APPENDIX X

Soil Survey of the Bonito Prairie

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Soil Survey of the Bonito Prairie White Mountain Indian Reservation

Prepared for
White Mountain Apache
Indian Reservation
August 2006

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Bonito Prairie
White Mountain Indian Reservation

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INTRODUCTION

The Bonito Prairie is located in the southeast portion of the White Mountain Apache Indian Reservation approximately 15 miles southeast of Whiteriver, the principle town on the reservation. The survey area totals over 41,000 acres or about 64 square miles. The prairie is mainly used for livestock and as wildlife habitat for deer, elk and antelope. There are two main creeks, Bonito and Turkey, dissecting the prairie, which flow into the Black River.

The purpose of this soil survey was to identify soils suitable for a proposed irrigation project located on the Bonito Prairie. The proposed crops to be irrigated are primarily poplar trees and various species of Christmas trees. The area surveyed includes most of what is considered to be the Bonito Prairie. The objective was to map the soils of the area at a reconnaissance level independent of the purpose and then identify those soils suitable for the proposed tree crop. The guidelines to evaluate the soils were developed independently from the criteria used to classify the soils.

SURVEY METHODS

This survey was completed primarily under the direction of Bruce Buchanan of Buchanan Consultants, Ltd. and Mike Kaczmarek of Morrison-Maierle, Inc. The site was visited by both soil scientists on two occasions, each for a one week period. Previous surveys had been conducted in the area but none to the extent or in the detail required for this project. A survey of great value for the project was the Fort Apache Indian Reservation Soil Survey issued May 1981 by the USDA-SCS and USDI-BIA in cooperation with Arizona Agricultural Experimental Station (USDA 1981). The Fort Apache Indian Reservation survey was used, in part, as the basis for defining the mapping units for this survey. The 1981 survey used various soil series and phases of those series to develop the mapping units used. Those mapping units consisted of associations, consociations and complexes. In this survey, soils types were distinguished using the classification of the soils to the family level and phases of the family in contrast to using the soil series and phase level to define soil types. Most of the mapping units used for this survey are consociations except for the rock outcrop complex.

The field survey involved excavating soil pits with a back hoe to expose the soil profile. The profiles were described using standard National Soil Surveying terminology. This information was used to classify the soils. Those soils with similar classifications were phased on the basis of slope, surface and subsurface rock content and depth of the argillic horizon. These are important suitability criteria for the proposed crop. Soil samples were collected and the analytical data is reported. Each soil profile was described and photographs of the profile taken. The soil profile descriptions and photographs are included in Appendix A of this report.

After the soils were classified and phased, the boundaries of the soil mapping units were drawn on orthophotos of the survey area. Largely these boundaries were a refinement of the soil boundaries used in the 1981 survey. The slope classes were more defined for this survey and therefore constitute a major difference in the two surveys. In this survey a larger number of soil profiles were evaluated on the Bonito Prairie than the 1981 survey thus providing for additional detail. Since not all map delineations were visited, photo interpretations for these areas were based on a combination of the orthophotos available and the 1981 survey delineations.

Some mapping units are described with more than one soil type, and some are made up with contrasting inclusions within the mapping unit. Most of the contrasting inclusions consist of variations in soil depth or significant changes in rock content. The rock outcrop land type is a typical contrasting soil type and is used to designate soil material that cannot be classified because of shallow depth or rockiness. This land type is not suitable for the intended crops.

The soil survey and associated map delineations can be used for a variety of purposes since it is soil based. It was not constructed using specific criteria useful for only a single purpose. The intent was various uses could be considered and a variety of crops considered. The map units used reflect the most up-to-date knowledge of soil classification.

DESCRIPTION OF SOILS

The descriptions of the soil families and phases used to define the mapping units for the Bonito Prairie are presented in this section. Each family used is described as is each mapping unit. The major soil types are characterized with a soil profile description. A typifying pedon is used as the central or model profile and variations or range of characteristics within the pedon are noted. There were a total of 172 profiles described. Each profile description is included with photographs, Appendix A.

Symbols (uppercase letters) are used to label the mapping units for identification and also included are the acreage and proportionate extent (%) of each mapping unit, Table 1. Mapping units are largely distinguished on the basis of soil classification and then modified by slope class and exposed surface rock. Rock content within the profile and depth to clay are also used as phase modifiers.

Table 1. Soil Mapping Units by Area and Proportionate Extent (%), Bonito Prairie Soil Survey, White Mountain Apache Indian Reservation

Map Symbol	Area (Acre)	Extent (%)
LA	479.9	1.2
LB	4315.8	10.4
LC	3940.5	9.5
LD	5332.9	12.9
MA	895.1	2.2
MAC	2240.0	5.4
MAG	2355.8	5.7
MB	263.2	0.6
MBC	5591.9	13.5
MBG	7352.3	17.8
MC	232.6	0.6
MCC	4180.5	10.1
MCG	1783.3	4.3
MDC	529.9	1.3
VA	1793.4	4.3
Water	57.4	0.1
Total	41344.5	100.0

Lithic Argiustoll – clayey, montmorillonitic, mesic

These soils consist of well drained, shallow soils on nearly level and gently sloping pediments to steep side slopes adjacent to waterways. These soils formed in material weathered from basic igneous rock. Slopes range from 0% to 50%. Surface rock content is typically less than 15% but phases include gravelly and cobbly surfaces. Elevation ranges from 5000 feet to 6500 feet. Vegetation is piñon, juniper, shrubs and grasses. In a representative profile, the surface is dark grayish brown clay loam 2 – 4 inches thick. The subsoil is 12 inches of dark brown clay on clay loam over weathered basalt. These soils are slowly permeable. The water supplying capacity is 12 to 16 inches. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Reaction is mildly alkaline to neutral. These soils have severe limitations for irrigated crops because of depth to bedrock. A representative profile (#112), Appendix A, of a Lithic Argiustoll from a Lithic-Rock Outcrop complex (L1) 0 to 1 percent slope located at 12195999N, 1977161E.

A - 0 to 3 inches, 7.5YR 3/2 (dry); weak and moderate, fine and medium granular structure; hard. Texture clay loam (5% gravel, 27% clay).

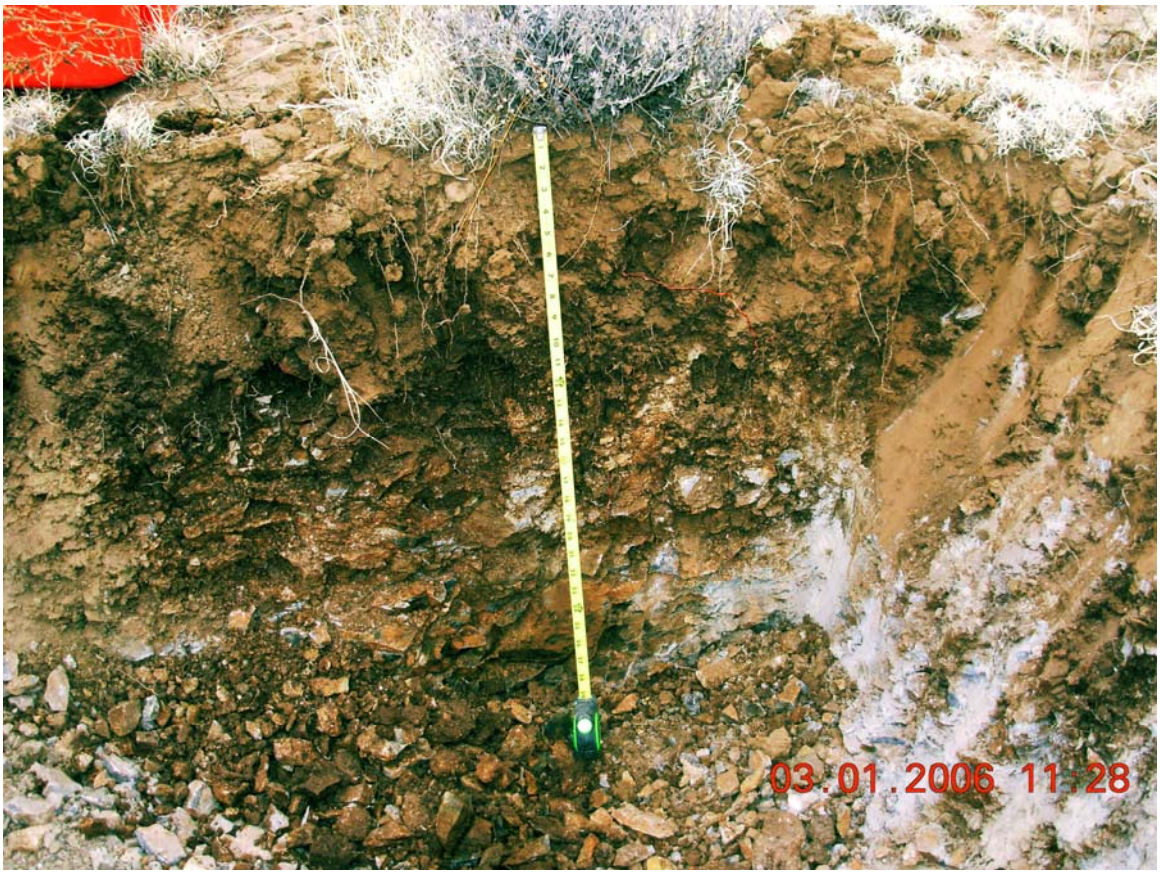
Bt_1 - 3 to 12 inches, 7.5YR 3/4 (dry); moderate to strong, medium to coarse prismatic structure; very hard. Texture clay loam (no gravel, 38% clay).

Bt_2 – 12 to 19 inches, 7.5YR 3/4 (dry); moderate, medium angular blocky structure; very hard to extremely hard. Texture cobbly clay loam (15% cobble, 38% clay).

R - 19 to 24 inches, weathered basalt

Basalt is at a depth of 10 to 20 inches. The A horizon has a hue of 7.5YR or 10YR, texture of silt loam, loam or clay loam and may be gravelly or cobbly. The Bt horizon has a hue of 5YR or 7.5YR, texture of clay loam or clay and may be gravelly, cobbly or stony. The R or Cr horizon is weathered basalt. The surface may be covered

with 15% – 50% gravels or 15% – 50% cobbles. Stones and boulders are generally less than 10% of the surface.



Lithic Argiustoll, Profile #112

LA Lithic Rock Outcrop complex, 0 – 1% slope.

This complex consists of level to nearly level areas on plains. It is about 80% Lithic Argiustolls with 15% rock outcrop. The soils comprise 480 acres or 1.2% of the survey area. The Lithic Argiustolls (LA) include non-gravelly surfaces, gravelly surfaces and cobbly surfaces. Included in this map unit are 10% Typic Chromusterts and Typic Argiustolls. The primary use of these soils is range and wildlife habitat. Their use for irrigated crops is severely limiting.

LB Lithic Rock Outcrop complex 1 – 3% slope.

This complex consists of gently rolling areas on plains. It is about 70% Lithic Argiustolls with 20% rock outcrop. The soils comprise 4316 acres or 10.4% of the survey area. The Lithic Argiustolls (LB) include non-gravelly surfaces, gravelly surfaces and cobbly surfaces. Included in this map unit are 10% Typic Argiustolls. The primary use of these soils is range and wildlife habitat. Their use for irrigated crops is severely limiting.

LC Lithic Rock Outcrop complex 3 – 8% slope.

This complex consists of moderately sloping areas on pediments. It is about 65% Lithic Argiustolls with 25% rock outcrop. The soils comprise 3940 acres or 9.6% of the survey area. The Lithic Argiustolls (LC) include non-gravelly surfaces and cobbly surfaces. Included in this map unit are 10% Typic Argiustolls. The primary use of these soils is range and wildlife habitat. Their use for irrigated crops is severely limiting.

LD Lithic Rock Outcrop complex 8 – 50% slope.

This complex consists of hilly and steep areas on breaks and drainage ways. It is about 40% to 50% Lithic Argiustolls with 30% - 50% rock outcrop. The soils comprise 5333 acres or 12.9% of the survey area. The Lithic Argiustolls (LD) include non-gravelly surfaces, gravelly surfaces and cobbly surfaces. Included in this map unit are 10% Typic Argiustolls. The primary use of these soils is range and wildlife habitat. Their use for irrigated crops is severely limiting.

<u>Typic Argiustoll – fine, montmorillonitic, mesic</u>

These soils consist of well drained, nearly level to steep slopes on plains, on hills and in waterways. These soils formed in material weathered from basic igneous rock. Slopes range from 0% to 50%. Surface rock content is typically less than 15% but phases include gravelly and cobbly surfaces. Elevation ranges from 5000 to 6500 feet. Vegetation is mainly grama grasslands and piñon-juniper woodlands. In a representative profile the surface is dark grayish brown loam or clay loam 3 to 4 inches thick. The subsoil is 36 to 45 inches of grayish brown, dark brown and yellowish red clay, clay

loam, gravelly clay loam and cobbly clay loam that overlies unconsolidated gravelly and cobbly basalt alluvium. These soils are slowly permeable. The water supplying capacity is 12 to 15 inches. Available water capacity is low to moderate. Effective rooting depth is 36 to 48 inches. Reaction is neutral. These soils generally have slight to moderate limitations for irrigated crops depending on slope, surface rock content and depth to clay texture. A representative profile (#78), Appendix A, of a Typic Argiustoll from an Argiustoll clay loam, 0 to 1 percent slope (MA) located at 12208638N, 1966440E, laboratory data, Appendix B.

A - 0 to 4 inches, 10YR 3/2 loam (26% clay); moderate fine granular structure; hard, no gravel or cobble; neutral (pH 6.8) organic matter 3.3%.

Bt_1 - 4 to 13 inches, 10YR 3/3 loam (24% clay); moderate fine and medium subangular blocky structure; very hard; no gravel or cobble; few thin clay films; neutral (pH 6.5) organic matter 1.8%.

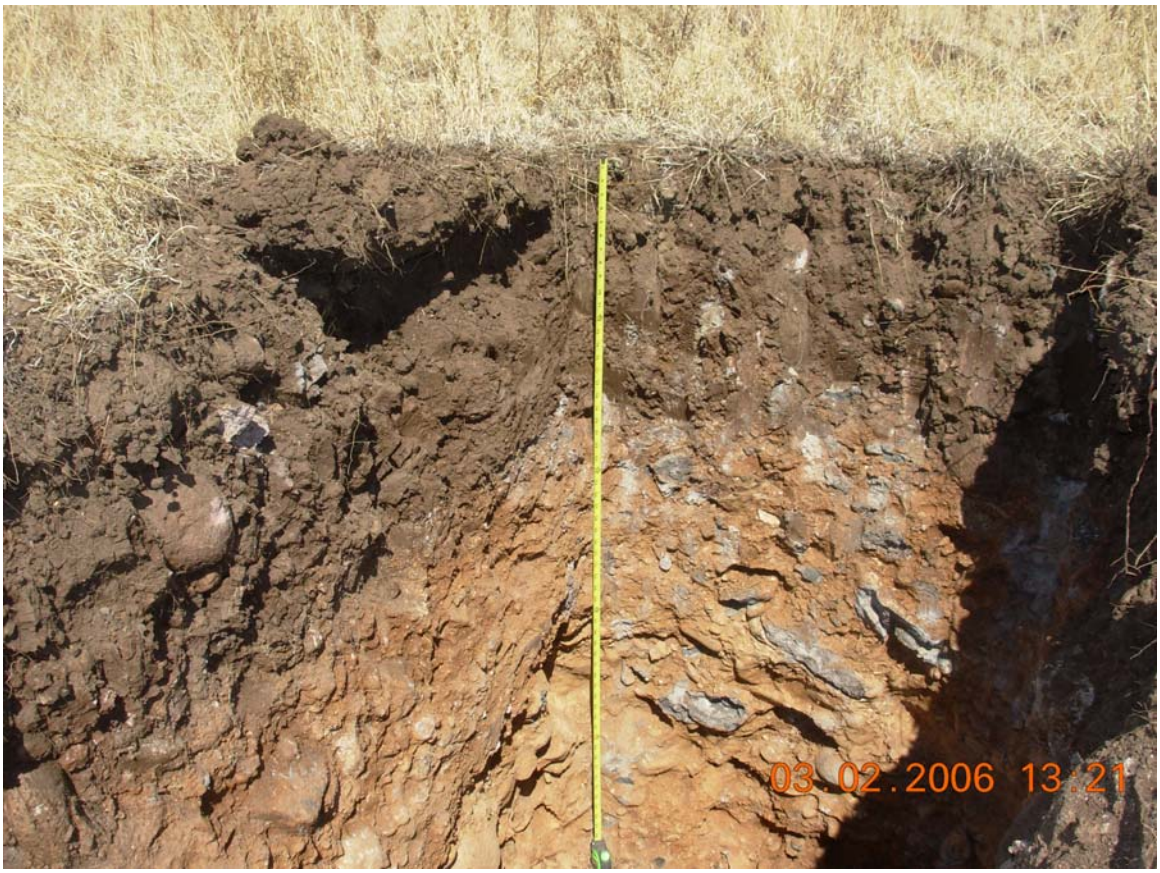
Bt_2 – 13 to 21 inches, 10YR 3/3 clay (49% clay); moderate to strong medium and coarse prismatic structure; extremely hard; no gravel or cobble; many thick clay films; neutral (pH 6.3); organic matter 1.2%.

Bt_3 – 21 to 32 inches, 10YR 3/4 clay (49% clay); moderate medium subangular blocky structure; extremely hard; no gravel or cobble; many thick clay films; neutral (pH 6.9).

Bt_4 – 32 to 40 inches, 5YR 4/4 clay (41% clay); moderate medium subangular blocky structure; very hard; 10% gravel, 5% cobble; few thin clay films; neutral (pH 7.6).

C – 40 to 60 inches, 5YR 4/4 gravelly sandy clay loam (31% clay); massive structure; very hard; 25% gravel, 10% cobble, 5% stone; neutral (pH7.5).

Bedrock is deeper than 60 inches. There are no surface rock fragments for this profile. The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam or clay loam. The Bt (1-3) horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma 2 to 4. It is clay loam, gravelly or cobbly clay loam, clay, gravelly or cobbly clay. The Bt_4 horizon has hue of 7.5YR or 5YR, value of 4 to 6 and chroma of 4 to 6. It is gravelly or cobbly clay loam, gravelly or cobbly sandy clay loam and gravelly or cobbly sandy loam. The C horizon has hue of 7.5YR or 5YR, value of 4 to 6 and chroma of 4 to 6. It is gravelly, very gravelly, cobbly, very cobbly and the fine earth is sandy clay loam, sandy loam or loamy sand. Occasionally there are lime coatings on rock fragments.



Typic Argiustoll, profile#131

MA Argiustoll clay loam, 0 to 1 % slopes.

This consociation consists of level and nearly level soils on stable plains. This soil includes non gravelly and non-cobbly surfaces (MA), gravelly surfaces (MAG) and cobbly surfaces (MAC).

The MA mapping unit (no gravel or cobble) consists of fine and clayey skeletal soils. The depth to clay (argillic horizon) ranges from 3 inches to >24 inches. More than half of the soils have depth to clay greater than 12 inches. The soils are about 95% fine, montmorillonitic, mesic and 5% clayey skeletal, montmorillonitic, mesic. MA is the soil mapping unit most suitable for irrigated crops. It comprises a total of 895 acres or 2.2% of the survey area. Many of these soils have slight limitations for irrigated trees. The primary exceptions are soils shallow to the clay layer (<8 inches).

The MAG mapping unit (gravelly surface) comprises 2356 acres or 5.7% of the survey area and has similar suitability as MA with the exception of the surface gravel content. These soils are about 90% fine, montmorillonitic, mesic and 10% clayey skeletal, montmorillonitic mesic. Approximately 30% of the soils have depth to clay greater than 12 inches. A few of these soils have slight limitations for irrigated trees. Some of these soils could be considered for a tree crop if the surface rock is removed.

The MAC mapping unit (cobbly surface) comprises a total of 2240 acres or 5.4% of the survey area and has similar suitability as MA and MAG. These soils are about 80% fine montmorillonitic, mesic and 20% clayey skeletal montmorillonitic, mesic. In these soils the surface cobble content affects the suitability as does the depth to clay which is 5 inches or less.

Inclusions in MA, MAG and MAC mapping units include 5 percent Typic Argiustolls on slopes steeper than 1%, 5 percent Typic Chromusterts, and 5 percent Lithic Argiustolls. The soils are currently used as range and wildlife habitat. The main range plants are sideoats grama, junegrass and juniper.

MB Argiustoll clay loam, 1 to 3 % slopes.

This consociation consists of nearly level to gently sloping soils on stable plains and rolling uplands. This soil includes non gravelly and non-cobbly surfaces (MB), gravelly surfaces (MBG) and cobbly surfaces (MBC).

The MB mapping unit (no gravel, no cobble) consists of fine, and clayey skeletal soils. The depth to clay (argillic horizon) ranges from 2 inches to 18 inches. The soils are about 90% fine, montmorillonitic, mesic and 10% clayey skeletal, montmorillonitic, mesic. The MB mapping unit has some soils suitable for irrigated trees. It comprises a total of 263 acres or 0.6% of the survey area. Some of these soils have slight limitations for irrigated trees. The main limitation is shallowness to the clay layer.

The MBG mapping unit (gravelly surface) comprises 7352 acres or 17.8% of the survey area and has similar suitability as MB except for the surface gravel content. These soils are about 80% fine, montmorillonitic, mesic, and 10% each clayey skeletal and clayey over loamy skeletal. Some of these soils could be considered for irrigation if the surface rock is removed.

The MBC mapping unit (cobbly surface) comprises 5592 acres or 13.5% of the survey area and has similar suitability as MB and MBG. These soils are about 80% fine, montmorillonitic, mesic, and 10% each clayey skeletal and clayey over loamy skeletal. The surface cobble content affects the suitability as well as depth to clay. Over 80% of the soils have clay depths less than 12 inches. Inclusions in MB, MBG and MBC mapping units include 5 percent Typic Argiustolls on both lesser and greater slopes, and 5 percent Lithic Argiustolls. The soils are currently used as range and wildlife habitat. The main range plants are sideoats grama, junegrass and juniper.

MC Argiustoll clay loam, 3 to 8% slopes.

This consociation consists of gently to moderately sloping soils on stable plains, and rolling uplands. This soil includes non gravelly and non-cobbly surfaces (MC), gravelly surfaces (MCG) and cobbly surfaces (MCC). The MC mapping units (MC,

MCG, MCC) consists of fine, and clayey skeletal soils. The depth to clay (argillic horizon) ranges from 2 inches to 10 inches. The soils are about 90% fine, montmorillonitic, mesic and 10% clayey skeletal, montmorillonitic, mesic.

The MC mapping units (MC, MCG, MCC) are both moderately and severely limiting as a suitable soil for irrigated trees. The limitation is slope, shallowness to clay, and rock fragments in the subsoil. The MC mapping unit comprises a total of 233 acres or 0.6% of the survey area.

The MCG mapping unit comprises 1784 acres or 4.3% of the survey area and has similar suitability as MC except for the surface gravel content. A limited number of these soils could be considered for irrigation if the surface rock is removed.

The MCC mapping unit comprises a total of 4180 acres or 10.1% of the survey area and has similar suitability as MC and MCG. The surface cobble content affects the suitability as well as depth to clay. Inclusions in MC, MCG and MCC mapping units include 5 percent Typic Argiustolls on both lesser and greater slopes, and 10 percent Lithic Argiustolls. The soils are currently used as range and wildlife habitat. The main range plants are sideoats grama, junegrass and juniper.

MDC Argiustoll clay loam, 8 to 50% slopes.

This consociation consists of steep to extremely steep soils on breaks and uplands. This soil mapping unit includes only cobbly surfaces (MDC). The MDC mapping unit consists of primarily clayey skeletal soils. The depth to clay (Argillic horizon) ranges from 3 inches to 12 inches. The soils are about 20% fine, montmorillonitic, mesic and 80% clayey skeletal, montmorillonitic. MDC is severely limiting for irrigated trees. It comprises a total of 530 acres or 1.3% of the survey area. Most of these soils have severe limitations because of slope. Inclusions in the MDC mapping units include 5 percent Typic Argiustolls on lesser slopes and 15 percent Lithic Argiustolls. The soils are currently used as range and wildlife habitat. The main range plants are sideoats grama, liveoak and juniper.

Typic Chromustert – fine, montmorillonitic, mesic

These soils consist of well drained soils located in depressions surrounded by large areas of gently sloping Argiustolls. They formed in material weathered from basic igneous rock. Slopes are 0 to 1 percent. Elevation ranges from 5500 feet to 6000 feet. Vegetation is a sparse cover of mostly annual grasses and forbs. In a representative profile the surface layer is brown clay 3 inches thick. The underlying layer is brown and reddish brown clay to a depth of at least 40 inches.

These soils are very slowly permeable. The water supplying capacity is 18 to 20 inches. Available water capacity is low to moderate. Effective rooting depth is 36 inches. These soils have wide and deep cracks when they are dry. Most perennial plants do not survive on these soils because of the episodes of shrinking and swelling. A representative profile (#79), Appendix A, of a Typic Chromustert from a Vertisol clay, 0 to 1 percent slope (VA) located at 12210293N, 1965825E, laboratory data, Appendix B.

A_1 - 0 to 3 inches, 10YR 3/3 clay (45%) clay; moderate fine granular structure; hard, no gravel or cobble; neutral (pH 6.7) organic matter 1.1%

Bss - 3 to 24 inches, 10YR 3/3 clay (47% clay); moderate wedge structure, extremely hard, no gravel or cobble; common large slickensides; neutral (pH 6.9), organic matter 0.9%

C – 24 to 60 inches, 10YR 4/3 clay (51% clay); massive structure, extremely hard, no gravel or cobble; neutral (pH 7.3).

The A horizon has hue of 7.5YR and 10YR, value of 3 or 4 and chroma of 2 or 3. It is clay or cobbly clay. The Bss horizon has hue of 7.5YR and 10YR, value of 3 or 4 and chroma of 2 or 3. It is clay and slickensides are common to many. Cracks form from ½ inch to 2 inches to depths of 24 inches. The C horizon is clay, gravelly clay, cobbly clay and may overlie basalt bedrock or weathered material with secondary carbonate. VA Vertisol clay, 0 to 1 percent slopes.

Typic Chromustert, profile #155

This consociation consists of level to nearly level soils located in depressions surrounded by Argiustolls on plains. Basalt cobbles are scattered on 5 to 25 percent of the surface.

Included with this soil are about 10% gently sloping Arigustoll clay loams on the toe slopes. Runoff in these soils is slow, and the hazard of erosion is slight. The mapping unit comprises a total area of 1793 acres or 4.3% of the survey area. The soils are used for range and wildlife habitat. They have severe limitations for irrigated trees and are not considered to have potential for establishing irrigated trees.

SOILS MAP

Soils of the Bonito Prairie, Exhibit A, are approximately 60% Typic Argiustolls, 35% Lithic Argiustolls and 5% Vertisols. The nearly level Typic Argiustolls, 0 – 1% slope are slightly less than 15% of the area, the gently sloping Typic Argiustolls, 1 – 3% slope are slightly more than 30% of the area, and the moderately sloping Typic Argiustolls, 3 – 8% slope are nearly 15% of the area, Table 1. Slope is an important characteristic used to distinguish soil mapping units.

IRRIGATED TREE SUITABILITY

The main purpose of the soil survey for the Bonito Prairie was to determine the location and extent of soils suitable for the growing of irrigated trees. Soil Suitability Criteria, Table 2, was developed for both Poplar trees and Christmas trees for the Bonito Prairie. Each of the 172 soil profile descriptions were evaluated for their suitability and were identified as having slight, moderate or severe limitations for poplar or Christmas trees, Appendix C. Soil mapping units were then rated for suitability using the respective associated profile descriptions. Soil mapping units that are potentially suitable for irrigated trees included Typic Argiustolls with slopes of 8% and less. The remaining soil mapping units; Lithic, Vertic and Typic Argiustolls, greater than 8% slopes were distinguished separately as severely limiting, Exhibit B.

Two of the potentially suitable mapping units, Typic Argiustolls 0 – 1% slope and 1 – 3% slope were the only areas evaluated for poplar and Christmas tree suitability. These two mapping units were selected because slopes of less than 3% have slight limitations for irrigation. These two mapping units were assigned either a slight, moderate or severe limitation primarily based on surface rock content, rock content 0 – 12 inches, and depth to clay.

Table 2. Soil Suitability Criteria For Christmas and Poplar trees, Bonita Prairie, White Mountain Apache Indian Reservation

Limitation	Slight	Moderate	Severe
Slope	<3% not ponded	3 – 8%	>8% or ponded
Depth to Bedrock	>40”	24 – 40”	<24”
Drainage	somewhat excessively, well	moderately well	very poorly, poorly, somewhat poorly
Gravel & Cobble Content (surface)	<15%	15 – 35%	>35%
Stone Content (surface)	<15%	15 – 35%	>35%
Surface Texture (0 – 4”)	loam, sandy loam, silt loam <27% clay	clay loam, sandy clay loam, silty clay loam 27 – 40% clay	clay, silty clay, sandy clay >40% clay
Gravel (<3”) & Cobble (3” – 10”) Content (0 – 12”)	<15%	15 – 35%	>35%
Stone (10 – 25”) Content (0 – 12”)	<15%	15 – 35%	>35%
Depth to Clay Texture (Poplar tree)	>8”	4 – 8”	<4”
(Christmas tree)	>12”	8 – 12”	<8”

Poplar Trees

The suitability evaluation for Poplar trees, Exhibit C, shows that a total of 18,698 acres of the original 41,344.5 acres (45%) was considered for suitability. The area includes Typic Argiustolls in the <1% and 1-3% slope classes. Of the nearly 19,000 acres considered, 1,041 acres (5.6%) have slight limitations, 11,098 acres (59.3%) have moderate limitations, and 6,559 acres (35.1%) have severe limitations.

The moderate and severe limitations are associated with either depth to clay (<8 inches), rock content in the upper 12 inches (>15%) or rock content on the surface (>15%). Further detailed mapping of the moderately and severely limiting soil mapping units would be required to identify additional areas having slight limitations. It is likely there are a substantial number of delineations that have slight limitations but were not able to be identified in this survey because many of the delineations lacked a profile description to justify a slight suitability rating.

Additionally, there are moderately limiting areas that would have slight limitations if the surface rock content were not limiting. A consideration is to physically remove the surface rock from these areas and thus change the soil suitability. Accurate estimates of the extent of the new slightly limiting areas can only be determined with more extensive mapping.

Christmas Trees

The suitability evaluation for the Christmas trees, Exhibit D, shows that a total of 380 acres of the original 41,344 acres (1%) was found to have slight limitation. There is no doubt there are additional mapping delineations having slight limitations for Christmas trees. These areas are complexed with soils having moderate limitations and cannot be separated at this level of mapping. If additional areas of soils having slight limitations are to be considered then additional soil mapping will be required to provide the necessary detail. Similar to the poplar tree evaluation, areas of slight limitations could be created if the surface rock content was altered. The extent of areas having slight limitations resulting from surface rock removal will require further mapping detail.

Map delineations with moderate and severe limitations were not designated at this time for the Christmas trees. There is at least 300 acres of slightly limiting soils, which was the assumed goal for the Christmas tree plantation. With minimal additional field review, additional areas of slightly limiting soils could be delineated within mapping delineations that are now designated as moderately or severley limiting. It is assumed the goal for the Christmas trees is a total area of 300 acres

SUMMARY

A soil survey was completed for an area of 41,000 acres for the Bonito Prairie, on the White Mountain Apache Indian Reservation. Approximately half (19,000 acres) of the area has potential for irrigated trees. Of this half, 1,000 acres have slight limitations and 11,000 acres have moderate limitations for Poplar trees. There is at least 300 acres that have slight limitations for Christmas trees. The areas of suitability for irrigated trees are identified by location and extent on the included maps, Exhibit C and D.

Appendix A. 172 Soil Profile Sheets

Soil Description

Soil Type | File No. 01 BAB

Area Bonita Prairie – White Mt. Apache Indian Res. | Date 1/30/06 | Stop No. A 1-1

Classification Typic Chromustert – fine, montmorillonitic, mesic - none 10:40am

Location N3731280.89 E5975005.84

N. veg. (or crop) | Climate

Parent Material

Physiography

Relief | Drainage | Salt or Alkali

Elevation | Gr. Water | Stoniness

Slope Concave | Moisture

Aspect | Root distrib.

Erosion

Permeability

Additional notes:

Samples (depth inches)

This profile appears to be eroded phase of soil at Pit 1-2 w/ top

Starting at base of Albic horizon

inches

Pit Depth ( )

Bedrock ( )

Mike's pictures 339-340 | Topsoil ( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-9	10YR 3/2		C 45%	WEG	VH			NE					
AC	9-36	10YR 3/2		C 45%	MA	VH			NE					
C	36-46	7.5YR 4/4		C 40%	MA	EH			NE					
2C	46-64	7.5YR 5/6		SCL 40%	MA	MH			NE					

01.30.2006

01.30.2006

Soil Description

Soil Type				File No.	02 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	A 1-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		11:20am		
Location	N3731202.63 E597506.37				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope 0 – 1%	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photo				
					inches
				Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-7		10YR 2/2	SICL	GR	H			NE					
E	7-13		10YR 2/2	SICL	SBK	H			NE					
Bt_1	13-24		10YR 3/2	CL	SBK	VH			NE					
Bt_2	24-38		10YR 3/4	C	SBK	EH			NE					
C	38-60		10YR 4/6	SCL	MA	H			NE					

01.30.2006 11:33

01.30.2006 11:27

01.30.2006 11:33

Soil Description

Soil Type				File No.	03 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 1-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		12:00pm		
Location	N3731395.85 E597484.07				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 328 - 325			
		Surface			
	Gravel %				
	Cobble %				
	Stone %				inches
	Boulder %			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/3	SIC	GR	SH			NE					
B	4-10		10YR 3/3	SICL	SBK	H			NE					
Bt	10-25		10YR 3/3	C	PR	EH			NE					
C	25-34		10YR 4/6	SCL	MA	VH			VS					
2C	34-55		10YR 4/4	SL	MA	SH			NE					
3C	55-60		10YR 4/4	LS	MA	S			NE					

01.30.2006 12:06

01.30.2006 12:05

Soil Description

Soil Type		File No.	04 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/30/06	Stop No. A 1-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly	1:20pm	
Location	N3731254.3198 E597721.1077		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 5%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 323 - 322		

Surface			
Gravel %	15		
Cobble %	20		
Stone %	10		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL	GR	H			NE		10	0	0	0
Bt_1	3-9		7.5YR 3/2	gCL	ABK	VH			NE		20	0	0	0
Bt_2	9-23		7.5YR 3/3	gC	PR	EH			NE		20	0	0	0
Bt_3	23-46		7.5YR 4/4	gCL	ABK	VH			VS		15	15	0	0
C	46-65		7.5YR 4/6	vcSCL	MA	H			VS		15	20	10	0

01.30.2006 12:18

01.30.2006 12:17

Soil Description

Soil Type				File No.	05 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	A 1-5
Classification	Typic Argiustoll –fine, montmorillonitic, mesic – very gravelly		1:00pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope 2%	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photo 324-325				
	Surface				
Gravel %	25				
Cobble %	25				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-4		7.5YR 3/2	CL 35%	GR	H			NE		>5	0	0	0
Bt_1	4-12		7.5YR 3/2	gC 45%	PR	VH			NE		10	5	0	0
Bt_2	12-24		7.5YR 4/4	gC 45%	ABK	EH			NE		15	10	0	0
C	24-60		7.5YR 5/6	vgSCL,SL 20%	MA	H-MA			NE		25	20	0	0

01.30.2006 12:55

01.30.2006 12:54

Soil Description

Soil Type		File No.	06 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/30/06	Stop No. A 1-6
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic - gravelly	1:35pm	
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 0 – 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 321-320		

	Surface		
Gravel %	10		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	(70)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	CL 35%	GR		SH		NE		5	0	0	0
Bt_2	2-8		7.5YR 3/2	gC	PR		VH		NE		15	10	0	0
Bt_2	8-24		7.5YR 3/3	vgC	ABK		VH		NE		15	25	0	0
Bt_3	24-45		7.5YR 4/6	vgCL	SBK		VH		NE		25	20	0	0
C	45-70		7.5YR 4/6	vgSCL	MA		H		NE		25	20	0	0

01.30.2006 13:18

01.30.2006 13:18

Soil Description

Soil Type				File No.	07 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	A 1-7
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		2:25PM		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1-2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 319-318			
	Surface				
	Gravel %				
	Cobble %				
	Stone %				inches
	Boulder %			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-8		10YR 2/2	SCL 25%	GR	SH			NE					
B	8-14		10YR 3/3	SCL 28%	SBK	SH			NE					
Bt_1	14-23		10YR 3/4	CL 35%	PR	EH			NE					
Bt_2	23-36		10YR 4/4	CL 33%	SBK	EH			NE					
C	36-48		10YR 5/4	SL 15%	M	VH			NE					
Cr/ Sandstone	48-60		10YR						NE					

01.30.2006 14:24

01.30.2006 14:24

Soil Description

Soil Type				File No.	08 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	A 1-8
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		3:00pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	0 – 1%	Moisture			
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photo 317 - 316				
	Surface				
Gravel %	0				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	(80)
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		10YR 3/2	CL	GR	H			NE					
Bt_1	5-16		10YR 3/2	C	PR	VH			NE					
Bt_2	16-36		10YR 2/2	C	SBK	EH			NE					
C	36-48		10YR 4/4	SCL	MA	VH			NE					
$2C_1$	48-60		10YR 6/4	SICL	MA	H			NE					
$2C_2$	60-80		10YR 6/4	SICL	MA	H			NE					

01.30.2006 15:09

01.30.2006 15:08

Soil Description

Soil Type		File No.	09 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/30/06	Stop No. B 1-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		
Location	J30-B1-5		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
Gravel %	0		
Cobble %	0		
Stone %	0		inches
Boulder %	1	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	L	GR	SLH	S	NP NS	NE		5	0	0	0
Bt_1	2-9		7.5YR 3/2	gCL	SBK	H	S	NP NS	NE		10	15	0	0
Bt_2	9-20		7.5YR 5/4	gC	PR	EH	EH	NS PLAS	NE		20	5	0	0
Bt_3	20-36		7.5YR 6/6	gCL	SBK	VH	VH		NE		20	10	0	0
C	36-66		7.5YR 5/4	egSL	M	H			NE		50	15	0	0

01.30.2006 17:21

01.30.2006 17:21

Soil Description

Soil Type				File No.	10 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	B 1-6
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location	J30-B1-6				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
		Surface			
	Gravel %	10			
	Cobble %	<1			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	(>60)
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		<5%	0	0	0
Bt_1	2-12		7.5YR 3/2	gCL	SBK	H			NE		10	10	0	0
Bt_2	12-23		7.5YR 4/2	gC	PR	EH			NE		10	5	0	0
Bt_3	23-36		7.5YR 4/4	vgCL	SBK	VH			NE		25	10	0	0
C	36-60		7.5YR 5/4	vgSL	M	H			NE		50	5	0	0

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Soil Description

Soil Type				File No.	11 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	B 1-7
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		5:30pm		
Location	J30-B1-7				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
		Surface			
	Gravel %	30			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	gCL 28%	GR	SH			NE		10	5	0	0
Bt_1	3-10		10YR 3/2	gCL 36%	SBK	H			NE		15	10	0	0
Bt_2	10-20		7.5YR 3/4	gC	PR	EH			NE		10	5	0	0
Bt_3	20-32		7.5YR 4/4	gCL	ABK	VH			NE		20	10	0	0
C	32-48		7.5YR 4/4	vgCL 27%	M	H			NE		15	20	20	0

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01.30.2006 17:50

Soil Description

Soil Type				File No.	12 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		9:20am		
Location	Sheet 5				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 309 - 306			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		7.5YR 3/2	L	GR	SH			NE		0	0	0	0
Bt_1	5-16		7.5YR 3/2	CL	SBK	H			NE		0	0	0	0
Bt_2	16-28		7.5YR 3/4	C	PR	EH			NE		0	0	0	0
C1	28-36		7.5YR 4/4	CL	MA	VH			NE		0	0	0	0
C_2	36-60		7.5YR 4/6	CL	MA	H			NE		0	0	0	0

310D
01.31.2006 09:19

01.31.2006 09:13

Soil Description

Soil Type				File No.	13 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-10
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		1:00pm		
Location	Sheet 5				
N. veg. (or crop)	Dense grama grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 292-291			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
	Profile in dense grama grass			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 33%	GR	H			NE		0	0	0	0
Bt_1	3-12		7.5YR 3/2	CL 38%	SBK	H			NE		0	0	0	0
Bt_2	12-20		10YR 3/4	C	PR	EH			NE		0	0	0	0
Bt_3	20-35		7.5YR 3/4	C	ABK	EH			NE		0	0	0	0
C	35-40		5YR 5/6	vgSCL	MA	VH			NE		35	10	0	0

01.31.2006 13:16

01.31.2006 13:07

Soil Description

Soil Type				File No.	14 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-11
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		1:20pm		
Location	Sheet 5				
N. veg. (or crop)	Dense grama grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 290-289			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
	No rock content			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		7.5YR 3/2	CL 27%	GR	SH			NE		0	0	0	0
Bt_1	5-12		7.5YR 3/2	CL 37%	SBK	H			NE		0	0	0	0
Bt_2	12-23		7.5YR 3/2	C	PR	EH			NE		0	0	0	0
Bt_3	23-39		7.5YR 3/4	C	SBK	EH			NE		0	0	0	0
C	39-60		5YR 4/6	vgSCL	MA	VH			NE		40	10	0	0

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01.31.2006 13:20

Soil Description

Soil Type				File No.	15 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-12
Classification	Typic Chromustert – fine, montmorillonitic, mesic - none		1:35pm		
Location	Sheet 5				
N. veg. (or crop)	Weed composite	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 288-287			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-2		10YR 3/3	C 40%	PL	VH			NE		0	0	0	0
B_{ss1}	2-16		10YR 3/3	C	WEG	EH			NE		0	0	0	0
B_{ss2}	16-54		10YR 3/4	C	WEG	EH			NE		0	0	0	0
R	54-60		--	--	--	--			NE		--	--	--	--

01.31.2006 13:39

01.31.2006 13:33

Soil Description

Soil Type				File No.	16 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-13
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic - cobbly		2:10pm		
Location	Sheet 5				
N. veg. (or crop)	Grass weed mix	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 286-285			
		Surface			
	Gravel %	5			
	Cobble %	20			
	Stone %	10			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		7.5YR 3/2	CL	GR	VH			NE		0	0	0	5
Bt_1	5-21		7.5YR 3/2	bC	WEG	EH			NE		5	5	10	15
Bt_2	21-32		7.5YR 3/4	vbC	ABK	EH			NE		5	5	10	25
Ck	32-40		7.5YR 7/6	vbCL	MA	H			VE		5	5	10	25
R	Basalt													

01.31.2006 14:09

01.31.2006 13:54

Soil Description

Soil Type		File No.	17 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-14
Classification	Typic Argiustoll –clayey skeletal, montmorillonitic, mesic – very gravelly	2:20pm	
Location	Sheet 5		
N. veg. (or crop)	weed grass mix	Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 2%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 284-283		
	Surface		
Gravel %	20		
Cobble %	20		
Stone %	25		inches
Boulder %	0	Pit Depth	( )
	Backhoe refusal at 36 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	L	GR	SH			NE		0	0	0	0
Bt_1	4-20		7.5YR 3/2	ebCL 38%	SBK	VH			NE		10	20	20	30
Bt_2	20-36		7.5YR 3/4	ebC	ABK	EH			NE		10	20	20	50

01.31.2006 14:37

01.31.2006 14:22

Soil Description

Soil Type		File No.	18 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-15
Classification	Typic Chromustert – fine, montmorillonitic, mesic – very gravelly	2:55pm	
Location	Sheet 5		
N. veg. (or crop)	composite weeds	Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 282-281		
	Surface		
Gravel %	20		
Cobble %	25		
Stone %	20		inches
Boulder %	0	Pit Depth	( )
Backhoe refusal at 48 inches (large stone)		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	C	SBK	VH			NE		0	0	0	0
Bss_1	4-24		7.5YR 3/2	C	WEG	EH			NE		0	0	0	0
Bss_2	24-41		7.5YR 3/4	C	WEG	EH			NE		0	0	0	0
C	41-60		7.5YR 3/4	gC	MA	EH			NE		0	0	10	20

01.31.2006 15:03

01.31.2006 14:53

Soil Description

Soil Type		File No.	19 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-16
Classification	Typic Chromustert – fine, montmorillonitic, mesic - none	3:10pm	
Location	Sheet 5		
N. veg. (or crop)	Composite weeds	Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 280-279		
	Surface		
Gravel %	0		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
	No rock content	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	C	PL	VH			NE		0	0	0	0
Bss_1	2-20		7.5YR 3/2	C	WEG	EH			NE		0	0	0	0
Bss_2	20-40		7.5YR 3/2	C	SBK	EH			NE		0	0	0	0
C	40-50		7.5YR 4/4	CL	MA	EH			NE		0	0	0	0

01.31.2006 15:17

01.31.2006 15:11

Soil Description

Soil Type		File No.	20 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	A 5-17
Classification	Typic Argiustoll –fine, montmorillonitic, mesic – very gravelly 3:59pm		
Location	Sheet 5		
N. veg. (or crop)	grass weed mix Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 2%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 278-277		
	Surface		
Gravel %	25		
Cobble %	10		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 28%	GR	SH			NE		10	0	0	0
Bt_1	3-12		7.5YR 3/2	cCL 35%	SBK	H			NE		10	15	0	0
Bt_2	12-21		7.5YR 3/4	cC	PR	EH			NE		10	15	0	0
C_1	21-30		7.5YR 4/4	vgSCL	MA	EH			NE		30	15	0	0
C_2	30-60		5YR 4/4	vcSCL	MA	H			NE		30	20	5	0

01.31.2006 16:14

01.31.2006 15:44

Soil Description

Soil Type				File No.	21 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-18
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:30pm		
Location	Sheet 5				
N. veg. (or crop)	Weed grass mix	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 276-275			
		Surface			
	Gravel %	10			
	Cobble %	5		Clayey over loamy skeletal	
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 30%	GR	SH			NE		0	0	0	0
Bt_1	3-9		7.5YR 3/2	gCL 36%	SBK	VH			NE		10	5	0	0
Bt_2	9-15		7.5YR 3/2	C	PR	EH			NE		10	0	0	0
Bt_3	15-25		7.5YR 3/4	C	ABK	EH			NE		10	0	0	0
C_1	25-30		7.5YR 4/4	vgSCL	MA	VH			NE		30	15	0	0
C_2	30-48		5YR 4/4	vcSL	MA	VH			NE		30	20	5	0

01.31.2006 16:26

01.31.2006 16:38

Soil Description

Soil Type				File No.	22 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-19
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		4:49pm		
Location	Sheet 5				
N. veg. (or crop)	Grama grass, some weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
	No rock content on surface			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	CL 30%	GR	H			NE		5	0	0	0
Bt_1	4-20		7.5YR 3/2	CL 36%	SBK	H			NE		0	0	0	0
Bt_2	20-30		7.5YR 3/4	gC	PR	EH			NE		10	5	0	0
Bt_3	30-40		7.5YR 3/4	cC	ABK	EH			NE		10	10	0	0
C	40-60		5YR 4/4	vcSCL	MA	VH			NE		35	20	0	0

01.31.2006 16:53

01.31.2006 16:45

Soil Description

Soil Type		File No.	23 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	A 5-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none 9:40am		
Location	Sheet 5		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 306 - 305		
	Surface		
Gravel %	0		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	L	GR	SH			NE		0	0	0	0
Bt_1	3-20		7.5YR 3/2	CL	SPK	H			NE		0	0	0	0
Bt_2	20-32		7.5YR 3/4	C	PR	EH			NE		0	0	0	0
C_1	32-41		7.5YR 4/4	CL	MA	VH			NE		10	0	0	0
C_2	41-60		7.5YR 3/4	vgSL	MA	H			NE		20	15	0	0

01.31.2006 09:39

01.31.2006 09:39

Soil Description

Soil Type				File No.	24 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-20
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		5:00pm		
Location	Sheet 5				
N. veg. (or crop)	Weed grass mix	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 275-274			
		Surface			
	Gravel %	10			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 35%	GR	H			NE		10	0	0	0
Bt_1	3-8		7.5YR 3/2	cCL 39%	SBK	VH			NE		10	10	0	0
Bt_2	8-15		7.5YR 3/4	C	PR	EH			NE		0	10	0	0
Bt_3	15-25		7.5YR 3/4	C	ABK	EH			NE		0	10	0	0
C	25-48		5YR 4/4	egSCL	MA	VH			NE		50	20	0	0

01.31.2006 17:07

01.31.2006 16:57

Soil Description

Soil Type		File No.	25 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none	9:55am	
Location	Sheet 5		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 304 - 303		

	Surface
Gravel %	0
Cobble %	5
Stone %	0
Boulder %	0

inches

Pit Depth ( )

Bedrock ( )

Topsoil ( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 2/2	CL 27%	GR	SH			NE		0	0	0	0
Bt_1	4-9		10YR 3/2	CL 36%	VH	VH			NE		0	0	0	0
Bt_2	9-19		10YR 3/2	C	EH	EH			NE		10	0	0	0
Bt_3	19-30		10YR 3/3	C	EH	EH			NE		10	0	0	0
C_1	30-36		7.5YR 3/4	gCL	VH	VH			NE		20	5	0	0
C_2	36-60		7.5YR 4/4	vgSCL	H	H			NE		25	10	0	0

01.31.2006 09:56

01.31.2006 09:54

Soil Description

Soil Type				File No.	26 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		10:40am		
Location	Sheet 5				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photo 302 - 301				
	Surface				
Gravel %	0				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	L	GR	SH			NE		0	0	0	0
Bt_1	4-11		7.5YR 3/2	CL 28%	SBK	H			NE		0	0	0	0
Bt_2	11-22		7.5YR 3/4	C	PR	EH			NE		0	0	0	0
C_1	22-36		7.5YR 4/4	CL	MA	VH			NE		0	0	0	0
C_2	36-48		7.5YR 4/4	CL	MA	VH			NE		0	0	0	0

01.31.2006 10:47

01.31.2006 10:31

Soil Description

Soil Type				File No.	27 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		10:55am		
Location	Sheet 5				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0 – 1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 300 - 299			
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	CL	GR	SH			NE		0	0	0	0
Bt_1	4-12		7.5YR 3/2	CL	SBK	H			NE		10	0	0	0
Bt_2	12-19		7.5YR 3/4	C	PR	EH			NE		10	0	0	0
C	19-28		7.5YR 4/4	gSCL	MA	VH			NE		15	0	0	0
2C	28-60		5YR 4/6	CL	MA	VH			NE		0	0	0	0

01.31.2006 11:06

01.31.2006 11:06

Soil Description

Soil Type		File No.	28 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-6
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly	11:10am	
Location	Sheet 5		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 6%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 298 - 297		
	Surface		
Gravel %	40		
Cobble %	20		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 27%	GR	SH			NE		10	0	0	0
Bt_1	3-9		7.5YR 3/2	vgCL 35%	SBK	VH			NE		10	10	20	0
Bt_2	9-20		7.5YR 3/4	C	PR	EH			NE		5	5	0	0
Bt_3	20-27		7.5YR 3/4	C	ABK	VH			NE		5	5	0	0
C_1	27-36		7.5YR 4/6	SCL	MA	VH			NE		5	0	0	0
C_2	36-60		7.5YR 4/6	SL	MA	H			NE		5	0	0	0

01.31.2006 11:25

01.31.2006 11:25

Soil Description

Soil Type				File No.	29 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	A 5-7
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic – very gravelly		11:35am		
Location	Sheet 5				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 296 - 295			
		Surface			
	Gravel %	25			
	Cobble %	15			
	Stone %	10			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
Bt_1	0-4		7.5YR 3/2	CL 37%	SBK	VH			NE		5	0	0	0
Bt_2	4-12		7.5YR 3/2	C	PR	EH			NE		5	0	0	0
Bt_3	12-20		7.5YR 3/2	C	ABK	EH			NE		0	5	0	0
R	Basalt													

01.31.2006 11:37

Soil Description

Soil Type		File No.	30 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-8
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 293 - 292		

	Surface
Gravel %	0
Cobble %	5
Stone %	0
Boulder %	0

inches

Pit Depth ( )

Bedrock ( )

Topsoil ( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL	GR	H			NE		0	0	0	0
Bt_1	3-15		7.5YR 3/2	CL 38%	SBK	VH			NE		0	0	0	0
Bt_2	15-28		7.5YR 3/4	C	ABK	EH			NE		0	0	0	0
R	Basalt													

01.31.2006 11:58

01.31.2006 11:50

Soil Description

Soil Type		File No.	31 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. A 5-9
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly	12:40pm	
Location	Sheet 5		
N. veg. (or crop)	Composite weeds	Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 5%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photo 292-291		
	Surface		
Gravel %	15		
Cobble %	40		
Stone %	0		inches
Boulder %	10	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/4	CL	SBK	H			NE		0	0	0	0
Bt_1	3-18		7.5YR 3/4	C	WEG	EH			NE		0	0	0	0
Bt_2	18-36		7.5YR 3/4	C	SBK	EH			NE		0	0	0	0
C	36-45		5YR 4/4	gC	MA	VH			NE		15	5	0	0
C_1	45-60		5YR 8/4	CL	MA	H			VE		0	0	0	0

01.31.2006 12:56

01.31.2006 12:43

Soil Description

Soil Type		File No.	32 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	J31-B2-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
Gravel %	10		
Cobble %	5		
Stone %	0		inches
Boulder %	5	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/3	CL	GR	SH			NE		10	0	0	0
B	3-9		7.5YR 3/2	cCL	SBK	MH			NE		0	25	0	5
Bt_2	9-20		10YR 3/3	cC	PR	VH			NE		0	10	0	5
Bt_3	20-39		7.5YR 5/4	gSCL	MA	VH			NE		25	5	0	0
C	39-50		7.5YR 4/6	egSL	MA	VH			NE		50	10	0	5

Soil Description

Soil Type		File No.	33 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. J31-B2-10
Classification	Typic Chromustert – fine, montmorillonitic, mesic – very cobbly	2:45pm	
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
Gravel %	10		
Cobble %	25		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
	Vertisol exhibiting very large cracks	Bedrock	(63)
	Clay skins	Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-10		10YR 5/3	C	SBK	VH			NE					
Bss	10-38		10YR 4/3	C	WEG	EH			NE					
C	38-63		7.5YR 5/4	C	MA	VH			NE					
R	63		Solid	basalt					NE					

Soil Description

Soil Type		File No.	34 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	J31-B2-11
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly		
Location	599951 3726415		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos – rocks and pit		
	bedrock in pit		
	Surface		
Gravel %	0		
Cobble %	30		
Stone %	10		inches
Boulder %	10	Pit Depth	( )
	32-43” weathered basalt bedrock	Bedrock	(43)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 5/3	CL	GR	H			NE		0	0	0	0
Bt_1	2-8		10YR 5/3	C	SBK	EH			NE		0	0	0	0
Bt_2	8-32		10YR 4/3	C	PR	EH			VS		0	0	0	0
C_1	32-43		7.5YR 5/4	C	MA	EH			ST		0	0	0	0
R	43				MA	EH			NE		0	0	0	Massive basalt bedrock

Soil Description

Soil Type		File No.	35 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	J31-B2-12
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none 3:45pm		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
	Gravel %		
	Cobble %		
	Stone %		inches
	Boulder %	Pit Depth	( )
	Bedrock (Basalt) at 28 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-2		10YR 4/3	CL	GR				NE		0	0	0	0
Bt_1	2-20		10YR 5/3	C	SBK	EH			NE		0	0	0	0
Bt_2	20-28		10YR 4/3	C	PR	EH			NE		0	0	0	0
R	28										Massive basalt bedrock			

Soil Description

Soil Type				File No. 36	MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	J31-B2-13
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:45pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
	Surface				
Gravel %	20				
Cobble %	5				
Stone %	0				inches
Boulder %	0			Pit Depth	(54)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 4/2	CL	GR	H			NE		0	0	0	0
Bt	4-23		10YR 4/2	C	PR	EH			NE		5	0	0	0
C	23-46		10YR 4/3	C	MA	EH			NE		<5			0
R	46										Massive hard basalt			

Soil Description

Soil Type				File No.	37 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	J31-B2-14
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
	Surface				
Gravel %	25				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-4		10YR 4/2	CL	GR	H					0	0	0	0
Bt	0-25		10YR 4/2	C	PR	H			NE		10	0	0	0
C	25-46		10YR 4/2	C	MA	EH			NE		0	0	0	0
R	46													

Soil Description

Soil Type				File No.	38 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	J31-B2-15
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
	Surface				
Gravel %	5				
Cobble %	5				
Stone %	10				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-2		10YR 5/3	CL	SBK	SH			NE		0	0	0	0
Bt	2-24		10YR 4/2	C	PR	EH			NE		0	0	0	0
C	24-40		10YR 4/3	C	MA	EH			NE		0	0	0	0
R	40								slight					

Soil Description

Soil Type		File No.	39 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 1/31/06	Stop No.	J31-B2-2
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic – very gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
Gravel %	20		
Cobble %	15		
Stone %	0		inches
Boulder %	15	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cL	GR	SH			NE		10	15	0	0
B	3-8		10YR 3/3	cCL	SBK	MH			NE		0	25	0	0
Bt_2	8-20		10YR 3/4	cC	PR	EH			NE		0	15	0	10
Bt_3	20-37		7.5YR 5/4	vbSCL	MA	VH			NE		20	10	0	15
C	37-↓		7.5YR 6/6	egCOSL	MA	MH			NE		50	10	0	15

Soil Description

Soil Type				File No.	40 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	B 2-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		9:50am		
Location	J31-B2-3				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
	Surface				
Gravel %	10				
Cobble %	5				
Stone %	0				inches
Boulder %	5			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
B	0-4		7.5YR 4/3	CL	SBK	H			NE		0	0	0	0
Bt_2	4-25		7.5YR 3/2	C	PR	H			NE		0	0	0	0
Bt_3	25-33		7.5YR 4/3	SIC	SBK	H			NE		0	0	0	0
C	33-62		7.5YR 5/4	CL	M	S			NE		0	0	0	0

Soil Description

Soil Type				File No.	41 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	B 2-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location	J31-B2-4				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	CL	GR	SH					0	0	0	0
B	2-5		7.5YR 2/2	C	PR	EH					<5%	0	0	0
Bt_2	5-21		7.5YR 4/2	C	SBK	VH					0	<5%	0	0
Bt_3	21-36		7.5YR 5/4	gSC	SBK	SH					10	10	0	0
C	36-54		7.5YR 5/6	gSL	M	SH					5	20	0	5

Soil Description

Soil Type				File No.	42 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/30/06	Stop No.	B 2-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly				
Location	J31-B2-5				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
		Surface			
	Gravel %	2			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	15		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
B	0-2		7.5YR 4/3	CL	SBK	H			NE		0	0	0	0
Bt_2	2-30		7.5YR 4/2	C	PR	EH			NE		0	0	0	0
Bt_3	30-43		7.5YR 4/6	CL	SBK	VH			NE		0	0	0	0
C	43-73		7.5YR 4/6	L	MA	VH			NE		0	0	0	0
C_2	73-82		7.5YR 5/4	SCL	MA	SH			NE		0	0	0	0

Soil Description

Soil Type		File No.	43 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. J31-B2-6
Classification	Lithic Argiustoll – clayey skeletal, montmorillonitic, mesic – very gravelly		
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 345-347		
	Surface	24 – 25” boulders pulled out	
Gravel %	15		
Cobble %	10		
Stone %	25		inches
Boulder %	40	Pit Depth	( )
	17” to solid basalt	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 4/3	gCL	GR	SH			NE		15	0	0	0
Bt	3-17		7.5YR 4/4	C	PR	EH			NE		>25 in boulders			75
Solid basalt	17↓													

Soil Description

Soil Type		File No.	44 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. J31-B2-7-S5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)			
	Surface		
	Gravel %		
	Cobble %		
	Stone %		inches
	Boulder %	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/3	CL	SBK	SH			NE		0	0	0	0
Bt_1	3-8		7.5YR 4/2	C	SBK	SH			NE		0	0	0	0
Bt_2	8-21		7.5YR 3/3	C	PR	EH			NE		5	0	0	0
Bt_3	21-41		7.5YR 4/2	C	SBK	EH			NE		0	0	0	0
Bt_4	41-53		7.5YR 4/3	C	SBK	EH			NE		0	0	0	0
C	53-68		7.5YR 5/4	bCL	MA	EH			NE		5	0	0	10

Soil Description

Soil Type		File No.	45 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 1/31/06	Stop No. J31-B2-8
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 348-349 – pits w/ bedrock at bottom 2-4 ft deep also picture @ J31-B2-9		
	Photos 350-351 – bedrock at surface boulders imbedded at surface		
	Surface		
Gravel %	15		
Cobble %	10		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
	Massive basalt bedrock at 24”	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/3	CL	GR	SH			NE		0	5	0	0
Bt	4-22		10YR 4/4	C	PR	EH			NE		0	0	0	0
C	22+													

Soil Description

Soil Type				File No.	46 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	1/31/06	Stop No.	J31-B2-9
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
	Surface				
Gravel %	15				
Cobble %	10				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
	Basalt bedrock at 37” – hard massive			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/3	CL	SBK	SH			NE		0	0	0	0
B	3-11		7.5YR 4/3	C	SBK	MH			NE		0	0	5	0
Bt	11-25		10YR 4/4	C	PR	EH			NE		0	0	0	0
C	25-37		10YR 4/3	C	MA	VH			NE		0	5	0	0
C_2	37-40				rock									

Soil Description

Soil Type				File No.	47 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	A 14-1-
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		10:05am		
Location					
N. veg. (or crop)	Composite weed/grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 271-270			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
			Vertic properties to 20 inches	Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 38%	GR	H			NE		0	0	0	0
Bt_1	4-18		10YR 3/3	C	ABK/PR	EH			NE		0	0	0	0
Bt_2	18-31		10YR 3/3	gC	SBK	EH			NE		12	10	0	0
C	31-48		5YR 4/4	vgCL	MA	VH			NE		25	20	20	0

02.01.2006 10:23

02.01.2006 10:07

Soil Description

Soil Type		File No.	48 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	A 14-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none 10:35am		
Location	Sheet 14		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 270-269		
	Surface		
Gravel %	5		
Cobble %	0		inches
Stone %	0	Pit Depth	( )
Boulder %	0	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 36%	GR	SH			NE		0	0	0	0
Bt_1	2-8		10YR 3/2	cC	SBK	VH			NE		5	10	0	0
Bt_2	8-18		10YR 3/2	cC	PR	EH			NE		5	10	0	0
Bt_3	18-26		10YR 3/3	cC	SBK	EH			NE		10	15	0	0
Bt_4	26-36		5YR 4/4	vcCL	SBK	VH			NE		15	15	10	0
C	36-48		5YR 4/6	egSCL	MA	VH			NE		25	20	20	0

02.01.2006 10:48

02.01.2006 10:32

Soil Description

Soil Type		File No.	49 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	A 14-3
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – very gravelly 11:00am		
Location	Sheet 14		
N. veg. (or crop)	Composite weed and grass Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 0-1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 268-267		
	Surface		
Gravel %	20		
Cobble %	15		
Stone %	10		inches
Boulder %	5	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cCL 33%	GR	H			NE		10	10	10	0
Bt_1	2-10		10YR 3/2	vcCL	SBK	VH			NE		10	15	10	0
Bt_2	10-20		10YR 3/4	vcC	PR	EH			NE		10	20	20	0
Bt_3	20-32		5YR 4/6	ecSCL	SBK	VH			NE		20	20	20	0
C	32-48		5YR 4/6	ecSL	MA	H			NE		25	20	20	10

02.01.2006 11:20

02.01.2006 11:00

Soil Description

Soil Type				File No.	50 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	A 14-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		11:35am		
Location	Sheet 14				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 266-265			
		Surface			
	Gravel %	10			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 2/2	CL 28%	GR	SH			NE		5	0	0	0
Bt_1	2-7		10YR 3/2	cCL 35%	SPK	VH			NE		5	10	0	0
Bt_2	7-16		10YR 3/3	cC	PR	EH			NE		5	20	0	0
Bt_3	16-24		10YR 3/3	cC	SBK	EH			NE		5	20	0	0
Bt_4	24-36		5YR 3/4	vcCL 35%	SBK	VH			SE		15	10	20	0
C	36-48		5YR 4/4	vcSCL	MA	H			SE		15	20	20	5

02.01.2006 11:56

02.01.2006 11:32

Soil Description

Soil Type		File No.	51 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 2/1/06	Stop No. A 15-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly	9:30am	
Location	Sheet 15		
N. veg. (or crop)	Composite weeds/grass	Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 0-1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 273-272		
	Surface		
Gravel %	20		
Cobble %	15		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
Upper 20 inches is vertic with cracks 1-2 centimeters wide		Bedrock	(48)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/3	CL 49%	SBK	VH			NE		0	0	0	0
Bt_1	2-20		10YR 3/2	C	SBK	EH			NE		0	0	0	0
Bt_2	20-32		10YR 3/2	cC	SBK	EH			NE		5	10	0	0
C	32-48		5YR 4/4	vgSCL	MA	VH			NE		25	15	10	0
R	Backhoe refusal at 48 inches													

02.01.2006 09:52

02.01.2006 09:34

Soil Description

Soil Type				File No.	52 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	A 18-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		12:55pm		
Location	Sheet 18				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 264-263			
		Surface			
	Gravel %	15			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 30%	GR	SH			NE		5	0	0	0
Bt_1	3-7		10YR 3/2	CL 36%	SBK	H			NE		5	5	0	0
Bt_2	7-15		10YR 3/3	C	PR	EH			NE		0	10	0	0
Bt_3	15-22		10YR 3/3	cC	SBK	EH			NE		15	10	5	0
Bt_4	22-40		5YR 3/4	vcCL	SBK	VH			NE		15	15	5	0
C	40-60		5YR 4/4	ecSCL	MA	H			NE		20	20	20	5

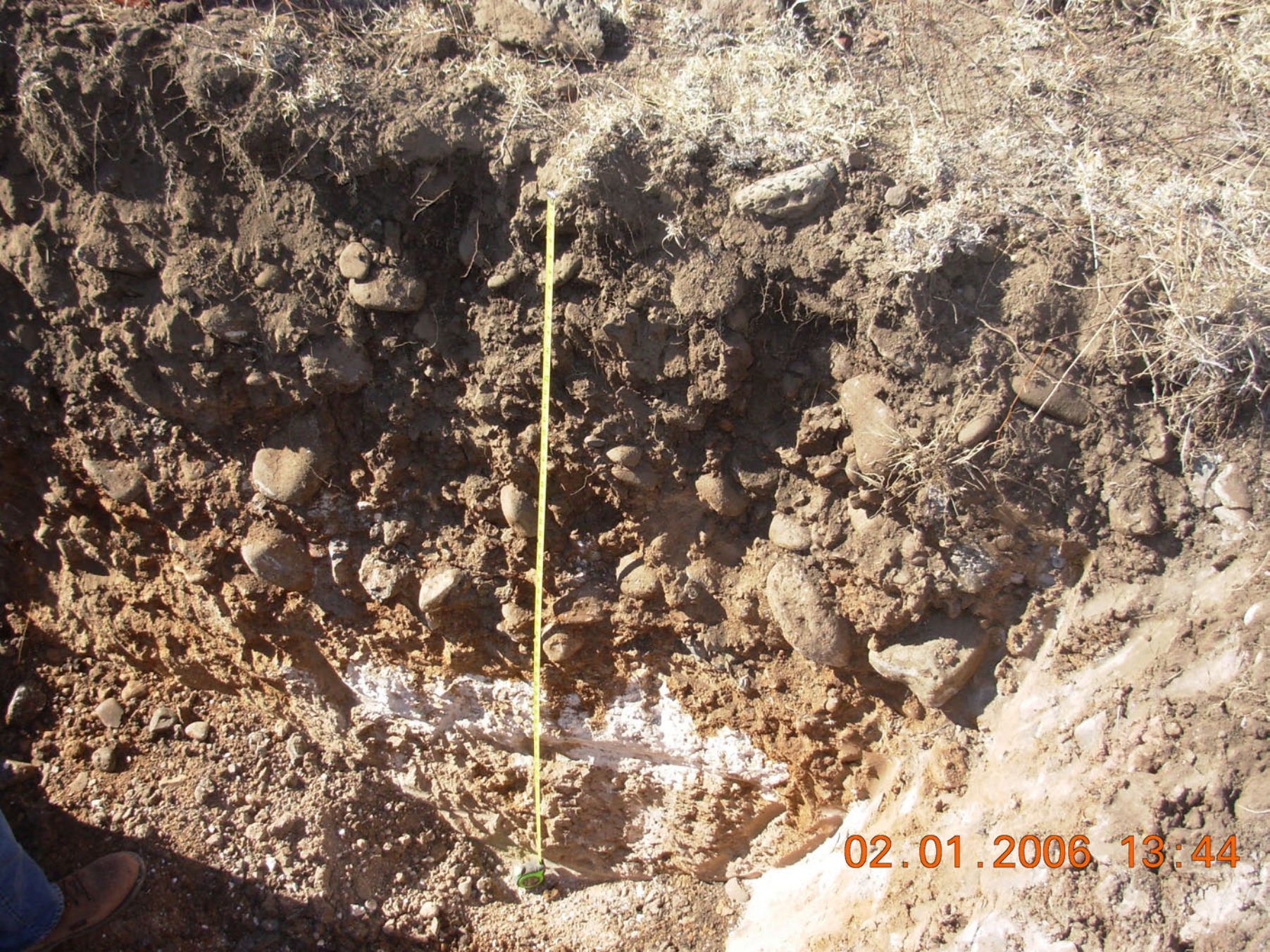
02.01.2006 13:02

02.01.2006 12:53

Soil Description

Soil Type				File No.	53 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	A 18-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		1:15pm		
Location	Sheet 18				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 262-261			
		Surface			
	Gravel %	20			
	Cobble %	15			
	Stone %	10			inches
	Boulder %	0		Pit Depth	( )
	Large nodules of calcium carbonate, 10% of C horizon (36-60 inches)			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/2	CL 28%	GR	SH			NE		5	5	0	0
Bt_1	3-9		10YR 3/2	cCL 35%	SBK	H			NE		5	15	0	0
Bt_2	9-15		10YR 3/3	cC	PR	EH			NE		5	15	0	0
Bt3	15-21		10YR 3/3	cC	SBK	EH			NE		10	20	0	0
Bt_4	21-36		5YR 3/4	vcC	SBK	EH			NE		10	25	10	0
C	36-60		5YR 4/6	vcSCL	MA	VH			SE / VE		15	15	20	0


02.01.2006 13:44

02.01.2006 13:15

Soil Description

Soil Type		File No.	54 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-1
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - cobbly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	0		
Cobble %	10		
Stone %	15		inches
Boulder %	20 exceeding 5 ft in length Backhoe failure	Pit Depth	(18)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/3	CL	GR	SH			NE		0	10	0	0
B	2-18		10YR 4/4	C	PR	SH			NE		0	10	0	0
R	18+										Large basalt boulders			

Soil Description

Soil Type		File No.	55 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-10
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 5%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	(58)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
B	0-3		10YR 4/2	CL	SBH	VH			NE		5	0	0	0
Bt	3-13		7.5YR 3/2	C	PR	EH			NE		0	10	0	0
C	13-26		10YR 5/2	sC	ABK	VH			NE		10	10	15	0
C_2	26-58		7.5YR 5/4	vsCL	MA	VH			NE		0	10	10	60

Soil Description

Soil Type		File No.	56 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-11
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	5		
Stone %	10		inches
Boulder %	0	Pit Depth	(56)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/3	CL	PL	SH			NE		0	0	0	0
Bt_1	3-7		10YR 4/2	SIC	SBK	VH			NE		5	5	0	0
Bt_2	7-15		10YR 5/2	C	PR	EH			NE		5	0	0	0
Bt_3	15-24		10YR 5/2	gC	ABK	EH			NE		10	5	0	0
C	24-56		7.5YR 5/4	egCL	MA	EH			NE		50	5	15	5

Soil Description

Soil Type		File No.	57 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-12
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 5%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	(62)
Reaction – small amounts in colecy around boulders		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/3	CL	PL	H			NE		<2	0	0	0
Bt_1	2-7		10YR 4/3	CL	SBK	EH			NE		5	0	0	0
Bt_2	7-19		7.5YR 3/2	CL	PR	EH			NE		5	0	0	0
Bt_3	19-33		7.5YR 5/4	cCL	ABK	EH			NE		5	10	10	0
C	33-62		7.5YR 5/4	ecSCL	MA	MH			NE		25	25	10	5

Soil Description

Soil Type				File No.	58 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	F1-B3-13
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:55pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	10%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
	No reaction other than lime cement			Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/3	CL	PL				NE		0	0	0	0
Bt_1	3-8		10YR 4/3	CL	SBK				NE		5	5	0	0
Bt_2	8-19		7.5YR 7/2	gC	PR				NE		5	10	0	0
Bt_3	19-31		7.5YR 5/4	gCL	SBK				NE		10	10	0	0
C	31-62		7.5YR 5/4	egSCL	MA				NE		50	10	15	0

Soil Description

Soil Type				File No.	59 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	F1-B3-2
Classification	Typic Chromustert – fine, montmorillonitic, mesic - gravelly				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 37			

	Surface		
Gravel %	15	Large expansion joints of surface	
Cobble %	10		
Stone %	0		inches
Boulder %	5	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
Bss_1	0-21		10YR 3/3	C	WEG	EH			NE					
Bss_2	21-38		10YR 3/3	C	WEG	EH			NE					
C	38-55					VH			SL		Basalt			

Soil Description

Soil Type		File No.	60 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-3
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 359		
	Surface		
Gravel %	10		
Cobble %	10		
Stone %	5		inches
Boulder %	5	Pit Depth	( )
	Large expansion cracks on surface	Bedrock	(32)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A/B	0-12		10YR 4/3	CL	SBK	VH			NE					
C	12-22		10YR 3/3	C	M	EH			NE					
R	22-32													

Soil Description

Soil Type		File No.	61 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	10		
Stone %	5		inches
Boulder %	5	Pit Depth	( )
	Backhoe refusal 30 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		10YR 5/4	CL	SBK	VH			NE		0	0	0	0
Bt	5-24		10YR 4/3	C	PR	VH			NE		0	5	0	0
C	24-30		10YR 4/3	C	ABK	VH			NE		0	5	0	0
R	30↓													

Soil Description

Soil Type		File No.	62 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-5
Classification	Typic Chromustert – fine, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 5%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 35-pit, 34-cracks around pit, 33-rocks on surface		
	Cracks on surface around area		
	Surface		
Gravel %	20		
Cobble %	20		
Stone %	5		inches
Boulder %	5	Pit Depth	( )
Clay skins & vertical CHURNING	Backhoe refusal	Bedrock	(38)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 4/2	C	SBK	H			NE		0	5	5	0
C	4-38		10YR 4/3	C	WEG	EH			NE		0	0	0	0
R	38↓								VS					

