williams, C. 1973. The Oshara tradition: origins of Anasazi culture. *Contributions in anthropology* 5(1). Portales: Eastern New Mexico University.
- James, Harry C. 1974. *Pages from Hopi history*. Tucson: University of Arizona Press.

- James, Steven R. 1989. Archaeofaunal remains from the Tempe Outer Loop corridor. In *Prehistoric agricultural activities on the Lehi-Mesa Terrace: excavations at la Cuenca del Sedimento*. T. Kathleen Henderson, ed. Flagstaff: Northland Research, Inc.
- James, Steven R. 1992. Prehistoric archaeofauna from La Escuela Cuba. In *Prehistoric and historic occupation of the lower Verde River Valley: the State Route 87 Verde Bridge Project*. M. R. Hackbarth, ed. Flagstaff: Northland Research, Inc.
- Janus Associates, Inc. 1989a. *Commerce in Phoenix, 1870-1942*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Janus Associates, Inc.
- Janus Associates, Inc. 1989b. *Transcontinental railroading in Arizona 1878-1940*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Janus Associates, Inc.
- Jennings, Jesse D. ed. 1978. *Ancient North Americans*. New York: W.H. Freeman and Company.
- Jensen, Karolyn Jackman. 1994. An assessment of cultural resources along U.S. 60 between Beardsley Road and the Morristown Railroad overpass, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Johnson, Alfred E. 1963. *An appraisal of the archaeological resources of five regional parks in Maricopa County, Arizona*. Tucson: Arizona State Museum.
- Judd, Neil M. 1922. Archaeological investigations at Pueblo Bonito. *Smithsonian Miscellaneous Collections* 72(15):106-117.
- Judge, W. James. 1982. The Paleo-Indian and Basketmaker periods: an overview and some research problems, In *The San Juan tomorrow*. Fred Plog and Walter Wait, eds. Santa Fe: National Park Service, Southwest Region.
- Judge, W. James. 1989. Chaco Canyon–San Juan Basin. In *Dynamics of Southwestern prehistory*. L. Cordell and G. Gumerman, eds. Washington D.C.: Smithsonian Institution Press.
- Judge, W. James. 1991. Chaco: current views of prehistory and the regional system. In *Chaco and Hohokam: prehistoric regional systems in the American Southwest*. Patricia L. Crown and W. James Judge, eds. Santa Fe: School of American Research Press.
- Keane, Melissa, and A.E. Rogge. 1992. *Gold and silver mining in Arizona 1848-1945*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Dames & Moore.
- Keanne, Melissa, A. E. Rogge, and Bradford Luckingham. 1992. *The Chinese in Arizona, 1870-1950*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Dames & Moore.
- Kelly, Isabel T. 1978. *The Hodges Ruin*. Anthropological papers of the University of Arizona no. 30. Tucson: Arizona State Museum.

- Kenny, Brian. 1987. The Stricklin Site: A transitional site in the Hohokam northern periphery. Paper presented at the 1987 Hohokam Conference, Tempe.
- Khera, Sigrid, and Patricia S. Mariella. 1983. Yavapai. In *Southwest*. Alfonso Ortiz, ed. Handbook of North American Indians, vol. 10. E.C. Sturtevant, gen. ed. Washington, D. C.: Smithsonian Institution.
- Kidder, Alfred V. 1927. Southwestern Archaeological Conference. *Science* 66:489-491.
- Kroeber, Clifton, and B. Fontana. 1986. *Massacre on the Gila*. Tucson: University of Arizona Press.
- Kutzbach, J.E., P.J. Guetter, P.J. Behling, and R. Selin. 1993. Simulated climatic changes: results of the COHMAP climate-model experiments. In *Global climates since the last glacial maximum*. H.E. Wright, Jr., J.E. Kutzbach, T. Webb III, W.F. Ruddiman, F.A. Street-Perrott, and P.J. Bartlein, eds. Minneapolis: University of Minnesota Press.
- Kwiatkowski, Scott. 1993. Cultural resources survey of a 7.07 mile long segment of U.S. 60 right-of-way in the vicinity of Morristown and Wittmann, northwestern Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Research Services, Ltd.
- Mabry, Jonathan, ed. 1998. *Archaeological investigations of early village sites in the middle Santa Cruz River*. Anthropological papers no. 19. Tucson: Center for Desert Archaeology.
