

ARCHEOLOGICAL ASSESSMENT

OF

**BIG BEND
NATIONAL PARK**

BY

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ARCHAEOLOGY RESEARCH PROGRAM

SOUTHERN METHODIST UNIVERSITY



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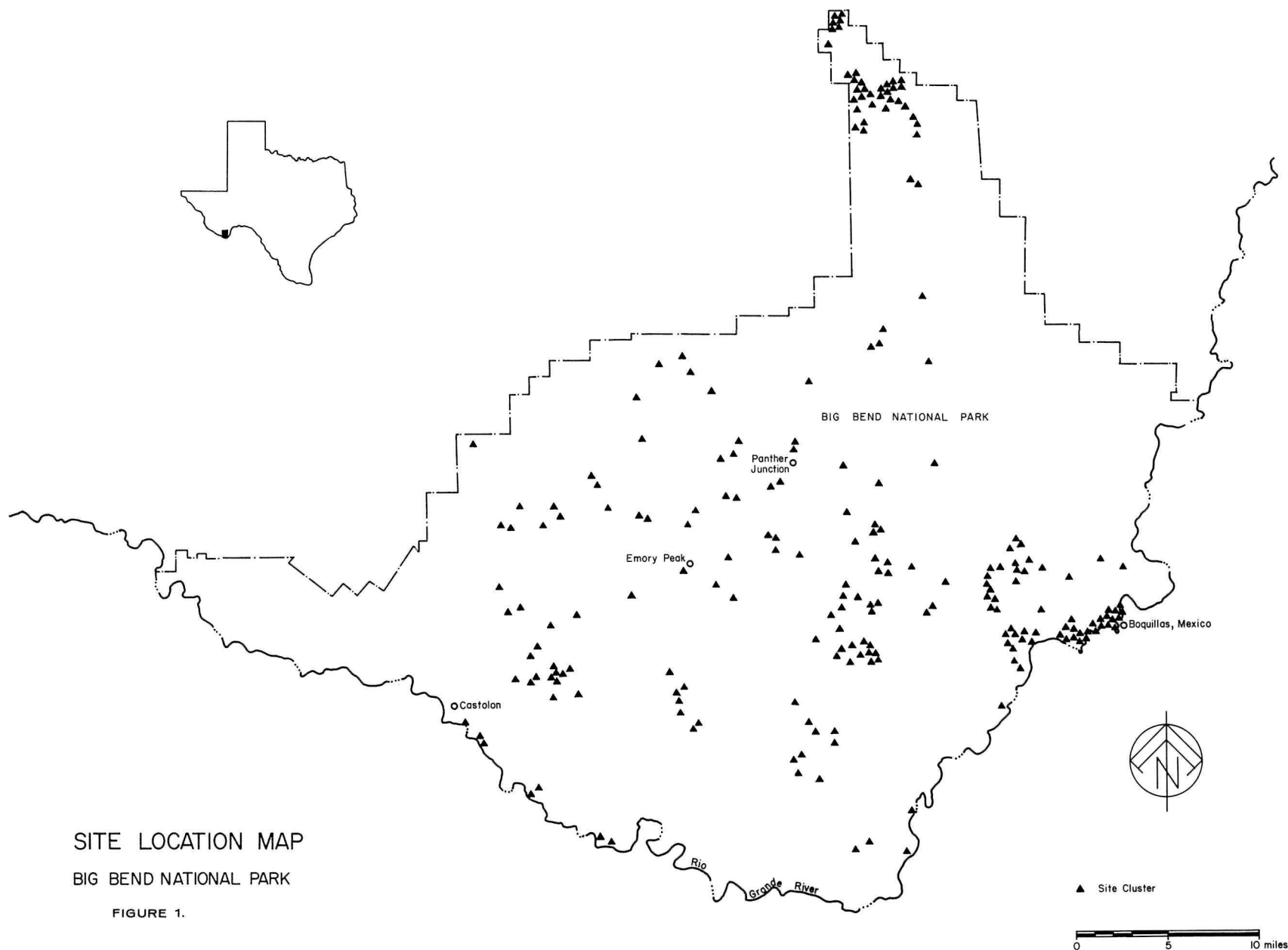
INTRODUCTION

In April of 1973 the Archaeology Research Program at Southern Methodist University undertook five projects to conduct literature and field survey assessments of the archaeological resources at five National Parks and Monuments. This report describes the results of an archaeological assessment of Big Bend National Park.

The objectives of this project were to synthesize the known literature on the prehistoric occupation at Big Bend National Park, define the major deficiencies in the literature, and discuss what might be done to correct these deficiencies. The objectives were accomplished by the following methods:

1. Compiling a thorough bibliography of all published reports concerned with the archaeology of the study area;
2. Spending one week in the field locating and evaluating sites;
3. Reviewing all literature dealing with Big Bend and abstracting each work;
4. Identifying topic areas which are instrumental toward understanding the cultural systems of all prehistoric inhabitants;
5. Recommending how these deficiencies can be corrected;
6. Preparing a synthesis of the known archaeology at the study area.

The final purpose of this report is that it serves as a tool which will allow the National Park Service to estimate the nature and intensity of a research project which would provide a detailed, comprehensive knowledge of the prehistoric occupation at Big Bend. This research project would not require total completion by one institution; in fact, the quality of information would be higher if various qualified institutions contributed to the total project. This type of project requires that an overall research design be compiled before field work is started and that an overseeing institution, namely the National Park Service, contract with other institutions to solve the various problems which have been explicitly defined in the research design.



SITE LOCATION MAP
BIG BEND NATIONAL PARK

FIGURE 1.

ENVIRONMENT

Big Bend National Park, located in the southern apex of a large bend in the Rio Grande River, represents the largest contiguous area of the Chihuahuan Desert (708,221 acres) to demonstrate the natural environmental situation. Although the area was farmed and ranched during the 19th and early 20th centuries, these pressures were removed when the official Park boundaries were established in 1944, and those areas which were affected are now returning to the natural ecological associations.

Five major ecological zones can be distinguished based on plant associations, which are determined by the amount of available moisture, temperature ranges, elevation, and topography (Wauer 1973). These are the River Floodplain - Arroyo Zone, Shrub Desert Zone, Sotol-Grassland Zone, Woodland Zone, and Moist Chisos Woodland Zone. A sixth possible zone, the Aquatic System, may be distinguished adjacent to the major water sources, the Rio Grande River, Tornillo Creek, and Terlingua Creek. This has been incompletely studied, however, and until further research is done, should be included within the River Floodplain-Arroyo Zone until more specific information becomes available.

The River Floodplain - Arroyo Zone (1800'-4000' m.s.l.) occurs adjacent to the Rio Grande River and its tributary arroyos. The moist, rich soils of this area support a dense growth of trees and shrubs. Reeds grow along the river edges, with cottonwoods, mesquite, tamarisk, willows, acacias, chollas, prickly pear, cactus, and wild flowers growing along the banks (Table 1).

The Shrub Desert Zone (1800'-3500' m.s.l.) overlies the River Floodplain - Arroyo Zone, and is a flat arid region. The low average annual rainfall (10") supports succulents and semi-succulents (Table 2); the plants are usually small and are thinly distributed over the region, which covers approximately 49% of the total Park area.

The Sotol-Grassland Zone (3200'-5500' m.s.l.) receives slightly greater amounts of rainfall and supports low growing grasses, sotol, yucca, cholla, prickly pear, various cacti, and some trees and shrubs (Table 3). This zone is found on various isolated mountains and mesas, and forms a transitional belt around the base of the Chisos Mountains. The Sotol-Grassland and Shrub Desert Zones cover approximately 98% of the total Park area.



Figure 2a. Rio Grande floodplain, desert flats, foothills, and Chisos Mountains from Santa Elena Canyon.



Figure 2b. The basin in the Chisos Mountains.

Table 1. Flora of the River Floodplain - Arroyo Zone.

Common Reed	(<u>Phragmites communis</u>)
Giant Reed	(<u>Arundo donax</u>)
Lanceleaf Cottonwood	(<u>Populus acuminata</u>)
Honey Mesquite	(<u>Prosopis glandulosa</u>)
Tamarisk	(<u>Tamarisk sps.</u>)
Seepwillow	(<u>Baccharis glutinosa</u>)
Southwest Black Willow	(<u>Salix gooddingii</u>)
Black Willow	(<u>Salix niger</u>)
Sandbar Willow	(<u>Salix interior</u>)
Yew-leaf Willow	(<u>Salix taxifolia</u>)
Retoma China	(<u>Cercidium texanum</u>)
Screwbean	(<u>Prosopis pubescens</u>)
Chaparro Brieto	(<u>Acacia rigidula</u>)
Catclaw Acacia	(<u>Acacia greggii</u>)
Huisache	(<u>Acacia farnesiana</u>)
Common Buttonbush	(<u>Cephalanthus occidentalis</u>)
Tree Tobacco	(<u>Nicotiana glauca</u>)
Desert Willow	(<u>Chilopsis linearis</u>)
Squaw Bush	(<u>Condalia spathulata</u>)
Javelina Bush	(<u>Condalia ericoides</u>)
Guayacan	(<u>Porlieria angustifolio</u>)
Cane Cholla	(<u>Opuntia imbricata inbricata</u>)
Candle Cholla	(<u>Opuntia kleiniae</u>)
Englemann Prickly Pear	(<u>Opuntia engelmannii</u>)
Brownsapine Prickly Pear	(<u>Opuntia phaeacantha</u>)
Brown-flowered Cactus	(<u>Echinocereus chloranthus chloranthus</u>)
Texas Rainbow Pitaya	(<u>Echinocereus pectinatus neomexicanus</u>)
Warty Hedgehog	(<u>Echinocereus enneacanthus enneacanthus</u>)
Devil's Claw	(<u>Echinocactus texensis</u>)
Catclaw Cactus	(<u>Echinocactus uncinatus wrightii</u>)
Turk's Head	(<u>Echinocactus hamatacanthus</u>)
Bicolor Cactus	(<u>Thelocactus bicolor schottii</u>)
White-flowered Cactus	(<u>Echinocactus erectocentrus pallidus</u>)
Peyote	(<u>Lophophora williamsii</u>)
Pancake Pincushion	(<u>Mammallaria heyderi applanata</u>)
Old-Man's Beard	(<u>Clematis drummondii</u>)
Morningglory	(<u>Ipomoea lindheimeri</u>)
Mexican Devilweed	(<u>Aster spinosus</u>)
Narrowleaf Globemallow	(<u>Spuaeralcea angustifolia</u>)
Broomrape	(<u>Orobanche ludoviciana</u>)
Cowpen Daisy	(<u>Verbesina enceliodes</u>)
Trompillo	(<u>Solanum elaeagnifolium</u>)

Chinese lanterns (Physalis lobata)
Tahoka Daisy (Machaeranthera tanacetifolia)
Pepperwort (Lepidium montanum)
Desert Bailey (Baileya multiradiata)
Espanta Vaqueros (Tidestromia lanuginosa)
Bluebells (Eustoma grandiflorum)

Table 2. Flora of the Shrub Desert Zone.

Lechuguilla	(<u>Agave lechuguilla</u>)
False Agave	(<u>Hechtia scariosa</u>)
Candelilla	(<u>Euphorbia antisiphilitica</u>)
Leather Stem	(<u>Jatropha dioica</u>)
Creosote Bush	(<u>Larrea tridentata</u>)
Tarbrush	(<u>Flourensia cernua</u>)
Chamiza	(<u>Atriplex canescans</u>)
Mormon Tea	(<u>Ephedra sp.</u>)
Ocotillo	(<u>Fouquieria splendens</u>)
Rocknettle	(<u>Eucnide bartonioides</u>)
Trailing Allionia	(<u>Allionia incarnata</u>)
Big Bend Spiderling	(<u>Boeraanavia linearifolia</u>)
Chisos Bluebonnet	(<u>Lupinus havardii</u>)
Desert Verbena	(<u>Verbena wrightii</u>)
Havard Nama	(<u>Nama havardii</u>)
Phacelia	(<u>Phacelia coerulea</u>)
Gyp Phacelia	(<u>Phacelia integrifolia</u>)
Edward's Nicollet	(<u>Nicolletia edwardsii</u>)
Chisos Prickly Poppy	(<u>Argemone chisosensis</u>)
Mesa Greggii	(<u>Nerisyrenia camporum</u>)
Gregg Keelpod	(<u>Synthlipsis greggii</u>)
Whitemargined Sandmat	(<u>Euphorbia albomarginata</u>)
Desert Tobacco	(<u>Nicotiana trigonophylla</u>)
New Mexico Dalea	(<u>Dalea neomexicana</u>)
Arizona Euphorbia	(<u>Euphorbia arizonica</u>)
Woolly-flowered Spurge	(<u>Euphorbia eriantha</u>)
Caliche Bahia	(<u>Bahia absinthifolia</u>)
Parralena	(<u>Dyssodia pentachaeta</u>)
Fendler's Bladderpod	(<u>Lesquerella fendleri</u>)
Limincillo	(<u>Pectis angustifolia</u>)
Pretty Dodder	(<u>Cuscuta indecora</u>)
Mexican Poppy	(<u>Kallstroemia grandiflora</u>)
Berlandier Flax	(<u>Linum rigidum</u>)
Cane Cholla	(<u>Opuntia imbricata imbricata</u>)
Big Bend Cane Cholla	(<u>Opuntia imbricata argentea</u>)
Tasajillo	(<u>Opuntia leptocaulis</u>)
Candle Cholla	(<u>Opuntia kleiniae</u>)
Devil Cholla	(<u>Opuntia schottii</u>)
Dog Cholla	(<u>Opuntia grahamii</u>)
Blind Prickly Pear	(<u>Opuntia rufida</u>)
Englemann Prickly Pear	(<u>Opuntia engelmannii</u>)
Brownspine Prickly Pear	(<u>Opuntia phaeacantha</u>)
Spinyfruit Prickly Pear	(<u>Opuntia spinosibacca</u>)

Purple-Tinged Prickly Pear (Opuntia macrocentra)
 Brown-flowered Cactus (Echinocereus chloranthus chloranthus)
 Chisos Pitaya (Echinocereus chisosensis)
 Slender-spined Pitaya (Echinocereus pectinatus minor)
 Rio Grande Pitaya (Echinocereus pectinatus pectinatus)
 Texas Rainbow Pitaya (Echinocereus pectinatus neomexicanus)
 Big Bend Pitaya (Echinocereus pectinatus ssp.)
 Strawberry Cactus (Echinocereus enneacanthus stramineus)
 Strawberry Hedgehog (Echinocereus enneacanthus dubius)
 Devil's Head (Echinocereus horizonthalonius)
 Devil's Claw (Echinocereus texensis)
 Catclaw Cactus (Echinocereus uncinatus wrightii)
 Turk's Head (Echinocereus hamatacanthus)
 White-flowered Cactus (Echinocereus erectocentrus pallidus)
 Warnock's Cactus (Echinocereus warnocki)
 Texas Cactus (Echinocereus conoideus)
 Living Rock (Ariocarpus fissuratus)
 Button Cactus (Epithelantha micromeris)
 Boquillas Button Cactus (Epithelantha bokei)
 Sea-urchin Cactus (Mammalleria echinus)
 Big Bend Mammalleria (Mammalleria ramillosa)
 Long Mamma (Mammalleria macromeris)
 Fragrant Cactus (Mammalleria fragrans)
 Cob Cactus (Mammalleria tuberculosa)
 White-spine Cob Cactus (Mammalleria albicolumnaria)
 Duncan's Cactus (Mammalleria duncanii)
 Foxtail Cactus (Mammalleria pottsii)
 Golf-ball Cactus (Mammalleria lasiacantha)
 Pancake Pincushion (Mammalleria heyderi applanata)
 Nipple Cactus (Mammalleria meiacantha)

Table 3. Flora of the Sotol-Grasslands Zone.