Soil Description

Soil Type		File No.	63 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-6
Classification	Typic Chromustert – fine, montmorillonitic, mesic - gravelly 11:00am		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 2%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	10		
Stone %	0		inches
Boulder %	15	Pit Depth	( )
	Backhoe refusal 22 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 4/2	CL	SBK	SH			NE		0	15	0	0
C	3-22		10YR 2/2	C	WEG	EH			NE		0	0	20	0
R											Basalt bedrock			

Soil Description

Soil Type		File No.	64 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 2/1/06	Stop No. F1-B3-7
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none	11:50am	
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos 32		
	Surface		
Gravel %			
Cobble %			
Stone %			inches
Boulder %		Pit Depth	(59)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 4/2	CL	SBK	MH			NE		5	0	0	0
Bt_1	4-9		10YR 4/2	SIC	ABK	EH			NE		5	0	0	0
Bt_2	9-22		10YR 5/2	C	ABK	EH			NE		5	0	0	0
Bt_3	22-34		10YR 5/2	vbC	PR	EH			NE		0	0	25	20
C	34-55		7.5YR 5/4	ebSCL	ABK	H			ST		25	0	10	50

Soil Description

Soil Type		File No.	65 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-8
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	5		
Stone %	2		inches
Boulder %		Pit Depth	(64)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/3	CL	PL	SH			NE		<2	0	0	0
Bt_1	3-7		10YR 4/2	SIC	SBK	EH			NE		<2	0	0	0
Bt_2	7-22		10YR 5/2	C	PR	EH			NE		5	0	0	0
Bt_3	22-34		10YR 5/2	vcC	ABK	EH			NE		0	40	0	0
C	34-64		7.5YR 5/4	ebCL	MA	MH			NE		10	5	5	60

Soil Description

Soil Type		File No.	66 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/1/06	Stop No.	F1-B3-9
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none 1:38pm		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 4%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	(65)
	Boulders mostly basalt	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/3	CL	SBK	SH			NE		5	0	0	0
Bt_1	2-7		10YR 42	SIC	SBK	EH			NE		5	0	0	0
Bt_2	7-21		10YR 5/2	C	PR	EH			NE		10	0	0	0
Bt_3	21-28		10YR 5/2	GC	ABK	EH			NE		20	5	0	0
C	28-65		7.5YR 5/4	ecCL	MA	MH			NE		10	60	10	0

Soil Description

Soil Type				File No.	67 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/3/06	Stop No.	A 19-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		10:40am		
Location	Sheet 19				
N. veg. (or crop)	Grass and weed, fairly dense	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	15				
Cobble %	5				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 28%	GR	SH			NE		5	0	0	0
Bt_1	4-12		10YR 3/2	cC	SBK	VH			NE		5	15	5	0
Bt_2	12-24		10YR 3/4	cC	PR	EH			NE		5	15	10	0
Bt_3	24-44		5YR 4/4	vcSCL	SBK	VH			NE		25	20	15	0
C	44-60		5YR 4/4	ecSL	MA	H			NE		30	25	20	10

Soil Description

Soil Type				File No.	68 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/3/06	Stop No.	A 22-9
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		8:55am		
Location	Sheet 22				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 257-254			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	10			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	SCL 26%	GR	SH			NE		5	0	0	0
Bt_1	2-12		10YR 3/2	cCL 33%	SBK	VH			NE		5	10	0	0
Bt_2	12-25		10YR 3/3	cC	PR	EH			NE		10	5	0	0
Bt_3	25-39		7.5YR 3/4	vcSCL	SBK	VH			NE		25	20	10	0
C	39-52		7.5YR 4/4	cSL	MA	H			NE		15	10	5	0

310D
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Soil Description

Soil Type				File No.	69 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 18-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		8:45am		
Location	Sheet 18				
N. veg. (or crop)	Weeds, low density	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 29-28 (Olympus			
		Surface			
	Gravel %	10			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/2	CL	GR	H			NE		0	0	0	0
Bt_1	3-12		10YR 3/3	C	PR	EH			NE		0	0	0	0
Bt_2	12-31		10YR 3/3	C	SBK	EH			NE		0	0	0	0
Btk	31-48		5YR 4/4	vgCL	SBK	VH			SE		20	20	0	0
2Btkb	48-60		5YR 4/6	vgCL	SBK	VH			SE / VE		25	25	0	0

Soil Description

Soil Type				File No.	70 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 18-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		10:55am		
Location	Sheet 18				
N. veg. (or crop)	Weed and grass, low density	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 34%	GR	SH			NE		0	0	0	0
Bt_1	3-7		10YR 3/3	CL 38%	SBK	H			NE		0	0	0	0
Bt_2	7-16		10YR 3/3	C	PR	EH			NE		0	0	0	0
Bt_3	16-25		10YR 3/4	cC	SBK	EH			NE		5	15	5	0
Bt_4	25-38		5YR 4/4	vgSCL 28%	SBK	VH			NE		25	15	5	0
C	38-60		5YR 4/4	vgSL 15%	MA	H			NE		30	5	0	0

Soil Description

Soil Type				File No.	71 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 18-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		11:10am		
Location	Sheet 18				
N. veg. (or crop)	grasses	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 28%	GR	SH			NE		5	0	0	0
Bt_1	3-7		10YR 3/3	CL 37%	SBK	VH			NE		5	0	0	0
Bt_2	7-16		10YR 3/4	C	PR	EH			NE		10	0	0	0
Bt_3	16-36		5YR 4/4	vgCL 36%	SBK	VH			NE		25	20	5	0
C	36-60		5YR 3/4	vgSCL 24%	MA	H			NE		30	20	10	0

Soil Description

Soil Type				File No.	72 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-1
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic - gravelly		12:05pm		
Location	Sheet 21				
N. veg. (or crop)	Grass, low desnity	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/2	CL 35%	GR	H			NE		5	0	0	0
Bt_1	3-14		10YR 3/3	vcC	SBK	EH			NE		10	25	0	0
Bt_2	14-24		10YR 3/4	vcC	PR	EH			NE		10	20	0	0
C_1	24-32		5YR 3/4	vcSCL/ CL	MA	VH			NE		20	25	0	0
C_2	32-60		5YR 4/6	gSCL	MA	VH			NE		10	5	0	0

Soil Description

Soil Type				File No.	73 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		12:25pm		
Location	Sheet 21				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/2	SCL 25%	GR	SH			NE		5	0	0	0
Bt_1	3-8		10YR 3/3	CL	SBK	VH			NE		5	0	0	0
Bt_2	8-18		10YR 3/4	gCL 38%	PR	EH			NE		10	5	0	0
Bt_3	18-35		5YR 4/4	vgSCL	SBK	VH			NE		25	20	0	0
C	35-60		5YR 4/4	vgCL 18%	MA	H			NE		30	25	5	0

Soil Description

Soil Type				File No.	74 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		12:50pm		
Location	Sheet 21				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	10				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 26%	GR	SH			NE		5	0	0	0
Bt_1	4-16		10YR 3/3	CL 35%	SBK	H			NE		0	0	0	0
Bt_2	16-27		10YR 3/4	C	PR	EH			NE		0	0	0	0
Bt_3	27-38		10YR 3/4	C	SPK	EH			NE		0	0	0	0
C_1	38-46		7.5YR 4/4	CL	MA	VH			NE		0	0	0	0
C_2	46-60		7.5YR 4/2	L 25%	MA	H			NE		0	0	0	

Soil Description

Soil Type				File No.	75 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		1:39pm		
Location	Sheet 24				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	SCL 24%	GR	SH			NE		5	0	0	0
Bt_1	3-11		10YR 3/3	CL 29%	SBK	H			NE		5	5	0	0
Bt_2	11-20		10YR 3/3	gC	PR	EH			NE		10	5	0	0
Bt_3	20-32		5YR 4/6	vgSCL 25%	SBL	VH			NE		25	15	0	0
C	32-48		5YR 4/4	vgLCS	MA	VH			NE		35	20	0	0

Soil Description

Soil Type				File No.	76 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly				
Location	Sheet 21				
N. veg. (or crop)	Grass, weed and yucca	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
	Soil is very suitable for Christmas trees. Well to somewhat			Bedrock	( )
	excessively well drained. Horizons are easily identified			Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	L 22%	GR	SH			NE		5	0	0	0
Bt_1	2-8		10YR 3/3	CL 34%	SBK	H			NE		5	0	0	0
Bt_2	8-21		10YR 3/3	C	PR	EH			NE		5	0	0	0
Bt_3	21-30		7.5YR 4/4	vgLCS 5%	SBK	VH			NE		25	15	0	0
C	30-48		10YR 4/3	vgS 1%	MA	H			NE		40	15	5	0

Soil Description

Soil Type				File No.	77 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 21-6
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location	Sheet 21				
N. veg. (or crop)	grass and sunflowers	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
Weak Albic horizon over prisms 4 inches thick. Heavy clay loam texture				Bedrock	( )
similar to Albic soil south of Navajo pit tank.				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	SCL 26%	GR	SH			NE		0	0	0	0
Bt_1	4-19		10YR 3/2	CL 30-36%	SBK	H			NE		0	0	0	0
Bt_2	19-29		10YR 3/4	C	PR	EH			NE		0	5	0	0
Bt_3	29-36		10YR 3/4	C	ABK	EH			NE		0	5	0	0
Bt_4	36-43		7.5YR 4/4	gSCL 30%	SBK	VH			NE		15	5	0	0
C	43-60		7.5YR 4/4	vgSL	MA	VH			NE		30	5	0	0

Soil Description

Soil Type				File No.	78 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		9:49am		
Location	Sheet 22				
N. veg. (or crop)	Grass, low density	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Sampled- see lab data					
Samples (depth inches)		Photos 27-25 (Olympus)			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
		No surface rock content		Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 34%	GR	H			NE		0	0	0	0
Bt_1	4-13		10YR 3/3	CL 36%	SBK	VH			NE		0	0	0	0
Bt_2	13-21		10YR 3/3	C 42%	PR	EH			NE		0	0	0	0
Bt_3	21-32		10YR 3/4	C 42%	SBK	EH			NE		0	0	0	0
Bt_4	32-40		5YR 4/4	gCL 36%	SBK	VH			NE		10	5	0	0
C	40-60		5YR 4/4	vgSCL	MA	VH			NE		25	10	10	0

Soil Description

Soil Type				File No.	79 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-2
Classification	Typic Chromustert – fine, montmorillonitic, mesic - none		10:30am		
Location	Sheet 22				
N. veg. (or crop)	Weeds, low density	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Sampled – see lab data					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	0			
	Cobble %	>5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/3	C 43%	GR	H			NE		0	0	0	0
Bss	3-24		10YR 3/3	C 45%	WEG	EH			NE		0	0	0	0
C	24-60		10YR 4/3	C	MA	EH			NE		0	0	0	0

Soil Description

Soil Type				File No.	80 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-3
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - none		3:30pm		
Location	Sheet 22				
N. veg. (or crop)	weeds	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	>5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-2		10YR 3/2	CL 33%	GR	SH			NE		0	0	0	0
Bt	2-12		10YR 3/2	C	PR	EH			NE		10	0	0	0
Cr (+)	12-20		--	Gravel	MA	--			NE		90	0	0	0
R	20+													

Soil Description

Soil Type				File No.	81 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly		3:45 pm		
Location	Sheet 22				
N. veg. (or crop)	Weed and grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	25				
Stone %	25				inches
Boulder %	10			Pit Depth	( )
		Backhoe refusal at 47 inches,		Bedrock	(48)
		grey basalt		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/3	gC	GR	SH			NE		5	10	0	0
Bt_1	4-24		10YR 3/3	gC	PR	EH			NE		5	20	0	0
Bt_2	24-41		10YR 3/3	vgC	SBK	EH			VE		10	20	5	0
Bt_3	41-48		7.5YR 5/6	vgCL	SBK	VH			SE		25	20	20	0

Soil Description

Soil Type				File No.	82 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-5
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		4:00pm		
Location					
N. veg. (or crop)	grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	L 26%	GR	SH			NE		5	0	0	0
Bt_1	3-12		10YR 3/2	CL 35%	SBK	H			NE		5	0	0	0
Bt_2	12-25		10YR 3/4	cC 45%	PR	EH			NE		5	15	0	0
Bt_3	25-48		5YR 3/3	vcCL 33%	SBK	VH			SE		30	25	10	0
Bk	48-60		5YR 4/4	gSCL 27%	SBK	VH			ST		30	2	0	0

Soil Description

Soil Type				File No.	83 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-6
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:30pm		
Location	Sheet 22				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 10 - 9			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 27%	GR	SH			NE		5	0	0	0
Bt_1	4-12		10YR 3/2	cCL 38%	SBK	VH			NE		5	20	5	0
Bt_2	12-20		10YR 3/4	cC	PR	EH			NE		5	15	0	0
Bt_3	20-39		5YR 3/4	vcCL	SBK	VH			NE		30	20	5	0
C	39-60		5YR 4/4	ecCO SL	MA	H			NE		75	35	10	0

Soil Description

Soil Type				File No.	84 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/1/06	Stop No.	A 22-7
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		4:50pm		
Location	Sheet 22				
N. veg. (or crop)	grass	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 10-9 (Olympus)			
	Surface				
Gravel %	0				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
		No rock content on surface		Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL 35%	GR	H			NE		0	0	0	0
Bt_1	4-16		10YR 3/3	C 45%	SBK	EH			NE		5	5	0	0
Bt_2	16-36		10YR 3/3	C 45%	PR	EH			NE		5	5	0	0
Bt_3	36-48		7.5YR 4/4	vgSCL 30%	SBK	VH			NE		30	25	5	0
C	48-60		7.5YR 5/4	egSL	MA	VH			NE		30	30	5	0

Soil Description

Soil Type				File No.	85 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	A 22-8
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		5:15pm		
Location	Sheet 22				
N. veg. (or crop)	Grass & weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 35%	GR	SH			NE		5	5	0	0
Bt_1	3-10		10YR 3/2	cCL 36%	SBK	H			NE		5	10	0	0
Bt_2	10-24		10YR 3/4	vcC	PR	EH			NE		5	20	10	0
Bt_3	24-54		5YR 4/4	ecSCL	SBK	VH			NE		25	25	25	5

Soil Description

Soil Type				File No.	86 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly		10:55am		
Location	Sheet				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	(60)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/3	CL	GR	SH			NE		0	0	0	0
Bt_1	2-5		7.5YR 4/3	SIC	SBK	VH			NE		10	0	0	0
Bt_2	5-17		7.5YR 4/3	C	PR	VH			NE		10	0	0	0
C_1	17-23		7.5YR 5/4	vgSCL	MA	MH			NE		30	5	0	0
C_2	23-60		7.5YR 5/4	cSCL	MA	MH			VS		30	15	5	0

Soil Description

Soil Type		File No.	87 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/2/06	Stop No.	F2-B4-10
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	20		
Stone %	5		inches
Boulder %	0	Pit Depth	(44)
	Backhoe refusal at 44 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	SICL	PL	SH			NE		5	0	0	0
Bt_1	3-8		10YR 4/2	SIC	SBK	VH			NE		5	5	0	0
Bt_2	8-20		10YR 4/2	sC	PR	EH			NE		5	5	5	0
C	20-44		7.5YR 5/4	vbSCL	MA	MH			NE		25	0	0	60

Soil Description

Soil Type				File No.	88 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-11
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly		3:30pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography	Top of crest near Ranch				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			

	Surface	C horizon – contains 15% accumulation of soft white lime	
Gravel %	5	strongly effervescent actual material has no	
Cobble %	25	large amounts of lime in horizon	
Stone %	5		inches
Boulder %	0	Pit Depth	(60)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	SCL	PL	SH			NE		0	0	0	0
Bt_1	2-4		10YR 4/2	SIC	SBK	VH			NE		5	0	0	0
Bt_2	4-19		10YR 4/2	C	PR	EH			NE		0	10	0	0
C_1	19-24		7.5YR 5/4	cC	MA	VH			VS		0	15	0	0
C_2	24-60		7.5YR 5/4	vcSCL	MA	MH					25	25	5	0

Soil Description

Soil Type				File No.	89 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		11:15AM		
Location	Sheet				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	<5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	5				
Stone %	5				inches
Boulder %	10			Pit Depth	( )
		Backhoe refusal at 32 inches		Bedrock	(32)
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		7.5YR 3/2	CL	SBK	MH			NE		0	0	0	0
Bt	4-18		7.5YR 3/2	SIC	SBK	MH			NE		0	5	0	0
C	18-27		10YR 3/6	vgLS	MA	MH			NE		50	0	0	0
R	27-32										Basalt bedrock			

Soil Description

Soil Type				File No.	90 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic -gravelly				
Location					
N. veg. (or crop)		Climate			
Parent Material	Weathered bedrock surface paved with boulders on top, boulders mostly angular				
Physiography	Bottomland near drainage				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	<5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	20			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0	Backhoe refusal	Pit Depth	(31)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-5		10YR 3/2	C	ABK	VH			NE		5			
Bt_1	5-22		10YR 2/1	C	PR	EH			NE		5	5		
Bt_2	22-28		10YR 4/2	gC	ABK	EH			NE		5	10		
R	28↓													

Soil Description

Soil Type				File No.	91 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-4
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		12:00pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	<5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	0				
Cobble %	5				
Stone %	5				inches
Boulder %	0			Pit Depth	(62)
		reddish brown color in Bt horizon		Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-7		7.5YR 4/3	SICL	SBK	SH			NE		0	0	0	0
Bt1	7-27		7.5YR 4/2	CL	SBK	VH			NE		5	0	0	0
Bt2	27-31		7.5YR 4/4	vC	PR	EH			NE		5	10	0	5
C	31-62		7.5YR 5/4	vgSC	MA	H			NE		30	10	0	25

Soil Description

Soil Type		File No.	92 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/2/06	Stop No.	F2-B4-5
Classification	Typic Chromusterts – fine, montmorillonitic, mesic - cobbly 12:35pm		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography	Side slope		
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope	10-15% Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
	Gravel %		
	Cobble % 10		
	Stone % 25		inches
	Boulder % 5	Pit Depth	(25)
	Backhoe refusal at 25 inches	Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
B	0-7		10YR 4/4	C	SBK	EH			NE		<2	0	0	0
Bss_1	7-22		10YR 4/2	C	WEG	EH			NE		0	0	0	0
Bss_2	22-25		10YR 4/2	C	ABK	VH			NE		<5	0	0	0
R	25+													

Soil Description

Soil Type				File No.	93 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-6
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - cobbly				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography	side hill				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			

	Surface	Stopped digging in large basalt boulder in front of hole, boulder	
Gravel %	10	embedded in C3 & C3 extends below bottom of pit	
Cobble %	15		
Stone %	10	C3 contains 50% weathered basalt	inches
Boulder %	10	fragments 0.8-1.0 cm	Pit Depth (40)
			Bedrock ( )
			Topsoil ( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/2	SICL	GR	SH			NE		0	0	0	0
Bt_1	3-9		10YR 4/3	C	ABK	VH			NE		0	0	5	0
Bt_2	9-24-		10YR 4/2	HC	ABK	EH			NE		0	0	0	0
Bt_3	24-33		10YR 4/2	C	ABK	VH			NE		0	0	0	0
C	33-40		10YR 5/4	SCL	MA	MH			NE		Boulders & cobbles not exposed			

Soil Description

Soil Type				File No.	94 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-7
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography	Flat pediment surface, top of ridge				
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photos				

	Surface	Soft lime skins on rocks in C horizon V Str Eff.	
Gravel %	5		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	(63)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/3	CL	GR	SH			NE		0	0	0	0
Bt_1	3-9		10YR 4/2	C	SBK	VH			NE		5	5	0	0
Bt_2	9-23		10YR 4/2	HC	PR	EH			NE		10	0	0	0
C	23-63		7.5YR 5/4	vcSCL	MA	SH			NE		0	30	15	5

Soil Description

Soil Type				File No.	95 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-8
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography	Flat, on top of hill				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	<5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	(29)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 4/3	SICL	PL	SH			NE		0	0	0	0
B	4-8		10YR 4/2	C	SBK	VH			NE		0	0	0	0
Bt	8-24		7.5YR 5/4	C	PR	VH			NE		0	0	0	0
R											Basalt Bedrock			

Soil Description

Soil Type				File No.	96 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/2/06	Stop No.	F2-B4-9
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - gravelly		3:05pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography	Top of ridge				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	5-10%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	0	Spoil pile contains angular fragments of basalt		
	Stone %	10			inches
	Boulder %	0		Pit Depth	(15)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/2	SCL	PL	MH			NE		15	0	0	0
B	2-8		10YR 4/3	C	SBK	VH			NE		30	0	0	0
C	8-15		10YR 4/3	C		VH			NE		weathered bedrock 70% angular basalt fragments			
R	15+													

Soil Description

Soil Type				File No.	97 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-01
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		12:01pm		
Location					
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope 2-3%	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photos				
	Surface				
Gravel %	10				
Cobble %	10				
Stone %	5				inches
Boulder %	0			Pit Depth	(60+)
				Bedrock	(60+)
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 27%	GR	SH			NE		5	0	0	0
Bt_1	2-8		10YR 3/2	cCL 34%	SBK	H			NE		5	10	0	0
Bt_2	8-22		10YR 3/3	cC	PR	EH			NE		5	10	0	0
Bt_3	22-40		7.5YR 4/4	vcSCL 25%	SBK	VH			NE		25	25	10	0
C	40-60		7.5YR 4/4	vcSCL 20%	MA	H			VS		20	25	10	5

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Soil Description

Soil Type		File No.	98 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 2/28/06	Stop No. A-02
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly	12:45pm	
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
4-5	Gr. Water	Stoniness	
Slope 2-3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	30		
Cobble %	25		
Stone %	5		inches
Boulder %	0	Pit Depth	(60+)
		Bedrock	(60+)
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 26%	GR	SH			NE		5	5	0	0
Bt_1	3-8		10YR 3/2	cCL 35%	SBK	H			NE		5	10	0	0
Bt_2	8-24		7.5YR 3/2	cC	PR	EH			NE		5	10	0	0
Bt_3	24-40		7.5YR 4/4	vcCL 33%	SBK	VH			SL		30	25	10	5

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Soil Description

Soil Type		File No.	99 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 2/28/06	Stop No.	A-03
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		
Location			
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 0 – 1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	photo of soil pit - 1332 hr		
	photo of landscape - 1333 hr		
	Surface		
Gravel %	20		
Cobble %	15		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 29%	GR		SH		NE		5	5	0	0
Bt_1	3-8		10YR 3/3	cCL 37%	SBK		H		NE		5	10	0	0
Bt_2	8-22		10YR 3/3	C	PR		EH		NE		5	5	0	0
Bt_3	22-40		7.5YR 4/4	vcCL 30%	SBK		VH		SL		20	15	5	0
Cr	40-60		7.5YR 5/4	ecLS	MA		H		VE		30	25	10	5
					H									

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Soil Description

Soil Type		File No.	100 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 2/28/06	Stop No. A-04
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly	1:38pm	
Location			
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation	Gr. Water	Stoniness	
Slope 3-4%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	30		
Cobble %	20		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-2		10YR 3/2	CL 27%	GR	SH			NE		5	5	0	0
Bt_1	2-7		7.5YR 3/2	cCL 35%	SBK	VH			NE		5	10	0	0
Bt_2	7-21		7.5YR 3/2	cC	PR	EH			NE		5	10	0	0
Bt_3	21-40		7.5YR 5/4	vcCL 32%	SBK	H			SL		15	20	10	0

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Soil Description

Soil Type				File No.	101 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-05
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		2:35pm		
Location	N12207792 E1995933				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	30			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cCL 25%	GR	H			NE		5	10	0	0
Bt_1	2-10		10YR 3/3	cCL 38%	SBK	VH			NE		5	10	0	0
Bt_2	10-24		10YR 3/3	cC	PR	EH			NE		5	15	0	0
Bt_3	24-36		7.5YR 4/4	ecSCL 27%	SBL	VH			ST		25	30	10	0
C	36-48		7.5YR 4/4	ecSL 8%	MA	H			NE		30	25	10	5

02.28.2006 14:53

02.28.2006 14:52

Soil Description

Soil Type				File No.	102 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-06
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		3:10 pm		
Location	N12211139 E1989611				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photo 3:35 & 3:36				

Surface			
Gravel %	15		
Cobble %	10		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2	10YR 3/2		cCL 26%	GR	SH			NE		5	10	0	0
Bt_1	2-8	10YR 3/3		cCL 35%	SBK	VH			NE		5	10	0	0
Bt_2	8-24	10YR 3/3		cC	PR	EH			NE		5	10	0	0
Bt_3	24-36	7.5YR 3/4		ecSCL 26%	SBK	VH			SL		25	30	15	5
C	36-48	7.5YR 4/4		ecSCL 20%	MA	H			NE		25	35	20	5

02.28.2006 15:35

02.28.2006 15:35

Soil Description

Soil Type				File No.	103 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-07
Classification	Typic Argiustoll – fine, montmorillonitic., mesic – very gravelly		3:55pm		
Location	N12213912 E1989810				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1 – 2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photo 4:10 & 4:11			
		Surface			
	Gravel %	20			
	Cobble %	15			
	Stone %	5			inches
	Boulder %	0		Pit Depth	(60)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3	10YR 3/2		CL 25%	GR	SH			NE		5	0	0	0
Bt_1	3-9	10YR 3/3		CL 35%	SBK	VH			NE		5	5	0	0
Bt_2	9-30	10YR 3/3		cC	PR	EH			NE		5	10	0	0
Bt_3	30-48	7.5YR 4/4		ecSCL 25%	SBK	VH			SL		25	20	15	5
C	48-60	5YR 4/4		ecSCL/SL 20%	M	H			NE		25	30	20	5

02.28.2006 16:10

02.28.2006 16:10

Soil Description

Soil Type				File No.	104 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-08
Classification	Typic Argiustoll – fine, montmorillonitic., mesic – very gravelly				
Location	N12214575 E1986325				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					

	Surface		
Gravel %	15		
Cobble %	15		
Stone %	5		inches
Boulder %	0	Pit Depth	(60)
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2	10YR 3/2		CL 35%	GR	H			NE		5	5	0	0
Bt_1	2-9	10YR 3/3		CL 38%	SBK	VH			NE		5	0	0	0
Bt_2	9-24	10YR 3/3		C	PR	EH			NE		5	0	0	0
Bt_2	24-36	10YR 3/3		C	ABK	EH			NE		5	5	0	0
Bt_3	36-48	7.5YR 4/4		vcCL 33%	SBK	VH			ST		15	25	5	5
C	48-60	7.5YR 4/4		vcCL 28%	M	H			SL		20	25	10	5

02.28.2006 16:38

02.28.2006 16:38

Soil Description

Soil Type				File No.	105 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-09
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – very gravelly		5:10pm		
Location	N12213015 E1985722				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	4-5%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	25			
	Cobble %	15			
	Stone %	5			inches
	Boulder %	0		Pit Depth	(39)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-2		10YR 3/2	cCL 33%	GR	H			NE		10	15	5	0
Bt_1	2-9		10YR 3/3	vcC	SBK	VH			NE		10	20	5	0
Bt_2	9-21		10YR 3/3	vcC	ABK	EH			NE		10	25	10	5
Bt_3	21-30		7.5YR 4/4	ecSCL	SBK	VH			ST		30	25	15	5
C	30-39		7.5YR 4/4	ecSL/LS	MA	VH			SL		30	25	15	5

02.28.2006 17:28

02.28.2006 17:28

Soil Description

Soil Type				File No.	106 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/28/06	Stop No.	A-10
Classification	Typic Argiustoll –fine, montmorillonitic, mesic - gravelly		5:58pm		
Location	N12217652 E1977832				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3	10YR 3/2		CL 30%	GR	SL			NE		5	5	0	0
Bt_1	3-10	10YR 3/3		CL 28%	SBK	VH			NE		5	0	0	0
Bt_2	10-30	10YR 3/3		C	PR	EH			NE		5	0	0	0
Bt_3	30-40	7.5YR 4/4		vcSCL 25%	SBK	VH			ST		20	25	10	5

02.28.2006 17:58

02.28.2006 17:58

Soil Description

Soil Type				File No.	107 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/3/06	Stop No.	A 19-1
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		9:30am		
Location	Sheet 19				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Sampled – see lab data					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	15			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 31%	GR	SH			NE		5	0	0	0
Bt_1	3-16		10YR 3/2	C 40%	SBK	EH			NE		5	5	0	0
Bt_2	16-30		10YR 3/4	C	PR	EH			NE		5	5	0	0
Bt_3	30-48		5YR 3/4	vcSCL 22%	SBK	VH			NE		25	30	5	0
C	48-60		5YR 4/4	ecLCOS	MA	H			NE		30	25	10	0

02.03.2006 09:21

BUCHANAN
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02.03.2006 09:13

Soil Description

Soil Type				File No.	108 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/3/06	Stop No.	A 19-2
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		10:00am		
Location	Sheet 19				
N. veg. (or crop)	Grass and a few weeds	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 251-250			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-2		10YR 3/2	CL	GR	SH					5	0	0	0
Bt_1	2-9		10YR 3/2	cCL	SBK	VH					5	10	0	0
Bt_2	9-16		10YR 3/4	cC	PR	EH					5	10	5	0
Bt_3	16-30		5YR 4/4	vcSL	SBK	VH					25	20	5	0
C	30-60		5YR 4/6	esSL	MA	H					30	25	20	0

02.03.2006 09:58

02.03.2006 10:02

Soil Description

Soil Type				File No.	109 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	2/3/06	Stop No.	A 19-3
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		10:25am		
Location	Sheet 19				
N. veg. (or crop)	Grass and weed	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos 249-248			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
		Backhoe refusal in B horizon (56 inches)		Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color		Texture	Structure	Consistence			Reaction	Boundary	G %	C %	S %	B %
		Dry	Moist			Dry	Moist	Wet						
A	0-3		10YR 3/2	CL 36%	GR	SH			NE		5	0	0	0
Bt_1	3-16		10YR 3/2	C	SBK	VH			NE		5	5	0	0
Bt_2	16-32		10YR 3/4	cC	SBK	EH			NE		5	10	5	0
Bt_3	32-56		5YR 4/4	vcSCL	SBK	VH			NE		30	25	20	0

02.03.2006 10:44

02.03.2006 10:36

Soil Description

Soil Type				File No.	110 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-01
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - none		10:25am		
Location	N12194946 E1973704				
N. veg. (or crop)		Climate			
Parent Material					
Physiography	Wooded area P pine, oak, juniper, piñon				
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	CL 28%	GR	SH			NE		0	0	0	0
Bt_1	2-6		7.5YR 3/3	CL 34%	SBK	H			NE		0	0	0	0
Bt_2	6-20		7.5YR 3/3	C	PR	VH/ EH			NE		0	0	0	0
R	20		--	Fine grey/black basalt										

03.01.2006 10:25

03.01.2006 10:24

Soil Description

Soil Type				File No.	111 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-02
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - cobbly		10:45am		
Location	N12195073 E1975211				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	15			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	cCL 27%	GR	SH			NE		5	10	0	0
Bt	2-12		7.5YR 3/4	cCL 40%	ABK	VH			NE		5	20	0	0
R	12-24		Fine grey basalt						NE		Basalt			
2R	24-40		Red clay stained basalt						NE					

03.01.2006 11:01

03.01.2006 11:01

Soil Description

Soil Type				File No.	112 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-03
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - none		11:15am		
Location	N12195999 E1977161				
N. veg. (or crop)	wooded Piñon/Juniper	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5869	Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	(30)
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 27%	GR	H			NE		5	0	0	0
Bt_1	3-12		7.5YR 3/4	CL 38%	PR	VH			NE		0	0	0	0
Bt_2	12-19		7.5YR 3/4	cCL 38%	ABK	VH			NE		5	15	0	0
R			Basalt fragmented						NE		Basalt			

03.01.2006 11:28

03.01.2006 11:29

Soil Description

Soil Type				File No.	113 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-04
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - none		11:40am		
Location	N12195818 E1979236				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5863	Gr. Water		Stoniness	
Slope	3-4%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL	GR	SH			NE		0	0	0	0
Bt_1	3-9		7.5YR 3/4	CL	SBK	H			NE		5	0	0	0
Bt_2	9-18		7.5YR 3/4	CL	PR	VH			NE		5	0	0	0
Crt	18-27		7.5YR 4/6	--		VH			NE					
R	27-36		--	--	--									

03.01.2006 11:49

03.01.2006 11:49

Soil Description

Soil Type	101-B			File No.	114 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-05
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - none		12:10pm		
Location	N12197197 E1981570				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5863	Gr. Water		Stoniness	
Slope	3-4%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					

	Surface		
Gravel %	5		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt	2-10		7.5YR 3/4	CL	PR/ ABK	VH			NE		0	0	0	0
Crt	10-16		Broken basalt w/ clay			VH			NE					
R	16-24		Basalt						NE					

03.01.2006 12:15

03.01.2006 12:15

Soil Description

Soil Type	48B			File No.	115 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-06
Classification	Lithic Argiustoll – clayey, montmorillonitic, mesic - gravelly		12:35pm		
Location	N12197956 E1978292				
N. veg. (or crop)	Open prairie	Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		5YR 3/2	L 20%	GR	SH			NE		0	0	0	0
Bt	3-15		5YR 3/3	CL 33%	PR	VH			NE		0	0	0	0
Rt	15-30				Grey basalt w/ clay stains 80-90% rock									

03.01.2006 12:49

03.01.2006 12:49

Soil Description

Soil Type				File No.	116 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-07
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		1:02pm		
Location	N12199507 E1979389				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief	Drainage		Salt or Alkali		
Elevation 5857	Gr. Water		Stoniness		
Slope	Moisture				
Aspect	Root distrib.				
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)	Photos				
	Surface				
Gravel %	0				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL	GR	H			NE		0	0	0	0
Bt_1	3-9		7.5YR 3/4	CL	SBK	VH			NE		0	0	0	0
Bt_2	9-24		7.5YR 3/4	C	PR	EH			NE		0	0	0	0
Bt_3	24-32		7.5YR 3/4	C	SBK	EH			NE		0	0	0	0
Bt_4	32-46		7.5YR 4/4	SCL	SBK	EH			NE					
R	46-										Basalt			

03.01.2006 13:27

03.01.2006 13:27

Soil Description

Soil Type				File No.	117 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-08
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:30pm		
Location	N12219164 E1977669				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6031	Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-8		10YR 3/3	CL	SBK	VH			NE		5	0	0	0
Bt_2	8-32		10YR 3/3	C	PR	EH			NE		5	0	0	0
C	32-48		5YR 4/4	vcLS	MA	H			NE		30	20	10	0
R	Basalt grey													

03.01.2006 16:31

03.01.2006 16:31

Soil Description

Soil Type				File No.	118 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	A-09
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		4:50pm		
Location	N12220781 E1977730				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6052	Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)					
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-4		10YR 3/3	C	SBK	H			NE		5	0	0	0
Bt_2	4-18		10YR 3/3	C	PR	VH			NE		5	5	0	0
Bt_3	18-30		10YR 3/3	cC	ABK/ SBK	EH			NE		5	10	0	0
C	30-51		5YR 4/4	ecSL	MA	H			NE		30	25	10	5

03.01.2006 16:53

03.01.2006 16:53

Soil Description

Soil Type		File No.	119 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/1/06	Stop No.	B-01
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic - gravelly 9:30am		
Location	NAD 83 UTM Z12S N3723679 E602669		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6017	Gr. Water	Stoniness	
Slope 0-1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	15		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-2		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-6		10YR 3/2	CL	SBK	VH			NE		5	5	0	0
Bt_2	6-19		10YR 4/2	C	PR	EH			NE		0	5	5	0
Bt_3	19-40		7.5YR 4/4	vcSCL	SBK	VH			SL		25	15	5	5
C_1	40-53		7.5YR 4/4	ecSL	MA	H			NE		35	20	10	5

Soil Description

Soil Type		File No.	120 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/1/06	Stop No.	B-02
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic - gravelly 9:45am		
Location	NAD 83 UTM Z12S N3723774 E602524		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6003	Gr. Water	Stoniness	
Slope 3-4%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	15		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-2		10YR 4/3	CL	GR	SH			NE		5	0	0	0
Bt_1	2-5		10YR 3/2	CL	SBK	VH			NE		0	5	0	0
Bt_2	5-20		10YR 3/2	C	PR	EH			NE		5	5	0	0
Bt_3	20-42		7.5YR 4/3	vgSCL	SBK	VH			SL		20	10	5	0
C_1	42-54		7.5YR 4/4	vgSL	MA	H			NE		35	15	5	5

Soil Description

Soil Type		File No.	121 MK
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/1/06	Stop No.	B-03
Classification	Typic Argiustoll –fine, montmorillonitic, mesic - gravelly 10:15am		
Location	NAD 83 UTM Z12S N3723889 E602345		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5990	Gr. Water	Stoniness	
Slope 3-4%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	10		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-3		10YR 4/2	CL	GR	SH			NE		5	0	0	0
Bt_1	3-10		10YR 4/2	CL	SBK	VH			NE		5	5	0	0
Bt_2	10-24		10YR 4/2	C	PR	EH			NE		0	5	0	0
Bt_3	24-40		7.5YR 4/4	vgSCL	SBK	VH			SL skins on cobbles		25	10	5	0
C_1	40-52		7.5YR 4/4	vgSL	MA	H			NE		25	15	5	0

Soil Description

Soil Type				File No.	122 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	B-04
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		10:38am		
Location	NAD 83 UTM Z12S N3723974 E602197				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5989		Gr. Water		Stoniness	
Slope 7-8%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	15				
Cobble %	20				
Stone %	5				inches
Boulder %	5			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-4		10YR 3/2	CL	GR	SH			NE		10	5	0	0
Bt_1	4-8		10YR 4/2	CL	SBK	VH			NE		5	5	3	0
Bt_2	8-20		10YR 4/2	C	PR	EH			NE		5	5	0	0
Bt_3	20-43		7.5YR 4/4	vgSCL	SBK	VH			NE		25	5	5	5
C_1	43-60		7.5YR 5/4	vgSCL	MA	H			NE		35	10	5	5

Soil Description

Soil Type				File No.	123 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	B-05
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		11:20am		
Location	NAD 83 UTM Z12S N3724158 E601905				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6008	Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	10				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-6		10YR 4/2	CL	SBK	VH			NE		5	0	0	0
Bt_2	6-25		10YR 3/2	C	PR	EH			NE		5	0	0	0
Bt_3	25-45		10YR 5/3	gSCL	SBK	VH			SL		25	5	0	0
C	45-51		10YR 5/3	vgSL	MA	H			NE		35	10	5	0

Soil Description

Soil Type				File No.	124 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	B-06
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none		11:48am		
Location	NAD 83 UTM Z12S N3724316 E601644				
N. veg. (or crop)		Climate			
Parent Material					
Physiography	near toe of slope				
Relief		Drainage		Salt or Alkali	
Elevation 5983		Gr. Water		Stoniness	
Slope 0-1%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			

	Surface	Parent material includes slope wash deposits	
Gravel %	5	slight amount of sand in Bt_2 & Bt_3.	
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-3		10YR 4/2	CL	GR	S			NE		5	0	0	0
Bt_1	3-12		10YR 3/2	CL	SBK	SH			NE		10	0	0	0
Bt_2	12-16		7.5YR 4/2	C	PR	VH			NE		0	0	0	0
Bt_3	16-40		7.5YR 4/2	gSCL	SBK	VH			NE		15	5	0	0
C_1	40-52		7.5YR 5/3	vgSCL	MA	H			VS		25	10	0	0

Soil Description

Soil Type				File No.	125 MK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/1/06	Stop No.	B-07
Classification	Typic Argiustoll –fine, montmorillonitic, mesic - gravelly		12:24pm		
Location	NAD 83 UTM Z12S N3724407 E601497				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6007	Gr. Water		Stoniness	
Slope	3-4%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			

	Surface		
Gravel %	20		
Cobble %	10		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A_1	0-3		10YR 4/2	CL	GR				NE		5	5	0	0
Bt_1	3-12		10YR 3/2	cCL	SBK				NE		10	15	0	0
Bt_2	12-22		10YR 3/3	C	PR				NE		5	0	0	0
Bt_3	22-47		7.5YR 4/4	vgSCL	SBK				NE		30	15	5	5
	Bucket refusal on 30 inch single boulder in bottom of hole – not bedrock – just a big rounded boulder													

Soil Description

Soil Type				File No.	126 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-01
Classification	Typic Chromustert – fine, montmorillonitic, mesic – very cobbly		10:00am		
Location	N12229278 E1974499				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6105	Gr. Water		Stoniness	
Slope	1-2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	20			
	Stone %	0			inches
	Boulder %	10		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/3	CL 38%	GR	H			NE		5	5	0	0
Bss_1	3-12		10YR 3/3	C	WEG	VH			NE		0	0	0	0
Bss_2	12-24		10YR 3/3	C	WEG	EH			NE		5	5	0	0

03.02.2006 10:10

03.02.2006 10:10

Soil Description

Soil Type				File No.	127 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-02
Classification	Lithic Argiustoll – clayey skeletal, montmorillonitic, mesic – very gravelly		10:45am		
Location	N12230181 E1976615				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	1-2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	5		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	cCL	GR	H			NE		5	10	0	0
Bt_1	3-16		10YR 3/3	vcC	PR	EH			NE		5	25	10	0
Bt_2	16-23		10YR 3/4	vcC	ABK	EH			NE		5	20	20	5
R	23-36		Basalt Bedrock											

03.02.2006 10:31

03.02.2006 10:31

Soil Description

Soil Type				File No.	128 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-03
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - gravelly		10:40am		
Location	N12229863 E1974288				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6104	Gr. Water		Stoniness	
Slope	1-2%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 27%	GR	SH			NE		0	0	0	0
Bt_1	2-14		10YR 3/3	CL 38%	SBK	H			NE		0	0	0	0
Bt_2	14-21		10YR 3/3	C	PR	EH			NE		0	0	0	0
Bt_3	21-30		10YR 3/3	C	ABK	EH			NE		5	0	0	0
R	Basalt Bedrock													

03.02.2006 10:59

03.02.2006 10:59

Soil Description

Soil Type				File No.	129 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-04
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly		11:21am		
Location	N12224938 E1977090				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	3-4	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 30%	GR	SH			NE		5	5	0	0
Bt_1	3-9		10YR 3/3	cCL 38%	SBK	H			NE		5	20	0	0
Bt_2	9-20		10YR 3/3	cC	PR	EH			NE		5	20	0	0
Bt_3	20-28		10YR 3/3	cC	SBK	EH			SL		10	20	0	0
C	28-60		5YR 4/4	ecLS	M	H			NE		25	30	15	5

03.02.2006 11:50

03.02.2006 11:50

Soil Description

Soil Type				File No.	130 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-05
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very gravelly		11:55am		
Location	N12225447 E1976921				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	20			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 35%	GR	SH			NE		5	5	0	0
Bt_1	2-9		10YR 3/3	cCL 38%	SBK	H			NE		5	15	0	0
Bt_2	9-16		7.5YR 3/4	C	PR	EH			NE		0	0	5	0
Bt_3	16-26		7.5YR 3/4	vcC	SBK	EH			NE		5	10	15	5
Bk	26-40		5YR 3/4	ecSCL	SBK	VH			SL		25	25	15	10
C	40-60		5YR 4/6	ecSL	M	H			SL		30	25	20	5

03.02.2006 12:59

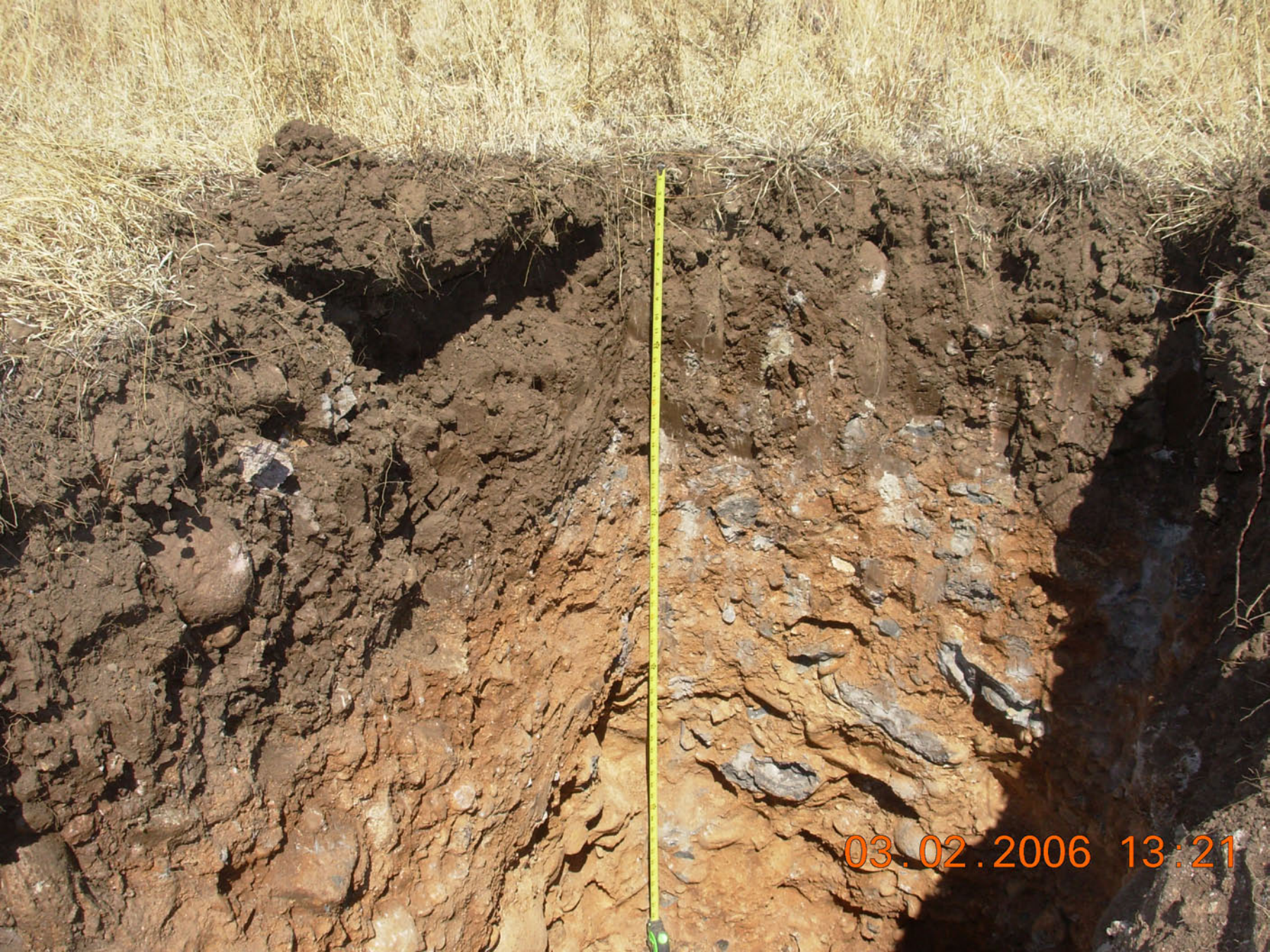
03.02.2006 12:58

Soil Description

Soil Type		File No.	131 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/2/06	Stop No.	A-06
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly 13:00		
Location	N12224640 E1978513		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6094	Gr. Water	Stoniness	
Slope 1-3	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	15		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-9		10YR 3/3	cCL	SBK	H			NE		5	10	0	0
Bt_2	9-16		10YR 3/3	C	PR	EH			NE		5	0	0	0
Bt_3	16-27		7.5YR 4/4	cSCL	SBK	VH			SL		10	15	5	0
C	27-60		7.5YR 4/4	ecLS	M	H			NE		30	25	15	5

03.02.2006 13:21


03.02.2006 13:21

Soil Description

Soil Type				File No.	132 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-07
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly		13:15		
Location	N12226745 E1981852				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6183	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	15				
Cobble %	5				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-10		10YR 3/3	cCL	SBK	H			NE		5	10	5	0
Bt_2	10-16		10YR 3/3	cC	PR	EH			NE		5	15	0	0
Bt_3	16-23		10YR 3/4	cC	SBK	EH			NE		5	15	5	0
Bt_4	23-32		7.5YR 4/4	esSCL	SBK	VH			NE		25	20	25	0
C	32-60		7.5YR 4/4	esSL	M	H			NE		25	20	25	10

Soil Description

Soil Type		File No.	133 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/2/06	Stop No.	A-08
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly 13:25		
Location	N12229387 E1983443		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6239	Gr. Water	Stoniness	
Slope 0-1	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		

Surface			
Gravel %	15		
Cobble %	20		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cCL 26%	GR	SH			NE		5	10	0	0
Bt_1	2-7		10YR 3/3	cCL 37%	SBK	VH			NE		5	15	5	0
Bt_2	7-14		10YR 3/3	cC	PR	EH			NE		5	10	10	0
Bt_3	14-22		10YR 3/3	vcC	SBK	VH			NE		25	20	10	0
C	22-48		7.5YR 4/4	ecSL	M	H			NE		30	25	20	10

03.02.2006 13:52

03.02.2006 13:52

Soil Description

Soil Type				File No.	134 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-09
Classification	Typic Argiustoll – fine, montmorillonitic, mesic –gravelly 14:07				
Location	N12224596 E1975511				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6073	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-9		10YR 3/3	CL	SBK	VH			NE		5	0	0	0
Bt_2	9-18		10YR 3/3	C	PR	EH			NE		5	0	0	0
Bt_3	18-30		10YR 3/3	C	SBK	EH			NE		5	5	0	0
C	30-60		7.5YR 4/4	ecLS	M	H			NE		25	30	10	5

03.02.2006 14:14

03.02.2006 14:14

Soil Description

Soil Type				File No.	135 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-10
Classification	Typic Argiustoll – fine, montmorillonitic, mesic –none		14:21		
Location	N12223716 E1974547				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	6075	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			

	Surface		
Gravel %	10		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-9		10YR 3/3	cCL	SBK	H			NE		5	15	0	0
Bt_2	9-17		10YR 3/3	cC	PR	EH			NE		5	15	0	0
Bt_3	17-30		10YR 3/3	cC	SBK	VH			NE		5	15	5	0
C	30-48		5YR 4/4	vgSCL	M	VH			SL*		30	15	5	0
	*SL IN	10%	OF	PROFILE										

03.02.2006 14:28

03.02.2006 14:28

Soil Description

Soil Type				File No.	136 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/2/06	Stop No.	A-11
Classification	Typic Argiustoll –fine, montmorillonitic, mesic – gravelly		15:45		
Location	N12213894 E1978276				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5970	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: control section 26%					
Samples (depth inches)		Photos			

Surface			
Gravel %	25		
Cobble %	5		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 29%	GR	SH			NE		5	5	0	5
Bt_1	2-8		10YR 3/3	cCL 36%	SBK	VH			NE		5	15	0	5
Bt_2	8-16		10YR 3/3	cC	PR	EH			NE		5	15	0	5
Bt_3	16-27		10YR 3/3	vcC	SBK	EH			NE		10	25	5	5
Bt_4	27-39		7.5YR 3/4	vcSCL	SBK	VH			NE		25	20	10	5
C	39-62		5YR 4/4	egLS	M	H			NE		35	15	20	5

03.02.2006 15:56

03.02.2006 15:56

Soil Description

Soil Type		File No.	137 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/2/06	Stop No. A-12
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly	16:45	
Location	N12223816 E1986630		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6201	Gr. Water	Stoniness	
Slope 1-3	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		

	Surface		
Gravel %	15		
Cobble %	25		
Stone %	5		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 35%	GR	H			NE		5	5	0	0
Bt_1	3-15		10YR 3/2	C	SBK	EH			NE		5	0	0	0
Bt_2	15-30		10YR 3/2	C	PR	EH			NE		5	0	0	0
C	30-48		7.5YR 4/4	ecSCL	M	H			NE		25	25	10	10
R	48		BASALT	ROCK										

03.02.2006 16:48

03.02.2006 16:47

Soil Description

Soil Type		File No.	138 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/2/06	Stop No. A-13
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – gravelly	17:05	
Location	N12224978 E1984334		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 6182	Gr. Water	Stoniness	
Slope 0-1	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes: Control sector 42%			
Samples (depth inches)	Photos		

Surface			
Gravel %	15		
Cobble %	10		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	cCL	GR	H			NE		5	10	0	0
Bt_1	3-12		10YR 3/2	vcC	PR	VH			NE		10	10	5	0
Bt_2	12-18		10YR 3/4	vcC	SBK	VH			NE		15	20	5	0
Bt_3	18-32		7.5YR 4/4	vcSCL	SBK	VH			NE		30	25	5	0
C	32-48		5YR 4/4	ecSL	M	H			NE		25	30	10	5

03.02.2006 17:22

03.02.2006 17:22

Soil Description

Soil Type				File No.	139 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 7:59	Stop No.	A-01
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	N12208279 E1973888				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5868	Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cCL	GR	SH			NE		5	0	0	0
Bt_1	2-10		10YR 3/3	cCL	SBK	H			NE		5	10	5	0
Bt_2	10-24		10YR 3/3	cC	PR/ABK	EH			NE		5	15	10	0
Bt_3	24-36		7.5YR 3/4	vgSCL	SBK	VH			NE		25	20	10	5
C	36-60		5YR 5/5	ecSL	M	H					25	25	10	10

03.03.2006 08:08

03.03.2006 08:08

Soil Description

Soil Type				File No.	140 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 8:27	Stop No.	A-01a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	N12206935 E1973145				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5846		Gr. Water		Stoniness	
Slope 1-3%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	0				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		7.5YR 3/2	CL 30%	GR	SH			NE		5	0	0	0
Bt_1	3-16		7.5YR 3/2	CL 36%	SBK/PR	H/VH			NE		5	0	0	0
Bt_2	16-24		7.5YR 3/2	vcC	PR	EH			NE		10	20	10	0
Bt_3	24-36		5YR 4/3	vcSCL 28%	SBK	VH			NE		25	20	10	5
C	36-48		5YR 4/4	ecSCL 20%	M	H			NE		25	25	15	10

03.03.2006 09:04

03.03.2006 09:04

Soil Description

Soil Type				File No.	141 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 9:22	Stop No.	A-02
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – gravelly				
Location	N12206840 E1973477				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5805	Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	3-9		10YR 3/3	cCL	SBK	VH			NE		5	15	5	0
Bt_2	9-24		10YR 3/3	vcC	ABK	EH			NE		10	25	5	0
Bt_3	24-36		5YR 4/4	ecSCL	SBK	VH			NE		20	25	15	5
C	36-48		5YR 4/4	esLS	M	H			NE		25	25	20	10

03.03.2006 09:36

03.03.2006 09:36

Soil Description

Soil Type				File No.	142 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 9:50	Stop No.	A-03a
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – none				
Location	N12207012 E1972618				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5847		Gr. Water		Stoniness	
Slope 4%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	10				
Cobble %	1				
Stone %	0				Inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-9		10YR 3/3	cCL	SBK	VH			NE		5	15	5	0
Bt_2	9-20		10YR 3/3	vcC	PR	EH			NE		5	20	10	0
Bt_3	20-36		7.5YR 3/4	vcSCL	SBK	VH			NE		20	25	10	0
C	36-60		7.5YR 4/4	ecSL	M	H			NE		25	25	10	5

03.03.2006 09:53

03.03.2006 09:53

Soil Description

Soil Type				File No.	143 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 10:15	Stop No.	A-04a
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – very cobbly				
Location	N12205532 E1973297				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5835	Gr. Water		Stoniness	
Slope	0-1%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	25			
	Stone %	5			Inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	cCL	GR	SH			NE		5	15	0	0
Bt_1	2-10		10YR 3/3	vcC	ABK	VH			NE		5	25	10	5
Bt_2	10-24		7.5YR 3/4	ecSCL	SBK	VH			NE		25	30	10	5
C	24-48		7.5YR 4/4	ecSL	M	H			NE		25	25	15	10

03.03.2006 10:14

03.03.2006 10:14

Soil Description

Soil Type				File No.	144 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 10:35	Stop No.	A-05a
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – gravelly				
Location	N12205588 E1973147				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5832		Gr. Water		Stoniness	
Slope 1-3%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	10				
Cobble %	10				
Stone %	0				Inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	bCL	GR	SH			NE		5	5	0	5
Bt_1	2-10		10YR 3/3	cCL	SBK	H			NE		5	15	5	5
Bt_2	10-18		10YR 3/3	sC	PR	EH			NE		5	10	10	5
Bt_3	18-36		7.5YR 3/4	vcSCL	SBK	VH			NE		20	25	10	5
C	36-48		7.5YR 4/4	esSL	M	H			NE		25	30	20	10

03.03.2006 10:28

03.03.2006 10:27

Soil Description

Soil Type		File No.	145 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/3/06	Stop No. A-06a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly		
Location	N12205684 E1972748		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5839	Gr. Water	Stoniness	
Slope 3-4%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	25		
Stone %	15		Inches
Boulder %	15	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	5	0	0
Bt_1	2-8		10YR 3/3	C	SBK	EH			NE		5	5	0	0
Bt_2	8-20		10YR 3/3	sC	PR	EH			NE		5	10	10	5
Bt_3	20-30		10YR 3/4	vbC	SBK	EH			NE		5	10	10	20
R	30		GREY	BASALT							5	10	10	25

03.03.2006 10:41

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Soil Description

Soil Type		File No.	146 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res. Date 3/3/06	Stop No.	A-07a
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – none		
Location	N12208144 E1973251		
N. veg. (or crop)	Climate		
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5870	Gr. Water	Stoniness	
Slope 0-1%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	10		
Cobble %	1		
Stone %	0		Inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 33%	GR	SH			NE		5	0	0	0
Bt_1	3-16		10YR 3/3	cCL 38%	SBK	VH			NE		5	20	5	0
Bt_2	16-30		5YR 3/4	vsSCL 35%	SBK	VH			NE		20	25	20	5
C	30-40		5YR 3/4	esSL	M	H			NE		25	20	25	10

03.03.2006 11:17

03.03.2006 11:17

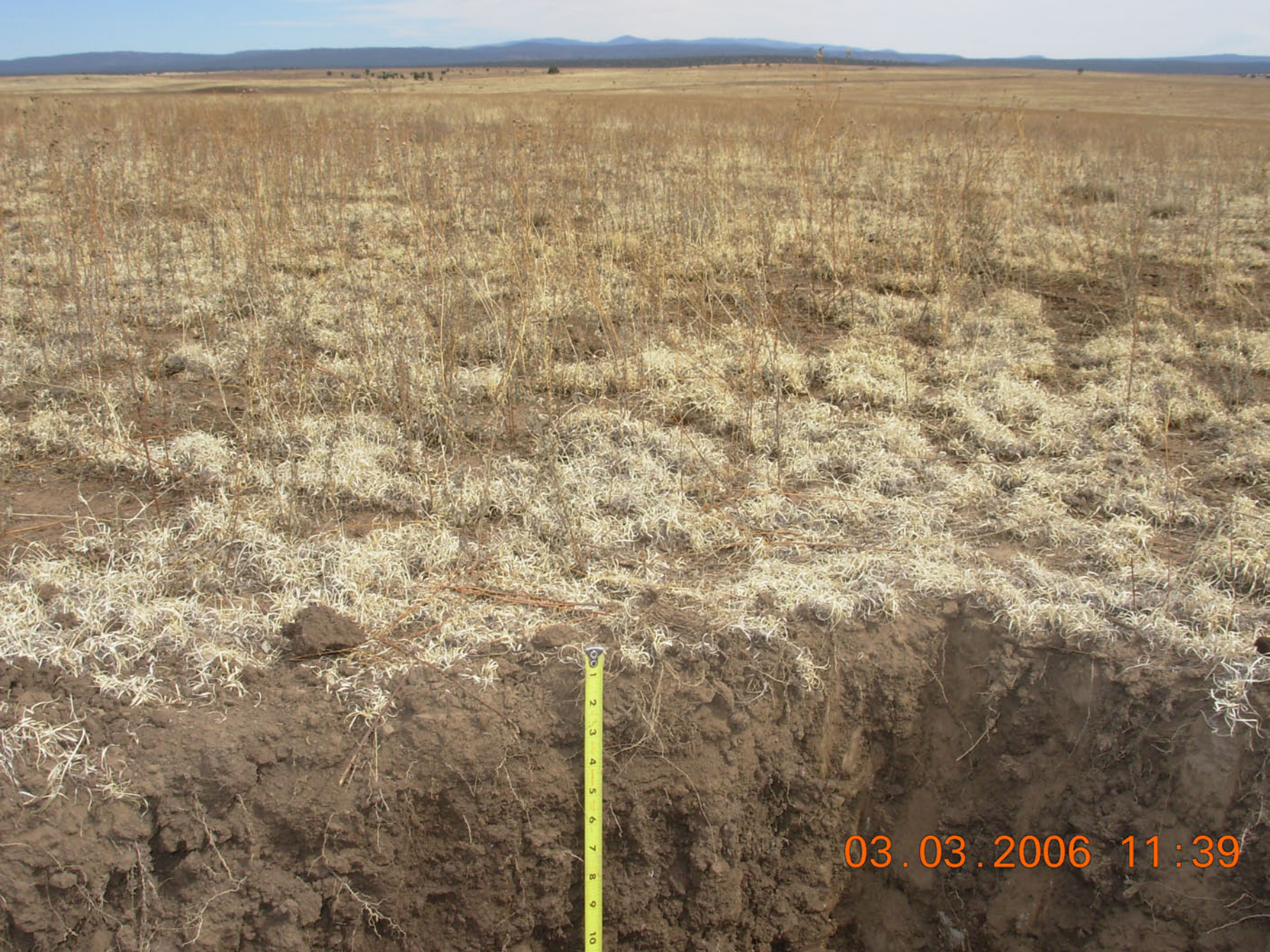
Soil Description

Soil Type		File No.	147 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/3/06 11:30	Stop No. A-08a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none		
Location	N12207724 E1972321		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5851	Gr. Water	Stoniness	
Slope 1-3%	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		

	Surface
Gravel %	10
Cobble %	0
Stone %	0
Boulder %	0

		Inches
Pit Depth	( )	
Bedrock	( )	
Topsoil	( )	

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL 34%	GR	SH			NE		5	0	0	0
Bt_1	2-10		10YR 3/3	CL 38%	SBK	H			NE		5	0	0	0
Bt_2	10-16		10YR 3/3	C	PR	EH			NE		5	5	0	0
Bt_3	16-24		7.5YR 3/3	vsSCL	SBK	EH			NE		25	20	15	0
Bt_4	24-40		7.5YR 3/4	esSCL	SBK	VH			NE		25	30	20	5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Soil Description

Soil Type				File No.	148 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 11:50	Stop No.	A-09a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	N12208915 E1971810				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5864	Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	1			
	Stone %	0			Inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	3-13		10YR 3/3	CL	SBK	H			NE		5	5	0	0
Bt_2	13-20		7.5YR 3/3	cC	PR	EH			NE		10	10	0	0
Bt_3	20-36		7.5YR 3/4	vsSCL	SBK	VH			NE		25	20	15	0
C	36-48		7.5YR 4/4	esSL	M	H			NE		25	20	30	5

03.03.2006 12:04

03.03.2006 12:05

Soil Description

Soil Type				File No.	149 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 12:30	Stop No.	A-10a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	N12209886 E1971312				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5871	Gr. Water		Stoniness	
Slope	1-3%	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	1			
	Stone %	0			Inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 29%	GR	SH			NE		5	0	0	0
Bt_1	3-13		10YR 3/3	CL 36%	SBK	H/VH			NE		5	0	0	0
Bt_2	13-23		10YR 3/3	vcC	PR	EH			NE		10	20	5	0
Bt_3	23-32		7.5YR 3/4	vcC	ABK	EH			NE		10	20	10	0
Bt_4	32-40		5YR 4/4	ecSCL 28%	SBK	VH			NE		30	20	10	5
C	40-48		5YR 4/4	esSCL 22%	M	VH			NE		25	25	15	10

03.03.2006 12:31

03.03.2006 12:31

Soil Description

Soil Type				File No.	150 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 12:47	Stop No.	A-11a
Classification	Typic Chromustert – fine, montmorillonitic, mesic - none				
Location	N 12208393 E 1969410				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1 playa	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	<2			
	Cobble %	10			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-1		7.5YR 3/2	C	GR	H			NE		0	0	0	0
Bss_1	1-6		7.5YR 3/2	C	WEG	EH			NE		0	0	0	0
Bss_2	6-30		7.5YR 3/2	C	WEG	EH			NE		0	0	0	0
C	30-48		5YR 4/4	esCL	MA	VH			NE		25	25	15	5

03.03.2006 13:05

03.03.2006 13:05

Soil Description

Soil Type				File No.	151 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 13:42	Stop No.	A-12a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic - none				
Location	N 12207401 E 19695338				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5881	Gr. Water		Stoniness	
Slope	0-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	3-9		3/2	CL	SBK	H			NE		5	0	0	0
Bt_2	9-22		3/2	C	PR	EH			NE		5	0	0	0
Bt_3	22-32		7.5YR 3/4	cC	SBK	EH			NE		10	15	0	0
Bk	32-48		7.5YR 7/4	vcSCL	M	H			NE		20	20	5	0

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Soil Description

Soil Type				File No.	152 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 13:50	Stop No.	A-13a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	N 12207401 E 19695338				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5897	Gr. Water		Stoniness	
Slope	1-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt	3-11		10YR 3/3	CL	SBK	H			NE		5	0	0	0
Bt	11-20		10YR 3/3	cC	PR	EH			NE		5	10	0	0
Bt	20-30		7.5YR 3/4	cC	ABK	EH			NE		10	15	5	0
R	30		Grey	Basalt										

03.03.2006 14:02

03.03.2006 14:02

Soil Description

Soil Type				File No.	153 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 14:25	Stop No.	A-14
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – very cobbly				
Location	N 12206218 E 1970291				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5889		Gr. Water		Stoniness	
Slope 1-3		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Vertic nature CRACKS to 14”					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	30				
Stone %	5				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/3	CL 38%	GR	SH			NE		5	0	0	0
Bt_1	2-14		10YR 3/3	C	PR	EH			NE		5	0	0	0
Bt_2	14-32		7.5YR 3/3	C	SBK	EH			NE		5	0	0	0
Bk	32-42		7.5YR 3/6	vcCL	M	VH			VE		15	15	5	0
R	42													

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Soil Description

Soil Type	Vertisol			File No.	154 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-15a
Classification	Typic Chromustert – fine, montmorillonitic, mesic – cobbly				
Location	N 12206367 E 1969871				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5894	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	20			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/3	C	PL/GR	H			NE		5	0	0	0
Bss_1	2-10		3/3	C	WEG	EH			NE		5	0	0	0
Bss_2	10-32		3/3	C	WEG	EH			NE		5	0	0	0
Bk	32-48		7.5YR 4/4	vcC	MA	VH			VE		20	15	5	0

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Soil Description

Soil Type	Vertisol			File No.	155 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 15:00	Stop No.	A-16a
Classification	Typic Chromustert – fine, montmorillonitic, mesic – very cobbly				
Location	N 12205840 E 1969144				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5888	Gr. Water		Stoniness	
Slope	1-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Vertic Cracks to 32”					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	25			
	Stone %	5			inches
	Boulder %	1		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/3	C	GR	SH			NE		5	0	0	0
Bss_1	4-32		3/3	C	WEG	EH			NE		5	0	0	0
Bss_2	32-48		3/3	C	WEG	EH			NE		5	0	0	0
R	48		Basalt	Bedrock					N		0	0	0	0

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Soil Description

Soil Type	Vertisol			File No.	156 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06 3:15	Stop No.	A-17a
Classification	Typic Chromustert – fine, montmorillonitic, mesic – very gravelly				
Location	N 12204769 E 1969882				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation		Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Vertic Cracks to 32”					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	25			
	Stone %	10			inches
	Boulder %	5		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/3	C	G				NE		0	0	0	0
Bss_1	2-12		7.5YR 3/3	C	WEG				NE		0	0	0	0
Bss_2	12-36		7.5YR 3/3	C	WEG				NE		0	0	0	0
Ck	36-48		7.5YR 6/3	cCL	M				VE		10	20	10	0

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Soil Description

Soil Type				File No.	157 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-18a
Classification	Lithic Argiustoll – clayey skeletal, montmorillonitic, mesic – very cobbly				
Location	N 12203469 E 1968573				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5881	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	30				
Stone %	15				inches
Boulder %	10			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 7/2	sCL	GR	SH			NE		5	10	10	0
Bt	2-12		10YR 3/3	vsC	SBK	VH			NE		5	20	25	5
R	12													

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Soil Description

Soil Type				File No.	158 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-19a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	N 12203241 E 1967545				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5862	Gr. Water		Stoniness	
Slope	1-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Landscape has boulder field 100'x100' in area separated by 500'					
Samples (depth inches)		Photos			
	Surface				
Gravel %	10				
Cobble %	5				
Stone %	5				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 38%	GR	H			NE		5	0	0	0
Bt_1	3-18		10YR 3/3	C	ABK	EH			NE		5	5	0	0
Bt_2	18-36		7.5YR 3/4	cC	ABK	EH			NE		10	15	5	0
R	36-40		Grey	Basalt					NE					

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Soil Description

Soil Type	Vertisol			File No.	159 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-20a
Classification	Typic Chromustert – fine, montmorillonitic, mesic – none				
Location	N 12203241 E 1967545				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5854	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Cracks 24”					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	0			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	C	GR	H			NE					
Bss_1	2-12		3/3	C	WEG	EH								
Bss_2	12-24		3/3	C	WEG	EH								
C	24-42		3/3	C	M	EH								

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03.03.2006 16:14

Soil Description

Soil Type				File No.	160 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-21a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	N 12204346 E 1967135				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5847	Gr. Water		Stoniness	
Slope		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Cracks 24”					
Samples (depth inches)		Photos			

Surface			
Gravel %	<1		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/2	CL 30%	GR	SH			NE		<1	<1	0	0
Bt_1	3-16		10YR 3/3	CL 35%	SBK	H			NE		<1	<1	0	0
Bt_2	16-24		10YR 3/3	C	PR	EH			NE		<1	<1	0	0
Bt_3	24-36		10YR 3/3	C	SBK	EH			NE		<1	<1	0	0
C	36-48		10YR 3/3	C	M	EH			NE		<1	<1	0	0

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Soil Description

Soil Type				File No.	161 BAB
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	03/03/06	Stop No.	A-22a
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	N 12205669 E 1967252				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5852	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Cracks 24”					
Samples (depth inches)		Photos			
	Surface				
	Gravel %	<1			
	Cobble %	<1			
	Stone %	<1			inches
	Boulder %	<1		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		7.5YR 3/2	CL 33%	GR	SH			NE		0	0	0	0
Bt_1	2-16		7.5YR 3/3	CL 37%	SBK	H			NE		0	0	0	0
Bt_2	16-24		3/3	C	PR	EH			NE		0	0	0	0
Bt_3	24-42		3/4	C	SBK	EH			NE		0	0	0	0
C	42-52		3/3	C	M	EH			NE		0	0	0	0

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Soil Description

Soil Type				File No.	162 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 10:45	Stop No.	B-01
Classification	Typic Argiustoll – clayey skeletal, montmorillonitic, mesic – none				
Location	NAD83 UTM Metric N3719910 E601486				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation 5805		Gr. Water		Stoniness	
Slope 1-2%		Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	0				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 3/3	CL	GR	SH			NE		0	0	0	0
Bt_1	3-10		10YR 3/2	CL	SBK	H			NE		5	0	0	0
Bt_2	10-30		10YR 3/3	vcC	PR	EH			NE		25	25	5	0
Bt_3	30-45		7.5YR 4/3	esSCL	ABK	VH			NE		30	15	30	0
C	45-56		7.5YR 4/4	esLS	M	VH			NE		30	30	20	0

Soil Description

Soil Type				File No.	163 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 11:27	Stop No.	B-02
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic – very cobbly				
Location	NAD83 UTM Metric Z12S N3719895 E601425				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5812	Gr. Water		Stoniness	
Slope	2-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	25			
	Stone %	10			inches
	Boulder %	5		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-5		10YR 3/2	CL	SBK	H			NE		10	5	0	0
Bt_2	5-10		10YR 3/3	vgC	ABK	VH			NE		25	5	5	0
C	10-40		7.5YR 4/3	esLS	M	H			NE		35	20	20	5
	*VS	at	bottom	of	horizon									

b

Soil Description

Soil Type				File No.	164 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 12:00	Stop No.	B-03
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	NAD83 UTM Metric Z12S N3719421 E601456				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5799	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	5			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	4-12		10YR 3/2	cCL	SBK	H			NE		10	20	0	0
Bt_2	12-29		10YR 4/2	cC	PR	EH			NE		5	25	0	0
Bt_3	29-44		10YR 5/4	cCL	ABK	EH			NE		10	10	5	0
C	44-55		10YR 6/4	gCL	ABK	VH			NE		10	5	0	0

Soil Description

Soil Type				File No.	165 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 12:30	Stop No.	B-04
Classification	Typic Argiustoll –fine, montmorillonitic, mesic – very gravelly				
Location	NAD83 UTM Metric Z12S N3719439 E601370				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5830	Gr. Water		Stoniness	
Slope	3-4	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes: Note 20-25% boulders on surface on opposite hillside.					
Samples (depth inches)		Photos			
	Surface				
Gravel %	25				
Cobble %	5				
Stone %	10				inches
Boulder %				Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 4/2	CL	GR	SH			NE		10	0	0	0
Bt_1	2-9		10YR 3/2	gCL	SBK	H			NE		15	5	0	0
Bt_2	9-14		10YR 5/4	cC	PR	EH			NE		5	25	0	0
Bt_3	14-42		7.5YR 5/3	vgSCL	SBK	VH			VS*		40	5	0	0
C	42-50		5YR 5/4	vgLS	M	VH			NE		40	15	5	0
	*VS	at	bottom	of	horizon									

Soil Description

Soil Type				File No.	166 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 1:04	Stop No.	B-05
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	NAD83 UTM Metric Z12S N3719047 E601421				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5807	Gr. Water		Stoniness	
Slope	2-3	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	15			
	Cobble %	0			
	Stone %	0			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/3	CL	GR	SH			NE		0	0	0	0
Bt_1	3-10		10YR 4/2	CL	SBK	H			NE		5	0	0	0
Bt_2	10-18		10YR 3/2	gC	PR	EH			NE		10	5	0	0
Bt_3	18-24		7.5YR 4/2	C	ABK	EH			NE		5	5	0	0
C	24-42		5YR 5/4	cSCL	M	VH			VS		10	10	0	0
R	42-54		Basalt	Bedrock										

Soil Description

Soil Type				File No.	167 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 1:32	Stop No.	B-06
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – cobbly				
Location	NAD83 UTM Metric Z12S N3719053 E601338				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5804	Gr. Water		Stoniness	
Slope	3-4	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	10			
	Cobble %	20			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/3	CL	GR	SH			NE		5	0	0	0
Bt_1	3-11		10YR 4/2	cCL	SBK	H			NE		5	20	0	0
Bt_2	11-17		10YR 3/2	cC	PR	EH			NE		5	20	0	0
Bt_3	17-21		7.5YR 4/2	gC	ABK	VH			NE		15	5	0	0
C	21-60		7.5YR 5/3	egLS	M	VH			NE		35	15	10	10