- Mabry, Jonathan B., ed. 1999. *Paleoindian and Archaic sites in Arizona*. Phoenix: Arizona State Historic Preservation Office, Arizona State Parks Board.
- Mabry, Jonathan B. and Michael K. Faught. 1999. Archaic complexes of the Early Holocene. In *Paleoindian and Archaic sites in Arizona*. Phoenix: Arizona State Historic Preservation Office, Arizona State Parks Board.
- Mabry, Jonathan B., Deborah L. Swartz, Helga Wocherl, Jeffery J. Clark, Gavin H. Archer, and Michael W. Lindeman. 1997. *Archaeological investigations of early village sites in the middle Santa Cruz Valley: descriptions of the Santa Cruz Bend, Square Hearth, Stone Pipe, and Canal sites*. Center for Desert Archaeology anthropological papers no. 18. Tucson, Center for Desert Archaeology.
- Macnider, Barbara S., and Richard W. Effland, Jr. 1989. *Cultural resources overview: the Tonto National Forest*. Tempe: Archaeological Consulting Services, Ltd.
- Macnider, Barbara S., Karolyn Jackman Jensen, Holly DeMaagd, Jerryll Moreno, and Gerald B. Doyle. 1999. *Assessment of cultural resources in Red Mountain Freeway (State Route 202) from State Route 87 to U.S. Highway 60, Mesa, Maricopa County, Arizona*. Cultural Resources Report No. 102. Tempe: Archaeological Consulting Services, Ltd.
- Madsen, John H. 1981. An archaeological survey on Cave Creek northeast of Cave Buttes Reservoir, Paradise Valley, Arizona. Unpublished manuscript. Tucson: Arizona State Museum.
- Marmaduke, William S., Claudia F. Berry, Laurene Conway, and David G. Robinson. 1983. *The Ak-Chin farm project. Archaeological survey of the Ak-Chin Indian reservation, west half*. Flagstaff: Northland Research, Inc.
- Marmaduke, William S., and Richard J. Martynek, eds. 1993. *Shell Town and the Hind Site: a study of two Hohokam craftsman communities in southwestern Arizona*. Flagstaff: Northland Research, Inc.

- Marmaduke, William S., Patricia Quillian, Todd W. Bostwick, and Brian Kenny. 1985. Archaeological survey in the Queen Creek, New Magma, and San Tan Irrigation Districts. Unpublished manuscript. Tempe: Northland Research, Inc.
- Marmaduke, William S., and D. G. Robinson. 1983. The Chuichu survey: evaluation of archaeological sites on the edge of the Papaguería. Flagstaff: Northland Research, Inc.
- Masse, W. Bruce. 1979. An intensive study of prehistoric dry farming systems near Tumamoc Hill in Tucson, Arizona. *The Kiva* 45(1-2):141-186.
- Masse, W. Bruce. 1980a. *Excavations at Gu Achi*. Western Archaeological Center publications in anthropology 12. Tucson: Western Archaeological Center.
- Masse, W. Bruce. 1980b. The Hohokam of the lower San Pedro Valley and the northern Papaguería: continuity and variability in two regional populations. In *Current issues in Hohokam prehistory*. David E. Doyel and Fred Plog, eds. Anthropological research papers no. 23. Tempe: Arizona State University.
- Matson, R. G. 1991. *The origins of southwestern agriculture*. Tucson: University of Arizona Press.
- Mayberry, James D. 1983. The Hohokam and Protohistoric periods. In *An archaeological assessment of the middle Santa Cruz River Basin, Rillito to Green Valley, Arizona, for the proposed Tucson Aqueduct Phase B, Central Arizona Project*. Jon S. Czaplicki and James D. Mayberry, eds. Arizona State Museum archaeological series no. 164. Tucson: University of Arizona.
- McGuire, Randall, and Ann Valdo Howard. 1987. The structure and organization of Hohokam shell exchange. *The Kiva* 52(2):113-46.
- Midvale, Frank J. 1920-1971. Frank J. Midvale research materials on file. Unpublished manuscript. Tempe: Arizona State University.
- Midvale, Frank. 1966. The prehistoric irrigation of the Salt River Valley. 4th ed. Unpublished map. Tempe: Arizona State University.