Giant Dagge	(<u>Yucca carnerosana</u>)
Torrey Yucca	(<u>Yucca torreyi</u>)
Beaked Yucca	(<u>Yucca rostrata</u>)
Soap-tree Yucca	(<u>Yucca elata</u>)
Sotol	(<u>Dasyilirian leiophyllum</u>)
Mesa Sacahuista	(<u>Nolina erumpens</u>)
Texas Persimmon	(<u>Diospyros texana</u>)
Desert Olive	(<u>Forestiera angustifolia</u>)
Allthorn	(<u>Koeberline spinosa</u>)
Desert Hackberry	(<u>Celtis pallida</u>)
Agarito	(<u>Berberis trifoliolata</u>)
Red Barberry	(<u>Berberis haematocarpa</u>)
Cat's Claw Mimosa	(<u>Mimosa biuncifera</u>)
Pink Mimosa	(<u>Mimosa borealis</u>)
Mescat Acacia	(<u>Acacia constricta</u>)
Catclaw Acacia	(<u>Acacia roemeriana</u>)
Feather Dalea	(<u>Dalea formosa</u>)
Mescal Bean	(<u>Sophora secundiflora</u>)
Mariola	(<u>Parthenium incanum</u>)
Guayule	(<u>Parthenium argentatum</u>)
Coldenia	(<u>Coldenia greggii</u>)
Woolly Butterfly bush	(<u>Buddleja marrubiifolia</u>)
Apache Plume	(<u>Fallugia paradoxa</u>)
Resin Bush	(<u>Viguiera stenoloba</u>)
Shorthorn Zexmenia	(<u>Zexmenia brevifolia</u>)
Damianita	(<u>Chrysactinia mexicana</u>)
Esperanza	(<u>Tecoma stans</u>)
River Walnut	(<u>Juglans microcarpa</u>)
Poison Ivy	(<u>Rhus toxicodendron</u>)
Evergreen Sumac	(<u>Rhus virens</u>)
Fragrant Sumac	(<u>Rhus aromatica</u>)
Littleleaf Sumac	(<u>Rhus microphylla</u>)
Silverleaf	(<u>Leucophyllum frutescens</u>)
Silverleaf	(<u>Leucophyllum candidum</u>)
Silverleaf	(<u>Leucophyllum minus</u>)
Havard Agave	(<u>Agave havardiana</u>)
Fluffgrass	(<u>Erioneuron pulchellum</u>)
Tobosa	(<u>Hilaria mutica</u>)
Chino Grama	(<u>Bouteloua breviseta</u>)
Mesa Greggii	(<u>Nerisyrenia camporum</u>)
Desert Verbena	(<u>Verbena wrightii</u>)
Fendler's Bladderpod	(<u>Lesquerella fendleri</u>)

Bracted Paintbrush (Castilleja latebracteata)
 Havard Penstemon (Penstemon havardii)
 Fendler's Penstemon (Penstemon fendleri)
 Rougeplant (Ruvila humilis)
 Arroyo Twine-vine (Sarcostemma cynanchoides)
 Scarlet Morningglory (Quamoclit coccinea)
 Bush Anisacantha (Anisacanthus insignis)
 Antelopehorn (Asclepias asperula)
 White Milkwort (Ploygala alba)
 Plains Fleabane (Erigeron modestus)
 Plains Blackfoot (Melampodium leucanthum)
 Zinnia (Zinnia acerosa)
 Rock Trumpet (Macrosiphonia macrosiphon)
 Variedleaf Bean (Phaseolus heterophyllus)
 Vetch (Vicia exigua)
 Hillside Vervain (Verbena neomexicana)
 Dayflower (Commelina erecta)
 Germander (Teucrium cubense)
 Common Horehound (Marrubium vulgare)
 Senna (Cassia lindheimeriana)
 Two-leaved Senna (Cassia durangensis)
 Indian Rushpea (Hoffmanseggia glauca)
 Showy Mendora (Mendora longiflora)
 Duccoon (Lithospermum incisum)
 Woolly Paperflower (Psilostrophe tagetina)
 Ox-eye (Heliopsis parvifolia)
 Cane Cholla (Opuntia imbricata inbricata)
 Tasajillo (Opuntia leptocaulis)
 Dog Cholla (Opuntia gramhamii)
 Grassland Prickly Pear (Opuntia macrorhiza)
 Dark-spined Prickly Pear (Opuntia atrispina)
 Englemann Prickly Pear (Opuntia engelmannii)
 Brownspine Prickly Pear (Opuntia phaeacantha)
 Chisos Prickly Pear (Opuntia lindheimeri chisosensis)
 Green-flowered Cactus (Echinocereus viridiflorus cylindricus)
 Brown-flowered Cactus (Echinocereus chloranthus chloranthus)
 Yellow-flowered Cactus (Echinocereus chloranthus ssp.)
 Texas Rainbow Pitaya (Echinocereus pectinatus neomexicanus)
 Little Claret-Cup (Echinocereus triglochidiatus melanacanthus)
 Southwest Claret-Cup (Echinocereus triglochidiatus neomexicanus)
 Texas Claret-Cup (Echinocereus trignochidiatus gurneyi)
 Devil's Head (Echinocereus horizonthalonius)
 Catclaw Cactus (Echinocereus uncinatus wrightii)
 Turk's Head (Echinocereus hamatacanthus)
 Woven Spine Pineapple Cactus (Echinocereus intertextus intertextus)

White-flowered Cactus (Echinocereus erectocentrus pallidus)
Warnock's Cactus (Echinocereus warnocki)
Cob Cactus (Mammallaria tuberculosa)
Varicolor Cactus (Mammallaria varicolor)
Nipple Cactus (Mammallaria meiacantha)

The Woodland Zone (3700'-7800' m.s.l.) receives even greater amounts of moisture than the Shrub Desert and Sotol-Grassland Zones due to its greater elevation. The Woodland Zone can be subdivided into the Deciduous Woodlands which interfinger with the Sotol-Grassland Zone, and the Coniferous Woodlands. The Deciduous Woodlands, growing in the lower elevation range, is characterized by broadleaf shrubs and trees; the Coniferous Woodlands is typefied by a piñon - juniper association (Table 4).

The Moist Chisos Woodland Zone (5000'-7200' m.s.l.) receives the highest amount of rainfall of any zone in the area. Cypress, oaks, maple, madrone, fir, and mahogany trees (Table 5) grow thickly throughout the zone's area. The thick tree cover inhibits the growth of many grasses and shrubs which occur in the lower Woodland Zone.

Fauna at Big Bend constitutes a wide variety of animals including bats, skunks, badger, javelina, fox, mountain lion, bobcat, deer, squirrel, mice, rats, rabbit, owl, hawk, heron, road-runner, lizard, snakes, and fish (Table 6). Most of these animals have wide tolerance levels with regard to ecological zones; many of them occur within all zones listed above.

The history of Big Bend geology is complex as it is an area which has been subjected to most forms of natural land modification. The constant theme of the geology has been one of deposition, faulting, folding, mountain forming, volcanic eruption, erosion, and redeposition.

The oldest exposed rock formations in the Big Bend area are Paleozoic Cambrian sediments deposited by inland seas flowing along the Ouachita Trough and forming the Ouachita System. These deposits have been repeatedly disturbed through folding and uplifting, forming mountains which were then subjected to erosion and weathering. Schist, metaquartzite, phyllite, marble, shale, chert, limestone, and novaculite make up the formations belonging to this period; prominent formations at Big Bend include the Maravillas, Caballos, and Tesnus.

The Mesozoic Era deposits were formed in great part by the inundating and receding actions of the Cretaceous seas. These thick deposits underwent erosion, continental warpage, and folding, and toward the end of the Mesozoic, the Chisos, Mariscal and Santiago Mountains of the Big Bend region were formed. Limestone, shale, sandstone, clay, and conglomerates compose the deposits.

Table 4. Flora of the Woodland Zone.

Mexican Pinyon	(<u>Pinus cembroides</u>)
Drooping Juniper	(<u>Juniperus flaeccida</u>)
Alligator Juniper	(<u>Juniperus deppeana</u>)
Red-berry Juniper	(<u>Juniperus pinchotii</u>)
Texas Madrone	(<u>Arbutus texana</u>)
Notched Lead-tree	(<u>Leucaena retusa</u>)
Vara Dulce	(<u>Eysenhardtia texana</u>)
Whitebrush	(<u>Aloysia gratissima</u>)
Palo Prieto	(<u>Vauquelinia angustifolia</u>)
Gregg Ash	(<u>Fraxinus greggii</u>)
Fragrant Ash	(<u>Fraxinus cuspidata</u>)
Mountain Mahogany	(<u>Cercocarpus montanus</u>)
Nettleaf Hackberry	(<u>Celtis reticulata</u>)
Silktassel	(<u>Garrya wrightii</u>)
Monilla	(<u>Ungnadia speciosa</u>)
Cedar Sage	(<u>Salvia roemeriana</u>)
Mountain Sage	(<u>Salvia regla</u>)
Gray Oak	(<u>Quercus grisea</u>)
Emory Oak	(<u>Quercus emoryi</u>)
Graves Oak	(<u>Quercus gravesi</u>)
Coahuila Scrub Oak	(<u>Quercus intricata</u>)
Vasey Oak	(<u>Quercus vaseyana</u>)
Gambel's Oak	(<u>Quercus gambelii</u>)
Chinkapin Oak	(<u>Quercus muehlenbergii</u>)
Chisos Oak	(<u>Quercus graciliformis</u>)
Woolly Loco	(<u>Astragalus mollissimus</u>)
Phlox	(<u>Phlox mesoleuca</u>)
Hesper Mustard	(<u>Sisymbrium linearifolium</u>)
Trompetilla	(<u>Bouvardia ternifolia</u>)
Snapdragon Vine	(<u>Mayrandia antirrhiniflora</u>)
Chisos Paintbrush	(<u>Castilleja elongata</u>)
Catchfly	(<u>Silene laciniata</u>)
Texas Milkweed	(<u>Asclepias texana</u>)
Longspur Columbine	(<u>Aquilegia longissima</u>)
Groundsel	(<u>Senecio millelobatus</u>)
Broomweed	(<u>Xanthocephalum sphaerocephalum</u>)
Evening Primrose	(<u>Oenothera greggii</u>)
Cane Cholla	(<u>Opuntia imbricata imbricata</u>)
Chisos Prickly Pear	(<u>Opuntia linoheimeri chisosensis</u>)
Little Claret-Cup	(<u>Echinocereus triglochidiatus melanacanthus</u>)
Turk's Head	(<u>Echinocereus hamatacanthus</u>)
Bisquit Cactus	(<u>Mammallaria vivipara radiosa</u>)
Mountain Cob Cactus	(<u>Mammallaria dasyacantha</u>)
Mountain Maple	(<u>Acer grandidentatum</u>)

Table 5. Flora of the Moist Chisos Woodlands Zone.

Arizona Cypress (Cupressus arizonica)
Emory Oak (Quercus emoryi)
Grave's Oak (Quercus gravesii)
Mountain Maple (Acer grandidentatum)
Texas Madrone (Arbutus texana)
Silktassel (Garrya wrightii)
Mountain Sage (Salvia regla)
Douglas Fir (Pseudotsuga menzeii)
Gray Oak (Quercus grisea)
Mountain Mahogany (Cercocarpus montanus)
Ponderosa Pine (Pinus ponderosa)
Lateleaf Oak (Quercus tardifolia)

Table 6. Fauna of Big Bend National Park.

Yuma Bat	(<u>Myotis yumanensis</u>)
Cave Bat	(<u>Myotis velifer</u>)
Fringed Bat	(<u>Myotis thysanodes</u>)
Longlegged Bat	(<u>Myotis volans</u>)
California Bat	(<u>Myotis californicus</u>)
Big Brown Bat	(<u>Eptesicus fuscus</u>)
Hoary Bat	(<u>Lasiurus cinereus</u>)
Pallid Cave Bat	(<u>Antrozous pallidus</u>)
Mexican Free-tailed Bat	(<u>Tadarida mexicana</u>)
Tailess Long-tongued Bat	(<u>Leptonycteris nivalis</u>)
Large Free-tailed Bat	(<u>Tadarida molossa</u>)
Western Mastiff Bat	(<u>Eumops perotis</u>)
Masked Bat	(<u>Myotis subulatus</u>)
Western Canyon Bat	(<u>Pipistrellus hesperus</u>)
Lump-nosed Bat	(<u>Corynorhinus rafinesquii</u>)
Raccoon	(<u>Procyon lotor</u>)
Spotted Skunk	(<u>Spilogale putorius</u>)
Striped Skunk	(<u>Mephitis mephitis</u>)
Hooded Skunk	(<u>Mephitis macroura</u>)
Hog-nosed Skunk	(<u>Conepatus mesoleucus</u>)
Badger	(<u>Taxidea taxus</u>)
Gray Fox	(<u>Urocyon cinereoargenteus</u>)
Desert Fox	(<u>Vulpes macrotis</u>)
Coyote	(<u>Canis latrans</u>)
Mountain Lion	(<u>Felis concolor</u>)
Bobcat	(<u>Lynx rufus</u>)
Crawford Shrew	(<u>Notiosorex crawfordi</u>)
Mexican Ground Squirrel	(<u>Citellus mexicanus</u>)
Spotted Ground Squirrel	(<u>Citellus spilosoma</u>)
Rock Squirrel	(<u>Citellus variegatus</u>)
Texas Antelope Ground Squirrel	(<u>Ammospermophilus interpres</u>)
Merriam Pocket Mouse	(<u>Perognathus merriami</u>)
Desert Pocket Mouse	(<u>Perognathus penicillatus</u>)
Nelson Pocket Mouse	(<u>Perognathus nelsoni</u>)
Long-tailed Grasshopper Mouse	(<u>Onychomys torridus</u>)
Desert Harvest Mouse	(<u>Reithrodontomys megalotis</u>)
Desert White-footed Mouse	(<u>Peromyscus eremicus</u>)
Brush Mouse	(<u>Peromyscus boylii</u>)
Merriam Kangaroo Rat	(<u>Dipodomys merriami</u>)
Ord Kangaroo Rat	(<u>Dipodomys ordi</u>)
Mexican Wood Rat	(<u>Neotoma mexicana</u>)
California Jack Rabbit	(<u>Lepus californicus</u>)
Davis Mountains Cottontail	(<u>Sylvilagus robustus</u>)
Beaver	(<u>Castor canadensis</u>)