Soil Description

Soil Type		File No.	168 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/3/06 2:05	Stop No. B-07
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none		
Location	NAD83 UTM Metric Z12S N3718599 E601382		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5809	Gr. Water	Stoniness	
Slope 1-2	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		

Surface			
Gravel %	10		
Cobble %	0		
Stone %	0		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	4-13		10YR 3/2	cCL	SBK	H			NE		5	10	0	0
Bt_2	13-31		10YR 3/3	cC	PR	EH			NE		10	5	0	0
Bt_3	31-40		7.5YR 3/2	cC	ABK	EH			VS		15	10	0	0
C	40-52		5YR 5/4	vcSCL	M	VH			SL		15	10	5	5

Soil Description

Soil Type				File No.	169 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 2:35	Stop No.	B-08
Classification	Typic Argiustoll – clayey over loamy skeletal, montmorillonitic, mesic – very gravelly				
Location	NAD83 UTM Metric Z12S N3718607 E601294				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5814	Gr. Water		Stoniness	
Slope	3-4	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	20			
	Cobble %	10			
	Stone %	10			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-2		10YR 3/2	CL	GR	SH			NE		5	0	0	0
Bt_1	2-9		10YR 3/2	gCL	SBK	H			NE		20	0	0	0
Bt_2	9-14		10YR 3/3	vsC	PR	EH			NE		10	15	10	0
Bt_3	14-30		7.5YR 4/3	vsSCL	ABK	VH			NE		10	15	10	0
C	30-54		5YR 4/4	egLS	M	H			SL		35	15	15	0

Soil Description

Soil Type				File No.	170 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 4:21	Stop No.	B-09
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – none				
Location	NAD83 UTM Metric Z12S N3718855 E600986				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5814	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
	Surface				
Gravel %	5				
Cobble %	5				
Stone %	0				inches
Boulder %	0			Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-3		10YR 4/3	CL	GR	SH			NE		5	10	0	0
Bt_1	3-18		10YR 4/2	CL	ABK	VH			NE		10	0	0	0
Bt_2	18-33		10YR 4/4	gC	PR	EH			NE		15	5	0	0
R	33-52		WEATHERED BASALT BEDROCK											

Soil Description

Soil Type		File No.	171 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date 3/3/06 2:35	Stop No. B-10
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – cobbly		
Location	NAD83 UTM Metric Z12S N3718853 E601092		
N. veg. (or crop)		Climate	
Parent Material			
Physiography			
Relief	Drainage	Salt or Alkali	
Elevation 5820	Gr. Water	Stoniness	
Slope 0-1	Moisture		
Aspect	Root distrib.		
Erosion			
Permeability			
Additional notes:			
Samples (depth inches)	Photos		
	Surface		
Gravel %	5		
Cobble %	10		
Stone %	10		inches
Boulder %	0	Pit Depth	( )
		Bedrock	( )
		Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/4	CL	GR	SH			NE		5	0	0	0
Bt_1	4-10		10YR 4/3	CL	PR	H			NE		5	0	0	0
Bt_2	10-24		10YR 5/4	gSCL	ABK	VH			NE		10	5	5	0
Bt_3	24-37		7.5YR 5/4	vgSCL	ABK	H			VS		25	15	10	5

Soil Description

Soil Type				File No.	172 MBK
Area	Bonita Prairie – White Mt. Apache Indian Res.	Date	3/3/06 5:12	Stop No.	B-11
Classification	Typic Argiustoll – fine, montmorillonitic, mesic – gravelly				
Location	NAD83 UTM Metric Z12S N3719558 E601180				
N. veg. (or crop)		Climate			
Parent Material					
Physiography					
Relief		Drainage		Salt or Alkali	
Elevation	5824 (5813)	Gr. Water		Stoniness	
Slope	0-1	Moisture			
Aspect		Root distrib.			
Erosion					
Permeability					
Additional notes:					
Samples (depth inches)		Photos			
		Surface			
	Gravel %	5			
	Cobble %	5			
	Stone %	5			inches
	Boulder %	0		Pit Depth	( )
				Bedrock	( )
				Topsoil	( )

Horizon	Depth inches	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary	G %	C %	S %	B %
A	0-4		10YR 3/4	CL	GR	SH			NE		5	0	0	0
Bt_1	4-12		10YR 4/3	CL	SBK	H			NE		5	0	0	0
Bt_2	12-24		7.5YR 4/3	C	PR	EH			NE		5	0	0	0
Bt_3	24-33		7.5YR 4/3	gSC	ABK	EH			NE		10	5	0	0
C	33-54		7.5YR 5/3	vgSCL	M	VH			NE		30	15	10	0

Appendix B. Lab Data for Soil Profiles #78 and #79

Sample ID	#78 A HORIZON	#78 Bt1 HORIZON	#78 Bt2 HORIZON	#78 Bt3 HORIZON	#78 Bt4 HORIZON	#78 C HORIZON
Upper Depth	0	4	13	21	32	40
Lower Depth	4	13	21	32	40	60
Sampled	2/2/2006	2/2/2006	2/2/2006	2/2/2006	2/2/2006	2/2/2006
pH	6.8	6.5	6.3	6.9	7.6	7.5
Saturation %	57.3	45.1	69.7	74.2	72.5	61.2
Electrical Conductivity	0.58	0.22	0.12	0.14	0.36	1.61
Calcium	2.75	0.84	0.34	0.32	0.80	4.73
Magnesium	1.54	0.46	0.28	0.29	0.52	2.93
Sodium	0.40	0.42	0.42	0.64	1.88	6.60
SAR	0.27	0.52	0.75	1.15	2.31	3.37
Sand %	25.0	31.0	20.0	27.0	37.0	51.0
Silt %	49.0	45.0	31.0	24.0	22.0	18.0
Clay %	26.0	24.0	49.0	49.0	41.0	31.0
Texture	LOAM	LOAM	CLAY	CLAY	CLAY	SANDY CLAY LOAM
Available Iron	19	48.2	41.4			
Nitrogen-Nitrate	0.36	0.78	0.3			
Available Phosphorus	21.7	18	5.92			
Available Potassium	354	240	390			
Available Zinc	0.7	<0.5	<0.5			
Organic Matter	3.3	1.8	1.2			

Sample ID	#79 A HORIZON	#79 Bw HORIZON	#79 C HORIZON
Upper Depth	0	3	24
Lower Depth	3	24	60
Sampled	2/2/2006	2/2/2006	2/2/2006
pH	6.7	6.9	7.3
Saturation %	56.4	61.2	74.9
Electrical Conductivity	0.27	0.23	1.53
Calcium	1.12	0.69	5.13
Magnesium	0.55	0.41	2.30
Sodium	0.63	0.91	5.90
SAR	0.69	1.22	3.06
Sand %	15.0	13.0	13.0
Silt %	40.0	40.0	36.0
Clay %	45.0	47.0	51.0
Texture	CLAY	CLAY	CLAY
Available Iron	15.7	27.6	
Nitrogen-Nitrate	1.98	0.5	
Available Phosphorus	13	8.69	
Available Potassium	419	305	
Available Zinc	<0.5	<0.5	
Organic Matter	1.1	0.9	

Appendix C. All 172 Soil Profiles

Soil Profile	Subgroup	Fineamily Texture	Slope	Slope Class	Depth to Bedrock	Gravel\Cobble Content at Surface	Stone Content at Surface	Surface Fragments	Gravel\Cobble Content at 0-12"	Stone Content 0-12"	Depth to Fragments	Suitability for Poplar	Suitability for Christmas
1	Vertisol	Fineine	0.8	A	60	0	0	None	0	0	60	Severe	Severe
2	Typic Argiustoll	Fineine	0.5	A	60	0	0	None	0	0	60	Slight	Slight
3	Typic Argiustoll	Fine	2.8	B	60	0	0	None	0	0	60	Slight	Moderate
4	Typic Argiustoll	Fine	3.0	C	60	35	10	Very Gravelly	20	0	3	Moderate	Moderate
5	Typic Argiustoll	Fine	2.2	B	60	50	0	Very Gravelly	25	0	4	Moderate	Severe
6	Typic Argiustoll	Clayey Skeletal	0.9	A	60	15	0	Gravelly	40	0	2	Severe	Severe
7	Typic Argiustoll	Fine	0.9	A	60	0	0	None	0	0	48	Slight	Slight
8	Typic Argiustoll	Fine	0.2	A	60	0	0	None	0	0	60	Moderate	Severe
9	Typic Argiustoll	Fine	0.7	A	60	0	0	None	25	0	2	Moderate	Moderate
10	Typic Argiustoll	Fine	1.0	A	60	11	0	None	20	0	2	Moderate	Moderate
11	Typic Argiustoll	Fine	1.4	B	48	40	5	Very Gravelly	25	0	0	Moderate	Moderate
12	Typic Argiustoll	Fine	0.8	A	60	0	0	None	0	0	60	Slight	Slight
13	Typic Argiustoll	Fine	0.9	A	60	0	0	None	0	0	35	Slight	Moderate
14	Typic Argiustoll	Fine	0.8	A	60	0	0	None	0	0	39	Slight	Moderate
15	Vertisol	Fine	1.2	B	54	0	0	None	0	0	54	Severe	Severe
16	Typic Argiustoll	Clayey Skeletal	0.8	A	32	25	10	Cobbly	10	10	5	Severe	Severe
17	Typic Argiustoll	Clayey Skeletal	0.3	A	36	40	25	Very Gravelly	30	20	4	Severe	Severe
18	Vertisol	Fine	0.3	A	60	45	20	Very Gravelly	0	0	41	Severe	Severe
19	Vertisol	Fine	0.1	A	50	0	0	None	0	0	50	Severe	Severe
20	Typic Argiustoll	Fine	0.2	A	60	35	0	Very Gravelly	25	0	3	Moderate	Moderate
21	Typic Argiustoll	Fine	1.0	A	48	15	0	Gravelly	15	0	3	Moderate	Moderate
22	Typic Argiustoll	Fine	0.7	A	60	0	0	None	5	0	20	Slight	Slight
23	Typic Argiustoll	Fine	0.8	A	60	0	0	None	0	0	41	Slight	Slight
24	Typic Argiustoll	Fine	1.7	B	48	20	0	Gravelly	20	0	3	Moderate	Moderate
25	Typic Argiustoll	Fine	0.1	A	60	5	0	None	10	0	30	Slight	Moderate
26	Typic Argiustoll	Fine	0.8	A	48	0	0	None	0	0	48	Slight	Moderate

27	Typic Argiustoll	Fine	0.5	A	60	5	0	None	10	0	19	Slight	Moderate
28	Typic Argiustoll	Fine	1.7	B	60	60	5	Very Gravelly	20	20	3	Moderate	Moderate
29	Lithic Argiustoll	Clayey	0.4	A	20	40	10	Very Gravelly	5	0	20	Severe	Severe
30	Typic Argiustoll	Fine	1.0	B	28	5	0	None	0	0	28	Slight	Slight
31	Typic Argiustoll	Fine	0.8	A	60	55	0	Very Cobbly	0	0	36	Severe	Severe
32	Typic Argiustoll	Fine	1.0	B	50	15	0	Gravelly	25	0	3	Moderate	Moderate
33	Vertisol	Fine	0.8	A	60	10	25	Very Cobbly	0	0	60	Severe	Severe
34	Typic Argiustoll	Fine	2.0	B	43	30	10	Very Cobbly	0	0	43	Severe	Severe
35	Typic Argiustoll	Fine	1.3	B	28	0	0	None	0	0	28	Severe	Severe
36	Typic Argiustoll	Fine	0.2	A	46	25	0	Gravelly	5	0	46	Severe	Severe
37	Typic Argiustoll	Fine	0.3	A	46	25	0	Gravelly	10	0	46	Severe	Severe
38	Typic Argiustoll	Fine	0.4	A	40	10	10	Gravelly	0	0	40	Severe	Severe
39	Typic Argiustoll	Clayey over Loamy Skeletal	1.1	B	60	35	0	Very Gravelly	25	0	0	Moderate	Moderate
40	Typic Argiustoll	Fine	0.6	A	60	15	0	Gravelly	0	0	60	Severe	Severe
41	Typic Argiustoll	Fine	1.1	B	60	5	0	None	10	0	21	Severe	Severe
42	Typic Argiustoll	Fine	0.3	A	60	12	0	Cobbly	0	0	60	Severe	Severe
43	Lithic Argiustoll	Clayey Skeletal	1.3	B	17	25	25	Very Gravelly	15	0	0	Severe	Severe
44	Typic Argiustoll	Fine	1.4	B	60	0	0	None	0	0	53	Severe	Severe
45	Lithic Argiustoll	Clayey	1.2	B	22	25	0	Gravelly	5	0	22	Severe	Severe
46	Typic Argiustoll	Fine	1.3	B	37	25	0	Gravelly	0	5	40	Severe	Severe
47	Typic Argiustoll	Fine	0.6	A	48	15	0	Gravelly	0	0	18	Moderate	Severe
48	Typic Argiustoll	Fine	1.1	B	48	5	0	None	15	0	2	Severe	Severe
49	Typic Argiustoll	Clayey Skeletal	1.6	B	48	35	10	Very Gravelly	30	20	0	Severe	Severe
50	Typic Argiustoll	Fine	0.7	A	48	10	0	None	25	0	2	Moderate	Severe
51	Typic Argiustoll	Fine	1.2	B	48	35	5	Very Gravelly	0	0	20	Severe	Severe
52	Typic Argiustoll	Fine	0.2	A	60	15	0	Gravelly	10	0	15	Moderate	Severe
53	Typic Argiustoll	Fine	1.2	B	60	35	10	Very Gravelly	20	0	3	Moderate	Moderate
54	Lithic Argiustoll	Clayey	0.4	A	10	15	10	Cobbly	0	2	18	Severe	Severe
55	Typic Argiustoll	Fine	0.7	A	58	5	0	None	10	0	13	Severe	Severe
56	Typic Argiustoll	Fine	0.9	A	56	15	10	Gravelly	10	0	15	Moderate	Severe

57	Typic Argiustoll	Fine	0.8	A	60	10	0	None	5	0	19	Slight	Slight
58	Typic Argiustoll	Fine	1.0	A	60	20	5	Gravelly	10	0	8	Moderate	Moderate
59	Vertisol	Fine	0.4	A	38	25	0	Gravelly	0	0	38	Severe	Severe
60	Lithic Argiustoll	Clayey	0.3	A	22	20	5	Gravelly	0	0	22	Severe	Severe
61	Typic Argiustoll	Fine	0.6	A	30	10	10	Cobbly	5	0	30	Severe	Severe
62	Vertisol	Fine	0.8	A	38	40	5	Gravelly	10	0	38	Severe	Severe
63	Vertisol	Fine	1.1	B	22	20	0	Gravelly	15	20	22	Severe	Severe
64	Typic Argiustoll	Fine	0.9	A	55	0	0	None	5	0	22	Slight	Moderate
65	Typic Argiustoll	Fine	0.6	A	60	15	2	Gravelly	5	0	22	Moderate	Severe
66	Typic Argiustoll	Fine	2.0	B	60	10	0	None	10	0	28	Moderate	Severe
67	Typic Argiustoll	Fine	0.8	A	60	20	0	Gravelly	20	5	4	Moderate	Severe
68	Typic Argiustoll	Fine	1.8	B	52	25	10	Very Gravelly	15	0	2	Moderate	Moderate
69	Typic Argiustoll	Fine	0.7	A	60	20	0	Gravelly	0	0	31	Severe	Severe
70	Typic Argiustoll	Fine	0.4	A	60	10	0	None	0	0	16	Moderate	Severe
71	Typic Argiustoll	Fine	2.6	B	60	20	0	Gravelly	5	0	16	Moderate	Severe
72	Typic Argiustoll	Clayey over Loamy Skeletal	1.6	B	60	15	0	Gravelly	35	0	3	Severe	Severe
73	Typic Argiustoll	Fine	0.1	A	60	20	0	Gravelly	15	0	8	Moderate	Moderate
74	Typic Argiustoll	Fine	0.6	A	60	10	0	None	5	0	60	Slight	Slight
75	Typic Argiustoll	Fine	1.1	B	48	20	0	Gravelly	15	0	11	Moderate	Moderate
76	Typic Argiustoll	Fine	2.8	B	48	20	0	Gravelly	5	0	21	Slight	Moderate
77	Typic Argiustoll	Fine	0.4	A	60	10	0	None	0	0	36	Slight	Slight
78	Typic Argiustoll	Fine	0.3	A	60	0	0	None	0	0	32	Slight	Slight
79	Vertisol	Fine	0.5	A	60	5	0	None	0	0	60	Severe	Severe
80	Lithic Argiustoll	Clayey	1.8	B	20	5	0	None	10	0	12	Severe	Severe
81	Typic Argiustoll	Fine	1.2	B	48	30	25	Very Cobbly	25	0	0	Severe	Severe
82	Typic Argiustoll	Fine	1.1	B	60	10	0	None	5	0	12	Slight	Moderate
83	Typic Argiustoll	Fine	1.1	B	60	15	0	Gravelly	25	5	4	Moderate	Moderate
84	Typic Argiustoll	Fine	0.2	A	60	0	0	None	10	0	36	Moderate	Severe
85	Typic Argiustoll	Fine	1.5	B	54	10	0	None	25	10	3	Moderate	Moderate
86	Typic Argiustoll	Fine	2.0	B	60	15	5	Cobbly	10	0	17	Moderate	Severe

87	Typic Argiustoll	Fine	2.5	B	44	25	5	Cobbly	10	0	8	Moderate	Moderate
88	Typic Argiustoll	Fine	0.9	A	60	30	5	Cobbly	10	0	19	Moderate	Severe
89	Typic Argiustoll	Fine	0.7	A	32	10	5	Gravelly	5	0	18	Slight	Slight
90	Typic Argiustoll	Fine	0.7	A	28	30	0	Gravelly	10	0	22	Severe	Severe
91	Typic Argiustoll	Fine	1.0	A	60	5	5	None	5	0	27	Slight	Slight
92	Vertisol	Fine	1.9	B	25	10	25	Cobbly	0	0	25	Severe	Severe
93	Typic Argiustoll	Fine	3.1	C	40	10	25	Cobbly	5	0	40	Severe	Severe
94	Typic Argiustoll	Fine	0.8	A	60	10	0	None	10	0	23	Severe	Severe
95	Typic Argiustoll	Fine	1.0	A	24	5	0	None	0	0	24	Moderate	Severe
96	Lithic Argiustoll	Clayey	1.6	B	8	15	10	Gravelly	30	0	15	Severe	Severe
97	Typic Argiustoll	Fine	2.0	B	60	20	5	Gravelly	5	10	2	Moderate	Moderate
98	Typic Argiustoll	Fine	3.3	C	40	55	5	Very Gravelly	15	0	3	Moderate	Moderate
99	Typic Argiustoll	Fine	1.0	B	60	35	0	Very Gravelly	15	0	3	Moderate	Moderate
100	Typic Argiustoll	Fine	1.4	B	40	50	5	Very Gravelly	15	0	2	Moderate	Severe
101	Typic Argiustoll	Fine	1.4	B	48	40	5	Very Gravelly	15	0	0	Moderate	Moderate
102	Typic Argiustoll	Fine	1.7	B	48	25	5	Gravelly	15	0	0	Moderate	Moderate
103	Typic Argiustoll	Fine	2.1	B	60	35	5	Very Gravelly	15	0	9	Moderate	Moderate
104	Typic Argiustoll	Fine	2.5	B	60	30	5	Very Gravelly	10	0	36	Slight	Moderate
105	Typic Argiustoll	Clayey Skeletal	4.5	C	39	40	5	Very Gravelly	30	5	0	Severe	Severe
106	Typic Argiustoll	Fine	0.9	A	40	20	0	Gravelly	10	0	30	Slight	Moderate
107	Typic Argiustoll	Fine	2.0	B	60	30	5	Very Gravelly	10	0	30	Severe	Severe
108	Typic Argiustoll	Fine	1.7	B	60	15	0	Gravelly	15	5	9	Moderate	Moderate
109	Typic Argiustoll	Fine	0.8	A	56	25	0	Gravelly	10	0	16	Severe	Severe
110	Lithic Argiustoll	Clayey	2.7	B	20	5	0	None	0	0	20	Severe	Severe
111	Lithic Argiustoll	Clayey	1.9	B	40	20	5	Cobbly	15	0	0	Severe	Severe
112	Lithic Argiustoll	Clayey	0.5	A	19	5	0	None	5	0	19	Severe	Severe
113	Lithic Argiustoll	Clayey	1.5	B	36	5	0	None	5	0	9	Severe	Severe
114	Lithic Argiustoll	Clayey	6.1	C	16	5	0	None	5	0	10	Severe	Severe
115	Lithic Argiustoll	Clayey	1.5	B	15	15	0	Gravelly	0	0	30	Severe	Severe
116	Typic Argiustoll	Fine	0.6	A	46	0	0	None	0	0	46	Slight	Moderate

117	Typic Argiustoll	Fine	2.7	B	48	25	5	Gravelly	10	0	32	Moderate	Slight
118	Typic Argiustoll	Fine	0.8	A	51	25	0	Gravelly	10	0	18	Severe	Severe
119	Typic Argiustoll	Clayey over Loamy Skeletal	1.3	B	53	15	0	Gravelly	10	5	19	Moderate	Severe
120	Typic Argiustoll	Clayey over Loamy Skeletal	1.8	B	54	15	0	Gravelly	10	0	20	Moderate	Severe
121	Typic Argiustoll	Fine	3.5	C	52	20	5	Gravelly	10	0	24	Moderate	Moderate
122	Typic Argiustoll	Fine	1.4	B	60	35	5	Very Gravelly	10	5	20	Slight	Moderate
123	Typic Argiustoll	Fine	1.7	B	51	10	0	None	5	0	25	Moderate	Severe
124	Typic Argiustoll	Fine	2.7	B	52	5	0	None	10	0	16	Slight	Moderate
125	Typic Argiustoll	Fine	1.5	B	47	30	5	Gravelly	25	0	3	Moderate	Moderate
126	Vertisol	Fine	2.6	B	24	30	0	Very Cobbly	10	0	24	Severe	Severe
127	Lithic Argiustoll	Clayey Skeletal	1.3	B	23	25	5	Very Gravelly	30	10	0	Severe	Severe
128	Typic Argiustoll	Fine	2.4	B	30	15	0	Gravelly	0	0	30	Slight	Slight
129	Typic Argiustoll	Fine	1.1	B	60	25	0	Gravelly	25	0	3	Moderate	Moderate
130	Typic Argiustoll	Fine	0.3	A	60	30	5	Very Gravelly	20	5	2	Moderate	Moderate
131	Typic Argiustoll	Fine	1.8	B	60	20	0	Gravelly	15	0	2	Moderate	Moderate
132	Typic Argiustoll	Fine	2.0	B	60	20	0	Gravelly	20	5	2	Moderate	Moderate
133	Typic Argiustoll	Fine	1.0	A	48	35	5	Very Gravelly	20	10	0	Moderate	Severe
134	Typic Argiustoll	Fine	0.9	A	60	25	5	Gravelly	5	0	30	Slight	Moderate
135	Typic Argiustoll	Fine	1.1	B	48	10	0	None	20	0	2	Moderate	Moderate
136	Typic Argiustoll	Fine	3.7	C	60	30	0	Gravelly	20	0	2	Moderate	Moderate
137	Typic Argiustoll	Fine	1.7	B	48	40	5	Very Cobbly	10	0	30	Severe	Severe
138	Typic Argiustoll	Clayey Skeletal	1.6	B	48	25	0	Gravelly	30	5	0	Severe	Severe
139	Typic Argiustoll	Fine	0.8	A	60	15	0	Gravelly	20	10	0	Moderate	Moderate
140	Typic Argiustoll	Fine	1.0	A	48	0	0	None	5	0	3	Moderate	Moderate
141	Typic Argiustoll	Clayey Skeletal	0.9	A	48	25	0	Gravelly	35	5	3	Severe	Severe
142	Typic Argiustoll	Clayey Skeletal	1.9	B	60	11	0	None	25	10	2	Severe	Severe
143	Typic Argiustoll	Clayey Skeletal	1.7	B	48	35	5	Very Cobbly	55	15	0	Severe	Severe
144	Typic Argiustoll	Clayey Skeletal	1.7	B	48	20	0	Gravelly	20	10	0	Severe	Severe
145	Typic Argiustoll	Fine	1.3	B	30	35	15	Very Cobbly	15	15	8	Severe	Severe
146	Typic Argiustoll	Clayey Skeletal	1.0	A	40	11	0	None	25	0	3	Severe	Severe

147	Typic Argiustoll	Fine	1.0	B	40	10	0	None	10	0	16	Slight	Moderate
148	Typic Argiustoll	Fine	1.7	B	48	16	0	None	10	0	13	Slight	Slight
149	Typic Argiustoll	Fine	4.3	C	48	11	0	None	5	0	13	Moderate	Moderate
150	Vertisol	Fine	0.2	A	48	12	0	None	0	0	30	Severe	Severe
151	Typic Argiustoll	Fine	0.5	A	48	5	0	None	5	0	22	Slight	Moderate
152	Typic Argiustoll	Fine	0.3	A	30	10	5	Gravelly	15	0	11	Moderate	Moderate
153	Typic Argiustoll	Fine	1.3	B	42	35	5	Very Cobbly	0	0	32	Severe	Severe
154	Vertisol	Fine	0.5	A	48	25	5	Cobbly	5	0	32	Severe	Severe
155	Vertisol	Fine	0.5	A	48	30	5	Very Cobbly	5	0	60	Severe	Severe
156	Vertisol	Fine	0.4	A	48	40	10	Very Gravelly	0	0	36	Severe	Severe
157	Lithic Argiustoll	Clayey Skeletal	0.2	A	12	35	15	Very Cobbly	25	30	0	Severe	Severe
158	Typic Argiustoll	Fine	1.2	B	36	15	5	Gravelly	10	0	18	Severe	Severe
159	Vertisol	Fine	1.0	A	42	0	0	None	0	0	60	Severe	Severe
160	Typic Argiustoll	Fine	0.2	A	48	0	0	None	0	0	60	Slight	Slight
161	Typic Argiustoll	Fine	1.2	B	52	0	0	None	0	0	60	Slight	Slight
162	Typic Argiustoll	Clayey Skeletal	1.3	B	56	5	0	None	50	5	10	Severe	Severe
163	Typic Argiustoll	Clayey over Loamy Skeletal	1.8	B	48	35	10	Very Cobbly	30	5	5	Moderate	Severe
164	Typic Argiustoll	Fine	0.8	A	55	15	5	Gravelly	30	0	4	Moderate	Moderate
165	Typic Argiustoll	Fine	2.1	B	50	30	10	Very Gravelly	30	0	2	Moderate	Moderate
166	Typic Argiustoll	Fine	2.2	B	54	15	0	Gravelly	15	0	10	Moderate	Moderate
167	Typic Argiustoll	Fine	3.4	C	60	30	5	Cobbly	25	0	3	Moderate	Moderate
168	Typic Argiustoll	Fine	2.5	B	52	10	0	None	15	0	4	Moderate	Moderate
169	Typic Argiustoll	Clayey over Loamy Skeletal	2.0	B	54	30	10	Very Gravelly	25	10	2	Moderate	Moderate
170	Typic Argiustoll	Fine	1.4	B	33	10	0	None	15	0	18	Slight	Slight
171	Typic Argiustoll	Fine	2.7	B	37	15	10	Cobbly	15	5	10	Moderate	Moderate
172	Typic Argiustoll	Fine	1.6	B	54	10	5	Gravelly	5	0	24	Slight	Moderate

APPENDIX Y

Detailed Costs Estimates of Domestic, Irrigation and Related Water Development Facilities Reliant upon Miner Flat Dam on the North Fork White River, Bonito Creek Dam on the Bonito Creek and Salt Wash Dam near Cibecue on the Fort Apache Indian Reservation

MORRISON-MAIERLE INC.

FEBRUARY 2007

DOMESTIC PROJECT COSTS

WMAT
EPA Master Plan
Summary
January 2007

Cedar Creek	
Schedule	**Engineer's Estimate**
Schedule I - Pipeline	$8,162,639
Schedule II - PS Procurement	$0
Schedule III - PS Installation	$0
Schedule IV - PRV Stations	$0
Schedule V - Reservoirs	$1,744,000
WTP	$20,442,000
TOTAL FIELD COSTS	$30,348,639

Carizzo	
Schedule	**Engineer's Estimate**
Schedule I - Pipeline	$10,603,839
Schedule II - PS Procurement	$505,000
Schedule III - PS Installation	$182,000
Schedule IV - PRV Stations	$0
Schedule V - Reservoirs	$2,724,000
WTP	$21,442,000
TOTAL FIELD COSTS	$35,456,839

Cibecue	
Schedule	**Engineer's Estimate**
Schedule I - Pipeline	$19,717,119
Schedule II - PS Procurement	$2,020,000
Schedule III - PS Installation	$725,500
Schedule IV - PRV Stations	$664,000
Schedule V - Reservoirs	$6,167,000
WTP	$24,437,000
TOTAL FIELD COSTS	$53,730,619

WMAT
EPA Master Plan
Schedule I: Pipeline
January 2007

Cedar Creek

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate	
				UNIT PRICE	TOTAL PRICE
1001	1	LS	Mobilization-Demobilization (no more than 3% of total bid for Schedule I)	$245,000.00	$245,000.00
1002	1	LS	Taxes, Bonds, and Insurance	$639,000.00	$639,000.00
1003	1	LS	General Requirements / Traffic Control	$411,500.00	$411,500.00
1004	1	LS	Pre-Construction Survey	$300,000.00	$300,000.00
1005	5,322	LF	16" Nominal Diameter, DR 32.5 C905 PVC Pipe.	$16.32	$86,834.34
1006	8,533	LF	16" Nominal Diameter, DR 25 C905 PVC Pipe.	$21.05	$179,586.47
1007	18,471	LF	16" Nominal Diameter, DR 21 C905 PVC Pipe.	$24.87	$459,342.99
1008	19,320	LF	16" Nominal Diameter, DR 18 C905 PVC Pipe.	$28.76	$555,686.13
1009	17,152	LF	16" Nominal Diameter, DR 14 C905 PVC Pipe.	$36.35	$623,422.79
1010	5,081	LF	8" Nominal Diameter, DR 25 C900 PVC Pipe.	$5.60	$28,463.48
1011	8,463	LF	8" Nominal Diameter, DR 18 C900 PVC Pipe.	$7.68	$64,998.19
1012	4,617	LF	8" Nominal Diameter, DR 14 C900 PVC Pipe.	$9.69	$44,724.62
1013	2,589	LF	6" Nominal Diameter, DR 25 C900 PVC Pipe.	$3.26	$8,442.30
1014	9,457	LF	6" Nominal Diameter, DR 18 C900 PVC Pipe.	$4.43	$41,907.64
1015	9,827	LF	6" Nominal Diameter, DR 14 C900 PVC Pipe.	$5.64	$55,402.44
1016	5,038	LF	6" Nominal Diameter, 250 ASTM PVC Pipe.	$8.82	$44,409.97
1017	5,252	LF	6" Nominal Diameter, 350 ASTM PVC Pipe.	$10.89	$57,211.79
1018	68,798	LF	C905 PVC Pipe Installation	$13.75	$945,972.50
1019	40,034	LF	C900 PVC Pipe Installation	$11.50	$460,391.00
1020	10,290	LF	ASTM Pipe Installation	$20.50	$210,945.00
1021	16,952	LF	Additional Cost for 4.1 to 8 ft Bury	$3.00	$50,856.13
1022	424	LF	Additional Cost for 8.1 + ft Bury	$24.00	$10,171.23
1023	64	EA	PVC Dia. Fittings	$2,500.00	$158,925.39
1024	85	EA	PVC Dia. RJ Tee	$2,000.00	$169,520.42
1025	424	LF	Jack & Bore Road Highway crossings	$350.00	$148,330.37
1026	17	EA	Flushing Hydrants (do not include Tee)	$5,750.00	$97,474.24
1027	68	EA	Blow-Off Hydrants (do not include Tee)	$2,750.00	$186,472.46
1028	11	EA	Type 34 Air Valve & Vault w/ BFV	$17,500.00	$185,412.96
1029	74	EA	Type 34 Air Valve & Vault w/o BFV	$11,750.00	$871,440.92
1030	1	EA	Type 37 Air Valve & Vault w/o BFV	$8,900.00	$8,900.00
1031	3	EA	Large Meter Vault/Service Tap	$20,000.00	$60,000.00
1032	3	EA	Small Meter Vault/Service	$10,000.00	$30,000.00
1033	424	LF	Type 1 Restoration	$87.50	$37,082.59
1034	848	LF	Type 2 Restoration	$23.50	$19,918.65
1035	119,122	LF	Type 3 Restoration	$1.28	$151,880.55
1036	424	CY	Type 2 Bedding	$40.00	$16,952.04
1037	170	EA	Clay Collars	$220.00	$37,294.49
1038	85	EA	Clay Collar Outfall Structure	$150.00	$12,714.03
1039	9,324	LF	4" Drain Pipe for Clay Collars	$6.00	$55,941.74
1040	424	CY	Class I Rip Rap	$95.00	$40,261.10
1041	424	CY	Class II Rip Rap	$102.50	$43,439.61
1042	8	EA	Utility Crossings - Water	$250.00	$2,119.01
1043	17	EA	Utility Crossings - Telephone Cable	$250.00	$4,238.01
1044	8	EA	Utility Crossings - Fiber Optic	$250.00	$2,119.01
1045	17	EA	Utility Crossings - Underground Electric	$250.00	$4,238.01
1046	8	EA	Utility Crossings - TV Cable	$250.00	$2,119.01
1047	42	EA	Utility Crossings - Culvert	$900.00	$38,142.09
1048	42	EA	Cathodic Protection Test Station Type P-AF 13941	$900.00	$38,142.09
1049	8	EA	Cathodic Protection Test Station Type P-T 13921	$750.00	$6,357.02
1050	4	EA	Cathodic Protection Test Station Type PT-A 13951	$1,550.00	$6,568.92
1051	119,512	LF	Fiber Optic Cable	$1.25	$149,389.87
1052	424	HR	Exploratory Excavation	$125.00	$52,975.13

TOTAL FIELD COSTS **$8,162,638.74**

WMAT
EPA Master Plan
Schedule I: Pipeline
January 2007

Carizzo

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate	
				UNIT PRICE	TOTAL PRICE
1001	1	LS	Mobilization-Demobilization (no more than 3% of total bid for Schedule I)	$318,500.00	$318,500.00
1002	1	LS	Taxes, Bonds, and Insurance	$830,000.00	$830,000.00
1003	1	LS	General Requirements / Traffic Control	$535,500.00	$535,500.00
1004	1	LS	Pre-Construction Survey	$300,000.00	$300,000.00
1005	3,855	LF	16" Nominal Diameter, DR 32.5 C905 PVC Pipe.	$16.32	$62,898.61
1006	10,000	LF	16" Nominal Diameter, DR 25 C905 PVC Pipe.	$21.05	$210,461.11
1007	14,259	LF	16" Nominal Diameter, DR 21 C905 PVC Pipe.	$24.87	$354,597.57
1008	23,532	LF	16" Nominal Diameter, DR 18 C905 PVC Pipe.	$28.77	$676,945.04
1009	17,152	LF	16" Nominal Diameter, DR 14 C905 PVC Pipe.	$28.76	$493,329.64
1010	9,329	LF	8" Nominal Diameter, DR 25 C900 PVC Pipe.	$5.60	$52,260.54
1011	6,444	LF	8" Nominal Diameter, DR 18 C900 PVC Pipe.	$7.68	$49,491.71
1012	2,388	LF	8" Nominal Diameter, DR 14 C900 PVC Pipe.	$9.69	$23,132.42
1013	20,983	LF	6" Nominal Diameter, DR 25 C900 PVC Pipe.	$3.26	$68,422.07
1014	30,880	LF	6" Nominal Diameter, DR 18 C900 PVC Pipe.	$4.43	$136,841.29
1015	10,550	LF	6" Nominal Diameter, DR 14 C900 PVC Pipe.	$5.64	$59,478.56
1016	4,345	LF	6" Nominal Diameter, 250 ASTM PVC Pipe.	$8.82	$38,301.18
1017	3,134	LF	4" Nominal Diameter, DR 25 C900 PVC Pipe.	$1.59	$4,978.71
1018	11,846	LF	4" Nominal Diameter, DR 18 C900 PVC Pipe.	$2.16	$25,610.39
1019	2,233	LF	4" Nominal Diameter, DR 14 C900 PVC Pipe.	$2.74	$6,107.88
1020	6,976	LF	4" Nominal Diameter, DR 14 C900 PVC Pipe.	$5.64	$39,329.14
1021	68,798	LF	C905 PVC Pipe Installation	$13.75	$945,972.50
1022	97,787	LF	C900 PVC Pipe Installation	$11.50	$1,124,550.50
1023	11,321	LF	ASTM PVC Pipe Installation	$20.50	$232,080.50
1024	25,317	LF	Additional Cost for 4.1 to 8 ft Bury	$3.00	$75,952.47
1025	633	LF	Additional Cost for 8.1 + ft Bury	$24.00	$15,190.49
1026	95	EA	PVC Dia. Fittings	$2,500.00	$237,351.47
1027	127	EA	PVC Dia. RJ Tee	$2,000.00	$253,174.90
1028	633	LF	Jack & Bore Road Highway crossings	$350.00	$221,528.03
1029	25	EA	Flushing Hydrants (do not include Tee)	$5,750.00	$145,575.57
1030	101	EA	Blow-Off Hydrants (do not include Tee)	$2,750.00	$278,492.39
1031	16	EA	Type 34 Air Valve & Vault w/ BFV	$17,500.00	$276,910.04
1032	111	EA	Type 34 Air Valve & Vault w/o BFV	$11,750.00	$1,301,477.20
1033	1	EA	Type 37 Air Valve & Vault w/o BFV	$8,900.00	$11,266.28
1034	4	EA	Large Meter Vault/Service Tap	$20,000.00	$80,000.00
1035	4	EA	Small Meter Vault/Service	$10,000.00	$40,000.00
1036	633	LF	Type 1 Restoration	$87.50	$55,382.01
1037	1,266	LF	Type 2 Restoration	$23.50	$29,748.05
1038	177,906	LF	Type 3 Restoration	$1.28	$226,830.15
1039	633	CY	Type 2 Bedding	$40.00	$25,317.49
1040	253	EA	Clay Collars	$220.00	$55,698.48
1041	127	EA	Clay Collar Outfall Structure	$150.00	$18,988.12
1042	13,925	LF	4" Drain Pipe for Clay Collars	$6.00	$83,547.72
1043	633	CY	Class I Rip Rap	$95.00	$60,129.04
1044	633	CY	Class II Rip Rap	$102.50	$64,876.07
1045	13	EA	Utility Crossings - Water	$250.00	$3,164.69
1046	25	EA	Utility Crossings - Telephone Cable	$250.00	$6,329.37
1047	13	EA	Utility Crossings - Fiber Optic	$250.00	$3,164.69
1048	25	EA	Utility Crossings - Underground Electric	$250.00	$6,329.37
1049	13	EA	Utility Crossings - TV Cable	$250.00	$3,164.69
1050	63	EA	Utility Crossings - Culvert	$900.00	$56,964.35
1051	63	EA	Cathodic Protection Test Station Type P-AF 13941	$900.00	$56,964.35
1052	13	EA	Cathodic Protection Test Station Type P-T 13921	$750.00	$9,494.06
1053	6	EA	Cathodic Protection Test Station Type PT-A 13951	$1,550.00	$9,810.53
1054	178,488	LF	Fiber Optic Cable	$1.25	$223,110.38
1055	633	HR	Exploratory Excavation	$125.00	$79,117.16

TOTAL FIELD COSTS **$10,603,838.92**

WMAT
EPA Master Plan
Schedule I: Pipeline
January 2007

Cibecue

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate	
				UNIT PRICE	TOTAL PRICE
1001	1	LS	Mobilization-Demobilization (no more than 3% of total bid for Schedule I)	$591,500.00	$591,500.00
1002	1	LS	Taxes, Bonds, and Insurance	$1,543,000.00	$1,543,000.00
1003	1	LS	General Requirements / Traffic Control	$994,500.00	$994,500.00
1004	1	LS	Pre-Construction Survey	$300,000.00	$300,000.00
1005	7,999	LF	20" Nominal Diameter, DR 32 C905 PVC Pipe.	$26.66	$213,253.34
1006	14,720	LF	20" Nominal Diameter, DR 25 C905 PVC Pipe.	$33.06	$486,675.91
1007	16,305	LF	20" Nominal Diameter, DR 21 C905 PVC Pipe.	$39.06	$636,846.13
1008	29,754	LF	20" Nominal Diameter, DR 18 C905 PVC Pipe.	$45.16	$1,343,748.50
1009	35,467	LF	14" Nominal Diameter, DR 25 C905 PVC Pipe.	$16.34	$579,530.78
1010	9,655	LF	14" Nominal Diameter, DR 21 C905 PVC Pipe.	$19.30	$186,362.96
1011	7,591	LF	14" Nominal Diameter, DR 18 C905 PVC Pipe.	$22.31	$169,372.08
1012	957	LF	12" Nominal Diameter, DR 25 C900 PVC Pipe.	$11.99	$11,476.56
1013	50,618	LF	12" Nominal Diameter, DR 18 C900 PVC Pipe.	$16.47	$833,748.76
1014	103,788	LF	12" Nominal Diameter, DR 14 C900 PVC Pipe.	$20.82	$2,160,779.67
1015	121,491	LF	C905 PVC Pipe Installation	$13.75	$1,670,501.25
1016	155,363	LF	C900 PVC Pipe Installation	$11.50	$1,786,674.50
1017	39,399	LF	Additional Cost for 4.1 to 8 ft Bury	$3.00	$118,195.82
1018	985	LF	Additional Cost for 8.1 + ft Bury	$24.00	$23,639.16
1019	148	EA	PVC Dia. Fittings	$2,500.00	$369,361.93
1020	197	EA	PVC Dia. RJ Tee	$2,000.00	$393,986.05
1021	985	LF	Jack & Bore Road Highway crossings	$350.00	$344,737.80
1022	39	EA	Flushing Hydrants (do not include Tee)	$5,750.00	$226,541.98
1023	158	EA	Blow-Off Hydrants (do not include Tee)	$2,750.00	$433,384.66
1024	25	EA	Type 34 Air Valve & Vault w/ BFV	$17,500.00	$430,922.25
1025	172	EA	Type 34 Air Valve & Vault w/o BFV	$11,750.00	$2,025,334.56
1026	2	EA	Type 37 Air Valve & Vault w/o BFV	$8,900.00	$17,532.38
1027	5	EA	Large Meter Vault/Service Tap	$20,000.00	$98,496.51
1028	5	EA	Small Meter Vault/Service	$10,000.00	$49,248.26
1029	985	LF	Type 1 Restoration	$87.50	$86,184.45
1030	1,970	LF	Type 2 Restoration	$23.50	$46,293.36
1031	276,854	LF	Type 3 Restoration	$1.28	$352,988.85
1032	985	CY	Type 2 Bedding	$40.00	$39,398.61
1033	394	EA	Clay Collars	$220.00	$86,676.93
1034	197	EA	Clay Collar Outfall Structure	$150.00	$29,548.95
1035	21,669	LF	4" Drain Pipe for Clay Collars	$6.00	$130,015.40
1036	985	CY	Class I Rip Rap	$95.00	$93,571.69
1037	985	CY	Class II Rip Rap	$102.50	$100,958.93
1038	20	EA	Utility Crossings - Water	$250.00	$4,924.83
1039	39	EA	Utility Crossings - Telephone Cable	$250.00	$9,849.65
1040	20	EA	Utility Crossings - Fiber Optic	$250.00	$4,924.83
1041	39	EA	Utility Crossings - Underground Electric	$250.00	$9,849.65
1042	20	EA	Utility Crossings - TV Cable	$250.00	$4,924.83
1043	98	EA	Utility Crossings - Culvert	$900.00	$88,646.86
1044	98	EA	Cathodic Protection Test Station Type P-AF 13941	$900.00	$88,646.86
1045	20	EA	Cathodic Protection Test Station Type P-T 13921	$750.00	$14,774.48
1046	10	EA	Cathodic Protection Test Station Type PT-A 13951	$1,550.00	$15,266.96
1047	277,760	LF	Fiber Optic Cable	$1.25	$347,200.21
1048	985	HR	Exploratory Excavation	$125.00	$123,120.64

TOTAL FIELD COSTS **$19,717,118.73**

WMAT
EPA Master Plan
Schedule II: Pump Stations Procurement (1500-1700 gpm)
January 2007

Cibecue

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL PRICE
201	4	EA	Base Bid: Furnish and deliver 1750 gpm packaged pump station equipment and accessories.	$475,000.00	$1,900,000.00
202	4	EA	Provide manufacturer's services as specified for equipment installation assistance, testing, and certification of proper installation.	$15,000.00	$60,000.00
203	4	EA	Provide manufacturer's services as specified for training of Owner's personnel.	$7,500.00	$30,000.00
204	4	EA	Provide all required submittals and O&M manuals as specified.	$7,500.00	$30,000.00

TOTAL FIELD COSTS **$2,020,000.00**

Cedar Creek

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL PRICE
201	0	EA	Base Bid: Furnish and deliver 1750 gpm packaged pump station equipment and accessories.	$475,000.00	$0.00
202	0	EA	Provide manufacturer's services as specified for equipment installation assistance, testing, and certification of proper installation.	$15,000.00	$0.00
203	0	EA	Provide manufacturer's services as specified for training of Owner's personnel.	$7,500.00	$0.00
204	0	EA	Provide all required submittals and O&M manuals as specified.	$7,500.00	$0.00

TOTAL FIELD COSTS **$0.00**

Carizzo

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL PRICE
201	1	EA	Base Bid: Furnish and deliver 1750 gpm packaged pump station equipment and accessories.	$475,000.00	$475,000.00
202	1	EA	Provide manufacturer's services as specified for equipment installation assistance, testing, and certification of proper installation.	$15,000.00	$15,000.00
203	1	EA	Provide manufacturer's services as specified for training of Owner's personnel.	$7,500.00	$7,500.00
204	1	EA	Provide all required submittals and O&M manuals as specified.	$7,500.00	$7,500.00

TOTAL FIELD COSTS **$505,000.00**

WMAT
EPA Master Plan
Schedule III: Pump Station Installation (1500-1700 gpm)
January 2007

Cibecue				Engineer's Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
301A	1	LS	Mobilization/Demobilization	$21,500.00	$21,500.00
302A	1	LS	Taxes, Bonds, and Insurance	$72,500.00	$72,500.00
303A	1	LS	General Requirements/Traffic Control	$43,500.00	$43,500.00
304A	4	EA	Pump Station Site Work	$20,000.00	$80,000.00
305A	4	EA	Pump Station Fencing	$12,500.00	$50,000.00
306A	4	EA	Pump Station Foundation, Complete	$30,000.00	$120,000.00
307A	4	EA	Pump Station Electrical Service	$20,000.00	$80,000.00
308A	4	EA	Pump Station French Drain	$2,500.00	$10,000.00
309A	4	EA	Pump Station Installation	$50,000.00	$200,000.00
310A	4	EA	Gravel Access Road and Parking	$4,000.00	$16,000.00
311A	4	EA	Pump Station Landscaping	$4,000.00	$16,000.00
312A	4	EA	Pump Station Cleaning and Testing	$4,000.00	$16,000.00
TOTAL FIELD COSTS					**$725,500.00**

Cedar Creek				Engineer's Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
301A	0	LS	Mobilization/Demobilization	$0.00	$0.00
302A	0	LS	Taxes, Bonds, and Insurance	$0.00	$0.00
303A	0	LS	General Requirements/Traffic Control	$0.00	$0.00
304A	0	EA	Pump Station Site Work	$20,000.00	$0.00
305A	0	EA	Pump Station Fencing	$12,500.00	$0.00
306A	0	EA	Pump Station Foundation, Complete	$30,000.00	$0.00
307A	0	EA	Pump Station Electrical Service	$20,000.00	$0.00
308A	0	EA	Pump Station French Drain	$2,500.00	$0.00
309A	0	EA	Pump Station Installation	$50,000.00	$0.00
310A	0	EA	Gravel Access Road and Parking	$4,000.00	$0.00
311A	0	EA	Pump Station Landscaping	$4,000.00	$0.00
312A	0	EA	Pump Station Cleaning and Testing	$4,000.00	$0.00
TOTAL FIELD COSTS					**$0.00**

Carizzo				Engineer's Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
301A	1	LS	Mobilization/Demobilization	$5,500.00	$5,500.00
302A	1	LS	Taxes, Bonds, and Insurance	$18,500.00	$18,500.00
303A	1	LS	General Requirements/Traffic Control	$11,000.00	$11,000.00
304A	1	EA	Pump Station Site Work	$20,000.00	$20,000.00
305A	1	EA	Pump Station Fencing	$12,500.00	$12,500.00
306A	1	EA	Pump Station Foundation, Complete	$30,000.00	$30,000.00
307A	1	EA	Pump Station Electrical Service	$20,000.00	$20,000.00
308A	1	EA	Pump Station French Drain	$2,500.00	$2,500.00
309A	1	EA	Pump Station Installation	$50,000.00	$50,000.00
310A	1	EA	Gravel Access Road and Parking	$4,000.00	$4,000.00
311A	1	EA	Pump Station Landscaping	$4,000.00	$4,000.00
312A	1	EA	Pump Station Cleaning and Testing	$4,000.00	$4,000.00
TOTAL FIELD COSTS					**$182,000.00**

WMAT
EPA Master Plan
Schedule IV: PRV Stations
January 2007

Cibecue				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
401A	1	LS	Mobilization/Demobilization	$19,500.00	$19,500.00
402A	1	LS	Taxes, Bonds, and Insurance	$66,000.00	$66,000.00
403A	1	LS	General Requirements/Traffic Control	$40,000.00	$40,000.00
404A	3	EA	PRV Station Site Work	$15,000.00	$45,000.00
405A	3	EA	PRV Station Fencing	$7,500.00	$22,500.00
406A	3	EA	PRV Station Excavation	$20,000.00	$60,000.00
407A	3	EA	PRV Station Foundation, Complete	$40,000.00	$120,000.00
408A	3	EA	Packaged PRV Station	$60,000.00	$180,000.00
409A	3	EA	PRV Station Installation	$25,000.00	$75,000.00
410A	3	EA	Gravel Access Road and Parking	$4,000.00	$12,000.00
411A	3	EA	PRV Station Site Restoration	$4,000.00	$12,000.00
412A	3	EA	PRV Station Cleaning and Testing	$4,000.00	$12,000.00

TOTAL FIELD COSTS **$664,000.00**

WMAT
EPA Master Plan
Schedule V(A): Ground Level Reservoir (1@400,000 gallons)
January 2007

For all demands				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
501A	1	LS	Mobilization/Demobilization	$23,000.00	$23,000.00
502A	1	LS	Taxes, Bonds, and Insurance	$76,500.00	$76,500.00
503A	1	LS	General Requirements/Traffic Control	$45,500.00	$45,500.00
504A	1	LS	Storage Reservoir Site Work	$30,000.00	$30,000.00
505A	1	LS	Storage Reservoir Fencing	$10,000.00	$10,000.00
506A	1	LS	Storage Reservoir Foundation	$100,000.00	$100,000.00
507A	1	LS	Storage Reservoir and Appurtenances	$400,000.00	$400,000.00
508A	1	LS	Storage Reservoir Piping	$50,000.00	$50,000.00
509A	1	LS	Storage Reservoir Electrical	$25,000.00	$25,000.00
510A	1	LS	Gravel Access Road	$4,000.00	$4,000.00
TOTAL FIELD COSTS					**$764,000.00**

WMAT
EPA Master Plan
Schedule V(B): Standpipes (1@400,000 gallons)
January 2007

Cedar Creek				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
501B	1	LS	Mobilization/Demobilization	$29,500.00	$29,500.00
502B	1	LS	Taxes, Bonds, and Insurance	$98,000.00	$98,000.00
503B	1	LS	General Requirements/Traffic Control	$58,500.00	$58,500.00
504B	1	LS	Storage Reservoir Site Work	$30,000.00	$30,000.00
505B	1	LS	Storage Reservoir Fencing	$10,000.00	$10,000.00
506B	1	LS	Storage Reservoir Foundation	$100,000.00	$100,000.00
507B	1	LS	Storage Reservoir and Appurtenances	$575,000.00	$575,000.00
508B	1	LS	Storage Reservoir Piping	$50,000.00	$50,000.00
509B	1	LS	Storage Reservoir Electrical	$25,000.00	$25,000.00
510B	1	LS	Gravel Access Road	$4,000.00	$4,000.00
TOTAL FIELD COSTS					**$980,000.00**

WMAT
EPA Master Plan
Schedule V(B): Standpipes (2@400,000 gallons)
January 2007

Carizzo				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
501B	1	LS	Mobilization/Demobilization	$58,500.00	$58,500.00
502B	1	LS	Taxes, Bonds, and Insurance	$196,000.00	$196,000.00
503B	1	LS	General Requirements/Traffic Control	$117,500.00	$117,500.00
504B	2	LS	Storage Reservoir Site Work	$30,000.00	$60,000.00
505B	2	LS	Storage Reservoir Fencing	$10,000.00	$20,000.00
506B	2	LS	Storage Reservoir Foundation	$100,000.00	$200,000.00
507B	2	LS	Storage Reservoir and Appurtenances	$575,000.00	$1,150,000.00
508B	2	LS	Storage Reservoir Piping	$50,000.00	$100,000.00
509B	2	LS	Storage Reservoir Electrical	$25,000.00	$50,000.00
510B	2	LS	Gravel Access Road	$4,000.00	$8,000.00
TOTAL FIELD COSTS					**$1,960,000.00**

WMAT
EPA Master Plan
Schedule V(B): Standpipes (4@400,000 gallons)
January 2007

Cibecue				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
501B	1	LS	Mobilization/Demobilization	$147,000.00	$147,000.00
502B	1	LS	Taxes, Bonds, and Insurance	$490,000.00	$490,000.00
503B	1	LS	General Requirements/Traffic Control	$294,000.00	$294,000.00
504B	5	LS	Storage Reservoir Site Work	$30,000.00	$150,000.00
505B	5	LS	Storage Reservoir Fencing	$10,000.00	$50,000.00
506B	5	LS	Storage Reservoir Foundation	$100,000.00	$500,000.00
507B	5	LS	Storage Reservoir and Appurtenances	$575,000.00	$2,875,000.00
508B	5	LS	Storage Reservoir Piping	$50,000.00	$250,000.00
509B	5	LS	Storage Reservoir Electrical	$25,000.00	$125,000.00
510B	5	LS	Gravel Access Road	$4,000.00	$20,000.00
TOTAL FIELD COSTS					**$4,901,000.00**

WMAT
EPA Master Plan
Schedule V(C): Elevated Reservoir in Cibecue (1@75,000 gallons)
January 2007

Cibecue				Engineer's Estimate	
ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
501C	1	LS	Mobilization/Demobilization	$15,000.00	$15,000.00
502C	1	LS	Taxes, Bonds, and Insurance	$50,000.00	$50,000.00
503C	1	LS	General Requirements/Traffic Control	$30,500.00	$30,500.00
504C	1	LS	Storage Reservoir Site Work	$30,000.00	$30,000.00
505C	1	LS	Storage Reservoir Fencing	$10,000.00	$10,000.00
506C	1	LS	Storage Reservoir Foundation	$100,000.00	$100,000.00
507C	1	LS	Storage Reservoir and Appurtenances	$187,500.00	$187,500.00
508C	1	LS	Storage Reservoir Piping	$50,000.00	$50,000.00
509C	1	LS	Storage Reservoir Electrical	$25,000.00	$25,000.00
510C	1	LS	Gravel Access Road	$4,000.00	$4,000.00
TOTAL FIELD COSTS					**$502,000.00**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Conventional Water Treatment Plant - 9.5 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,022,000	$ 1,022,000
1001	1	LS	Bonds and Insurance (5%)	$ 1,022,000	$ 1,022,000
1002	1	LS	General Requirements (4%)	$ 818,000	$ 818,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,225,000	$ 2,225,000
1101	1	LS	Pre-oxidation Diversion Box	$ 86,000	$ 86,000
1102	1	LS	Rapid Mix	$ 145,000	$ 145,000
1103	1	LS	Flocculation	$ 419,000	$ 419,000
1104	1	LS	Sedimentation	$ 1,711,000	$ 1,711,000
1105	1	LS	Filtration Systen	$ 2,263,000	$ 2,263,000
1106	1	LS	Clearwell and Finished Water Pumping	$ 1,839,000	$ 1,839,000
1107	1	LS	Chemical Systems	$ 909,000	$ 909,000
1108	1	LS	Lab/Admin/Maint Building	$ 991,000	$ 991,000
1109	1	LS	Backwash Recovery System	$ 1,172,000	$ 1,172,000
1110	1	LS	Sludge Lagoons	$ 817,000	$ 817,000
1111	1	LS	Sitework	$ 1,093,000	$ 1,093,000
1112	1	LS	Electrical and I&C	$ 2,185,000	$ 2,185,000
1113	1	LS	Pipeline to White River Tanks	$ 1,725,000	$ 1,725,000

TOTAL FIELD COSTS **$ 20,442,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Microfiltration Water Treatment Plant - 10.2 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,151,000	$ 1,151,000
1001	1	LS	Bonds and Insurance (5%)	$ 1,151,000	$ 1,151,000
1002	1	LS	General Requirements (4%)	$ 921,000	$ 921,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,294,000	$ 2,294,000
1101	1	LS	Pre-oxidation Diversion Box	$ 90,000	$ 90,000
1102	1	LS	Rapid Mix	$ 154,000	$ 154,000
1103	1	LS	Flocculation	$ 439,000	$ 439,000
1104	1	LS	Sedimentation	$ 1,886,000	$ 1,886,000
1105	1	LS	Microfiltration Systen	$ 3,741,000	$ 3,741,000
1106	1	LS	Building Space for Microfiltration	$ 761,000	$ 761,000
1107	1	LS	Clearwell and Finished Water Pumping	$ 1,541,000	$ 1,541,000
1108	1	LS	Chemical Systems	$ 929,000	$ 929,000
1109	1	LS	Lab/Admin/Maint Building	$ 1,039,000	$ 1,039,000
1110	1	LS	Backwash Recovery System	$ 612,000	$ 612,000
1111	1	LS	Sludge Lagoons	$ 873,000	$ 873,000
1112	1	LS	Sitework	$ 1,214,000	$ 1,214,000
1113	1	LS	Electrical and I&C	$ 2,427,000	$ 2,427,000
1114	1	LS	Pipeline to White River Tanks	$ 1,794,000	$ 1,794,000
			TOTAL FIELD COSTS		**$ 23,017,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Conventional Water Treatment Plant - 10.2 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,072,000	$ 1,072,000
1001	1	LS	Bonds and Insurance (5%)	$ 1,072,000	$ 1,072,000
1002	1	LS	General Requirements (4%)	$ 856,000	$ 856,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,294,000	$ 2,294,000
1101	1	LS	Pre-oxidation Diversion Box	$ 90,000	$ 90,000
1102	1	LS	Rapid Mix	$ 154,000	$ 154,000
1103	1	LS	Flocculation	$ 439,000	$ 439,000
1104	1	LS	Sedimentation	$ 1,817,000	$ 1,817,000
1105	1	LS	Filtration Systen	$ 2,383,000	$ 2,383,000
1106	1	LS	Clearwell and Finished Water Pumping	$ 1,942,000	$ 1,942,000
1107	1	LS	Chemical Systems	$ 932,000	$ 932,000
1108	1	LS	Lab/Admin/Maint Building	$ 1,039,000	$ 1,039,000
1109	1	LS	Backwash Recovery System	$ 1,235,000	$ 1,235,000
1110	1	LS	Sludge Lagoons	$ 873,000	$ 873,000
1111	1	LS	Sitework	$ 1,150,000	$ 1,150,000
1112	1	LS	Electrical and I&C	$ 2,300,000	$ 2,300,000
1113	1	LS	Pipeline to White River Tanks	$ 1,794,000	$ 1,794,000

TOTAL FIELD COSTS **$ 21,442,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Microfiltration Water Treatment Plant - 12.3 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,310,000	$ 1,310,000
1001	1	LS	Bonds and Insurance (5%)	$ 1,310,000	$ 1,310,000
1002	1	LS	General Requirements (4%)	$ 1,048,000	$ 1,048,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,500,000	$ 2,500,000
1101	1	LS	Pre-oxidation Diversion Box	$ 100,000	$ 100,000
1102	1	LS	Rapid Mix	$ 178,000	$ 178,000
1103	1	LS	Flocculation	$ 501,000	$ 501,000
1104	1	LS	Sedimentation	$ 2,209,000	$ 2,209,000
1105	1	LS	Microfiltration Systen	$ 4,355,000	$ 4,355,000
1106	1	LS	Building Space for Microfiltration	$ 837,000	$ 837,000
1107	1	LS	Clearwell and Finished Water Pumping	$ 1,750,000	$ 1,750,000
1108	1	LS	Chemical Systems	$ 1,000,000	$ 1,000,000
1109	1	LS	Lab/Admin/Maint Building	$ 1,182,000	$ 1,182,000
1110	1	LS	Backwash Recovery System	$ 701,000	$ 701,000
1111	1	LS	Sludge Lagoons	$ 1,039,000	$ 1,039,000
1112	1	LS	Sitework	$ 1,395,000	$ 1,395,000
1113	1	LS	Electrical and I&C	$ 2,789,000	$ 2,789,000
1114	1	LS	Pipeline to White River Tanks	$ 2,000,000	$ 2,000,000
			TOTAL FIELD COSTS		**$ 26,204,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Microfiltration Water Treatment Plant - 9.5 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,098,000	$ 1,098,000
1001	1	LS	Bonds and Insurance (7%)	$ 1,098,000	$ 1,098,000
1002	1	LS	General Requirements (4%)	$ 878,000	$ 878,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,225,000	$ 2,225,000
1101	1	LS	Pre-oxidation Diversion Box	$ 86,000	$ 86,000
1102	1	LS	Rapid Mix	$ 145,000	$ 145,000
1103	1	LS	Flocculation	$ 419,000	$ 419,000
1104	1	LS	Sedimentation	$ 1,779,000	$ 1,779,000
1105	1	LS	Microfiltration Systen	$ 3,536,000	$ 3,536,000
1106	1	LS	Building Space for Microfiltration	$ 736,000	$ 736,000
1107	1	LS	Clearwell and Finished Water Pumping	$ 1,471,000	$ 1,471,000
1108	1	LS	Chemical Systems	$ 905,000	$ 905,000
1109	1	LS	Lab/Admin/Maint Building	$ 991,000	$ 991,000
1110	1	LS	Backwash Recovery System	$ 582,000	$ 582,000
1111	1	LS	Sludge Lagoons	$ 817,000	$ 817,000
1112	1	LS	Sitework	$ 1,154,000	$ 1,154,000
1113	1	LS	Electrical and I&C	$ 2,307,000	$ 2,307,000
1114	1	LS	Pipeline to White River Tanks	$ 1,725,000	$ 1,725,000
			TOTAL FIELD COSTS		**$ 21,952,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Microfiltration Water Treatment Plant - 2.1 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 536,000	$ 536,000
1001	1	LS	Bonds and Insurance (5%)	$ 536,000	$ 536,000
1002	1	LS	General Requirements (4%)	$ 429,000	$ 429,000
			WTP		
1100	1	LS	Intake Pipeline from Dam	$ 1,500,000	$ 1,500,000
1101	1	LS	Pre-oxidation Diversion Box	$ 50,000	$ 50,000
1102	1	LS	Rapid Mix	$ 59,000	$ 59,000
1103	1	LS	Flocculation	$ 202,000	$ 202,000
1104	1	LS	Sedimentation	$ 641,000	$ 641,000
1105	1	LS	Microfiltration Systen	$ 1,373,000	$ 1,373,000
1106	1	LS	Building Space for Microfiltration	$ 470,000	$ 470,000
1107	1	LS	Clearwell and Finished Water Pumping	$ 733,000	$ 733,000
1108	1	LS	Chemical Systems	$ 653,000	$ 653,000
1109	1	LS	Lab/Admin/Maint Building	$ 486,000	$ 486,000
1110	1	LS	Backwash Recovery System	$ 267,000	$ 267,000
1111	1	LS	Sludge Lagoons	$ 231,000	$ 231,000
1112	1	LS	Sitework	$ 517,000	$ 517,000
1113	1	LS	Electrical and I&C	$ 1,033,000	$ 1,033,000
1114	1	LS	Pipeline to Cibecue	$ 1,000,000	$ 1,000,000
			TOTAL FIELD COSTS		**$ 10,716,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Conventional Water Treatment Plant - 2.1 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 495,000	$ 495,000
1001	1	LS	Bonds and Insurance (5%)	$ 495,000	$ 495,000
1002	1	LS	General Requirements (4%)	$ 396,000	$ 396,000
			WTP		
1100	1	LS	Intake Pipeline from Dam	$ 1,500,000	$ 1,500,000
1101	1	LS	Pre-oxidation Diversion Box	$ 50,000	$ 50,000
1102	1	LS	Rapid Mix	$ 59,000	$ 59,000
1103	1	LS	Flocculation	$ 202,000	$ 202,000
1104	1	LS	Sedimentation	$ 600,000	$ 600,000
1105	1	LS	Filtration System	$ 1,000,000	$ 1,000,000
1106	1	LS	Clearwell and Finished Water Pumping	$ 750,000	$ 750,000
1107	1	LS	Chemical Systems	$ 670,000	$ 670,000
1108	1	LS	Lab/Admin/Maint Building	$ 486,000	$ 486,000
1109	1	LS	Backwash Recovery System	$ 510,000	$ 510,000
1110	1	LS	Sludge Lagoons	$ 231,000	$ 231,000
1111	1	LS	Sitework	$ 484,000	$ 484,000
1112	1	LS	Electrical and I&C	$ 967,000	$ 967,000
1113	1	LS	Pipeline to Cibecue	$ 1,000,000	$ 1,000,000

TOTAL FIELD COSTS **$ 9,895,000**

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Ground Water Treatment Plant - 2.1 mgd
CAPITAL COST
October 2006

ITEM NO.	EST. QNTY	UNIT	DESCRIPTION	Preliminary Estimate UNIT PRICE	Preliminary Estimate TOTAL PRICE
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 592,000	$ 592,000
1001	1	LS	Bonds and Insurance (5%)	$ 592,000	$ 592,000
1002	1	LS	General Requirements (4%)	$ 473,000	$ 473,000
			WTP		
1100	1	LS	Pre-oxidation Diversion Box	$ 50,000	$ 50,000
1101	1	LS	Iron Oxidation (aeration)	$ 742,000	
1102	1	LS	Rapid Mix	$ 59,000	$ 59,000
1103	1	LS	Flocculation	$ 202,000	$ 202,000
1104	1	LS	Sedimentation	$ 641,000	$ 641,000
1105	1	LS	Microfiltration System	$ 1,473,000	$ 1,473,000
1106	1	LS	Reverse Osmosis System (RO)	$ 1,589,000	$ 1,589,000
1107	1	LS	Building Space for Microfiltration and RO	$ 840,000	$ 840,000
1106	1	LS	Clearwell and Finished Water Pumping	$ 763,000	$ 763,000
1107	1	LS	Chemical Systems	$ 653,000	$ 653,000
1108	1	LS	Lab/Admin/Maint Building	$ 486,000	$ 486,000
1109	1	LS	Evaporation Ponds (unlined)	$ 247,000	$ 247,000
1110	1	LS	Sitework	$ 869,000	$ 869,000
1111	1	LS	Electrical and I&C	$ 1,703,000	$ 1,703,000
1112	1	LS	Land for Evaporation Ponds*	$ 600,000	$ 600,000

*$5000/ac was used to calculate land cost for ponds. Adjust as necessary for local land cost.