- Miksicek, Charles H. 1989. Snails, seeds, and charcoal: biological remains from la Cuenca del Sedimento. In *Prehistoric agricultural activities on the Lehi-Mesa Terrace: excavations at la Cuenca del Sedimento*. T. Kathleen Henderson, ed. Flagstaff: Northland Research, Inc.
- Miksicek, Charles H. 1992. The Verde Bridge Project: a view from the Float Tank. In *Prehistoric and historic occupation of the lower Verde River Valley: the State Route 87 Verde Bridge Project*. Mark Hackbarth, ed. Tempe: Northland Research, Inc.
- Moffitt, Kathleen, Sandra Rayl, and Michael Metcalf. 1978. *Archaeological investigations along the Navajo McCulloch Transmission Line, southern Utah and northern Arizona*. Museum of Northern Arizona Research Report No. 10. Flagstaff: Museum of Northern Arizona Press.
- Moreno, Jerryll, and Barbara S. Macnider. 1996. Cultural resources assessment of the Superstition Mountain Development, Apache Junction, Pinal County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.

- Morris, Donald H. 1969. Red Mountain: an Early Pioneer Period Hohokam site in the Salt River Valley of central Arizona. *American Antiquity* 34(1):40-53.
- Mueller, James W., Gregory J. Staley, Gayle G. Harrison, Ronald W. Ralph, Carla A. Sartwell, and Ronald P. Gauthier. 1968. Paria Plateau survey report, 1968 season. Unpublished manuscript. Flagstaff: Museum of Northern Arizona Press.
- National Park Service. 1986. *Guidelines for completing National Register of Historic Places form*. National Register bulletin 16. Washington D.C.: United States Department of the Interior, National Park Service, Interagency Resources Division.
- Neily, Robert. 1991. An archaeological survey of existing El Paso Natural Gas Company pipelines on the Gila River Indian Community, Maricopa and Pinal Counties, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Neily, Robert. 1992a. *Archaeological survey of the Salt River and Windy Hill parcels around Roosevelt Lake, Tonto Basin Ranger District, Tonto National Forest, Gila County, Arizona*. Tempe: Archaeological Consulting Services, Ltd.
- Neily, Robert. 1992b. An archaeological survey of 367 acres near Sun City West, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Consulting Services, Ltd.
- Nelson, Ben A. and Steven A. LeBlanc. 1986. *Short-term sedentism in the American Southwest: the Mimbres Valley Salado*. Albuquerque: Maxwell Museum of Anthropology and the University of New Mexico Press.
- Nichols, Deborah L., and Francis E. Smiley. 1985. An overview of northern Black Mesa archaeology. In *Excavations on Black Mesa, 1983: a descriptive report*. A. L. Christenson and W. J. Parry, eds. Carbondale: Southern Illinois University Press.
- Noble, David Grant, ed. 1991. *The Hohokam: ancient people of the desert*. School of American Research and advanced seminar series. Santa Fe: School of American Research.
- Officer, James E. 1987. *Hispanic Arizona, 1536-1856*. Tucson: University of Arizona Press.
- O'Brien, Patrick M., J. Simon Bruder, David A. Gregory, and A.E. Rogge. 1987. *Cultural resources technical report for the US Telecom fiber optic cable project from San Timoteo Canyon, California, to Socorro, Texas: the Arizona segment*. Phoenix: Dames & Moore.
- O'Laughlin, T.C. 1980. The Keystone Dam Site and other Archaic and Formative sites in northwest El Paso, Texas. *Publications in anthropology*, no. 8. El Paso: El Paso Centennial Museum.
- Parry, W. J., and R. L. Kelly. 1986. Expedient core technology and sedentism. In *The organization of core technology*. J. K. Johnson and C.A. Morrow, eds. Boulder: Westview Press.
- Peckham, Stewart, and John Wilson. 1967. Archaeological survey of the Chuska Valley and Chaco Plateau, New Mexico. Unpublished manuscript. Santa Fe: Museum of New Mexico.
- Pilles, Peter J. Jr. 1976. Sinagua and Salado similarities as seen from the Verde Valley. *The Kiva* 42(1):113-123.

- Pilles, Peter J. Jr. 1978. The field house and Sinagua demography. In *Limited activity and occupation sites: a collection of conference papers*. A. E. Ward, ed. Albuquerque: Center for Anthropological Studies.