Audubon Cottontail (Sylvilagus auduboni)
 Opossum (Didelphis marsupialis)
 Javelina (Pecari tajacu)
 Mule Deer (Odocoileus hemionus)
 White-tailed Deer (Odocoileus virginianus)
 Elf Owls (Micrathene whitneyi)
 Mourning Doves (Zenaidura sp.)
 Ladder-backed Woodpecker (Dendrocopos scalaris)
 Black-tailed Gnatcatcher (Polioptila melanura)
 Hooded Oriole (Icterus cucullatus)
 Zone-tailed Hawk (Buteo albonotatus)
 Louisiana Herons (Hydranassa tricolor)
 Gadwall (Anas strepera)
 Black-chinned Hummingbird (Archilochus alexandri)
 Roadrunner (Geococcyx californianus)
 Golden Eagle (Aquila chrysaetos)
 Cañon Wren (Catherpes mexicanus)
 Orange-crowned Warbler (Vermivora celata)
 Texas Banded Gecko (Coleonyx brevis)
 Great Plains Skink (Eumeces obsoletus)
 Leopard Lizard (Crotaphytus wislizeni wislizeni)
 Central Texas Whipsnake (Masticophis taeniatus ornatus)
 Bull Snake (Pituophis melanoleucus sayi)
 Regal Ringneck Snake (Diadophis punctatus regalis)
 Blacktailed Rattlesnake (Crotalus molossus molossus)
 Trans-Pecos Copperhead (Agkistrodon contortix pictigaster)
 Millipede (Orthoporus ornatus)
 Tarantulas (Dugesia echina)
 Texas Lubber (Taenipoda eques)
 Agave Snail (Humboldtiana agavophila)
 Longnose Gar (Lepisosteus osseus)
 Gizzard Shad (Dorosoma cepedianum)
 Mexican Tetra (Astyanax mexicanus)
 Mexican Stoneroller (Campostoma ornatum)
 Carp (Cyprinus carpio)
 Goldfish (Canisius aurotus)
 Round Hose Minnow (Dionda episcopa)
 Speckled Chub (Hybopsis aestivalis)
 Tamaulipas Shiner (Notropis braytoni)
 Chihuahua Shiner (Notropis chihuahua)
 Rio Grande Shiner (Notropis jemenzanus)
 Red Shiner (Notropis lutrensis)
 Bluntnose Shiner (Notropis simus)
 Flathead Minnow (Pimephales promelas)
 Longnose Dace (Rhinichthys cataractae)

River Carpsucker (Carpionodes carpio)
Smallmouth Buffalo (Ictiobus bubalus)
Blue Sucker (Cycleptus elongatus)
Gray Redhorse (Moxostoma congestum)
Blue Catfish (Ictalurus furcatus)
Channel Catfish (Ictalurus pinctatus)
Flathead Catfish (Pylodictis olivaris)
American Eel (Anguilla rostrata)
Plains Killifish (Fundulus kansae)
Mosquito Fish (Gambusia affinis)
Big Bend Gambusia (Gambusia gaigei)
Warmouth (Chaenobryttus gulosus)
Green Sunfish (Chaembryttus cyanelus)
Bluegill (Lepomis macrochirus)
Longear Sunfish (Lepomis megalotis)
Redear Sunfish (Lepomis microlophus)
Largemouth Bass (Micropterus salmoides)
Freshwater Drum (Aplodinotus grunniens)
Rio Grande Perch (Chichlasoma cyanoguttatum)
Tidewater Silverside (Menidia beryllina)
Yellow Mud Turtle (Kinosternon flavescens flavescens)
Texas Soft-shelled Turtle (Trionyx spinifer emoryi)
Big Bend Turtle (Pseudemys scripta gaigeae)

Formations of the Mesozoic Era at Big Bend include the Glen Rose, Maxon sandstone, Telephone Canyon, Del Carne limestone, Sue Peaks, Santa Elena limestone, Del Rio clay, Buda limestone, Boquillas, Pen, Aguja, and Javelina.

The Cenozoic Era saw a great amount of natural land modification through the agents of sedimentary deposition, volcanic eruptions and intrusions, folding, tilting, uplifting, erosion, and weathering. Clay, sandstone, conglomerates, mudstone, tuffs, lava, ash, and breccias make up the formations of this era, which include the Black Peaks, Hannold Hill, Canoe, Chisos, South Rim, and current depositions. Volcanic materials of hard and/or compact consistencies, especially the lavas, form many of the caprocks found throughout the area. The upper layers of the Chisos Mountains are also composed of volcanic material from this period.

HISTORY OF ARCHAEOLOGICAL WORK

Since 1535 when the first Spanish explorers entered the Big Bend area, archaeological and ethnological information has been recorded about the past and historic native cultures. While many of the reports only briefly dwell on the people and their remains, they have provided information which later researchers have used in attempting to define the inhabitants of the Big Bend.

The first modern reporting done on the archaeology of the Big Bend was a brief reconnaissance by Charles Peabody in 1909, who noted rockshelters, lithic workshops, midden circles, and rock art sites. No scientific work was done until the 1920's when Sul Ross University was established and a member of the faculty, Victor J. Smith began to actively investigate the archaeology. Smith's work, spanning over a quarter of a century, contributed greatly to bringing the area to the attention of other archaeologists, and did much to delineate links between the early periods represented at Big Bend and the Southwest. His work, concentrated on rockshelters, rock art sites, and fiber artifacts, marked the beginning of scientific interest and research.

Also during the 1920's, excavations in the Big Bend were conducted by M. R. Harrington, Edwin F. Coffin, and Claude Young. In 1928 Harrington dug 3 caves in the Chisos Mountains and 1 rockshelter in Chalk Draw. The deep deposits at the sites yielded fiber woven materials, stone tools, and floral remains, all in excellent states of preservation. Coffin's 1929 excavations at Bee Cave Canyon revealed pictographs, fire pits, grass, stone walls within the shelter, numerous stone tools, wooden tools, gourd vessels, basketry, vegetal remains, and faunal material. In the winter of 1929, the University of Texas and Witte Museum funded a reconnaissance and testing of cave sites in Santa Elena Canyon and the Chisos Mountains under the direction of Claude Young. Young's field journal, in addition to relating the cave discoveries, describes several large rock art sites in the Big Bend.

A decade of active investigation within the Big Bend region began in 1930. Victor Smith continued his research and excavations within Big Bend, and several excavation programs, primarily on cave sites, were initiated. The Smithsonian Institution spon-

sored excavations in 1931-32 under the direction of Frank Setzler at Knight Cave, Cartledge Cave, 2 unnamed caves near Mule Ear Peaks, and 2 other caves near Sunny Glen Canyon. In 1931 the Woolford-Martin expedition, sponsored by the Witte Museum, performed a reconnaissance and excavation program of shelters in Big Bend. In 1933, J. Charles Kelley began work in the area by excavating a shelter site near Alpine, and has worked for over 25 years to define the cultures and their sequence within the region by doing field work throughout central and western Texas and northern Mexico. Kelley's work revealed previously unrecognized cultures within Big Bend, notably the Bravo Valley Aspect and the controversial Livermore Focus. He has also strived to tie in the culture sequence with well documented geologic events in the region, and thereby correlate Big Bend archaeology with that in adjacent areas. Also during 1931, R. King Harris, with Fred Client, excavated a cave in Boquillas Canyon which yielded rich remains of fiber, bone, and stone implements (Harris, personal communication).

In addition to the primarily excavation programs conducted during this time, two other forms of research were started at Big Bend, systematic site survey, and compilation of data into a more cohesive unit. The first systematic site survey of portions of the Park area was conducted by Erik Reed in 1936 under the auspices of the National Park Service. Since the boundaries of the Park proper had not yet been established, Reed only dealt with parts of the Park; within this area, he located 184 sites, four of which were also excavated. In 1937, Ruel R. Cook continued the survey begun by Reed, and located 140 additional archaeological sites. The site cataloguing method employed in this survey was the first attempt at systematizing the survey data collected in Big Bend and is still in use today.

The second measure, compilation of data, began with Sayles' archaeological survey of Texas and Chihuahua (Sayles 1935). In 1938 A.T. Jackson published a book on petroglyphs and pictographs in Texas. In addition to overviews of Texas which included the Big Bend area, articles began to appear which advocated more rigid cultural sequences than Archaic, Basket-Makers of the Big Bend, and Big Bend Aspect. Throughout the 1940's this work was continued and the concept of a region became more popular.

Only sporadic field work was done during the 1940's and first part of the 1950's in Big Bend National Park. In Coahuila,

Mexico, however, several significant studies were being conducted, one by Pablo Martinez del Rio and another by Walter W. Taylor. These excavations yielded much information which correlated with and supplemented the data previously gathered at Big Bend.

During 1966-67 a University of Texas crew led by T. N. Campbell began the second archaeological site survey of Big Bend National Park. Efforts were made during this survey to relocate as many sites as possible from Reed and Cook's 1936-37 survey, as well as record all new archaeological sites encountered. During the course of the survey, 351 additional sites were recorded.

In recent years the bulk of archaeological investigation has been to redefine the cultural sequences proposed in the previous decades in light of new information and scientific techniques, and to interpret the the importance to man of the Big Bend area through time. The early ethnographic accounts left by the first explorers and settlers are being more thoroughly examined, and excavations on historic sites are being conducted. These studies have opened new avenues of research, some of which are currently being explored, and many of which are left to be done.

CHRONOLOGY

Many cultural sequences have been suggested for the Big Bend region, which is classified as the Southeastern District of the Trans-Pecos of Texas (Lehmer 1958). Although these cultural sequences often conflict as to the groupings of plans of cultural evolution, four broad categories can be delineated: Paleo-Indian; Archaic; Neo-American; and Historic. Within these categories, numerous phases of development have been proposed. From the evidence, however, several major cultural stages seem to exist; the general chronology listed below is designed as a guide. Until further definitive information is available from the Big Bend region, no rigid culture sequence can be proposed.

Paleo-Indian Stage (10,000 - 6,000 B.C.) - No direct evidence of Folsom peoples has yet been uncovered within the Big Bend. Sites of this time have been explored in adjacent areas, and it is likely that further exploration at Big Bend will yield evidence of the Folsom peoples. Material which is associated with these big-game hunters include Folsom points, end and side scrapers, and knives.

Archaic Stage (6,000 B.C. - A.D. 900) - A hunting and gathering economy was practiced during this period. Within the Big Bend area, the Maravillas Complex, Santiago Complex, and Big Bend Aspect are recognized. An additional complex, the Red Bluff, may exist, but information to either support or refute its existence is scarce; its chronological placement in relation to the Maravillas as Santiago Complexes is uncertain. Maravillas Complex - this lithic complex, associated with the Post-Neville erosion, is known only from the Calamity Creek site. Stone artifacts associated with this complex include dart points, scrapers, knives, blades, and a few grinding implements. The geologic association would indicate that this is the earliest known culture in the Big Bend region.

Santiago Complex - Occurring during the Calamity Deposition, the lithic complex known as the Santiago Complex appears to overlap during its later period with the Pecos River Focus of the Big Bend Aspect. Evidence for this culture complex was discovered at the Calamity Creek site. Cultural remains include dart points, scrapers, knives, blades, and grinding stones.

Big Bend Aspect - The culture of the Big Bend Aspect has been linked to the Basketmaker of the Southwest due to the occurrence of woven materials such as basketry, matting, and sandals. The Big Bend Aspect, however, would appear to be a similar culture rather than a direct association with the Basketmaker based on weaving techniques and lithic manufacturing techniques. The later levels of the Big Bend Aspect appear to overlap with the Neo-American Stage.

Pecos River Focus (A.D. (?) - 900) - This focus has been defined through excavations at Fate Bell Shelter, Murrah Cave, Shumla Caves, Eagle Cave, Bee Canyon Cave, and Alpine 2:7. Geologic deposits suggest its occurrence during the latter portion of the Calamity Creek deposition, and there would appear to be some overlap with the Santiago Complex. Most of the known sites of the Pecos River Focus are rockshelter sites; open camp sites are also known. Thick midden deposits are usually associated with these sites in which the remains of the material culture are found. Dart points (especially Langtry and Shumla), hand-axes, large, stemmed drills, end scrapers, ovoid and lanceolate knives, grinding stones, bedrock mortars, beads of snail shell, bone, and olivella, gorgets, pendants, bone awls, spatulas, needles, gorges, flaking tools, animal skin, atlatls, dart shafts, clubs, cradles, pipes, coiled basketry, sandals of yucca, lechugilla, and sotol, netting, matting, cordage, fishhooks, hammerstones, pecked and scratched pebbles, and petroglyphs and pictographs have all been recorded from excavations. Burials, most often in a flexed position and wrapped in matting, animal skins, or woven bags with associated grave goods have been reported; cremations occur less frequently. The subsistence economy suggested from the cultural remains is one of plant gathering, fishing, and hunting. Lithic evidence suggests some association with the Edwards Plateau Aspect of Central Texas.

Chisos Focus (A.D. 800 - 1200) - Evidence of the Chisos Focus, occurring during the Post-Calamity erosion, is found primarily at rockshelter sites in the mountainous regions of the Big Bend. Sites at which this focus has been found include Muller Rockshelter, Alpine 2:5, Alpine 2:7, Sentinel Canyon Shelter, and Bee Cave. Midden deposits contain Paisano dart points, large, stemmed drills, end scrapers, side scrapers, knives, grinding stones, bone awls, beads, animal skins, wooden fire thongs, prayer sticks (?), clubs,

atlatls, dart shafts, fire drill, split-stitch basketry, sandals of yucca, netting, matting, hammerstones, gourd vessels, and pictographs. Clay figurines and some pottery (El Paso Polychrome and Chupadero Black-on-White) have been reported from upper levels. Burials are usually flexed and wrapped in matting, animal skins, or woven bags; grave goods include weapons, tools, basketry, and food. Cremations are rare. The subsistence economy would appear to be plant gathering, hunting, and some fishing. Evidences of agriculture appear in the later levels of the focus, with maize, squash, and beans being the primary products. Arrow points, similar to types attributed to the Bravo Valley Aspect to the west, have also been recovered.

Neo-American Stage (A.D. 900 - 1400) - This stage is usually defined by the occurrence of pottery, common usage of arrow points, the practice of agriculture, and a semi-sedentary to sedentary way of life. Ceremonial and religious manifestations in the form of structures and/or artifacts became more widespread.