TOTAL FIELD COSTS **$ 11,832,000**

WMAT EPA Master Plan
OM&R Summary
October 2006

Annual Operation, Maintenance, and Replacement Costs

System Serving Cibecue	12.3 mgd WTP	Distribution	Total
Labor	$ 354,490	$ 268,010	**$ 622,500**
Material and Supplies	$ 122,185	$ 98,586	**$ 220,771**
Energy	$ 209,484	$ 150,767	**$ 360,251**
Total	$ 686,159	$ 517,363	**$ 1,203,522**

System Serving Cibecue	2.1 mgd WTP	Distribution	Total
Labor	$ 240,090		**$ 240,090**
Material and Supplies	$ 49,475		**$ 49,475**
Energy	$ 20,201		**$ 20,201**
Total	$ 309,766		**$ 309,766**

System Serving Carrizo	Water Treatment Plant	Distribution	Total
Labor	$ 260,890	$ 182,140	**$ 443,030**
Material and Supplies	$ 107,210	$ 53,019	**$ 160,229**
Energy	$ 164,340	$ 3,440	**$ 167,780**
Total	$ 532,440	$ 238,599	**$ 771,040**

System Serving Cedar Creek	Water Treatment Plant	Distribution	Total
Labor	$ 250,490	$ 139,205	**$ 389,695**
Material and Supplies	$ 102,210	$ 40,813	**$ 143,023**
Energy	$ 155,960	$ -	**$ 155,960**
Total	$ 508,660	$ 180,018	**$ 688,678**

WMAT EPA Master Plan
Pump Station Power Cost and Present Worth Analysis
October 2006

Variables	
Discount Factor	0%
Years	40
Max operating hrs/day	24

Energy cost, $/kW*hr	
First 300 kW*hrs/month	0.05197
After 300 kW*hrs	0.02747
Demand Charge, $/hp	6.4902

WTP	To D5	To D4	To D2, 3	To D1	White River	Cibecue
Pump demand (mgd)	12.3	10.05	9.49	7.85	5.23	2.10
	To D5	To D4	To D2, 3	To D1	White River	Cibecue
WTP Capacity (gpm)	8550	6977	6587	5451	3631	1460

Distribution pipeline	P2, 3, 4	P1
To Demand 4 (mgd)	0	0.20
To Demand 5 (mgd)	2.26	2.46
Pump Capacity (gpm)	To D5	To D4
Pump 1	1710	137
Pump 2, 3, 4	1573	
Power	To D5	To D4
Pump 1, HP	190	20
Pump 2, HP	240	
Pump 3, HP	260	
Pump 4, HP	240	

	To D5	To D4	To D2, 3	To D1	White River	Cibecue
WTP	1250	980	930	770	510	120

Required Water Power

	Pump 1-D5	Pump 1-D4	Pump 2	Pump 3	Pump 4
Q, gpm	1710	137	1573	1573	1573
Q, cfs	3.81	0.31	3.50	3.50	3.50
HL, ft	300	300	420	460	430
gamma, lb/cf	62.4	62.4	62.4	62.4	62.4
Conv.	550	550	550	550	550
Watr Pwr, HP	**129.68**	**10.39**	**167.01**	**182.92**	**170.99**
Pump Pwr, HP	162.11	12.99	208.76	228.65	213.74
Motor Pwr, HP	180.12	14.43	231.96	254.05	237.48

	WTP	w/o d5	w/o d3,4	w/o d2	w/o d1
Q, gpm	8550	6977	6587	5451	3631
Q, cfs	19.05	15.55	14.68	12.15	8.09
HL, ft	400	400	400	400	400
gamma, lb/cf	62.4	62.4	62.4	62.4	62.4
Conv.	550	550	550	550	550
Watr Pwr, HP	**864.56**	**705.50**	**666.07**	**551.19**	**367.16**
Pump Pwr, HP	1080.70	881.88	832.58	688.99	458.95
Motor Pwr, HP	1200.78	979.86	925.09	765.55	509.94

	2.1 mgd
Q, gpm	1460
Q, cfs	3.25
gamma, lb/cf	62.4
Conv.	550
Watr Pwr, HP	**84.89**
Pump Pwr, HP	106.11
Motor Pwr, HP	117.90

Pump 1	Common Variables										
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/ yr	Energy $/ yr	Total $/ yr	Inflated $/ yr	EE PW $/ yr
To Carizzo	0										
	1	0.20	137	12.0	3266.2	20.00	$1,558	$1,883	$3,440	$3,440	$3,440

Pump 1	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/ yr	Energy $/ yr	Total $/ yr	Inflated $/ yr	EE PW $/ yr
to demand 5	0										
	1	2.46	1710	12.0	3266.2	190.00	$14,798	$17,135	$31,933	$31,933	$31,933

Pump 2	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
	0										
	1	2.26	1710	11.0	2997.7	240.00	$18,692	$19,851	$38,543	$38,543	$38,543

Pump 3	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
	0										
	1	2.26	1710	11.0	2997.7	260.00	$20,249	$21,498	$41,748	$41,748	$41,748

Pump 4	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
	0										
	1	2.26	1710	11.0	2997.7	240.00	$18,692	$19,851	$38,543	$38,543	$38,543

WTP	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
Cibecue	0										
	1	12.30	8550	12.0	3263.0	1250.00	$97,353	$112,131	$209,484	$209,484	$209,484

WTP w/o D5	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
Carizzo	0										
	1	10.05	6977	12.0	3266.2	980.00	$76,325	$88,015	$164,340	$164,340	$164,340

WTP w/o D4	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
Cedar Creek	0										
	1	9.49	6587	12.0	3266.2	930.00	$72,431	$83,529	$155,960	$155,960	$155,960

WTP 2.1 mgd	Common Variables					PVC Kadoka Reservoir @ 2609					
	Year	Daily Flowrate	Pump Capacity	Hours/ Day	kW-hr/year/ HP	HP	Demand $/yr	Energy $/yr	Total $/yr	Inflated $/yr	EE PW $/yr
Cibecue	0										
	1	2.10	1460	12.0	3266.2	120.00	$9,346	$10,855	$20,201	$20,201	$20,201

WHITE MOUNTAIN APACHE TRIBE EPA MASTER PLAN
Conventional Water Treatment Plant - 12.3 mgd
CAPITAL COST
October 2006

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization (5%)	$ 1,222,000	$ 1,222,000
1001	1	LS	Bonds and Insurance (5%)	$ 1,222,000	$ 1,222,000
1002	1	LS	General Requirements (4%)	$ 977,000	$ 977,000
			WTP		
1100	1	LS	Diversion and Raw Water Pumping	$ 2,500,000	$ 2,500,000
1101	1	LS	Pre-oxidation Diversion Box	$ 100,000	$ 100,000
1102	1	LS	Rapid Mix	$ 178,000	$ 178,000
1103	1	LS	Flocculation	$ 501,000	$ 501,000
1104	1	LS	Sedimentation	$ 2,132,000	$ 2,132,000
1105	1	LS	Filtration Systen	$ 2,741,000	$ 2,741,000
1106	1	LS	Clearwell and Finished Water Pumping	$ 2,251,000	$ 2,251,000
1107	1	LS	Chemical Systems	$ 1,000,000	$ 1,000,000
1108	1	LS	Lab/Admin/Maint Building	$ 1,182,000	$ 1,182,000
1109	1	LS	Backwash Recovery System	$ 1,423,000	$ 1,423,000
1110	1	LS	Sludge Lagoons	$ 1,039,000	$ 1,039,000
1111	1	LS	Sitework	$ 1,395,000	$ 1,323,000
1112	1	LS	Electrical and I&C	$ 1,646,000	$ 2,646,000
1113	1	LS	Pipeline to White River Tanks	$ 2,000,000	$ 2,000,000

TOTAL FIELD COSTS **$ 24,437,000**

WMAT EPA Master Plan
Water Treatment Plant (WTP) Replacement Costs and Present Worth Analysis
October 2006

Discount 4%

Conventional WTP	Replacement year	Percent of intital cost	Replacement cost for D5-1	Replacement cost for D5-2	Replacement cost for D4	Replacement cost for D3	2.1 mgd plant
Pre-oxidation diversion box	10	50%	$ 50,000	$ 25,000	$ 45,000	$ 43,000	$ 25,000
Rapid mix	10	50%	$ 89,000	$ 29,500	$ 77,000	$ 72,500	$ 29,500
Flocculation	10	50%	$ 250,500	$ 101,000	$ 219,500	$ 209,500	$ 101,000
Sedimentation	10	50%	$ 1,066,000	$ 320,500	$ 908,500	$ 855,500	$ 320,500
Filtration system	10	50%	$ 1,370,500	$ 527,000	$ 1,191,500	$ 1,131,500	$ 527,000
Clearwell and finished water pu	10	50%	$ 1,125,500	$ 431,500	$ 971,000	$ 919,500	$ 431,500
Chemical systems	10	50%	$ 500,000	$ 342,500	$ 466,000	$ 454,500	$ 342,500
Lab/Admin/Maint Bldg	40	100%	$ 1,182,000	$ 243,000	$ 519,500	$ 495,500	$ 243,000
Backwash recovery system	10	50%	$ 711,500	$ 282,000	$ 617,500	$ 586,000	$ 282,000
Sludge lagoons	20	100%	$ 1,039,000	$ 115,500	$ 436,500	$ 408,500	$ 115,500
Sitework	20	50%	$ 661,500	$ 242,000	$ 575,000	$ 546,500	$ 242,000
Electrical and I&C	10	100%	$ 2,646,000	$ 483,500	$ 1,150,000	$ 1,092,500	$ 483,500
Pipeline to White River Tanks	40	100%	$ 2,000,000	$ 500,000	$ 897,000	$ 862,500	$ 500,000

WMAT EPA Master Plan
OM&R for the System Serving Cibecue - Configuration 1
October 2006

Annual Operation, Maintenance, and Replacement Costs

System Serving Cibecue	12.3 mgd WTP	Distribution	Total
Labor	$ 354,490	$ 268,010	**$ 622,500**
Material and Supplies	$ 122,185	$ 98,586	**$ 220,771**
Energy	$ 209,484	$ 150,767	**$ 360,251**
Total	$ 686,159	$ 517,363	**$ 1,203,522**

Annual Operation and Maintenance Costs

Pipeline - to Cibecue (Demand 5)	**287,497 ft of pipe**					
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe	2	2080	$ 20	$ 83,200		
1 Technician per 200 ARVs	1	2080	$ 20	$ 41,600		
1.5 Technicians per 4 pump stations	1.5	2080	$ 20	$ 62,400		
0.5 Technician per 3 PRVs	0.5	2080	$ 20	$ 20,800		
1 Manager	1	2080	$ 25	$ 52,000		
Total Personnel	**6**					**$ 260,000**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	6	3000	$ 0.445	$ 8,010		
						$ 8,010
Parts and tools, 1/2% of init. Constr. Cost						**$ 98,586**
Pump power						**$ 150,767**
Total per Year						**$ 517,363**

WTP						
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
Supervisor	1	2080	$ 30	$ 62,400		
Operators	2	2080	$ 25	$ 104,000		
Technicians	3	2080	$ 20	$ 124,800		
Secretarial	2	2080	$ 15	$ 62,400		
Total Personnel	8					**$ 353,600**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per 2 persons	4	2000	$ 0.445	$ 890		
						$ 890
Parts and tools, 1/2% of init. Constr. Cost						**$ 122,185**
Chemicals						**$ 800,000**
Pump power						**$ 209,484**
Total per Year						**$ 1,486,159**

Replacement Costs

System Serving Cibecue	**287,497 ft of pipe**	
Pipeline		
Pipes, Fittings, and Installation (40 yrs)	$11,328,891.18	
Total 40-year Replacement		**$ 11,328,891**
Hydrants, Valves, and Taps (20 yrs)	$3,281,460.59	
Cathodic Protection (20 yrs)	$118,688.30	
Total 20-year Replacement		**$ 3,400,149**

Reservoirs (40 yrs)	
Ground Level Reservoir	**$764,000.00**
Tanks 1 trough 5	**$4,901,000.00**
Cibecue Elevated Reservoir	**$502,000.00**
Total Reservoir Replacement Cost	**$ 6,167,000**

Pump Stations	
Pumps, Motors, Controls, Electrical (10yrs)	**$2,100,000.00**

Pump power	$	150,767
WTP Power	$	209,484
Total O&M	$	2,003,522

OM&R for the System Serving Cibecue - Configuration 2

Annual Operation, Maintenance, and Replacement Costs

System Serving Cibecue	2.1 mgd WTP	Distribution	Total
Labor	$ 240,090	$ -	**$ 240,090**
Material and Supplies	$ 49,475	$ -	**$ 49,475**
Energy	$ 20,201	$ -	**$ 20,201**
Total	$ 309,766	$ -	**$ 309,766**

Annual Operation and Maintenance Costs

Pipeline - to Cibecue (Demand 5)	**188,579 ft of pipe**					
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe	0	2080	$ 20	$ -		
1 Technician per 200 ARVs	0	2080	$ 20	$ -		
1.5 Technicians per 4 pump stations	0	2080	$ 20	$ -		
0.5 Technician per 3 PRVs	0	2080	$ 20	$ -		
1 Manager	0	2080	$ 25	$ -		
Total Personnel	**0**				**$**	**-**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	0	3000	$ 0.445	$ -		
					$	**-**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**-**
Pump power					**$**	**-**
Total per Year					**$**	**-**

WTPs						
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
Supervisor	1	2080	$ 30	$ 62,400		
Operators	2	2080	$ 25	$ 104,000		
Technicians	1	2080	$ 20	$ 41,600		
Secretarial	1	2080	$ 15	$ 31,200		
Total Personnel	5				**$**	**239,200**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per 2 persons	2.5	2000	$ 0.445	$ 890		
					$	**890**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**49,475**
Chemicals					**$**	**136,585**
Pump power					**$**	**20,201**
Total per Year					**$**	**446,351**

Replacement Costs

System Serving Cibecue	**ft of pipe**
Pipeline	
Pipes, Fittings, and Installation (40 yrs)	
Total 40-year Replacement	
Hydrants, Valves, and Taps (20 yrs)	
Cathodic Protection (20 yrs)	
Total 20-year Replacement	

Reservoirs (40 yrs)
Ground Level Reservoir
Tanks 1 and 2
Total Reservoir Replacement Cost

Pump Stations
Pumps, Motors, Controls, Electrical (10yrs)

Pump power	$	3,440
WTP Power	$	20,201
Total O&M	$	446,351

WMAT EPA Master Plan
OM&R for the System Serving Carrizo
October 2006

Annual Operation, Maintenance, and Replacement Costs

System Serving Carrizo	Water Treatment Plant	Distribution	Total
Labor	$ 260,890	$ 182,140	**$ 443,030**
Material and Supplies	$ 107,210	$ 53,019	**$ 160,229**
Energy	$ 164,340	$ 3,440	**$ 167,780**
Total	$ 532,440	$ 238,599	**$ 771,040**

Pipeline - to Carrizo (Demand 4)	**188,579 ft of pipe**					
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe	1.5	2080	$ 20	$ 62,400		
1 Technician per 200 ARVs	1	2080	$ 20	$ 41,600		
0.5 Technicians per 1 pump stations	0.5	2080	$ 20	$ 20,800		
0.5 Technician per 3 PRVs	0	2080	$ 20	$ -		
1 Manager	1	2080	$ 25	$ 52,000		
Total Personnel	**4**				**$**	**176,800**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	4	3000	$ 0.445	$ 5,340		
					$	**5,340**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**53,019**
Pump power					**$**	**3,440**
Total per Year					**$**	**238,599**

WTP						
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
Supervisor	1	2080	$ 30	$ 62,400		
Operators	1	2080	$ 25	$ 52,000		
Technicians	2	2080	$ 20	$ 83,200		
Secretarial	2	2080	$ 15	$ 62,400		
Total Personnel	6				**$**	**260,000**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per 2 persons	3	2000	$ 0.445	$ 890		
					$	**890**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**107,210**
Chemicals					**$**	**656,000**
Pump power					**$**	**164,340**
Total per Year					**$**	**1,188,440**

Replacement Costs

System Serving Carrizo	**188,579 ft of pipe**		
Pipeline			
Pipes, Fittings, and Installation (40 yrs)		$5,407,986.70	
Total 40-year Replacement			**$ 5,407,987**
Hydrants, Valves, and Taps (20 yrs)		$2,133,721.48	
Cathodic Protection (20 yrs)		$76,268.94	
Total 20-year Replacement			**$ 2,209,990**

Reservoirs (40 yrs)	
Ground Level Reservoir	**$764,000.00**
Tanks 1 and 2	**$1,960,000.00**
Total Reservoir Replacement Cost	**$ 2,724,000**

Pump Stations	
Pumps, Motors, Controls (10yrs)	**$525,000.00**

Pump power	$	3,440
WTP power	$	164,340
Total O&M	$	1,427,040

OM&R for the System Serving Cedar Creek

Annual Operation, Maintenance, and Replacement Costs

System Serving Cedar Creek	Water Treatment Plant	Distribution	Total
Labor	$ 250,490	$ 139,205	**$ 389,695**
Material and Supplies	$ 102,210	$ 40,813	**$ 143,023**
Energy	$ 155,960	$ -	**$ 155,960**
Total	$ 508,660	$ 180,018	**$ 688,678**

Pipeline - to Cedar Creek (Demand 3)	**129,765 ft of pipe**					
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe	1	2080	$ 20	$ 41,600		
1 Technician per 200 ARVs	1	2080	$ 20	$ 41,600		
1.5 Technicians per 4 pump stations	0	2080	$ 20	$ -		
0.5 Technician per 3 PRVs	0	2080	$ 20	$ -		
1 Manager	1	2080	$ 25	$ 52,000		
Total Personnel	**3**				**$**	**135,200**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	3	3000	$ 0.445	$ 4,005		
					$	**4,005**
Parts and tools, 1/2% of init. Constr. Cost						**$40,813**
Total per Year					**$**	**180,018**

WTP						
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
Supervisor	1	2080	$ 30	$ 62,400		
Operators	1	2080	$ 30	$ 62,400		
Technicians	1	2080	$ 30	$ 62,400		
Secretarial	1	2080	$ 30	$ 62,400		
Total Personnel	4				**$**	**249,600**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per 2 persons	2	2000	$ 0.445	$ 890		
					$	**890**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**102,210**
Chemicals					**$**	**616,000**
Pump power					**$**	**155,960**
Total per Year					**$**	**1,124,660**

Replacement Costs

System Serving Cedar Creek	**129,765 ft of pipe**		
Pipeline			
Pipes, Fittings, and Installation (40 yrs)		$11,186,457.65	
Total 40-year Replacement			**$ 11,186,458**
Hydrants, Valves, and Taps (20 yrs)		$4,765,775.38	
Cathodic Protection (20 yrs)		$2,889,641.46	
Total 20-year Replacement			**$ 7,655,417**

Reservoirs (40 yrs)	
Ground Level Reservoir	**$764,000.00**
Tank 1	**$980,000.00**
Total Reservoir Replacement Cost	**$ 1,744,000**

Pump Stations	
Pumps, Motors, Controls (10yrs)	**$ -**
	$ -

WTP Power	$	155,960
Total O&M	$	1,304,678

IRRIGATION AND MULTIPURPOSE STORAGE COSTS

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
SUMMARY OF TOTAL PROBABLE PROJECT COSTS
January 2007

Schedule	Total Field Costs	
Irrigation Application: Center Pivot Irrigation	$	4,305,000.00
Irrigation Conveyance: Canal System	$	1,589,000.00
Irrigation Conveyance: Pipelines	$	11,148,000.00
Irrigation Conveyance: Diversions & Pump Stations	$	5,510,000.00
Irrigation Storage: Bear Canyon Regulating Reservoir	$	71,435,000.00
Irrigation Storage: Miner Flat Dam	$	24,728,000.00
Hydropower: Miner Flat Dam	$	6,072,000.00
TOTALS	**$**	**124,787,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION APPLICATION: CENTER PIVOT IRRIGATION
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
3001	1	LS	Mobilization-Demobilization	$215,000.00	$215,000.00
3002	1	LS	Taxes, Bonds, and Insurance	$301,000.00	$301,000.00
3003	1	LS	General Requirements / Traffic Control	$172,000.00	$172,000.00
3100	5120	ACRES	Pivot Clearing and Grubbing	$50.00	$256,000.00
3200	2	EA	4 Span Pivot	$42,000.00	$84,000.00
3201	14	EA	5 Span Pivot	$48,000.00	$672,000.00
3202	1	EA	6 Span Pivot	$55,000.00	$55,000.00
3203	30	EA	7 Span Pivot	$62,000.00	$1,860,000.00
3300	12	EA	Booster Pumps	$10,000.00	$120,000.00
3300	1	LS	Center Pivot Control System	$100,000.00	$100,000.00
3400	47	EA	Center Pivot Electrical Connections	$10,000.00	$470,000.00
			TOTAL FIELD COSTS	**$**	**4,305,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION CONVEYANCE: CANAL SYSTEM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 79,000.00	$ 79,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 111,000.00	$ 111,000.00
1002	1	LS	General Requirements / Traffic Control	$ 64,000.00	$ 64,000.00
			CANAL SYSTEM		
1100	16,200	LF	85 cfs Canal Excavation/Embankment (1.3 cy/ft)	$ 26.00	$ 421,200.00
1101	16,200	LF	85 cfs Canal Soil-Cement Liner (0.75 cy/ft)	$ 30.00	$ 486,000.00
			STRUCTURES AND APPURTENANT FACILITIES		
1200	1	LS	85 cfs Grade Control Structures (10% of Canal)	$ 91,000.00	$ 91,000.00
1201	1	LS	85 cfs Wasteway Facilities (15% of 85 cfs Canal)	$ 136,500.00	$ 136,500.00
1202	1	LS	Canal System Automation	$ 50,000.00	$ 50,000.00
			SITE RESTORATION		
1300	100	AC	Finish Grading and Seeding	$ 1,500.00	$ 150,000.00
			TOTAL FIELD COSTS		**$ 1,588,700.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION CONVEYANCE: PIPELINES
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 557,000.00	$ 557,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 780,000.00	$ 780,000.00
1002	1	LS	General Requirements / Traffic Control	$ 446,000.00	$ 446,000.00
			PIPELINE		
1100	3,500	LF	60" Class 250 Steel Pipe	$ 400.00	$ 1,400,000.00
1101	7,000	LF	42" Class 80 C905 Pipe	$ 80.00	$ 560,000.00
1102	7,000	LF	42" Class 100 C905 Pipe	$ 100.00	$ 700,000.00
1103	8000	LF	36" Class 80 C905 Pipe	$ 60.00	$ 480,000.00
1104	6,000	LF	36" Class 100 C905 Pipe	$ 75.00	$ 450,000.00
1105	6,000	LF	36" Class 125 C905 Pipe	$ 95.00	$ 570,000.00
1106	7,800	LF	30" Class 100 C905 Pipe	$ 50.00	$ 390,000.00
1107	5,000	LF	27" Class 80 PIP Pipe	$ 32.00	$ 160,000.00
1108	10,000	LF	27" Class 100 PIP Pipe	$ 40.00	$ 400,000.00
1109	10,000	LF	27" Class 125 PIP Pipe	$ 50.00	$ 500,000.00
1110	2,000	LF	24" Class 80 PIP Pipe	$ 25.00	$ 50,000.00
1111	2,500	LF	24" Class 100 PIP Pipe	$ 31.00	$ 77,500.00
1112	2,000	LF	24" Class 125 PIP Pipe	$ 39.00	$ 78,000.00
1113	1,200	LF	21" Class 80 PIP Pipe	$ 20.00	$ 24,000.00
1114	5,000	LF	18" Class 80 PIP Pipe	$ 15.00	$ 75,000.00
1115	4,500	LF	18" Class 100 PIP Pipe	$ 18.00	$ 81,000.00
1116	4,000	LF	18" Class 125 PIP Pipe	$ 22.00	$ 88,000.00
1117	2,800	EA	15" Class 80 PIP Pipe	$ 12.00	$ 33,600.00
1118	2,000	EA	15" Class 100 PIP Pipe	$ 15.00	$ 30,000.00
1119	2,000	EA	15" Class 125 PIP Pipe	$ 18.00	$ 36,000.00
1120	2400	EA	12" Class 80 PIP Pipe	$ 8.00	$ 19,200.00
1121	2000	EA	12" Class 100 PIP Pipe	$ 10.00	$ 20,000.00
1122	20000	EA	10" Class 80 PIP Pipe	$ 6.00	$ 120,000.00
1123	15000	EA	10" Class 100 PIP Pipe	$ 8.00	$ 120,000.00
1124	15000	EA	10" Class 125 PIP Pipe	$ 10.00	$ 150,000.00
1125	3000	EA	8" Class 80 PIP Pipe	$ 5.00	$ 15,000.00
1126	3000	EA	8" Class 100 PIP Pipe	$ 6.00	$ 18,000.00
1127	3000	EA	8" Class 125 PIP Pipe	$ 7.00	$ 21,000.00
1128	1	LS	PVC Fittings (5% of Pipe)	$ 263,000.00	$ 263,000.00
1129	1	LS	Steel Fittings (5% of Pipe)	$ 70,000.00	$ 70,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 333,000.00	$ 333,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 467,000.00	$ 467,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 533,000.00	$ 533,000.00
1203	1	LS	Boring and Jacking (3% of Pipe)	$ 200,000.00	$ 200,000.00
1204	1	LS	Utility Crossings (3% of Pipe)	$ 200,000.00	$ 200,000.00
1205	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 133,000.00	$ 133,000.00
1206	1	LS	Pressure Reducing Facilities (5% of Pipe)	$ 333,000.00	$ 333,000.00
			SITE RESTORATION		
1300	161,300	LS	Native Restoration	$ 1.00	$ 161,300.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 11,148,200.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION CONVEYANCE: DIVERSIONS AND PUMP STATIONS
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 276,000.00	$ 276,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 386,000.00	$ 386,000.00
1002	1	LS	General Requirements	$ 220,000.00	$ 220,000.00
			DIVERSION FACILITY FOR PS		
1100	1	LS	Rubber Dam Assembly	$ 500,000.00	$ 500,000.00
1101	4000	CY	Excavation/Backfill	$ 10.00	$ 40,000.00
1102	300	CY	Concrete	$ 500.00	$ 150,000.00
1103	4000	SF	Vinyl Sheet Piling	$ 20.00	$ 80,000.00
1104	2600	TONS	Rip Rap Channel	$ 30.00	$ 78,000.00
1105	1	LS	60" Inlet Slide Gate	$ 25,000.00	$ 25,000.00
1106	200	LF	60" HDPE Intake Pipeline	$ 300.00	$ 60,000.00
1107	1	LS	Blower Facilities	$ 200,000.00	$ 200,000.00
			PUMP STATION (38000 gpm @ 210 psi)		
1200	6000	CY	Excavation/Backfill	$ 10.00	$ 60,000.00
1201	250	CY	Wetwell Concrete	$ 500.00	$ 125,000.00
1202	1	LS	Wetwell 60" Slide Gate	$ 25,000.00	$ 25,000.00
1203	1	LS	Wetwell Miscellaneous Metals	$ 10,000.00	$ 10,000.00
1204	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1205	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1206	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1207	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1208	6	EA	Equipment Pumps @ 6350 gpm (1000 hp)	$ 200,000.00	$ 1,200,000.00
1209	1	LS	Equipment Pump Manifold	$ 300,000.00	$ 300,000.00
1210	1	LS	Equipment Valves and Appurtenant Items	$ 500,000.00	$ 500,000.00
1211	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 200,000.00	$ 200,000.00
1212	1	LS	Pump Station Structure Foundation	$ 200,000.00	$ 200,000.00
1213	1	LS	Pump Station Instrumentation and Controls	$ 200,000.00	$ 200,000.00
1214	1	LS	Pump Station Electrical	$ 300,000.00	$ 300,000.00
1215	1	LS	Pump Station Heating and Ventilation	$ 30,000.00	$ 30,000.00
			AMOS WASH BOOSTER (3500 gpm @ 100 psi)		
1300	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1301	1	AC	Sitework Restoration	$ 2,500.00	$ 2,500.00
1302	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1303	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1304	4	EA	Equipment Pumps @ 900 gpm (75 hp)	$ 15,000.00	$ 60,000.00
1305	1	LS	Equipment Pump Manifold	$ 40,000.00	$ 40,000.00
1306	1	LS	Equipment Valves and Appurtenant Items	$ 50,000.00	$ 50,000.00
1307	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 25,000.00	$ 25,000.00
1308	1	LS	Pump Station Structure Foundation	$ 30,000.00	$ 30,000.00
1309	1	LS	Pump Station Instrumentation and Controls	$ 25,000.00	$ 25,000.00
1310	1	LS	Pump Station Electrical	$ 50,000.00	$ 50,000.00
1311	1	LS	Pump Station Heating and Ventilation	$ 10,000.00	$ 10,000.00

TOTAL FIELD COSTS **$ 5,510,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION STORAGE: BEAR CANYON
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 3,574,000.00	$ 3,574,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 5,000,000.00	$ 5,000,000.00
1002	1	L.S.	General Requirements	$ 2,857,000.00	$ 2,857,000.00
			SITE PREPARATION		
1100	1	L.S.	Diversion and Care of Stream	$ 50,000.00	$ 50,000.00
1101	1	L.S.	Upstream and Downstream Coffer dams	$ 100,000.00	$ 100,000.00
1102	440	ACRE	Clearing and Grubbing	$ 750.00	$ 330,000.00
1103	12	MON.	Dewatering	$ 5,000.00	$ 60,000.00
1104	52,000	C.Y.	Rock Excavation	$ 18.00	$ 936,000.00
1105	400,000	C.Y.	Unclassified Excavation	$ 6.00	$ 2,400,000.00
1106	1	L.S.	Access Road	$ 100,000.00	$ 100,000.00
1107	1	L.S.	Curtain Grouting	$ 1,000,000.00	$ 1,000,000.00
1108	1	L.S.	Consolidation Grouting	$ 250,000.00	$ 250,000.00
1109	42,000	S.Y.	Abutment and Foundation Preparation	$ 65.00	$ 2,730,000.00
1109	2,500	C.Y.	Dental concrete	$ 120.00	$ 300,000.00
			RCC DAM		
1200	600,000	C.Y.	RCC for dam	$ 55.00	$ 33,000,000.00
1201	8,000	C.Y.	Structural Concrete for stilling basin	$ 300.00	$ 2,400,000.00
1202	20,000	S.F.	Spillway Facing Concrete	$ 60.00	$ 1,200,000.00
1203	600	C.Y.	Training Wall Concrete	$ 600.00	$ 360,000.00
1204	250,000	S.F.	Non Overflow Face Concrete	$ 5.00	$ 1,250,000.00
1205	200,000	S.F.	Upstream face panels & Liner	$ 10.00	$ 2,000,000.00
1206	1	L.S.	Plinth Construction	$ 500,000.00	$ 500,000.00
1207	1	LS	Cutoff Wall	$ 5,000,000.00	$ 5,000,000.00
1208	1	L.S.	Security Fence	$ 40,000.00	$ 40,000.00
1209	1	L.S.	Instrumentation/Automation	$ 250,000.00	$ 250,000.00
			OUTLET, TOWER, GATES, OPERATORS		
1300	7,500	C.Y.	Structural Concrete, 4000 psi	$ 550.00	$ 4,125,000.00
1301	30	L.F.	Steel Transition Liner (10 foot dia.)	$ 1,200.00	$ 36,000.00
1302	200	L.F.	10 Ft x 10 Ft Box Culvert	$ 1,000.00	$ 200,000.00
1303	250	L.F.	5 Foot Diameter Outlet	$ 750.00	$ 187,500.00
1304	170	L.F.	5 Foot Diameter Air Shaft	$ 750.00	$ 127,500.00
1305	1,200	S.F.	Bridge to tower	$ 60.00	$ 72,000.00
1306	2	EACH	Trashracks	$ 25,000.00	$ 50,000.00
1307	1	L.S.	Slide gates w/ operators	$ 500,000.00	$ 500,000.00
1308	1	L.S.	Handrails and miscellaneous metal	$ 50,000.00	$ 50,000.00
1309	1	L.S.	Emergency Warning System	$ 250,000.00	$ 250,000.00
			SITE RESTORATION		
1500	100	ACRE	Finish grading and seeding	$ 1,500.00	$ 150,000.00
			TOTAL FIELD COSTS		**$ 71,435,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
IRRIGATION STORAGE: MINER FLAT DAM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 1,250,000.00	$ 1,250,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 1,731,000.00	$ 1,731,000.00
1002	1	L.S.	General Requirements	$ 989,000.00	$ 989,000.00
			SITE PREPARATION		
1100	1	L.S.	Diversion and Care of Stream	$ 150,000.00	$ 150,000.00
1101	1	L.S.	Upstream and Downstream Coffer dams	$ 150,000.00	$ 150,000.00
1102	160	ACRE	Clearing and Grubbing	$ 750.00	$ 120,000.00
1103	12	MON.	Dewatering	$ 20,000.00	$ 240,000.00
1104	115,000	C.Y.	Rock Excavation	$ 18.00	$ 2,070,000.00
1105	15,000	C.Y.	Unclassified Excavation	$ 6.00	$ 90,000.00
1106	1	L.S.	Access Road	$ 100,000.00	$ 100,000.00
1107	2,400	S.F.	Bridge to Powerhouse	$ 100.00	$ 240,000.00
1108	1	L.S.	Jet Grounting	$ 500,000.00	$ 500,000.00
1109	1	L.S.	Curtain Grouting	$ 600,000.00	$ 600,000.00
1110	1	L.S.	Consolidation Grouting	$ 200,000.00	$ 200,000.00
1111	3,000	S.Y.	Abutment and Foundation Preparation	$ 65.00	$ 195,000.00
1111	500	C.Y.	Dental concrete	$ 120.00	$ 60,000.00
1112	1	L.S.	Visitor viewpoint	$ 75,000.00	$ 75,000.00
			RCC DAM		
1200	130,000	C.Y.	RCC for dam	$ 60.00	$ 7,800,000.00
1201	2,000	C.Y.	Structural Concrete for stilling basin	$ 300.00	$ 600,000.00
1202	1	L.S.	Rock bolts for RCC stilling basin	$ 100,000.00	$ 100,000.00
1203	30,000	S.F.	Spillway Facing Concrete	$ 60.00	$ 1,800,000.00
1204	1	L.S.	Ogee crest concrete	$ 300,000.00	$ 300,000.00
1205	400	C.Y.	Training Wall Concrete	$ 600.00	$ 240,000.00
1205	1	L.S.	Non Overflow Face Concrete	$ 150,000.00	$ 150,000.00
1206	50,000	S.F.	Upstream face panels & Liner	$ 10.00	$ 500,000.00
1207	1	L.S.	Plinth Construction	$ 500,000.00	$ 500,000.00
1208	200	L.F.	Adit	$ 1,500.00	$ 300,000.00
1209	1	L.S.	Security Fence	$ 50,000.00	$ 50,000.00
1210	1	L.S.	Instrumentation/Automation	$ 250,000.00	$ 250,000.00
			OUTLET, TOWER, GATES, OPERATORS		
1300	2,400	C.Y.	Structural Concrete, 4000 psi	$ 550.00	$ 1,320,000.00
1301	30	L.F.	Steel Transition Liner (10 foot dia.)	$ 1,200.00	$ 36,000.00
1302	150	L.F.	10 Ft x 10 Ft Box Culvert	$ 1,000.00	$ 150,000.00
1303	180	L.F.	6 foot diameter steel penstock	$ 1,000.00	$ 180,000.00
1304	170	L.F.	6 foot diameter air shaft	$ 1,000.00	$ 170,000.00
1305	1,200	S.F.	Bridge to tower	$ 60.00	$ 72,000.00
1306	3	EACH	Trashracks	$ 25,000.00	$ 75,000.00
1307	1	L.S.	Slide gates w/ operators	$ 1,000,000.00	$ 1,000,000.00
1308	1	L.S.	Handrails and miscellaneous metal	$ 50,000.00	$ 50,000.00
1309	1	L.S.	Emergency Warning System	$ 250,000.00	$ 250,000.00
			SITE RESTORATION		
1500	50	ACRE	Finish grading and seeding	$ 1,500.00	$ 75,000.00
			TOTAL FIELD COSTS		**$ 24,728,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
HYDROPOWER: MINER FLAT DAM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 304,000.00	$ 304,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 425,000.00	$ 425,000.00
1002	1	L.S.	General Requirements	$ 243,000.00	$ 243,000.00
			HYDROELECTRIC GENERATION		
1400	1	L.S.	Turbine & Generator	$ 3,000,000.00	$ 3,000,000.00
1401	1	L.S.	Switchyard	$ 750,000.00	$ 750,000.00
1402	1	L.S.	Station Electrical	$ 750,000.00	$ 750,000.00
1403	1	MILES	Electrical Interconnection	$ 100,000.00	$ 100,000.00
1404	1	L.S.	Valving	$ 250,000.00	$ 250,000.00
1405	1	L.S.	Miscellaneous	$ 250,000.00	$ 250,000.00
			TOTAL FIELD COSTS		**$ 6,072,000.00**

WMAT Irrigation System - Canyon Day
OM&R
October 2006

Operation and Maintenance Costs per Year

Pipe/Canal	**177,900 combined ft of pipe/canal**					**Total/Yr**
Personnel	#	Hours/yr	$/hr	$/Yr		
1 Technician per 150,000 feet of pipe/canal	1	2080	$ 20	$ 41,600		
1 Technician for pump stations, ARVs, other	1	2080	$ 20	$ 41,600		
1 Manager/Supervisor	1	2080	$ 30	$ 62,400		
Total Personnel	**3**				**$**	**145,600**
Pump Power					**$**	**896,674**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	3	3000	$ 0.445	$ 4,005		
					$	**4,005**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**63,685**
Total Distribution					**$**	**1,109,963**
Reservoirs/Dams						
Personnel	No.	Hours/yr	$/hr	$/Yr		
Technicians (Miner Flat, 2; Bear Canyon, 3)	5	2080	$ 20	$ 208,000		
Total Personnel	5				**$**	**208,000**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	5	3000	$ 0.445	$ 6,675		
					$	**6,675**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**538,725**
Total Reservoirs					**$**	**753,400**
Center Pivots	**5,120 acres total**					
	No.	Hours/yr	$/hr	$/Yr		
1 Person per 1000 ac of center pivots	5	2080	$ 20	$ 208,000		
					$	**208,000**
Power, including booster pumps					**$**	**94,807**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	5	3000	$ 0.445	$ 6,675		
					$	**6,675**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**21,525**
Total Irrigation					**$**	**331,007**
Total Operation and Maintenance Cost per Year					**$**	**2,194,371**

Replacement Costs

Pipes/Canal/Pump Stations	**177,900 ft of pipe**			
Pipes, Fittings, and Installation (40 yrs)			**$**	**7,199,300**
Hydrants, Valves, and Taps (20 yrs)		$ 1,666,000		
Pump Station HV and Appurtenances (20 yrs)		$ 1,150,000		
			$	**1,666,000**
Pumps, Motors, Controls, Mechanical (10yrs)		$ 2,095,000		
Canal System Automation (10 yrs)		$ 50,000		
			$	**50,000**
Reservoirs/Dams				
Hydropower Turbine/Generator Replacement (40 yrs)			**$**	**5,100,000**
Hydropower Turbine/Generator Rebuild 25% of Replacement (10 yrs)			**$**	**1,275,000**
Bear Canyon, Mechanical/electrical (20 yrs)		$ 800,000		
Miner Flat, Mechanical/Electrical (20 yrs)		$ 1,375,000		
			$	**2,175,000**
Center Pivot System				
Pivots (20 yrs)				**$2,671,000.00**
Pumps, Controls, Electrical (10 yrs)				**$690,000.00**
Total Replacement Costs by Replacement Period				
40 Years			**$**	**12,299,300**
20 Years			**$**	**6,512,000**
10 Years			**$**	**2,015,000**

WMAT Irrigation System - Canyon Day
Pump Station Power Cost Present Worth Analysis
October 2006

Variables		
Demand Charge/hp	6.4876	
Energy cost / kW*hr first	0.052	
after 300 hours	0.0275	
Discount Factor	0%	
Years	40	
	Pump 1	Pump 2
Startup Flowrate (mgd)	54.72	5.04
Buildout Flowrate (mgd)	54.72	5.04
Year Buildout	1	1
	Pump 1	Pump 2
Pumpstation Capacity (g	38,000	3,500
Max operating hrs/day	24	
Pump 1, HP	6,000	
Pump 2, HP	300	

Required Water Power

	Pump 1	Pump 2
Q, gpm	38,000	3,500
Q, cfs	84.67	7.80
HL, ft	483	230
gamma, lb/cf	62.40	62.40
Conversion	550	550
Watr Pwr, HP	**4,639.8**	**203.5**
Pump Pwr, HP	5,458.6	239.4
Motor Pwr, HP	5,745.9	252.0

	Common Variables								
Pumpstation 1	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/ yr**	**Energy $/ yr**	**Total $/ yr**
	0								
	1	54.72	38,000	8	2,148	6,000	$467,106	$386,869	$853,975

	Common Variables								
Pumpstation 2	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	5.04	3,500	8	2,148	300	$23,355	$19,343	$42,699

WMAT Irrigation System - Canyon Day
Center Pivot Power Cost
October 2006

Calculate power requirements according to formula: 4.9 HP +[(# of spans - 1) x 60% x 0.6 HP
Assume average use of 8 hours per day for 365 days per year

Demand Charge/hp	6.48759
Energy cost / kW*hr, first 300 hours	0.05197
After 300 hours per month	0.02747

Number of pivots		Power requirement, HP	kWh/yr	Demand charge	Annual energy cost	Total annual power cost
2	4 Span Pivot	117.8	256,503	$ 9,171	$ 7,692	$ 16,863
14	5 Span Pivot	176.6	384,537	$ 13,749	$ 11,532	$ 25,280
1	6 Span Pivot	112.9	245,833	$ 8,789	$ 7,372	$ 16,161
30	7 Span Pivot	255.0	555,248	$ 19,852	$ 16,651	$ 36,503
Total			**1,442,121**	**$ 51,561**	**$ 43,247**	**$ 94,807**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
SUMMARY OF TOTAL PROBABLE PROJECT COSTS
January 2007

Schedule	Total Field Costs	
Irrigation Application: Orchard Solid Set Irrigation	$	4,886,000.00
Irrigation Application: Center Pivot Irrigation	$	369,000.00
Irrigation Conveyance: Canals	$	1,348,500.00
Irrigation Conveyance: Pipelines	$	384,000.00
Irrigation Conveyance: Diversions & Pump Stations	$	4,286,000.00
Irrigation Storage: Salt Creek Dam	$	40,320,000.00
TOTALS	**$**	**51,593,500.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION APPLICATION: ORCHARD or VINEYARD SOLID SET IRRIGATION (per 40 acres)

January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 14,000.00	$ 14,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 19,000.00	$ 19,000.00
1002	1	LS	General Requirements	$ 11,000.00	$ 11,000.00
			UNDERTREE SPRINKLER SYSTEM		
1100	4273	EA	UT Sprinkler Assemblies	$ 3.20	$ 13,673.60
1101	117012	LF	1" Poly Lateral Piping	$ 0.15	$ 17,551.80
1102	1320	LF	12" Class 100 PIP Distribution Piping	$ 12.00	$ 15,840.00
1103	252	LF	10" Class 100 PIP Distribution Piping	$ 9.00	$ 2,268.00
1104	434	LF	8" Class 100 PIP Distribution Piping	$ 6.00	$ 2,604.00
1105	630	LF	6" Class 100 PIP Distribution Piping	$ 4.00	$ 2,520.00
1106	10	EA	PIP Fittings	$ 100.00	$ 1,000.00
1107	94	EA	PIP Saddles	$ 50.00	$ 4,700.00
			OVERTREE SPRINKLER COOLING SYSTEM		
1200	1453	EA	OT Sprinkler Assemblies	$ 5.20	$ 7,555.60
1201	39788	LF	1.5" Poly Lateral Piping	$ 0.40	$ 15,915.20
1202	1320	LF	15" Class 100 PIP Distribution Piping	$ 15.00	$ 19,800.00
1203	476	LF	10" Class 100 PIP Distribution Piping	$ 9.00	$ 4,284.00
1204	378	LF	8" Class 100 PIP Distribution Piping	$ 6.00	$ 2,268.00
1205	462	LF	6" Class 100 PIP Distribution Piping	$ 4.00	$ 1,848.00
1206	10	EA	PIP Fittings	$ 100.00	$ 1,000.00
1207	32	EA	PIP Saddles	$ 50.00	$ 1,600.00
			PUMPING AND ZONING FACILITIES		
1300	1	LS	UT Pump Station (25% of 160 Acre Facility)	$ 20,000.00	$ 20,000.00
1301	1	LS	OT Pump Station Additional Costs	$ 5,000.00	$ 5,000.00
1302	1	EA	UT Zone Valve	$ 1,000.00	$ 1,000.00
1303	1	EA	OT Zone Valve	$ 1,000.00	$ 1,000.00
			UT FROST PROTECTION FACILITIES		
1400	16000	CY	Earthwork for Storage Pond	$ 2.00	$ 32,000.00
1401	4	AC	Clay Liner	$ 4,000.00	$ 16,000.00
1402	1	LS	Pump Station Additional Costs	$ 10,000.00	$ 10,000.00
1403	1	LS	Diesel Gen-Set (25% of 300 kW Gen-Set)	$ 20,000.00	$ 20,000.00
			APPURTENANT FACILITIES		
1500	1	LS	Electrical Facilities	$ 4,000.00	$ 4,000.00
1501	1	LS	Control System	$ 4,000.00	$ 4,000.00

40 Acre Parcel Construction Subotal	**$**	**271,428.20**
TOTAL FIELD COSTS (18 Parcels)	**$**	**4,885,707.60**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION APPLICATION: CENTER PIVOT IRRIGATION
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
3001	1	LS	Mobilization-Demobilization	$18,000.00	$18,000.00
3002	1	LS	Taxes, Bonds, and Insurance	$26,000.00	$26,000.00
3003	1	LS	General Requirements / Traffic Control	$15,000.00	$15,000.00
3100	400	ACRES	Pivot Clearing and Grubbing	$50.00	$20,000.00
3200	2	LS	5 Span Pivot	$48,000.00	$96,000.00
3201	2	LS	7 Span Pivot	$62,000.00	$124,000.00
3300	1	LS	Center Pivot Control System	$30,000.00	$30,000.00
3400	4	LS	Center Pivot Electrical Connections	$10,000.00	$40,000.00
			TOTAL FIELD COSTS	**$**	**369,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION CONVEYANCE: CANAL SYSTEM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 67,000.00	$ 67,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 94,000.00	$ 94,000.00
1002	1	LS	General Requirements / Traffic Control	$ 54,000.00	$ 54,000.00
			CANAL SYSTEM		
1100	9,000	LF	20 cfs Canal Excavation/Embankment (0.5 cy/ft)	$ 10.00	$ 90,000.00
1101	9,000	LF	20 cfs Canal Soil-Cement Liner (0.33/ft)	$ 13.00	$ 117,000.00
			SIPHONS & ENCLOSED CONDUITS		
1200	200	LF	20 cfs Siphons (30" Diameter)	$ 100.00	$ 20,000.00
1201	3,000	LF	20 cfs Pipe Drop	$ 100.00	$ 300,000.00
1202	7,000	LF	16 cfs Lateral Enclosed Conduits (24" Diameter)	$ 20.00	$ 140,000.00
			STRUCTURES AND APPURTENANT FACILITIES		
1300	1	LS	20 cfs Grade Control Structures (10% of Canal)	$ 21,000.00	$ 21,000.00
1301	9	EA	16 cfs Inlet/Outlet Structures w/ Slide Gates	$ 2,000.00	$ 18,000.00
1302	1	LS	20 cfs Wasteway Facilities (15% of 20 cfs Canal)	$ 31,500.00	$ 31,500.00
1303	1	LS	20 cfs Impact Basin	$ 50,000.00	$ 50,000.00
1304	1	LS	Culverts (10% of Canal)	$ 21,000.00	$ 21,000.00
1305	1	LS	Canal System Automation	$ 25,000.00	$ 25,000.00
			SITE RESTORATION		
1300	200	AC	Finish Grading and Seeding	$ 1,500.00	$ 300,000.00
			TOTAL FIELD COSTS		**$ 1,348,500.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION CONVEYANCE: PIPELINES
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 19,000.00	$ 19,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 27,000.00	$ 27,000.00
1002	1	LS	General Requirements / Traffic Control	$ 15,000.00	$ 15,000.00
			PIPELINE		
1100	1,600	LF	24" Class 165 C900 Pipe	$ 55.00	$ 88,000.00
1101	1,700	LF	24" Class 100 PIP Pipe	$ 31.00	$ 52,700.00
1102	1300	LF	16" Class 165 C905 Pipe	$ 24.00	$ 31,200.00
1103	2640	LF	15" Class 100 PIP Pipe	$ 15.00	$ 39,600.00
1104	2800	LF	10" Class 80 PIP Pipe	$ 6.00	$ 16,800.00
1104	1600	LF	8" Class 100 PIP Pipe	$ 5.00	$ 8,000.00
1105	1	LS	PVC Fittings (5% of Pipe)	$ 12,000.00	$ 12,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 12,000.00	$ 12,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 17,000.00	$ 17,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 19,000.00	$ 19,000.00
1203	1	LS	Utility Crossings (2% of Pipe)	$ 5,000.00	$ 5,000.00
1204	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 5,000.00	$ 5,000.00
			SITE RESTORATION		
1300	11,240	LS	Native Restoration	$ 1.00	$ 11,240.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00
			TOTAL FIELD COSTS		**$ 384,140.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION CONVEYANCE: DIVERSIONS AND PUMP STATIONS
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 214,000.00	$ 214,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 300,000.00	$ 300,000.00
1002	1	LS	General Requirements	$ 171,000.00	$ 171,000.00
			DIVERSION FACILITY FOR PS NO. 1		
1100	1	LS	Rubber Dam Assembly	$ 500,000.00	$ 500,000.00
1101	2000	CY	Excavation/Backfill	$ 10.00	$ 20,000.00
1102	150	CY	Concrete	$ 500.00	$ 75,000.00
1103	2000	SF	Vinyl Sheet Piling	$ 20.00	$ 40,000.00
1104	2000	TONS	Rip Rap Channel	$ 30.00	$ 60,000.00
1105	2	LS	3'x3' Head Gates	$ 30,000.00	$ 60,000.00
1106	1	LS	Blower Facilities	$ 200,000.00	$ 200,000.00
			PUMP STATION NO. 1 (3000 gpm @ 140 psi)		
1200	3000	CY	Excavation/Backfill	$ 10.00	$ 30,000.00
1201	1200	LF	16" Inclined Wetwells (Steel) (400 lf each)	$ 200.00	$ 240,000.00
1202	3	EA	Intake Screens	$ 15,000.00	$ 45,000.00
1203	3	EA	Intake Screens Backwash & Appurtenances	$ 15,000.00	$ 45,000.00
1204	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1205	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1206	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1207	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1208	3	EA	Equipment Pumps @ 1000 gpm (100 hp)	$ 25,000.00	$ 75,000.00
1209	1	LS	Equipment Pump Manifold	$ 150,000.00	$ 150,000.00
1210	1	LS	Equipment Valves and Appurtenant Items	$ 250,000.00	$ 250,000.00
1211	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 80,000.00	$ 80,000.00
1212	1	LS	Pump Station Structure Foundation	$ 80,000.00	$ 80,000.00
1213	1	LS	Pump Station Instrumentation and Controls	$ 50,000.00	$ 50,000.00
1214	1	LS	Pump Station Electrical	$ 75,000.00	$ 75,000.00
1215	1	LS	Pump Station Heating and Ventilation	$ 15,000.00	$ 15,000.00
			PUMP STATION NO. 2 (5400 gpm @ 110 psi)		
1300	3000	CY	Excavation/Backfill	$ 10.00	$ 30,000.00
1301	1200	CY	24" Inclined Wetwells (Steel) (400 lf each)	$ 300.00	$ 360,000.00
1302	3	EA	Intake Screens	$ 20,000.00	$ 60,000.00
1303	3	EA	Intake Screens Backwash & Appurtenances	$ 20,000.00	$ 60,000.00
1304	1	LS	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1305	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1306	1000	AC	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1307	400	SY	Sitework Fence	$ 10.00	$ 4,000.00
1308	4	LF	Equipment Pumps @ 1800 gpm (150 hp)	$ 30,000.00	$ 120,000.00
1309	1	EA	Equipment Pump Manifold	$ 200,000.00	$ 200,000.00
1310	1	LS	Equipment Valves and Appurtenant Items	$ 300,000.00	$ 300,000.00
1311	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 80,000.00	$ 80,000.00
1312	1	LS	Pump Station Structure Foundation	$ 80,000.00	$ 80,000.00
1313	1	LS	Pump Station Instrumentation and Controls	$ 50,000.00	$ 50,000.00
1314	1	LS	Pump Station Electrical	$ 100,000.00	$ 100,000.00
1315	1	LS	Pump Station Heating and Ventilation	$ 15,000.00	$ 15,000.00

TOTAL FIELD COSTS **$ 4,285,500.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CIBECUE IRRIGATION UNIT
IRRIGATION STORAGE: SALT CREEK DAM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 1,613,000.00	$ 1,613,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 2,822,000.00	$ 2,822,000.00
1002	1	L.S.	General Requirements	$ 1,613,000.00	$ 1,613,000.00
			SITE PREPARATION		
1100	1	L.S.	Diversion and Care of Stream	$ 100,000.00	$ 100,000.00
1101	1	L.S.	Diversion Coffer Dams	$ 150,000.00	$ 150,000.00
1102	400	ACRE	Clearing and Grubbing	$ 750.00	$ 300,000.00
1103	50,000	C.Y.	Rock Excavation	$ 18.00	$ 900,000.00
1104	210,000	C.Y.	Unclassified Excavation	$ 6.00	$ 1,260,000.00
1105	1	L.S.	Access Road	$ 50,000.00	$ 50,000.00
1106	30,000	S.Y.	Abutment and Foundation Preparation	$ 65.00	$ 1,950,000.00
1107	1	L.S.	General Grouting	$ 1,000,000.00	$ 1,000,000.00
1108	3,500	C.Y.	Dental Concrete	$ 120.00	$ 420,000.00
			RCC DAM		
1200	350,000	C.Y.	RCC for Dam	$ 65.00	$ 22,750,000.00
1201	6,000	C.Y.	Structural Concrete for Stilling Basin	$ 120.00	$ 720,000.00
1202	24,000	S.F.	Spillway Facing Concrete	$ 60.00	$ 1,440,000.00
1203	400	C.Y.	Training Wall Concrete	$ 600.00	$ 240,000.00
1204	1	L.S.	Non Overflow Face Concrete	$ 150,000.00	$ 150,000.00
1205	125,000	S.F.	Upstream face panels & Liner	$ 12.00	$ 1,500,000.00
1206	11,000	S.F.	Impermable Membrane	$ 2.00	$ 22,000.00
1207	1	L.S.	Security Fence	$ 30,000.00	$ 30,000.00
1208	1	L.S.	Instrumentation/Automation	$ 100,000.00	$ 100,000.00
			OUTLETS, GATES, OPERATORS		
1300	800	L.F.	5 Foot Diameter Steel Principal Spillway	$ 600.00	$ 480,000.00
1301	600	L.F.	2 Foot Diameter Steel Low Flow Pipeline	$ 200.00	$ 120,000.00
1302	2	EACH	Trashracks	$ 5,000.00	$ 10,000.00
1303	1	L.S.	Gates and Operators	$ 250,000.00	$ 250,000.00
1304	1	L.S.	Handrails and miscellaneous metal	$ 30,000.00	$ 30,000.00
1305	1	L.S.	Emergency Warning System	$ 150,000.00	$ 150,000.00
			SITE RESTORATION		
1500	100	ACRE	Finish grading and seeding	$ 1,500.00	$ 150,000.00
			TOTAL FIELD COSTS		**$ 40,320,000.00**

WMAT Irrigation System - Cibecue
OM&R
October 2006

Operation and Maintenance Costs per Year

Pipe/Canal/Pump Stations	**30,640 combined ft of pipe/canal**					**Total/Yr**
Personnel	#	Hours/yr	$/hr	$/Yr		
1 Technician per 150,000 feet of pipe/canal	1	2080	$ 20	$ 41,600		
and for pump stations, ARVs, other		2080	$ 20	$ -		
1 Manager/Supervisor	1	2080	$ 30	$ 62,400		
Total Personnel	**2**				**$**	**104,000**
Pump Power					**$**	**105,324**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	2	3000	$ 0.445	$ 2,670		
					$	**2,670**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**8,663**
Total Distribution					**$**	**220,657**
Reservoirs/Dams						**Total/Yr**
Personnel	No.	Hours/yr	$/hr	$/Yr		
Technicians (Salt Creek, 3)	3	2080	$ 20	$ 124,800		
Total Personnel	3				**$**	**124,800**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	3	3000	$ 0.445	$ 4,005		
					$	**4,005**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**219,139**
Total Reservoirs					**$**	**347,944**
Center Pivots	**400 acres total**					**Total/Yr**
	No.	Hours/yr	$/hr	$/Yr		
1 Person per 1000 ac of center pivots	1	2080	$ 20	$ 41,600		
					$	**41,600**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	1	3000	$ 0.445	$ 1,335		
					$	**1,335**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**1,845**
Power, including booster pumps					**$**	**33,726**
Orchard Application	**600 acres total**					
	No.	Hours/yr	$/hr	$/Yr		
1 Person per 500 ac of orchard	1	2080	$ 20	$ 41,600		
1 Part-Time Person for power	1	520	$ 20	$ 10,400		
					$	**52,000**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	1	3000	$ 0.445	$ 1,335		
					$	**1,335**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**24,429**
Power, including booster pumps					**$**	**32,208**
Total Irrigation					**$**	**188,478**
Total Operation and Maintenance Cost per Year					**$**	**757,079**

Replacement Costs

Pipes/Canal/Pump Stations	**30,640 ft of pipe**			
Pipes, Fittings, and Installation (40 yrs)			**$**	**248,300**
Hydrants, Valves, and Taps (20 yrs)		$ 48,000		
Cathodic Protection (20 yrs)				
Pump Station HV and Appurtenances (20 yrs)		$ 1,080,000		
			$	**1,128,000**
Pumps, Motors, Controls, Mechanical (10yrs)		$ 940,000		
Canal Sys. Automation, Slide Gates (10 yrs)		$ 43,000		
			$	**983,000**
Reservoirs/Dams				
Salt Creek, Mechanical/electrical (20 yrs)			**$**	**430,000**
Center Pivot System				
Pivots (20 yrs)				**$220,000.00**
Pumps, Controls, Electrical (10 yrs)				**$70,000.00**
Orchard Application				
Distribution Piping (40 yrs)			**$**	**1,075,176**
Sprinklers, Pumps, Controls, Electrical (10 yrs)			**$**	**1,974,532**
Total Replacement Costs by Replacement Period				
40 Years			**$**	**248,300**
20 Years			**$**	**2,423,176**
10 Years			**$**	**3,457,532**

WMAT Irrigation System - Cibecue
Pump Station Power Cost Present Worth Analysis
October 2006

Variables

Demand Charge/hp	6.4876	
Energy cost / kW*hr first	0.052	
after 300 hours	0.0275	
Discount Factor	0%	
Years	40	
	Pump 1	Pump 2
Startup Flowrate (mgd)	4.32	7.776
Buildout Flowrate (mgd)	4.32	7.776
Year Buildout	1	1
	Pump 1	Pump 2
Pumpstation Capacity (g	3,000	5,400
Max operating hrs/day	24	
Pump 1, HP	310	
Pump 2, HP	430	

Required Water Power

	Pump 1	Pump 2
Q, gpm	3,000	5,400
Q, cfs	6.68	12.03
HL, ft	322	253
gamma, lb/cf	62.40	62.40
Conversion	550	550
Watr Pwr, HP	**244.2**	**345.4**
Pump Pwr, HP	287.3	406.3
Motor Pwr, HP	302.4	427.7

	Common Variables								
Pumpstation 1	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/ yr**	**Energy $/ yr**	**Total $/ yr**
	0								
	1	4.32	3,000	8	2,148	310	$24,134	$19,988	$44,122

	Common Variables					PVC Kadoka Reservoir @			
Pumpstation 2	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	7.78	5,400	8	2,148	430	$33,476	$27,726	$61,202

WMAT Irrigation System - Cibecue
Center Pivot and Orchard Application Power
October 2006

Center Pivot Application

Calculate power requirements according to formula: 4.9 HP +[(# of spans - 1) x 60% x 0.6 HP
Assume average use of 8 hours per day for 365 days per year

Demand Charge/hp	6.48759
Energy cost / kW*hr, first 300 hours	0.05197
After 300 hours per month	0.02747

Number of pivots		Power requirement, HP	kWh/yr	Demand charge	Annual energy cost	Total annual power cost
2	5 Span Pivot	117.8	256,503	$ 9,171	$ 7,692	$ 16,863
2	7 Span Pivot	117.8	256,503	$ 9,171	$ 7,692	$ 16,863
Total			**513,006**	**$ 18,342**	**$ 15,384**	**$ 33,726**

Orchard Application

Assume power requirement of 15 HP per 40 acre parcel
Assume average use of 8 hours per day for 365 days per year

Demand Charge/hp	6.48759
Energy cost / kW*hr, first 300 hours	0.05197
After 300 hours per month	0.02747

Number of parcels	Power per parcel, HP	Power requirement, HP	kWh/yr	Demand charge	Annual energy cost	Total annual power cost
15	15	225	489,925	$ 17,516	$ 14,692	**$ 32,208**

Total Annual Power Cost for the Cibecue Unit	**$ 65,934**

Total Present Worth	
40 yrs	20 yrs
$ (1,305,021)	$ (896,068)

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
SUMMARY OF TOTAL PROBABLE PROJECT COSTS
January 2007

Schedule	Total Field Costs	
Irrigation Application: Drip Irrigation for Poplar	$	37,061,000.00
Irrigation Application: Drip Irrigation for X-Mas Trees	$	1,507,000.00
Irrigation Conveyance: Canal System	$	4,669,000.00
Irrigation Conveyance: Pipelines	$	14,896,000.00
Irrigation Conveyance: Diversions & Pump Stations	$	14,959,000.00
Irrigation Storage: Jeep Trail Regulating Reservoir	$	7,784,000.00
Irrigation Storage: Bonito Creek Dam	$	138,650,000.00
TOTALS	**$**	**219,526,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION APPLICATION: POPLAR DRIP IRRIGATION (per 160 acres)

January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 34,000.00	$ 34,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 47,000.00	$ 47,000.00
1002	1	LS	General Requirements	$ 27,000.00	$ 27,000.00
			DRIPPER SYSTEM		
1100	580800	LF	20mm Dripperline	$ 0.25	$ 145,200.00
1101	1	LS	Miscellaneous Fittings	$ 5,000.00	$ 5,000.00
1102	160	AC	Dripperline Install	$ 350.00	$ 56,000.00
			DISTRIBUTION SYSTEM		
1200	159200	LF	1.5" Poly Lateral Piping	$ 0.40	$ 63,680.00
1201	5280	LF	15" Class 100 PIP Distribution Piping	$ 15.00	$ 79,200.00
1202	1900	LF	10" Class 100 PIP Distribution Piping	$ 8.00	$ 15,200.00
1203	1520	LF	8" Class 100 PIP Distribution Piping	$ 6.00	$ 9,120.00
1204	1860	LF	6" Class 100 PIP Distribution Piping	$ 4.00	$ 7,440.00
1205	40	EA	PIP Fittings	$ 100.00	$ 4,000.00
1206	120	EA	PIP Saddles	$ 50.00	$ 6,000.00
1207	1	LS	Air Vents, Valves, Flow Meters	$ 10,000.00	$ 10,000.00
			PUMPING, FILTRATION AND ZONING FACILITIES		
1300	1	LS	Pump Station & Inlet	$ 40,000.00	$ 40,000.00
1301	1	LS	Sand Media Filtration	$ 40,000.00	$ 40,000.00
1302	4	EA	Pressure Regulating Field Valves	$ 5,000.00	$ 20,000.00
1303	1	EA	Soil Moisture Monitoring	$ 25,000.00	$ 25,000.00
			APPURTENANT FACILITIES		
1500	1	LS	Electrical Facilities	$ 20,000.00	$ 20,000.00
1501	1	LS	Control System	$ 20,000.00	$ 20,000.00

160 Acre Parcel Construction Subotal	**$ 673,840.00**
TOTAL FIELD COSTS (55 Parcels)	**$ 37,061,200.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION APPLICATION: XMAS TREES DRIP IRRIGATION (per 20 acres)
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 6,000.00	$ 6,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 8,000.00	$ 8,000.00
1002	1	LS	General Requirements	$ 5,000.00	$ 5,000.00
			DRIPPER SYSTEM		
1100	72600	LF	20mm Dripperline	$ 0.30	$ 21,780.00
1101	1	LS	Miscellaneous Fittings	$ 5,000.00	$ 5,000.00
1102	40	AC	Dripperline Install	$ 350.00	$ 14,000.00
			DISTRIBUTION SYSTEM		
1200	20000	LF	1.5" Poly Lateral Piping	$ 0.40	$ 8,000.00
1201	900	LF	10" Class 100 PIP Distribution Piping	$ 8.00	$ 7,200.00
1202	200	LF	8" Class 100 PIP Distribution Piping	$ 6.00	$ 1,200.00
1203	240	LF	6" Class 100 PIP Distribution Piping	$ 4.00	$ 960.00
1204	5	EA	PIP Fittings	$ 100.00	$ 500.00
1205	16	EA	PIP Saddles	$ 50.00	$ 800.00
1206	1	LS	Air Vents, Valves, Flow Meters	$ 1,500.00	$ 1,500.00
			PUMPING, FILTRATION AND ZONING FACILITIES		
1300	1	LS	Pump Station	$ 10,000.00	$ 10,000.00
1301	1	LS	Sand Media Filtration	$ 10,000.00	$ 10,000.00
1302	1	EA	Pressure Regulating Field Valves	$ 1,000.00	$ 1,000.00
1303	1	EA	Soil Moisture Monitoring	$ 5,000.00	$ 5,000.00
			APPURTENANT FACILITIES		
1500	1	LS	Electrical Facilities	$ 5,000.00	$ 5,000.00
1501	1	LS	Control System	$ 5,000.00	$ 5,000.00

20 Acre Parcel Construction Subotal	**$ 115,940.00**
TOTAL FIELD COSTS (13 Parcels)	**$ 1,507,220.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION CONVEYANCE: CANAL SYSTEM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 233,000.00	$ 233,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 327,000.00	$ 327,000.00
1002	1	LS	General Requirements / Traffic Control	$ 187,000.00	$ 187,000.00
			CANAL SYSTEM		
1100	24,000	LF	120 cfs Canal Excavation/Embankment (2 cy/ft)	$ 40.00	$ 960,000.00
1101	24,000	LF	120 cfs Canal Soil-Cement Liner (1.0 cy/ft)	$ 40.00	$ 960,000.00
			SIPHONS & ENCLOSED CONDUITS		
1300	1,700	LF	120 cfs Siphons (60" Diameter)	$ 400.00	$ 680,000.00
			STRUCTURES AND APPURTENANT FACILITIES		
1200	1	LS	120 cfs Grade Control Structures (10% of Canal)	$ 192,000.00	$ 192,000.00
1201	1	LS	120 cfs Wasteway Facilities (15% of Canal)	$ 288,000.00	$ 288,000.00
1202	1	LS	120 cfs Discharge Structure	$ 400,000.00	$ 400,000.00
1203	1	LS	Culverts (10% of Canal)	$ 192,000.00	$ 192,000.00
1204	1	LS	Canal System Automation	$ 100,000.00	$ 100,000.00
			SITE RESTORATION		
1300	100	AC	Finish Grading and Seeding	$ 1,500.00	$ 150,000.00
			TOTAL FIELD COSTS		**$ 4,669,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION CONVEYANCE: PIPELINES
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 745,000.00	$ 745,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 1,043,000.00	$ 1,043,000.00
1002	1	LS	General Requirements / Traffic Control	$ 596,000.00	$ 596,000.00
			PIPELINE		
1100	7,200	LF	60" HDPE Pipe	$ 300.00	$ 2,160,000.00
1101	8,600	LF	54" HDPE Pipe	$ 200.00	$ 1,720,000.00
1102	2,640	LF	48" Class 100 C905 Pipe	$ 130.00	$ 343,200.00
1103	2,000	LF	42" Class 100 C905 Pipe	$ 100.00	$ 200,000.00
1104	3,060	LF	36" Class 100 C905 Pipe	$ 75.00	$ 229,500.00
1105	4,040	LF	36" Class 125 C905 Pipe	$ 95.00	$ 383,800.00
1106	2,640	LF	36" Class 165 C905 PIpe	$ 120.00	$ 316,800.00
1107	800	LF	36" Class 250 Steel Pipe	$ 200.00	$ 160,000.00
1108	4,220	LF	30" Class 100 C905 Pipe	$ 50.00	$ 211,000.00
1109	4,200	LF	30" Class 125 C905 Pipe	$ 66.00	$ 277,200.00
1110	2,000	LF	27" Class 100 PIP Pipe	$ 40.00	$ 80,000.00
1111	2,000	LF	27" Class 125 PIP Pipe	$ 50.00	$ 100,000.00
1112	14,500	LF	24" Class 100 PIP Pipe	$ 31.00	$ 449,500.00
1113	14,500	LF	24" Class 125 PIP Pipe	$ 39.00	$ 565,500.00
1114	3,800	LF	21" Class 100 PIP Pipe	$ 25.00	$ 95,000.00
1115	3,800	LF	21" Class 125 PIP Pipe	$ 31.00	$ 117,800.00
1116	6,900	LF	18" Class 100 PIP Pipe	$ 18.00	$ 124,200.00
1117	6,900	LF	18" Class 125 PIP Pipe	$ 22.00	$ 151,800.00
1118	9,100	EA	15" Class 100 PIP Pipe	$ 15.00	$ 136,500.00
1119	9,100	EA	15" Class 125 PIP Pipe	$ 18.00	$ 163,800.00
1120	26000	EA	12" Class 100 PIP Pipe	$ 10.00	$ 260,000.00
1121	26000	EA	12" Class 125 PIP Pipe	$ 13.00	$ 338,000.00
1122	2100	EA	10" Class 100 PIP Pipe	$ 8.00	$ 16,800.00
1123	2100	EA	10" Class 125 PIP Pipe	$ 10.00	$ 21,000.00
1124	12000	EA	8" Class 100 PIP Pipe	$ 6.00	$ 72,000.00
1125	12000	EA	8" Class 125 PIP Pipe	$ 7.00	$ 84,000.00
1126	10500	EA	6" Class 100 PIP Pipe	$ 6.00	$ 63,000.00
1127	10500	EA	6" Class 125 PIP Pipe	$ 7.00	$ 73,500.00
1128	1	LS	PVC Fittings (5% of Pipe)	$ 245,000.00	$ 245,000.00
1129	1	LS	HDPE Fittings (5% of Pipe)	$ 194,000.00	$ 194,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 446,000.00	$ 446,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 624,000.00	$ 624,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 713,000.00	$ 713,000.00
1203	1	LS	Boring and Jacking (3% of Pipe)	$ 267,000.00	$ 267,000.00
1204	1	LS	Utility Crossings (3% of Pipe)	$ 267,000.00	$ 267,000.00
1205	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 178,000.00	$ 178,000.00
1206	1	LS	Pressure Reducing Facilities (5% of Pipe)	$ 446,000.00	$ 446,000.00
			SITE RESTORATION		
1300	212,800	LS	Native Restoration	$ 1.00	$ 212,800.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 14,896,300.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION CONVEYANCE: DIVERSIONS AND PUMP STATIONS
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 748,000.00	$ 748,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 1,047,000.00	$ 1,047,000.00
1002	1	LS	General Requirements	$ 598,000.00	$ 598,000.00
			CANAL LIFT PUMP (52,000 gpm @ 90 psi max)		
1400	3	AC	Sitework Clearing and Grubbing	$ 750.00	$ 2,250.00
1401	3	AC	Sitework Restoration	$ 3,000.00	$ 9,000.00
1402	2500	SY	Sitework Access Road and Parking Area	$ 20.00	$ 50,000.00
1403	1600	LF	Sitework Fence	$ 10.00	$ 16,000.00
1404	2500	LF	72" Intake Pipeline	$ 750.00	$ 1,875,000.00
1405	5	EA	Equipment Pumps @ 10400 gpm (750 hp)	$ 200,000.00	$ 1,000,000.00
1406	1	LS	Equipment Pump Manifold	$ 500,000.00	$ 500,000.00
1407	1	LS	Equipment Valves and Appurtenant Items	$ 1,000,000.00	$ 1,000,000.00
1408	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 250,000.00	$ 250,000.00
1409	1	LS	Pump Station Structure Foundation	$ 250,000.00	$ 250,000.00
1410	1	LS	Pump Station Instrumentation and Controls	$ 400,000.00	$ 400,000.00
1411	1	LS	Pump Station Electrical	$ 600,000.00	$ 600,000.00
1412	1	LS	Pump Station Heating and Ventilation	$ 150,000.00	$ 150,000.00
			DIVERSION FACILITY FOR PS NO. 2		
1200	1	LS	Rubber Dam Assembly	$ 500,000.00	$ 500,000.00
1201	2000	CY	Excavation/Backfill	$ 10.00	$ 20,000.00
1202	150	CY	Concrete	$ 500.00	$ 75,000.00
1203	2000	SF	Vinyl Sheet Piling	$ 20.00	$ 40,000.00
1204	2000	TONS	Rip Rap Channel	$ 30.00	$ 60,000.00
1205	1	LS	42" Inlet Slide Gates	$ 15,000.00	$ 15,000.00
1206	200	LF	42" HDPE Intake Pipeline	$ 200.00	$ 40,000.00
1207	1	LS	Blower Facilities	$ 200,000.00	$ 200,000.00
			PUMP STATION NO. 2 (16,500 gpm @ 200 psi)		
1300	6000	CY	Excavation/Backfill	$ 10.00	$ 60,000.00
1301	240	CY	Wetwell Concrete	$ 500.00	$ 120,000.00
1302	1	LS	Wetwell 42" Slide Gate	$ 15,000.00	$ 15,000.00
1303	1	LS	Wetwell Miscellaneous Metals	$ 20,000.00	$ 20,000.00
1304	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1305	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1306	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1307	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1308	4	EA	Equipment Pumps @ 4125 gpm (600 hp)	$ 150,000.00	$ 600,000.00
1309	1	LS	Equipment Pump Manifold	$ 200,000.00	$ 200,000.00
1310	1	LS	Equipment Valves and Appurtenant Items	$ 300,000.00	$ 300,000.00
1311	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 150,000.00	$ 150,000.00
1312	1	LS	Pump Station Structure Foundation	$ 100,000.00	$ 100,000.00
1313	1	LS	Pump Station Instrumentation and Controls	$ 150,000.00	$ 150,000.00
1314	1	LS	Pump Station Electrical	$ 250,000.00	$ 250,000.00
1315	1	LS	Pump Station Heating and Ventilation	$ 50,000.00	$ 50,000.00

			PUMP STATION NO. 3 (6,900 gpm @ 100 psi)		
1300	3000	CY	Excavation/Backfill	$ 10.00	$ 30,000.00
1301	1500	CY	30" Inclined Wetwells (Steel) (500 lf each)	$ 400.00	$ 600,000.00
1302	3	EA	Intake Screens	$ 25,000.00	$ 75,000.00
1303	3	EA	Intake Screens Backwash & Appurtenances	$ 25,000.00	$ 75,000.00
1400	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1401	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1402	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1403	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1404	3	EA	Equipment Pumps @ 2300 gpm (200 hp)	$ 50,000.00	$ 150,000.00
1405	1	LS	Equipment Pump Manifold	$ 200,000.00	$ 200,000.00
1406	1	LS	Equipment Valves and Appurtenant Items	$ 300,000.00	$ 300,000.00
1407	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 150,000.00	$ 150,000.00
1408	1	LS	Pump Station Structure Foundation	$ 100,000.00	$ 100,000.00
1409	1	LS	Pump Station Instrumentation and Controls	$ 150,000.00	$ 150,000.00
1410	1	LS	Pump Station Electrical	$ 250,000.00	$ 250,000.00
1411	1	LS	Pump Station Heating and Ventilation	$ 50,000.00	$ 50,000.00
			PUMP STATION NO. 4 (7,200 gpm @ 100 psi)		
1500	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1501	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1502	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1503	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1504	500	LF	24" Intake Pipeline	$ 50.00	$ 25,000.00
1505	3	EA	Equipment Pumps @ 2400 gpm (200 hp)	$ 45,000.00	$ 135,000.00
1506	1	LS	Equipment Pump Manifold	$ 175,000.00	$ 175,000.00
1507	1	LS	Equipment Valves and Appurtenant Items	$ 275,000.00	$ 275,000.00
1508	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 150,000.00	$ 150,000.00
1509	1	LS	Pump Station Structure Foundation	$ 100,000.00	$ 100,000.00
1510	1	LS	Pump Station Instrumentation and Controls	$ 150,000.00	$ 150,000.00
1511	1	LS	Pump Station Electrical	$ 225,000.00	$ 225,000.00
1512	1	LS	Pump Station Heating and Ventilation	$ 50,000.00	$ 50,000.00

TOTAL FIELD COSTS **$ 14,958,500.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION STORAGE: JEEP TRAIL REGULATING RESERVOIR
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 389,000.00	$ 389,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 545,000.00	$ 545,000.00
1002	1	L.S.	General Requirements	$ 311,000.00	$ 311,000.00
			SITE PREPARATION		
1100	1	L.S.	Diversion and care of stream	$ 100,000.00	$ 100,000.00
1101	70	ACRE	Clearing and Grubbing	$ 750.00	$ 52,500.00
1102	12	MON.	Dewatering	$ 5,000.00	$ 60,000.00
1103	50,000.00	C.Y.	Unclassified excavation	$ 6.15	$ 307,500.00
1104	1	L.S.	Upstream and Downstream Coffer dams	$ 50,000.00	$ 50,000.00
1105	1	L.S.	Access road	$ 50,000.00	$ 50,000.00
1106	5,000.00	S.Y.	Abutment and foundation preparation	$ 40.00	$ 200,000.00
			EARTH DAM		
1200	150,000.00	C.Y.	Earthwork for Dam Embankment	$ 6.00	$ 900,000.00
1201	16,000.00	VLF	Sheet Piling Cutoff Wall	$ 50.00	$ 800,000.00
1202	10,000.00	VLF	Sheet Piling Support Dam Tower and Outlet Condu	$ 50.00	$ 500,000.00
1203	1000	C.Y.	Concrete Cutoff Wall	$ 250.00	$ 250,000.00
1204	5,000.00	C.Y.	Riprap Embankment Protection	$ 70.00	$ 350,000.00
1205	1	L.S.	Security Fence	$ 50,000.00	$ 50,000.00
1206	1	L.S.	Instrumentation/Automation	$ 250,000.00	$ 250,000.00
			OUTLET, TOWER, GATES, OPERATORS		
1300	1,000.00	C.Y.	Structural Concrete, 4000 psi	$ 500.00	$ 500,000.00
1301	800	L.F.	6 foot diameter outlet	$ 750.00	$ 600,000.00
1302	120	L.F.	6 foot diameter air shaft	$ 750.00	$ 90,000.00
	1000	L.F.	6 foot diameter principal spillway	$ 750.00	$ 750,000.00
1303	2,400.00	S.F.	Bridge to tower	$ 60.00	$ 144,000.00
1304	2	EACH	Trashracks	$ 25,000.00	$ 50,000.00
1305	1	L.S.	Slide gates w/ operators	$ 250,000.00	$ 250,000.00
1306	1	L.S.	Handrails and miscellaneous metal	$ 40,000.00	$ 40,000.00
1307	1	L.S.	Emergency Warning System	$ 150,000.00	$ 150,000.00
			SITE CLEAN UP		
1500	30	ACRE	Finish grading and seeding	$ 1,500.00	$ 45,000.00

TOTAL FIELD COSTS **$ 7,784,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE IRRIGATION UNIT
IRRIGATION STORAGE: BONITO CREEK DAM
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	L.S.	Mobilization/Demobilization	$ 6,933,000.00	$ 6,933,000.00
1001	1	L.S.	Taxes, Bonds, and Insurance	$ 9,706,000.00	$ 9,706,000.00
1002	1	L.S.	General Requirements	$ 5,546,000.00	$ 5,546,000.00
			SITE PREPARATION		
1100	1	L.S.	Diversion and Care of Stream	$ 500,000.00	$ 500,000.00
	1	L.S.	Diversion Coffer Dams	$ 250,000.00	$ 250,000.00
1101	1,200	ACRE	Clearing and Grubbing	$ 750.00	$ 900,000.00
1102	24	MON.	Dewatering	$ 75,000.00	$ 1,800,000.00
1103	200,000	C.Y.	Rock Excavation	$ 18.75	$ 3,750,000.00
1104	1,000,000	C.Y.	Unclassified Excavation	$ 6.15	$ 6,150,000.00
1105	1	L.S.	Access Road	$ 500,000.00	$ 500,000.00
1106	36,000	S.Y.	Abutment and Foundation Preparation	$ 65.00	$ 2,340,000.00
1107	1	L.S.	General Grouting	$ 8,000,000.00	$ 8,000,000.00
1108	5,000	C.Y.	Dental concrete	$ 120.00	$ 600,000.00
			RCC DAM		
1200	1,300,000	C.Y.	RCC for dam	$ 53.00	$ 68,900,000.00
1201	1,000	C.Y.	Structural Concrete for Base Apron	$ 120.00	$ 120,000.00
1202	20,000	S.F.	Facing concrete	$ 60.00	$ 1,200,000.00
1203	420,000	SF	Non Overflow Face Treatment	$ 5.00	$ 2,100,000.00
1204	345,000	S.F.	Upstream face panels & Liner	$ 10.00	$ 3,450,000.00
1205	1	L.S.	Plinth Construction (Spplemental)	$ 500,000.00	$ 500,000.00
1206	1	L.S.	Security Fence	$ 360,000.00	$ 360,000.00
1207	1	L.S.	Instrumentation/Automation	$ 1,000,000.00	$ 1,000,000.00
			OUTLET, TOWER, GATES, OPERATORS		
1300	15,000	C.Y.	Structural Concrete, 4000 psi	$ 500.00	$ 7,500,000.00
1301	300	L.F.	Steel Transition Liner (10 foot dia.)	$ 1,105.00	$ 331,500.00
1302	1,600	L.F.	10 foot diameter RCP	$ 953.00	$ 1,524,800.00
1303	2,200	L.F.	6 foot diameter steel penstock	$ 750.00	$ 1,650,000.00
1304	360	L.F.	6 foot diameter air shaft	$ 750.00	$ 270,000.00
1305	2,400	S.F.	Bridge to Tower	$ 60.00	$ 144,000.00
1306	5	EACH	Trashracks	$ 50,000.00	$ 250,000.00
1307	1	L.S.	Slide gates w/ operators	$ 1,000,000.00	$ 1,000,000.00
1308	1	L.S.	Handrails and miscellaneous metal	$ 500,000.00	$ 500,000.00
1309	1	L.S.	Emergency Warning System	$ 500,000.00	$ 500,000.00
			SITE RESTORATION		
1400	250	ACRE	Finish grading and seeding	$ 1,500.00	$ 375,000.00