- Pilles, Peter J. Jr. 1979. Sunset Crater and the Sinagua: a new interpretation. Unpublished manuscript. Flagstaff: Coconino National Forest.
- Pilles, Peter J. Jr., and Pat H. Stein. 1981. A cultural resources overview of the Coconino National Forest. Unpublished manuscript. Flagstaff: Coconino National Forest.
- Plog, Fred. 1983. Political and economic alliances on the Colorado Plateaus, A.D. 400-1450. In *Advances in world archaeology*, vol. 2. F. Wendorf and A.E. Close, eds. New York: Academic Press.
- Powers, Margaret A., and Byron P Johnson. 1987. *Defense sites of Dinétah*. Bureau of Land Management, Cultural resources series, no. 2. Albuquerque: United States Department of the Interior, Albuquerque district.
- Quillian, Patricia. 1985. Archaeological investigations along the Central Arizona Irrigation and Drainage District, Central Main Canal. Unpublished manuscript. Phoenix: Bureau of Reclamation.
- Reagan, Albert B. 1930. *Notes on the Indians of the Fort Apache region*. Anthropological papers of the American Museum of Natural History no. 31, vol. 5. New York: American Museum of Natural History.
- Reed, P. F. 1999. Environmental and cultural setting. In *A Pueblo I household on the Chuska Slope*. K. N. Hensler, P. F. Reed, S. Wilcox, J. Goff, and J. A. Torres, eds. Gallup: Navajo Nation Archaeology Department.
- Reed, P. F., and L. S. Reed. 1992. Reexamining Gobernador polychrome: toward a new understanding of the early Navajo chronological sequence in northwestern New Mexico. In *The archaeology of Navajo origins*. R. H. Towner, ed. Salt Lake City: University of Utah Press.
- Regional Environmental Consultants [RECON]. 1987. North Scottsdale reconnaissance survey, Scottsdale, Arizona. Unpublished manuscript. Phoenix: Arizona State Historic Preservation Office.
- Rice, Glen E. 1990. Variability in the development of Classic period elites. In *A design for Salado research*. G.E. Rice, ed. Roosevelt monograph series 1. Anthropological field studies 22. Tempe: Office of Cultural Resources Management, Arizona State University.
- Rieder, Morgan, and Laural Myers. 1996. A cultural resource survey along Thornydale Road for proposed road improvements between Orange Grove and Ina Roads, Pima County, Arizona. Unpublished manuscript. Tucson: SWCA, Inc., Environmental Consultants.
- Riley, Carroll L. 1987. *The frontier people: the Greater Southwest in the Protohistoric period*. Albuquerque, University of New Mexico Press.
- Rogers, Malcolm J. 1945. An outline of Yuman prehistory. *Southwestern Journal of Anthropology* 1:167-198.
- Roth, Barbara J. 1989. *Late Archaic settlement and subsistence in the Tucson Basin*. Unpublished Ph.D. dissertation, University of Arizona.

- Roth, Barbara J. 1992. Sedentary agriculturalists or mobile hunter-gatherers? Recent evidence on the Late Archaic occupation of the northern Tucson Basin. *Kiva* 57(4):291-314.
- Rozen, Kenneth. 1985. Letter report to the State Land Department regarding the survey of 330 acres north of Corona de Tucson, Pima County, Arizona. Tucson: Arizona State Museum.
- Sayles, Edwin B. 1983. *The Cochise cultural sequence in southeastern Arizona*. Anthropological papers no. 42. Tucson: University of Arizona.
- Sayles, Edwin B., and Ernst V. Antevs. 1941. *The Cochise culture*. Medallion papers 29. Globe: Gila Pueblo.
- Schaefer, Paul D. 1969. Prehistoric trade in the Southwest and the distribution of Pueblo IV Hopi Jeddito Black-on-yellow. *Kroeber Anthropological Papers* 41:54-77.
- Schroeder, Albert H. 1952. A brief survey of the lower Colorado River from Davis Dam to the international border. Unpublished manuscript. Boulder City: National Park Service.
- Schroeder, Albert. 1953. The problem of the Hohokam, Sinagua, and Salado relations in southern Arizona. *Plateau* 26(2):75-83.