Livermore Focus (A.D. 800 - 1300) - This highly controversial focus has been defined on the basis of Livermore arrow points, found at Alpine 2:7 and on Mt. Livermore. Site types which have been attributed to this focus are rockshelters and open campsites. Artifacts include Livermore points, graveurs, diamond-shaped knives, snub-nose scrapers, long, narrow drills, and some trade pottery (El Paso Polychrome). No basketry, sandals, matting, or burials are known for the Livermore Focus. Suhn, Krieger, and Jelks (1954) suggest that this is an intrusion of Plains hunting people, not an indigenous culture.

Bravo Valley Aspect (A.D. 1200 - 1800) - This aspect, located to the west of Big Bend, is composed of the La Junta, Concepcion, and Conchos Foci. Although no remains have been found within the boundaries of Big Bend National Park, Lehmer (1958:116) states that "The Big Bend and Bravo Valley Aspects, together with the Livermore Focus and the Maravillas and Santiago complexes, include most of the archeological remains of the Big Bend area. This aspect demonstrates Puebloan influence through house structures (pit houses, jacal construction adobe), pottery (indigenous and trade), and agriculture (maize, beans, squash). The later periods show some evidences of European contact.

Historic Stage (A.D. 1535 - present) - The Historic Stage is considered to begin in the Big Bend region when European contact was first made by Cabeza de Vaca in 1535. After this time, the culture of the native populations began to reflect this contact, and European immigrants began to move into the area, building missions, forts, and farming communities.

Latin-American Phase (A.D. 1535 - 1850) - During this phase, Spanish immigrants began settling along the Rio Grande River; the Big Bend area was still dominated by the native peoples. There was little infringement upon the region held by the Indians until the area came under American control in 1850. During the Latin-American Phase, the Big Bend was controlled first by a group called the Chisos and later by Apaches.

Chisos Sub-Phase (A.D. 1535 - 1700) - Six related groups, whom the Spaniards called the Chisos Indians, were the primary occupants of the Big Bend area. Little is known of the Chisos Indians; they seem to have been a nomadic hunting people who ranged over the Big Bend, Chihuahua, and Coahuila, and who occasionally raided the Spanish settlements. Early documents report some agriculture being practiced near water sources by lesser groups in the Big Bend area. As Spanish settlement became more dense, the Indian groups in the area began to fight and raid the Europeans more and more frequently. The Spaniards began to retaliate, and the Chisos Indians and their allies were subdued in the late 17th century.

Apache Sub-Phase (A.D. 1700 - 1850) - Groups of Mescalero Apaches had been moving into the Big Bend region prior to the defeat of the Chisos Indians; when the Chisos were finally subdued, the Apaches began to dominate the area. Other Indian groups joined the Apaches in their rebellion and raiding against the Spaniards. The militant attitude of the Indians caused a severe drain on men and resources both for the Spaniards and the Indians. When the Big Bend area came under American jurisdiction in 1850, American troops were sent out to exterminate the Indians and the problems they presented. By 1870, virtually all native inhabitants of the area had been killed or removed.

Anglo-American Phase (A.D. 1850 - present) - When the Big Bend area came under Anglo-American control in 1850, concerted efforts were made to remove the Indian threat from

the area so that it could be opened to Anglo settlement. After 20 years of Indian fighting, Big Bend was open for settlement. The first group to move into the area were ranchers; in 1933 the Big Bend was set aside as a park and ranching activities were discontinued.

Ranching Sub-Phase (A.D. 1850 - 1933) - When the Big Bend area was opened to settlers, Texas cattlemen began to use the area for grazing. Sheep and goats were introduced in the early 20th century, and the area began to suffer from overgrazing and erosion. By the time the park was established in 1933, many areas were considered worthless for grazing; in these areas, erosion was severe and mesquite trees dominated the vegetation.

Park Sub-Phase (A.D. 1933 - present) - In 1933 portions of what is now Big Bend National Park were set aside as a state park; increasing interest in the area, not only scientific but also scenic, prompted the creation of Big Bend National Park in 1943. Since that time, the area has been allowed to return to the natural environment, and now constitutes the largest contiguous natural area of the Chihuahuan Desert.

Table 7. CHRONOLOGY OF THE BIG BEND.

Geological Episodes		Time Scale										Geological Stages	
Post-Kokernot Erosion	Present												
	A.D. 1900												
	A.D. 1800												
Kokernot Deposition	A.D. 1500											Historic Stage	
	A.D. 1200											Neo-American Stage	
Post Calamity Erosion	A.D. 900												
Upper Calamity Deposition	A.D. 1												
Lower Calamity Deposition												Archaic Stage	
Post Neville Erosion													
Neville Deposition	10,000 B.C.											Paleo-Indian Stage	

LIST OF RECORDED SITES

Legend:

A: Campsite	G: Mortar Holes
B: Shelter	H: Petroglyphs/Pictographs
C: Cave	I: Historic
D: Quarry	J: No record/Not used
E: Hearth/Hearthstones	K: Other
F: Midden	

Figure 1 shows the site locations within Big Bend National Park.

SITE DESIGNATION	TYPE	RECORDED BY
Bone Spring 1:1	A,E	N.P.S.
Bone Spring 1:2	A,G	N.P.S.
Bone Spring 1:3	A,F	N.P.S.
Bone Spring 1:4	A,E,F	N.P.S.
Bone Spring 1:5	A	Campbell
Bone Spring 1:6	A	Campbell
Bone Spring 1:7	A,F	Campbell
Bone Spring 1:8	A,E	Campbell
Bone Spring 1:9	A	Campbell
Bone Spring 1:10	A,E	Campbell
Bone Spring 1:11	A,E	Campbell
Bone Spring 1:12	B,E	Campbell
Bone Spring 4:1	A,E	N.P.S.
Bone Spring 5:1	G	N.P.S.
Bone Spring 5:2	B	N.P.S.
Bone Spring 5:3	B	N.P.S.
Bone Spring 5:4	A,E	N.P.S.
Bone Spring 5:5	A,E,F	N.P.S.
Bone Spring 5:6	A,E	N.P.S.
Bone Spring 5:7	A,E	N.P.S.
Bone Spring 5:8	B	N.P.S.
Bone Spring 5:9	B	N.P.S.
Bone Spring 5:10	B	N.P.S.
Bone Spring 5:11	B	N.P.S.
Bone Spring 5:12	A,E	N.P.S.
Bone Spring 5:13	B	N.P.S.
Bone Spring 5:14	A,E	N.P.S.
Bone Spring 5:15	B	N.P.S.
Bone Spring 5:16	B	N.P.S.

SITE DESIGNATION	TYPE	RECORDED BY
Bone Spring 5:17	B	N.P.S.
Bone Spring 5:18	B	N.P.S.
Bone Spring 5:19	A,E	N.P.S.
Bone Spring 5:20	A,E	N.P.S.
Bone Spring 5:21	A,E	N.P.S.
Bone Spring 5:22	B	N.P.S.
Bone Spring 5:23	B	N.P.S.
Bone Spring 5:24	A	N.P.S.
Bone Spring 5:25	A,E	Campbell
Bone Spring 5:26	A,I	Campbell
Bone Spring 5:27	A,E	Campbell
Bone Spring 5:28	A,E	Campbell
Bone Spring 5:29	D	Campbell
Bone Spring 5:30	E	Campbell
Bone Spring 5:31	A,E	Campbell
Bone Spring 5:32	D	Campbell
Bone Spring 5:33	A,E	Campbell
Bone Spring 5:34	A,E	Campbell
Bone Spring 5:35	A,E	Campbell
Bone Spring 5:36	A,E	Campbell
Bone Spring 5:37	A,E	Campbell
Bone Spring 5:38	C	Campbell
Bone Spring 5:39	A,E	Campbell
Bone Spring 5:40	A,E	Campbell
Bone Spring 5:41	A,E	Campbell
Bone Spring 5:42	A	Campbell
Bone Spring 5:43	A	Campbell
Bone Spring 5:44	A,E	Campbell
Bone Spring 5:45	A	Campbell
Bone Spring 8:1	B	N.P.S.
Bone Spring 8:2	B	N.P.S.
Bone Spring 8:3	B	N.P.S.
Bone Spring 8:4	B	N.P.S.
Bone Spring 9:1	A,E	N.P.S.
Bone Spring 9:2	B	N.P.S.
Bone Spring 9:3	B	N.P.S.
Bone Spring 9:4	B,H	N.P.S.
Bone Spring 9:5	B	N.P.S.
Chisos 1:1	B	N.P.S.
Chisos 1:2	B	N.P.S.
Chisos 1:3	A	N.P.S.
Chisos 1:4	A	N.P.S.
Chisos 1:5	A,G	N.P.S.

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 1:6	A	N.P.S.
Chisos 1:7	B	N.P.S.
Chisos 1:8	A	N.P.S.
Chisos 1:9	A,E	N.P.S.
Chisos 1:10	A,E	Campbell
Chisos 1:11	A,E	Campbell
Chisos 1:12	A,E	Campbell
Chisos 1:13	A,E	Campbell
Chisos 1:14	A,E	Campbell
Chisos 1:15	A,E	Campbell
Chisos 1:16	A	Campbell
Chisos 1:17	A	Campbell
Chisos 1:18	A	Campbell
Chisos 1:19	A,E	Campbell
Chisos 1:20	A,E	Campbell
Chisos 1:21	B	Campbell
Chisos 1:22	K	Campbell
Chisos 1:23	A,E	Campbell
Chisos 1:24	E,F	Campbell
Chisos 1:25	A,E	Campbell
Chisos 1:26	A,E	Campbell
Chisos 2:1	F	N.P.S.
Chisos 2:2	F	N.P.S.
Chisos 2:3	A,E	N.P.S.
Chisos 2:4	A,E	N.P.S.
Chisos 2:5	A,F,G,I	N.P.S.
Chisos 2:6	A	N.P.S.
Chisos 2:7	A	N.P.S.
Chisos 2:8	J	N.P.S.
Chisos 2:9	J	N.P.S.
Chisos 2:10	J	N.P.S.
Chisos 2:11	J	N.P.S.
Chisos 2:12	J	N.P.S.
Chisos 2:13	J	N.P.S.
Chisos 2:14	J	N.P.S.
Chisos 2:15	J	N.P.S.
Chisos 2:16	J	N.P.S.
Chisos 2:17	J	N.P.S.
Chisos 2:18	J	N.P.S.
Chisos 2:19	J	N.P.S.
Chisos 2:20	A,E	N.P.S.
Chisos 2:21	A	N.P.S.
Chisos 2:22	A	N.P.S.

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	2:23	A,E	N.P.S.
Chisos	2:24	A	N.P.S.
Chisos	2:25	A	Campbell
Chisos	2:26	A	Campbell
Chisos	2:27	A,E	Campbell
Chisos	2:28	A,E	Campbell
Chisos	2:29	A,E	Campbell
Chisos	2:30	A,E	Campbell
Chisos	2:31	D	Campbell
Chisos	2:32	J	Campbell
Chisos	2:33	A,E	Campbell
Chisos	2:34	A,E	Campbell
Chisos	2:35	A,E	Campbell
Chisos	2:36	B	Campbell
Chisos	2:37	A,E	Campbell
Chisos	2:38	A,E	Campbell
Chisos	2:39	A,E	Campbell
Chisos	2:40	A,E	Campbell
Chisos	2:41	F,G,K	Campbell
Chisos	2:42	A	Campbell
Chisos	2:43	A,E,F	Campbell
Chisos	2:44	A,E	Campbell
Chisos	2:45	A,E	Campbell
Chisos	2:46	A	Campbell
Chisos	2:47	A,K	Campbell
Chisos	2:48	A,E	Campbell
Chisos	2:49	A,E	Campbell
Chisos	2:50	A,E	Campbell
Chisos	2:51	A,E	Campbell
Chisos	2:52	A,E,F	Campbell
Chisos	2:53	A,E	Campbell
Chisos	2:54	A	Campbell
Chisos	2:55	A,G,K	Campbell
Chisos	2:56	A,E	Campbell
Chisos	2:57	A,E	Campbell
Chisos	2:58	A,E	Campbell
Chisos	3:1	A,E	N.P.S.
Chisos	3:2	C	N.P.S.
Chisos	3:3	A,E	N.P.S.
Chisos	3:4	A	N.P.S.
Chisos	3:5	A	N.P.S.
Chisos	3:6	A,E	Campbell
Chisos	3:7	D	Campbell

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 3:8	A,E	Campbell
Chisos 3:9	A,E	Campbell
Chisos 3:10	A,E	Campbell
Chisos 3:11	F	Campbell
Chisos 3:12	A	Campbell
Chisos 3:13	A,E	Campbell
Chisos 3:14	A	Campbell
Chisos 3:15	A,E	Campbell
Chisos 3:16	A,D,E	Campbell
Chisos 3:17	A,E	Campbell
Chisos 3:18	A,E	Campbell
Chisos 3:19	A,E	Campbell
Chisos 3:20	A,E	Campbell
Chisos 3:21	A,E	Campbell
Chisos 3:22	A,E,F	Campbell
Chisos 3:23	A,E	Campbell
Chisos 3:24	A,D,E	Campbell
Chisos 3:25	A,E	Campbell
Chisos 3:26	A,E	Campbell
Chisos 3:27	A,E	Campbell
Chisos 3:28	Chisos 3:1, 3:2	Campbell
Chisos 3:29	A,D	Campbell
Chisos 3:30	A,E	Campbell
Chisos 3:31	A,E	Campbell
Chisos 3:32	A	Campbell
Chisos 3:33	A	Campbell
Chisos 3:34	A,E	Campbell
Chisos 3:35	A	Campbell
Chisos 3:36	A,E	Campbell
Chisos 3:37	A,E	Campbell
Chisos 3:38	A,E	Campbell
Chisos 3:39	A,E	Campbell
Chisos 3:40	A,E	Campbell
Chisos 3:41	A,E	Campbell
Chisos 3:42	A	Campbell
Chisos 3:43	A	Campbell
Chisos 3:44	A,E	Campbell
Chisos 3:45	D	Campbell
Chisos 3:46	A,E	Campbell
Chisos 3:47	A	Campbell
Chisos 3:48	D	Campbell
Chisos 3:49	A,D,E	Campbell
Chisos 3:50	A,E	Campbell
Chisos 3:51	A	Campbell