TOTAL FIELD COSTS **$ 138,650,300.00**

WMAT Irrigation System - Bonito Prairie
OM&R
October 2006

Operation and Maintenance Costs per Year

Pipe/Canal/Pump Stations	**237,200 combined ft of pipe/canal**					**Total/Yr**
Personnel	#	Hours/yr	$/hr	$/Yr		
1 Technician per 150,000 feet of pipe/canal	2	2080	$ 20	$ 83,200		
Technicians for pump stations, ARVs, other	3	2080	$ 20	$ 124,800		
1 Manager/Supervisor	1	2080	$ 30	$ 62,400		
Total Personnel	**6**				**$**	**270,400**
Pump Power					**$**	**970,685**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	6	3000	$ 0.445	$ 8,010		
					$	**8,010**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**99,284**
Total					**$**	**1,348,379**
Reservoirs/Dams						**Total/Yr**
Personnel	No.	Hours/yr	$/hr	$/Yr		
Technicians (Jeep Trail and Bonito Creek, 6)	6	2080	$ 20	$ 249,600		
1 Manager/Supervisor	1	2080	$ 30	$ 62,400		
Total Personnel	7				**$**	**312,000**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	7	3000	$ 0.445	$ 9,345		
					$	**9,345**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**732,172**
Total					**$**	**1,053,517**
Drip Irrigation	**9,060 acres total**					**Total/Yr**
1 Person per 500 ac of drip irrigation	No.	Hours/yr	$/hr	$/Yr		
Poplars (55x160 ac), Xmas trees (13x20 ac)	18	2080	$ 20	$ 748,800		
1 Part-Time Person for Power	16	520	$ 20	$ 166,400		
Total Personnel	34				**$**	**915,200**
Miscellaneous	No.	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	28	3000	$ 0.445	$ 37,380		
					$	**37,380**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**192,842**
Power, including booster pumps					**$**	**486,347**
Total					**$**	**1,631,769**
Total Operation and Maintenance Cost per Year					**$**	**4,033,665**

Replacement Costs

					$	1,552,335
					$	1,024,298
Pipes/Canal/Pump Stations	**237,200 ft of pipe**					
Pipes, Fittings, and Installation (40 yrs)					**$**	**9,619,900**
Hydrants, Valves, and Taps (20 yrs)				$ 2,229,000		
Pump Station HV and Appurtenances (20 yrs)				$ 2,756,000		
					$	**4,985,000**
Pumps, Motors, Controls, Mechanical (10yrs)				$ 4,460,000		
Canal System Automation (10 yrs)				$ 100,000		
					$	**4,560,000**
Reservoirs/Dams						
Jeep Trail, Mechanical/electrical (20 yrs)				$ 440,000		
Bonito Creek, Mechanical/Electrical (20 yrs)				$ 3,000,000		
					$	**3,440,000**
Drip Irrigation Systems						
Distribution Piping (40 yrs)					**$**	**7,360,880**
Dripperline, Pumps, Electrical (10 yrs)					**$**	**15,822,140**
Sand filter (20 yrs)					**$**	**2,330,000**
Total Replacement Costs by Replacement Period						
40 Years					**$**	**16,980,780**
20 Years					**$**	**10,755,000**
10 Years					**$**	**20,382,140**

WMAT Irrigation System - Bonito Prairie
Pump Station Power Cost Present Worth Analysis
October 2006

Variables

Demand Charge/hp	6.4876			
Energy cost / kW*hr first	0.052			
after 300 hours	0.0275			
Discount Factor	0%			
Years	40			
	Canal Lift Pump	Pump St. 2	Pump St. 3	Pump St. 4
Startup Flowrate (mgd)	74.88	23.76	9.936	10.368
Buildout Flowrate (mgd)	74.88	23.76	9.936	10.368
Year Buildout	1			
Pumpstation Capacity (g	52,000	16,500	6,900	7,200
Max operating hrs/day	24			
Canal Lift Pump, HP*	3,400			
Pump Station 2, HP*	2,400			
Pump Station 3, HP*	500			
Pump Station 4, HP*	520			

*Values as given in Cap Cost estimates

Required Water Power

	Canal Lift Pump	Pump Station 2	Pump Station 3	Pump Station 4
Q, gpm	52,000	16,500	6,900	7,200
Q, cfs	115.86	36.76	15.37	16.04
HL, ft	207	460	230	230
gamma, lb/cf	62.40	62.40	62.40	62.40
Conversion	550	550	550	550
Watr Pwr, HP	**2,721.1**	**1,918.7**	**401.2**	**418.6**
Pump Pwr, HP	3,201.3	2,257.3	472.0	492.5
Motor Pwr, HP	3,369.8	2,376.1	496.8	518.4

	Common Variables								
Canal Lift Pump	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/ yr**	**Energy $/ yr**	**Total $/ yr**
	0								
	1	74.88	52,000	8	2,148	3,400	$264,694	$219,226	$483,919

	Common Variables								
Pumpstation 2	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	23.76	16,500	8	2,148	2,400	$186,843	$154,747	$341,590

	Common Variables								
Pumpstation 3	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	9.94	6,900	8	2,148	500	$38,926	$32,239	$71,165

	Common Variables								
Pumpstation 4	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	10.37	7,200	8	2,148	520	$40,483	$33,529	$74,011

WMAT Irrigation System - Bonito Prairie
Drip Irrigation - Power Requirements
October 2006

Poplars

Assume power requirement of 60 HP per 160 acre parcel
Assume average use of 8 hours per day for 365 days per year

Demand Charge/hp	6.48759
Energy cost / kW*hr, first 300 hours	0.05197
After 300 hours per month	0.02747

Number of parcels	Power per parcel	Power requirement, HP	kWh/yr	Demand charge	Annual energy cost	Total annual power cost
55	60	3,300	7,185,565	$ 256,909	$ 215,482	**$ 472,390**

Christmas trees

Assume power requirement of 7.5 HP per 20 acre parcel
Assume average use of 8 hours per day for 365 days per year

Demand Charge/hp	6.48759
Energy cost / kW*hr, first 300 hours	0.05197
After 300 hours per month	0.02747

Number of parcels	Power per parcel	Power requirement, HP	kWh/yr	Demand charge	Annual energy cost	Total annual power cost
13	7.5	98	212,301	$ 7,590	$ 6,367	**$ 13,957**

Total Annual Power Cost for the Bonito Prairie Unit	**$ 486,347**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE/CANYON DAY UNITS
100% TRANSFER PIPELINE & PUMP STATION
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 2,231,000.00	$ 2,231,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 3,123,000.00	$ 3,123,000.00
1002	1	LS	General Requirements / Traffic Control	$ 1,785,000.00	$ 1,785,000.00
			PIPELINE		
1100	32,700	LF	60" Class 250 Steel Pipe	$ 300.00	$ 9,810,000.00
1101	60,000	LF	60" Class 150 Steel Pipe	$ 200.00	$ 12,000,000.00
1102	92,700	LF	60" Steel Pipe Install	$ 60.00	$ 5,562,000.00
1103	1	LS	Steel Fittings (5% of Pipe)	$ 1,091,000.00	$ 1,091,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 1,091,000.00	$ 1,091,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 1,527,000.00	$ 1,527,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 1,745,000.00	$ 1,745,000.00
1203	1	LS	Boring and Jacking (3% of Pipe)	$ 654,000.00	$ 654,000.00
1204	1	LS	Utility Crossings (3% of Pipe)	$ 654,000.00	$ 654,000.00
1205	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 436,000.00	$ 436,000.00
			PUMP STATION (38400 gpm @ 100 psi)		
1300	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1301	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1302	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1303	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1304	500	LF	60" Intake Pipeline	$ 300.00	$ 150,000.00
1305	6	EA	Equipment Pumps @ 6350 gpm (500 hp)	$ 150,000.00	$ 900,000.00
1306	1	LS	Equipment Pump Manifold	$ 300,000.00	$ 300,000.00
1307	1	LS	Equipment Valves and Appurtenant Items	$ 500,000.00	$ 500,000.00
1308	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 200,000.00	$ 200,000.00
1309	1	LS	Pump Station Structure Foundation	$ 200,000.00	$ 200,000.00
1310	1	LS	Pump Station Instrumentation and Controls	$ 200,000.00	$ 200,000.00
1311	1	LS	Pump Station Electrical	$ 300,000.00	$ 300,000.00
1312	1	LS	Pump Station Heating and Ventilation	$ 30,000.00	$ 30,000.00
			SITE RESTORATION		
1300	92,300	LS	Native Restoration	$ 1.00	$ 92,300.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 44,614,650.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE/CANYON DAY UNITS
50% TRANSFER PIPELINE & PUMP STATION

January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 1,432,000.00	$ 1,432,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 2,005,000.00	$ 2,005,000.00
1002	1	LS	General Requirements / Traffic Control	$ 1,146,000.00	$ 1,146,000.00
			PIPELINE		
1100	32,700	LF	42" Class 250 Steel Pipe	$ 175.00	$ 5,722,500.00
1101	60,000	LF	42" Class 150 Steel Pipe	$ 125.00	$ 7,500,000.00
1102	92,700	LF	42" Steel Pipe Install	$ 50.00	$ 4,635,000.00
1103	1	LS	Steel Fittings (5% of Pipe)	$ 661,000.00	$ 661,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 661,000.00	$ 661,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 926,000.00	$ 926,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 1,058,000.00	$ 1,058,000.00
1203	1	LS	Boring and Jacking (3% of Pipe)	$ 397,000.00	$ 397,000.00
1204	1	LS	Utility Crossings (3% of Pipe)	$ 397,000.00	$ 397,000.00
1205	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 264,000.00	$ 264,000.00
			PUMP STATION (19,200 gpm @ 100 psi)		
1300	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1301	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1302	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1303	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1304	500	LF	42" Intake Pipeline	$ 175.00	$ 87,500.00
1305	6	EA	Equipment Pumps @ 3200 gpm (250 hp)	$ 75,000.00	$ 450,000.00
1306	1	LS	Equipment Pump Manifold	$ 200,000.00	$ 200,000.00
1307	1	LS	Equipment Valves and Appurtenant Items	$ 300,000.00	$ 300,000.00
1308	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 150,000.00	$ 150,000.00
1309	1	LS	Pump Station Structure Foundation	$ 100,000.00	$ 100,000.00
1310	1	LS	Pump Station Instrumentation and Controls	$ 150,000.00	$ 150,000.00
1311	1	LS	Pump Station Electrical	$ 250,000.00	$ 250,000.00
1312	1	LS	Pump Station Heating and Ventilation	$ 30,000.00	$ 30,000.00
			SITE RESTORATION		
1300	92,300	LS	Native Restoration	$ 1.00	$ 92,300.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 28,647,650.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
CANYON DAY IRRIGATION UNIT
MINER FLAT/BEAR CANYON TRANSFER PIPELINE
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 1,404,000.00	$ 1,404,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 1,965,000.00	$ 1,965,000.00
1002	1	LS	General Requirements / Traffic Control	$ 1,123,000.00	$ 1,123,000.00
			PIPELINE		
1100	25,000	LF	48" DR 17 HDPE Pipe	$ 235.00	$ 5,875,000.00
1101	27,500	LF	48" DR 21 HDPE Pipe	$ 195.00	$ 5,362,500.00
1102	5,000	LF	48" DR 26 HDPE Pipe	$ 155.00	$ 775,000.00
1103	57,500	LF	48" HDPE Pipe Welding	$ 25.00	$ 1,437,500.00
1104	57,500	LF	48" HDPE Pipe Install	$ 40.00	$ 2,300,000.00
1105	850	LF	48" HDPE Microtunneling	$ 1,500.00	$ 1,275,000.00
1106	1	LS	HDPE Fittings (5% of Pipe)	$ 601,000.00	$ 601,000.00
			APPURTENANT FACILITIES		
1200	1	LF	Miner Flat Control Gates	$ 500,000.00	$ 500,000.00
1201	1	LS	Isolation Valves (5% of Pipe)	$ 601,000.00	$ 601,000.00
1202	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 841,000.00	$ 841,000.00
1203	1	LS	Air Valves (8% of Pipe)	$ 961,000.00	$ 961,000.00
1204	1	LS	Boring and Jacking (5% of Pipe)	$ 601,000.00	$ 601,000.00
1205	1	LS	Utility Crossings (3% of Pipe)	$ 360,000.00	$ 360,000.00
1206	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 240,000.00	$ 240,000.00
1207	1	LS	Pressure Reducing Facilities (5% of Pipe)	$ 601,000.00	$ 601,000.00
			CANAL SYSTEM		
1100	12,700	LF	85 cfs Canal Excavation/Embankment (1.3 cy/ft)	$ 26.00	$ 330,200.00
1101	12,700	LF	85 cfs Canal Soil-Cement Liner (0.75 cy/ft)	$ 30.00	$ 381,000.00
			STRUCTURES AND APPURTENANT FACILITIES		
1200	1	LS	85 cfs Grade Control Structures (10% of Canal)	$ 71,000.00	$ 71,000.00
1201	1	LS	85 cfs Wasteway Facilities (15% of 85 cfs Canal)	$ 106,500.00	$ 106,500.00
1202	1	LS	85 cfs Drop Structure (25% of 85 cfs Canal)	$ 177,500.00	$ 177,500.00
1203	1	LS	Canal System Automation	$ 50,000.00	$ 50,000.00
			SITE RESTORATION		
1300	57,100	LS	Native Restoration	$ 1.00	$ 57,100.00
1301	50	AC	Native Restoration - Canal	$ 1,500.00	$ 75,000.00
1302	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1303	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 28,076,900.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE/CANYON DAY UNITS
WTP TRANSFER PIPELINE & PUMP STATION
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 1,122,000.00	$ 1,122,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 1,571,000.00	$ 1,571,000.00
1002	1	LS	General Requirements / Traffic Control	$ 898,000.00	$ 898,000.00
			PIPELINE		
1100	20,000	LF	30" Class 250 Steel Pipe	$ 150.00	$ 3,000,000.00
1101	24,580	LF	30" Class 200 PVC Pipe	$ 90.00	$ 2,212,200.00
1102	24,580	LF	30" Class 165 PVC Pipe	$ 75.00	$ 1,843,500.00
1103	24,580	LF	30" Class 125 PVC Pipe	$ 55.00	$ 1,351,900.00
1104	24,580	LF	30" Class 100 PVC Pipe	$ 33.00	$ 811,140.00
1105	20,000	LF	30" Steel Pipe Install	$ 30.00	$ 600,000.00
1106	98,320	LF	30" PVC Pipe Install	$ 20.00	$ 1,966,400.00
1107	1	LS	Steel Fittings (5% of Pipe)	$ 150,000.00	$ 150,000.00
1108	1	LS	PVC Fittings (5% of Pipe)	$ 311,000.00	$ 311,000.00
			APPURTENANT FACILITIES		
1200	1	LS	Isolation Valves (5% of Pipe)	$ 461,000.00	$ 461,000.00
1201	1	LS	Blow-Off Hydrants (7% of Pipe)	$ 645,000.00	$ 645,000.00
1202	1	LS	Air Valves (8% of Pipe)	$ 737,000.00	$ 737,000.00
1203	1	LS	Boring and Jacking (3% of Pipe)	$ 277,000.00	$ 277,000.00
1204	1	LS	Utility Crossings (3% of Pipe)	$ 277,000.00	$ 277,000.00
1205	1	LS	Clay Collar & Outfall Structures (2% of Pipe)	$ 184,000.00	$ 184,000.00
1206	1	LS	Pressure Reducing Facilities (25% of Pipe)	$ 2,305,000.00	$ 2,305,000.00
			PUMP STATION (9,300 gpm @ 100 psi)		
1300	1	AC	Sitework Clearing and Grubbing	$ 750.00	$ 750.00
1301	1	AC	Sitework Restoration	$ 3,000.00	$ 3,000.00
1302	1000	SY	Sitework Access Road and Parking Area	$ 20.00	$ 20,000.00
1303	400	LF	Sitework Fence	$ 10.00	$ 4,000.00
1304	500	LF	30" Intake Pipeline	$ 175.00	$ 87,500.00
1305	4	EA	Equipment Pumps @ 3100 gpm (250 hp)	$ 75,000.00	$ 300,000.00
1306	1	LS	Equipment Pump Manifold	$ 200,000.00	$ 200,000.00
1307	1	LS	Equipment Valves and Appurtenant Items	$ 300,000.00	$ 300,000.00
1308	1	LS	Pump Station Structure (Pre-Fab Metal)	$ 150,000.00	$ 150,000.00
1309	1	LS	Pump Station Structure Foundation	$ 100,000.00	$ 100,000.00
1310	1	LS	Pump Station Instrumentation and Controls	$ 150,000.00	$ 150,000.00
1311	1	LS	Pump Station Electrical	$ 250,000.00	$ 250,000.00
1312	1	LS	Pump Station Heating and Ventilation	$ 30,000.00	$ 30,000.00
			SITE RESTORATION		
1300	117,920	LS	Native Restoration	$ 1.00	$ 117,920.00
1301	200	LF	Gravel Restoration	$ 8.00	$ 1,600.00
1302	200	LF	Asphalt Restoration	$ 20.00	$ 4,000.00

TOTAL FIELD COSTS **$ 22,441,910.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE/CANYON DAY UNITS
100% TRANSFER PIPELINE HYDROPOWER
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 402,000.00	$ 402,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 562,000.00	$ 562,000.00
1002	1	LS	General Requirements / Traffic Control	$ 321,000.00	$ 321,000.00
			HYDROELECTRIC GENERATION		
1400	4	EA	Turbine & Generator (1 MW)	$ 1,000,000.00	$ 4,000,000.00
1401	1	L.S.	Switchyard	$ 400,000.00	$ 400,000.00
1402	1	L.S.	Station Electrical	$ 750,000.00	$ 750,000.00
1403	10	MILES	Electrical Interconnection	$ 100,000.00	$ 1,000,000.00
1404	4	L.S.	Valving	$ 75,000.00	$ 300,000.00
1405	4	L.S.	Miscellaneous	$ 75,000.00	$ 300,000.00
			TOTAL FIELD COSTS		**$ 8,035,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
BONITO PRAIRIE/CANYON DAY UNITS
50% TRANSFER PIPELINE HYDROPOWER
January 2007

				Preliminary Estimate	
ITEM NO.	**EST. QNTY**	**UNIT**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**
			CONTRACT ITEMS		
1000	1	LS	Mobilization-Demobilization	$ 310,000.00	$ 310,000.00
1001	1	LS	Taxes, Bonds, and Insurance	$ 433,000.00	$ 433,000.00
1002	1	LS	General Requirements / Traffic Control	$ 248,000.00	$ 248,000.00
			HYDROELECTRIC GENERATION		
1400	4	EA	Turbine & Generator (0.5 MW)	$ 750,000.00	$ 3,000,000.00
1401	1	L.S.	Switchyard	$ 300,000.00	$ 300,000.00
1402	1	L.S.	Station Electrical	$ 500,000.00	$ 500,000.00
1403	10	MILES	Electrical Interconnection	$ 100,000.00	$ 1,000,000.00
1404	4	L.S.	Valving	$ 50,000.00	$ 200,000.00
1405	4	L.S.	Miscellaneous	$ 50,000.00	$ 200,000.00
			TOTAL FIELD COSTS		**$ 6,191,000.00**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
Bonito Prairie / Canyon Day Units
100% Transfer Pipeline and Pump Station

Operation and Maintenance Costs per Year

Bonito Prairie Transfer Pipeline 1	**185,400**	**ft of pipe**				
Personnel	#	Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe	1	2080	$ 20	$ 41,600		
1 Technician per pump station and valves	1	2080	$ 20	$ 41,600		
1 Manager	1	2080	$ 25	$ 52,000		
Total Personnel	**3**				**$**	**135,200**
Miscellaneous	#	Miles/Yr	$/Mile	$/Year		
1 Vehicle per person	3	3000	$ 0.445	$ 4,005		
					$	**4,005**
Parts and tools, 1/2% of init. Constr. Cost					**$**	**263,248**
Pump power					**$**	**536,421**
Total per Year					**$**	**938,874**

Replacement Costs

Hydropower Turbine/Gen Replacement (40 yrs)	$ 6,750,000		
Pipes, Fittings, and Installation (40 yrs)	$ 29,267,000		
Total 40-year Replacement		**$**	**36,017,000**
Hydrants and Valves (20 yrs)	$ 4,363,000		
Cathodic Protection (20 yrs)	$ -		
Total 20-year Replacement		**$**	**4,363,000**
Hydropower Turbine/Gen Rebuild 25% of Relacement (10 years)	$ 1,687,500		
Pumps, Motors, Controls, Electrical (10yrs)	$ 1,930,000		
Total 10-year Replacement		**$**	**3,617,500**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
Bonito Prairie / Canyon Day Units
50% Transfer Pipeline and Pump Station

Operation and Maintenance Costs per Year

Bonito Prairie Transfer Pipeline 2	**185,400 ft of pipe**							
Personnel	#		Hours/yr	$/hr		$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe		1	2080	$	20	$	41,600	
1 Technician per pump station and valves		1	2080	$	20	$	41,600	
1 Manager		1	2080	$	25	$	52,000	
Total Personnel		**3**						**$ 135,200**
Miscellaneous	#		Miles/Yr	$/Mile		$/Year		
1 Vehicle per person		3	3000	$	0.445	$	4,005	
								$ 4,005
Parts and tools, 1/2% of init. Constr. Cost								**$ 174,193**
Pump power								**$ 268,255**
Total per Year								**$ 581,653**

Replacement Costs

Hydropower Turbine/Gen Replacement (40 yrs)	$ 6,750,000	
Pipes, Fittings, and Installation (40 yrs)	$ 19,003,000	
Total 40-year Replacement		**$ 25,753,000**
Hydrants and Valves (20 yrs)	$ 2,645,000	
Cathodic Protection (20 yrs)	$ -	
Total 20-year Replacement		**$ 2,645,000**
Hydropower Turbine/Gen Rebuild 25% of Relacement (10 years)	$ 1,687,500	
Pumps, Motors, Controls (10yrs)	$ 1,180,000	
Total 10-year Replacement		**$ 2,867,500**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
Bonito Prairie / Canyon Day Units
WTP Transfer Pipeline and Pump Station

Operation and Maintenance Costs per Year

WTP Transfer Pipeline	**236,640**	**ft of pipe**						
Personnel	#		Hours/yr	$/hr		$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe		2	2080	$	20	$	83,200	
1 Technician per pump station and valves		1	2080	$	20	$	41,600	
1 Manager		1	2080	$	25	$	52,000	
Total Personnel		**4**						**$ 176,800**
Miscellaneous	#		Miles/Yr	$/Mile		$/Year		
1 Vehicle per person		4	3000	$	0.445	$	5,340	
								$ 5,340
Parts and tools, 1/2% of init. Constr. Cost								**$ 112,210**
Pump power								**$ 134,171**
Total per Year								**$ 294,350**

Replacement Costs

Pipes, Fittings, and Installation (40 yrs)	$ 12,610,640	
Total 40-year Replacement		**$ 12,610,640**
Hydrants and Valves (20 yrs)	$ 1,843,000	
Cathodic Protection (20 yrs)	$ -	
Total 20-year Replacement		**$ 1,843,000**
Pumps, Motors, Controls (10yrs)	$ 1,030,000	
Total 10-year Replacement		**$ 1,030,000**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
Canyon Day Irrigation Unit
Miner Flat/Bear Canyon Transfer Pipeline

Operation and Maintenance Costs per Year

Miner Flat Transfer Pipeline	**186,050**	**ft of pipe, microtunneling, and canal**					
Personnel	#		Hours/yr	$/hr	$/Yr		**Total/Yr**
1 Technician per 150,000 feet of pipe		1	2080	$ 20	$ 41,600		
1 Technician per 200 ARVs		1	2080	$ 20	$ 41,600		
1 Manager		1	2080	$ 25	$ 52,000		
Total Personnel		**3**				**$**	**135,200**
Miscellaneous	#		Miles/Yr	$/Mile	$/Year		
1 Vehicle per person		3	3000	$ 0.445	$ 4,005		
						$	**4,005**
Parts and tools, 1/2% of init. Constr. Cost						**$**	**140,385**
Total per Year						**$**	**279,590**

Replacement Costs

Pipes, Fittings, and Installation (40 yrs)	$ 18,227,000		
Total 40-year Replacement		**$**	**18,227,000**
Hydrants, Valves, Pressure Reducing Facilities (20 yrs)	$ 3,004,000		
Cathodic Protection (20 yrs)	$ -		
Total 20-year Replacement		**$**	**3,004,000**
Control Gates, Canal System Automation (10 yrs)	$ 550,000		
Total 10-year Replacement		**$**	**550,000**

WHITE MOUNTAIN APACHE TRIBE IRRIGATION INFRASTRUCTURE PLANNING
Bonito Prairie / Canyon Day Units
Transfer Pipeline and Pump Station

Variables	
Discount Factor	0%
Years	40
Max operating hrs/day	24

Energy cost, $/kW*hr	
First 300 kW*hrs/month	0.05197
After 300 kW*hrs	0.02747
Demand Charge, $/hp	6.4902

BP-CD Trans Pipe 1	
Pump demand (mgd)	55.296
WTP Capacity (gpm)	38400
WTP, HP	3200

BP-CD Trans Pipe 2	
Pump demand (mgd)	27.648
WTP Capacity (gpm)	19200
WTP, HP	1600

WTP	
Pump demand (mgd)	13.392
WTP Capacity (gpm)	9300
WTP, HP	800

Required Water Power			
	Pump 1	**Pump 2**	**WTP**
Q, gpm	38400	19200	9300
Q, cfs	85.56	42.78	20.72
HL, ft	230	230	230
gamma, lb/cf	62.4	62.4	62.4
Conv.	550	550	550
Watr Pwr, HP	**2232.69**	**1116.34**	**540.73**
Pump Pwr, HP	2790.86	1395.43	675.91
Motor Pwr, HP	3100.96	1550.48	751.01

	Common Variables								
BP-CD 1	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/ yr**	**Energy $/ yr**	**Total $/ yr**
Pump 1	0								
	1	55.30	38400	12.0	3266.2	3200.00	$249,224	$287,197	$536,421

	Common Variables								
BP-CD 2	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
Pump 2	0								
	1	27.65	19200	12.0	3266.2	1600.00	$124,612	$143,643	$268,255

	Common Variables								
WTP	**Year**	**Daily Flowrate**	**Pump Capacity**	**Hours/ Day**	**kW-hr/year/ HP**	**HP**	**Demand $/yr**	**Energy $/yr**	**Total $/yr**
	0								
	1	13.39	9300	12.0	3266.2	800.00	$62,306	$71,865	$134,171

APPENDIX Z

Results of Simulation Studies of Water Use from Storage on the White River, Bonito Creek and Cibecue Creek, Fort Apache Indian Reservation

WATSON ENGINEERING, INC.

FEBRUARY 2007

APPENDIX A
WHITE AND SALT RIVER STREAMFLOW RECORD
1958 THROUGH 2003 WATER YEARS

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
1958	Oct	1,228	2,667	798	3,164	2,906	12,314	13,706	4,016
	Nov	1,878	3,270	1,212	4,487	4,255	18,558	21,610	25
	Dec	1,504	2,943	752	3,831	3,564	12,619	14,779	-
	Jan	1,044	2,483	557	2,742	2,483	9,378	11,409	-
	Feb	2,135	3,585	824	4,937	4,786	35,062	40,150	38
	Mar	9,758	14,369	2,192	21,172	23,054	162,831	192,915	6,253
	Apr	23,481	27,184	7,061	37,646	57,331	221,795	232,942	2,771
	May	17,821	19,276	11,064	31,723	43,744	104,421	112,193	35,774
	Jun	4,252	5,669	2,957	10,042	9,747	22,687	24,228	47,804
	Jul	870	1,743	766	3,295	2,059	7,692	9,017	59,184
	Aug	1,736	3,127	920	5,439	4,068	14,089	18,193	74,478
	Sep	3,038	4,380	2,218	7,864	6,956	27,289	33,956	53,511
1959	Oct	3,648	5,099	2,949	8,372	8,464	33,103	41,217	3,859
	Nov	1,545	2,938	855	3,910	3,654	12,595	13,825	60
	Dec	1,213	2,652	673	3,139	2,878	11,217	12,675	10
	Jan	1,024	2,463	596	2,692	2,434	9,493	11,125	-
	Feb	1,017	2,317	579	2,651	2,416	9,354	11,296	2,233
	Mar	1,516	2,955	611	3,871	3,602	12,002	14,162	78,987
	Apr	1,985	3,502	1,125	5,939	4,594	12,950	14,311	42,165
	May	796	1,601	826	3,054	1,880	6,500	7,813	44,105
	Jun	248	944	370	1,329	606	4,389	4,681	73,128
	Jul	917	1,837	790	2,965	2,112	9,015	14,037	87,691
	Aug	5,754	7,130	4,344	12,757	13,389	56,087	81,831	54,637
	Sep	1,314	2,297	972	4,253	3,023	12,450	14,075	64,541
1960	Oct	1,406	3,032	595	3,458	3,301	15,493	33,942	17,516
	Nov	4,350	6,666	1,156	9,909	10,273	44,855	74,893	2,602
	Dec	3,562	5,864	875	8,210	8,458	77,043	164,476	2,954
	Jan	4,957	7,352	1,265	10,922	11,191	104,009	161,120	12,652
	Feb	3,557	5,205	1,010	7,812	7,746	42,322	57,986	586
	Mar	16,331	24,081	3,913	35,745	40,089	144,764	180,554	8,399
	Apr	13,417	16,242	6,016	25,083	32,299	83,862	97,812	18,140
	May	8,802	10,532	6,000	18,217	20,745	39,174	41,628	32,589
	Jun	3,319	4,572	2,438	8,261	7,478	15,993	16,937	55,611
	Jul	588	1,320	647	2,491	1,398	6,916	8,041	80,028
	Aug	1,024	2,006	670	3,598	2,394	8,737	10,550	80,804
	Sep	484	1,208	466	2,134	1,160	6,361	8,093	64,115
1961	Oct	838	2,277	733	2,217	1,985	9,229	14,525	14,258
	Nov	872	2,265	738	2,306	2,065	8,523	11,354	200
	Dec	989	2,428	648	2,605	2,348	9,406	10,925	4,003
	Jan	863	2,302	474	2,308	2,061	8,831	11,068	315
	Feb	929	2,229	528	2,443	2,210	9,152	10,804	17,526
	Mar	1,759	3,215	771	4,416	4,167	17,568	20,841	82,367
	Apr	4,741	6,723	2,222	10,883	10,483	27,678	32,115	51,571
	May	1,838	2,861	1,783	5,667	4,294	10,798	12,145	75,673
	Jun	497	1,238	599	2,108	1,183	5,486	6,452	88,147
	Jul	343	1,102	484	1,638	826	5,901	8,567	101,456
	Aug	1,770	3,088	826	5,206	4,225	12,849	17,574	72,217
	Sep	1,350	2,431	929	4,424	3,144	10,580	14,315	58,255
1962	Oct	807	2,246	535	2,156	1,924	7,797	9,035	16,058
	Nov	1,475	2,868	671	3,758	3,499	14,581	16,304	2,813
	Dec	1,969	3,408	853	4,912	4,661	32,010	34,570	492
	Jan	2,384	3,874	763	5,739	5,518	51,696	69,085	2,224
	Feb	7,377	11,059	1,714	16,451	17,504	94,567	119,645	8,408
	Mar	5,989	8,740	1,644	13,135	13,591	78,176	105,939	9,371

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Apr	28,831	32,490	8,392	44,519	70,599	217,392	237,960	57,775
	May	13,011	14,771	7,938	24,139	30,756	65,618	73,074	69,020
	Jun	3,887	5,157	2,989	9,416	8,658	17,653	18,453	78,523
	Jul	1,372	2,498	976	4,586	3,237	10,639	11,246	80,887
	Aug	689	1,456	795	2,756	1,628	8,313	9,257	118,455
	Sep	1,621	2,902	844	4,946	3,779	11,651	13,922	81,120
1963	Oct	1,384	2,823	966	3,525	3,267	12,197	15,596	4,087
	Nov	1,637	3,061	821	4,038	3,812	12,206	13,950	6,683
	Dec	1,271	2,710	608	3,288	3,021	11,346	13,301	-
	Jan	1,191	2,630	654	3,090	2,826	13,764	15,299	-
	Feb	3,592	5,109	1,377	7,800	7,759	61,356	71,414	5,064
	Mar	6,368	9,117	1,882	13,681	14,283	43,445	48,149	90,057
	Apr	7,509	9,728	3,800	15,738	17,423	47,029	53,555	62,492
	May	3,838	5,023	3,132	9,341	8,537	17,584	18,332	83,553
	Jun	504	1,231	671	2,142	1,196	6,427	6,218	108,398
	Jul	99	819	615	593	240	5,593	4,816	121,073
	Aug	3,334	4,865	1,928	8,324	7,627	34,561	63,381	69,704
	Sep	4,331	6,288	1,985	10,229	9,860	45,989	55,040	61,756
1964	Oct	1,421	2,860	984	3,566	3,316	19,301	20,065	8,123
	Nov	1,468	2,861	928	3,724	3,467	16,485	18,435	411
	Dec	1,030	2,469	620	2,706	2,448	11,153	12,464	6,399
	Jan	824	2,263	474	2,209	1,968	8,723	9,886	1,626
	Feb	802	2,148	449	2,145	1,914	8,343	9,662	11,467
	Mar	1,293	2,744	633	3,284	3,033	11,492	13,527	74,179
	Apr	7,019	10,028	1,888	14,925	16,463	48,550	56,867	55,250
	May	3,846	5,182	2,715	9,233	8,212	20,817	22,679	61,401
	Jun	819	1,668	774	3,025	1,936	7,714	8,204	77,257
	Jul	1,303	2,471	743	3,916	3,012	12,224	17,147	82,593
	Aug	2,537	4,138	1,313	7,052	5,831	30,683	39,008	36,304
	Sep	4,773	6,883	1,814	10,807	11,090	42,957	47,626	30,740
1965	Oct	1,887	3,340	909	4,580	4,348	16,263	18,149	21,446
	Nov	1,036	2,429	567	2,715	2,464	10,328	11,316	5,407
	Dec	1,170	2,609	618	3,041	2,779	11,441	12,778	97
	Jan	6,663	10,092	1,340	14,621	15,632	78,828	114,515	72
	Feb	4,681	6,787	1,220	10,113	10,277	64,015	78,287	1,647
	Mar	7,484	11,156	1,708	16,536	17,370	86,493	103,592	6,398
	Apr	23,814	28,659	4,931	38,435	58,140	170,422	201,167	266
	May	15,861	18,063	8,370	28,636	38,482	83,597	91,185	16,328
	Jun	7,176	8,754	4,945	15,278	16,544	28,616	33,115	33,835
	Jul	4,853	6,841	2,386	11,214	11,324	22,092	24,389	46,024
	Aug	4,792	6,724	2,356	11,012	10,762	29,407	32,028	32,896
	Sep	1,707	3,046	1,006	5,391	4,028	12,044	13,861	38,817
1966	Oct	1,170	2,609	598	3,042	2,781	8,501	9,923	10,084
	Nov	3,967	6,289	1,874	9,229	9,802	23,056	30,163	11,369
	Dec	11,260	16,631	2,222	24,213	27,043	244,913	389,010	112,098
	Jan	7,336	10,802	1,831	16,073	16,963	79,046	108,737	244,974
	Feb	2,987	4,345	1,043	6,657	6,522	31,072	38,861	68,748
	Mar	16,645	24,054	4,076	35,513	40,007	177,876	197,757	98,372
	Apr	16,064	19,561	5,921	28,979	39,523	139,559	148,663	95,632
	May	10,009	12,014	6,056	20,074	23,576	49,143	53,919	47,662
	Jun	2,788	4,184	1,857	7,437	6,321	15,858	15,959	48,659
	Jul	1,684	2,996	952	5,261	3,900	10,261	12,310	77,039
	Aug	3,298	5,116	1,466	8,401	7,307	20,222	28,241	74,562
	Sep	2,623	4,189	1,331	7,086	5,883	17,550	34,461	66,941
1967	Oct	1,416	2,855	743	3,623	3,356	8,638	13,680	18,393
	Nov	1,215	2,608	611	3,145	2,886	8,394	12,587	1,755
	Dec	1,715	3,172	913	4,230	3,989	12,175	27,339	73,342
	Jan	1,523	2,965	553	3,883	3,622	9,404	12,895	4,737

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Feb	1,159	2,459	577	2,995	2,753	9,892	12,369	1,255
	Mar	2,404	3,867	1,027	5,768	5,556	15,124	18,345	57,813
	Apr	3,197	4,818	1,644	8,044	6,909	16,372	18,169	48,844
	May	1,535	2,515	1,519	5,015	3,590	9,358	10,590	53,283
	Jun	854	1,662	835	3,208	2,015	6,423	7,648	59,081
	Jul	2,860	4,268	1,658	7,178	6,524	16,306	23,153	52,144
	Aug	10,074	12,908	4,120	19,862	23,871	76,823	82,268	71,731
	Sep	6,434	8,648	3,112	13,973	15,031	40,789	40,856	68,250
1968	Oct	1,555	2,994	858	3,935	3,677	12,254	13,139	33,017
	Nov	1,197	2,590	586	3,100	2,844	10,497	11,594	301
	Dec	1,884	3,463	717	4,647	4,433	29,463	71,787	2,145
	Jan	3,165	5,065	1,023	7,382	7,345	68,970	114,293	472
	Feb	8,002	11,884	1,950	17,716	18,845	118,986	180,022	114,555
	Mar	12,118	18,001	2,936	26,820	29,189	122,521	173,933	137,613
	Apr	20,197	24,481	5,288	34,054	48,691	147,434	166,535	152,710
	May	15,123	17,675	7,904	28,131	37,082	77,481	82,793	78,588
	Jun	5,336	6,465	4,227	11,821	12,097	24,966	27,253	73,520
	Jul	1,812	2,827	1,690	5,490	4,171	14,309	17,310	68,010
	Aug	4,221	5,862	2,777	10,173	9,612	27,870	43,121	72,342
	Sep	1,643	2,863	1,089	5,173	3,828	11,399	13,819	105,641
1969	Oct	1,158	2,597	748	3,004	2,743	9,989	14,057	56,792
	Nov	1,129	2,521	635	2,934	2,680	9,180	12,347	25,169
	Dec	1,113	2,552	675	2,903	2,642	10,163	13,793	49,127
	Jan	4,387	6,827	1,462	9,994	10,364	49,401	79,844	11,548
	Feb	2,767	4,104	1,152	6,441	6,298	26,041	38,551	26,371
	Mar	6,112	8,981	2,140	13,792	14,478	54,046	75,155	37,566
	Apr	18,735	22,304	6,754	32,628	46,154	125,385	142,514	82,573
	May	11,698	13,435	7,769	22,906	28,039	51,583	62,784	132,022
	Jun	3,650	4,963	2,704	8,980	8,301	16,683	18,581	135,037
	Jul	2,078	3,492	1,077	5,956	4,756	10,610	13,105	69,423
	Aug	3,291	4,904	1,908	8,425	7,611	17,014	21,406	12,615
	Sep	4,085	5,791	2,275	9,773	9,088	25,052	29,409	77,946
1970	Oct	2,466	3,936	855	5,971	5,756	12,702	14,222	53,261
	Nov	1,886	3,288	998	4,655	4,419	14,045	17,439	810
	Dec	1,649	3,088	1,085	4,154	3,888	12,649	16,060	48,959
	Jan	1,308	2,747	655	3,371	3,104	10,979	14,091	10,563
	Feb	1,241	2,541	608	3,189	2,945	10,522	12,742	42,042
	Mar	3,532	5,134	1,309	7,868	7,769	31,863	37,214	39,922
	Apr	7,810	10,907	2,452	16,456	18,282	49,240	55,421	85,965
	May	8,569	9,978	6,306	17,686	19,875	39,357	41,189	98,659
	Jun	2,661	4,029	1,720	7,118	5,962	12,278	12,185	121,866
	Jul	1,162	2,245	764	4,092	2,751	8,755	10,019	98,540
	Aug	2,795	4,328	1,690	7,550	6,329	16,626	20,696	78,884
	Sep	4,156	5,460	2,705	9,470	9,753	24,851	49,369	65,910
1971	Oct	1,700	3,139	1,198	4,173	3,923	13,230	15,513	19,395
	Nov	1,021	2,414	568	2,680	2,428	8,162	10,257	368
	Dec	1,035	2,474	545	2,721	2,464	8,825	11,344	272
	Jan	1,111	2,550	496	2,900	2,646	10,066	13,262	251
	Feb	1,200	2,499	581	3,091	2,848	9,969	12,302	32,129
	Mar	2,604	4,055	1,133	6,031	5,841	15,277	16,120	81,423
	Apr	2,583	4,217	1,379	7,228	5,960	14,166	15,440	66,233
	May	1,758	3,039	1,238	5,557	4,138	10,832	11,062	74,592
	Jun	586	1,318	650	2,433	1,390	5,502	5,958	63,159
	Jul	771	1,695	474	2,381	1,800	6,472	7,555	79,177
	Aug	5,503	7,926	2,019	12,368	12,619	38,839	52,892	37,355
	Sep	3,396	4,904	1,853	8,265	8,033	21,033	31,488	34,834
1972	Oct	10,622	14,688	4,562	22,920	25,093	93,363	132,008	8,581
	Nov	5,092	6,862	2,414	10,999	11,177	37,873	43,284	415

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Dec	7,946	11,548	1,999	16,921	18,409	74,542	96,817	519
	Jan	4,518	6,599	1,333	10,003	10,092	33,533	39,638	330
	Feb	2,212	3,574	891	5,441	5,232	16,043	19,105	296
	Mar	4,647	6,189	2,446	10,019	10,064	28,521	30,369	28,678
	Apr	2,516	4,051	1,559	7,096	5,826	13,990	15,319	71,632
	May	1,386	2,443	1,150	4,650	3,259	8,880	9,289	82,652
	Jun	1,652	2,818	1,119	5,102	3,808	10,050	11,302	88,762
	Jul	1,392	2,574	823	4,361	3,229	8,803	9,182	91,142
	Aug	1,458	2,791	728	4,851	3,455	9,223	10,993	71,694
	Sep	841	1,650	773	3,193	1,987	10,378	12,466	51,192
1973	Oct	10,050	13,549	5,169	21,439	23,858	176,331	290,954	42,838
	Nov	4,402	6,049	1,611	9,296	9,305	52,553	73,159	2,731
	Dec	4,642	6,902	1,234	10,388	10,661	60,880	87,185	550
	Jan	4,514	6,485	1,204	9,644	9,672	44,444	60,528	487
	Feb	4,672	6,906	1,137	10,272	10,459	94,639	147,414	8,667
	Mar	10,665	16,113	2,341	23,901	25,780	183,613	338,901	201,234
	Apr	32,155	36,018	6,861	46,492	79,116	269,617	368,653	383,946
	May	51,628	53,172	17,461	69,392	127,440	311,747	364,785	323,469
	Jun	15,027	16,158	10,217	26,748	35,840	68,195	79,082	113,734
	Jul	5,200	7,079	2,811	11,768	11,518	29,838	34,277	109,747
	Aug	2,595	4,187	1,396	7,175	5,867	19,551	22,769	112,583
	Sep	1,119	2,173	726	3,954	2,650	8,682	11,915	111,929
1974	Oct	940	2,379	597	2,489	2,235	7,644	11,064	74,211
	Nov	1,070	2,462	519	2,800	2,547	9,695	13,218	5,010
	Dec	1,189	2,628	501	3,098	2,832	10,548	14,081	594
	Jan	1,536	2,976	512	3,918	3,654	13,256	20,382	106
	Feb	1,355	2,655	525	3,462	3,221	9,890	13,065	67
	Mar	4,541	6,749	1,414	10,351	10,485	26,851	34,388	57,944
	Apr	5,064	7,149	2,227	11,461	11,125	27,120	30,346	78,150
	May	3,853	5,269	2,610	9,296	8,315	16,774	17,802	86,917
	Jun	977	1,889	762	3,525	2,313	6,252	7,220	104,848
	Jul	579	1,404	589	2,354	1,381	7,974	10,647	100,345
	Aug	1,054	1,972	1,062	3,772	2,477	14,924	17,471	107,565
	Sep	799	1,668	622	3,067	1,898	8,844	10,009	77,930
1975	Oct	2,877	4,643	1,496	6,628	6,617	23,923	32,575	2,355
	Nov	2,245	3,639	1,271	5,343	5,133	21,511	28,505	6
	Dec	1,565	3,004	598	3,986	3,717	9,519	13,815	192
	Jan	1,452	2,891	556	3,720	3,451	10,467	13,597	170
	Feb	1,722	3,034	691	4,264	4,044	21,376	26,377	876
	Mar	9,715	14,283	2,828	21,680	23,247	103,693	131,823	31,789
	Apr	18,536	23,253	4,128	32,098	45,904	147,196	176,631	19,884
	May	18,372	21,076	8,232	32,012	44,508	98,913	107,583	77,335
	Jun	6,520	7,954	4,635	14,023	15,015	30,129	28,378	98,818
	Jul	2,509	4,122	1,303	7,037	5,730	19,335	19,942	102,646
	Aug	1,576	2,981	762	5,148	3,735	9,701	11,123	103,321
	Sep	1,860	3,035	1,372	5,582	4,336	18,355	19,936	85,306
1976	Oct	1,012	2,451	585	2,664	2,406	8,364	9,148	20,136
	Nov	1,021	2,414	489	2,685	2,434	8,600	9,713	75
	Dec	1,239	2,678	597	3,210	2,944	10,836	12,748	71
	Jan	1,070	2,509	509	2,810	2,549	10,017	11,516	12,155
	Feb	3,653	5,709	798	8,244	8,390	37,806	67,552	6,227
	Mar	3,608	5,436	1,003	8,218	8,156	32,416	35,318	1,151
	Apr	9,223	12,674	2,751	18,876	22,066	65,632	71,626	23,826
	May	9,717	11,557	6,181	19,577	22,709	49,875	53,644	49,830
	Jun	2,746	4,123	1,743	7,243	6,161	15,148	14,259	73,538
	Jul	3,136	4,786	1,492	7,927	7,174	15,838	18,266	88,821
	Aug	3,354	5,076	1,650	8,448	7,547	17,086	18,145	107,129
	Sep	1,816	3,187	1,063	5,622	4,284	12,252	14,065	72,539

		White River					Salt River		
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1977	Oct	1,461	2,900	938	3,708	3,451	10,245	11,607	24,017
	Nov	1,068	2,461	551	2,795	2,541	9,003	10,548	316
	Dec	1,133	2,572	480	2,963	2,700	8,523	10,338	127
	Jan	1,306	2,745	552	3,374	3,106	9,422	12,891	-
	Feb	1,204	2,503	535	3,103	2,860	9,531	11,988	-
	Mar	1,779	3,218	672	4,479	4,221	13,843	14,825	28,104
	Apr	5,835	8,026	2,734	12,950	13,399	33,890	36,183	68,818
	May	3,436	4,739	2,579	8,621	7,605	18,379	19,797	77,134
	Jun	1,081	1,994	909	3,792	2,549	7,845	8,436	113,278
	Jul	2,378	4,075	674	6,434	5,490	12,631	13,839	127,123
	Aug	2,777	4,408	1,296	7,334	6,313	22,719	24,393	119,288
	Sep	1,465	2,674	783	4,667	3,469	15,662	18,933	65,335
1978	Oct	1,963	3,511	1,054	4,752	4,574	12,322	14,291	25,561
	Nov	1,271	2,664	569	3,279	3,021	9,636	11,697	120
	Dec	912	2,351	515	2,423	2,174	8,672	9,929	28
	Jan	1,177	2,617	607	3,011	2,759	14,146	15,854	-
	Feb	4,142	5,901	1,430	8,946	9,001	63,585	102,025	59
	Mar	26,998	39,314	6,341	57,970	68,268	370,696	638,647	60,265
	Apr	22,188	25,065	8,602	36,467	53,826	151,321	183,315	66,325
	May	12,587	14,465	7,964	24,247	30,415	56,891	63,656	93,304
	Jun	3,863	5,204	2,823	9,367	8,727	19,912	19,057	101,972
	Jul	1,186	2,284	789	4,165	2,807	11,423	11,734	104,154
	Aug	2,147	3,654	1,034	6,196	5,022	16,126	22,136	103,340
	Sep	908	1,911	497	3,411	2,164	7,950	10,538	92,967
1979	Oct	1,013	2,452	620	2,655	2,408	7,890	11,516	45,158
	Nov	5,347	8,261	1,252	11,563	12,524	77,360	119,546	9,207
	Dec	17,143	25,106	3,511	36,460	43,950	242,915	365,400	440,805
	Jan	8,099	11,785	2,057	17,528	18,693	147,055	227,198	599,354
	Feb	7,141	10,525	1,769	15,679	16,525	105,157	170,561	82,698
	Mar	15,169	22,630	3,554	33,646	37,373	188,393	310,715	422,643
	Apr	35,022	38,249	10,816	51,096	86,137	288,619	373,771	288,659
	May	28,682	30,975	12,591	45,646	71,388	148,227	181,986	184,029
	Jun	14,477	15,714	9,981	26,418	35,360	66,459	76,200	120,577
	Jul	3,395	4,924	2,206	8,658	7,617	21,400	24,802	128,412
	Aug	2,805	4,102	2,132	7,530	6,355	20,607	25,456	127,103
	Sep	1,065	2,002	872	3,810	2,513	10,201	13,287	109,152
1980	Oct	812	2,251	643	2,169	1,928	8,168	12,325	59,170
	Nov	1,163	2,556	693	3,013	2,757	9,987	15,953	405
	Dec	1,193	2,632	795	3,089	2,825	10,140	15,638	-
	Jan	2,939	4,973	922	7,096	7,206	85,330	90,120	6,716
	Feb	18,445	26,762	3,808	38,880	45,246	355,517	521,843	1,090,072
	Mar	12,102	18,137	3,108	27,281	29,683	129,344	166,078	97,916
	Apr	28,390	32,187	8,355	44,118	70,732	217,768	228,995	185,517
	May	28,159	29,940	13,095	43,963	67,860	152,174	168,598	172,326
	Jun	12,682	13,695	9,410	23,330	29,798	50,710	52,331	126,416
	Jul	4,250	5,919	2,225	9,813	8,916	21,910	22,711	159,255
	Aug	4,020	5,772	2,081	9,604	8,779	22,059	28,364	135,790
	Sep	2,301	3,753	1,232	6,436	5,215	15,368	18,804	135,870
1981	Oct	1,329	2,768	766	3,413	3,148	11,012	19,125	27,959
	Nov	1,279	2,672	655	3,295	3,035	11,080	22,122	192
	Dec	1,390	2,829	630	3,569	3,301	11,566	18,451	170
	Jan	1,336	2,775	600	3,444	3,176	11,088	15,400	25,096
	Feb	1,536	2,835	603	3,878	3,644	11,383	15,733	41,548
	Mar	4,249	6,218	1,202	9,381	9,412	37,435	46,918	81,085
	Apr	12,247	15,229	5,369	23,580	29,753	69,300	76,192	88,385
	May	6,996	8,627	4,691	14,950	16,271	29,271	35,669	70,027
	Jun	1,934	3,205	1,271	5,747	4,439	10,659	12,081	103,638
	Jul	2,418	4,041	1,022	6,685	5,445	16,346	16,558	108,418

		White River					Salt River		
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	Aug	2,250	3,785	1,164	6,484	5,159	17,869	20,660	110,759
	Sep	1,911	3,340	1,101	5,871	4,507	13,448	16,519	74,040
1982	Oct	1,852	3,303	1,115	4,503	4,267	16,767	21,741	16,561
	Nov	1,227	2,620	615	3,171	2,914	10,473	13,730	324
	Dec	1,203	2,642	599	3,125	2,860	13,075	15,017	219
	Jan	1,673	3,112	647	4,234	3,971	16,457	27,517	221
	Feb	3,391	5,351	843	7,794	7,841	50,359	78,025	84
	Mar	11,886	17,937	2,287	26,276	28,753	117,868	162,429	94
	Apr	14,707	18,340	5,429	27,402	36,288	100,048	115,737	6,811
	May	14,680	16,275	9,751	27,546	36,211	67,725	74,431	56,506
	Jun	4,346	5,692	3,110	10,148	9,834	19,851	23,096	107,744
	Jul	1,116	2,170	776	3,904	2,642	9,969	12,441	108,676
	Aug	3,128	5,111	1,022	8,115	7,032	20,313	26,369	103,221
	Sep	3,866	5,990	1,240	9,354	8,753	20,376	28,334	87,056
1983	Oct	1,280	2,719	653	3,307	3,039	9,709	12,641	23,166
	Nov	2,202	3,702	774	5,283	5,090	14,983	21,775	352
	Dec	4,085	6,067	1,170	9,172	9,192	57,882	113,240	15,011
	Jan	3,861	5,746	1,214	8,678	8,696	54,280	71,581	56,314
	Feb	5,394	7,975	1,323	11,878	12,199	98,818	160,783	233,962
	Mar	14,273	21,439	2,832	31,437	34,650	231,554	321,545	326,702
	Apr	22,291	26,519	5,949	36,695	55,127	214,139	253,809	257,795
	May	26,582	28,379	13,605	42,656	65,188	175,837	197,279	165,880
	Jun	13,624	14,768	9,670	24,919	32,674	56,847	70,783	99,000
	Jul	3,667	5,382	1,819	8,917	7,839	20,960	27,400	91,856
	Aug	5,651	7,603	3,104	12,660	12,629	27,394	34,287	87,958
	Sep	6,673	8,386	3,921	13,427	15,602	35,626	40,644	61,328
1984	Oct	19,285	25,685	7,849	39,934	47,616	232,268	297,093	438,316
	Nov	3,057	4,464	1,341	6,943	6,790	21,075	28,943	8,952
	Dec	5,327	7,929	1,442	11,883	12,343	69,970	100,012	60,642
	Jan	5,573	8,050	1,628	12,156	12,417	44,486	58,192	101,434
	Feb	3,979	5,519	1,277	8,331	8,285	26,972	33,321	42,748
	Mar	5,701	8,229	1,712	12,469	12,768	47,039	50,115	41,100
	Apr	8,291	11,103	3,344	17,258	19,401	47,390	54,838	29,116
	May	7,299	9,380	3,989	15,449	16,846	31,012	35,368	47,554
	Jun	1,237	2,397	680	4,236	2,934	10,269	11,308	88,345
	Jul	2,306	3,930	777	6,331	5,258	15,652	20,214	60,437
	Aug	6,493	9,219	2,164	14,108	15,029	32,446	44,865	79,356
	Sep	5,355	7,780	1,833	12,037	11,980	27,741	39,422	79,901
1985	Oct	12,390	17,906	3,257	26,680	29,372	56,922	74,183	12,516
	Nov	5,012	7,078	1,686	10,820	10,969	24,540	31,337	928
	Dec	11,966	17,698	2,672	26,089	29,332	178,388	254,913	215,279
	Jan	8,637	12,909	2,075	19,255	20,448	103,572	145,761	209,660
	Feb	7,818	11,601	1,936	17,320	18,355	90,164	133,232	138,423
	Mar	29,198	41,885	6,006	60,579	71,243	263,944	317,003	335,707
	Apr	24,806	28,947	7,742	40,829	62,224	177,107	200,016	152,769
	May	18,857	22,093	7,995	33,325	47,134	108,664	132,002	142,931
	Jun	6,571	8,610	3,543	14,191	15,209	30,617	38,589	105,165
	Jul	2,717	4,382	1,339	7,385	6,163	17,496	19,845	105,185
	Aug	2,793	4,414	1,531	7,567	6,294	21,934	28,172	108,279
	Sep	3,519	5,305	1,615	8,704	8,037	20,156	26,823	74,867
1986	Oct	4,974	6,896	1,872	10,609	10,735	27,039	32,873	16,024
	Nov	3,584	5,305	1,244	8,223	8,186	26,190	34,824	347
	Dec	3,871	5,619	1,244	8,593	8,533	28,150	35,657	85,875
	Jan	2,542	3,998	1,061	6,217	6,008	17,046	21,501	31,605
	Feb	6,578	9,792	1,789	14,788	15,697	71,414	83,807	282
	Mar	12,837	18,680	3,604	28,127	30,855	119,060	146,323	35,280
	Apr	13,232	15,988	5,816	24,560	31,444	87,923	102,067	108,021
	May	7,075	9,186	3,866	15,164	16,209	29,048	37,439	91,400

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Jun	2,511	4,031	1,329	6,880	5,637	13,996	16,068	102,269
	Jul	3,502	4,807	2,705	8,765	7,752	19,054	24,193	99,929
	Aug	2,706	3,882	2,287	7,345	6,224	18,296	23,735	99,949
	Sep	2,867	4,396	1,728	7,652	6,520	16,836	20,839	62,782
1987	Oct	4,461	6,095	2,686	9,971	10,078	25,903	31,300	1,127
	Nov	5,743	7,904	2,596	12,638	12,980	51,047	56,161	415
	Dec	5,339	7,715	1,428	11,518	11,746	60,806	67,042	467
	Jan	3,212	4,884	932	7,462	7,331	24,915	27,428	43,509
	Feb	5,160	7,439	1,587	11,305	11,556	45,803	57,605	38,071
	Mar	12,148	18,194	2,975	27,214	29,667	143,947	165,067	70,910
	Apr	26,539	30,055	7,841	41,411	64,224	176,095	184,704	106,573
	May	14,058	16,892	6,603	26,329	34,380	72,144	82,313	94,653
	Jun	4,248	5,946	2,426	10,069	9,533	20,926	23,774	103,499
	Jul	1,801	3,149	1,085	5,582	4,243	13,307	13,648	101,337
	Aug	3,805	5,458	2,261	9,372	8,561	25,615	32,736	100,266
	Sep	1,532	2,863	817	5,010	3,626	12,169	13,079	74,665
1988	Oct	1,651	3,090	773	4,171	3,911	11,209	14,870	2,973
	Nov	3,378	4,849	1,668	7,664	7,577	20,025	29,151	628
	Dec	2,257	3,704	1,097	5,563	5,330	14,595	19,518	567
	Jan	2,692	4,179	1,121	6,299	6,099	24,137	35,685	664
	Feb	6,010	8,771	1,619	13,150	13,627	66,683	91,423	31,047
	Mar	6,770	9,766	2,229	14,991	15,570	58,170	69,194	91,420
	Apr	12,307	15,332	4,255	22,611	29,175	99,923	106,214	42,727
	May	10,950	13,212	5,833	21,307	25,910	64,363	74,734	69,504
	Jun	3,040	4,622	1,803	8,007	6,877	15,624	19,143	102,408
	Jul	2,896	4,523	1,753	7,903	6,647	15,305	19,264	107,208
	Aug	6,735	9,257	2,456	14,234	15,471	55,268	75,696	99,413
	Sep	7,270	10,113	1,944	14,899	17,457	66,921	85,683	80,814
1989	Oct	2,361	3,814	1,053	5,679	5,455	16,409	18,934	23,285
	Nov	1,801	3,194	902	4,510	4,259	13,371	14,706	2,512
	Dec	1,876	3,315	976	4,692	4,433	13,748	15,501	193
	Jan	2,150	3,609	1,043	5,278	5,038	17,379	20,121	1,700
	Feb	3,190	4,735	940	7,155	7,071	22,392	26,847	-
	Mar	9,772	13,854	3,943	21,878	23,451	61,937	71,216	63,405
	Apr	6,085	8,049	3,410	13,422	13,861	29,596	34,681	91,122
	May	1,824	3,157	1,198	5,688	4,296	12,202	14,283	117,185
	Jun	545	1,288	494	2,325	1,303	6,361	7,014	126,289
	Jul	577	1,379	618	2,359	1,374	7,333	8,646	129,523
	Aug	1,137	2,206	729	4,004	2,696	11,931	17,022	113,040
	Sep	470	1,178	411	2,111	1,131	7,319	8,539	75,133
1990	Oct	1,055	2,494	563	2,759	2,509	10,723	11,278	16,154
	Nov	976	2,369	456	2,578	2,329	9,513	11,048	100
	Dec	1,066	2,505	580	2,795	2,535	9,741	11,760	4,273
	Jan	1,255	2,694	522	3,255	2,987	11,346	12,776	-
	Feb	1,090	2,390	430	2,839	2,598	11,256	12,494	3,387
	Mar	2,598	4,193	879	6,004	5,837	22,489	26,234	3,263
	Apr	4,421	6,246	2,301	10,297	9,670	22,794	24,665	41,935
	May	2,857	4,100	2,057	7,401	6,218	16,181	15,368	63,654
	Jun	450	1,157	712	1,983	1,065	6,542	6,728	93,363
	Jul	1,450	2,515	1,157	4,591	3,328	20,696	29,743	80,219
	Aug	1,122	2,075	988	3,986	2,644	17,933	28,406	59,465
	Sep	2,116	3,447	1,480	6,243	4,939	16,243	15,929	28,144
1991	Oct	1,369	2,808	1,156	3,477	3,219	15,299	14,712	18,696
	Nov	1,369	2,761	857	3,494	3,235	14,192	17,314	756
	Dec	2,464	4,183	1,247	5,822	5,697	57,855	71,981	407
	Jan	5,162	7,878	1,224	11,471	11,927	80,437	111,383	264
	Feb	4,057	6,021	1,345	9,124	9,229	35,515	39,672	9,917
	Mar	15,004	22,779	2,783	33,337	36,957	265,194	394,042	61,477

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Apr	25,987	29,854	7,434	41,156	63,012	197,497	218,602	78,247
	May	16,487	18,534	8,922	29,502	39,678	75,355	99,314	87,633
	Jun	4,969	6,889	2,630	11,438	11,330	20,837	33,174	109,212
	Jul	1,507	2,812	858	4,976	3,564	10,231	13,464	120,041
	Aug	2,192	3,773	1,025	6,380	5,102	14,295	18,310	111,255
	Sep	2,414	3,851	1,490	6,778	5,586	21,793	26,621	70,989
1992	Oct	1,166	2,605	596	3,033	2,771	8,275	11,919	53,195
	Nov	1,599	2,996	791	4,034	3,785	12,387	17,100	1,133
	Dec	2,603	4,194	946	6,133	5,956	33,926	47,592	23,262
	Jan	2,766	4,290	845	6,512	6,321	38,894	54,802	91,689
	Feb	5,651	8,453	1,269	12,515	12,952	95,198	133,749	140,789
	Mar	12,578	18,870	2,838	28,000	30,552	128,309	168,578	202,674
	Apr	21,350	24,463	8,313	35,769	52,043	153,404	179,626	181,589
	May	16,433	18,008	9,947	29,451	39,656	77,775	87,869	175,024
	Jun	6,825	8,974	3,320	14,443	16,122	39,922	48,282	138,151
	Jul	1,760	3,065	1,194	5,550	4,144	12,409	17,131	102,392
	Aug	9,763	11,554	5,564	17,823	22,999	59,364	87,766	136,247
	Sep	3,603	5,667	1,279	9,010	8,212	19,859	26,472	98,657
1993	Oct	1,438	2,877	791	3,673	3,406	12,347	14,480	1,525
	Nov	1,388	2,781	835	3,543	3,283	12,022	14,595	6,142
	Dec	6,167	9,318	1,688	13,286	14,690	74,976	120,793	28,732
	Jan	27,860	40,491	5,215	58,336	69,179	488,139	828,389	1,242,742
	Feb	17,580	25,769	3,090	37,048	42,443	268,050	436,945	654,079
	Mar	23,212	33,829	6,286	50,732	58,182	223,818	316,844	439,206
	Apr	29,724	32,797	11,449	46,444	73,830	239,488	289,452	278,940
	May	22,243	23,046	14,958	37,917	55,508	116,769	141,205	275,131
	Jun	7,379	8,728	5,488	15,535	17,342	33,230	42,711	55,693
	Jul	1,792	3,142	1,131	5,623	4,223	13,444	18,101	82,541
	Aug	1,818	3,143	1,164	5,631	4,249	15,332	22,826	106,536
	Sep	2,654	3,859	2,299	7,136	6,056	16,310	26,357	75,928
1994	Oct	2,295	3,745	1,478	5,492	5,284	15,323	22,185	42,237
	Nov	2,068	3,461	1,085	5,028	4,794	15,390	33,031	5,359
	Dec	1,801	3,240	797	4,525	4,265	14,168	20,365	191
	Jan	1,543	2,982	436	3,944	3,675	12,958	17,114	12,574
	Feb	1,845	3,168	532	4,556	4,336	23,794	37,851	36,415
	Mar	8,402	12,260	2,194	18,299	19,601	68,970	87,320	48,499
	Apr	7,280	9,737	3,471	15,664	16,975	41,304	53,677	64,077
	May	5,904	7,762	3,594	13,215	13,359	26,609	33,696	32,317
	Jun	1,577	2,690	1,186	4,989	3,667	11,663	13,508	74,960
	Jul	826	1,731	571	3,207	1,968	7,139	9,088	111,393
	Aug	1,753	2,983	1,319	5,525	4,120	13,863	16,374	115,936
	Sep	3,545	4,568	2,329	7,872	8,232	38,081	42,060	63,514
1995	Oct	816	2,255	753	2,164	1,932	14,634	16,415	39,243
	Nov	4,481	6,553	2,077	9,863	10,314	65,041	72,439	498
	Dec	3,628	5,785	1,250	8,429	8,575	51,738	64,349	19,067
	Jan	3,471	5,339	1,018	7,791	7,728	98,372	157,853	34,188
	Feb	13,676	20,231	3,092	29,867	33,763	156,427	210,787	142,272
	Mar	21,835	31,946	4,935	46,991	53,747	205,828	312,937	336,183
	Apr	11,100	14,459	3,909	21,728	26,383	64,063	81,859	83,642
	May	13,389	15,449	7,950	25,460	32,424	55,506	65,531	17,649
	Jun	6,439	8,085	4,153	13,885	14,783	23,899	28,356	126,408
	Jul	1,560	2,817	988	5,062	3,683	10,683	13,565	120,339
	Aug	1,682	2,779	1,202	5,025	3,796	11,046	15,541	106,732
	Sep	1,468	2,691	906	4,821	3,467	11,552	14,898	86,996
1996	Oct	935	2,374	566	2,477	2,225	10,148	12,302	39,961
	Nov	1,244	2,636	608	3,210	2,953	10,187	12,970	470
	Dec	1,116	2,555	561	2,919	2,656	8,954	13,155	522
	Jan	1,184	2,623	613	3,078	2,813	8,791	13,161	30,975

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Feb	1,419	2,765	619	3,619	3,368	10,269	14,329	34,715
	Mar	1,530	2,969	715	3,897	3,628	10,786	13,670	37,564
	Apr	1,382	2,776	871	4,632	3,267	10,100	11,752	60,588
	May	578	1,327	515	2,458	1,381	7,188	8,057	81,480
	Jun	164	861	296	975	412	5,738	6,893	108,160
	Jul	766	1,641	624	2,955	1,821	13,192	15,065	100,702
	Aug	1,335	2,403	986	4,422	3,148	14,117	16,663	109,549
	Sep	3,932	5,604	2,120	9,396	8,882	23,979	33,513	37,839
1997	Oct	1,368	2,807	789	3,503	3,239	11,998	12,199	28,933
	Nov	1,712	3,104	902	4,301	4,046	18,300	18,667	448
	Dec	1,983	3,422	1,067	4,930	4,681	18,546	17,348	24,585
	Jan	2,599	4,141	1,111	6,153	5,964	29,064	37,936	12,452
	Feb	2,606	3,960	881	6,105	5,941	24,552	33,212	457
	Mar	11,108	16,252	3,201	24,586	26,698	102,608	130,098	15,764
	Apr	9,326	12,181	3,969	19,005	22,078	57,414	64,430	24,778
	May	8,128	9,810	5,310	16,802	18,732	36,715	37,236	80,233
	Jun	1,461	2,593	1,010	4,716	3,445	11,522	11,901	99,810
	Jul	522	1,290	544	2,265	1,248	7,754	8,124	116,332
	Aug	995	1,937	799	3,631	2,352	10,881	12,312	99,453
	Sep	1,302	2,307	1,109	4,404	3,061	11,034	13,125	62,514
1998	Oct	1,062	2,501	772	2,772	2,515	9,622	11,371	30,560
	Nov	1,056	2,449	670	2,758	2,505	10,927	11,962	506
	Dec	1,295	2,734	772	3,330	3,066	15,731	17,909	9,124
	Jan	1,539	2,978	865	3,908	3,640	17,844	20,720	6,532
	Feb	1,888	3,199	853	4,683	4,465	35,979	52,555	773
	Mar	11,337	16,478	3,152	24,735	27,134	125,722	178,416	501
	Apr	19,961	24,151	5,980	34,322	50,014	150,528	196,168	10,790
	May	21,443	22,736	12,365	35,920	51,803	99,701	111,592	55,861
	Jun	5,910	7,503	3,923	13,020	13,791	24,252	27,065	29,639
	Jul	2,340	4,043	1,006	6,748	5,439	14,404	15,539	97,299
	Aug	1,148	2,245	737	4,079	2,721	13,498	15,640	107,942
	Sep	707	1,524	515	2,838	1,686	8,384	9,527	80,808
1999	Oct	1,336	2,824	901	3,252	3,114	11,818	12,952	3,834
	Nov	1,660	3,058	772	4,182	3,931	12,302	14,261	417
	Dec	1,735	3,174	780	4,367	4,110	13,617	15,729	4,617
	Jan	1,143	2,582	608	2,979	2,715	11,139	12,550	13,425
	Feb	944	2,244	502	2,482	2,247	10,017	11,342	472
	Mar	1,150	2,589	630	2,996	2,731	10,723	11,820	23,959
	Apr	3,556	5,190	1,953	8,667	7,728	20,359	25,002	18,806
	May	2,129	3,289	1,807	6,255	4,899	14,011	15,376	44,377
	Jun	866	1,751	669	3,239	2,055	8,198	8,676	69,893
	Jul	3,031	4,449	1,790	7,582	7,135	19,353	25,607	65,483
	Aug	8,337	11,049	3,596	17,357	19,676	60,158	71,315	64,718
	Sep	3,365	5,307	1,291	8,540	7,640	23,717	31,070	59,213
2000	Oct	1,205	2,644	627	3,127	2,862	11,171	12,571	43,570
	Nov	892	2,285	470	2,372	2,128	9,493	10,719	1,733
	Dec	818	2,257	525	2,192	1,950	9,614	11,181	454
	Jan	910	2,349	517	2,421	2,170	9,610	11,951	457
	Feb	837	2,184	428	2,233	1,999	8,622	11,326	476
	Mar	1,230	2,669	647	3,183	2,920	10,925	13,896	491
	Apr	1,288	2,683	895	4,382	3,041	11,522	12,865	20,332
	May	442	1,171	505	2,007	1,060	7,406	8,337	58,831
	Jun	197	906	451	1,048	481	6,665	9,838	57,236
	Jul	276	1,034	441	1,336	670	7,381	7,886	70,252
	Aug	1,314	2,501	727	4,293	3,074	14,575	18,609	45,694
	Sep	519	1,292	528	2,180	1,240	8,948	9,376	12,226
2001	Oct	2,287	3,849	1,429	5,329	5,236	29,040	33,600	21,868
	Nov	4,076	5,972	1,359	9,161	9,207	53,844	69,869	9,229

		White River					Salt River		
Water Year	Month	LLR (af)	Domestic Diversion (af)	East Fork (af)	at Fort Apache (af)	Near Fort Apache (af)	near Chrysotile 9-4940	near Roosevelt 9-4985	below Stewart Mtn 9-5020
	Dec	1,987	3,426	916	4,946	4,699	17,611	20,289	458
	Jan	1,534	2,973	737	3,904	3,636	13,672	15,507	540
	Feb	2,733	4,159	904	6,241	6,099	23,873	27,507	562
	Mar	8,393	12,523	2,176	18,830	20,069	63,539	77,230	434
	Apr	14,463	17,841	5,641	26,860	35,211	90,071	105,661	4,076
	May	9,745	11,712	5,966	19,646	23,066	40,739	44,948	64,093
	Jun	1,564	2,731	999	4,896	3,606	11,494	11,494	72,556
	Jul	1,220	2,359	652	4,146	2,852	9,983	10,384	70,882
	Aug	2,599	4,292	1,150	7,135	5,885	17,364	21,307	62,685
	Sep	776	1,614	582	3,018	1,845	9,545	10,836	82,395
2002	Oct	690	2,129	514	1,872	1,648	8,202	9,592	24,449
	Nov	648	2,041	419	1,771	1,553	8,222	9,543	484
	Dec	855	2,294	450	2,289	2,043	9,243	11,002	3,361
	Jan	824	2,263	446	2,213	1,970	9,392	10,971	19,093
	Feb	746	2,046	414	2,003	1,783	8,460	9,648	12,373
	Mar	916	2,355	499	2,434	2,184	9,511	10,991	6,817
	Apr	1,036	2,429	647	3,742	2,460	8,848	9,789	25,315
	May	308	1,031	355	1,546	750	6,191	6,782	42,822
	Jun	98	794	237	708	259	4,298	4,437	70,845
	Jul	955	2,054	495	3,171	2,248	13,710	15,676	50,970
	Aug	1,201	2,223	913	4,098	2,834	18,036	21,791	43,012
	Sep	2,661	4,003	984	6,173	6,264	21,051	28,739	15,997
2003	Oct	749	2,188	488	2,024	1,789	8,045	9,771	11,867
	Nov	1,129	2,521	854	2,865	2,630	10,495	12,141	1,399
	Dec	967	2,406	597	2,552	2,299	10,364	12,173	531
	Jan	1,325	2,764	859	3,397	3,132	12,859	15,013	528
	Feb	2,765	4,341	1,081	6,240	6,169	23,596	26,585	501
	Mar	10,977	16,096	2,987	24,203	26,331	116,777	161,854	512
	Apr	13,051	16,040	5,685	24,712	31,510	70,894	78,634	416
	May	8,320	9,715	6,192	17,302	19,299	33,825	37,298	10,311
	Jun	1,179	2,037	1,123	3,826	2,694	9,890	11,161	26,369
	Jul	430	1,194	675	1,875	1,020	8,914	11,619	27,420
	Aug	1,725	2,932	1,029	5,103	3,860	14,297	18,536	26,978
	Sep	4,198	6,023	1,718	9,566	9,735	34,313	51,309	20,271
						147,133			