- Schroeder, Albert H. 1954. Comments. *American Anthropologist* 56(4, Part 1):597-599.
- Schroeder, Albert H. 1955. Fray Marcos de Niza, Coronado, and the Yavapai. *New Mexico Historical Review* 30(4):265-296.
- Schroeder, Albert H. 1956. Fray Marcos de Niza, Coronado, and the Yavapai. *New Mexico Historical Review* 31(1):24-37.
- Schroeder, Albert H. 1960. *The Hohokam, Sinagua, and Hakataya*. Society for American Archaeology archives of archaeology, no. 5. Madison: Society for American Archaeology.
- Schroeder, Albert H. 1961. An archaeological survey of the Painted Rocks Reservoir, Western Arizona. *The Kiva* 27(1):1-28.
- Schroeder, Albert H. 1966. Pattern diffusion from Mexico into the Southwest after A.D. 600. *American Antiquity* 31(5):683-704.
- Schroeder, Albert H. 1975. *The Hohokam, Sinagua, and the Hakataya*. Madison: Society for American Archaeology.
- Schroeder, K. J. 1992. The Barr-Holben 80 acre archaeological survey located in the southern McDowell Mountains, Scottsdale, Arizona. Unpublished manuscript. Scottsdale: Roadrunner Archaeology.
- Seymour, Deni. 1989. The dynamics of Sobaipuri settlement in the eastern Pimería Alta. *Journal of the Southwest* 31(2):205-222.
- Seymour, Deni. 1993. Piman settlement survey in the middle Santa Cruz River Valley, Santa Cruz County, Arizona. Unpublished manuscript. Albuquerque: Mariah Associates, Inc.
- Seymour, Deni. 1997. Finding history in the archaeological record: the upper Piman settlement of Guevari. *Kiva* 62(3):245-260.

- Sheridan, Thomas E. 1995. *Arizona: a History*. Tucson: University of Arizona Press.
- Shutler, Dick Jr. 1950. The Dry Creek Site: a pre-pottery lithic horizon in the Verde Valley, Arizona. *Plateau* 23(1):6-10.
- Simpson, Kay C., and Susan J. Wells. 1984. *Survey of the Saguaro National Monument*. WACC publications in anthropology. Tucson: National Park Service.
- Sires, Earl W. 1984. Excavations at El Polvorón (AZ U:15:59). In *Hohokam archaeology along the Salt-Gila Aqueduct, Central Arizona Project: prehistoric occupation of the Queen Creek Delta*. Lynn S. Teague and Patricia L. Crown, eds. Archaeological series no. 150(4). Tucson: Arizona State Museum, University of Arizona.
- Sires, Earl W. 1987. Hohokam architectural variability and site structure during the Sedentary-Classic transition. In *The Hohokam village: site structure and organization*. David E. Doyel, ed. Glenwood Springs, Colorado: Southwestern Rocky Mountain Division of the American Association for the Advancement of Science.
- Slawson, Laurie V. 1993. A class III archaeological survey for the Julian and Rodeo Wash linear parks in Tucson, Arizona. Unpublished manuscript. Tucson: Cultural and Environmental Systems.
- Slawson, Laurie V. 1994. A cultural resource inventory for Sunset Hills Estates in Pima County, Arizona. Unpublished manuscript. Tucson: Cultural and Environmental Systems.
- Spier, Leslie. 1933. *Yuman tribes of the Gila River*. Chicago: University of Chicago Press.
- Steen, Charlie R. 1962. Excavations at the Upper Ruin, Tonto National Monument. In *Archaeological studies at Tonto National Monument*. L.R. Caywood, ed. Southwestern Monuments Association technical series 2. Globe, Arizona: Southwestern Monuments Association.
- Stein, Pat H. 1979. Archaeological investigations along the Salt-Gila Aqueduct. Unpublished manuscript. Flagstaff: Museum of Northern Arizona.
- Stein, Pat H. 1990. *Homesteading in Arizona 1862-1940*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Arizona State Preservation Office.
- Stein, Pat H. 1994. *Historic Trails in Arizona from Coronado to 1940*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Phoenix: Arizona State Preservation Office.
- Stephen, David V. M. 1988. Preliminary archaeological survey for the roadway alignment alternatives within the Sahuarita corridor. Unpublished manuscript. Tucson: P.A.S.T.