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 3:52	A,E	Campbell
Chisos 3:53	A	Campbell
Chisos 3:54	A,E	Campbell
Chisos 3:55	A,E	Campbell
Chisos 3:56	A,E	Campbell
Chisos 3:57	A,G	Campbell
Chisos 3:58	A,E	Campbell
Chisos 3:59	A,D	Campbell
Chisos 3:60	A,D	Campbell
Chisos 3:61	A,D	Campbell
Chisos 3:62	D	Campbell
Chisos 3:63	A,D	Campbell
Chisos 3:64	A,E	Campbell
Chisos 5:1	A	N.P.S.
Chisos 5:2	A	N.P.S.
Chisos 5:3	A	N.P.S.
Chisos 5:4	A,H	N.P.S.
Chisos 5:5	Chisos 5:77	N.P.S.
Chisos 5:6	A	N.P.S.
Chisos 5:7	A	N.P.S.
Chisos 5:8	B	N.P.S.
Chisos 5:9	B	N.P.S.
Chisos 5:10	A	N.P.S.
Chisos 5:11	B	N.P.S.
Chisos 5:12	A,B,H	Campbell
Chisos 5:13	B	N.P.S.
Chisos 5:14	B	N.P.S.
Chisos 5:15	B	N.P.S.
Chisos 5:16	B	N.P.S.
Chisos 5:17	B	N.P.S.
Chisos 5:18	B	N.P.S.
Chisos 5:19	B	N.P.S.
Chisos 5:20	B	N.P.S.
Chisos 5:21	B	N.P.S.
Chisos 5:22	B	N.P.S.
Chisos 5:23	A	N.P.S.
Chisos 5:24	A	N.P.S.
Chisos 5:25	A	N.P.S.
Chisos 5:26	A	N.P.S.
Chisos 5:27	A	N.P.S.
Chisos 5:28	A	Campbell
Chisos 5:29	B	Campbell
Chisos 5:30	A	Campbell

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	5:31	J	N.P.S.
Chisos	5:32	A	N.P.S.
Chisos	5:33	A	N.P.S.
Chisos	5:34	A	N.P.S.
Chisos	5:35	J	N.P.S.
Chisos	5:36	J	N.P.S.
Chisos	5:37	J	N.P.S.
Chisos	5:38	J	N.P.S.
Chisos	5:39	B	N.P.S.
Chisos	5:40	B	N.P.S.
Chisos	5:41	B	N.P.S.
Chisos	5:42	A	N.P.S.
Chisos	5:43	B	N.P.S.
Chisos	5:44	J	N.P.S.
Chisos	5:45	J	N.P.S.
Chisos	5:46	J	N.P.S.
Chisos	5:47	A	N.P.S.
Chisos	5:48	A	Campbell
Chisos	5:49	A	Campbell
Chisos	5:50	A	Campbell
Chisos	5:51	A	Campbell
Chisos	5:52	B	Campbell
Chisos	5:53	A	Campbell
Chisos	5:54	A	Campbell
Chisos	5:55	A	Campbell
Chisos	5:56	A	Campbell
Chisos	5:57	A,D	Campbell
Chisos	5:58	B	Campbell
Chisos	5:59	A	Campbell
Chisos	5:60	A	Campbell
Chisos	5:61	A	Campbell
Chisos	5:62	A	Campbell
Chisos	5:63	A	Campbell
Chisos	5:64	A	Campbell
Chisos	5:65	A	Campbell
Chisos	5:66	A	Campbell
Chisos	5:67	A	Campbell
Chisos	5:68	A	Campbell
Chisos	5:69	A	Campbell
Chisos	5:70	A	Campbell
Chisos	5:71	B,H	Campbell
Chisos	5:72	A	Campbell
Chisos	5:73	B,H	Campbell

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 5:74	B	Campbell
Chisos 5:75	D	Campbell
Chisos 5:76	A	Campbell
Chisos 5:77	A	Campbell
Chisos 5:78	A,E	Campbell
Chisos 5:79	A	Campbell
Chisos 5:80	A	Campbell
Chisos 5:81	A	Campbell
Chisos 5:82	A	Campbell
Chisos 5:83	E	Campbell
Chisos 5:84	A	Campbell
Chisos 5:85	A	Campbell
Chisos 5:86	A	Campbell
Chisos 5:87	A	Campbell
Chisos 5:88	G	Campbell
Chisos 5:89	A	Campbell
Chisos 5:90	A	Campbell
Chisos 5:91	A	Campbell
Chisos 5:92	A	Campbell
Chisos 5:93	A	Campbell
Chisos 5:94	A	Campbell
Chisos 5:95	A	Campbell
Chisos 5:96	A	Campbell
Chisos 5:97	A	Campbell
Chisos 5:98	A	Campbell
Chisos 5:99	A	Campbell
Chisos 5:100	A	Campbell
Chisos 5:101	A	Campbell
Chisos 5:102	A	Campbell
Chisos 5:103	A	Campbell
Chisos 5:104	A	Campbell
Chisos 5:105	A	Campbell
Chisos 5:106	A	Campbell
Chisos 5:107	A	Campbell
Chisos 5:108	A	Campbell
Chisos 5:109	A	Campbell
Chisos 5:110	A	Campbell
Chisos 5:111	A	Campbell
Chisos 5:112	A,K	Campbell
Chisos 5:113	A,K	Campbell
Chisos 5:114	A	Campbell
Chisos 5:115	K	Campbell
Chisos 5:116	E	Campbell

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 5:117	A	Campbell
Chisos 5:118	A,F,H	Campbell
Chisos 5:119	A,F,K	Campbell
Chisos 5:120	A,F	Campbell
Chisos 5:121	A	Campbell
Chisos 5:122	A,E	Campbell
Chisos 5:123	A	Campbell
Chisos 5:124	A,E	Campbell
Chisos 5:125	A	Campbell
Chisos 6:1	A,B,G,H	N.P.S.
Chisos 6:2	B	N.P.S.
Chisos 6:3	B	N.P.S.
Chisos 6:4	B	N.P.S.
Chisos 6:5	B	N.P.S.
Chisos 6:6	B	N.P.S.
Chisos 6:7	A	N.P.S.
Chisos 6:8	B	N.P.S.
Chisos 6:9	B	N.P.S.
Chisos 6:10	B	N.P.S.
Chisos 6:11	B	N.P.S.
Chisos 6:12	B	N.P.S.
Chisos 6:13	B	N.P.S.
Chisos 6:14	B	N.P.S.
Chisos 6:15	A	N.P.S.
Chisos 6:16	A	N.P.S.
Chisos 6:17	A,G	N.P.S.
Chisos 6:18	A	N.P.S.
Chisos 6:19	A	N.P.S.
Chisos 6:20	A	N.P.S.
Chisos 6:21	A	N.P.S.
Chisos 6:22	B	N.P.S.
Chisos 6:23	B	N.P.S.
Chisos 6:24	A	N.P.S.
Chisos 6:25	A	N.P.S.
Chisos 6:26	B	N.P.S.
Chisos 6:27	B	N.P.S.
Chisos 6:28	B	N.P.S.
Chisos 6:29	B	N.P.S.
Chisos 6:30	A	N.P.S.
Chisos 6:31	B	N.P.S.
Chisos 6:32	B	N.P.S.
Chisos 6:33	B	N.P.S.
Chisos 6:34	C	N.P.S.



Figure 3a. Chisos 6:2, an excavated rockshelter in the Chisos Mountains. Note midden deposit in foreground.



Figure 3b. Chisos 6:1, a large complex site. Midden deposit in foreground and boulder shelter.

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	6:35	A	N.P.S.
Chisos	6:36	B	N.P.S.
Chisos	6:37	A	N.P.S.
Chisos	6:38	A,F	N.P.S.
Chisos	6:39	F	N.P.S.
Chisos	6:40	A	N.P.S.
Chisos	6:41	B	N.P.S.
Chisos	6:42	A	N.P.S.
Chisos	6:43	F	N.P.S.
Chisos	6:44	B	N.P.S.
Chisos	6:45	B	N.P.S.
Chisos	6:46	B	N.P.S.
Chisos	6:47	B	N.P.S.
Chisos	6:48	B	N.P.S.
Chisos	6:49	B	N.P.S.
Chisos	6:50	B	N.P.S.
Chisos	6:51	B	N.P.S.
Chisos	6:52	B	N.P.S.
Chisos	6:53	B	N.P.S.
Chisos	6:54	B	N.P.S.
Chisos	6:55	B	N.P.S.
Chisos	6:56	B	N.P.S.
Chisos	6:57	B	N.P.S.
Chisos	6:58	B	N.P.S.
Chisos	6:59	F	N.P.S.
Chisos	6:60	B	N.P.S.
Chisos	6:61	B	N.P.S.
Chisos	6:62	B	N.P.S.
Chisos	6:63	B	N.P.S.
Chisos	6:64	J	N.P.S.
Chisos	6:65	J	N.P.S.
Chisos	6:66	J	N.P.S.
Chisos	6:67	J	N.P.S.
Chisos	6:68	J	N.P.S.
Chisos	6:69	B	N.P.S.
Chisos	6:70	B	N.P.S.
Chisos	6:71	B	N.P.S.
Chisos	6:72	B	N.P.S.
Chisos	6:73	A	N.P.S.
Chisos	6:74	A,F	N.P.S.
Chisos	6:75	J	N.P.S.
Chisos	6:76	E	N.P.S.
Chisos	6:77	A	Campbell

SITE DESIGNATION	TYPE	RECORDED BY
Chisos 6:78	A,F	Campbell
Chisos 6:79	G	Campbell
Chisos 6:80	A	Campbell
Chisos 6:81	B	Campbell
Chisos 6:82	A	Campbell
Chisos 6:83	A	Campbell
Chisos 6:84	A	Campbell
Chisos 6:85	A	Campbell
Chisos 6:86	A	Campbell
Chisos 6:87	A	Campbell
Chisos 6:88	A,D,K	Campbell
Chisos 6:89	A	Campbell
Chisos 6:90	A,F	Campbell
Chisos 6:91	A,F	Campbell
Chisos 6:92	A	Campbell
Chisos 6:93	F,G,K	Campbell
Chisos 6:94	A,E,K	Campbell
Chisos 6:95	A	Campbell
Chisos 6:96	D	Campbell
Chisos 6:97	A	Campbell
Chisos 6:98	A	Campbell
Chisos 6:99	A	Campbell
Chisos 6:100	A	Campbell
Chisos 6:101	A,F	Campbell
Chisos 6:102	B	N.P.S.
Chisos 6:103	B	N.P.S.
Chisos 6:104	B	N.P.S.
Chisos 7:1	B	N.P.S.
Chisos 7:2	B	N.P.S.
Chisos 7:3	B	N.P.S.
Chisos 7:4	A	N.P.S.
Chisos 7:5	A,B	N.P.S.
Chisos 7:6	B	N.P.S.
Chisos 7:7	A	N.P.S.
Chisos 7:8	A	N.P.S.
Chisos 7:9	A	N.P.S.
Chisos 7:10	A,E	N.P.S.
Chisos 7:11	B	N.P.S.
Chisos 7:12	B	N.P.S.
Chisos 7:13	A	N.P.S.
Chisos 7:14	A	N.P.S.
Chisos 7:15	A	N.P.S.
Chisos 7:16	E	N.P.S.



Figure 4a. Dog Canyon in the northern portion of the Big Bend National Park.



Figure 4b. A hearth with scattered flint debris near Dog Canyon.

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	7:17	A,E	N.P.S.
Chisos	7:18	J	N.P.S.
Chisos	7:19 (7:30?)	A,E	N.P.S.
Chisos	7:20	E,F	N.P.S.
Chisos	7:21	A	N.P.S.
Chisos	7:22	A,E	N.P.S.
Chisos	7:23	D,E	Campbell
Chisos	7:24	I	Campbell
Chisos	7:25	I	Campbell
Chisos	7:26	A,E	Campbell
Chisos	7:27	A,E,F	Campbell
Chisos	7:28	D,E	Campbell
Chisos	7:29	A,E	Campbell
Chisos	7:30	E,F,I	Campbell
Chisos	7:31	A,B,D	Campbell
Chisos	7:32	E,F,I	Campbell
Chisos	7:33	A,F	Campbell
Chisos	7:34	A,E,F	Campbell
Chisos	7:35	A,E,I	Campbell
Chisos	7:36	A,E	Campbell
Chisos	7:37	A,E	Campbell
Chisos	7:38	A,F	Campbell
Chisos	7:39	A,E,I	Campbell
Chisos	7:40	A,E,F	Campbell
Chisos	7:41	A,E,F	Campbell
Chisos	7:42	A,E	Campbell
Chisos	7:43	A,E	Campbell
Chisos	7:44	A,E	Campbell
Chisos	7:45	A	Campbell
Chisos	7:46	A,E	Campbell
Chisos	7:47	A,E	Campbell
Chisos	7:48	A,E	Campbell
Chisos	7:49	A,D,E	Campbell
Chisos	7:50	A,E	Campbell
Chisos	7:51	A,E,F	Campbell
Chisos	7:52	A,E,K	Campbell
Chisos	7:53	A,E	Campbell
Chisos	7:54	A,D,E	Campbell
Chisos	7:55	A,E	Campbell
Chisos	7:56	A,E,G,K	Campbell
Chisos	7:57	A,E	Campbell
Chisos	7:58	A,E	Campbell
Chisos	7:59	A,E,F	Campbell

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	7:60	A,E	Campbell
Chisos	7:61	A,E	Campbell
Chisos	7:62	B,H	Campbell
Chisos	7:63	B,E,H	Campbell
Chisos	7:64	A,E	Campbell
Chisos	7:65	E	Campbell
Chisos	7:66	E	Campbell
Chisos	7:67	A,E	Campbell
Chisos	7:68	A,E	Campbell
Chisos	7:69	A,E	Campbell
Chisos	7:70	A,E	Campbell
Chisos	7:71	A,E,K	Campbell
Chisos	7:72	A,E,F,G	Campbell
Chisos	8:1	A,E	N.P.S.
Chisos	8:2	C,F,K	N.P.S.
Chisos	8:3	A,E,G	N.P.S.
Chisos	8:4	B,F	N.P.S.
Chisos	8:5	F	N.P.S.
Chisos	8:6	B	N.P.S.
Chisos	8:7	A	N.P.S.
Chisos	8:8	A	N.P.S.
Chisos	8:9	A	N.P.S.
Chisos	8:10	A	N.P.S.
Chisos	8:11	A,E,G	N.P.S.
Chisos	8:12	A,G	N.P.S.
Chisos	8:13	A,E	N.P.S.
Chisos	8:14	A,E	N.P.S.
Chisos	8:15	A	N.P.S.
Chisos	8:16	A,G	N.P.S.
Chisos	8:17	B	N.P.S.
Chisos	8:18	(8:37?) A,E,F	N.P.S.
Chisos	8:19	E	N.P.S.
Chisos	8:20	A,E,F	N.P.S.
Chisos	8:21	A,F	N.P.S.
Chisos	8:22	(8:42?) A,G,K	N.P.S.
Chisos	8:23	A,E	N.P.S.
Chisos	8:24	A,D,E	Campbell
Chisos	8:25	B,F,H,I	Campbell
Chisos	8:26	J	Campbell
Chisos	8:27	J	Campbell
Chisos	8:28	J	Campbell
Chisos	8:29	A,E	Campbell
Chisos	8:30	J	Campbell



Figure 5a. A small rock shelter near Croton Springs. Occupational debris scattered in and in front of the shelter.



Figure 5b. Bison pictograph in a shelter near Croton Springs. The shelter demonstrated no occupational debris whatsoever.