APPENDIX B

BLACK RIVER STREAMFLOW RECORD
WATER YEARS 1958 THROUGH 2003

Water Year	Month	Bonito Creek (af)	Black River (af)
1958	Oct	958	5,921
	Nov	1,805	10,760
	Dec	1,321	6,676
	Jan	821	4,032
	Feb	2,585	29,082
	Mar	10,911	121,444
	Apr	27,555	148,286
	May	14,297	55,905
	Jun	2,464	7,523
	Jul	730	2,362
	Aug	1,533	6,290
	Sep	3,217	13,718
1959	Oct	4,963	20,618
	Nov	1,291	5,697
	Dec	1,035	4,530
	Jan	815	3,689
	Feb	914	3,890
	Mar	1,287	5,584
	Apr	1,623	5,645
	May	698	2,418
	Jun	374	1,150
	Jul	771	3,191
	Aug	5,859	40,491
	Sep	1,015	5,893
1960	Oct	998	4,562
	Nov	2,571	20,761
	Dec	2,297	37,375
	Jan	3,965	56,369
	Feb	3,178	21,027
	Mar	13,367	78,201
	Apr	10,717	44,805
	May	4,983	12,863
	Jun	1,281	3,907
	Jul	570	1,841
	Aug	638	2,819
	Sep	416	1,813
1961	Oct	779	3,503
	Nov	670	3,299
	Dec	849	3,785
	Jan	751	3,336
	Feb	863	3,814
	Mar	1,805	10,126
	Apr	3,096	15,961
	May	1,168	4,213
	Jun	384	1,660
	Jul	397	2,003
	Aug	807	4,481
	Sep	597	4,021

Water Year	Month	Bonito Creek (af)	Black River (af)
1962	Oct	565	2,811
	Nov	1,271	7,827
	Dec	2,156	22,410
	Jan	2,819	39,545
	Feb	7,156	62,845
	Mar	6,254	44,131
	Apr	25,674	132,994
	May	7,888	29,294
	Jun	1,462	5,217
	Jul	828	3,324
	Aug	476	2,386
	Sep	746	3,876
1963	Oct	783	4,729
	Nov	1,160	4,637
	Dec	932	4,433
	Jan	906	6,756
	Feb	4,193	46,892
	Mar	5,274	28,348
	Apr	5,943	26,553
	May	1,932	6,760
	Jun	460	2,341
	Jul	526	2,705
	Aug	3,261	22,921
	Sep	2,973	29,800
1964	Oct	1,428	11,524
	Nov	1,396	9,428
	Dec	737	5,119
	Jan	662	3,429
	Feb	579	3,416
	Mar	1,369	5,895
	Apr	5,472	31,524
	May	2,305	9,249
	Jun	585	2,791
	Jul	1,764	4,149
	Aug	5,403	17,935
	Sep	6,659	26,537
1965	Oct	1,666	7,976
	Nov	863	4,384
	Dec	1,289	5,415
	Jan	7,049	44,524
	Feb	5,669	44,972
	Mar	8,081	56,966
	Apr	19,722	101,198
	May	11,391	37,427
	Jun	3,122	7,293
	Jul	2,307	8,523
	Aug	3,223	12,905
	Sep	1,339	4,376
1966	Oct	693	2,868
	Nov	3,170	10,336
	Dec	9,951	146,543
	Jan	6,784	45,460
	Feb	3,221	19,159
	Mar	21,442	125,688
	Apr	19,988	91,102

Water Year	Month	Bonito Creek (af)	Black River (af)
	May	6,831	20,410
	Jun	1,408	4,756
	Jul	926	3,769
	Aug	1,837	9,205
	Sep	1,615	7,857
1967	Oct	748	3,066
	Nov	851	2,904
	Dec	1,335	4,626
	Jan	705	3,457
	Feb	845	3,713
	Mar	2,061	6,577
	Apr	2,515	6,474
	May	1,196	2,604
	Jun	595	1,837
	Jul	2,003	6,232
	Aug	7,506	39,246
	Sep	4,624	18,851
1968	Oct	1,055	4,471
	Nov	863	3,673
	Dec	918	10,273
	Jan	2,856	44,779
	Feb	8,132	72,461
	Mar	11,167	75,526
	Apr	16,348	99,810
	May	10,481	40,820
	Jun	2,938	7,319
	Jul	1,805	4,532
	Aug	4,356	13,952
	Sep	1,876	6,260
1969	Oct	686	2,416
	Nov	863	2,997
	Dec	841	3,229
	Jan	5,254	28,134
	Feb	2,489	11,615
	Mar	7,256	30,703
	Apr	20,611	77,779
	May	7,900	21,819
	Jun	1,589	4,520
	Jul	840	2,537
	Aug	1,910	5,439
	Sep	3,193	11,709
1970	Oct	1,131	3,471
	Nov	2,378	5,709
	Dec	1,515	5,298
	Jan	861	4,201
	Feb	1,152	4,570
	Mar	5,467	19,266
	Apr	9,439	27,604
	May	6,998	14,559
	Jun	1,305	2,856
	Jul	862	2,638
	Aug	1,718	4,233
	Sep	3,380	7,712
1971	Oct	1,436	4,895
	Nov	972	2,535

Water Year	Month	Bonito Creek (af)	Black River (af)
	Dec	920	3,005
	Jan	863	4,439
	Feb	756	4,157
	Mar	2,083	6,256
	Apr	1,783	4,485
	May	1,093	2,517
	Jun	518	1,341
	Jul	497	2,214
	Aug	2,884	14,077
	Sep	2,182	8,775
1972	Oct	9,648	55,780
	Nov	4,023	18,010
	Dec	4,844	36,445
	Jan	2,557	15,414
	Feb	1,676	6,907
	Mar	3,878	13,654
	Apr	1,394	4,590
	May	928	2,575
	Jun	1,079	2,844
	Jul	837	2,561
	Aug	810	2,364
	Sep	754	4,415
1973	Oct	8,418	109,820
	Nov	3,804	29,812
	Dec	4,215	35,766
	Jan	4,522	25,831
	Feb	4,608	59,438
	Mar	10,830	126,845
	Apr	27,785	194,800
	May	37,528	191,190
	Jun	8,638	26,684
	Jul	3,045	10,282
	Aug	1,537	5,094
	Sep	658	2,134
1974	Oct	614	1,884
	Nov	604	2,862
	Dec	730	2,900
	Jan	1,363	4,328
	Feb	948	3,187
	Mar	3,967	12,930
	Apr	3,852	11,205
	May	2,053	4,403
	Jun	485	1,008
	Jul	688	1,843
	Aug	2,103	7,097
	Sep	759	2,844
1975	Oct	1,959	9,844
	Nov	2,152	12,397
	Dec	922	4,027
	Jan	942	4,584
	Feb	1,823	15,198
	Mar	9,566	77,293
	Apr	14,208	91,410
	May	12,212	48,626
	Jun	2,313	7,539

Water Year	Month	Bonito Creek (af)	Black River (af)
	Jul	1,595	5,550
	Aug	784	2,148
	Sep	1,824	8,626
1976	Oct	710	2,384
	Nov	647	2,186
	Dec	852	2,743
	Jan	692	2,261
	Feb	2,499	16,907
	Mar	3,205	18,458
	Apr	7,008	42,433
	May	5,806	21,769
	Jun	954	3,239
	Jul	1,595	4,354
	Aug	1,381	5,137
	Sep	916	2,656
1977	Oct	932	2,224
	Nov	650	2,337
	Dec	690	2,358
	Jan	895	3,277
	Feb	936	3,517
	Mar	1,279	5,544
	Apr	5,363	16,483
	May	2,313	6,867
	Jun	612	1,934
	Jul	900	3,723
	Aug	2,660	8,844
	Sep	1,065	4,239
1978	Oct	1,370	3,733
	Nov	764	3,219
	Dec	665	3,047
	Jan	1,404	7,960
	Feb	5,597	42,959
	Mar	32,032	237,564
	Apr	21,882	102,251
	May	8,434	22,880
	Jun	1,680	3,664
	Jul	1,133	1,932
	Aug	2,122	4,296
	Sep	664	2,208
1979	Oct	707	1,968
	Nov	4,086	33,604
	Dec	15,436	150,589
	Jan	5,907	66,055
	Feb	6,714	63,770
	Mar	14,628	99,956
	Apr	32,135	164,254
	May	27,670	75,290
	Jun	8,795	25,002
	Jul	1,763	5,441
	Aug	2,114	7,051
	Sep	862	2,590
1980	Oct	639	2,216
	Nov	781	2,668
	Dec	813	2,807
	Jan	3,247	38,474

Water Year	Month	Bonito Creek (af)	Black River (af)
	Feb	18,157	180,925
	Mar	11,197	79,640
	Apr	22,582	134,636
	May	19,153	75,684
	Jun	3,550	14,884
	Jul	1,672	6,272
	Aug	1,521	8,466
	Sep	1,252	5,429
1981	Oct	841	3,291
	Nov	734	3,701
	Dec	788	3,775
	Jan	944	3,007
	Feb	978	3,523
	Mar	3,318	22,229
	Apr	9,232	40,092
	May	6,051	10,181
	Jun	1,536	2,924
	Jul	1,500	6,145
	Aug	1,775	7,525
	Sep	1,495	4,869
1982	Oct	1,706	7,377
	Nov	852	3,830
	Dec	857	4,187
	Jan	1,159	7,266
	Feb	3,521	33,751
	Mar	8,864	79,911
	Apr	11,417	66,519
	May	13,615	31,863
	Jun	3,875	5,687
	Jul	956	2,874
	Aug	1,612	7,533
	Sep	1,814	6,857
1983	Oct	763	2,233
	Nov	1,107	4,727
	Dec	4,138	36,947
	Jan	4,195	37,038
	Feb	6,445	63,363
	Mar	15,146	150,520
	Apr	18,575	148,445
	May	24,079	107,105
	Jun	12,654	20,962
	Jul	2,429	6,268
	Aug	4,315	11,330
	Sep	5,889	19,169
1984	Oct	22,289	167,562
	Nov	2,132	9,376
	Dec	5,191	46,194
	Jan	3,998	28,612
	Feb	2,319	12,552
	Mar	3,922	26,466
	Apr	5,593	23,772
	May	5,295	10,842
	Jun	818	2,475
	Jul	1,048	4,023
	Aug	3,672	16,830

Water Year	Month	Bonito Creek (af)	Black River (af)
	Sep	2,770	10,267
1985	Oct	5,553	24,599
	Nov	2,572	9,896
	Dec	11,058	101,779
	Jan	6,654	55,358
	Feb	6,392	53,876
	Mar	19,746	162,310
	Apr	16,870	101,359
	May	12,815	47,126
	Jun	4,670	9,396
	Jul	1,824	5,617
	Aug	2,637	13,002
	Sep	2,292	7,428
1986	Oct	2,827	10,467
	Nov	2,022	9,396
	Dec	2,068	10,037
	Jan	1,473	5,238
	Feb	5,953	50,510
	Mar	11,099	88,873
	Apr	11,018	55,974
	May	5,136	10,628
	Jun	1,706	4,227
	Jul	3,433	6,052
	Aug	2,911	5,562
	Sep	2,270	5,526
1987	Oct	3,703	9,707
	Nov	5,301	30,893
	Dec	4,711	40,396
	Jan	1,982	13,444
	Feb	3,594	23,963
	Mar	10,921	95,692
	Apr	17,872	112,445
	May	10,523	38,528
	Jun	3,221	7,367
	Jul	1,605	6,538
	Aug	3,345	11,350
	Sep	1,083	3,806
1988	Oct	993	3,388
	Nov	2,479	9,003
	Dec	1,556	5,752
	Jan	2,106	12,278
	Feb	4,744	37,934
	Mar	5,336	36,667
	Apr	9,686	61,800
	May	9,164	32,627
	Jun	2,372	5,714
	Jul	2,333	6,012
	Aug	5,666	37,538
	Sep	5,174	38,686
1989	Oct	1,503	5,718
	Nov	1,243	4,578
	Dec	1,365	5,115
	Jan	1,564	6,625
	Feb	1,618	8,577
	Mar	6,700	29,052

Water Year	Month	Bonito Creek (af)	Black River (af)
	Apr	4,616	10,634
	May	1,473	3,265
	Jun	542	1,686
	Jul	766	2,773
	Aug	1,070	4,981
	Sep	541	2,872
1990	Oct	764	3,552
	Nov	588	2,817
	Dec	717	2,711
	Jan	728	3,691
	Feb	701	4,479
	Mar	1,799	11,925
	Apr	3,184	8,698
	May	2,554	4,403
	Jun	791	1,670
	Jul	2,107	11,768
	Aug	1,546	7,194
	Sep	2,043	6,262
1991	Oct	1,677	6,411
	Nov	1,320	6,194
	Dec	4,586	41,427
	Jan	5,258	50,163
	Feb	3,309	23,885
	Mar	17,414	179,562
	Apr	19,276	135,830
	May	13,106	37,427
	Jun	3,456	7,353
	Jul	1,125	3,804
	Aug	1,550	6,702
	Sep	2,646	13,650
1992	Oct	773	3,187
	Nov	1,197	5,611
	Dec	2,557	20,432
	Jan	2,631	22,814
	Feb	6,709	67,500
	Mar	9,874	84,594
	Apr	17,192	97,154
	May	14,192	36,244
	Jun	5,140	18,456
	Jul	1,588	4,758
	Aug	8,702	30,738
	Sep	1,863	6,897
1993	Oct	1,043	3,747
	Nov	1,104	3,814
	Dec	4,849	38,381
	Jan	29,980	301,524
	Feb	13,755	129,239
	Mar	18,715	145,410
	Apr	25,057	150,270
	May	21,647	57,264
	Jun	6,893	9,164
	Jul	1,416	3,527
	Aug	1,531	4,471
	Sep	2,867	4,770
1994	Oct	1,860	4,072

Water Year	Month	Bonito Creek (af)	Black River (af)
	Nov	1,415	4,102
	Dec	1,077	4,082
	Jan	627	3,654
	Feb	1,319	10,721
	Mar	5,766	42,554
	Apr	5,487	20,626
	May	4,603	7,884
	Jun	1,412	2,600
	Jul	604	1,432
	Aug	1,719	4,590
	Sep	4,290	22,114
1995	Oct	1,073	4,665
	Nov	5,892	45,745
	Dec	4,046	34,660
	Jan	6,222	65,170
	Feb	11,318	98,766
	Mar	15,541	125,210
	Apr	7,166	35,286
	May	10,606	20,194
	Jun	5,068	5,578
	Jul	1,189	2,741
	Aug	1,536	3,997
	Sep	1,182	3,761
1996	Oct	699	2,686
	Nov	778	3,007
	Dec	711	2,908
	Jan	796	3,229
	Feb	882	4,082
	Mar	937	3,519
	Apr	1,067	2,832
	May	567	1,783
	Jun	307	1,613
	Jul	990	5,490
	Aug	1,430	5,772
	Sep	2,906	7,825
1997	Oct	1,091	4,388
	Nov	1,549	8,394
	Dec	1,676	7,678
	Jan	2,329	15,209
	Feb	1,922	13,240
	Mar	9,168	70,549
	Apr	6,683	28,398
	May	6,766	10,213
	Jun	1,221	2,763
	Jul	644	2,319
	Aug	1,053	3,757
	Sep	1,434	3,987
1998	Oct	960	2,997
	Nov	882	3,414
	Dec	1,333	7,650
	Jan	1,575	9,330
	Feb	2,737	23,812
	Mar	10,520	88,155
	Apr	14,501	97,102
	May	17,620	44,264

Water Year	Month	Bonito Creek (af)	Black River (af)
	Jun	4,893	6,696
	Jul	1,377	4,830
	Aug	1,105	5,306
	Sep	631	2,501
1999	Oct	1,136	3,338
	Nov	1,039	3,913
	Dec	1,099	4,618
	Jan	824	3,642
	Feb	689	3,289
	Mar	804	3,088
	Apr	2,733	8,075
	May	2,224	3,882
	Jun	815	2,577
	Jul	2,465	7,145
	Aug	6,802	35,316
	Sep	2,106	9,757
2000	Oct	850	3,695
	Nov	632	3,164
	Dec	691	3,180
	Jan	698	3,370
	Feb	588	3,144
	Mar	904	4,092
	Apr	1,178	3,884
	May	589	2,194
	Jun	523	2,073
	Jul	524	2,303
	Aug	1,031	4,522
	Sep	648	2,533
2001	Oct	3,066	19,833
	Nov	4,672	40,836
	Dec	1,542	8,182
	Jan	1,090	5,109
	Feb	1,859	12,101
	Mar	5,503	39,531
	Apr	10,738	54,991
	May	7,862	14,452
	Jun	1,226	2,977
	Jul	826	3,031
	Aug	1,692	6,686
	Sep	783	3,443
2002	Oct	634	2,636
	Nov	541	2,757
	Dec	592	3,033
	Jan	597	3,140
	Feb	560	2,936
	Mar	671	3,310
	Apr	786	2,555
	May	380	1,734
	Jun	214	1,297
	Jul	861	5,726
	Aug	1,304	5,258
	Sep	1,588	7,718
2003	Oct	613	2,739
	Nov	1,191	4,629
	Dec	850	4,132

Water Year	Month	Bonito Creek (af)	Black River (af)
	Jan	1,315	6,175
	Feb	2,316	15,277
	Mar	9,985	83,831
	Apr	9,405	37,714
	May	7,822	10,699
	Jun	1,342	2,648
	Jul	802	2,412
	Aug	1,303	3,564
	Sep	3,185	17,098
		50,854	

APPENDIX Z-C

WATER AVAILABILITY
SIMULATION OF LAKE ROOSEVELT IMPACT

water availablility
fort apache

		Miner Flat Dam	Bear Flat Dam
Weight of Water, #/cubic ft	62.40		
Power Efficiency, %	85.00		
kw per hp	1.341		
Penstock Capacity, cfs	1,000	1,000	
Tailrace Elevation, ft	5,920	5,920	
Minimum Release, cfs	10	10	0
Maximum Capacity, af	26,990	8,415	18,576
Total Conservation Storage, af	24,933	7,162	17,771
Minimum Capacity, af	2,058	1,253	805
Apache Lake, af	245,138		
Canyon Lake, af	57,852		
Saguaro Lake	73,613		
Minimum Roosevelt, af	452		
Annual WMAT Depletion, af	-69,704		
Annual Evaporation Offset, af	5,887		
Net WMAT Impact			

http://www.usbr.gov/dataweb/dams/az10317.htm

	Hydraulic Height	Top of Pool	Bot of Pool
Theodore Roosevelt Da	249	2,151	1,902
Horse Mesa	266		
Mormon Flat	142		
Stewart Mountain	116		
	773		

	MFD Area	Evap McNary	Evap Whiteriv
A	7.2652	0.1451	0.0157
B	0.0243	1.3110	1.6816
C	0.0000		
D	0.0000		
R^2	0.9927	0.2460	0.5512
Elev		7,340	5,120

Reservoir, MFD		
Elevation	Shoreline	Area
5,926.87	-473,015	##########
0.04029125	237.76	13,111
-0.00000459	-0.039841	-2.19
0.00000000	0.0000022	0.0001224

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	Surplus or Shortage: Is there a surplus? Storage Test 1 (af)	Surplus or Shortage: Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
											3,581			76		3,581											
1958	Oct	346	0	1,451	0	1,228	3	346	346	615	3,927	0	0	82	10	3,917	0	0	892	6,026	4.10	80.39	106	82,374	-336	-1,299	-302
	Nov	1,483	0	3,137	0	1,878	3	1,483	1,483	595	5,199	0	0	101	15	5,185	0	0	610	6,040	4.94	103.77	120	63,666	-1,268	-1,910	-1,156
	Dec	1,333	0	2,559	0	1,504	3	1,333	1,333	615	6,074	0	0	115	20	6,054	0	0	635	6,047	5.39	117.87	127	69,859	-870	-1,383	-612
	Jan	872	0	1,478	0	1,044	3	872	872	615	6,483	0	0	121	23	6,460	0	0	638	6,049	5.58	123.81	129	71,573	-406	-919	-114
	Feb	2,045	0	3,825	0	2,135	3	2,045	2,045	560	8,035	0	0	148	-2	8,037	0	0	558	6,057	6.22	145.31	137	66,516	-1,577	-2,093	-2,071
	Mar	12,353	0	21,792	0	9,758	3	12,353	9,758	615	8,415	9,379	0	155	-20	8,435	9,379	0	9,361	6,059	6.39	151.20	139	239,836	-398	-10,569	-10,437
	Apr	24,788	0	55,828	0	23,481	3	24,788	23,481	595	8,415	23,481	0	155	35	8,379	23,481	0	23,536	6,059	6.37	150.34	139	239,346	56	-1,352	-26,846
	May	14,927	0	33,804	0	17,821	3	14,927	14,927	615	8,415	14,927	0	155	73	8,341	14,927	0	17,859	6,058	6.35	149.77	138	239,016	38	-8,714	-12,504
	Jun	636	0	2,947	0	4,252	3	636	636	595	8,977	73	0	167	79	8,898	73	0	3,696	6,061	6.61	158.92	141	244,103	-557	-6,315	-731
	Jul	0	2,907	0	2,512	870	0	-2,907	-2,907	615	5,991	0	0	113	76	5,915	0	0	3,854	6,046	5.33	115.73	126	216,743	2,984	-6,600	784
	Aug	0	714	0	2,037	1,736	0	-2,037	-2,037	615	3,877	0	0	81	46	3,831	0	0	3,819	6,025	4.04	78.77	105	181,233	2,083	-6,120	-443
	Sep	1,984	0	3,125	0	3,038	3	1,984	1,984	595	5,816	0	0	111	15	5,801	0	0	1,068	6,045	5.27	113.96	125	115,979	-1,970	-5,196	-2,210
1959	Oct	2,779	0	7,009	0	3,648	3	2,779	2,779	615	8,580	15	0	159	32	8,548	15	0	901	6,060	6.44	152.98	140	109,431	-2,747	-3,710	-4,205
	Nov	1,150	0	2,536	0	1,545	3	1,150	1,150	595	8,415	1,316	0	155	29	8,386	1,316	0	1,707	6,059	6.37	150.45	139	205,983	162	-909	-592
	Dec	1,041	0	1,873	0	1,213	3	1,041	1,041	615	8,415	1,041	0	155	38	8,377	1,041	0	1,222	6,059	6.37	150.31	139	147,436	9	-514	-249
	Jan	852	0	1,429	0	1,024	3	852	852	615	8,415	852	0	155	32	8,382	852	0	1,018	6,059	6.37	150.39	139	122,909	-5	-524	-83
	Feb	778	0	1,454	0	1,017	3	778	778	560	8,415	778	0	155	21	8,394	778	0	1,006	6,059	6.38	150.57	139	121,414	-12	-538	-295
	Mar	939	0	2,340	0	1,516	3	939	939	615	8,415	939	0	155	42	8,373	939	0	1,538	6,059	6.37	150.25	139	185,490	21	-770	-481
	Apr	1,106	0	0	788	1,985	1	-788	-788	595	7,585	0	0	140	50	7,535	0	0	2,822	6,055	6.02	138.41	135	232,244	838	-4,601	-794
	May	0	2,543	0	4,228	796	0	-4,228	-4,228	615	3,307	0	0	72	46	3,261	0	0	5,070	6,016	3.60	68.23	96	166,251	4,274	-7,556	1,292
	Jun	0	4,089	0	2,716	248	0	-4,089	-4,089	595	1,253	0	2,034	35	31	1,222	0	2,034	2,288	5,970	1.89	39.06	50	85,610	2,040	-6,273	1,438
	Jul	0	3,019	0	1,410	917	0	-3,019	-3,019	615	1,253	0	3,019	35	12	1,241	0	3,019	898	5,970	1.90	39.32	50	39,210	-20	-5,764	522
	Aug	3,289	0	7,575	0	5,754	3	3,289	3,289	615	4,530	0	0	91	18	4,512	0	0	2,484	6,033	4.52	91.62	113	195,745	-3,271	-8,433	-4,963
	Sep	0	99	0	2,215	1,314	0	-2,215	-2,215	595	2,297	0	0	55	36	2,261	0	0	3,565	5,997	2.79	52.22	77	132,526	2,251	-4,648	124
1960	Oct	711	0	1,846	0	1,406	3	711	711	615	2,972	0	0	66	4	2,968	0	0	699	6,011	3.37	63.12	91	55,482	-707	-1,670	-406
	Nov	4,879	0	9,155	0	4,350	3	4,879	4,350	595	6,722	0	0	125	13	6,710	0	0	608	6,050	5.69	127.30	130	68,934	-3,742	-4,384	-1,916
	Dec	4,254	0	7,452	0	3,562	3	4,254	3,562	615	8,415	1,870	0	155	-3	8,417	1,870	0	1,855	6,059	6.39	150.93	139	224,097	-1,707	-4,093	-1,758
	Jan	5,741	0	10,186	0	4,957	3	5,741	4,957	615	8,415	4,957	0	155	-14	8,428	4,957	0	4,946	6,059	6.39	151.10	139	239,779	-11	-4,156	-3,435
	Feb	3,665	0	6,784	0	3,557	3	3,665	3,557	560	8,415	3,557	0	155	21	8,394	3,557	0	3,592	6,059	6.38	150.57	139	239,476	34	-514	-2,552
	Mar	22,065	0	38,827	0	16,331	3	22,065	16,331	615	8,415	16,331	0	155	30	8,385	16,331	0	16,340	6,059	6.37	150.43	139	239,397	9	-770	-12,643
	Apr	13,846	0	28,000	0	13,417	3	13,846	13,417	595	8,415	13,417	0	155	54	8,360	13,417	0	13,441	6,059	6.36	150.05	139	239,182	25	-3,604	-9,876
	May	6,183	0	12,830	0	8,802	3	6,183	6,183	615	8,415	6,183	0	155	58	8,357	6,183	0	8,805	6,059	6.36	150.00	139	239,152	3	-6,896	-3,149
	Jun	0	262	343	0	3,319	2	-262	-262	595	7,762	0	0	143	87	7,674	0	0	4,001	6,055	6.08	140.29	135	233,404	683	-6,261	594
	Jul	0	3,536	0	2,157	588	0	-3,536	-3,536	615	4,138	0	0	85	53	4,085	0	0	4,178	6,028	4.23	83.58	108	187,046	3,589	-6,247	889
	Aug	0	1,836	0	2,116	1,024	0	-2,116	-2,116	615	1,970	0	0	49	26	1,943	0	0	3,166	5,989	2.52	48.02	69	119,588	2,142	-5,669	509
	Sep	0	1,188	0	3,092	484	0	-3,092	-3,092	595	1,253	0	2,375	35	20	1,232	0	2,375	1,195	5,970	1.90	39.21	50	51,911	711	-4,746	752
1961	Oct	0	43	574	0	838	2	-43	-43	615	1,253	0	615	35	8	1,245	0	615	825	5,970	1.91	39.38	50	36,130	-13	-976	-86
	Nov	477	0	947	0	872	3	477	477	595	1,523	0	0	40	10	1,512	0	0	605	5,978	2.15	42.73	58	30,549	-267	-909	86
	Dec	818	0	1,343	0	989	3	818	818	615	1,886	0	0	47	4	1,882	0	0	619	5,988	2.47	47.25	68	36,504	-370	-884	-194
	Jan	692	0	1,056	0	863	3	692	692	615	2,131	0	0	52	7	2,123	0	0	622	5,994	2.67	50.36	74	39,853	-241	-755	-63
	Feb	689	0	1,248	0	929	3	689	689	560	2,492	0	0	58	12	2,480	0	0	572	6,002	2.97	55.37	82	40,614	-357	-871	-193
	Mar	1,199	0	2,905	0	1,759	3	1,199	1,199	615	3,624	0	0	77	8	3,616	0	0	623	6,022	3.88	74.73	102	55,236	-1,136	-1,906	-1,175
	Apr	4,327	0	6,458	0	4,741	3	4,327	4,327	595	7,762	0	0	143	35	7,727	0	0	630	6,055	6.10	141.01	135	74,266	-4,111	-7,462	-2,301
	May	0	1,488	0	2,500	1,838	0	-2,500	-2,500	615	5,227	0	0	102	55	5,173	0	0	4,393	6,040	4.93	103.56	120	206,911	2,555	-7,225	738
	Jun	0	3,795	0	2,226	497	0	-3,795	-3,795	595	1,378	0	0	38	38	1,339	0	0	4,331	5,973	1.99	40.59	53	91,599	3,834	-6,099	1,373
	Jul	0	3,754	0	2,203	343	0	-3,754	-3,754	615	1,253	0	3,629	35	14	1,239	0	3,629	444	5,970	1.90	39.29	50	19,343	101	-5,965	851
	Aug	0	754	89	0	1,770	2	-754	-754	615	1,253	0	754	35	2	1,251	0	754	1,758	5,970	1.91	39.45	50	77,207	-12	-4,293	-2
	Sep	35	0	0	1,439	1,350	1	-1,439	-1,439	595	1,253	0	1,439	35	13	1,239	0	1,439	1,362	5,970	1.90	39.30	50	59,395	11	-3,936	379
1962	Oct	0	74	544	0	807	2	-74	-74	615	1,253	0	615	35	6	1,247	0	615	800	5,970	1.91	39.39	50	35,042	-7	-970	647
	Nov	1,080	0	2,381	0	1,475	3	1,080	1,080	595	2,127	0	0	52	7	2,120	0	0	602	5,994	2.67	50.30	74	38,538	-873	-1,515	-610
	Dec	1,798	0	3,656	0	1,969	3	1,798	1,798	615	3,474	0	0	75	2	3,472	0	0	617	6,020	3.77	72.06	100	53,503	-1,353	-1,866	-1,574
	Jan	2,264	0	4,513	0	2,384	3	2,264	2,264	615	5,241	0	0	102	2	5,239	0	0	617	6,040	4.97	104.72	120	64,631	-1,767	-2,281	-2,230
	Feb	9,519	0	16,543	0	7,377	3	9,519	7,377	560	8,415	4,204	0	155	17	8,397	4,204	0	4,219	6,059	6.38	150.62	139	239,506	-3,158	-7,858	-6,558
	Mar	6,724	0	12,329	0	5,989	3	6,724	5,989	615	8,415	5,989	0	155	23	8,392	5,989	0	5,994	6,059	6.37	150.54	139	239,456	6	-6,735	-5,577
	Apr	30,094	0	65,850	0	28,831	3	30,094	28,831	595	8,415	28,831	0	155	60	8,354	28,831	0	28,869	6,059	6.36	149.96	139	239,128	38	-4,083	-24,500
	May	10,422	0	22,364	0	13,011	3	10,422	10,422	615	8,415	10,422	0	155	64	8,351	10,422	0	13,014	6,059	6.36	149.91	139	239,101	3	-7,324	-6,284
	Jun	124	0	1,928	0	3,887	3	124	124	595	8,475	64	0	156	80	8,395	64	0	3,843	6,059	6.38	150.59	139	239,484	-44	-5,743	171
	Jul	0	2,152	0	1,341	1,372	0	-2,152	-2,152	615	6,243	0	0	117	55	6,187	0	0	3,580	6,047	5.46	119.85	127	219,798	2,208	-5,917	441
	Aug	0	2,385	0	3,469	689	0	-3,469	-3,469	615	2,718	0	0	62	52	2,666	0	0	4,211	6,005	3.12	58.20	85	147,410	3,522	-6,752	780
	Sep	506	0	0	382	1,621	1	-382	-382	595	2,070	0	0	51	12	2,058	0	0	2,228	5,992	2.62	49.50	72	124,415	607	-3,538	119
1963	Oct	503	0	1,812	0	1,384	3	503	503	615	2,561	0	0	59	17	2,545	0	0	898	6,003	3.02	56.34	83	64,805	-486	-1,449	-19

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	Nov	1,273	0	2,695	0	1,637	3	1,273	1,273	595	3,587	0	0	76	15	3,572	0	0	610	6,021	3.85	73.90	101	53,747	-1,027	-1,669	-468
	Dec	1,100	0	2,016	0	1,271	3	1,100	1,100	615	4,229	0	0	86	9	4,219	0	0	624	6,030	4.32	86.12	110	59,771	-647	-1,161	-257
	Jan	1,019	0	1,821	0	1,191	3	1,019	1,019	615	4,795	0	0	95	8	4,787	0	0	622	6,036	4.70	96.71	116	62,992	-568	-1,082	-261
	Feb	3,570	0	6,798	0	3,592	3	3,570	3,570	560	7,820	0	0	144	11	7,808	0	0	572	6,056	6.13	142.11	136	67,593	-3,021	-3,534	-3,607
	Mar	7,101	0	13,021	0	6,368	3	7,101	6,368	615	8,415	5,773	0	155	26	8,388	5,773	0	5,788	6,059	6.37	150.48	139	239,424	-580	-1,734	-4,581
	Apr	7,332	0	15,920	0	7,509	3	7,332	7,332	595	8,415	7,332	0	155	45	8,369	7,332	0	7,528	6,059	6.36	150.19	139	239,260	19	-1,027	-5,165
	May	675	0	0	2,017	3,838	1	-2,017	-2,017	615	6,353	0	0	119	65	6,288	0	0	5,920	6,048	5.50	121.33	128	220,862	2,082	-9,265	-13
	Jun	0	3,604	0	1,866	504	0	-3,604	-3,604	595	2,684	0	0	62	46	2,638	0	0	4,154	6,005	3.10	57.77	85	146,457	3,650	-5,644	1,184
	Jul	0	4,037	0	3,004	99	0	-4,037	-4,037	615	1,253	0	2,606	35	24	1,229	0	2,606	1,508	5,970	1.89	39.16	50	65,388	1,409	-6,420	796
	Aug	1,023	0	2,699	0	3,334	3	1,023	1,023	615	2,252	0	0	54	4	2,249	0	0	2,315	5,997	2.78	52.05	77	132,054	-1,019	-5,336	-2,347
	Sep	3,892	0	4,445	0	4,331	3	3,892	3,892	595	5,985	0	0	113	38	5,947	0	0	633	6,046	5.34	116.24	126	69,262	-3,699	-8,421	-1,886
1964	Oct	540	0	1,862	0	1,421	3	540	540	615	6,487	0	0	121	42	6,445	0	0	924	6,049	5.57	123.59	129	103,584	-498	-1,461	-637
	Nov	1,073	0	2,349	0	1,468	3	1,073	1,073	595	7,318	0	0	135	23	7,296	0	0	618	6,053	5.92	135.21	133	71,696	-851	-1,493	-739
	Dec	859	0	1,442	0	1,030	3	859	859	615	7,711	0	0	142	26	7,685	0	0	641	6,055	6.08	140.43	135	75,434	-389	-903	-24
	Jan	653	0	962	0	824	3	653	653	615	7,894	0	0	145	15	7,879	0	0	630	6,056	6.16	143.09	136	74,665	-194	-708	-7
	Feb	609	0	952	0	802	3	609	609	560	8,121	0	0	150	22	8,099	0	0	582	6,057	6.25	146.19	137	69,558	-220	-733	45
	Mar	728	0	1,771	0	1,293	3	728	728	615	8,776	72	0	163	18	8,758	72	0	633	6,061	6.54	156.47	141	77,490	-659	-1,485	-719
	Apr	7,632	0	12,338	0	7,019	3	7,632	7,019	595	8,415	7,381	0	155	36	8,379	7,381	0	7,399	6,059	6.37	150.34	139	239,345	379	-6,461	-4,772
	May	833	0	689	0	3,846	3	689	689	615	8,415	689	0	155	68	8,347	689	0	3,878	6,059	6.35	149.85	139	239,064	32	-6,543	-695
	Jun	0	3,166	0	1,720	819	0	-3,166	-3,166	595	5,181	0	0	101	68	5,113	0	0	4,053	6,039	4.90	102.52	119	206,002	3,234	-5,776	1,069
	Jul	0	2,385	0	1,343	1,303	0	-2,385	-2,385	615	2,728	0	0	62	32	2,696	0	0	3,719	6,006	3.15	58.68	86	148,459	2,417	-5,926	-634
	Aug	297	0	0	168	2,537	1	-168	-168	615	2,081	0	0	51	19	2,062	0	0	3,171	5,992	2.62	49.55	72	124,560	634	-5,339	-4,467
	Sep	4,487	0	6,979	0	4,773	3	4,487	4,487	595	6,240	0	0	117	21	6,219	0	0	616	6,048	5.47	120.33	128	68,327	-4,157	-7,647	-5,825
1965	Oct	1,020	0	2,893	0	1,887	3	1,020	1,020	615	7,239	0	0	134	43	7,197	0	0	910	6,053	5.89	133.89	133	105,226	-978	-1,941	-870
	Nov	641	0	1,346	0	1,036	3	641	641	595	7,638	0	0	141	23	7,615	0	0	618	6,055	6.05	139.49	135	72,522	-418	-1,060	-212
	Dec	998	0	1,774	0	1,170	3	998	998	615	8,170	0	0	151	21	8,149	0	0	636	6,058	6.27	146.92	138	76,090	-534	-1,047	-623
	Jan	8,482	0	14,627	0	6,663	3	8,482	6,663	615	8,415	6,418	0	155	3	8,412	6,418	0	6,400	6,059	6.38	150.85	139	239,634	-263	-1,193	-6,452
	Feb	5,248	0	9,315	0	4,681	3	5,248	4,681	560	8,415	4,681	0	155	8	8,406	4,681	0	4,687	6,059	6.38	150.76	139	239,586	5	-514	-5,145
	Mar	9,140	0	16,107	0	7,484	3	9,140	7,484	615	8,415	7,484	0	155	20	8,394	7,484	0	7,496	6,059	6.38	150.57	139	239,478	12	-770	-7,442
	Apr	26,263	0	56,637	0	23,814	3	26,263	23,814	595	8,415	23,814	0	155	33	8,381	23,814	0	23,827	6,059	6.37	150.37	139	239,364	13	-1,027	-19,057
	May	13,714	0	30,230	0	15,861	3	13,714	13,714	615	8,415	13,714	0	155	57	8,358	13,714	0	15,884	6,059	6.36	150.02	139	239,161	23	-7,198	-10,021
	Jun	3,722	0	10,543	0	7,176	3	3,722	3,722	595	8,415	3,722	0	155	65	8,350	3,722	0	7,184	6,059	6.36	149.90	139	239,092	8	-5,084	-1,642
	Jul	1,985	0	5,410	0	4,853	3	1,985	1,985	615	8,415	1,985	0	155	35	8,380	1,985	0	4,823	6,059	6.37	150.36	139	239,354	-30	-5,234	-1,330
	Aug	2,882	0	3,587	0	4,792	3	2,882	2,882	615	8,415	2,882	0	155	85	8,330	2,882	0	4,842	6,058	6.35	149.60	138	238,919	50	-6,459	-1,969
	Sep	650	0	0	692	1,707	1	-692	-692	595	7,638	0	0	141	60	7,578	0	0	2,459	6,055	6.04	138.98	135	232,601	752	-4,066	-252
1966	Oct	289	0	1,326	0	1,170	3	289	289	615	7,867	0	0	145	48	7,819	0	0	929	6,056	6.13	142.25	136	109,915	-241	-1,204	150
	Nov	4,501	0	8,685	0	3,967	3	4,501	3,967	595	8,415	3,419	0	155	14	8,400	3,419	0	3,386	6,059	6.38	150.67	139	239,530	-582	-1,417	-2,587
	Dec	15,020	0	26,038	0	11,260	3	15,020	11,260	615	8,415	11,260	0	155	-43	8,458	11,260	0	11,203	6,059	6.40	151.56	139	240,037	-58	-632	-9,687
	Jan	9,191	0	15,958	0	7,336	3	9,191	7,336	615	8,415	7,336	0	155	17	8,398	7,336	0	7,396	6,059	6.38	150.63	139	239,507	60	-514	-1,802
	Feb	2,805	0	5,560	0	2,987	3	2,805	2,805	560	8,415	2,805	0	155	18	8,396	2,805	0	2,988	6,059	6.38	150.61	139	239,497	1	-514	1
	Mar	22,038	0	38,745	0	16,645	3	22,038	16,645	615	8,415	16,645	0	155	41	8,374	16,645	0	16,668	6,059	6.37	150.26	139	239,297	23	-770	148
	Apr	17,165	0	38,020	0	16,064	3	17,165	16,064	595	8,415	16,064	0	155	46	8,368	16,064	0	16,069	6,059	6.36	150.18	139	239,253	5	-1,027	52
	May	7,665	0	12,622	0	10,009	3	7,665	7,665	615	8,415	7,665	0	155	72	8,342	7,665	0	10,036	6,058	6.35	149.78	138	239,024	26	-9,625	-4,759
	Jun	0	650	541	0	2,788	2	-650	-650	595	7,692	0	0	142	66	7,626	0	0	3,504	6,055	6.06	139.63	135	233,000	716	-5,446	248
	Jul	0	1,859	0	1,489	1,684	0	-1,859	-1,859	615	5,766	0	0	110	61	5,706	0	0	3,604	6,044	5.22	112.45	124	214,218	1,920	-6,390	485
	Aug	1,275	0	2,251	0	3,298	3	1,275	1,275	615	6,980	0	0	129	10	6,971	0	0	2,032	6,052	5.79	130.86	132	227,412	-1,265	-5,705	-874
	Sep	1,793	0	914	0	2,623	3	914	914	595	7,884	0	0	145	59	7,826	0	0	1,768	6,056	6.14	142.35	136	209,137	-855	-5,156	-554
1967	Oct	535	0	1,901	0	1,416	3	535	535	615	8,360	0	0	154	54	8,306	0	0	936	6,058	6.34	149.23	138	112,616	-480	-1,443	92
	Nov	820	0	1,768	0	1,215	3	820	820	595	8,415	766	0	155	36	8,378	766	0	1,143	6,059	6.37	150.33	139	137,912	-72	-1,044	-120
	Dec	1,562	0	2,984	0	1,715	3	1,562	1,562	615	8,415	1,562	0	155	10	8,404	1,562	0	1,689	6,059	6.38	150.73	139	203,968	-26	-567	-725
	Jan	1,355	0	2,617	0	1,523	3	1,355	1,355	615	8,415	1,355	0	155	26	8,389	1,355	0	1,539	6,059	6.37	150.49	139	185,744	15	-514	-3
	Feb	920	0	1,792	0	1,159	3	920	920	560	8,415	920	0	155	36	8,379	920	0	1,170	6,059	6.37	150.33	139	141,125	10	-514	-136
	Mar	1,851	0	4,294	0	2,404	3	1,851	1,851	615	8,415	1,851	0	155	26	8,388	1,851	0	2,395	6,059	6.37	150.48	139	239,425	-10	-790	-1,393
	Apr	2,422	0	5,406	0	3,197	3	2,422	2,422	595	8,415	2,422	0	155	42	8,372	2,422	0	3,213	6,059	6.37	150.24	139	239,285	16	-1,027	-1,737
	May	0	1,628	0	4,215	1,535	0	-4,215	-4,215	615	4,157	0	0	85	43	4,114	0	0	5,793	6,029	4.25	84.13	109	187,679	4,258	-8,259	392
	Jun	0	3,371	0	1,193	854	0	-3,371	-3,371	595	1,253	0	466	35	30	1,223	0	466	3,745	5,970	1.89	39.08	50	85,685	2,891	-5,572	948
	Jul	0	588	885	0	2,860	2	-588	-588	615	1,253	0	615	35	10	1,243	0	615	2,841	5,970	1.90	39.34	50	86,694	-20	-5,477	-979
	Aug	9,067	0	18,166	0	10,074	3	9,067	9,067	615	8,415	1,905	0	155	27	8,387	1,905	0	2,929	6,059	6.37	150.47	139	239,417	-7,145	-13,464	-6,607
	Sep	6,252	0	10,329	0	6,434	3	6,252	6,252	595	8,415	6,252	0	155	60	8,354	6,252	0	6,467	6,059	6.36	149.97	139	239,131	33	-4,048	-3,601
1968	Oct	673	0	2,223	0	1,555	3	673	673	615	9,028	60	0	168	60	8,967	60	0	942	6,062	6.65	160.17	142	116,223	-613	-1,576	-202
	Nov	802	0	1,727	0	1,197	3	802	802	595	8,415	1,415	0	155	31	8,384	1,415	0	1,780	6,059	6.37	150.41	139	214,878	583	-675	-168
	Dec	1,852	0	3,428	0	1,884	3	1,852	1,852	615	8,415	1,852	0	155	-13	8,428	1,852	0	1,840	6,059	6.39	151.09	139	222,435	-44	-603	-571
	Jan	3,455	0	6,340	0	3,165	3	3,455	3,165	615	8,415	3,165	0	155	19	8,396	3,165	0	3,197	6,059	6.38	150.60	139	239,490	32	-514	-2,205
	Feb	10,345	0	17,884	0	8,002	3	10,345	8,002	560	8,415	8,002	0	155	23	8,392	8,002	0	8,006	6,059	6.37	150.54	139	239,456	4	-514	-7,480
	Mar	15,985	0	27,927	0	12,118	3	15,985	12,118	615	8,415	12,118	0	155	17	8,398	12,118	0	12,112	6,059	6.38	150.63	139	239,508	-6	-783	-10,542
	Apr	22,085	0	47,188	0	20,197	3	22,085	20,197	595	8,415	20,197	0	155	31	8,383	20,197	0	20,211	6,059	6.37	150.41	139	239,382	14	-1,027	-6,791
	May	13,326	0	28,547	0	15,123	3	13,326	13,326	615	8,415	13,326	0	155	66	8,349	13,326	0	15,157	6,059	6.36	149.88	139	239,082	34	-7,452	-5,705
	Jun	1,432	0	5,068	0	5,336	3	1,432	1,432	595	8,415	1,432	0	155	85	8,330	1,432	0	5,355	6,058	6.35	149.59	138	238,917	19	-5,951	-1,147
	Jul	0	1,823	0	353	1,812	0	-1,823	-1,823	615	6,507	0	0	122	48	6,458	0	0	3,683	6,049	5.58	123.78	129	222,603	1,871	-5,568	-676
	Aug	2,020	0	4,849	0	4,221	3	2,020	2,020	615	8,479	48	0	157	13	8,466	48	0	2,213	6,059	6.41	151.68	139	240,106	-2,007	-6,201	-3,513
	Sep	467	0	0	1,015	1,643	1	-1,015	-1,015	595	7,450	0	0	137	63	7,388	0	0	2,720	6,054	5.96	136.44	134	231,010	1,078	-4,182	-717
1969	Oct	277	0	1,289	0	1,158	3	277	277	615	7,664	0	0	141	52	7,612	0	0	933	6,055	6.05	139.45	135	109,577	-225	-1,188	184
	Nov	734	0	1,562	0	1,129	3	734	734	595	8,146	0	0	150	20	8,126	0	0	615	6,057	6.26	146.59	137	73,559	-514	-1,156	-196
	Dec	942	0	1,637	0	1,113	3	942	942	615	8,415	674	0	155	1	8,413	674	0	826	6,059	6.38	150.87	139	99,845	-287	-1,064	-318
	Jan	5,216	0	9,359	0	4,387	3	5,216	4,387	615	8,415	4,387	0	155	12	8,402	4,387	0	4,397	6,059	6.38	150.70	139	239,550	11	-514	-4,650
	Feb	2,565	0	5,336	0	2,767	3	2,565	2,565	560	8,415	2,565	0	155	23	8,391	2,565	0	2,778	6,059	6.37	150.53	139	239,454	11	-514	-1,879
	Mar	6,965	0	13,216	0	6,112	3	6,965	6,112	615	8,415	6,112	0	155	19	8,396	6,112	0	6,107	6,059	6.38	150.60	139	239,493	-4	-780	-2,239
	Apr	19,908	0	41,992	0	18,735	3	19,908	18,735	595	8,415	18,735	0	155	51	8,363	18,735	0	18,768	6,059	6.36	150.10	139	239,207	33	-3,477	217
	May	9,086	0	20,382	0	11,698	3	9,086	9,086	615	8,415	9,086	0	155	49	8,366	9,086	0	11,695	6,059	6.36	150.14	139	239,230	-3	-6,669	-6,126
	Jun	0	0	1,401	0	3,650	2	0	0	595	7,771	0	0	143	79	7,692	0	0	4,324	6,055	6.08	140.52	135	233,548	674	-5,733	161
	Jul	0	1,158	0	733	2,078	0	-1,158	-1,158	615	6,533	0	0	122	49	6,484	0	0	3,286	6,049	5.59	124.15	129	222,858	1,208	-5,842	414
	Aug	1,062	0	1,030	0	3,291	3	1,030	1,030	615	7,514	0	0	139	51	7,463	0	0	2,312	6,054	5.99	137.44	134	231,643	-979	-6,871	-794
	Sep	3,396	0	3,865	0	4,085	3	3,396	3,396	595	8,415	2,495	0	155	68	8,347	2,495	0	3,201	6,059	6.35	149.85	139	239,066	-884	-5,610	-2,015
1970	Oct	1,616	0	4,301	0	2,466	3	1,616	1,616	615	8,415	1,616	0	155	45	8,370	1,616	0	2,443	6,059	6.36	150.20	139	239,265	-23	-1,014	-339
	Nov	1,500	0	3,301	0	1,886	3	1,500	1,500	595	8,415	1,500	0	155	22	8,393	1,500	0	1,863	6,059	6.37	150.55	139	224,917	-23	-689	-1,711
	Dec	1,478	0	2,882	0	1,649	3	1,478	1,478	615	8,415	1,478	0	155	28	8,387	1,478	0	1,655	6,059	6.37	150.46	139	199,812	6	-514	-795

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	Jan	1,136	0	2,099	0	1,308	3	1,136	1,136	615	8,415	1,136	0	155	24	8,391	1,136	0	1,304	6,059	6.37	150.52	139	157,386	-4	-522	-121
	Feb	1,002	0	1,984	0	1,241	3	1,002	1,002	560	8,415	1,002	0	155	31	8,384	1,002	0	1,248	6,059	6.37	150.41	139	150,634	7	-514	-461
	Mar	3,118	0	6,507	0	3,532	3	3,118	3,118	615	8,415	3,118	0	155	6	8,409	3,118	0	3,507	6,059	6.38	150.80	139	239,607	-25	-822	-4,872
	Apr	8,511	0	16,779	0	7,810	3	8,511	7,810	595	8,415	7,810	0	155	32	8,383	7,810	0	7,836	6,059	6.37	150.40	139	239,379	26	-1,027	-8,688
	May	5,629	0	11,243	0	8,569	3	5,629	5,629	615	8,415	5,629	0	155	69	8,345	5,629	0	8,606	6,059	6.35	149.83	139	239,053	37	-7,539	-5,093
	Jun	0	805	0	180	2,661	0	-805	-805	595	7,541	0	0	139	79	7,462	0	0	3,544	6,054	5.99	137.43	134	231,636	883	-5,882	565
	Jul	0	2,611	0	2,035	1,162	0	-2,611	-2,611	615	4,851	0	0	96	61	4,790	0	0	3,834	6,036	4.70	96.76	116	200,766	2,672	-6,526	490
	Aug	486	0	0	198	2,795	1	-198	-198	615	4,175	0	0	86	38	4,138	0	0	3,448	6,029	4.26	84.57	109	188,181	653	-5,842	-681
	Sep	3,064	0	5,697	0	4,156	3	3,064	3,064	595	7,202	0	0	133	28	7,173	0	0	1,120	6,053	5.88	133.57	133	129,378	-3,036	-6,474	-2,577
1971	Oct	818	0	2,469	0	1,700	3	818	818	615	7,992	0	0	147	34	7,957	0	0	916	6,057	6.19	144.18	137	108,841	-784	-1,747	-692
	Nov	626	0	1,310	0	1,021	3	626	626	595	8,383	0	0	155	40	8,343	0	0	635	6,058	6.35	149.79	138	76,545	-386	-1,028	-224
	Dec	863	0	1,458	0	1,035	3	863	863	615	8,415	832	0	155	20	8,395	832	0	983	6,059	6.38	150.58	139	118,687	-52	-979	-257
	Jan	939	0	1,641	0	1,111	3	939	939	615	8,415	939	0	155	24	8,391	939	0	1,115	6,059	6.37	150.52	139	134,550	4	-514	-155
	Feb	960	0	1,887	0	1,200	3	960	960	560	8,415	960	0	155	29	8,386	960	0	1,204	6,059	6.37	150.45	139	145,375	5	-514	-88
	Mar	2,039	0	4,579	0	2,604	3	2,039	2,039	615	8,415	2,039	0	155	42	8,372	2,039	0	2,618	6,059	6.37	150.24	139	239,285	14	-770	-1,292
	Apr	1,821	0	1,158	0	2,583	3	1,158	1,158	595	8,415	1,158	0	155	44	8,370	1,158	0	2,585	6,059	6.36	150.21	139	239,269	2	-4,067	-1,012
	May	0	1,104	0	2,047	1,758	0	-2,047	-2,047	615	6,324	0	0	119	52	6,272	0	0	3,857	6,048	5.49	121.10	128	220,695	2,099	-6,333	560
	Jun	0	3,715	0	1,817	586	0	-3,715	-3,715	595	2,557	0	0	59	49	2,508	0	0	4,349	6,002	2.99	55.79	82	141,831	3,764	-5,861	1,234
	Jul	0	3,160	0	1,933	771	0	-3,160	-3,160	615	1,253	0	1,857	35	20	1,233	0	1,857	2,046	5,970	1.90	39.22	50	86,206	1,275	-6,066	857
	Aug	4,084	0	7,583	0	5,503	3	4,084	4,084	615	5,317	0	0	103	8	5,309	0	0	1,427	6,041	5.01	105.91	121	150,261	-4,076	-8,497	-2,109
	Sep	2,508	0	3,773	0	3,396	3	2,508	2,508	595	7,817	0	0	144	35	7,782	0	0	923	6,056	6.12	141.75	136	109,081	-2,472	-6,104	-1,253
1972	Oct	12,367	0	23,639	0	10,622	3	12,367	10,622	615	8,415	10,025	0	155	-5	8,419	10,025	0	9,985	6,059	6.39	150.96	139	239,698	-638	-3,783	-9,153
	Nov	5,074	0	10,059	0	5,092	3	5,074	5,074	595	8,415	5,074	0	155	27	8,387	5,074	0	5,124	6,059	6.37	150.47	139	239,417	32	-642	-3,345
	Dec	9,938	0	17,404	0	7,946	3	9,938	7,946	615	8,415	7,946	0	155	0	8,415	7,946	0	7,919	6,059	6.38	150.89	139	239,658	-27	-570	-4,312
	Jan	4,989	0	9,087	0	4,518	3	4,989	4,518	615	8,415	4,518	0	155	32	8,382	4,518	0	4,550	6,059	6.37	150.39	139	239,374	32	-514	-1,802
	Feb	2,035	0	4,271	0	2,212	3	2,035	2,035	560	8,415	2,035	0	155	37	8,377	2,035	0	2,217	6,059	6.37	150.32	139	239,332	5	-514	-954
	Mar	4,173	0	8,802	0	4,647	3	4,173	4,173	615	8,415	4,173	0	155	54	8,361	4,173	0	4,664	6,059	6.36	150.07	139	239,188	16	-770	-3,018
	Apr	1,655	0	1,556	0	2,516	3	1,556	1,556	595	8,415	1,556	0	155	54	8,360	1,556	0	2,517	6,059	6.36	150.05	139	239,181	1	-3,576	-549
	May	0	1,701	0	3,108	1,386	0	-3,108	-3,108	615	5,252	0	0	102	54	5,197	0	0	4,548	6,040	4.95	103.99	120	207,280	3,163	-7,033	1,008
	Jun	0	2,215	257	0	1,652	2	-2,215	-2,215	595	2,982	0	0	67	27	2,955	0	0	3,894	6,011	3.36	62.92	91	157,013	2,242	-4,886	72
	Jul	0	2,282	0	1,115	1,392	0	-2,282	-2,282	615	1,253	0	553	35	19	1,234	0	553	3,113	5,970	1.90	39.23	50	86,242	1,722	-5,822	461
	Aug	0	1,051	0	1,598	1,458	0	-1,598	-1,598	615	1,253	0	1,598	35	13	1,240	0	1,598	1,452	5,970	1.90	39.30	50	63,342	-6	-5,445	255
	Sep	0	746	0	1,792	841	0	-1,792	-1,792	595	1,253	0	1,792	35	12	1,241	0	1,792	840	5,970	1.90	39.32	50	36,662	-1	-3,883	270
1973	Oct	11,229	0	22,403	0	10,050	3	11,229	10,050	615	8,415	2,888	0	155	-14	8,429	2,888	0	2,862	6,059	6.39	151.11	139	239,782	-7,188	-11,063	-7,962
	Nov	4,261	0	8,187	0	4,402	3	4,261	4,261	595	8,415	4,261	0	155	7	8,407	4,261	0	4,424	6,059	6.38	150.77	139	239,592	22	-2,005	-3,218
	Dec	5,292	0	9,656	0	4,642	3	5,292	4,642	615	8,415	4,642	0	155	8	8,407	4,642	0	4,642	6,059	6.38	150.77	139	239,588	0	-514	-3,611
	Jan	4,874	0	8,666	0	4,514	3	4,874	4,514	615	8,415	4,514	0	155	18	8,396	4,514	0	4,524	6,059	6.38	150.61	139	239,497	10	-514	-3,874
	Feb	5,367	0	9,497	0	4,672	3	5,367	4,672	560	8,415	4,672	0	155	6	8,408	4,672	0	4,660	6,059	6.38	150.79	139	239,601	-12	-538	-4,079
	Mar	14,097	0	24,518	0	10,665	3	14,097	10,665	615	8,415	10,665	0	155	-20	8,434	10,665	0	10,639	6,059	6.39	151.19	139	239,829	-26	-824	-10,492
	Apr	33,622	0	77,613	0	32,155	3	33,622	32,155	595	8,415	32,155	0	155	39	8,375	32,155	0	32,214	6,059	6.37	150.29	139	239,314	59	-1,027	-5,347
	May	48,824	0	119,339	0	51,628	3	48,824	48,824	615	8,415	48,824	0	155	38	8,376	48,824	0	51,628	6,059	6.37	150.30	139	239,320	-1	-7,064	-4,960
	Jun	11,125	0	29,485	0	15,027	3	11,125	11,125	595	8,415	11,125	0	155	69	8,345	11,125	0	15,058	6,059	6.35	149.83	139	239,052	31	-5,382	-3,336
	Jul	2,223	0	4,977	0	5,200	3	2,223	2,223	615	8,415	2,223	0	155	59	8,356	2,223	0	5,190	6,059	6.36	149.99	139	239,144	-11	-5,766	-1,824
	Aug	345	0	0	477	2,595	1	-477	-477	615	7,741	0	0	143	61	7,680	0	0	3,270	6,055	6.08	140.36	135	233,451	676	-5,667	-344
	Sep	0	24	0	2,635	1,119	0	-2,635	-2,635	595	5,045	0	0	99	61	4,985	0	0	3,814	6,038	4.82	100.26	118	203,991	2,695	-4,621	594
1974	Oct	59	0	781	0	940	3	59	59	615	5,043	0	0	99	40	5,003	0	0	921	6,038	4.83	100.59	118	94,895	-19	-982	909
	Nov	675	0	1,429	0	1,070	3	675	675	595	5,478	0	0	106	16	5,462	0	0	611	6,042	5.09	108.48	122	65,035	-459	-1,101	51
	Dec	1,018	0	1,827	0	1,189	3	1,018	1,018	615	6,036	0	0	114	23	6,013	0	0	638	6,046	5.37	117.25	126	70,059	-551	-1,065	28
	Jan	1,365	0	2,648	0	1,536	3	1,365	1,365	615	6,934	0	0	129	-4	6,938	0	0	611	6,052	5.78	130.41	132	69,976	-925	-1,443	-871
	Feb	1,116	0	2,260	0	1,355	3	1,116	1,116	560	7,733	0	0	142	26	7,707	0	0	586	6,055	6.09	140.73	135	69,044	-769	-1,283	-269
	Mar	4,733	0	9,223	0	4,541	3	4,733	4,541	615	8,415	3,860	0	155	15	8,400	3,860	0	3,849	6,059	6.38	150.66	139	239,526	-692	-1,806	-3,290
	Apr	4,753	0	9,622	0	5,064	3	4,753	4,753	595	8,415	4,753	0	155	49	8,366	4,753	0	5,098	6,059	6.36	150.14	139	239,232	34	-1,027	-3,030
	May	920	0	0	2,180	3,853	1	-2,180	-2,180	615	6,186	0	0	116	60	6,125	0	0	6,093	6,047	5.43	118.93	127	219,126	2,241	-9,213	-98
	Jun	0	2,945	0	2,360	977	0	-2,945	-2,945	595	3,180	0	0	70	57	3,123	0	0	3,979	6,014	3.49	65.80	94	162,195	3,002	-6,448	1,491
	Jul	0	3,452	0	1,658	579	0	-3,452	-3,452	615	1,253	0	1,525	35	19	1,234	0	1,525	2,469	5,970	1.90	39.22	50	86,221	1,890	-5,699	576
	Aug	0	1,870	0	2,404	1,054	0	-2,404	-2,404	615	1,253	0	2,404	35	17	1,235	0	2,404	1,052	5,970	1.90	39.25	50	45,785	-2	-6,057	-1,021
	Sep	0	728	0	2,332	799	0	-2,332	-2,332	595	1,253	0	2,332	35	16	1,237	0	2,332	797	5,970	1.90	39.27	50	34,736	-2	-4,293	290
1975	Oct	2,323	0	5,162	0	2,877	3	2,323	2,323	615	3,499	0	0	75	-1	3,500	0	0	614	6,020	3.79	72.58	100	53,513	-2,263	-3,228	-1,455
	Nov	1,852	0	4,016	0	2,245	3	1,852	1,852	595	5,150	0	0	101	22	5,128	0	0	617	6,039	4.90	102.78	119	64,168	-1,627	-2,269	-1,414
	Dec	1,393	0	2,712	0	1,565	3	1,393	1,393	615	6,077	0	0	115	15	6,063	0	0	630	6,047	5.40	117.99	127	69,350	-935	-1,449	-243
	Jan	1,280	0	2,446	0	1,452	3	1,280	1,280	615	6,899	0	0	128	14	6,886	0	0	629	6,051	5.76	129.70	131	71,831	-823	-1,337	-311
	Feb	1,495	0	3,083	0	1,722	3	1,495	1,495	560	8,047	0	0	148	5	8,042	0	0	565	6,057	6.22	145.38	137	67,360	-1,157	-1,670	-1,300
	Mar	12,267	0	21,985	0	9,715	3	12,267	9,715	615	8,415	9,348	0	155	2	8,412	9,348	0	9,345	6,059	6.38	150.85	139	239,636	-370	-7,871	-9,004
	Apr	20,857	0	44,401	0	18,536	3	20,857	18,536	595	8,415	18,536	0	155	7	8,407	18,536	0	18,541	6,059	6.38	150.77	139	239,592	5	-1,027	-13,590
	May	16,728	0	38,524	0	18,372	3	16,728	16,728	615	8,415	16,728	0	155	58	8,356	16,728	0	18,423	6,059	6.36	149.99	139	239,146	51	-5,161	-10,103
	Jun	2,921	0	8,282	0	6,520	3	2,921	2,921	595	8,415	2,921	0	155	82	8,333	2,921	0	6,544	6,058	6.35	149.64	138	238,944	23	-5,701	-542
	Jul	0	529	0	51	2,509	0	-529	-529	615	7,718	0	0	142	49	7,669	0	0	3,173	6,055	6.07	140.22	135	233,361	664	-5,534	-404
	Aug	0	861	0	2,313	1,576	0	-2,313	-2,313	615	5,356	0	0	104	63	5,294	0	0	3,952	6,041	5.00	105.64	121	208,687	2,376	-6,205	439
	Sep	639	0	0	52	1,860	1	-52	-52	595	4,699	0	0	94	30	4,668	0	0	2,485	6,035	4.62	94.52	115	198,626	625	-3,752	-798
1976	Oct	130	0	951	0	1,012	3	130	130	615	4,799	0	0	95	36	4,762	0	0	918	6,036	4.68	96.24	116	92,670	-94	-1,057	173
	Nov	627	0	1,316	0	1,021	3	627	627	595	5,189	0	0	101	17	5,172	0	0	612	6,040	4.93	103.55	120	63,828	-410	-1,052	22
	Dec	1,067	0	1,938	0	1,239	3	1,067	1,067	615	5,795	0	0	110	16	5,779	0	0	631	6,045	5.26	113.62	125	68,461	-607	-1,121	-160
	Jan	898	0	1,544	0	1,070	3	898	898	615	6,234	0	0	117	17	6,217	0	0	632	6,048	5.47	120.30	128	70,090	-438	-952	13
	Feb	4,170	0	7,429	0	3,653	3	4,170	3,653	560	8,415	1,473	0	155	15	8,400	1,473	0	1,471	6,059	6.38	150.66	139	177,634	-2,182	-3,087	-1,921
	Mar	3,420	0	6,894	0	3,608	3	3,420	3,420	615	8,415	3,420	0	155	24	8,391	3,420	0	3,617	6,059	6.37	150.52	139	239,449	9	-770	-2,548
	Apr	10,278	0	20,563	0	9,223	3	10,278	9,223	595	8,415	9,223	0	155	30	8,384	9,223	0	9,229	6,059	6.37	150.42	139	239,390	7	-1,027	-6,314
	May	7,208	0	14,621	0	9,717	3	7,208	7,208	615	8,415	7,208	0	155	38	8,376	7,208	0	9,725	6,059	6.37	150.30	139	239,319	8	-7,051	-3,928
	Jun	0	711	0	102	2,746	0	-711	-711	595	7,665	0	0	141	82	7,583	0	0	3,539	6,055	6.04	139.05	135	232,645	793	-5,905	828
	Jul	0	70	851	0	3,136	2	-70	-70	615	6,968	0	0	129	48	6,920	0	0	3,799	6,051	5.77	130.17	131	226,956	663	-5,610	-572
	Aug	1,234	0	1,695	0	3,354	3	1,234	1,234	615	8,154	0	0	150	43	8,111	0	0	2,163	6,057	6.25	146.37	137	237,049	-1,192	-6,390	-360
	Sep	791	0	0	159	1,816	1	-159	-159	595	7,516	0	0	139	49	7,467	0	0	2,460	6,054	5.99	137.50	134	231,679	644	-3,804	73
1977	Oct	580	0	1,997	0	1,461	3	580	580	615	8,047	0	0	148	38	8,009	0	0	920	6,057	6.21	144.91	137	109,524	-542	-1,505	-166
	Nov	673	0	1,423	0	1,068	3	673	673	595	8,482	239	0	157	36	8,446	239	0	631	6,059	6.40	151.38	139	76,325	-437	-1,280	92
	Dec	961	0	1,694	0	1,133	3	961	961	615	8,415	1,029	0	155	30	8,384	1,029	0	1,194	6,059	6.37	150.42	139	144,160	62	-617	50
	Jan	1,135	0	2,101	0	1,306	3	1,135	1,135	615	8,415	1,135	0	155	-4	8,418	1,135	0	1,272	6,059	6.39	150.95	139	153,705	-34	-583	-353
	Feb	964	0	1,899	0	1,204	3	964	964	560	8,415	964	0	155	34	8,381	964	0	1,241	6,059	6.37	150.37	139	149,785	38	-514	-246