- Stevens, Michelle N. 1999. Spectacular results from modest remains. *Southwest Archaeology* 13(1):4-5.
- Szuter, Christine R., and Frank E. Bayham. 1987. Faunal exploitation during the Late Archaic and Pioneer periods. Paper presented at the 1987 Hohokam Conference, Tempe, Arizona.

- Teague, Lynn S., and Patricia L. Crown. 1984. *Hohokam archaeology along the Salt-Gila Aqueduct, Central Arizona Project, Volume IV: Prehistoric Occupation of the Queen Creek Delta*. Archaeological Series No. 150. Tucson: Arizona State Museum.
- Thiel, J. Homer. 1995. *Rock art in Arizona*. A component of the Arizona historic preservation plan, Arizona State Historic Preservation Office. Tucson: Center for Desert Archaeology.
- Thompson, Robert S., C. Whitlock, P. J. Bartlein, S. P. Harrison, and W. G. Spaulding. 1993. Climatic changes in the western United States since 18,000 yr. B.P. In *Global climates since the last glacial maximum*. H.E. Wright, Jr., J.E. Kutzbach, T. Webb III, W.F. Ruddiman, F.A. Street-Perrott, and P.J. Bartlein, eds. Minneapolis: University of Minnesota Press.
- Turney, Omar A. 1929. *Prehistoric irrigation*. Phoenix: Arizona State Historian.
- Underhill, Ruth. 1948. *Social Organization of the Papago Indians*. New York: Columbia University Press.
- Upham, Steadman. 1982. *Politics and power: an economic and political history of the Western Pueblo*. New York: Academic Press.
- Upham, Steadman, and Paul F. Reed. 1989. Inferring the structure of Anasazi warfare. In *Cultures in conflict: current archaeological perspectives*. D.C. Tkaczuk and B.C. Vivian, eds. Calgary: Chacmool, the Archaeological Association of the University of Calgary.
- Vivian, R. Gwinn. 1970. An Apache site on Ranch Creek, southeast Arizona. *The Kiva* 35(2):125-130.
- Vivian, R. Gwinn. 1984. Agricultural and social adjustments to changing environments in the Chaco Basin. In *Prehistoric agricultural strategies in the Southwest*. S.K. Fish and P.R. Fish, eds. Arizona State University anthropological research papers no. 33. Tempe: Arizona State University.
- Vogler, L. E., Dennis Gilpin, and J. K. Anderson. eds. 1993. *Cultural resource investigations on Gallegos Mesa: excavations in Blocks VIII and IX, and testing operations in Blocks X and XI, Navajo Indian irrigation project, San Juan County, New Mexico*. Window Rock: Navajo Nation Cultural Resource Management Program.
- Wallace, Henry D. 1986. *Rincon phase decorated ceramics in the Tucson Basin: a focus on the West Branch Site*. Anthropological papers no. 1. Tucson: Institute for American Research.
- Wallace, Henry D., and James P. Holmlund. 1984. The Classic period in the Tucson Basin. *The Kiva* 49(2):167-194.
- Wasley, William W., and David E. Doyel. 1980. The Classic period Hohokam. *The Kiva* 45(4):337-352.
- Waters, Michael R. 1986. *The geoarchaeology of Whitewater Draw, Arizona*. Anthropological papers no. 45. Tucson: University of Arizona Press.
- Waters, Michael R. 1989. Late Quaternary lacustrine history and paleoclimatic significance of Pluvial Lake Cochise, southeastern Arizona. *Quaternary Research* 32:1-11.
- Wells, Susan J. 1984. An archaeological survey of the Camp Pima environmental study area. Unpublished manuscript. Tucson: Western Archaeological and Conservation Center.

- Whalen, Norman M. 1971. *Cochise culture sites in the central San Pedro drainage, Arizona*. Unpublished Ph.D. dissertation, University of Arizona.
- Whittlesey, Stephanie M. 1993. Analysis of ceramics from the Houghton Road Site, AZ BB:13:398(ASM). Unpublished manuscript. Tucson: Statistical Research, Inc.
- Whittlesey, Stephanie M. 1995. Mogollon, Hohokam, and O'otam: rethinking the Early Formative period in southern Arizona. *Kiva* 60(4):465–480.