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	8:31	J	Campbell
Chisos	8:32	A,E,I	Campbell
Chisos	8:33	A,E	Campbell
Chisos	8:34	A,E	Campbell
Chisos	8:35	A,E	Campbell
Chisos	8:36	E	Campbell
Chisos	8:37	A,E,F	Campbell
Chisos	8:38	G	Campbell
Chisos	8:39	A,E,G	Campbell
Chisos	8:40	G	Campbell
Chisos	8:41	A,E,F	Campbell
Chisos	8:42	A,G,K	Campbell
Chisos	8:43	A,E	Campbell
Chisos	9:1	A	N.P.S.
Chisos	9:2	A	N.P.S.
Chisos	9:3	A,E	N.P.S.
Chisos	9:4	A,E	N.P.S.
Chisos	9:5	A,E,G	N.P.S.
Chisos	9:6	B	N.P.S.
Chisos	9:7	B	N.P.S.
Chisos	9:8	A,E	Campbell
Chisos	9:9	J	Campbell
Chisos	9:10	A	Campbell
Chisos	9:11	A,E,I	Campbell
Chisos	9:12	A,E,G	Campbell
Chisos	9:13	A,E,I	Campbell
Chisos	9:14	A,E	Campbell
Chisos	9:15	A,E	Campbell
Chisos	9:16	A	Campbell
Chisos	9:17	A,K	Campbell
Chisos	9:18	A,E	Campbell
Chisos	9:19	A,E,F	Campbell
Chisos	9:20	A	Campbell
Chisos	9:21	Cartledge Cave B	Setzler
Chisos	10:1	A	N.P.S.
Chisos	10:2	A	N.P.S.
Chisos	10:3	B,K	N.P.S.
Chisos	10:4	B,F	N.P.S.
Chisos	10:5	B,F,H	N.P.S.
Chisos	10:6	B	N.P.S.
Chisos	10:7	A,E,F,G	N.P.S.
Chisos	10:8	A,E,F	N.P.S.
Chisos	10:9	A	N.P.S.

SITE DESIGNATION		TYPE	RECORDED BY
Chisos	10:10	A	N.P.S.
Chisos	10:11	A,E	N.P.S.
Chisos	10:12	A,E	N.P.S.
Chisos	10:13	A	N.P.S.
Chisos	10:14	A,E	N.P.S.
Chisos	10:15	A,E	Campbell
Chisos	10:16	A,E	Campbell
Chisos	10:17	A,E	Campbell
Chisos	11:1	A,G	N.P.S.
Chisos	11:2	B	N.P.S.
Chisos	11:3	B	N.P.S.
Chisos	11:4	G	N.P.S.
Chisos	11:5	B	N.P.S.
Chisos	11:6	B	N.P.S.
Chisos	11:7	B	N.P.S.
Chisos	11:8	A	N.P.S.
Chisos	11:9	A	N.P.S.
Chisos	11:10	A	N.P.S.
Chisos	11:11 (11:18?)	A	N.P.S.
Chisos	11:12	A,E	N.P.S.
Chisos	11:13	A	N.P.S.
Chisos	11:14	A,E,F	Campbell
Chisos	11:15	A,E	Campbell
Chisos	11:16	D	Campbell
Chisos	11:17	E	Campbell
Chisos	11:18	A,E,I	Campbell
Chisos	11:19	A,E	Campbell
Chisos	11:20	D	Campbell
Chisos	11:21	San Vincent I	Campbell
		Texas	
Chisos	11:22	C	N.P.S.
Chisos	12:1	A,E	Campbell
Terlingua	6:1	outside park	N.P.S.
Terlingua	6:2	outside park	N.P.S.
Terlingua	6:3	outside park	N.P.S.
Terlingua	6:4	outside park	N.P.S.
Terlingua	6:5	outside park	N.P.S.
Terlingua	6:6	outside park	N.P.S.
Terlingua	6:7	outside park	N.P.S.
Terlingua	6:8	outside park	N.P.S.
Terlingua	6:9	outside park	N.P.S.
Terlingua	6:10	outside park	N.P.S.
Terlingua	6:11	outside park	N.P.S.

SITE DESIGNATION		TYPE	RECORDED BY
Terlingua	6:12	outside park	N.P.S.
Terlingua	6:13	outside park	N.P.S.
Terlingua	6:14	outside park	N.P.S.
Terlingua	6:15	outside park	N.P.S.
Terlingua	6:16	outside park	N.P.S.
Terlingua	6:17	A,E	Campbell
Terlingua	6:18	A,I	Campbell
Terlingua	6:19	A,F,G	Campbell
Terlingua	6:20	A,E	Campbell
Terlingua	6:21	A,E	Campbell
Terlingua	6:22	A	Campbell
Terlingua	6:23	A	Campbell
Terlingua	6:24	A,E,F,I	Campbell
Terlingua	9:1	I	Campbell
Terlingua	9:2	I	Campbell
Terlingua	9:3	A,D,E	Campbell
Terlingua	9:4	A,E	Campbell
Terlingua	9:5	A,E	Campbell
Terlingua	9:6	A,E	Campbell

SITE COMPONENT TOTALS:

A: 420	G: 29
B: 128	H: 11
C: 5	I: 18
D: 27	J: 34
E: 220	K: 19
F: 55	

RECOMMENDATIONS

Although a great amount of reporting has been done on the Big Bend region in the last 50 years, only a relatively small amount of actual correlation of these data into a comprehensible body has been attempted. Depending upon the times and viewpoint of an author, various cultural sequences have been proposed; none of these, however, has found much support from other factions of the archaeological community. Much of the testing and excavation done in the area was performed prior to scientific dating and sampling techniques, and several programs have never been reported in scientific journals. In addition, the ecological aspects of the Park have never been fully explored.

The suggested methods which would allow for a more accurate statement to be formulated for all periods of occupation are as follows:

1. Microenvironmental survey. A comprehensive survey of all microenvironmental zones and niches within Big Bend National Park should be conducted, including factors such as water supplies (intermittent, seasonal, and permanent), edible plants and animals, and resources from which the material culture could be fabricated. No detailed study of this information has been reported and this should be an integral part of explaining how man utilized the area. The results of this ecological study should in part determine the strategy used in the site survey and predictions for other site locations in unsurveyed areas.
2. Comprehensive literature search. A compilation of all available field notes, site reports, excavation reports, and artifact assemblages from previous archaeological research should be made and organized into a body which will give a complete up-to-date detailing of the known aspects of archaeology contained in Big Bend National Park. This must be completed prior to further field work as it will give the survey and testing and excavation programs the raw data which will be used in writing a research design to answer or further delineate the problems of cultural chronology and ecology of the Big Bend area.
3. Archaeological site survey. Once the microenvironmental zones have been mapped, a 25% stratified aligned sample of the area within each microenvironment will be selected for intensive survey. The area selected should be

surveyed in detail to determine the relationships between site types and environmental location. The areas chosen, totaling approximately 180,000 acres, will be surveyed thoroughly on foot and all archaeological and historic sites located will be recorded on survey forms designed to collect problem solving information about the nature of the archaeology at Big Bend. In order to preserve the context of artifacts with relation to features within a site, no artifact collections are recommended. The research design, based upon the information included in the comprehensive literature search, will be reevaluated in the light of the survey data, and can be used to formulate plans for future work in the Park, and to pinpoint the areas in which this work should be done. Data collected during the survey will include quantitative information about site types, site components, inter- and intra-site patterning, cultural periods, activity areas, types of artifacts noted, and environmental zone in which the site is located. Previous site survey work has been directed toward a cataloguing of archaeological sites rather than problem solving, and the initiation of a survey directed toward discovering the nature of settlement patterns, resource utilization, chronology, and cultural affiliations will promote the understanding of man and his adaptation within the Big Bend region. This survey method will also help guide decisions about where future archaeological work in the Park should and should not be concentrated.

4. Testing and excavation. Following the survey, a testing and excavation program at a few selected sites would be appropriate to aid in resolving the questions posed by the results of the survey and to test several of the specific hypotheses that are formulated. The sites selected might constitute a representative sample of all types of cultural periods or of resource orientation utilization. The aims of these testing and excavation activities should be directed at clarifying those problems presented during the literature search and survey phases of research.

The comprehensive literature search is an important step in bringing together all the available data about the archaeology of Big Bend and generating models concerning man's usage of the area through time. This search would include all published works relating to the Big Bend area, unpublished reports, and contact with

persons who have notes and artifacts in private collections. Once this material has been gathered, it would be compiled and written up into an organized body which would present the known aspects of the archaeology, present hypotheses concerning settlement patterns, chronology, cultural affiliations, and resource utilization, and set forth problems which should be investigated through the survey and testing and excavation programs.

Approximately 25% (180,000 acres) of the total Park area should be covered by the survey program in order to collect adequate data to test hypotheses about man's total utilization of the Big Bend area. Much of the area selected for the survey will occur in areas with only limited road access. Therefore, the crew should set up temporary field headquarters centralized within a survey area; once the area has been covered on foot by the crew, the headquarters can be moved to the next survey area. This would eliminate much travel time to and from a less convenient headquarter area, and would allow the crew to spend more time in the actual survey. A crew of 15, split into 3-4 groups, should be able to thoroughly cover the 180,000 acres selected for the stratified aligned survey in two seasons, preferably during the spring and fall. In this way, the extreme summer temperatures could be avoided, and floral and faunal resources which are more abundant during these seasons would provide greater insight into man's utilization of the resources. By splitting the survey into two phases, the results of the first season's work can be written up and the research design evaluated, so that future research problems can be formulated prior to the completion of field work.

The final survey report should include a list of all sites which have been recorded, recommendations for further research, and an evaluation concerning testing and excavation work at selected sites. Models regarding settlement patterns, resource utilization, and chronology, based upon the information collected during the survey and the literature compilation, should be written out and set forth as hypotheses to be tested by the testing and excavation program.

Immediate steps should be taken to protect and preserve the wealth of archaeological information in the Big Bend area. It is a key area in discovering man's adaptation to the environment, and the cultural continuum which is evidenced by previous research must be investigated more fully in order to understand the cultural development and adaptations which took place in the region.

COMPREHENSIVE LITERATURE SEARCH
PROPOSED BUDGET

Salaries and Wages

Off Campus

Research Archaeologist (2)	
3 months @ \$600.	\$3600.
Student Assistants (1)	
2 months @ \$400.	800.

On Campus

Principal Investigator	
1 month @ \$1500.	1500.
Research Archaeologist (2)	
3 months @ \$600.	3600.
Student Assistants (2)	
2 months @ \$400	1600.
Secretary	
350 hrs. @ \$3.00	1050.
Draftsman	
50 hrs. @ \$3.50	175.

Employee Benefits

10% x \$9750.	975.
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Supplies and Services

1500.

Publication

2200.

Vehicle Expenses

3420.

1 Carryall for 12 months
@ \$160. month plus 10¢ mile
estimated 15,000 miles

Perdiem

140 mandays @ \$15/day	2100.
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TOTAL DIRECT

\$22,520.

Overhead

Off Campus

27.3% x \$4400.	1201.
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On Campus

48.4% x \$7925.	3836.
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TOTAL PROJECT COST

\$27,557.

PROPOSED SURVEY BUDGET

Salaries and Wages

Off Campus

Principal Investigator	
2 months @ \$1500.	\$3000.
Research Archaeologists (3)	
6 months @ \$600.	10,800.
Student Assistants (12)	
6 months @ \$400.	<u>28,800.</u>
	\$42,600

On Campus

Principal Investigator	
2.5 months @ \$1500.	3750.
Research Archaeologists (2)	
9 months @ \$600.	10,800.
Student Assistants (3)	
3 months @ \$400.	3600.
Secretary	
300 hrs. @ \$3.00/hr.	900.
Draftsman	
60 hrs. @ \$3.50/hr.	<u>210.</u>
	\$19,260.

Employee Benefits

10% x \$29,250.	2925.
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Supplies and Services

3000.

Publication

2200.

Perdiem and Travel

1840 mandays @ \$15.	\$27,600.
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Vehicle Expenses

4 Blazers @ \$15/day rental	
plus 18¢/mile, estimated	
60,000 miles; 3 closed 6' x 12'	
trailers @ \$144/month	24,192.

Equipment

4 cameras @ \$250.; 8 tents	
@ \$100.; 3 propane refrigerators	
@ \$450.; 4 calculators	
@ \$80.	<u>3470.</u>

TOTAL DIRECT COSTS

51

\$125,247.

Overhead

Off Campus

27.3% x \$42,600.

\$11,630

On Campus

48.4% x \$19,260.

9322.

TOTAL PROJECT COSTS

\$146,199.

ABSTRACTS

This section contains a summation of each important report. Many of the manuscripts which are in the bibliography have not been abstracted because they were not deemed relevant or that work was inaccessible. The abstracts are ordered alphabetically by the authors' last name, the reference is stated, and the abstraction follows below. The information contained in these works was utilized to draft the recommendations for further archaeological investigation.

Anonymous

1929 Notes. Museum of the American Indian. Indian Notes 6:4:407-411.

After visiting caves in the Hueco Mountains, E.F. Coffin of Cambridge University Museum, began digging a pueblo near Newman, New Mexico in January, 1929. In February of 1929 Coffin moved to Bee (Eagle Canyon) Cave Canyon in Chalk Draw and began digging a rock shelter which Harrington had previously started. Within the rockshelter Coffin found sandals, fiber cordage, nets, bags, basketry, matting, fire drills, throwing sticks, atlatls, foreshafts, arrowshifts, metates, manos, hammerstones, projectile points, bifaces, flakes, bone and antler tools, gourds, animal skin, corn, piñon nuts, sotol quids, sherds, and earthenware figurines. From other caves and rockshelters in the area three burials were encountered.

Campbell, T.N.

1967 Archaeological Survey of the Big Bend National Park Texas. Part I. Unpublished report submitted to the National Park Service.

During a 6 week survey conducted for the National Park Service in 1966, 132 archaeological sites were recorded. Site types defined were stone-paved hearths, caves and rockshelters, quarries (basalt and flint), boulder enclosures, rock walls, pictographs and petroglyphs, and miscellaneous (burned rock middens).

From the evidence gained on this part of the two season survey, the author believes that the Big Bend area was primarily occupied by hunting and gathering groups on an intermittent

basis for collection of wild plants and animals and stone from the quarries. No evidence of agriculture or large village sites were discovered.

Objectives laid out for the second part of the survey are included. A site list of located sites is appended.

Campbell, T.N.

1970 Archaeological Survey of the Big Bend National Park. Unpublished manuscript submitted to the National Park Service.

This monograph compiles the available survey information gathered in 1936-37 by National Park Service archaeologists with that of the 1966-67 survey conducted by Campbell. Sections are devoted to previous archaeological work, historic chronology, artifact classes, and a summary of all sites located and their characteristics. The 1936-37 survey located 277 sites, and the 1966-67 site survey recorded 351 additional sites. Of the total number of sites within the boundaries of Big Bend National Park, 480 are open campsites, 130 are shelter sites, and 6 were quarry sites. Recommendations for future work are also made.