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	Mar	1,202	0	2,959	0	1,779	3	1,202	1,202	615	8,415	1,202	0	155	20	8,395	1,202	0	1,765	6,059	6.38	150.58	139	213,110	-14	-799	-621
	Apr	5,630	0	11,896	0	5,835	3	5,630	5,630	595	8,415	5,630	0	155	48	8,367	5,630	0	5,863	6,059	6.36	150.16	139	239,240	28	-1,027	-4,591
	May	390	0	0	2,135	3,436	1	-2,135	-2,135	615	6,232	0	0	117	50	6,182	0	0	5,621	6,047	5.45	119.78	127	219,744	2,185	-8,534	-654
	Jun	0	2,840	0	1,128	1,081	0	-2,840	-2,840	595	3,342	0	0	73	43	3,299	0	0	3,964	6,017	3.63	68.90	97	167,323	2,883	-5,519	963
	Jul	0	781	640	0	2,378	2	-781	-781	615	2,518	0	0	59	10	2,508	0	0	3,168	6,002	2.99	55.79	82	141,833	791	-4,914	125
	Aug	566	0	0	23	2,777	1	-23	-23	615	1,893	0	0	47	20	1,873	0	0	3,412	5,988	2.46	47.14	68	116,568	635	-5,660	-1,588
	Sep	278	0	0	887	1,465	1	-887	-887	595	1,253	0	247	35	12	1,241	0	247	2,097	5,970	1.90	39.32	50	86,618	632	-3,722	-94
1978	Oct	1,191	0	3,119	0	1,963	3	1,191	1,191	615	2,432	0	0	57	9	2,423	0	0	781	6,000	2.92	54.53	80	54,601	-1,182	-2,145	-653
	Nov	876	0	1,903	0	1,271	3	876	876	595	3,099	0	0	69	16	3,084	0	0	611	6,013	3.46	65.10	93	49,574	-660	-1,302	-41
	Dec	741	0	1,169	0	912	3	741	741	615	3,381	0	0	73	14	3,367	0	0	629	6,018	3.69	70.14	98	53,639	-283	-797	56
	Jan	1,006	0	1,754	0	1,177	3	1,006	1,006	615	3,929	0	0	82	-5	3,934	0	0	610	6,026	4.12	80.70	106	56,498	-567	-1,090	-861
	Feb	4,362	0	8,040	0	4,142	3	4,362	4,142	560	7,515	0	0	139	-5	7,521	0	0	555	6,054	6.01	138.21	134	64,957	-3,587	-4,108	-5,159
	Mar	37,298	0	67,006	0	26,998	3	37,298	26,998	615	8,415	26,099	0	155	-27	8,442	26,099	0	26,077	6,059	6.40	151.31	139	239,895	-921	-2,366	-30,285
	Apr	22,669	0	52,323	0	22,188	3	22,669	22,188	595	8,415	22,188	0	155	48	8,367	22,188	0	22,263	6,059	6.36	150.15	139	239,238	75	-1,027	436
	May	10,116	0	20,698	0	12,587	3	10,116	10,116	615	8,415	10,116	0	155	54	8,361	10,116	0	12,593	6,059	6.36	150.06	139	239,186	6	-8,514	-6,527
	Jun	171	0	1,575	0	3,863	3	171	171	595	8,532	54	0	158	87	8,444	54	0	3,779	6,059	6.40	151.35	139	239,917	-83	-6,139	182
	Jul	0	2,366	0	2,261	1,186	0	-2,366	-2,366	615	6,078	0	0	115	72	6,006	0	0	3,624	6,046	5.37	117.13	126	217,795	2,438	-6,559	316
	Aug	0	187	0	117	2,147	0	-187	-187	615	5,391	0	0	104	21	5,370	0	0	2,782	6,042	5.04	106.94	122	209,776	636	-4,698	-1,142
	Sep	0	485	0	2,369	908	0	-2,369	-2,369	595	3,001	0	0	67	39	2,962	0	0	3,316	6,011	3.36	63.03	91	157,228	2,408	-4,348	482
1979	Oct	132	0	953	0	1,013	3	132	132	615	3,094	0	0	68	18	3,076	0	0	899	6,013	3.46	64.98	93	72,890	-114	-1,077	90
	Nov	6,474	0	11,406	0	5,347	3	6,474	5,347	595	7,829	0	0	144	-14	7,843	0	0	581	6,056	6.14	142.59	136	68,744	-4,767	-5,430	-3,708
	Dec	23,496	0	42,945	0	17,143	3	23,496	17,143	615	8,415	16,557	0	155	-28	8,442	16,557	0	16,544	6,059	6.40	151.32	139	239,900	-599	-1,447	-15,132
	Jan	10,174	0	17,687	0	8,099	3	10,174	8,099	615	8,415	8,099	0	155	-24	8,439	8,099	0	8,102	6,059	6.40	151.26	139	239,870	4	-514	-317
	Feb	8,986	0	15,563	0	7,141	3	8,986	7,141	560	8,415	7,141	0	155	20	8,394	7,141	0	7,185	6,059	6.38	150.57	139	239,478	45	-514	339
	Mar	20,614	0	36,111	0	15,169	3	20,614	15,169	615	8,415	15,169	0	155	6	8,409	15,169	0	15,155	6,059	6.38	150.80	139	239,608	-15	-801	-153
	Apr	35,853	0	84,634	0	35,022	3	35,853	35,022	595	8,415	35,022	0	155	48	8,366	35,022	0	35,065	6,059	6.36	150.15	139	239,233	43	-1,027	310
	May	26,626	0	62,451	0	28,682	3	26,626	26,626	615	8,415	26,626	0	155	29	8,385	26,626	0	28,663	6,059	6.37	150.44	139	239,399	-19	-7,853	-6,521
	Jun	10,681	0	28,689	0	14,477	3	10,681	10,681	595	8,415	10,681	0	155	78	8,337	10,681	0	14,525	6,058	6.35	149.70	138	238,977	49	-5,649	-3,428
	Jul	68	0	371	0	3,395	3	68	68	615	8,405	0	0	155	79	8,326	0	0	3,406	6,058	6.35	149.53	138	238,881	11	-6,387	-244
	Aug	260	0	271	0	2,805	3	260	260	615	8,586	79	0	159	59	8,527	79	0	2,604	6,059	6.44	152.65	139	240,650	-201	-5,639	-1,025
	Sep	0	196	0	2,942	1,065	0	-2,942	-2,942	595	5,585	0	0	107	69	5,516	0	0	4,076	6,043	5.12	109.37	123	211,763	3,011	-4,945	425
1980	Oct	0	70	543	0	812	2	-70	-70	615	4,901	0	0	97	42	4,859	0	0	1,468	6,037	4.74	98.00	117	149,497	657	-963	260
	Nov	768	0	1,639	0	1,163	3	768	768	595	5,427	0	0	105	15	5,412	0	0	610	6,042	5.07	107.64	122	64,708	-553	-1,195	-101
	Dec	1,022	0	1,819	0	1,193	3	1,022	1,022	615	5,990	0	0	113	18	5,972	0	0	633	6,046	5.35	116.62	126	69,345	-561	-1,074	-110
	Jan	3,362	0	6,201	0	2,939	3	3,362	2,939	615	8,297	0	0	153	-22	8,318	0	0	593	6,058	6.34	149.42	138	71,397	-2,346	-2,886	-2,921
	Feb	25,222	0	44,284	0	18,445	3	25,222	18,445	560	8,415	18,327	0	155	-35	8,450	18,327	0	18,314	6,059	6.40	151.43	139	239,965	-131	-1,003	-11,995
	Mar	16,121	0	28,421	0	12,102	3	16,121	12,102	615	8,415	12,102	0	155	6	8,408	12,102	0	12,143	6,059	6.38	150.79	139	239,603	41	-770	267
	Apr	29,791	0	69,229	0	28,390	3	29,791	28,390	595	8,415	28,390	0	155	40	8,375	28,390	0	28,424	6,059	6.37	150.27	139	239,307	34	-1,027	210
	May	25,591	0	59,222	0	28,159	3	25,591	25,591	615	8,415	25,591	0	155	53	8,362	25,591	0	28,172	6,059	6.36	150.08	139	239,195	13	-7,544	-6,506
	Jun	8,662	0	22,602	0	12,682	3	8,662	8,662	595	8,415	8,662	0	155	89	8,326	8,662	0	12,718	6,058	6.35	149.53	138	238,881	36	-6,092	-1,630
	Jul	1,063	0	3,360	0	4,250	3	1,063	1,063	615	8,415	1,063	0	155	18	8,396	1,063	0	4,179	6,059	6.38	150.60	139	239,495	-71	-4,991	-539
	Aug	1,930	0	3,477	0	4,020	3	1,930	1,930	615	8,415	1,930	0	155	27	8,387	1,930	0	4,029	6,059	6.37	150.47	139	239,418	9	-4,674	-618
	Sep	1,357	0	233	0	2,301	3	233	233	595	8,621	27	0	159	67	8,553	27	0	2,135	6,060	6.45	153.07	140	240,890	-166	-4,478	-136
1981	Oct	448	0	1,693	0	1,329	3	448	448	615	9,001	67	0	167	46	8,955	67	0	928	6,062	6.64	159.95	142	114,430	-401	-1,385	-55
	Nov	884	0	1,917	0	1,279	3	884	884	595	8,415	1,471	0	155	43	8,372	1,471	0	1,862	6,059	6.37	150.23	139	224,601	583	-649	40
	Dec	1,218	0	2,295	0	1,390	3	1,218	1,218	615	8,415	1,218	0	155	26	8,389	1,218	0	1,373	6,059	6.37	150.49	139	165,730	-17	-547	-78
	Jan	1,165	0	2,170	0	1,336	3	1,165	1,165	615	8,415	1,165	0	155	31	8,383	1,165	0	1,342	6,059	6.37	150.41	139	161,956	6	-514	-196
	Feb	1,296	0	2,682	0	1,536	3	1,296	1,296	560	8,415	1,296	0	155	20	8,395	1,296	0	1,524	6,059	6.38	150.58	139	184,033	-11	-537	-371
	Mar	4,202	0	8,150	0	4,249	3	4,202	4,202	615	8,415	4,202	0	155	-15	8,430	4,202	0	4,214	6,059	6.39	151.12	139	239,789	-35	-842	-2,849
	Apr	12,833	0	25,658	0	12,247	3	12,833	12,247	595	8,415	12,247	0	155	48	8,367	12,247	0	12,310	6,059	6.36	150.15	139	239,237	63	-3,415	-8,439
	May	4,279	0	8,102	0	6,996	3	4,279	4,279	615	8,415	4,279	0	155	62	8,352	4,279	0	7,010	6,059	6.36	149.93	139	239,112	14	-7,123	-4,190
	Jun	0	1,629	0	731	1,934	0	-1,629	-1,629	595	6,723	0	0	125	68	6,655	0	0	3,631	6,050	5.66	126.54	130	224,516	1,697	-5,758	260
	Jul	0	815	0	615	2,418	0	-815	-815	615	5,840	0	0	111	51	5,789	0	0	3,284	6,045	5.26	113.78	125	215,250	866	-6,049	-205
	Aug	0	57	0	1,180	2,250	0	-1,180	-1,180	615	4,609	0	0	92	40	4,569	0	0	3,471	6,034	4.56	92.68	114	196,813	1,220	-5,717	-675
	Sep	944	0	0	428	1,911	1	-428	-428	595	3,974	0	0	83	36	3,937	0	0	2,542	6,026	4.12	80.77	106	183,720	631	-4,268	-381
1982	Oct	983	0	2,812	0	1,852	3	983	983	615	4,920	0	0	97	28	4,893	0	0	897	6,037	4.76	98.61	117	91,592	-955	-1,918	-891
	Nov	832	0	1,796	0	1,227	3	832	832	595	5,524	0	0	106	17	5,507	0	0	612	6,043	5.12	109.23	123	65,318	-615	-1,257	-165
	Dec	1,032	0	1,855	0	1,203	3	1,032	1,032	615	6,096	0	0	115	26	6,070	0	0	641	6,047	5.40	118.11	127	70,601	-563	-1,076	-88
	Jan	1,502	0	2,966	0	1,673	3	1,502	1,502	615	7,128	0	0	132	-10	7,138	0	0	605	6,053	5.86	133.10	133	69,825	-1,068	-1,594	-672
	Feb	3,812	0	6,879	0	3,391	3	3,812	3,391	560	8,415	2,104	0	155	3	8,411	2,104	0	2,117	6,059	6.38	150.84	139	239,629	-1,274	-2,229	-2,994
	Mar	15,921	0	27,491	0	11,886	3	15,921	11,886	615	8,415	11,886	0	155	10	8,405	11,886	0	11,892	6,059	6.38	150.73	139	239,569	7	-770	-8,280
	Apr	15,944	0	32,254	0	14,707	3	15,944	14,707	595	8,415	14,707	0	155	50	8,364	14,707	0	14,747	6,059	6.36	150.12	139	239,218	40	-3,360	-9,180
	May	11,926	0	29,235	0	14,680	3	11,926	11,926	615	8,415	11,926	0	155	42	8,372	11,926	0	14,673	6,059	6.37	150.24	139	239,287	-8	-6,068	-7,549
	Jun	659	0	3,151	0	4,346	3	659	659	595	8,415	659	0	155	81	8,334	659	0	4,384	6,058	6.35	149.66	138	238,954	38	-5,659	-2,118
	Jul	0	2,480	0	1,239	1,116	0	-2,480	-2,480	615	5,854	0	0	111	45	5,809	0	0	3,641	6,045	5.27	114.09	125	215,484	2,525	-5,581	296
	Aug	1,269	0	2,382	0	3,128	3	1,269	1,269	615	7,078	0	0	131	-1	7,078	0	0	1,858	6,052	5.84	132.30	132	213,938	-1,269	-5,322	-849
	Sep	3,594	0	4,301	0	3,866	3	3,594	3,594	595	8,415	2,257	0	155	44	8,370	2,257	0	2,574	6,059	6.36	150.21	139	239,268	-1,292	-5,193	-809
1983	Oct	399	0	1,584	0	1,280	3	399	399	615	8,769	44	0	162	59	8,710	44	0	940	6,060	6.52	155.65	140	114,893	-340	-1,303	121
	Nov	1,915	0	3,972	0	2,202	3	1,915	1,915	595	8,415	2,269	0	155	4	8,410	2,269	0	2,501	6,059	6.38	150.83	139	239,621	299	-705	-575
	Dec	4,457	0	8,186	0	4,085	3	4,457	4,085	615	8,415	4,085	0	155	-7	8,422	4,085	0	4,073	6,059	6.39	151.00	139	239,719	-11	-537	-3,622
	Jan	4,136	0	7,690	0	3,861	3	4,136	3,861	615	8,415	3,861	0	155	-1	8,416	3,861	0	3,867	6,059	6.38	150.90	139	239,665	6	-514	-3,649
	Feb	6,435	0	11,237	0	5,394	3	6,435	5,394	560	8,415	5,394	0	155	12	8,402	5,394	0	5,407	6,059	6.38	150.70	139	239,548	13	-514	-3,622
	Mar	19,423	0	33,388	0	14,273	3	19,423	14,273	615	8,415	14,273	0	155	-14	8,429	14,273	0	14,246	6,059	6.39	151.11	139	239,781	-26	-825	-175
	Apr	24,123	0	53,624	0	22,291	3	24,123	22,291	595	8,415	22,291	0	155	33	8,381	22,291	0	22,339	6,059	6.37	150.37	139	239,364	48	-1,027	301
	May	24,030	0	56,953	0	26,582	3	24,030	24,030	615	8,415	24,030	0	155	64	8,351	24,030	0	26,612	6,059	6.36	149.91	139	239,099	30	-7,183	-5,167
	Jun	9,735	0	25,941	0	13,624	3	9,735	9,735	595	8,415	9,735	0	155	82	8,333	9,735	0	13,642	6,058	6.35	149.64	138	238,944	18	-5,701	-3,925
	Jul	526	0	1,084	0	3,667	3	526	526	615	8,859	82	0	164	65	8,794	82	0	3,206	6,061	6.56	157.09	141	243,108	-461	-6,416	-1,156
	Aug	3,762	0	7,059	0	5,651	3	3,762	3,762	615	8,415	4,207	0	155	36	8,379	4,207	0	6,067	6,059	6.37	150.34	139	239,345	415	-4,964	-3,302
	Sep	5,990	0	11,384	0	6,673	3	5,990	5,990	595	8,415	5,990	0	155	30	8,385	5,990	0	6,667	6,059	6.37	150.43	139	239,394	-6	-3,602	-4,973
1984	Oct	23,365	0	46,161	0	19,285	3	23,365	19,285	615	8,415	19,285	0	155	21	8,394	19,285	0	19,275	6,059	6.38	150.57	139	239,476	-9	-982	-2,639
	Nov	2,677	0	5,672	0	3,057	3	2,677	2,677	595	8,415	2,677	0	155	9	8,405	2,677	0	3,045	6,059	6.38	150.75	139	239,576	-11	-665	-20
	Dec	6,319	0	11,338	0	5,327	3	6,319	5,327	615	8,415	5,327	0	155	-2	8,416	5,327	0	5,316	6,059	6.39	150.91	139	239,670	-11	-536	-90
	Jan	6,440	0	11,412	0	5,573	3	6,440	5,573	615	8,415	5,573	0	155	26	8,389	5,573	0	5,601	6,059	6.37	150.49	139	239,430	27	-514	143
	Feb	3,980	0	7,323	0	3,979	3	3,980	3,979	560	8,415	3,979	0	155	33	8,382	3,979	0	3,986	6,059	6.37	150.38	139	239,369	7	-514	73
	Mar	6,213	0	11,506	0	5,701	3	6,213	5,701	615	8,415	5,701	0	155	40	8,374	5,701	0	5,709	6,059	6.37	150.27	139	239,305	7	-770	16
	Apr	8,707	0	17,898	0	8,291	3	8,707	8,291	595	8,415	8,291	0	155	34	8,380	8,291	0	8,285	6,059	6.37	150.36	139	239,357	-6	-1,040	-58

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	May	5,031	0	7,097	0	7,299	3	5,031	5,031	615	8,415	5,031	0	155	74	8,341	5,031	0	7,339	6,058	6.35	149.76	138	239,014	39	-8,542	-3,514
	Jun	0	2,437	0	1,068	1,237	0	-2,437	-2,437	595	5,903	0	0	112	60	5,843	0	0	3,735	6,045	5.29	114.63	125	215,901	2,498	-5,453	844
	Jul	0	926	0	506	2,306	0	-926	-926	615	4,918	0	0	97	43	4,875	0	0	3,275	6,037	4.75	98.29	117	202,194	969	-5,880	184
	Aug	5,377	0	10,033	0	6,493	3	5,377	5,377	615	8,415	1,880	0	155	13	8,402	1,880	0	2,966	6,059	6.38	150.69	139	239,545	-3,527	-8,111	-2,626
	Sep	5,384	0	7,233	0	5,355	3	5,384	5,355	595	8,415	5,355	0	155	58	8,357	5,355	0	5,400	6,059	6.36	150.01	139	239,154	45	-4,091	-1,786
1985	Oct	15,586	0	27,917	0	12,390	3	15,586	12,390	615	8,415	12,390	0	155	-10	8,424	12,390	0	12,323	6,059	6.39	151.04	139	239,741	-67	-1,101	-5,025
	Nov	5,291	0	9,851	0	5,012	3	5,291	5,012	595	8,415	5,012	0	155	29	8,386	5,012	0	5,050	6,059	6.37	150.45	139	239,404	38	-642	-1,866
	Dec	16,088	0	28,327	0	11,966	3	16,088	11,966	615	8,415	11,966	0	155	-29	8,443	11,966	0	11,908	6,059	6.40	151.33	139	239,910	-58	-632	-8,263
	Jan	11,299	0	19,443	0	8,637	3	11,299	8,637	615	8,415	8,637	0	155	0	8,415	8,637	0	8,666	6,059	6.38	150.89	139	239,660	28	-514	152
	Feb	10,061	0	17,394	0	7,818	3	10,061	7,818	560	8,415	7,818	0	155	6	8,409	7,818	0	7,824	6,059	6.38	150.80	139	239,604	6	-514	92
	Mar	39,869	0	69,981	0	29,198	3	39,869	29,198	615	8,415	29,198	0	155	15	8,400	29,198	0	29,207	6,059	6.38	150.66	139	239,525	9	-770	29
	Apr	26,551	0	60,721	0	24,806	3	26,551	24,806	595	8,415	24,806	0	155	34	8,380	24,806	0	24,826	6,059	6.37	150.36	139	239,355	19	-1,027	110
	May	17,745	0	37,547	0	18,857	3	17,745	17,745	615	8,415	17,745	0	155	67	8,347	17,745	0	18,890	6,059	6.35	149.86	139	239,068	33	-8,397	-6,915
	Jun	3,577	0	8,254	0	6,571	3	3,577	3,577	595	8,415	3,577	0	155	83	8,332	3,577	0	6,586	6,058	6.35	149.63	138	238,936	15	-5,889	-2,850
	Jul	0	269	0	597	2,717	0	-597	-597	615	7,717	0	0	142	69	7,648	0	0	3,401	6,055	6.07	139.93	135	233,186	684	-6,190	-499
	Aug	573	0	0	115	2,793	1	-115	-115	615	7,033	0	0	130	54	6,979	0	0	3,463	6,052	5.80	130.96	132	227,483	669	-5,728	-1,441
	Sep	2,909	0	4,174	0	3,519	3	2,909	2,909	595	8,415	1,527	0	155	32	8,383	1,527	0	2,116	6,059	6.37	150.40	139	239,376	-1,404	-4,851	-1,459
1986	Oct	4,576	0	9,280	0	4,974	3	4,576	4,576	615	8,415	4,576	0	155	35	8,380	4,576	0	4,977	6,059	6.37	150.35	139	239,352	3	-963	-2,068
	Nov	3,518	0	7,068	0	3,584	3	3,518	3,518	595	8,415	3,518	0	155	11	8,403	3,518	0	3,560	6,059	6.38	150.72	139	239,559	-24	-691	-1,428
	Dec	4,008	0	7,528	0	3,871	3	4,008	3,871	615	8,415	3,871	0	155	31	8,383	3,871	0	3,891	6,059	6.37	150.41	139	239,382	20	-514	-1,323
	Jan	2,388	0	5,003	0	2,542	3	2,388	2,388	615	8,415	2,388	0	155	36	8,379	2,388	0	2,546	6,059	6.37	150.34	139	239,345	4	-514	-688
	Feb	8,253	0	14,736	0	6,578	3	8,253	6,578	560	8,415	6,578	0	155	4	8,410	6,578	0	6,547	6,059	6.38	150.82	139	239,618	-31	-578	-4,758
	Mar	16,664	0	29,593	0	12,837	3	16,664	12,837	615	8,415	12,837	0	155	18	8,397	12,837	0	12,850	6,059	6.38	150.61	139	239,499	14	-770	27
	Apr	13,592	0	27,112	0	13,232	3	13,592	13,232	595	8,415	13,232	0	155	55	8,360	13,232	0	13,269	6,059	6.36	150.05	139	239,177	37	-3,634	244
	May	4,838	0	7,801	0	7,075	3	4,838	4,838	615	8,415	4,838	0	155	68	8,346	4,838	0	7,088	6,059	6.35	149.84	139	239,058	14	-7,338	-3,130
	Jun	0	803	14	0	2,511	2	-803	-803	595	7,543	0	0	139	65	7,478	0	0	3,379	6,054	6.00	137.65	134	231,772	868	-5,442	-60
	Jul	0	49	933	0	3,502	2	-49	-49	615	6,864	0	0	127	62	6,801	0	0	4,179	6,051	5.72	128.56	131	225,880	677	-6,042	-2,049
	Aug	40	0	293	0	2,706	3	40	40	615	6,841	0	0	127	33	6,808	0	0	2,698	6,051	5.73	128.65	131	225,946	-7	-5,281	-1,899
	Sep	2,000	0	1,726	0	2,867	3	1,726	1,726	595	8,535	33	0	158	56	8,479	33	0	1,196	6,059	6.41	151.89	139	144,910	-1,670	-5,805	-1,252
1987	Oct	3,775	0	8,624	0	4,461	3	3,775	3,775	615	8,415	3,895	0	155	46	8,369	3,895	0	4,571	6,059	6.36	150.19	139	239,257	110	-1,207	-2,948
	Nov	6,117	0	11,862	0	5,743	3	6,117	5,743	595	8,415	5,743	0	155	11	8,403	5,743	0	5,708	6,059	6.38	150.72	139	239,558	-34	-712	-4,712
	Dec	6,105	0	10,741	0	5,339	3	6,105	5,339	615	8,415	5,339	0	155	-2	8,417	5,339	0	5,326	6,059	6.39	150.92	139	239,674	-13	-541	-4,172
	Jan	3,273	0	6,326	0	3,212	3	3,273	3,212	615	8,415	3,212	0	155	10	8,405	3,212	0	3,224	6,059	6.38	150.74	139	239,570	12	-514	-1,386
	Feb	5,900	0	10,594	0	5,160	3	5,900	5,160	560	8,415	5,160	0	155	10	8,404	5,160	0	5,161	6,059	6.38	150.73	139	239,568	0	-514	-3,085
	Mar	16,177	0	28,405	0	12,148	3	16,177	12,148	615	8,415	12,148	0	155	8	8,406	12,148	0	12,146	6,059	6.38	150.76	139	239,584	-2	-774	-1,340
	Apr	27,659	0	62,721	0	26,539	3	27,659	26,539	595	8,415	26,539	0	155	46	8,368	26,539	0	26,577	6,059	6.36	150.18	139	239,253	38	-1,027	231
	May	12,543	0	24,529	0	14,058	3	12,543	12,543	615	8,415	12,543	0	155	56	8,359	12,543	0	14,068	6,059	6.36	150.03	139	239,167	10	-8,634	-7,853
	Jun	913	0	2,981	0	4,248	3	913	913	595	8,415	913	0	155	75	8,339	913	0	4,268	6,058	6.35	149.74	138	239,001	19	-5,548	-1,556
	Jul	0	1,501	0	833	1,801	0	-1,501	-1,501	615	6,839	0	0	127	60	6,779	0	0	3,362	6,051	5.71	128.25	131	225,674	1,561	-5,777	-385
	Aug	1,616	0	2,517	0	3,805	3	1,616	1,616	615	8,395	0	0	155	52	8,343	0	0	2,241	6,058	6.35	149.79	138	239,032	-1,564	-6,945	-2,264
	Sep	467	0	0	780	1,532	1	-780	-780	595	7,563	0	0	139	51	7,512	0	0	2,364	6,054	6.01	138.09	134	232,049	831	-3,769	-17
1988	Oct	770	0	2,457	0	1,651	3	770	770	615	8,281	0	0	153	52	8,229	0	0	933	6,058	6.30	148.09	138	112,030	-718	-1,681	-145
	Nov	3,062	0	6,459	0	3,378	3	3,062	3,062	595	8,415	2,929	0	155	21	8,393	2,929	0	3,214	6,059	6.38	150.56	139	239,470	-164	-1,104	-1,843
	Dec	2,093	0	4,324	0	2,257	3	2,093	2,093	615	8,415	2,093	0	155	4	8,411	2,093	0	2,240	6,059	6.38	150.83	139	239,624	-18	-550	-988
	Jan	2,569	0	5,094	0	2,692	3	2,569	2,569	615	8,415	2,569	0	155	12	8,403	2,569	0	2,701	6,059	6.38	150.71	139	239,553	8	-514	-1,522
	Feb	7,231	0	12,665	0	6,010	3	7,231	6,010	560	8,415	6,010	0	155	35	8,380	6,010	0	6,033	6,059	6.37	150.35	139	239,352	23	-514	-4,058
	Mar	7,750	0	14,308	0	6,770	3	7,750	6,770	615	8,415	6,770	0	155	39	8,376	6,770	0	6,774	6,059	6.37	150.29	139	239,316	4	-770	-3,075
	Apr	12,936	0	27,672	0	12,307	3	12,936	12,307	595	8,415	12,307	0	155	4	8,411	12,307	0	12,272	6,059	6.38	150.83	139	239,621	-35	-1,099	-220
	May	8,863	0	18,767	0	10,950	3	8,863	8,863	615	8,415	8,863	0	155	67	8,348	8,863	0	11,013	6,059	6.36	149.87	139	239,074	63	-6,203	-4,045
	Jun	0	212	198	0	3,040	2	-212	-212	595	7,753	0	0	143	78	7,675	0	0	3,713	6,055	6.08	140.29	135	233,406	673	-5,835	-770
	Jul	0	333	309	0	2,896	2	-333	-333	615	7,060	0	0	131	54	7,006	0	0	3,565	6,052	5.81	131.33	132	227,721	669	-5,863	-1,034
	Aug	5,415	0	11,147	0	6,735	3	5,415	5,415	615	8,415	4,060	0	155	-11	8,425	4,060	0	5,315	6,059	6.39	151.06	139	239,752	-1,420	-5,395	-5,044
	Sep	7,717	0	12,347	0	7,270	3	7,717	7,270	595	8,415	7,270	0	155	74	8,341	7,270	0	7,355	6,058	6.35	149.76	138	239,011	85	-4,434	-4,011
1989	Oct	1,494	0	4,000	0	2,361	3	1,494	1,494	615	8,415	1,494	0	155	56	8,359	1,494	0	2,343	6,059	6.36	150.04	139	239,171	-18	-1,001	-640
	Nov	1,406	0	3,141	0	1,801	3	1,406	1,406	595	8,415	1,406	0	155	37	8,377	1,406	0	1,783	6,059	6.37	150.31	139	215,159	-18	-679	-499
	Dec	1,705	0	3,428	0	1,876	3	1,705	1,705	615	8,415	1,705	0	155	22	8,392	1,705	0	1,861	6,059	6.37	150.55	139	224,648	-15	-545	-673
	Jan	1,998	0	4,033	0	2,150	3	1,998	1,998	615	8,415	1,998	0	155	4	8,411	1,998	0	2,132	6,059	6.38	150.83	139	239,625	-18	-552	-962
	Feb	3,196	0	6,110	0	3,190	3	3,196	3,190	560	8,415	3,190	0	155	22	8,393	3,190	0	3,208	6,059	6.37	150.55	139	239,464	18	-514	-964
	Mar	11,837	0	22,189	0	9,772	3	11,837	9,772	615	8,415	9,772	0	155	17	8,398	9,772	0	9,767	6,059	6.38	150.63	139	239,508	-5	-781	145
	Apr	5,653	0	8,999	0	6,085	3	5,653	5,653	595	8,415	5,653	0	155	62	8,353	5,653	0	6,130	6,059	6.36	149.94	139	239,115	45	-4,122	-3,250
	May	0	986	0	3,752	1,824	0	-3,752	-3,752	615	4,600	0	0	92	54	4,546	0	0	5,631	6,034	4.54	92.26	114	196,386	3,807	-7,901	299
	Jun	0	3,745	0	1,824	545	0	-3,745	-3,745	595	1,253	0	397	35	34	1,218	0	397	3,872	5,970	1.88	39.02	50	85,444	3,327	-5,818	1,255
	Jul	0	3,477	0	2,784	577	0	-3,477	-3,477	615	1,253	0	3,477	35	20	1,233	0	3,477	563	5,970	1.90	39.21	50	24,458	-15	-6,757	692
	Aug	0	1,636	0	1,710	1,137	0	-1,710	-1,710	615	1,253	0	1,710	35	12	1,240	0	1,710	1,130	5,970	1.90	39.31	50	49,324	-7	-5,386	-26
	Sep	0	1,218	0	3,151	470	0	-3,151	-3,151	595	1,253	0	3,151	35	18	1,235	0	3,151	476	5,970	1.90	39.24	50	20,698	6	-4,801	659
1990	Oct	173	0	1,054	0	1,055	3	173	173	615	1,408	0	0	38	9	1,399	0	0	890	5,975	2.05	41.34	55	42,443	-164	-1,128	-9
	Nov	581	0	1,211	0	976	3	581	581	595	1,780	0	0	45	10	1,770	0	0	605	5,985	2.37	45.86	65	34,191	-371	-1,013	752
	Dec	894	0	1,530	0	1,066	3	894	894	615	2,221	0	0	53	8	2,213	0	0	623	5,996	2.75	51.57	76	41,015	-443	-957	-9
	Jan	1,084	0	1,982	0	1,255	3	1,084	1,084	615	2,854	0	0	64	7	2,846	0	0	622	6,009	3.27	61.10	89	48,156	-633	-1,146	-52
	Feb	851	0	1,637	0	1,090	3	851	851	560	3,376	0	0	73	7	3,369	0	0	568	6,018	3.69	70.17	98	48,455	-523	-1,036	-116
	Mar	2,177	0	4,575	0	2,598	3	2,177	2,177	615	5,352	0	0	104	18	5,334	0	0	633	6,041	5.02	106.33	121	66,785	-1,965	-2,736	-1,082
	Apr	3,850	0	5,348	0	4,421	3	3,850	3,850	595	8,415	788	0	155	39	8,375	788	0	1,379	6,059	6.37	150.29	139	166,421	-3,041	-7,417	-2,414
	May	0	43	0	1,581	2,857	0	-1,581	-1,581	615	6,794	0	0	126	56	6,739	0	0	4,493	6,051	5.70	127.70	131	225,302	1,637	-6,830	-810
	Jun	0	3,876	0	2,830	450	0	-3,876	-3,876	595	2,863	0	0	65	60	2,803	0	0	4,386	6,008	3.24	60.39	88	152,061	3,936	-6,577	1,140
	Jul	0	2,341	0	1,584	1,450	0	-2,341	-2,341	615	1,253	0	731	35	25	1,227	0	731	3,025	5,970	1.89	39.14	50	85,902	1,575	-6,395	-845
	Aug	0	1,767	0	1,938	1,122	0	-1,938	-1,938	615	1,253	0	1,938	35	16	1,237	0	1,938	1,113	5,970	1.90	39.27	50	48,468	-10	-5,681	-517
	Sep	1,051	0	423	0	2,116	3	423	423	595	1,660	0	0	43	13	1,647	0	0	1,705	5,982	2.27	44.37	62	91,510	-410	-4,283	-1,121
1991	Oct	488	0	1,765	0	1,369	3	488	488	615	2,135	0	0	52	17	2,118	0	0	898	5,994	2.67	50.29	74	57,447	-471	-1,434	-895
	Nov	974	0	2,117	0	1,369	3	974	974	595	2,892	0	0	65	9	2,883	0	0	604	6,010	3.30	61.70	90	47,115	-765	-1,407	-684
	Dec	2,573	0	4,691	0	2,464	3	2,573	2,464	615	4,732	0	0	94	-10	4,743	0	0	604	6,036	4.67	95.89	116	60,927	-1,860	-2,386	-3,988
	Jan	6,268	0	10,922	0	5,162	3	6,268	5,162	615	8,415	1,480	0	155	2	8,413	1,480	0	1,492	6,059	6.38	150.86	139	180,261	-3,670	-5,662	-4,645
	Feb	4,482	0	8,268	0	4,057	3	4,482	4,057	560	8,415	4,057	0	155	24	8,390	4,057	0	4,079	6,059	6.37	150.52	139	239,445	23	-4,550	-2,665
	Mar	20,763	0	35,695	0	15,004	3	20,763	15,004	615	8,415	15,004	0	155	-20	8,435	15,004	0	14,960	6,059	6.39	151.20	139	239,834	-44	-6,798	-16,840
	Apr	27,458	0	61,509	0	25,987	3	27,458	25,987	595	8,415	25,987	0	155	49	8,365	25,987	0	26,057	6,059	6.36	150.13	139	239,226	69	-1,027	-18,456
	May	14,185	0	29,766	0	16,487	3	14,185	14,185	615	8,415	14,185	0	155	64	8,350	14,185	0	16,502	6,059	6.36	149.90	139	239,095	15	-8,689	-10,007
	Jun	1,856	0	5,068	0	4,969	3	1,856	1,856	595	8,415	1,856	0	155	70	8,344	1,856	0	4,975	6,059	6.35	149.81	139	239,044	6	-5,304	-1,816

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	Jul	0	1,838	0	1,895	1,507	0	-1,895	-1,895	615	6,449	0	0	121	73	6,376	0	0	3,476	6,048	5.54	122.60	128	221,771	1,969	-6,435	338
	Aug	0	68	647	0	2,192	2	-68	-68	615	5,761	0	0	110	-4	5,765	0	0	2,803	6,045	5.25	113.39	125	214,951	611	-3,938	-779
	Sep	1,455	0	1,832	0	2,414	3	1,455	1,455	595	7,220	0	0	133	20	7,200	0	0	980	6,053	5.89	133.93	133	113,302	-1,435	-4,588	-1,716
1992	Oct	284	0	1,316	0	1,166	3	284	284	615	7,484	0	0	138	51	7,433	0	0	933	6,054	5.98	137.04	134	108,788	-233	-1,196	75
	Nov	1,209	0	2,667	0	1,599	3	1,209	1,209	595	8,436	256	0	156	10	8,426	256	0	605	6,059	6.39	151.06	139	73,183	-993	-1,867	-569
	Dec	2,584	0	4,951	0	2,603	3	2,584	2,584	615	8,415	2,606	0	155	1	8,414	2,606	0	2,615	6,059	6.38	150.88	139	239,652	12	-525	-1,997
	Jan	2,679	0	5,316	0	2,766	3	2,679	2,679	615	8,415	2,679	0	155	11	8,404	2,679	0	2,776	6,059	6.38	150.72	139	239,564	10	-514	-2,012
	Feb	6,913	0	11,991	0	5,651	3	6,913	5,651	560	8,415	5,651	0	155	15	8,400	5,651	0	5,656	6,059	6.38	150.66	139	239,525	4	-514	-6,081
	Mar	16,854	0	29,290	0	12,578	3	16,854	12,578	615	8,415	12,578	0	155	4	8,410	12,578	0	12,567	6,059	6.38	150.82	139	239,619	-11	-793	-382
	Apr	22,067	0	47,907	0	21,350	3	22,067	21,350	595	8,415	21,350	0	155	50	8,364	21,350	0	21,396	6,059	6.36	150.12	139	239,217	46	-3,453	269
	May	13,659	0	32,831	0	16,433	3	13,659	13,659	615	8,415	13,659	0	155	23	8,391	13,659	0	16,406	6,059	6.37	150.53	139	239,451	-27	-5,972	-7,452
	Jun	3,941	0	10,133	0	6,825	3	3,941	3,941	595	8,415	3,941	0	155	64	8,350	3,941	0	6,866	6,059	6.36	149.90	139	239,095	41	-5,073	-2,931
	Jul	0	1,585	0	1,148	1,760	0	-1,585	-1,585	615	6,765	0	0	126	70	6,695	0	0	3,415	6,050	5.68	127.10	130	224,893	1,655	-6,051	-166
	Aug	7,713	0	18,002	0	9,763	3	7,713	7,713	615	8,415	6,063	0	155	19	8,395	6,063	0	8,062	6,059	6.38	150.59	139	239,488	-1,700	-6,210	-7,917
	Sep	3,271	0	3,527	0	3,603	3	3,271	3,271	595	8,415	3,271	0	155	61	8,354	3,271	0	3,644	6,059	6.36	149.96	139	239,127	41	-4,032	-730
1993	Oct	557	0	1,951	0	1,438	3	557	557	615	8,911	61	0	165	61	8,850	61	0	943	6,061	6.59	158.06	141	115,793	-496	-1,459	-167
	Nov	993	0	2,165	0	1,388	3	993	993	595	8,415	1,490	0	155	30	8,385	1,490	0	1,853	6,059	6.37	150.43	139	223,646	465	-677	-392
	Dec	7,708	0	13,685	0	6,167	3	7,708	6,167	615	8,415	6,167	0	155	-33	8,448	6,167	0	6,104	6,059	6.40	151.40	139	239,947	-63	-641	-2,736
	Jan	38,880	0	68,173	0	27,860	3	38,880	27,860	615	8,415	27,860	0	155	-59	8,473	27,860	0	27,834	6,059	6.41	151.80	139	240,175	-26	-567	-70
	Feb	24,230	0	41,481	0	17,580	3	24,230	17,580	560	8,415	17,580	0	155	-3	8,417	17,580	0	17,636	6,059	6.39	150.93	139	239,681	56	-514	217
	Mar	31,813	0	56,920	0	23,212	3	31,813	23,212	615	8,415	23,212	0	155	20	8,394	23,212	0	23,235	6,059	6.38	150.58	139	239,479	23	-770	187
	Apr	30,401	0	69,720	0	29,724	3	30,401	29,724	595	8,415	29,724	0	155	52	8,362	29,724	0	29,757	6,059	6.36	150.09	139	239,199	32	-3,430	184
	May	18,698	0	47,716	0	22,243	3	18,698	18,698	615	8,415	18,698	0	155	63	8,352	18,698	0	22,254	6,059	6.36	149.93	139	239,108	10	-6,786	-7,785
	Jun	3,695	0	10,769	0	7,379	3	3,695	3,695	595	8,415	3,695	0	155	79	8,336	3,695	0	7,395	6,058	6.35	149.68	138	238,967	16	-5,566	-3,846
	Jul	0	1,508	0	1,641	1,792	0	-1,641	-1,641	615	6,694	0	0	125	80	6,614	0	0	3,513	6,050	5.65	125.97	130	224,119	1,722	-6,503	166
	Aug	0	699	0	1,250	1,818	0	-1,250	-1,250	615	5,364	0	0	104	45	5,319	0	0	3,113	6,041	5.01	106.07	121	209,049	1,295	-5,527	-473
	Sep	1,463	0	1,587	0	2,654	3	1,463	1,463	595	6,782	0	0	126	40	6,742	0	0	1,231	6,051	5.70	127.74	131	139,894	-1,423	-5,251	-1,776
1994	Oct	1,425	0	3,829	0	2,295	3	1,425	1,425	615	8,167	0	0	150	24	8,143	0	0	894	6,058	6.27	146.83	138	106,981	-1,401	-2,364	-1,115
	Nov	1,673	0	3,676	0	2,068	3	1,673	1,673	595	8,415	1,426	0	155	25	8,389	1,426	0	1,822	6,059	6.37	150.50	139	219,953	-246	-1,185	-753
	Dec	1,629	0	3,259	0	1,801	3	1,629	1,629	615	8,415	1,629	0	155	35	8,380	1,629	0	1,810	6,059	6.37	150.35	139	218,404	9	-514	-320
	Jan	1,372	0	2,670	0	1,543	3	1,372	1,372	615	8,415	1,372	0	155	27	8,387	1,372	0	1,536	6,059	6.37	150.47	139	185,347	-7	-529	114
	Feb	1,628	0	3,374	0	1,845	3	1,628	1,628	560	8,415	1,628	0	155	-2	8,416	1,628	0	1,816	6,059	6.39	150.92	139	219,381	-29	-574	-797
	Mar	10,244	0	18,339	0	8,402	3	10,244	8,402	615	8,415	8,402	0	155	39	8,375	8,402	0	8,443	6,059	6.37	150.29	139	239,314	41	-770	-5,028
	Apr	7,341	0	15,472	0	7,280	3	7,341	7,280	595	8,415	7,280	0	155	31	8,384	7,280	0	7,272	6,059	6.37	150.41	139	239,386	-8	-1,044	-4,025
	May	3,414	0	5,126	0	5,904	3	3,414	3,414	615	8,415	3,414	0	155	48	8,366	3,414	0	5,921	6,059	6.36	150.15	139	239,235	17	-7,181	-3,100
	Jun	0	2,144	0	1,424	1,577	0	-2,144	-2,144	595	6,222	0	0	117	79	6,144	0	0	3,800	6,047	5.44	119.21	127	219,327	2,223	-6,125	470
	Jul	0	3,125	0	1,698	826	0	-3,125	-3,125	615	3,019	0	0	67	40	2,979	0	0	3,991	6,011	3.38	63.31	91	157,748	3,165	-5,972	711
	Aug	0	859	0	1,028	1,753	0	-1,028	-1,028	615	1,951	0	0	49	18	1,932	0	0	2,799	5,989	2.51	47.88	69	119,122	1,046	-5,346	-716
	Sep	2,172	0	4,333	0	3,545	3	2,172	2,172	595	4,105	0	0	85	13	4,091	0	0	1,386	6,028	4.23	83.69	108	130,819	-2,159	-5,448	-3,388
1995	Oct	0	65	543	0	816	2	-65	-65	615	3,476	0	0	75	13	3,464	0	0	1,444	6,020	3.76	71.90	100	125,113	628	-963	-374
	Nov	4,766	0	9,196	0	4,481	3	4,766	4,481	595	7,349	0	0	136	5	7,345	0	0	600	6,054	5.94	135.86	134	69,724	-3,881	-4,523	-5,368
	Dec	4,175	0	7,569	0	3,628	3	4,175	3,628	615	8,415	2,563	0	155	14	8,400	2,563	0	2,572	6,059	6.38	150.67	139	239,530	-1,055	-1,884	-3,322
	Jan	3,729	0	6,723	0	3,471	3	3,729	3,471	615	8,415	3,471	0	155	-13	8,428	3,471	0	3,443	6,059	6.39	151.10	139	239,775	-28	-572	-5,601
	Feb	18,692	0	32,802	0	13,676	3	18,692	13,676	560	8,415	13,676	0	155	3	8,411	13,676	0	13,693	6,059	6.38	150.84	139	239,629	17	-514	-1,412
	Mar	29,930	0	52,485	0	21,835	3	29,930	21,835	615	8,415	21,835	0	155	8	8,407	21,835	0	21,840	6,059	6.38	150.77	139	239,588	5	-770	-7
	Apr	12,063	0	24,880	0	11,100	3	12,063	11,100	595	8,415	11,100	0	155	32	8,382	11,100	0	11,124	6,059	6.37	150.39	139	239,372	25	-1,027	108
	May	11,101	0	24,786	0	13,389	3	11,101	11,101	615	8,415	11,101	0	155	58	8,357	11,101	0	13,414	6,059	6.36	150.00	139	239,152	25	-6,647	-4,114
	Jun	3,052	0	8,450	0	6,439	3	3,052	3,052	595	8,415	3,052	0	155	75	8,340	3,052	0	6,456	6,058	6.35	149.74	138	239,001	17	-5,364	-2,801
	Jul	0	1,833	0	1,751	1,560	0	-1,833	-1,833	615	6,507	0	0	122	76	6,431	0	0	3,469	6,049	5.57	123.39	129	222,325	1,909	-6,407	296
	Aug	0	1,063	0	1,260	1,682	0	-1,260	-1,260	615	5,171	0	0	101	37	5,134	0	0	2,979	6,040	4.91	102.89	120	206,323	1,297	-5,453	-467
	Sep	295	0	0	1,391	1,468	1	-1,391	-1,391	595	3,743	0	0	79	37	3,706	0	0	2,895	6,023	3.95	76.41	103	178,185	1,427	-4,196	-136
1996	Oct	54	0	771	0	935	3	54	54	615	3,760	0	0	79	31	3,729	0	0	912	6,024	3.96	76.84	104	82,212	-23	-986	201
	Nov	849	0	1,836	0	1,244	3	849	849	595	4,378	0	0	89	16	4,362	0	0	611	6,032	4.42	88.81	112	59,395	-633	-1,275	-49
	Dec	945	0	1,651	0	1,116	3	945	945	615	4,863	0	0	96	17	4,847	0	0	632	6,037	4.74	97.78	117	64,232	-485	-998	-6
	Jan	1,012	0	1,807	0	1,184	3	1,012	1,012	615	5,416	0	0	105	20	5,395	0	0	635	6,042	5.06	107.37	122	67,283	-549	-1,062	-50
	Feb	1,226	0	2,406	0	1,419	3	1,226	1,226	560	6,254	0	0	118	22	6,233	0	0	582	6,048	5.48	120.52	128	64,618	-837	-1,351	-208
	Mar	953	0	2,366	0	1,530	3	953	953	615	7,148	0	0	132	32	7,116	0	0	647	6,053	5.85	132.81	133	74,568	-883	-1,654	-165
	Apr	381	0	0	2,295	1,382	1	-2,295	-2,295	595	4,821	0	0	96	38	4,783	0	0	3,715	6,036	4.70	96.63	116	200,648	2,332	-4,767	103
	May	0	2,816	0	3,904	578	0	-3,904	-3,904	615	1,253	0	336	35	29	1,224	0	336	4,137	5,970	1.89	39.10	50	85,736	3,559	-7,062	1,103
	Jun	0	4,172	0	2,193	164	0	-4,172	-4,172	595	1,253	0	4,172	35	18	1,235	0	4,172	153	5,970	1.90	39.24	50	6,675	-11	-5,750	1,412
	Jul	0	3,214	0	798	766	0	-3,214	-3,214	615	1,253	0	3,214	35	7	1,246	0	3,214	756	5,970	1.91	39.38	50	33,080	-10	-5,109	104
	Aug	0	1,438	0	1,281	1,335	0	-1,438	-1,438	615	1,253	0	1,438	35	11	1,242	0	1,438	1,338	5,970	1.90	39.33	50	58,467	4	-5,212	-441
	Sep	3,208	0	5,180	0	3,932	3	3,208	3,208	595	4,450	0	0	90	11	4,439	0	0	735	6,033	4.47	90.25	113	72,034	-3,197	-6,301	-1,845
1997	Oct	487	0	1,784	0	1,368	3	487	487	615	4,926	0	0	97	25	4,900	0	0	907	6,037	4.77	98.74	117	92,623	-461	-1,424	-371
	Nov	1,317	0	2,929	0	1,712	3	1,317	1,317	595	6,017	0	0	114	23	5,994	0	0	618	6,046	5.36	116.95	126	67,854	-1,093	-1,735	-863
	Dec	1,812	0	3,676	0	1,983	3	1,812	1,812	615	7,362	0	0	136	27	7,335	0	0	641	6,054	5.94	135.73	134	74,566	-1,342	-1,855	-942
	Jan	2,530	0	4,959	0	2,599	3	2,530	2,530	615	8,415	1,477	0	155	-5	8,419	1,477	0	1,515	6,059	6.39	150.96	139	183,063	-1,084	-3,079	-1,779
	Feb	2,421	0	4,979	0	2,606	3	2,421	2,421	560	8,415	2,421	0	155	31	8,384	2,421	0	2,641	6,059	6.37	150.41	139	239,387	36	-2,908	-1,318
	Mar	14,236	0	25,436	0	11,108	3	14,236	11,108	615	8,415	11,108	0	155	26	8,389	11,108	0	11,103	6,059	6.37	150.49	139	239,430	-5	-6,894	-8,431
	Apr	9,785	0	20,575	0	9,326	3	9,785	9,326	595	8,415	9,326	0	155	43	8,371	9,326	0	9,343	6,059	6.37	150.22	139	239,279	17	-1,027	-5,922
	May	5,461	0	8,816	0	8,128	3	5,461	5,461	615	8,415	5,461	0	155	63	8,352	5,461	0	8,148	6,059	6.36	149.92	139	239,106	20	-8,693	-5,011
	Jun	0	2,241	0	696	1,461	0	-2,241	-2,241	595	6,110	0	0	115	64	6,046	0	0	3,767	6,046	5.39	117.74	126	218,249	2,305	-5,406	414
	Jul	0	3,566	0	2,059	522	0	-3,566	-3,566	615	2,480	0	0	58	40	2,440	0	0	4,128	6,001	2.94	54.78	81	139,336	3,606	-6,047	690
	Aug	0	1,905	0	2,222	995	0	-2,222	-2,222	615	1,253	0	994	35	20	1,232	0	994	2,202	5,970	1.90	39.20	50	86,162	1,208	-5,795	-41
	Sep	0	89	0	2,559	1,302	0	-2,559	-2,559	595	1,253	0	2,559	35	19	1,234	0	2,559	1,300	5,970	1.90	39.23	50	56,521	-2	-5,002	-291
1998	Oct	181	0	1,060	0	1,062	3	181	181	615	1,415	0	0	38	9	1,406	0	0	890	5,975	2.05	41.43	55	42,615	-172	-1,135	-238
	Nov	661	0	1,387	0	1,056	3	661	661	595	1,868	0	0	47	5	1,862	0	0	600	5,987	2.45	47.00	67	35,143	-456	-1,098	-210
	Dec	1,123	0	2,061	0	1,295	3	1,123	1,123	615	2,542	0	0	59	4	2,538	0	0	618	6,003	3.02	56.24	83	44,567	-676	-1,190	-737
	Jan	1,367	0	2,635	0	1,539	3	1,367	1,367	615	3,462	0	0	74	11	3,452	0	0	626	6,019	3.75	71.68	99	54,130	-913	-1,427	-884
	Feb	1,659	0	3,503	0	1,888	3	1,659	1,659	560	4,779	0	0	95	-1	4,780	0	0	559	6,036	4.69	96.58	116	56,562	-1,329	-1,844	-2,217
	Mar	14,462	0	25,872	0	11,337	3	14,462	11,337	615	8,415	7,702	0	155	0	8,414	7,702	0	7,703	6,059	6.38	150.88	139	239,654	-3,634	-8,404	-9,939
	Apr	21,755	0	48,511	0	19,961	3	21,755	19,961	595	8,415	19,961	0	155	31	8,384	19,961	0	19,992	6,059	6.37	150.41	139	239,385	31	-1,027	-13,789
	May	18,387	0	43,962	0	21,443	3	18,387	18,387	615	8,415	18,387	0	155	61	8,354	18,387	0	21,473	6,059	6.36	149.96	139	239,126	30	-6,830	-16,103
	Jun	2,470	0	7,315	0	5,910	3	2,470	2,470	595	8,415	2,470	0	155	77	8,337	2,470	0	5,927	6,058	6.35	149.70	138	238,981	17	-5,484	-2,921
	Jul	0	607	0	503	2,340	0	-607	-607	615	7,722	0	0	142	53	7,669	0	0	3,009	6,055	6.07	140.21	135	233,357	668	-5,752	-69
	Aug	0	1,596	0	2,720	1,148	0	-2,720	-2,720	615	4,948	0	0	97	63	4,886	0	0	3,931	6,037	4.76	98.49	117	202,380	2,783	-6,328	134

Water Year/	Month	Domestic Suplus (af)	Domestic Shortage (af)	Irrigation Surplus (af)	Irrigation Shortage (af)	LLR (af)	a surplus? Storage Test 1 (af)	Value, Storage Test 3 (af)	Storage Test 4 (af)	MFD Minimum Release (af)	Preliminary Miner Flat Dam (af)	Preliminary Spill (af)	Preliminary w/o BF Shortage (af)	Miner Flat Area (ac)	Net Lake Evapor (af)	Final Miner Flat Dam (af)	Final Spill (af)	Final Shortage (af)	NF Below MFD Spill and Release (af)	Elevation (ft)	Shoreline (mi)	Surface Area (ac)	Head (ft)	Hydro Energy (kwh)	NF Change in Flow (af)	White R. Change in Flow (af)	Black River Change in Flow (af)
	Sep	0	872	0	3,146	707	0	-3,146	-3,146	595	1,740	0	0	45	38	1,702	0	0	3,891	5,983	2.31	45.03	63	108,949	3,184	-4,995	645
1999	Oct	503	0	1,659	0	1,336	3	503	503	615	2,205	0	0	53	10	2,195	0	0	843	5,995	2.73	51.31	75	55,214	-493	-1,456	-448
	Nov	1,271	0	2,814	0	1,660	3	1,271	1,271	595	3,260	0	0	71	12	3,247	0	0	608	6,016	3.59	67.98	96	50,797	-1,052	-1,694	-335
	Dec	1,563	0	3,105	0	1,735	3	1,563	1,563	615	4,367	0	0	89	15	4,352	0	0	630	6,032	4.41	88.63	112	61,161	-1,105	-1,619	-368
	Jan	971	0	1,710	0	1,143	3	971	971	615	4,880	0	0	96	20	4,860	0	0	635	6,037	4.74	98.02	117	64,651	-508	-1,021	-64
	Feb	705	0	1,286	0	944	3	705	705	560	5,244	0	0	102	26	5,218	0	0	587	6,040	4.96	104.34	120	61,392	-358	-871	37
	Mar	573	0	1,469	0	1,150	3	573	573	615	5,753	0	0	110	29	5,723	0	0	644	6,044	5.23	112.73	124	69,641	-506	-1,276	-5
	Apr	2,794	0	6,225	0	3,556	3	2,794	2,794	595	8,517	29	0	157	19	8,498	29	0	781	6,059	6.42	152.19	139	94,676	-2,775	-3,809	-2,098
	May	0	854	0	3,200	2,129	0	-3,200	-3,200	615	5,298	0	0	103	55	5,243	0	0	5,384	6,040	4.97	104.78	120	207,957	3,255	-7,828	-812
	Jun	0	3,282	0	802	866	0	-3,282	-3,282	595	1,961	0	0	49	30	1,931	0	0	4,179	5,989	2.51	47.86	69	119,061	3,312	-5,200	732
	Jul	0	407	1,831	0	3,031	2	-407	-407	615	1,316	0	0	36	8	1,308	0	0	3,654	5,972	1.97	40.19	52	90,041	623	-4,987	-1,615
	Aug	7,207	0	14,700	0	8,337	3	7,207	7,207	615	8,516	8	0	157	7	8,508	8	0	1,137	6,059	6.43	152.36	139	137,848	-7,200	-11,564	-6,001
	Sep	2,911	0	2,810	0	3,365	3	2,810	2,810	595	8,415	2,911	0	155	61	8,353	2,911	0	3,520	6,059	6.36	149.95	139	239,123	155	-4,792	-1,118
2000	Oct	324	0	1,408	0	1,205	3	324	324	615	8,677	61	0	161	66	8,611	61	0	947	6,060	6.47	154.01	140	115,304	-258	-1,221	40
	Nov	497	0	1,011	0	892	3	497	497	595	8,415	760	0	155	53	8,361	760	0	1,142	6,059	6.36	150.07	139	137,735	250	-658	186
	Dec	646	0	945	0	818	3	646	646	615	8,564	497	0	158	32	8,532	497	0	647	6,059	6.44	152.73	139	78,513	-171	-706	49
	Jan	739	0	1,165	0	910	3	739	739	615	8,415	889	0	155	40	8,375	889	0	1,067	6,059	6.37	150.28	139	128,776	157	-514	64
	Feb	644	0	1,038	0	837	3	644	644	560	8,415	644	0	155	33	8,382	644	0	830	6,059	6.37	150.39	139	100,208	-7	-528	99
	Mar	653	0	1,658	0	1,230	3	653	653	615	8,415	653	0	155	25	8,390	653	0	1,222	6,059	6.37	150.50	139	147,531	-8	-786	-221
	Apr	287	0	0	4,045	1,288	1	-4,045	-4,045	595	4,345	0	0	88	47	4,298	0	0	5,380	6,031	4.37	87.60	111	191,538	4,092	-6,171	193
	May	0	2,972	0	5,765	442	0	-5,765	-5,765	615	1,253	0	2,673	35	31	1,222	0	2,673	3,518	5,970	1.89	39.06	50	85,607	3,076	-8,586	1,262
	Jun	0	4,127	0	1,774	197	0	-4,127	-4,127	595	1,253	0	4,127	35	14	1,239	0	4,127	180	5,970	1.90	39.29	50	7,857	-17	-5,422	885
	Jul	0	3,822	0	3,248	276	0	-3,822	-3,822	615	1,253	0	3,822	35	21	1,232	0	3,822	283	5,970	1.90	39.20	50	12,291	7	-6,839	953
	Aug	0	1,341	0	728	1,314	0	-1,341	-1,341	615	1,253	0	1,341	35	4	1,249	0	1,341	1,298	5,970	1.91	39.42	50	56,926	-17	-4,539	-221
	Sep	0	1,104	0	3,398	519	0	-3,398	-3,398	595	1,253	0	3,398	35	19	1,234	0	3,398	534	5,970	1.90	39.22	50	23,234	15	-5,031	504
2001	Oct	1,529	0	3,782	0	2,287	3	1,529	1,529	615	2,762	0	0	63	0	2,762	0	0	759	6,007	3.20	59.73	87	57,657	-1,529	-2,492	-2,488
	Nov	4,185	0	8,090	0	4,076	3	4,185	4,076	595	6,243	0	0	117	5	6,238	0	0	600	6,048	5.48	120.60	128	66,696	-3,476	-4,118	-4,067
	Dec	1,815	0	3,694	0	1,987	3	1,815	1,815	615	7,610	0	0	140	34	7,575	0	0	649	6,055	6.04	138.95	135	76,132	-1,337	-1,851	-826
	Jan	1,363	0	2,631	0	1,534	3	1,363	1,363	615	8,494	478	0	157	7	8,488	478	0	621	6,059	6.42	152.03	139	75,287	-912	-1,901	-480
	Feb	2,619	0	5,138	0	2,733	3	2,619	2,619	560	8,415	2,699	0	155	22	8,392	2,699	0	2,828	6,059	6.37	150.55	139	239,462	95	-3,200	-1,261
	Mar	10,507	0	18,807	0	8,393	3	10,507	8,393	615	8,415	8,393	0	155	31	8,383	8,393	0	8,401	6,059	6.37	150.41	139	239,384	9	-9,134	-4,807
	Apr	15,445	0	33,708	0	14,463	3	15,445	14,463	595	8,415	14,463	0	155	28	8,387	14,463	0	14,460	6,059	6.37	150.46	139	239,414	-3	-5,164	-10,060
	May	7,363	0	13,971	0	9,745	3	7,363	7,363	615	8,415	7,363	0	155	58	8,357	7,363	0	9,774	6,059	6.36	150.01	139	239,153	30	-7,956	-6,312
	Jun	0	2,103	0	1,258	1,564	0	-2,103	-2,103	595	6,254	0	0	118	72	6,181	0	0	3,740	6,047	5.45	119.77	127	219,734	2,176	-5,899	528
	Jul	0	2,497	0	1,160	1,220	0	-2,497	-2,497	615	3,684	0	0	78	34	3,650	0	0	3,751	6,022	3.90	75.36	102	176,765	2,531	-5,716	329
	Aug	450	0	596	0	2,599	3	450	450	615	4,100	0	0	84	12	4,089	0	0	2,160	6,028	4.23	83.64	108	187,122	-439	-5,101	-822
	Sep	0	782	0	2,552	776	0	-2,552	-2,552	595	1,537	0	0	41	28	1,509	0	0	3,356	5,978	2.15	42.69	58	99,911	2,580	-4,499	315
2002	Oct	0	191	385	0	690	2	-191	-191	615	894	0	-28	28	13	880	0	-28	1,319	5,959	1.55	33.95	39	44,656	628	-963	147
	Nov	254	0	435	0	648	3	254	254	595	934	0	635	28	8	926	0	635	603	5,960	1.60	34.71	40	21,202	-45	-687	720
	Dec	684	0	1,038	0	855	3	684	684	615	1,166	0	-452	33	4	1,162	0	-452	619	5,968	1.83	38.26	48	25,732	-237	-1,183	656
	Jan	653	0	964	0	824	3	653	653	615	1,371	0	0	37	6	1,365	0	0	621	5,974	2.02	40.91	54	29,087	-203	-717	674
	Feb	507	0	822	0	746	3	507	507	560	1,551	0	0	41	9	1,542	0	0	570	5,979	2.17	43.09	59	29,157	-177	-690	659
	Mar	339	0	922	0	916	3	339	339	615	1,843	0	0	47	9	1,834	0	0	624	5,987	2.43	46.65	67	36,117	-292	-1,062	24
	Apr	33	0	0	4,078	1,036	1	-4,078	-4,078	595	1,253	0	3,488	35	15	1,238	0	3,488	1,632	5,970	1.90	39.28	50	71,138	596	-5,666	409
	May	0	3,318	0	5,027	308	0	-5,027	-5,027	615	1,253	0	5,027	35	16	1,237	0	5,027	308	5,970	1.90	39.27	50	13,433	1	-7,954	1,230
	Jun	0	4,238	0	2,859	98	0	-4,238	-4,238	595	1,253	0	4,238	35	21	1,232	0	4,238	103	5,970	1.90	39.20	50	4,486	5	-6,227	1,468
	Jul	0	2,802	0	545	955	0	-2,802	-2,802	615	1,253	0	2,802	35	4	1,249	0	2,802	939	5,970	1.91	39.42	50	41,175	-17	-4,898	89
	Aug	0	1,618	0	1,740	1,201	0	-1,740	-1,740	615	1,253	0	1,740	35	14	1,239	0	1,740	1,210	5,970	1.90	39.29	50	52,788	10	-5,170	-416
	Sep	1,607	0	2,165	0	2,661	3	1,607	1,607	595	2,846	0	0	64	11	2,836	0	0	1,064	6,009	3.26	60.92	89	82,169	-1,596	-5,078	-790
2003	Oct	0	132	467	0	749	2	-132	-132	615	2,221	0	0	53	21	2,200	0	0	1,385	5,995	2.74	51.39	75	90,853	636	-963	655
	Nov	734	0	1,512	0	1,129	3	734	734	595	2,734	0	0	62	11	2,723	0	0	606	6,007	3.17	59.10	87	45,643	-522	-1,167	-573
	Dec	795	0	1,294	0	967	3	795	795	615	3,074	0	0	68	2	3,073	0	0	617	6,013	3.45	64.92	93	49,951	-350	-867	-239
	Jan	1,153	0	2,127	0	1,325	3	1,153	1,153	615	3,782	0	0	80	17	3,766	0	0	631	6,024	3.99	77.53	104	57,186	-693	-1,207	-672
	Feb	2,801	0	5,207	0	2,765	3	2,801	2,765	560	5,971	0	0	113	-5	5,976	0	0	555	6,046	5.36	116.68	126	60,880	-2,210	-2,729	-1,774
	Mar	14,080	0	25,069	0	10,977	3	14,080	10,977	615	8,415	8,533	0	155	16	8,398	8,533	0	8,554	6,059	6.38	150.64	139	239,513	-2,422	-11,712	-9,359
	Apr	13,644	0	30,007	0	13,051	3	13,644	13,051	595	8,415	13,051	0	155	50	8,364	13,051	0	13,085	6,059	6.36	150.11	139	239,215	34	-10,225	-8,718
	May	5,366	0	8,576	0	8,320	3	5,366	5,366	615	8,415	5,366	0	155	71	8,343	5,366	0	8,341	6,058	6.35	149.80	138	239,033	21	-9,418	-6,026
	Jun	0	2,797	0	1,470	1,179	0	-2,797	-2,797	595	5,546	0	0	107	72	5,474	0	0	4,048	6,042	5.10	108.68	122	211,202	2,869	-5,894	245
	Jul	0	3,662	0	3,325	430	0	-3,662	-3,662	615	1,812	0	0	46	46	1,766	0	0	4,138	5,985	2.37	45.81	65	111,829	3,708	-7,082	459
	Aug	0	910	0	2,036	1,725	0	-2,036	-2,036	615	1,253	0	1,477	35	19	1,234	0	1,477	2,257	5,970	1.90	39.23	50	86,243	532	-6,107	-365
	Sep	3,627	0	5,178	0	4,198	3	3,627	3,627	595	4,837	0	0	96	21	4,816	0	0	616	6,037	4.72	97.23	117	62,458	-3,582	-7,494	-2,318
													88,880		369			88,880						2,082,689	-27	-42,848	-23,692
																								145,788			

APPENDIX Z-C

WATER AVAILABILITY
SIMULATION OF LAKE ROOSEVELT IMPACT

water availablili				
fort apache	Oct	33,051		
	Nov	2,600		
Weight of Water,	Dec	26,974		
Power Efficiency,	Jan	61,835		
kw per hp	Feb	67,052		
Penstock Capacity	Mar	86,119		
Tailrace Elevatio	Apr	82,304		
Minimum Release,	May	86,854	pan coefficient	0.70
Maximum Capacity,	Jun	88,622		
Total Conservatio	Jul	92,255		
Minimum Capacity,	Aug	86,375		
Apache Lake, af	Sep	68,276		
Canyon Lake, af		2,151	1,653,043	
Saguaro Lake		2,136	1,348,314	
Minimum Roosevelt	Min Res	452	1.00	304,729
Annual WMAT Deple	CAP Trigger	950,000		
Annual Evaporatio	CAP Level	41,800		
Net WMAT Impact		3,483		

	feet	Acres
A	1.995E+03	1.621E+03
B	1.943E-01	1.990E+01
C	-8.020E-05	-6.255E-03
D	1.284E-08	9.079E-07

					w/o CAP		w/ CAP			Roosevelt									
		Cibecue	Cumulative		Trial 1	Final	Trial 1	Final	Salt R.	Elevation			Surface Area			Evaporation		Hydropower	
Water		Change in	Change in	Historic	Historic	Revised	Revised	Revised	Below	Historic	Revised	Change	Historic	Revised	Change	Net	Change	Historic	Revised
Year/	Month	Flow	Flow	Reservoir	Spill	Roosevelt	Roosevelt	Roosevelt	SMD							(in x 100)			
		(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(ft)	(ft)	(ft)	(ac)	(ac)	(ac)		(af)	mwh	mwh
1958	Oct	-415	-2,016	25,709		23,693	23,693	23,693	27,177	4,016	1,999.59	1,999.87	0.28	2,128	2,157	29	183	4	2,172	2,173
	Nov	-514	-3,580	51,273		45,673	45,673	49,157	52,640	25	2,004.40	2,004.65	0.25	2,625	2,651	26	195	4	14	14
	Dec	-595	-2,590	58,832		50,638	50,638	57,605	61,088	0	2,005.80	2,006.22	0.42	2,770	2,813	43	92	3	0	0
	Jan	-538	-1,571	45,797		36,029	36,029	46,479	49,962	0	2,003.38	2,004.15	0.78	2,519	2,599	80	-416	-28	0	0
	Feb	-780	-4,944	53,971		39,287	39,287	53,220	56,703	38	2,004.90	2,005.41	0.51	2,677	2,729	53	124	5	21	21
	Mar	-2,339	-23,345	258,620		220,585	220,585	238,002	241,485	6,253	2,039.75	2,037.06	-2.68	6,364	6,074	-290	44	-11	3,601	3,586
	Apr	0	-28,197	483,954		417,732	417,732	438,632	442,116	2,771	2,071.33	2,065.97	-5.37	9,889	9,274	-615	551	-282	1,672	1,659
	May	-378	-21,597	552,614		465,078	465,078	489,461	492,945	35,774	2,079.68	2,072.46	-7.22	10,861	10,019	-842	592	-415	21,842	21,618
	Jun	-225	-7,271	503,674		409,282	409,282	437,149	440,632	47,804	2,073.79	2,065.77	-8.01	10,173	9,252	-921	950	-729	28,942	28,609
	Jul	-895	-6,711	444,998		344,624	344,624	375,974	379,457	59,184	2,066.35	2,057.52	-8.83	9,317	8,321	-997	1,004	-834	35,449	34,994
	Aug	-297	-6,860	397,437		291,037	291,037	325,870	329,354	74,478	2,059.99	2,050.39	-9.61	8,599	7,529	-1,070	646	-576	44,198	43,575
	Sep	-53	-7,459	407,116		293,832	293,832	332,149	335,632	53,511	2,061.31	2,051.30	-10.01	8,747	7,629	-1,117	726	-676	31,816	31,350
1959	Oct	0	-7,915	438,741		318,218	318,218	360,018	363,502	3,859	2,065.53	2,055.28	-10.24	9,224	8,071	-1,153	412	-396	2,309	2,274
	Nov	-32	-1,534	438,344		316,684	316,684	361,967	365,450	60	2,065.47	2,055.56	-9.92	9,218	8,102	-1,116	180	-167	36	36
	Dec	0	-762	436,468		314,213	314,213	362,979	366,463	10	2,065.23	2,055.70	-9.53	9,190	8,118	-1,072	74	-66	6	6
	Jan	-38	-646	439,830		316,995	316,995	369,245	372,729	0	2,065.67	2,056.58	-9.09	9,240	8,216	-1,025	-387	330	0	0
	Feb	-26	-859	450,312		326,289	326,289	382,022	385,505	2,233	2,067.04	2,058.35	-8.68	9,396	8,415	-982	-499	408	1,339	1,322
	Mar	0	-1,251	406,279		280,596	280,596	339,813	343,296	78,987	2,061.20	2,052.41	-8.79	8,734	7,752	-982	171	-140	46,956	46,352
	Apr	0	-5,396	379,890		248,951	248,951	311,651	315,134	42,165	2,057.58	2,048.30	-9.27	8,327	7,299	-1,028	456	-390	24,934	24,593
	May	-228	-6,492	333,233		196,192	196,192	262,376	265,859	44,105	2,050.95	2,040.87	-10.09	7,591	6,486	-1,105	682	-628	25,826	25,439
	Jun	-30	-4,866	250,371		109,092	109,092	178,759	182,242	73,128	2,038.46	2,027.46	-11.00	6,225	5,045	-1,180	932	-916	42,026	41,326
	Jul	-445	-5,687	184,166		38,117	38,117	111,267	114,750	87,691	2,027.78	2,015.90	-11.88	5,079	3,823	-1,256	877	-918	49,581	48,674
	Aug	-183	-13,579	222,764		64,054	64,054	140,687	144,170	54,637	2,034.08	2,021.03	-13.06	5,753	4,362	-1,391	707	-820	31,192	30,571
	Sep	-42	-4,566	199,143		36,687	36,687	116,803	120,287	64,541	2,030.25	2,016.88	-13.38	5,343	3,925	-1,417	506	-598	36,631	35,879
1960	Oct	-71	-2,147	245,572		81,566	81,566	165,166	168,649	17,516	2,037.71	2,025.19	-12.52	6,144	4,803	-1,341	488	-545	10,055	9,864
	Nov	-1,085	-7,384	322,214		151,369	151,369	238,452	241,936	2,602	2,049.35	2,037.13	-12.21	7,414	6,082	-1,332	288	-320	1,520	1,493
	Dec	-595	-6,446	528,140		351,169	351,169	441,735	445,219	2,954	2,076.77	2,066.37	-10.39	10,520	9,321	-1,199	116	-115	1,796	1,769
	Jan	-932	-8,523	764,253		578,874	578,874	672,924	676,407	12,652	2,102.00	2,093.33	-8.67	13,581	12,500	-1,081	68	-61	7,971	7,875
	Feb	120	-2,945	832,691		644,427	644,427	741,961	745,444	586	2,108.22	2,100.21	-8.00	14,378	13,355	-1,023	105	-90	372	368
	Mar	0	-13,414	1,016,568		814,980	814,980	915,997	919,480	8,399	2,122.74	2,115.45	-7.29	16,340	15,336	-1,004	123	-103	5,443	5,389
	Apr	0	-13,480	1,094,806		879,841	879,841	984,341	984,341	18,140	2,128.05	2,120.41	-7.64	17,101	16,014	-1,087	565	-512	11,839	11,718
	May	-342	-10,386	1,102,939		878,100	878,100	982,600	982,600	32,589	2,128.57	2,120.28	-8.29	17,178	15,996	-1,182	825	-813	21,284	21,049
	Jun	-126	-5,794	1,049,221		819,401	819,401	923,901	927,384	55,611	2,125.01	2,116.07	-8.94	16,663	15,420	-1,243	1,141	-1,182	36,148	35,715
	Jul	-236	-5,594	985,359		751,126	751,126	859,109	862,593	80,028	2,120.48	2,110.79	-9.70	16,025	14,715	-1,310	824	-899	51,704	51,028
	Aug	-434	-5,594	924,791		685,863	685,863	797,330	800,813	80,804	2,115.87	2,105.38	-10.49	15,392	14,012	-1,381	944	-1,086	51,880	51,143
	Sep	-227	-4,221	907,569		665,507	665,507	780,457	783,940	64,115	2,114.50	2,103.84	-10.66	15,208	13,814	-1,393	698	-811	41,088	40,494
1961	Oct	-277	-1,339	906,711		664,120	664,120	782,554	786,037	14,258	2,114.43	2,104.03	-10.40	15,199	13,839	-1,360	370	-419	9,136	9,008
	Nov	-150	-973	890,054		646,909	646,909	768,826	772,309	200	2,113.07	2,102.76	-10.31	15,018	13,677	-1,341	84	-94	128	126
	Dec	-138	-1,216	865,626		621,359	621,359	746,759	750,243	4,003	2,111.04	2,100.67	-10.37	14,748	13,413	-1,335	150	-167	2,553	2,517
	Jan	-129	-947	861,274		616,227	616,227	745,110	748,594	315	2,110.67	2,100.52	-10.16	14,700	13,393	-1,307	-150	164	201	198
	Feb	-108	-1,171	843,386		597,004	597,004	729,371	732,854	17,526	2,109.14	2,099.00	-10.15	14,499	13,202	-1,297	-18	19	11,150	10,995
	Mar	-281	-3,362	817,629		567,865	567,865	703,715	707,199	82,367	2,106.89	2,096.46	-10.42	14,206	12,887	-1,319	85	-94	52,240	51,493
	Apr	-455	-10,218	792,460		532,572	532,572	671,905	675,388	51,571	2,104.62	2,093.22	-11.40	13,914	12,487	-1,427	608	-723	32,606	32,095
	May	-10	-6,497	705,783		440,121	440,121	582,938	586,421	75,673	2,096.32	2,083.58	-12.74	12,869	11,322	-1,547	592	-763	47,299	46,460
	Jun	51	-4,675	619,248		349,674	349,674	495,974	499,458	88,147	2,087.24	2,073.27	-13.97	11,761	10,113	-1,648	1,051	-1,444	54,399	53,327
	Jul	-181	-5,295	545,175		271,750	271,750	421,534	425,017	101,456	2,078.80	2,063.71	-15.09	10,758	9,018	-1,739	796	-1,153	61,868	60,536
	Aug	-118	-4,413	510,483		233,798	233,798	387,065	390,548	72,217	2,074.63	2,059.05	-15.58	10,270	8,493	-1,777	640	-947	43,776	42,797
	Sep	-183	-3,741	525,843		246,365	246,365	403,115	406,599	58,255	2,076.49	2,061.24	-15.25	10,487	8,739	-1,748	462	-673	35,407	34,634
1962	Oct	-165	-488	527,702		248,409	248,409	408,643	412,126	16,058	2,076.72	2,061.99	-14.73	10,513	8,823	-1,690	501	-705	9,763	9,557
	Nov	-134	-2,259	528,140		247,293	247,293	411,010	414,493	2,813	2,076.77	2,062.30	-14.46	10,520	8,859	-1,661	-75	103	1,711	1,675
	Dec	-205	-3,645	552,502		267,907	267,907	435,107	438,591	492	2,079.66	2,065.51	-14.16	10,859	9,222	-1,637	-164	224	300	294
	Jan	-514	-5,024	589,522		299,679	299,679	470,363	473,846	2,224	2,083.93	2,070.06	-13.87	11,364	9,742	-1,622	-43	57	1,366	1,340
	Feb	-980	-15,396	687,825		382,529	382,529	556,696	560,179	8,408	2,094.50	2,080.56	-13.94	12,644	10,965	-1,680	-11	15	5,242	5,140
	Mar	-1,437	-13,749	767,873		448,813	448,813	626,463	629,946	9,371	2,102.34	2,088.41	-13.94	13,624	11,901	-1,723	211	-303	5,907	5,793
	Apr	-421	-29,004	920,764		573,003	573,003	754,137	757,620	57,775	2,115.55	2,101.38	-14.17	15,349	13,502	-1,848	636	-979	37,079	36,366
	May	-275	-13,883	906,854		546,190	546,190	730,807	734,290	69,020	2,114.44	2,099.14	-15.30	15,200	13,220	-1,980	768	-1,268	44,228	43,309
	Jun	-93	-5,665	849,800		484,739	484,739	672,839	676,322	78,523	2,109.70	2,093.32	-16.38	14,572	12,499	-2,073	1,000	-1,726	49,994	48,875
	Jul	-137	-5,613	771,231		402,284	402,284	593,867	597,350	80,887	2,102.66	2,084.81	-17.85	13,664	11,469	-2,195	985	-1,802	51,004	49,748
	Aug	-124	-6,097	702,796		329,553	329,553	524,620	528,103	118,455	2,096.02	2,076.76	-19.26	12,832	10,519	-2,313	1,019	-1,963	74,008	72,023
	Sep	-158	-3,577	647,912		273,055	273,055	471,605	475,089	81,120	2,090.34	2,070.22	-20.12	12,135	9,760	-2,375	441	-873	50,281	48,861
1963	Oct	-281	-1,750	648,530		272,796	272,796	474,830	478,313	4,087	2,090.41	2,070.62	-19.78	12,143	9,807	-2,336	383	-745	2,534	2,463