- Whittlesey, Stephanie M., Richard S. Ciolek-Torrello, and Matthew A. Sterner. 1994. *Southern Arizona in the last 12,000 years: a cultural-historic overview for the Western Army National Guard Aviation Training Site*. Statistical Research Technical Series no. 48. Tucson: Statistical Research, Inc.
- Whittlesey, Stephanie M., and J. Jefferson Reid. 1982. Cholla Project perspectives on Salado. In *Cholla Project archaeology: vol. 1. Introduction and special studies*. J.J. Reid, ed. Archaeological series no. 161. Tucson: Arizona State Museum.
- Wilcox, David R. 1979a. The Hohokam regional system. In *An archaeological test of the sites in the Gila Butte-Santan region, south-central Arizona*. G. Rice, D. Wilcox, K. Rafferty and J. Schoenwetter, eds. Anthropological research papers no. 18. Tempe: Arizona State University.
- Wilcox, David R. 1979b. Warfare implications of the dry-laid masonry walls of Tumamoc Hill. *The Kiva* 45(1-2):15-38.
- Wilcox, David R. 1988. The regional context of the Brady Wash and Picacho area sites. In *Synthesis and conclusions*. Hohokam settlement along the slopes of the Picacho Mountains, Tucson Aqueduct Project, vol. 6, Richard Ciolek-Torrello and David R. Wilcox, eds. Museum of Northern Arizona research papers 35. Flagstaff: Museum of Northern Arizona.
- Wilcox, David R., Thomas R. McGuire, and Charles Sternberg. 1981. *Snaketown revisited: a partial cultural resource survey, analysis of site structure, and an ethnohistoric study of the proposed Hohokam-Pima National Monument*. Archaeological series no. 155. Tucson: Arizona State Museum, University of Arizona.
- Wilcox, David R., and Charles Sternberg. 1983. *Hohokam ballcourts and their interpretation*. Archaeological series no. 160. Tucson: Arizona State Museum, The University of Arizona.
- Wills, Wirt H. 1995. Archaic foraging and the beginning of food production in the American Southwest. In *Last hunters–first farmers: new perspectives on the prehistoric transition to agriculture*. T. D. Price and A. B. Gebauer, eds. Santa Fe: School of American Research Press.
- Wills, Wirt H., and Bruce B. Huckell. 1994. Economic implications of changing land-use patterns in the Late Archaic. In *Themes in Southwest prehistory*. George J. Gumerman, ed. Santa Fe: School of American Research Press.
- Wilson, C. Dean, Eric Blinman, James M. Skibo, and Michael B. Schiffer. 1993. The designing of Southwest pottery: a technological and experimental approach. Presented at the 3rd Southwest Symposium, Tucson.

- Wood, J. Scott. 1987. *Checklist of pottery types for the Tonto National Forest: an introduction to the archaeological ceramics of central Arizona*. The Arizona archaeologist no. 21. Phoenix: Arizona Archaeological Society.
- Wood, J. Scott, and Martin McAllister. 1982. The Salado tradition: an alternative view. In *Cholla Project archaeology: vol. 1. Introduction and special studies*. J.J. Reid, ed. Archaeological series no. 161. Tucson: Arizona State Museum.
- Woodall, Gregory R. 1994. *Cultural resources survey of a 3.5 mile segment of Arizona Avenue right-of-way between Frye and Ocotillo Roads, Chandler, Maricopa County, Arizona*. Tempe: Archaeological Research Services, Inc.
- Woodbury, Richard B. 1954. Prehistoric stone implements of northeastern Arizona. *Reports of the Awatowi Expedition No. 6*. Papers of the Peabody Museum of American Archaeology and Ethnology vol. 34. Cambridge: Harvard University Press.
- Woosley, Anne I. 1980. Agricultural diversity in the prehistoric Southwest. *Kiva* 45(4):317-336.
- Wright, Thomas E. 1993. A cultural resources survey of 20 acres of Arizona state trust lands near Cave Creek Wash at Dixileta Drive in northern Phoenix, Maricopa County, Arizona. Unpublished manuscript. Tempe: Archaeological Research Services, Inc.
- Zaslow, Bert, and Alfred E. Dittert. 1977. *Pattern mathematics and archaeology: the pattern technology of the Hohokam*. Arizona State University anthropological research papers no. 2. Tempe: Arizona State University.