Campbell, T. N. and William T. Field

1968 Identification of Comanche Raiding Trails in Trans-Pecos Texas. West Texas Historical Association Year Book 44:128-144.

The Comanche Indians are known from documentary evidence to have crossed the Big Bend area for raiding missions on Mexican settlements during the late 18th and through the middle 19th centuries. Two major raiding trails are known to have been used by the Comanches, the Chisos Trail and the San Carlos Trail. The authors have compiled existing records and attempted to trace the most plausible major routes of these raiding parties as well as the secondary trails, using contemporary records, maps, and the geography of the Big Bend area. While conducting an archaeological survey of the Big Bend National Park, the authors made several attempts to locate these trails, but were unable to do so.

According to the documents available to the authors, the Comanche parties, sometimes numbering in hundreds of people with stock, crossed the Pecos River near Horsehead Crossing and went south toward present-day Fort Stockton and to Marathon, where

the route divided into two major branches. The San Carlos Trail went south through Paso del Norte and traveled west of the Chisos Mountains, crossing the Rio Grande River near present-day Lajitas, Texas. The Chisos Trail passed through Persimmon Gap and to the east of the Chisos Mountains, evidently crossing the Rio Grande River at two different fords, neither of which have been identified.

The authors conclude that more intensive and sophisticated methods should be used to locate these trails, which are an important part of the archaeological record at Big Bend National Park.

Coffin, Edwin F.

1932 Texas. Museum of the American Indian. Indian Notes and Monographs 48.

This manuscript describes the results of excavations of a rock shelter in Bee Cave Canyon, located south of Black Peak and northwest of Persimmon Gap, and is a tributary of Chalk Draw. At the end of Bee Cave Canyon is a natural stone formation which supplies a permanent reservoir of water. The shelter, measuring 768 feet east/west by 110 feet north/south, contained the majority of the prehistoric occupation in the eastern portion. Within the shelter large rocks have fallen from the roof to form caves, two of which were occupied prehistorically. Pictographs of birds, humans, and hands were found on the shelter's walls. In the shelter were two large depressions which Coffin has termed fire pits, one surrounded by roasted sotol crowns and other with refuse. Large accumulations of grass were found in the back and eastern portions of the shelter. Coffin suggests that the grass was used as flooring and bedding. Along the back wall of the shelter were thirteen stone structures of unshaped rock with adobe or ash mortar which Coffin terms as "house-sites"; eight of the structures formed complete enclosures and five consisted of only a wall or two. Coffin excavated five rooms in the eastern portion of the shelter and Harrington (1928) excavated one in the same area. The artifacts recovered by the excavation consist of manos, metates, hammerstones, projectile points, scrapers, saws, knives, spear points, a grooved ax, a ground bowl, cooking stones, limestone pipes, stones wrapped with grass, and black, red, and yellow painted pebbles. Wooden artifacts consisted of fire making kits, small bows, atlatls, grooved clubs, wooden plugs, stakes,

digging sticks, "rhythm sticks", wooden tongs, painted sticks, foreshafts, reed arrowshafts, reed pipes, reed containers with grass plugs, tenon sticks, and reeds with attached feathers, antler pestles, flaking tools, and scrapers were present along with bone awls, chisels, gouges, scoops, and grooved and painted bone. Gourd vessels were also found and many had been repaired by caulking and sewing. Mats of yucca and grass demonstrated either checker or twilled construction. Checker, open-coil stitch or nine split stitch baskets of yucca and small stems were made into sifting baskets, cylindrical baskets and pouches, one of which contained corn and squash seeds. Cordage of yucca was used to make netting and net bags with either the slip knot or open-coil method. Braided and opposed warp sandals, fiber fabrics and brushes and bindings of yucca leaves, grass and leather were present. Pendants of stone and shell were found as were reed and seed beads. A few unidentified sherds and numerous "small grotesque human figures" of untempered and unfired clay were found. Vegetable foods present consisted of prickly pears, corn, mesquite beans, acorns, Mexican walnuts, Mexican buckeye, piñon nuts, desert-willow pods, pumpkin seeds, gourds, squash seeds, seeds and pods of yucca, devil's head (Homolacephala texensis), star cacti (Astrocarpus fissuratus), opuntia leaves, sotol crowns and cuds of chewed fiber. The identified faunal remains consisted of deer, rabbit, badger, coyote, rat, turtle, bison, and bird bones.

Coffin concludes that the shelter was successively inhabited and abandoned many times by prehistoric peoples but that there were no cultural changes from the period represented by the bottom layer to the latest period and layer. He also suggests that the shelter was occupied temporarily in the summer based on the artifact assemblage and the dominance of corn and sotol in the vegetable matter category.

Harrington, M.R.

1928 Texas. Museum of the American Indian. Indian
Notes 5:3:307-316.

Harrington began digging three caves east of Crows Peak on W.T. Burnham's ranch in the Chisos Mountains in 1928. In these caves the author found checker weave baskets, sandals, matting, cordage, arrow shafts, scrapers, flakes, metates, manos, partly cooked sotol leaves, and cuds of chewed sotol fiber "still bearing the marks of human teeth". After excavating the three caves in

the Chisos Mountains, Harrington moved his project to Chalk Draw and began excavations of a rockshelter. The excavation revealed stone walled rooms with two floor levels, pictographs and petroglyphs of hands, men, birds and geometrics, pottery, corn cobs, squash seeds, chipped stone, fiber artifacts, and a necklace made of iridescent green beetles strung on a fiber cord.

Ing, J. David and George Kegley

1971 Archaeological Investigations at Fort Leaton
Historic Site Presidio County, Texas. Texas
Parks and Wildlife Department.

Excavations done in 1971 at the Fort Leaton site revealed several additional rooms previously unrecorded and artifacts dating the occupation between A.D. 1850-1920. No evidence was found to support hypotheses that this was also the site of the Mission del Apostol Santiago or the Spanish presidio El Fortin.

Jackson, A.T.

1938 Picture-Writing of Texas Indians. Bureau of
Research in the Social Sciences No. 27, Anthro-
pological Papers Volume 2.

This comprehensive survey of rock art sites in Texas covers all pictograph and petroglyph sites reported to date, and discusses them with regard to county, design elements, material on which it is done, and temporal placement. Special sections deal with methods used to produce "picture-writing" and comparisons with pottery designs and rock art in other areas.

Kelley, J. Charles

1933 Report on Archaeological Field Work in the Madera
Valley Area. West Texas Historical and Scientific
Society Publications 5:53-59

Sixty-seven archaeological sites were located in the immediate area of the Madera Valley during 1933. These include: large sites containing evidence of agriculture, the Toyah Creek sites (5); sotol or mescal pit sites, with 1-12 pits and associated campsites and hearths each (25); hearth sites (15); rockshelter sites (8), five of which had pictographs; burial sites (4); sites not classified within the above categories (10), one of which had some petroglyphs and several mortar holes; and a bluff

pictograph location (1). Artifacts noted include metates, manos, hammerstones, hand axes, and scrapers. Projectile points and ceramics were rare. The author concludes that the area was occupied by two different peoples, one with a hunting and gathering way of life, and one with a semi-agricultural orientation.

Kelley, J. Charles

1948 Arrow or Dart Shaft Tools and Problematical Incised
 Stones from Central and Western Texas. El Palacio
 55:1:73-85.

The author describes known specimens of stone shaft tools as to appearance and usage, and attributes them to the Uvalde Focus (of the Balcones Phase, Edwards Plateau Aspect) which he feels is closely related to the Chisos Focus of the Big Bend Aspect. The usage of the "problematical incised stones " is unknown. These were, however, found in association with the stone shaft tools and may have some function relating to production of projectile point shafts.

Kelley, J. Charles

1949 Archaeological Notes on Two Excavated House Structures in Western Texas. Bulletin of the Texas
 Archeological and Paleontological Society 20:89-114.

An archaeological reconnaissance in 1948 discovered 49 previously unreported sites; four of these were excavated, two of which were house structure sites. At the first site (57D2-3) two houses with adobe plaster, resembling jacal structures, were excavated, and have been attributed to the La Junta Focus of the Brazos Valley Aspect. Historic debris was also noted on the surface of the site. The second site reported (31C9-5) yielded several partial house structures which were tentatively attributed to the Hueco Phase, Chisos Focus of the Big Bend Aspect based on the occurrence of a split-stitch basket. The author also believes that the pottery found at the site shows strong affiliations with the Jornada Branch of the Mogollon.

Kelley, J. Charles

1951 A Bravo Valley Aspect Component of the Lower Rio
 Conchos Valley, Chihuahua Mexico. American Antiquity 17:2:114-119.

Excavations at Loma Seca uncovered one house structure in what appears to be a La Junta Focus village complete with middens, streets, plazas, and dwellings. The excavated house was roughly rectangular with a fire pit and "altar" against the southern wall. The walls and floors were plastered with clay. Charred saplings, reeds, and chunks of adobe were found on the floor, probably representing jacal walls and roof. Casas Grandes and El Paso ceramics found at the site indicate an occupation of ca. A.D. 1200-1400.

Kelley, J. Charles

1957 The Livermore Focus: A Clarification. El Palacio
64:1-2:44-52.

The author attempts to justify his classification of the Livermore Focus as attacked by The Handbook of Texas Archaeology (Suhm, Krieger, and Jelks 1954). Included as his defense of the Livermore Focus are three distinctive arrow point types (Livermore Barbed, Toyah Triple Notched, Fresno Triangular) and artifact types which are "consistently associated with the point complex but represented by small numbers of actual specimens..." Kelley also reviews the sites at which the Livermore Focus was recognized, and discusses its chronological placement (ca. A.D. 900-1200).

Kelley, J. Charles

1959 The Desert Cultures and the Balcones Phase: Archaic
Manifestations in the Southwest and Texas. American
Antiquity 24:3:276-288.

In summarizing the evidence for the "Desert Culture" in the Southwest, the author presents geologic, faunal, radiocarbon, and artifactual data to support his statements about the archaeology. He proposes that the Desert culture is an Archaic adaptation which lasted from ca. 8495 B.C. to A.D. 188 and that within this time various regional offshoots began to develop and give rise to local cultural sequences.

As defined by Kelley, the Balcones Phase occurs "In that area of the state of Texas lying south of the Caprock of the High Plains and bounded roughly by the Brazos River on the east and northeast, the Rio Grande on the west and southwest, and the Gulf of Mexico on the south..." and is an Archaic manifestation in Texas.

In assigning cultural sequences and chronologies, Kelley divides Texas into 3 regions: Central; South and Gulf Coast; and

Western. In Central Texas, the Balcones Phase includes the Round Rock, Clear Fork, and Uvalde Foci. In South and Gulf Coast Texas, the temporal sequence is unclear, but foci mentioned include Morhiss (southeast), Rockport (Gulf Coast), Aransas and Brownsville (Gulf Coast), Repelo and Absalo (Coastal Plain) which he groups together as the Monte Aspect, and Falcon and Mier (Coastal Plain). In Western Texas, Kelley advocates the Big Bend Aspect with two major cultural periods, the Pecos River and Chisos Foci.

Kelly, Thomas C. and H.P. Smith, Jr.

1963 An Investigation of Archeological Sites in Reagan Canyon, Brewster County, Texas. Bulletin of the Texas Archeological Society 33:167-190.

This report describes the results of excavations and test pits in four rockshelters in Brewster County, east of Big Bend National Park. Sites 1 and 2 were tested and flint artifacts were recovered. In site 3, which had a smoke blackened ceiling, a "limited series" of five foot squares were dug. There was no natural or cultural stratigraphy in the gray-black ash and broken rock deposit. In site 4, 10 five foot squares were excavated and a surface collection of artifacts was made of the talus midden in front of the totally excavated cave. Based on the occurrence of certain types of projectile points, the authors have concluded that the caves were occupied by peoples of the Pecos River Focus, the Chisos Focus, the Livermore Focus, and a component represented by the Toyah arrow point type. The sequence of occupation was not determined.

Kelly, Thomas C.

1963 Archeological Investigations at Roark Cave, Brewster, County, Texas. Bulletin of the Texas Archaeological Society 33:191-227.

Archaeological investigations in Reagan Canyon during 1961 led to the excavation of a cave containing material remains attributed to the Big Bend Aspect. Cultural levels recognized in the cave were the Pecos River and Chisos Foci. The author believes that there may have been some material from the earlier Maravillas Focus mixed in with that recognized for the Pecos River Focus, as well as some artifacts attributed to the Livermore Focus. Features discovered during the excavation included

numerous mortar holes and one grass-lined pit. Artifacts included projectile points (upon which he bases his chronology), knives, blades, scrapers, spokeshaves, gravers, utilized flakes, choppers, manos, hammerstones, polished stones, sandals, matting, cordage, and a few bone tools.

Lehmer, Donald J.

1958 A Review of Trans-Pecos Texas Archeology. Bulletin of the Texas Archeological Society 29:109-144.

In this review of archaeology in the Trans-Pecos region, Lehmer consolidates the known data of the area by incorporating the ethnography, geology, and archaeology to form a cultural scheme. The author divides the Trans-Pecos into four sections: the El Paso district; the Northeastern district (tentative); the Southeastern district; and the La Junta district. Chronologies for each of these are presented, beginning with evidences of Folsom occupation, through historic times. Recovery techniques applicable to site types and artifacts in the region are discussed, and approaches for further research are suggested.

Martinez del Rio, Pablo

1953 A Preliminary Report on the Mortuary Cave of Candelaria, Coahuila, Mexico. Bulletin of the Texas Archeological Society 24:208-257.

A mass burial cave explored in Coahuila, Mexico yielded a large number of human skeletons of all ages and sexes. The bodies were usually wrapped in fiber blankets and bound with fiber cord. Artifacts associated with the cave burials included bows, arrowshafts, cordage, matting, basketry, digging sticks, jewelry, decorated bone, antlers, projectile points, and scrapers. Bone tools and pottery were virtually absent. The author states that the people who committed their dead to this cave were probably doing so during the period of the first European contact due to the good preservation in the cave and the presence of articles such as bows and arrows.

Oetteking, Bruno

1930 Texas. Museum of the American Indian. Indian Notes 7:3:336-347.

The author discusses human remains from Chalk Draw, Brewster County, and Satan Canyon rockshelter in Val Verde County.

Peabody, Charles

1909 A Reconnaissance Trip in Western Texas. American Anthropologist 11:202-216.

While on vacation, the author visited the Big Bend area and describes the climate, geology, paleontology, and archaeology of the area. Among the types of archaeological sites he noted were lithic workshops, midden circles, rock shelters, and pictograph sites. Artifacts mentioned include scrapers, knives, points, cores, lithic debris, metates, and hammerstones.

Reed, Erik K.

1936 Special Report on Archaeological Work in the Big Bend. Unpublished report prepared by the National Park Service.

During 1936 the author and his assistants performed the first archaeological investigation of Big Bend by the National Park Service. This program included a reconnaissance survey which located 184 sites and the excavation of 4 of these. Of the 184 sites, 89 were open camps, 4 were sotol pits, and 95 were "sheltered sites" (caves, cliff or ledge shelters, boulder shelters). The four excavated sites included 1 rockshelter (Chisos 6:11), 2 caves (Chisos 8:2, Chisos 11:3), and 1 debris-midden (Chisos 6:2); a site report for each of these excavations is included. Sixteen mortar holes were reported and 3 pictographs were recorded. The majority of artifacts were of stone, with bone tools, matting, and cordage occurring rarely.

Sayles, E.B.

1935 An Archaeological Survey of Texas. Medallion Papers No. 17.

Using geology as the basis of his scheme, Sayles has divided Texas archaeology into five broad areas: Gulf Region; Central Texas; Plains; Western; and Northeastern. The author uses the known ethnology, linguistic stocks, and archaeology to further define cultural sequences and relationships within these areas. Through the use of extensive charts he characterizes the material

culture of each culture group and draw cultural links, both contemporaneously and temporally, to illustrate the origin of the groups.

Setzler, Frank M.

1931 A Prehistoric Cave in Texas. Explorations and Fieldwork of the Smithsonian Institute in 1931, 133-140.

Archaeological investigations at Knight Cave in 1931 produced baskets, matting, projectile points, a burial, sandals, cordage, stone beads, gourds, cradles, woven bags, and bone and wooden awls. Three strata were delimited in the cave and the human remains were found in the second layer.

Setzler, Frank M.

1932 Prehistoric Cave Dwellers of Texas. Explorations and Fieldwork of the Smithsonian Institute in 1932, 53-56.

The author excavated two caves near Mule Ear Peaks, Cartledge Cave, and two caves in Sunny Glen Canyon. In these caves were found baskets, sandals, grooved clubs, atlatls, foreshafts, woven bags, woven cloth, metates, manos, projectile points, painted pebbles, scrapers, matting, netting, cordage, scoops, awls, cave tubes containing seeds, corn cobs, gourds, bone beads, painted sticks, bones, and skin bags.

Setzler, Frank M.

1935 A Prehistoric Cave Culture in Southwestern Texas. American Anthropologist 37:1:104-110.

After excavating Knight Cave, two caves near Mule Ear Peaks, Cartledge Cave, two caves in Sunny Glen Canyon, and two others on the Pecos River, Setzler concluded that the basic differences between the Pecos group and the more westerly group was the western group raised corn. Also he stated that the caves were used as temporary shelters and in all forms, except the western group, the cultures were uniform. Setzler suggests that although many traits appear to resemble Basketmaker traits, these traits under careful study are significantly different. He hypothesizes that an independent cultural center existed in northern Mexico and the Big Bend. Similarities between this culture center

and the Southwest are due to their origination from a common base.

Smith, Victor J.

- 1927 Some Notes on Dry Rock Shelters in Western Texas.
 American Anthropologist 29:2:286-290.

Smith discusses artifacts found in over one hundred sites near Alpine, Texas. Artifacts discussed include fire sticks, a wooden knife, sharpened sticks, sticks wrapped with fiber, sandals, baskets, string, rope, pottery, shell, beads, salt, red crayon, projectile points, and scrapers.

Smith, Victor J.

- 1928 Early Spanish Explorations in the Big Bend of Texas.
 West Texas Historical and Scientific Society 2:55-68.

The author briefly traces the history of early European expeditions in the Big Bend area. Included in his outline are: Cabeza de Vaca (A.D. 1535); Rodriguez (A.D. 1581); Espego (A.D. 1582); Gaspar Castano de Sosa (A.D. 1590); and Juan Dominguez de Mendoza (A.D. 1684). Smith also includes maps of their route on the San Carlos Trail, a Comanche raiding trail.

Smith, Victor J.

- 1933 Sandals of the Big Bend Culture with Additional
 Notes Concerning Basket-Maker Evidence. Texas
 Archeological and Paleontological Society 5:57-65.

The author briefly discusses the three major types of sandal weaving which he has encountered in the Big Bend area - two opposing warps, multiple warp of more than two, and plaited. These sandals were normally made from leaves of various yucca species and tied to the foot with yucca fibers. He presents a chronology of sandals by their depth in cave deposits, and concludes that there might be a link between Basketmaker in the Southwest and that of Big Bend.

Smith, Victor J.

1934 Hord Rock Shelter. Bulletin of the Texas Archeological and Paleontological Society 6:97-106.

The shelter, located in Sunny Glen Canyon, is one of a series of shelters excavated in this canyon. The author uncovered cordage, metates, sandals, projectile points, scrapers, manos, woven bags, corn cobs, mats, pestles, hammerstones, a knife fire kits, awls, and pits buried with leaves, branches, grass, prickly pear, baskets, sandals, and matting. A burial of a three to four year old child was recovered as were bones from horse and a "musk ox-like" animal.

Smith, Victor J.

1935 The Split Stitch Basket, a Distinguishing Culture Trait of the Big Bend in Texas. Texas Archeological and Paleontological Society 7:100-104.

The author states that coiled bundle baskets of grass and twigs, with a split stitch sewing technique is typical of the Big Bend Culture, and appears to be a distinguishing characteristic of that culture. These baskets are circular with a slightly pointed base, and have been found in burials where they are decorated and occasionally "killed".

Smith, Victor J.

1938 Carved Rock Shelter. Bulletin of the Texas Archeological and Paleontological Society 10:222-233.

Smith reports the results of excavating a rockshelter in Sunny Glen Canyon near Alpine. The excavation produced flakes, hammerstones, metates, manos, scrapers, bifaces, projectile points, cores, hatchet blades, two of which were hafted in wood, a stone awl (drill ?), worked wood, pieces of wooden fire kits, gourds, some of which had been sewn, corn cobs, round toe, and fish-tailed sandals, twilled and checker matting, rawhide string, animal skin, coiled basketry, pictographs, bones of antelope, deer and others unidentifiable, and carved rock which was either drilled or abraded in grooves of radial lines or V-shaped patterns. Also found were chewed "cuds" of cacti fiber and cists lined with sandals, mats, sticks, grass, and leaves. Smith concludes that the archaeological remains from this shelter "fit well into the pattern of the Big Bend Cave Culture."

Smith, Victor J.

- 1940 Cordage of the Caves in the Greater Big Bend.
Bulletin of the Texas Archeological and Paleontological Society 12:175-194.

The author studied 3,721 pieces of cord all made from rough grass and stranded fiber cord from sites in the Big Bend area. Cordage was made of leaves from Agave lechuguilla, yucca, sotol, apocynum (rare), and bear grass. The plants were soaked or boiled, shredded and cleaned, then spun by hand. The most common type has two strands twisted counter-clockwise, but cordage with three, four, five or six strands is found as is cordage twisted clockwise. Diameters range from .05 to .325 of an inch and a square knot is the most common knot.

Some of the uses of cord include basketry, netting, cradles, binding on sticks, cane or shafts, matting, tying bundles, thread, sandal ties, fur cloth, snares, net bags, waist strings, attaching feathers to a shaft, head-dress frame assembly, and dyed and woven into basketry for designs.

Smith, Victor J.

- 1941 Some Unusual Basketry from the Big Bend. Bulletin of the Texas Archeological and Paleontological Society 13:133-151.

The range of variations of basket manufacturing is discussed. The most common type of basket is the split stitch type with non-interlocking stitches and counter-clockwise coils. Other types include plain twined, cross warp twined, coiled bags, netting, and checkered basketry.

Smith, Victor J.

- 1942 Evidence of European Influence in the Pictographs of West Texas. Bulletin of the Texas Archeological and Paleontological Society 14:38-48.

The author discusses rock art sites in Brewster County Chalk Draw and Ajua Frio Bluff. The Chalk Draw pictographs displayed geometric designs, lightning, water and contiguous rooms. At Ajua Frio Bluff horses and riders, and a mission with a cross were represented. A site in Jeff Davis County, Point of the Rocks Ranch, exhibited a "hand and arm with star" and a 24 inch wide mission with a cross. At Meyer's Spring a priest bearing a cross, a stage coach, horses and guns were

depicted. Most of the pictographs use cinnabar ore (mercury) as a red pigment.

Smith, Victor J.

- 1946 Evidence of European Influence in the Pictographs of West Texas, II. Texas Archeological and Paleontological Society 17:48-62.

Pictographs representing Europeans and European contact such as horses, guns, crosses, missions, priests, cattle, and wheeled vehicles have been documented in this area of Texas. These can be dated to A.D. 1500 and later in the region, and A.D. 1683 and later in the Big Bend area.

Taylor, Walter W.

- 1956 Some Implications of the Carbon-14 Dates from a Cave in Coahuila, Mexico. Bulletin of the Texas Archeological Society 27:215-234.

One cave dug in Coahuila, Mexico yielded rich archaeological remains and radiocarbon dates documenting occupation in the area to almost 9,000 years ago B.P. Climatic conditions indicate a climatic change from moist to arid, geologically placed in other areas circa 6,000 years ago. Material remains resemble those of the "Desert Culture" of the Southwest, and include large amounts of fiber and wood artifacts, with lesser amounts of bone and stone.

The author has divided the cultures in this area into three parts, based upon changes in the artifact record: Ciénegas Complex (8870 \pm 350 - 7300 \pm 400 B.P.); Coahuila Complex (6170 \pm 300 - 9300 \pm 400); and an unnamed complex (3620 \pm 350 - 1770 \pm 250). These radiocarbon tests were run in 1954, therefore accounting for the wide margin of standard deviation on all dates, and the author believes that the 9300 \pm 400 date for the Coahuila Complex was due to sampling error. Taylor believes that there is a definite cultural relationship between his Coahuila Complex peoples and those of the Pecos River Focus in the Big Bend area.

From the cultural evidence at Coahuila, Taylor believes that there was little change in the basic subsistence techniques in this area throughout the time period documented.

Taylor, W.W.

1962 Tethered Nomadism and Water Territoriality: A Hypothesis. 35th International Congress of Americanists. Actas y Memorias 2:197-203

The author suggests that the prehistoric cultures of Northern Coahuila, their ecology, demography, social and political structures may be explained by the stringent environment of the Chihuahuan Desert and two hypotheses represented by the terms "tethered nomadism" and "water territoriality". Taylor states that the monte, the junction of alluvial fans and open sediment slopes, offers the largest and most concentrated source of vegetable foods. But the mountains and canyons offer the only dependable supply of water. Thus most prehistoric sites are located where the watered canyons and the monte intersect, or close by in shelters or caves.

The Indians' major food source, demonstrated both archaeologically and ethnographically, was plants, which to meet nutritional requirements must be consumed in large quantities. The great amount of plant foods necessary for survival and the limited amount of vegetable resources, even on the monte, forced the prehistoric populations to be fairly nomadic. The major restriction of their nomadism was a finite and constant supply of water. Taylor suggests that due to the limited amount of useable water and population pressures in the area, some type of water rights or ownership of water sources must have existed and was recognized by other groups. Taylor proposes the expression "tethered nomadism" to represent the nomadic wanderings for food which are restricted by an association to one or a few water sources.

Another factor employed on nomadic wanderings of the prehistoric groups was "water territoriality". This hypothesis is closely related to "tethered nomadism" and is stated that given the limited technology of the prehistoric of the prehistoric inhabitants, the environment, and topography a group could exploit only a certain amount of land before being forced to return to a water source. It is quite possible that gathering territories of neighboring groups overlapped and without a competitive conflict, but as explained by "tethered nomadism" water sources were not shared. Taylor suggests that intra-group contact occurred most often while gathering food stuffs and was by nature short. Thus, this restricted flow of ideas, material culture, and people may possibly account for the conservatism which characterizes the prehistory of the area.

Taylor, W.W.

1966 Archaic Cultures Adjacent to the Northeastern
Frontiers of Mesoamerica. In Handbook of Middle
American Indians, R. Wauchope (ed.) 4:59-94.

In northern Coahuila a single cultural tradition is reported to have been in existence for 10,000 years; changes have occurred thru time but reflect only slight differences of a single culture continuum. This desert culture exhibits four variations through time: the Cienegas, Coahuila, Jora, and Mayran complexes.

The Cienegas Complex, known from Frightful Cave, Fat Burro Cave, and CM-65, consists of wads of human hair, rattlesnake rattles, agave scuffer sandals (ca. 6125 \pm 450 B.C.), narrow plaited bands, shells, twill-pad sandals (ca. 5345 \pm 400 B.C.), pointed dart foreshafts, limestone choppers, bone awls, agave needles, faunal remains of elk, antelope, coatimundi, bison, and bear.

Frightful Cave, Fat Burro Cave, Nopal Shelter, and CM-37 have produced artifacts which have been classified under the rubric of the Coahuila Complex. Dates for this complex range from 7585 \pm 550 B.C. to A.D. 185 \pm 250. The Coahuila Complex was not static, as it demonstrates through time an increase in typological variation and nomadism, and a decline in craftsmanship. This is interpreted as a decrease in group stability and integration possibly due to a slow gradual dessication of the environment which took place during this time. Shifts in subsistence patterns have been noted as a movement from animal to plant foods and the use of woody plants to desert fibrous plants. Artifacts of this complex include bifacial and unifacial "blades", projectile points, metates, manos, few cores, flakes, fire cracked rock, few choppers, stone ornaments, bedrock mortars, grooved stones, ring middens, bunt, notched, and pointed foreshafts, atlatls, grooved clubs, digging sticks, fire tongs, netting reel, wooden fire kits, fiber cordage, twill-pad, checker-pad, sewn, braided, two-warp plaited, and three-warp sandals, coiled basketry, plaited matting, netting, twined bags, aprons, and robes, bone awls, antler flakers, fur cord, animal hides, shells, fiber ooids, mescal beans, tubular beads, and scarifiers.

The Jora Complex artifacts exhibit a continuum of the Coahuila Complex artifacts but with some new traits, possibly introduced from the region near La Junta. The artifacts listed include arrow points, pointed wooden foreshafts for arrows, snub-nose scrapers, manos, metates, bedrock mortars, ring middens, petroglyphs, and Jornada brownware ceramics.

The Mayran Complex, Candelaria and Paila caves, consist of textiles, triangular bifaces, snub-nose scrapers, arrow points, dart points, bow and arrow, elaborate bone and shell beads, net baskets, peyote buttons strung on a cord, elaborate burial custom and ceramics from a historic Spanish mission.

Young, Claude S.

1929 Report of Archeological Expedition into the Big Bend District, Brewster County, Texas. Unpublished report submitted to the University of Texas and the Witte Museum.

During December, 1929, a small reconnaissance party explored the Doric Cave in Santa Elena Canyon and tested the Smoky Canyon Cave in the Chisos Mountains. Several other cave shelters were located in the Chisos Mountains, and several petroglyph and pictograph sites were recorded. Material remains reported from Smoky Canyon Cave included basketry, hair and fiber, cordage, sandals, grass covered floors, metates, manos, hammerstones, and bone. Floral material included sotol, peyote, seeds, beans and lechugilla.

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