						w/o CAP		w/ CAP			Roosevelt										
		Cibecue	Cumulative			Trial 1	Final	Trial 1	Final	Salt R.											
		Change in	Change in	Historic	Historic	Revised	Revised	Revised:ed	by WMAT	Below		Elevation			Surface Area			Evaporation		Hydropower	
Water		Flow	Flow	Reservoir	Spill	Roosevelt	Roosevelt	Roosevelt	Roosevelt	SMD	Historic	Revised	Change	Historic	Revised	Change	Net	Change	Historic	Revised
Year/	Month	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(ft)	(ft)	(ft)	(ac)	(ac)	(ac)	(in x 100)	(af)	mwh	mwh
	Nov	-152	-2,289	654,074		276,796	276,796	482,313	485,796	6,683	2,090.99	2,071.57	-19.43	12,215	9,916	-2,299	270	-518	4,146	4,033
	Dec	-176	-1,593	654,198		275,844	275,844	484,844	488,328	0	2,091.01	2,071.88	-19.12	12,216	9,952	-2,264	-58	110	0	0
	Jan	-149	-1,492	654,321		274,366	274,366	486,849	490,332	0	2,091.02	2,072.13	-18.89	12,218	9,981	-2,237	71	-132	0	0
	Feb	-533	-7,673	708,645		321,149	321,149	537,115	540,599	5,064	2,096.61	2,078.26	-18.35	12,905	10,694	-2,211	68	-125	3,166	3,086
	Mar	-425	-6,740	669,411		275,299	275,299	494,749	498,232	90,057	2,092.60	2,073.12	-19.49	12,411	10,095	-2,316	335	-647	55,998	54,471
	Apr	-151	-6,343	639,707		239,899	239,899	462,832	466,315	62,492	2,089.46	2,069.10	-20.36	12,029	9,632	-2,397	516	-1,030	38,687	37,580
	May	-44	-9,322	576,348		168,248	168,248	394,664	398,148	83,553	2,082.43	2,060.09	-22.34	11,186	8,609	-2,576	907	-1,946	51,214	49,590
	Jun	43	-4,418	481,344		70,772	70,772	300,672	304,155	108,398	2,071.01	2,046.68	-24.33	9,851	7,120	-2,731	1,065	-2,425	65,366	63,071
	Jul	14	-5,610	383,630		-30,128	-30,128	203,256	206,739	121,073	2,058.10	2,031.49	-26.60	8,386	5,475	-2,910	1,180	-2,862	71,649	68,846
	Aug	-265	-7,949	386,128		-32,716	-32,716	204,150	207,634	69,704	2,058.44	2,031.64	-26.80	8,424	5,491	-2,933	-81	198	41,271	39,645
	Sep	-370	-10,678	432,044		2,325	2,325	242,675	246,158	61,756	2,064.64	2,037.80	-26.84	9,124	6,154	-2,970	556	-1,377	36,898	35,456
1964	Oct	-114	-2,212	437,157		6,602	6,602	250,436	253,919	8,123	2,065.32	2,039.01	-26.30	9,200	6,285	-2,915	392	-951	4,858	4,672
	Nov	-197	-2,429	441,913		9,881	9,881	257,198	260,681	411	2,065.94	2,040.07	-25.88	9,271	6,399	-2,872	57	-135	246	237
	Dec	-100	-1,027	437,455		4,531	4,531	255,331	258,814	6,399	2,065.36	2,039.78	-25.58	9,205	6,368	-2,837	127	-300	3,827	3,685
	Jan	-112	-827	434,494		1,043	1,043	255,326	258,809	1,626	2,064.97	2,039.78	-25.19	9,161	6,368	-2,793	99	-230	972	936
	Feb	-111	-799	423,217		-10,803	-10,803	246,963	250,447	11,467	2,063.47	2,038.47	-25.00	8,991	6,226	-2,765	286	-658	6,840	6,590
	Mar	-163	-2,366	360,410		-75,319	-75,319	185,931	189,415	74,179	2,054.85	2,028.65	-26.19	8,023	5,172	-2,851	302	-718	43,688	41,997
	Apr	-1,297	-12,530	359,626		-87,915	-87,915	176,819	180,302	55,250	2,054.74	2,027.14	-27.59	8,010	5,011	-3,000	601	-1,503	32,535	31,208
	May	-152	-7,390	314,251		-139,177	-139,177	129,040	132,523	61,401	2,048.17	2,019.01	-29.16	7,285	4,150	-3,135	945	-2,468	35,806	34,248
	Jun	-24	-4,731	247,767		-207,923	-207,923	63,777	67,260	77,257	2,038.05	2,007.35	-30.70	6,181	2,931	-3,250	1,064	-2,882	44,372	42,308
	Jul	-379	-6,939	181,533		-278,215	-278,215	-3,032	452	82,593	2,027.35	1,994.73	-32.61	5,032	1,630	-3,403	897	-2,543	46,667	44,323
	Aug	-96	-9,902	200,598		-266,509	-266,509	12,158	15,641	36,304	2,030.49	1,997.67	-32.83	5,368	1,930	-3,438	665	-1,904	20,612	19,575
	Sep	-366	-13,838	236,627		-242,414	-242,414	39,736	43,220	30,740	2,036.30	2,002.89	-33.40	5,991	2,469	-3,522	494	-1,450	17,608	16,715
1965	Oct	-137	-2,948	252,720		-227,818	-227,818	57,815	61,299	21,446	2,038.83	2,006.26	-32.57	6,265	2,817	-3,448	505	-1,452	12,332	11,724
	Nov	-121	-1,394	260,590		-219,890	-219,890	69,227	72,710	5,407	2,040.05	2,008.35	-31.70	6,398	3,035	-3,363	141	-396	3,115	2,966
	Dec	-110	-1,780	271,170		-210,695	-210,695	81,905	85,389	97	2,041.68	2,010.66	-31.03	6,575	3,275	-3,300	26	-72	56	54
	Jan	-743	-8,388	394,336		-95,845	-95,845	200,239	203,722	72	2,059.57	2,031.00	-28.57	8,551	5,423	-3,128	-156	407	43	41
	Feb	-1,165	-6,823	468,781		-28,630	-28,630	270,936	274,420	1,647	2,069.41	2,042.18	-27.23	9,668	6,629	-3,039	55	-139	991	952
	Mar	-1,092	-9,305	587,549		80,972	80,972	384,022	387,505	6,398	2,083.71	2,058.63	-25.08	11,338	8,446	-2,892	197	-474	3,929	3,789
	Apr	-127	-20,211	807,604		281,289	281,289	587,823	591,306	266	2,105.99	2,084.13	-21.86	14,090	11,388	-2,702	374	-843	168	163
	May	-110	-17,329	881,836		339,035	339,035	649,052	652,535	16,328	2,112.40	2,090.83	-21.56	14,928	12,195	-2,733	808	-1,839	10,434	10,128
	Jun	-234	-6,960	864,362		316,441	316,441	629,941	633,424	33,835	2,110.94	2,088.79	-22.15	14,734	11,947	-2,788	965	-2,242	21,578	20,926
	Jul	-122	-6,686	842,411		290,046	290,046	607,029	610,512	46,024	2,109.06	2,086.28	-22.78	14,488	11,645	-2,843	929	-2,201	29,277	28,365
	Aug	-188	-8,616	852,872		294,092	294,092	614,558	618,042	32,896	2,109.96	2,087.11	-22.85	14,606	11,745	-2,861	960	-2,288	20,952	20,298
	Sep	-176	-4,494	845,757		284,771	284,771	608,721	612,204	38,817	2,109.35	2,086.47	-22.88	14,526	11,667	-2,859	486	-1,159	24,702	23,929
1966	Oct	-191	-1,245	832,413		271,340	271,340	598,773	602,257	10,084	2,108.19	2,085.36	-22.83	14,375	11,535	-2,840	466	-1,103	6,407	6,207
	Nov	-400	-4,405	841,994		277,619	277,619	608,536	612,019	11,369	2,109.02	2,086.45	-22.58	14,484	11,665	-2,819	-10	23	7,232	7,009
	Dec	-667	-10,987	1,321,237	85,124	830,976	916,101	1,165,376	1,250,501	112,098	2,140.93	2,137.27	-3.66	19,088	18,500	-588	-790	387	74,417	74,060
	Jan	-215	-2,531	1,238,844	183,139	1,013,929	1,197,068	1,348,329	1,531,468	244,974	2,136.64	2,150.17	13.53	18,400	20,688	2,287	48	92	161,834	161,834
	Feb	0	-513	1,244,089		1,201,708	1,201,708	1,536,108	1,536,108	68,748	2,136.92	2,150.35	13.43	18,445	20,721	2,276	87	164	45,399	46,203
	Mar	0	-622	1,341,437		1,298,269	1,298,269	1,632,669	1,632,669	98,372	2,141.92	2,153.91	11.99	19,251	21,389	2,137	350	623	65,389	66,416
	Apr	0	-975	1,371,540		1,326,774	1,326,774	1,661,174	1,653,043	95,632	2,143.35	2,154.61	11.27	19,490	21,525	2,035	641	1,086	63,688	64,625
	May	-281	-14,664	1,362,886		1,302,369	1,302,369	1,628,638	1,628,638	47,662	2,142.94	2,153.77	10.83	19,422	21,362	1,939	1,008	1,629	31,724	32,173
	Jun	-108	-5,306	1,308,785		1,241,333	1,241,333	1,567,602	1,567,602	48,659	2,140.30	2,151.55	11.25	18,987	20,943	1,956	1,023	1,667	32,276	32,753
	Jul	-214	-6,119	1,242,906		1,167,668	1,167,668	1,493,937	1,493,937	77,039	2,136.86	2,148.68	11.82	18,435	20,417	1,982	1,039	1,716	50,870	51,662
	Aug	-306	-6,884	1,217,942		1,134,104	1,134,104	1,460,373	1,460,373	74,562	2,135.48	2,147.29	11.81	18,219	20,170	1,950	768	1,248	49,145	49,911
	Sep	-106	-5,816	1,212,731		1,121,829	1,121,829	1,448,098	1,448,098	66,941	2,135.19	2,146.77	11.58	18,174	20,078	1,904	476	755	44,105	44,780
1967	Oct	-292	-1,644	1,205,369		1,112,069	1,112,069	1,438,338	1,438,338	18,393	2,134.77	2,146.35	11.58	18,109	20,005	1,895	330	522	12,112	12,297
	Nov	-306	-1,470	1,198,527		1,103,235	1,103,235	1,429,504	1,429,504	1,755	2,134.38	2,145.96	11.59	18,049	19,938	1,889	209	330	1,155	1,173
	Dec	-678	-1,969	1,168,775		1,071,185	1,071,185	1,397,454	1,397,454	73,342	2,132.64	2,144.54	11.90	17,784	19,692	1,908	-12	-19	48,160	48,919
	Jan	-145	-662	1,143,340		1,045,107	1,045,107	1,371,376	1,371,376	4,737	2,131.11	2,143.34	12.23	17,553	19,489	1,936	95	153	3,104	3,155
	Feb	-191	-841	1,121,235		1,022,009	1,022,009	1,348,278	1,348,278	1,255	2,129.74	2,142.24	12.51	17,349	19,306	1,957	305	498	821	835
	Mar	-228	-2,411	1,073,918		971,783	971,783	1,298,052	1,298,052	57,813	2,126.68	2,139.76	13.08	16,902	18,898	1,996	361	600	37,663	38,321
	Apr	-120	-2,884	1,049,377		943,758	943,758	1,270,027	1,270,027	48,844	2,125.03	2,138.31	13.28	16,664	18,665	2,001	560	933	31,749	32,314
	May	-89	-7,956	996,268		881,760	881,760	1,208,029	1,208,029	53,283	2,121.28	2,134.92	13.64	16,136	18,133	1,997	808	1,344	34,461	35,094
	Jun	-32	-4,656	933,172		812,664	812,664	1,138,933	1,138,933	59,081	2,116.52	2,130.84	14.31	15,482	17,513	2,031	1,044	1,768	37,966	38,702
	Jul	-89	-6,545	895,602		766,781	766,781	1,093,050	1,093,050	52,144	2,113.53	2,127.94	14.41	15,078	17,085	2,007	653	1,092	33,373	34,027
	Aug	-205	-20,276	937,954		787,765	787,765	1,114,034	1,114,034	71,731	2,116.90	2,129.28	12.38	15,532	17,282	1,750	817	1,191	46,119	46,892
	Sep	-265	-7,915	933,897		774,603	774,603	1,100,872	1,100,872	68,250	2,116.58	2,128.44	11.86	15,489	17,159	1,669	596	829	43,863	44,567
1968	Oct	-132	-1,910	906,866		744,833	744,833	1,071,102	1,071,102	33,017	2,114.44	2,126.49	12.05	15,200	16,875	1,675	598	835	21,158	21,504
	Nov	-150	-994	893,328		729,467	729,467	1,055,736	1,055,736	301	2,113.34	2,125.46	12.12	15,053	16,726	1,673	83	116	192	195
	Dec	-348	-1,522	1,024,187		858,688	858,688	1,184,957	1,184,957	2,145	2,123.28	2,133.59	10.32	16,416	17,929	1,513	-570	-718	1,391	1,410
	Jan	-887	-3,605	1,180,611		1,012,226	1,012,226	1,338,495	1,338,495	472	2,133.34	2,141.77	8.43	17,890	19,228	1,337	88	98	310	314
	Feb	59	-7,935	1,302,226	47,503	1,173,311	1,220,814	1,499,580	1,547,083	114,555	2,139.97	2,150.77	10.80	18,933	20,798	1,866	158	246	75,953	77,029
	Mar	-22	-11,347	1,357,523	51,494	1,316,012	1,367,506	1,642,281	1,653,043	137,613	2,142.69	2,154.61	11.93	19,380	21,525	2,146	153	274	91,566	92,994
	Apr	0	-7,818	1,365,827	70,405	1,438,123	1,508,528	1,723,660	1,653,043	152,710	2,143.08	2,154.61	11.53	19,445	21,525	2,080	528	915	101,663	103,196
	May	-783	-13,940	1,364,270		1,492,116	1,492,116	1,636,631	1,636,631	78,588	2,143.01	2,154.05	11.04	19,433	21,415	1,982	872	1,440	52,313	53,068
	Jun	-255	-7,353	1,324,499		1,443,552	1,443,552	1,588,067	1,588,067	73,520	2,141.09	2,152.31	11.22	19,115	21,085	1,970	1,068	1,752	48,817	49,535
	Jul	-347	-6,590	1,281,366		1,392,076	1,392,076	1,536,591	1,536,591	68,010	2,138.90	2,150.37	11.47	18,760	20,724	1,964	820	1,343	45,029	45,708
	Aug	-376	-10,090	1,252,051		1,351,328	1,351,328	1,495,843	1,495,843	72,342	2,137.35	2,148.75	11.40	18,513	20,431	1,918	327	522	47,800	48,518
	Sep	-101	-5,000	1,187,231		1,280,985	1,280,985	1,425,500	1,425,500	105,641	2,133.73	2,145.79	12.06	17,949	19,908	1,958	738	1,204	69,469	70,578
1969	Oct	-206	-1,209	1,126,542		1,217,883	1,217,883	1,362,398	1,362,398	56,792	2,130.07	2,142.92	12.85	17,399	19,418	2,020	370	623	37,165	37,800
	Nov	-272	-1,624	1,091,001		1,180,096	1,180,096	1,324,611	1,324,611	25,169	2,127.80	2,141.09	13.29	17,065	19,116	2,050	3	4	16,421	16,712
	Dec	-332	-1,713	1,058,096		1,145,473	1,145,473	1,289,988	1,289,988	49,127	2,125.62	2,139.35	13.73	16,749	18,832	2,082	-73	-126	31,959	32,546
	Jan	-412	-5,576	1,139,462		1,221,389	1,221,389	1,365,904	1,365,904	11,548	2,130.87	2,143.08	12.21	17,518	19,446	1,928	-140	-224	7,565	7,688
	Feb	-374	-2,767	1,169,102		1,248,486	1,248,486	1,393,001	1,393,001	26,371	2,132.66	2,144.34	11.68	17,787	19,658	1,871	48	75	17,317	17,585
	Mar	-10	-3,029	1,227,865		1,304,145	1,304,145	1,448,660	1,448,660	37,566	2,136.03	2,146.79	10.76	18,305	20,082	1,777	245	363	24,778	25,130
	Apr	0	-3,260	1,283,099		1,355,756	1,355,756	1,500,271	1,500,271	82,573	2,138.99	2,148.93	9.94	18,774	20,463	1,689	618	870	54,678	55,392
	May	-740	-13,536	1,215,253		1,273,505	1,273,505	1,418,020	1,418,020	132,922	2,135.33	2,145.46	10.13	18,196	19,851	1,655	728	1,004	87,000	88,164
	Jun	-123	-5,695	1,155,861		1,207,414	1,207,414	1,351,929	1,351,929	135,037	2,131.87	2,142.42	10.55	17,668	19,335	1,668	1,090	1,515	88,581	89,820
	Jul	-395	-5,823	1,153,095		1,197,310	1,197,310	1,341,825	1,341,825	69,423	2,131.70	2,141.93	10.23	17,642	19,254	1,612	791	1,063	45,529	46,147
	Aug	-372	-8,037	1,130,574		1,165,689	1,165,689	1,310,204	1,310,204	12,615	2,130.32	2,140.38	10.06	17,436	18,998	1,562	683	889	8,258	8,369
	Sep	-472	-8,098	1,132,998		1,159,126	1,159,126	1,303,641	1,303,641	77,946	2,130.47	2,140.04	9.57	17,458	18,944	1,486	674	835	51,035	51,685
1970	Oct	-189	-1,542	1,080,527		1,104,279	1,104,279	1,248,794	1,248,794	53,261	2,127.12	2,137.18	10.06	16,966	18,485	1,520	407	516	34,718	35,184
	Nov	-322	-2,722	1,054,359		1,074,872	1,074,872	1,219,387	1,219,387	810	2,125.36	2,135.56	10.19	16,713	18,232	1,519	86	109	527	534
	Dec	-300	-1,608	1,032,422		1,051,218	1,051,218	1,195,733	1,195,733	48,959	2,123.85	2,134.22	10.36	16,498	18,025	1,527	52	66	31,774	32,216

Water Year/	Month	Cibecue Change in Flow (af)	Cumulative Change in Flow (af)	Historic Reservoir (af)	Historic Spill (af)	w/o CAP Trial 1 Revised Roosevelt (af)	w/o CAP Final Revised Roosevelt (af)	w/ CAP Trial 1 Revised Roosevelt (af)	w/ CAP Final Revised by WMAT Roosevelt (af)	Salt R. Below SMD (af)	Roosevelt Elevation Historic (ft)	Roosevelt Elevation Revised (ft)	Roosevelt Elevation Change (ft)	Roosevelt Surface Area Historic (ac)	Roosevelt Surface Area Revised (ac)	Roosevelt Surface Area Change (ac)	Roosevelt Evaporation Net (in x 100)	Roosevelt Evaporation Change (af)	Roosevelt Hydropower Historic mwh	Roosevelt Hydropower Revised mwh
	Jan	-260	-902	1,019,460		1,037,288	1,037,288	1,181,803	1,181,803	10,563	2,122.94	2,133.41	10.46	16,369	17,901	1,532	157	200	6,847	6,943
	Feb	-136	-1,110	986,855		1,003,373	1,003,373	1,147,888	1,147,888	42,042	2,120.59	2,131.39	10.79	16,040	17,595	1,555	184	238	27,166	27,561
	Mar	-572	-6,267	951,783		961,796	961,796	1,106,311	1,106,311	39,922	2,117.96	2,128.79	10.83	15,678	17,210	1,532	175	224	25,705	26,081
	Apr	-296	-10,010	898,728		898,507	898,507	1,043,022	1,043,022	85,965	2,113.78	2,124.59	10.81	15,112	16,602	1,490	581	722	55,038	55,846
	May	-63	-12,695	834,916		821,278	821,278	965,793	965,793	98,659	2,108.41	2,119.03	10.62	14,404	15,823	1,420	964	1,140	62,704	63,615
	Jun	14	-5,302	716,765		696,685	696,685	841,200	844,683	121,866	2,097.42	2,109.26	11.84	13,005	14,514	1,509	1,133	1,425	76,288	77,543
	Jul	-120	-6,155	611,622		583,961	583,961	731,960	735,443	98,540	2,086.40	2,099.25	12.85	11,660	13,234	1,574	944	1,238	60,741	61,843
	Aug	-43	-6,566	572,469		537,005	537,005	688,486	691,970	78,884	2,081.98	2,094.93	12.94	11,133	12,697	1,563	752	979	48,322	49,210
	Sep	-352	-9,403	647,301		601,454	601,454	756,419	759,903	65,910	2,090.27	2,101.59	11.32	12,127	13,529	1,402	353	413	40,850	41,499
1971	Oct	-305	-2,744	654,464		605,460	605,460	763,909	767,392	19,395	2,091.04	2,102.30	11.26	12,220	13,618	1,399	421	490	12,033	12,223
	Nov	-158	-1,409	656,811		605,908	605,908	767,840	771,323	368	2,091.28	2,102.67	11.38	12,250	13,665	1,415	243	287	229	232
	Dec	-134	-1,370	666,796		614,236	614,236	779,651	783,134	272	2,092.33	2,103.76	11.43	12,378	13,805	1,427	27	32	169	172
	Jan	-131	-799	655,823		602,431	602,431	771,330	774,813	251	2,091.18	2,102.99	11.81	12,237	13,707	1,469	132	161	156	158
	Feb	-103	-705	592,097		537,839	537,839	710,221	713,704	32,129	2,084.22	2,097.11	12.89	11,399	12,967	1,568	285	373	19,744	20,104
	Mar	-116	-2,179	496,722		439,913	439,913	615,778	619,261	81,423	2,072.93	2,087.24	14.31	10,073	11,761	1,687	519	729	49,235	50,249
	Apr	-105	-5,184	442,823		380,101	380,101	559,449	562,933	66,233	2,066.06	2,080.88	14.82	9,285	11,003	1,718	686	981	39,655	40,509
	May	-16	-5,789	447,209		377,717	377,717	560,548	564,032	74,592	2,066.63	2,081.01	14.38	9,350	11,018	1,668	907	1,260	44,696	45,629
	Jun	9	-4,619	447,612		372,241	372,241	558,556	562,039	63,159	2,066.69	2,080.78	14.09	9,356	10,990	1,634	1,252	1,705	37,848	38,623
	Jul	-207	-5,416	447,814		365,321	365,321	555,120	558,603	79,177	2,066.71	2,080.38	13.67	9,359	10,943	1,584	1,183	1,562	47,449	48,391
	Aug	-509	-11,115	492,701		397,531	397,531	590,813	594,296	37,355	2,072.43	2,084.47	12.04	10,015	11,428	1,413	525	618	22,572	22,963
	Sep	-411	-7,768	487,835		384,279	384,279	581,044	584,527	34,834	2,071.82	2,083.36	11.54	9,945	11,297	1,352	384	432	21,030	21,380
1972	Oct	-570	-13,506	628,539		511,045	511,045	711,293	714,777	8,581	2,088.26	2,097.22	8.96	11,883	12,980	1,098	56	51	5,303	5,370
	Nov	-788	-4,775	671,937		549,617	549,617	753,349	756,832	415	2,092.87	2,101.30	8.43	12,443	13,492	1,049	187	164	258	261
	Dec	-327	-5,209	764,927		637,235	637,235	844,450	847,933	519	2,102.07	2,109.54	7.47	13,589	14,551	962	-5	-4	327	331
	Jan	-997	-3,313	737,853		606,852	606,852	817,550	821,034	330	2,099.48	2,107.19	7.71	13,263	14,245	982	161	132	207	209
	Feb	-339	-1,807	657,922		524,982	524,982	739,164	742,647	296	2,091.40	2,099.95	8.54	12,264	13,321	1,057	282	249	184	186
	Mar	-137	-3,926	598,396		461,281	461,281	678,946	682,430	28,678	2,084.93	2,093.95	9.02	11,483	12,576	1,093	580	529	17,641	17,866
	Apr	-63	-4,188	512,552		370,721	370,721	591,869	595,352	71,632	2,074.88	2,084.59	9.71	10,299	11,443	1,143	733	698	43,437	44,042
	May	35	-5,990	430,796		282,276	282,276	506,908	510,391	82,652	2,064.48	2,074.61	10.14	9,105	10,269	1,163	944	916	49,371	50,100
	Jun	-115	-4,929	360,157		205,793	205,793	433,908	437,391	88,762	2,054.81	2,065.35	10.54	8,019	9,204	1,185	831	820	52,274	53,088
	Jul	-105	-5,467	272,121		111,470	111,470	343,068	346,552	91,142	2,041.83	2,052.87	11.04	6,591	7,804	1,213	1,139	1,150	52,646	53,522
	Aug	-266	-5,456	205,318		38,061	38,061	273,143	276,626	71,694	2,031.26	2,042.52	11.26	5,451	6,666	1,215	862	873	40,753	41,455
	Sep	-201	-3,814	169,905		-2,040	-2,040	236,525	240,009	51,192	2,025.40	2,036.83	11.43	4,826	6,049	1,223	696	709	28,838	29,347
1973	Oct	-710	-19,734	522,351		329,962	329,962	572,011	575,494	42,838	2,076.07	2,082.33	6.26	10,438	11,174	736	-491	-301	26,020	26,254
	Nov	-1,232	-6,456	624,550		426,007	426,007	671,538	675,022	2,731	2,087.82	2,093.19	5.37	11,830	12,483	652	124	67	1,687	1,700
	Dec	-812	-4,936	763,853		560,306	560,306	809,321	812,804	550	2,101.97	2,106.46	4.49	13,576	14,151	574	5	2	346	348
	Jan	0	-4,388	844,640		636,703	636,703	889,202	892,685	487	2,109.25	2,113.29	4.04	14,514	15,046	533	86	38	310	311
	Feb	-8	-4,625	1,052,958		840,358	840,358	1,096,340	1,096,340	8,667	2,125.27	2,128.15	2.88	16,699	17,116	417	-148	-51	5,636	5,657
	Mar	7	-11,308	1,302,744	115,115	1,194,002	1,309,116	1,449,983	1,565,098	201,234	2,140.00	2,151.46	11.46	18,937	20,925	1,988	239	396	161,438	161,438
	Apr	0	-6,375	1,336,077	301,642	1,637,321	1,653,043	1,893,303	1,653,043	383,946	2,141.65	2,154.61	12.96	19,208	21,525	2,317	511	987	160,464	160,464
	May	-110	-12,135	1,378,637	236,615	1,919,096	1,653,043	1,919,096	1,653,043	323,469	2,143.68	2,154.61	10.94	19,546	21,525	1,979	542	894	160,464	160,464
	Jun	-423	-9,142	1,344,722	25,112	1,634,204	1,653,043	1,634,204	1,653,043	113,734	2,142.07	2,154.61	12.54	19,278	21,525	2,248	1,001	1,875	75,616	76,857
	Jul	-70	-7,660	1,269,902		1,568,688	1,568,688	1,568,688	1,568,688	109,747	2,138.30	2,151.59	13.29	18,664	20,950	2,286	869	1,655	72,606	73,875
	Aug	-614	-6,625	1,183,424		1,473,930	1,473,930	1,473,930	1,473,930	112,583	2,133.50	2,147.86	14.35	17,915	20,270	2,355	823	1,615	74,012	75,418
	Sep	-187	-4,214	1,116,251		1,400,927	1,400,927	1,400,927	1,400,927	111,929	2,129.42	2,144.70	15.27	17,303	19,719	2,416	760	1,529	73,184	74,672
1974	Oct	-227	-300	1,046,906		1,329,753	1,329,753	1,329,753	1,329,753	74,211	2,124.86	2,141.35	16.49	16,640	19,157	2,517	530	1,111	48,227	49,292
	Nov	-314	-1,364	1,048,602		1,328,974	1,328,974	1,328,974	1,328,974	5,010	2,124.97	2,141.31	16.34	16,657	19,151	2,494	124	258	3,257	3,328
	Dec	-310	-1,347	1,059,342		1,338,109	1,338,109	1,338,109	1,338,109	594	2,125.70	2,141.75	16.05	16,761	19,224	2,463	230	472	387	395
	Jan	-125	-2,438	1,089,573		1,365,429	1,365,429	1,365,429	1,365,429	106	2,127.71	2,143.06	15.35	17,052	19,442	2,390	-69	-138	69	71
	Feb	0	-1,552	1,083,701		1,358,144	1,358,144	1,358,144	1,358,144	67	2,127.33	2,142.72	15.39	16,996	19,384	2,389	245	488	44	45
	Mar	-27	-5,123	1,053,736		1,322,568	1,322,568	1,322,568	1,322,568	57,944	2,125.32	2,140.99	15.67	16,707	19,099	2,392	238	475	37,680	38,470
	Apr	0	-4,057	1,007,375		1,271,674	1,271,674	1,271,674	1,271,674	78,150	2,122.08	2,138.40	16.31	16,248	18,679	2,431	579	1,172	50,599	51,708
	May	-115	-9,426	928,406		1,182,107	1,182,107	1,182,107	1,182,107	86,917	2,116.15	2,133.43	17.28	15,431	17,904	2,473	993	2,047	55,827	57,133
	Jun	-57	-5,015	830,472		1,077,111	1,077,111	1,077,111	1,077,111	104,848	2,108.02	2,126.89	18.87	14,353	16,933	2,580	1,100	2,366	66,602	68,323
	Jul	-184	-5,307	739,448		978,415	978,415	978,415	978,415	100,345	2,099.64	2,119.97	20.33	13,283	15,954	2,671	787	1,751	63,010	64,785
	Aug	-228	-7,305	651,500		881,411	881,411	881,411	884,894	107,565	2,090.72	2,112.65	21.93	12,182	14,961	2,780	761	1,762	66,709	68,761
	Sep	-322	-4,324	586,850		810,674	810,674	814,157	817,641	77,930	2,083.63	2,106.89	23.26	11,328	14,206	2,878	626	1,502	47,849	49,426
1975	Oct	-640	-5,324	616,756		833,754	833,754	840,720	844,204	2,355	2,086.97	2,109.21	22.25	11,728	14,509	2,781	179	415	1,453	1,499
	Nov	-481	-4,164	651,995		864,413	864,413	874,863	878,347	6	2,090.77	2,112.11	21.33	12,188	14,889	2,701	318	715	4	4
	Dec	-135	-1,827	664,295		874,171	874,171	888,104	891,588	192	2,092.07	2,113.20	21.13	12,346	15,034	2,688	46	102	119	123
	Jan	-122	-1,770	672,445		880,449	880,449	897,866	901,349	170	2,092.92	2,113.99	21.07	12,450	15,141	2,691	140	314	105	109
	Feb	-201	-3,171	692,725		897,244	897,244	918,144	921,627	876	2,095.00	2,115.62	20.61	12,706	15,359	2,653	-25	-54	547	562
	Mar	-1,325	-18,200	798,051		984,424	984,424	1,008,808	1,008,808	31,789	2,105.13	2,122.19	17.06	13,980	16,262	2,283	21	40	20,113	20,585
	Apr	-172	-14,790	962,916		1,134,459	1,134,459	1,158,843	1,158,843	19,884	2,118.81	2,132.05	13.24	15,794	17,695	1,901	170	270	12,818	13,047
	May	-208	-15,472	982,555		1,138,357	1,138,357	1,162,740	1,162,740	77,335	2,120.28	2,132.28	12.01	15,996	17,730	1,734	661	955	49,949	50,757
	Jun	-118	-6,361	907,867		1,056,353	1,056,353	1,080,736	1,080,736	98,818	2,114.52	2,127.13	12.61	15,211	16,968	1,757	845	1,237	63,330	64,415
	Jul	-63	-6,001	823,014		964,261	964,261	988,645	988,645	102,646	2,107.36	2,120.72	13.36	14,268	16,058	1,790	767	1,144	65,145	66,338
	Aug	-182	-5,948	720,826		854,981	854,981	879,364	882,848	103,321	2,097.82	2,112.48	14.66	13,055	14,939	1,884	761	1,194	64,714	66,032
	Sep	-310	-4,860	669,799		797,900	797,900	825,767	829,250	85,306	2,092.64	2,107.91	15.27	12,416	14,339	1,923	641	1,027	53,047	54,181
1976	Oct	-202	-1,086	648,289		774,277	774,277	805,627	809,111	20,136	2,090.38	2,106.13	15.75	12,140	14,108	1,968	620	1,017	12,482	12,758
	Nov	-153	-1,183	655,453		779,242	779,242	814,075	817,558	75	2,091.14	2,106.88	15.74	12,232	14,205	1,973	73	119	47	48
	Dec	-286	-1,566	668,673		790,776	790,776	829,093	832,576	71	2,092.53	2,108.21	15.68	12,402	14,377	1,975	50	83	44	45
	Jan	-366	-1,305	666,421		787,136	787,136	828,936	832,419	12,155	2,092.29	2,108.19	15.90	12,373	14,375	2,002	137	229	7,555	7,723
	Feb	-350	-5,358	772,180		887,308	887,308	932,591	936,075	6,227	2,102.75	2,116.75	14.00	13,675	15,512	1,837	8	12	3,927	4,003
	Mar	0	-3,319	810,905		922,702	922,702	971,469	971,469	1,151	2,106.29	2,119.45	13.16	14,129	15,882	1,753	301	440	729	742
	Apr	0	-7,342	864,696		968,712	968,712	1,017,479	1,017,479	23,826	2,110.96	2,122.80	11.84	14,738	16,349	1,611	415	557	15,196	15,441
	May	-630	-11,609	866,536		958,385	958,385	1,007,152	1,007,152	49,830	2,111.12	2,122.67	10.95	14,759	16,246	1,487	698	865	31,787	32,262
	Jun	-93	-5,170	793,965		879,779	879,779	928,546	932,029	73,538	2,104.76	2,116.44	11.68	13,932	15,469	1,538	972	1,246	46,504	47,252
	Jul	-155	-6,337	715,979		794,210	794,210	846,460	849,944	88,821	2,097.34	2,109.71	12.37	12,995	14,573	1,578	794	1,044	55,596	56,552
	Aug	-297	-7,048	630,353		700,492	700,492	756,226	759,709	107,129	2,088.45	2,101.57	13.12	11,907	13,527	1,620	801	1,081	66,227	67,450
	Sep	-266	-3,997	593,263		658,325	658,325	717,542	721,025	72,539	2,084.35	2,097.84	13.48	11,415	13,057	1,643	535	733	44,584	45,435
1977	Oct	-225	-1,896	594,545		656,978	656,978	719,678	723,162	24,017	2,084.50	2,098.05	13.55	11,432	13,084	1,652	321	442	14,765	15,048
	Nov	-192	-1,379	597,111		657,723	657,723	723,906	727,390	316	2,084.78	2,098.46	13.68	11,466	13,136	1,669	216	301	194	198
	Dec	-216	-784	599,928		659,455	659,455	729,122	732,605	127	2,085.10	2,098.97	13.87	11,504	13,199	1,695	121	172	78	80
	Jan	-293	-1,230	609,360		667,486	667,486	740,636	744,119	0	2,086.15	2,100.09	13.94	11,630	13,339	1,709	-147	-210	0	0
	Feb	-225	-985	598,632		655,983	655,983	732,616	736,099	0	2,084.96	2,099.31	14.36	11,487	13,242	1,755	251	367	0	0

Water Year/	Month	Cibecue Change in Flow (af)	Cumulative Change in Flow (af)	Historic Reservoir (af)	Historic Spill (af)	w/o CAP Trial 1 Revised Roosevelt (af)	w/o CAP Final Revised Roosevelt (af)	w/ CAP Trial 1 Revised Roosevelt (af)	w/ CAP Final Revised by WMAT Roosevelt (af)	Salt R. Below SMD (af)	Roosevelt Elevation Historic (ft)	Roosevelt Elevation Revised (ft)	Roosevelt Elevation Change (ft)	Roosevelt Surface Area Historic (ac)	Roosevelt Surface Area Revised (ac)	Roosevelt Surface Area Change (ac)	Roosevelt Evaporation Net (in x 100)	Roosevelt Evaporation Change (af)	Roosevelt Hydropower Historic mwh	Roosevelt Hydropower Revised mwh
	Mar	-211	-1,631	581,888		637,241	637,241	717,358	720,841	28,104	2,083.06	2,097.82	14.76	11,261	13,055	1,794	345	516	17,242	17,603
	Apr	179	-5,440	538,016		587,413	587,413	671,013	674,496	68,818	2,077.95	2,093.13	15.18	10,658	12,476	1,818	560	848	41,914	42,823
	May	-80	-9,268	479,161		518,442	518,442	605,526	609,009	77,134	2,070.73	2,086.11	15.38	9,820	11,625	1,805	825	1,241	46,495	47,527
	Jun	-29	-4,585	359,549		393,004	393,004	483,570	487,054	113,278	2,054.72	2,071.72	17.00	8,009	9,934	1,925	1,072	1,719	66,703	68,379
	Jul	-172	-4,961	236,178		262,953	262,953	357,003	360,486	127,123	2,036.22	2,054.86	18.63	5,984	8,024	2,040	999	1,698	72,809	74,870
	Aug	-174	-7,422	142,337		159,992	159,992	257,525	261,008	119,288	2,020.71	2,040.12	19.41	4,329	6,405	2,076	707	1,223	66,712	68,726
	Sep	-194	-4,009	89,442		101,864	101,864	202,881	206,364	65,335	2,011.39	2,031.43	20.04	3,351	5,469	2,118	448	790	36,008	37,148
1978	Oct	-61	-2,860	103,898		112,670	112,670	217,170	220,654	25,561	2,013.98	2,033.75	19.77	3,622	5,717	2,095	378	659	14,145	14,585
	Nov	-59	-1,402	114,624		121,336	121,336	229,319	232,802	120	2,015.88	2,035.69	19.81	3,821	5,926	2,105	230	404	67	69
	Dec	-100	-841	124,880		130,346	130,346	241,813	245,296	28	2,017.68	2,037.66	19.98	4,010	6,139	2,129	130	230	16	16
	Jan	-245	-2,196	153,400		156,441	156,441	271,391	274,874	0	2,022.61	2,042.25	19.65	4,529	6,637	2,107	-149	-261	0	0
	Feb	-977	-10,244	289,110		282,168	282,168	400,602	404,085	59	2,044.42	2,060.90	16.48	6,873	8,700	1,827	-32	-49	34	35
	Mar	-369	-33,020	1,220,296		1,180,384	1,180,384	1,302,300	1,302,300	60,265	2,135.61	2,139.98	4.37	18,240	18,933	693	-350	-202	39,729	39,958
	Apr	-939	-1,530	1,325,363		1,284,123	1,284,123	1,406,039	1,406,039	66,325	2,141.13	2,144.93	3.80	19,122	19,759	637	507	269	44,042	44,261
	May	-317	-15,358	1,300,846		1,243,979	1,243,979	1,365,895	1,365,895	93,304	2,139.90	2,143.08	3.18	18,921	19,446	524	727	318	61,857	62,115
	Jun	-83	-6,040	1,213,572		1,150,347	1,150,347	1,272,264	1,272,264	101,972	2,135.23	2,138.43	3.19	18,181	18,684	502	1,015	425	67,189	67,473
	Jul	-302	-6,545	1,123,808		1,053,613	1,053,613	1,175,530	1,175,530	104,154	2,129.90	2,133.04	3.14	17,373	17,845	472	811	319	68,143	68,428
	Aug	-294	-6,133	1,036,420		959,773	959,773	1,081,690	1,081,690	103,340	2,124.13	2,127.19	3.06	16,537	16,977	439	703	257	67,093	67,368
	Sep	-169	-4,035	952,514		871,574	871,574	993,491	993,491	92,967	2,118.02	2,121.08	3.06	15,685	16,108	422	716	252	59,863	60,111
1979	Oct	-275	-1,261	925,377		842,924	842,924	964,841	964,841	45,158	2,115.91	2,118.95	3.04	15,399	15,813	415	278	96	28,996	29,115
	Nov	-521	-9,659	1,054,360		962,151	962,151	1,084,068	1,084,068	9,207	2,125.37	2,127.35	1.98	16,713	16,999	286	-273	-65	5,987	6,003
	Dec	-925	-17,504	1,235,639	413,831	1,539,823	1,653,043	1,661,739	1,653,043	440,805	2,136.46	2,154.61	18.15	18,373	21,525	3,153	-601	-1,579	160,464	160,464
	Jan	-581	-1,411	1,140,916	537,519	2,096,007	1,653,043	2,096,007	1,653,043	599,354	2,130.96	2,154.61	23.65	17,531	21,525	3,994	-416	-1,383	160,464	160,464
	Feb	0	-174	1,285,846	15,646	1,814,828	1,653,043	1,814,828	1,653,043	82,698	2,139.13	2,154.61	15.48	18,797	21,525	2,728	124	283	54,771	55,885
	Mar	-17	-971	1,308,440	336,524	2,010,907	1,653,043	2,010,907	1,653,043	422,643	2,140.29	2,154.61	14.33	18,984	21,525	2,541	44	93	160,464	160,464
	Apr	0	-718	1,370,502	206,354	1,920,649	1,653,043	1,920,649	1,653,043	288,659	2,143.30	2,154.61	11.32	19,482	21,525	2,043	551	938	160,464	160,464
	May	-49	-14,422	1,380,715	97,175	1,745,070	1,653,043	1,745,070	1,653,043	184,029	2,143.77	2,154.61	10.84	19,562	21,525	1,963	592	969	160,464	160,464
	Jun	-526	-9,602	1,359,772	31,955	1,653,484	1,653,043	1,653,484	1,653,043	120,577	2,142.79	2,154.61	11.82	19,397	21,525	2,128	950	1,685	80,242	81,482
	Jul	-470	-7,101	1,264,272		1,548,757	1,548,757	1,548,757	1,548,757	128,412	2,138.00	2,150.84	12.83	18,616	20,810	2,194	1,004	1,836	84,920	86,354
	Aug	-134	-6,798	1,193,189		1,469,041	1,469,041	1,469,041	1,469,041	127,103	2,134.07	2,147.65	13.58	18,002	20,234	2,232	646	1,201	83,620	85,122
	Sep	-497	-5,017	1,104,875		1,374,509	1,374,509	1,374,509	1,374,509	109,152	2,128.70	2,143.48	14.79	17,196	19,514	2,317	726	1,401	71,300	72,704
1980	Oct	-474	-1,177	1,080,527		1,347,583	1,347,583	1,347,583	1,347,583	59,170	2,127.12	2,142.21	15.10	16,966	19,300	2,335	412	802	38,569	39,346
	Nov	-232	-1,528	1,090,208		1,354,933	1,354,933	1,354,933	1,354,933	405	2,127.75	2,142.56	14.81	17,058	19,359	2,301	180	345	264	270
	Dec	0	-1,184	1,102,476		1,365,672	1,365,672	1,365,672	1,365,672	0	2,128.54	2,143.07	14.53	17,174	19,444	2,270	74	141	0	0
	Jan	-20	-5,828	1,248,324		1,505,551	1,505,551	1,505,551	1,505,551	6,716	2,137.15	2,149.15	12.00	18,481	20,501	2,020	-387	-651	4,436	4,507
	Feb	0	-12,998	1,186,735	1,023,020	2,454,635	1,653,043	2,454,635	1,653,043	1,090,072	2,133.70	2,154.61	20.92	17,945	21,525	3,580	-499	-1,490	160,464	160,464
	Mar	0	-504	1,287,052	11,797	1,766,143	1,653,043	1,766,143	1,653,043	97,916	2,139.20	2,154.61	15.42	18,807	21,525	2,718	171	386	64,855	66,168
	Apr	0	-817	1,354,409	103,212	1,822,409	1,653,043	1,822,409	1,653,043	185,517	2,142.54	2,154.61	12.08	19,355	21,525	2,170	456	824	160,464	160,464
	May	-878	-14,928	1,380,715	85,472	1,749,069	1,653,043	1,749,069	1,653,043	172,326	2,143.77	2,154.61	10.84	19,562	21,525	1,963	682	1,115	114,827	116,452
	Jun	-564	-8,286	1,338,844	37,794	1,639,565	1,653,043	1,639,565	1,653,043	126,416	2,141.79	2,154.61	12.82	19,230	21,525	2,295	932	1,782	84,017	85,428
	Jul	-480	-6,010	1,229,724		1,536,131	1,536,131	1,536,131	1,536,131	159,255	2,136.13	2,150.35	14.22	18,322	20,721	2,399	877	1,753	105,058	107,028
	Aug	-455	-5,747	1,160,255		1,459,162	1,459,162	1,459,162	1,459,162	135,790	2,132.13	2,147.24	15.11	17,707	20,161	2,453	707	1,446	89,106	90,891
	Sep	-490	-5,104	1,094,493		1,386,850	1,386,850	1,386,850	1,386,850	135,870	2,128.03	2,144.06	16.03	17,098	19,610	2,512	506	1,059	88,673	90,568
1981	Oct	-62	-1,502	1,100,557		1,390,353	1,390,353	1,390,353	1,390,353	27,959	2,128.42	2,144.22	15.79	17,156	19,637	2,482	488	1,010	18,256	18,641
	Nov	0	-609	1,110,311		1,398,487	1,398,487	1,398,487	1,398,487	192	2,129.05	2,144.59	15.54	17,247	19,700	2,453	288	590	125	128
	Dec	-40	-665	1,125,095		1,412,017	1,412,017	1,412,017	1,412,017	170	2,129.98	2,145.19	15.21	17,385	19,805	2,419	116	233	111	114
	Jan	0	-710	1,099,918		1,385,897	1,385,897	1,385,897	1,385,897	25,096	2,128.38	2,144.01	15.63	17,150	19,603	2,453	68	138	16,386	16,728
	Feb	-30	-938	1,066,053		1,350,956	1,350,956	1,350,956	1,350,956	41,548	2,126.15	2,142.37	16.22	16,826	19,327	2,501	105	219	27,048	27,634
	Mar	-11	-3,702	1,031,965		1,312,947	1,312,947	1,312,947	1,312,947	81,085	2,123.82	2,140.51	16.69	16,493	19,021	2,527	123	258	52,622	53,800
	Apr	0	-11,854	1,026,933		1,295,804	1,295,804	1,295,804	1,295,804	88,385	2,123.47	2,139.65	16.17	16,443	18,880	2,436	565	1,148	57,332	58,576
	May	-133	-11,446	999,260		1,255,538	1,255,538	1,255,538	1,255,538	70,027	2,121.50	2,137.54	16.04	16,166	18,543	2,377	825	1,634	45,304	46,282
	Jun	-87	-5,584	900,150		1,149,209	1,149,209	1,149,209	1,149,209	103,638	2,113.90	2,131.47	17.57	15,128	17,607	2,479	1,141	2,358	66,363	67,947
	Jul	-476	-6,730	817,214		1,057,185	1,057,185	1,057,185	1,057,185	108,418	2,106.85	2,125.56	18.71	14,201	16,740	2,539	824	1,743	68,759	70,524
	Aug	-498	-6,889	729,920		961,259	961,259	961,259	961,259	110,759	2,098.71	2,118.68	19.97	13,166	15,776	2,610	944	2,053	69,459	71,384
	Sep	-69	-4,717	674,600		899,169	899,169	899,169	902,652	74,040	2,093.14	2,114.10	20.96	12,477	15,155	2,677	698	1,558	46,073	47,424
1982	Oct	-422	-3,231	705,926		925,706	925,706	929,190	932,673	16,561	2,096.34	2,116.49	20.15	12,871	15,476	2,605	370	804	10,351	10,642
	Nov	-326	-1,749	717,682		934,910	934,910	941,877	945,360	324	2,097.51	2,117.47	19.96	13,016	15,610	2,594	84	182	203	209
	Dec	-601	-1,765	734,144		949,425	949,425	959,875	959,875	219	2,099.12	2,118.58	19.46	13,218	15,762	2,544	150	318	138	141
	Jan	-842	-3,108	751,423		963,279	963,279	973,729	973,729	221	2,100.79	2,119.62	18.83	13,427	15,905	2,478	-150	-310	139	143
	Feb	-136	-5,359	860,252		1,067,058	1,067,058	1,077,508	1,077,508	84	2,110.59	2,126.92	16.33	14,689	16,937	2,248	-18	-34	54	55
	Mar	0	-9,051	1,079,739		1,277,529	1,277,529	1,287,979	1,287,979	94	2,127.06	2,139.24	12.18	16,958	18,815	1,857	85	132	61	62
	Apr	0	-12,540	1,178,513		1,363,631	1,363,631	1,374,081	1,374,081	6,811	2,133.22	2,143.47	10.25	17,872	19,510	1,639	608	831	4,476	4,537
	May	-548	-14,166	1,196,439		1,366,560	1,366,560	1,377,010	1,377,010	56,506	2,134.26	2,143.60	9.34	18,031	19,533	1,502	592	741	37,184	37,643
	Jun	-223	-8,000	1,114,834		1,276,214	1,276,214	1,286,664	1,286,664	107,744	2,129.33	2,139.18	9.84	17,290	18,804	1,514	1,051	1,327	70,439	71,362
	Jul	-386	-5,671	1,021,519		1,175,901	1,175,901	1,186,351	1,186,351	108,676	2,123.09	2,133.67	10.58	16,390	17,941	1,552	796	1,029	70,458	71,459
	Aug	-265	-6,436	952,114		1,099,032	1,099,032	1,109,482	1,109,482	103,221	2,117.99	2,128.99	11.00	15,681	17,240	1,559	640	831	66,464	67,452
	Sep	-65	-6,067	904,201		1,044,221	1,044,221	1,054,671	1,054,671	87,056	2,114.22	2,125.39	11.16	15,171	16,716	1,545	462	595	55,770	56,615
1983	Oct	-272	-1,453	901,053		1,039,026	1,039,026	1,049,476	1,049,476	23,166	2,113.97	2,125.03	11.06	15,137	16,665	1,528	501	637	14,835	15,058
	Nov	-605	-1,885	927,383		1,062,833	1,062,833	1,073,283	1,073,283	352	2,116.07	2,126.64	10.57	15,420	16,896	1,476	-75	-92	226	229
	Dec	-143	-4,302	1,102,429		1,233,669	1,233,669	1,244,119	1,244,119	15,011	2,128.54	2,136.92	8.38	17,173	18,445	1,272	-164	-174	9,803	9,913
	Jan	0	-4,162	1,140,163		1,267,415	1,267,415	1,277,865	1,277,865	56,314	2,130.91	2,138.72	7.81	17,524	18,731	1,206	-34	-34	36,893	37,276
	Feb	0	-4,135	1,160,726	166,910	1,450,786	1,617,696	1,461,236	1,628,146	233,962	2,132.16	2,153.75	21.59	17,712	21,358	3,647	-25	-74	160,731	160,731
	Mar	-1	-1,001	1,288,548	240,583	1,985,175	1,653,043	1,995,625	1,653,043	326,702	2,139.27	2,154.61	15.34	18,820	21,525	2,706	-257	-580	160,464	160,464
	Apr	0	-726	1,299,151	175,491	1,838,991	1,653,043	1,838,991	1,653,043	257,795	2,139.82	2,154.61	14.80	18,907	21,525	2,618	463	1,010	160,464	160,464
	May	-712	-13,062	1,332,064	79,026	1,750,910	1,653,043	1,750,910	1,653,043	165,880	2,141.46	2,154.61	13.15	19,176	21,525	2,349	844	1,653	110,197	112,096
	Jun	-609	-10,235	1,302,239		1,611,330	1,611,330	1,611,330	1,611,330	99,000	2,139.97	2,153.15	13.18	18,933	21,244	2,311	981	1,890	65,640	66,775
	Jul	-445	-8,017	1,238,052		1,537,236	1,537,236	1,537,236	1,537,236	91,856	2,136.59	2,150.39	13.80	18,393	20,729	2,335	809	1,575	60,633	61,736
	Aug	-463	-8,729	1,187,542		1,476,422	1,476,422	1,476,422	1,476,422	87,958	2,133.74	2,147.96	14.22	17,952	20,289	2,337	575	1,119	57,842	58,930
	Sep	-365	-8,940	1,178,184		1,457,005	1,457,005	1,457,005	1,457,005	61,328	2,133.20	2,147.15	13.95	17,869	20,145	2,276	493	935	40,300	41,045
1984	Oct	-27	-3,648	1,091,215	405,265	1,770,718	1,653,043	1,770,718	1,653,043	438,316	2,127.82	2,154.61	26.80	17,067	21,525	4,458	195	726	160,464	160,464
	Nov	-12	-697	1,093,899		1,654,304	1,653,043	1,654,304	1,653,043	8,952	2,127.99	2,154.61	26.62	17,093	21,525	4,432	93	344	5,842	6,050
	Dec	-8	-633	1,164,463		1,722,629	1,653,043	1,722,629	1,653,043	60,642	2,132.38	2,154.61	22.23	17,745	21,525	3,780	-19	-61	39,807	40,979
	Jan	0	-371	1,153,576		1,641,846	1,641,846	1,641,846	1,641,846	101,434	2,131.73	2,154.23	22.50	17,647	21,450	3,804	141	448	66,526	68,512
	Feb	0	-440	1,137,421		1,624,804	1,624,804	1,624,804	1,624,804	42,748	2,130.74	2,153.63	22.89	17,499	21,336	3,837	291	931	28,000	28,851
	Mar	0	-754	1,119,618		1,605,315	1,605,315	1,605,315	1,605,315	41,100	2,129.63	2,152.94	23.30	17,334	21,203	3,869	531	1,711	26,881	27,714
	Apr	-37	-1,135	1,143,071		1,625,923	1,625,923	1,625,923	1,625,923	29,116	2,131.09	2,153.67	22.58	17,551	21,343	3,792	570	1,801	19,080	19,652

						w/o CAP		w/ CAP			Roosevelt										
		Cibecue	Cumulative			Trial 1	Final	Trial 1	Final	Salt R.											
		Change in	Change in	Historic	Historic	Revised	Revised	Revised:ed	by WMAT	Below	Elevation			Surface Area			Evaporation			Hydropower	
Water		Flow	Flow	Reservoir	Spill	Roosevelt	Roosevelt	Roosevelt	Roosevelt	SMD	Historic	Revised	Change	Historic	Revised	Change	Net	Change		Historic	Revised
Year/	Month	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(ft)	(ft)	(ft)	(ac)	(ac)	(ac)	(in x 100)	(af)		mwh	mwh
	May	-217	-12,274	1,130,675		1,599,452	1,599,452	1,599,452	1,599,452	47,554	2,130.33	2,152.72	22.40	17,437	21,163	3,726	868	2,695		31,131	32,057
	Jun	-123	-4,732	1,054,340		1,515,689	1,515,689	1,515,689	1,515,689	88,345	2,125.36	2,149.55	24.19	16,713	20,575	3,862	1,100	3,540		57,452	59,311
	Jul	-58	-5,753	1,017,724		1,469,780	1,469,780	1,469,780	1,469,780	60,437	2,122.82	2,147.68	24.86	16,352	20,240	3,888	728	2,358		39,169	40,477
	Aug	-634	-11,371	989,100		1,427,427	1,427,427	1,427,427	1,427,427	79,356	2,120.76	2,145.87	25.12	16,063	19,922	3,859	617	1,985		51,288	53,022
	Sep	-395	-6,272	978,664		1,408,734	1,408,734	1,408,734	1,408,734	79,901	2,119.99	2,145.05	25.06	15,956	19,779	3,823	362	1,155		51,587	53,329
1985	Oct	-317	-6,443	1,044,933		1,467,406	1,467,406	1,467,406	1,467,406	12,516	2,124.72	2,147.58	22.86	16,621	20,222	3,601	279	837		8,132	8,381
	Nov	0	-2,508	1,077,386		1,496,514	1,496,514	1,496,514	1,496,514	928	2,126.91	2,148.78	21.87	16,935	20,436	3,500	29	85		605	623
	Dec	-24	-8,919	1,243,930	188,305	1,842,360	1,653,043	1,842,360	1,653,043	215,279	2,136.91	2,154.61	17.70	18,444	21,525	3,082	-335	-861		160,464	160,464
	Jan	0	-362	1,236,870	147,825	1,794,307	1,653,043	1,794,307	1,653,043	209,660	2,136.53	2,154.61	18.09	18,383	21,525	3,142	-28	-74		160,464	160,464
	Feb	0	-422	1,267,754	71,371	1,754,950	1,653,043	1,754,950	1,653,043	138,423	2,138.19	2,154.61	16.42	18,646	21,525	2,879	117	280		91,563	93,541
	Mar	0	-742	1,301,895	249,588	1,935,750	1,653,043	1,935,750	1,653,043	335,707	2,139.96	2,154.61	14.66	18,930	21,525	2,595	240	520		160,464	160,464
	Apr	0	-917	1,335,002	70,465	1,755,178	1,653,043	1,755,178	1,653,043	152,769	2,141.60	2,154.61	13.01	19,199	21,525	2,326	488	946		101,507	103,236
	May	-947	-16,259	1,331,203	56,077	1,688,116	1,653,043	1,688,116	1,653,043	142,931	2,141.42	2,154.61	13.20	19,169	21,525	2,356	795	1,562		94,947	96,588
	Jun	-585	-9,324	1,256,414	16,543	1,583,912	1,600,455	1,583,912	1,600,455	105,165	2,137.59	2,152.76	15.17	18,550	21,170	2,620	1,034	2,258		69,509	70,897
	Jul	-582	-7,271	1,175,732		1,510,244	1,510,244	1,510,244	1,510,244	105,185	2,133.05	2,149.33	16.28	17,847	20,535	2,689	985	2,206		69,107	70,597
	Aug	-220	-7,389	1,099,113		1,424,030	1,424,030	1,424,030	1,424,030	108,279	2,128.33	2,145.73	17.40	17,142	19,896	2,754	851	1,954		70,695	72,334
	Sep	-297	-6,606	1,061,016		1,377,373	1,377,373	1,377,373	1,377,373	74,867	2,125.82	2,143.62	17.80	16,778	19,536	2,758	364	837		48,717	49,876
1986	Oct	0	-3,031	1,091,215		1,403,704	1,403,704	1,403,704	1,403,704	16,024	2,127.82	2,144.82	17.00	17,067	19,741	2,673	188	418		10,455	10,692
	Nov	-32	-2,150	1,133,233		1,443,153	1,443,153	1,443,153	1,443,153	347	2,130.49	2,146.56	16.07	17,460	20,041	2,581	-146	-313		227	232
	Dec	0	-1,837	1,113,086		1,421,483	1,421,483	1,421,483	1,421,483	85,875	2,129.22	2,145.61	16.39	17,273	19,877	2,604	118	257		56,134	57,359
	Jan	0	-1,202	1,102,113		1,409,051	1,409,051	1,409,051	1,409,051	31,605	2,128.52	2,145.06	16.54	17,170	19,782	2,611	170	370		20,640	21,095
	Feb	-36	-5,372	1,188,033		1,489,229	1,489,229	1,489,229	1,489,229	282	2,133.77	2,148.49	14.71	17,956	20,383	2,426	-69	-140		186	189
	Mar	0	-743	1,322,727		1,623,319	1,623,319	1,623,319	1,623,319	35,280	2,141.00	2,153.58	12.58	19,100	21,326	2,225	127	236		23,423	23,809
	Apr	0	-3,390	1,321,689		1,618,656	1,618,656	1,618,656	1,618,656	108,021	2,140.95	2,153.41	12.46	19,092	21,294	2,202	615	1,128		71,713	72,884
	May	-484	-10,951	1,263,355		1,548,242	1,548,242	1,548,242	1,548,242	91,400	2,137.96	2,150.82	12.86	18,609	20,807	2,198	828	1,517		60,440	61,463
	Jun	-367	-5,869	1,175,731		1,453,233	1,453,233	1,453,233	1,453,233	102,269	2,133.05	2,146.99	13.93	17,847	20,117	2,270	973	1,840		67,191	68,431
	Jul	-622	-8,714	1,101,006		1,367,954	1,367,954	1,367,954	1,367,954	99,929	2,128.45	2,143.18	14.73	17,160	19,462	2,302	854	1,639		65,253	66,534
	Aug	-523	-7,703	1,021,971		1,279,577	1,279,577	1,279,577	1,279,577	99,949	2,123.12	2,138.81	15.69	16,394	18,745	2,351	813	1,593		64,803	66,167
	Sep	-410	-7,467	1,003,808		1,252,354	1,252,354	1,252,354	1,252,354	62,782	2,121.83	2,137.37	15.54	16,212	18,515	2,304	605	1,161		40,635	41,484
1987	Oct	-443	-4,598	1,030,820		1,273,607	1,273,607	1,273,607	1,273,607	1,127	2,123.74	2,138.50	14.75	16,482	18,695	2,213	281	518		731	746
	Nov	-640	-6,065	1,083,500		1,319,704	1,319,704	1,319,704	1,319,704	415	2,127.31	2,140.85	13.54	16,994	19,076	2,082	59	103		270	275
	Dec	25	-4,688	1,138,386		1,369,800	1,369,800	1,369,800	1,369,800	467	2,130.80	2,143.27	12.46	17,508	19,477	1,969	76	125		306	311
	Jan	0	-1,899	1,137,901		1,367,291	1,367,291	1,367,291	1,367,291	43,509	2,130.77	2,143.15	12.37	17,503	19,457	1,953	47	77		28,499	28,968
	Feb	4	-3,595	1,154,060		1,379,778	1,379,778	1,379,778	1,379,778	38,071	2,131.76	2,143.73	11.97	17,651	19,555	1,904	-67	-106		24,970	25,367
	Mar	0	-2,115	1,260,814		1,484,524	1,484,524	1,484,524	1,484,524	70,910	2,137.82	2,148.29	10.47	18,587	20,348	1,761	339	497		46,882	47,529
	Apr	0	-796	1,327,222		1,549,639	1,549,639	1,549,639	1,549,639	106,573	2,141.22	2,150.87	9.65	19,137	20,816	1,680	660	924		70,777	71,672
	May	-507	-16,994	1,317,372		1,521,870	1,521,870	1,521,870	1,521,870	94,653	2,140.73	2,149.79	9.06	19,057	20,619	1,562	646	841		62,820	63,566
	Jun	-307	-7,411	1,236,870		1,433,116	1,433,116	1,433,116	1,433,116	103,499	2,136.53	2,146.12	9.59	18,383	19,965	1,582	963	1,270		68,312	69,176
	Jul	-275	-6,438	1,142,259		1,330,798	1,330,798	1,330,798	1,330,798	101,337	2,131.04	2,141.40	10.36	17,543	19,166	1,622	1,159	1,566		66,402	67,315
	Aug	-592	-9,801	1,076,605		1,253,777	1,253,777	1,253,777	1,253,777	100,266	2,126.86	2,137.44	10.59	16,928	18,528	1,600	654	872		65,335	66,258
	Sep	-283	-4,069	1,036,021		1,208,251	1,208,251	1,208,251	1,208,251	74,665	2,124.11	2,134.93	10.83	16,533	18,135	1,602	722	963		48,474	49,177
1988	Oct	-311	-2,136	1,040,921		1,210,052	1,210,052	1,210,052	1,210,052	2,973	2,124.44	2,135.03	10.59	16,582	18,151	1,569	432	565		1,931	1,958
	Nov	-610	-3,557	1,068,479		1,233,488	1,233,488	1,233,488	1,233,488	628	2,126.32	2,136.34	10.03	16,850	18,354	1,504	-3	-4		409	414
	Dec	-538	-2,076	1,081,151		1,244,088	1,244,088	1,244,088	1,244,088	567	2,127.16	2,136.92	9.76	16,971	18,445	1,474	-5	-6		370	375
	Jan	-140	-2,175	1,131,151		1,291,919	1,291,919	1,291,919	1,291,919	664	2,130.36	2,139.45	9.09	17,441	18,848	1,406	-66	-78		435	440
	Feb	0	-4,571	1,208,683		1,364,957	1,364,957	1,364,957	1,364,957	31,047	2,134.96	2,143.04	8.08	18,139	19,438	1,300	158	171		20,449	20,668
	Mar	0	-3,846	1,192,151		1,344,409	1,344,409	1,344,409	1,344,409	91,420	2,134.01	2,142.06	8.05	17,993	19,275	1,282	529	566		60,139	60,779
	Apr	-41	-1,360	1,259,967		1,410,299	1,410,299	1,410,299	1,410,299	42,727	2,137.78	2,145.12	7.34	18,580	19,791	1,211	446	450		28,247	28,520
	May	-114	-10,361	1,262,504		1,402,025	1,402,025	1,402,025	1,402,025	69,504	2,137.91	2,144.75	6.83	18,602	19,728	1,126	855	803		45,958	46,371
	Jun	-265	-6,869	1,179,003		1,310,851	1,310,851	1,310,851	1,310,851	102,408	2,133.25	2,140.41	7.16	17,876	19,003	1,127	898	843		67,300	67,938
	Jul	-427	-7,325	1,090,894		1,214,575	1,214,575	1,214,575	1,214,575	107,208	2,127.80	2,135.29	7.49	17,064	18,190	1,126	804	754		69,946	70,645
	Aug	-254	-10,694	1,066,460		1,178,693	1,178,693	1,178,693	1,178,693	99,413	2,126.18	2,133.23	7.05	16,830	17,873	1,043	631	548		64,720	65,330
	Sep	-128	-8,573	1,098,950		1,202,061	1,202,061	1,202,061	1,202,061	80,814	2,128.32	2,134.58	6.26	17,141	18,080	940	698	547		52,762	53,202
1989	Oct	-470	-2,111	1,110,377		1,210,830	1,210,830	1,210,830	1,210,830	23,285	2,129.05	2,135.08	6.03	17,248	18,157	909	404	306		15,218	15,340
	Nov	237	-941	1,115,949		1,215,155	1,215,155	1,215,155	1,215,155	2,512	2,129.40	2,135.32	5.92	17,300	18,195	895	222	166		1,643	1,656
	Dec	-31	-1,249	1,124,903		1,222,694	1,222,694	1,222,694	1,222,694	193	2,129.97	2,135.74	5.78	17,383	18,261	877	165	121		126	127
	Jan	-16	-1,529	1,143,390		1,239,530	1,239,530	1,239,530	1,239,530	1,700	2,131.11	2,136.67	5.56	17,554	18,406	852	-24	-17		1,114	1,122
	Feb	0	-1,477	1,150,489		1,245,169	1,245,169	1,245,169	1,245,169	0	2,131.54	2,136.98	5.44	17,619	18,454	836	235	164		0	0
	Mar	0	-636	1,154,710		1,248,591	1,248,591	1,248,591	1,248,591	63,405	2,131.80	2,137.17	5.37	17,657	18,483	826	246	169		41,588	41,884
	Apr	-475	-7,848	1,098,792		1,184,656	1,184,656	1,184,656	1,184,656	91,122	2,128.31	2,133.58	5.27	17,139	17,926	787	659	432		59,491	59,909
	May	-148	-7,750	996,431		1,074,113	1,074,113	1,074,113	1,074,113	117,185	2,121.29	2,126.69	5.40	16,137	16,904	767	904	578		75,792	76,343
	Jun	-111	-4,674	871,931		944,361	944,361	944,361	947,844	126,289	2,111.57	2,117.66	6.09	14,818	15,636	818	965	658		80,612	81,281
	Jul	-146	-6,211	754,367		819,927	819,927	823,411	826,894	129,523	2,101.07	2,107.71	6.64	13,463	14,312	850	845	598		81,492	82,240
	Aug	-207	-5,620	720,777		780,120	780,120	787,086	790,570	113,040	2,097.81	2,104.45	6.63	13,054	13,892	838	808	564		70,801	71,454
	Sep	-201	-4,343	708,486		762,921	762,921	773,371	776,854	75,133	2,096.59	2,103.18	6.59	12,903	13,731	828	835	576		46,979	47,410
1990	Oct	-154	-1,290	702,948		755,517	755,517	769,450	772,934	16,154	2,096.04	2,102.82	6.78	12,834	13,684	851	408	289		10,093	10,188
	Nov	-164	-425	677,025		728,880	728,880	746,297	749,780	100	2,093.39	2,100.63	7.24	12,508	13,408	899	273	205		62	63
	Dec	-161	-1,128	661,615		712,137	712,137	733,037	736,521	4,273	2,091.79	2,099.35	7.56	12,312	13,247	935	135	105		2,654	2,682
	Jan	-227	-1,426	668,464		717,456	717,456	741,839	745,322	0	2,092.51	2,100.20	7.70	12,399	13,354	955	96	76		0	0
	Feb	-230	-1,382	677,286		724,819	724,819	752,686	756,169	3,387	2,093.42	2,101.24	7.82	12,511	13,484	973	114	93		2,108	2,131
	Mar	-194	-4,012	661,230		704,658	704,658	736,008	739,492	3,263	2,091.75	2,099.64	7.89	12,307	13,283	976	249	202		2,026	2,049
	Apr	-132	-9,963	635,408		668,671	668,671	703,505	706,988	41,935	2,089.00	2,096.44	7.44	11,973	12,884	911	485	368		25,944	26,216
	May	-42	-7,683	576,765		601,977	601,977	640,294	643,777	63,654	2,082.48	2,089.90	7.42	11,192	12,082	890	835	620		39,020	39,431
	Jun	9	-5,428	468,150		487,315	487,315	529,115	532,598	93,363	2,069.33	2,077.30	7.97	9,659	10,582	923	1,088	837		56,164	56,811
	Jul	-232	-7,471	410,238		421,094	421,094	466,378	469,861	80,219	2,061.73	2,069.55	7.82	8,794	9,684	890	771	572		47,726	48,272
	Aug	-257	-6,455	398,919		402,749	402,749	451,515	454,999	59,465	2,060.20	2,067.64	7.45	8,621	9,466	844	615	433		35,299	35,685
	Sep	-320	-5,724	406,401		404,074	404,074	456,324	459,807	28,144	2,061.21	2,068.26	7.05	8,736	9,537	801	598	399		16,731	16,904
1991	Oct	-199	-2,528	416,222		410,968	410,968	466,701	470,185	18,696	2,062.54	2,069.59	7.06	8,885	9,689	804	499	334		11,136	11,251
	Nov	-347	-2,438	428,196		420,170	420,170	479,386	482,870	756	2,064.13	2,071.20	7.06	9,066	9,873	807	140	94		451	456
	Dec	-382	-6,756	460,205		445,329	445,329	508,029	511,512	407	2,068.32	2,074.75	6.44	9,542	10,285	742	-148	-91		244	247
	Jan	-1,332	-11,640	575,926		549,501	549,501	615,684	619,168	264	2,082.38	2,087.23	4.85	11,180	11,760	579	108	52		162	163
	Feb	-1,266	-8,480	586,099		551,142	551,142	620,809	624,292	9,917	2,083.54	2,087.79	4.25	11,318	11,827	509	245	104		6,088	6,125
	Mar	-531	-24,168	1,113,563		1,054,334	1,054,334	1,127,484	1,127,484	61,477	2,129.25	2,130.13	0.88	17,278	17,407	129	-325	-35		40,187	40,234
	Apr	-870	-20,353	1,294,534		1,214,986	1,214,986	1,288,136	1,288,136	78,247	2,139.58	2,139.25	-0.33	18,869	18,816	-53	627	-28		51,853	51,831
	May	-706	-19,402	1,287,515		1,188,593	1,188,593	1,261,743	1,261,743	87,633	2,139.22	2,137.87	-1.35	18,811	18,595	-216	826	-149		58,046	57,943
	Jun	-260	-7,379	1,203,374		1,097,221	1,097,221	1,170,371	1,170,371	109,212	2,134.66	2,132.74	-1.92	18,092	17,799	-293	806	-197		71,905	71,722

						w/o CAP		w/ CAP			Roosevelt										
		Cibecue	Cumulative			Trial 1	Final	Trial 1	Final	Salt R.											
		Change in	Change in	Historic	Historic	Revised	Revised	Revised:ed	by WMAT	Below		Elevation			Surface Area			Evaporation		Hydropower	
Water		Flow	Flow	Reservoir	Spill	Roosevelt	Roosevelt	Roosevelt	Roosevelt	SMD	Historic	Revised	Change	Historic	Revised	Change	Net	Change	Historic	Revised
Year/	Month	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(af)	(ft)	(ft)	(ft)	(ac)	(ac)	(ac)	(in x 100)	(af)	mwh	mwh
	Jul	-122	-6,219	1,094,052		981,877	981,877	1,055,027	1,055,027	120,041	2,128.00	2,125.41	-2.59	17,094	16,719	-375	1,025	-320	78,340	78,069
	Aug	-171	-4,888	1,008,476		891,733	891,733	964,883	964,883	111,255	2,122.16	2,118.96	-3.20	16,259	15,814	-445	598	-222	72,040	71,730
	Sep	-347	-6,651	964,451		841,279	841,279	914,429	917,912	70,989	2,118.93	2,115.32	-3.60	15,809	15,319	-490	508	-208	45,768	45,545
1992	Oct	-241	-1,362	949,192		824,866	824,866	901,499	904,983	53,195	2,117.76	2,114.29	-3.48	15,650	15,180	-471	490	-192	34,242	34,081
	Nov	-391	-2,827	957,255		830,294	830,294	910,410	913,894	1,133	2,118.38	2,115.00	-3.38	15,735	15,276	-459	128	-49	730	727
	Dec	-510	-3,032	989,850		859,906	859,906	943,506	946,989	23,262	2,120.81	2,117.60	-3.22	16,070	15,627	-443	-137	50	15,036	14,971
	Jan	0	-2,526	987,907		855,387	855,387	942,470	945,953	91,689	2,120.67	2,117.52	-3.15	16,051	15,616	-434	-5	2	59,252	59,001
	Feb	0	-6,595	1,018,176		879,060	879,060	969,626	969,626	140,789	2,122.85	2,119.31	-3.54	16,356	15,863	-493	7	-3	91,249	90,816
	Mar	-14	-1,189	1,094,369		954,066	954,066	1,044,633	1,044,633	202,674	2,128.02	2,124.70	-3.32	17,097	16,618	-479	-271	108	169,688	169,688
	Apr	0	-3,184	1,116,108		972,513	972,513	1,063,079	1,063,079	181,589	2,129.41	2,125.95	-3.46	17,302	16,798	-504	473	-199	169,301	169,301
	May	-88	-13,512	1,045,241		888,332	888,332	978,899	978,899	175,024	2,124.74	2,120.01	-4.74	16,624	15,958	-665	450	-249	113,726	113,005
	Jun	-414	-8,418	964,745		799,668	799,668	890,234	893,718	138,151	2,118.95	2,113.37	-5.57	15,813	15,058	-755	762	-480	89,070	88,400
	Jul	-493	-6,710	887,651		716,343	716,343	810,393	813,876	102,392	2,112.88	2,106.55	-6.32	14,991	14,163	-828	616	-425	65,474	64,911
	Aug	-443	-14,570	926,223		740,770	740,770	838,304	841,787	136,247	2,115.98	2,109.01	-6.97	15,408	14,481	-926	381	-294	87,491	86,664
	Sep	-454	-5,216	909,359		718,984	718,984	820,001	823,484	98,657	2,114.64	2,107.41	-7.23	15,227	14,273	-954	648	-515	63,238	62,617
1993	Oct	-62	-1,688	918,710		727,162	727,162	831,662	835,145	1,525	2,115.39	2,108.43	-6.96	15,328	14,406	-921	556	-427	978	969
	Nov	-55	-1,124	903,338		711,092	711,092	819,075	822,559	6,142	2,114.15	2,107.32	-6.83	15,162	14,263	-899	359	-269	3,934	3,898
	Dec	-24	-3,402	1,011,042		815,662	815,662	927,129	930,612	28,732	2,122.35	2,116.32	-6.02	16,285	15,454	-830	-350	242	18,609	18,459
	Jan	55	-582	1,151,135	1,180,907	2,135,839	1,653,043	2,250,789	1,653,043	1,242,742	2,131.58	2,154.61	23.03	17,625	21,525	3,901	-916	-2,977	160,464	160,464
	Feb	0	-296	1,187,867	587,027	2,279,482	1,653,043	2,279,482	1,653,043	654,079	2,133.76	2,154.61	20.85	17,955	21,525	3,570	-277	-825	160,464	160,464
	Mar	0	-584	1,128,268		1,593,686	1,593,686	1,593,686	1,593,686	439,206	2,130.18	2,152.51	22.34	17,415	21,123	3,709	332	1,026	161,111	161,111
	Apr	0	-3,245	1,148,878		1,610,024	1,610,024	1,610,024	1,610,024	278,940	2,131.45	2,153.10	21.66	17,604	21,235	3,631	575	1,741	160,929	160,929
	May	-52	-14,622	999,290		1,444,072	1,444,072	1,444,072	1,444,072	275,131	2,121.50	2,146.60	25.10	16,166	20,048	3,882	1,061	3,433	162,936	162,936
	Jun	-622	-10,034	982,683		1,413,998	1,413,998	1,413,998	1,413,998	55,693	2,120.29	2,145.28	25.00	15,997	19,820	3,823	1,161	3,697	35,972	37,183
	Jul	-470	-6,808	974,961		1,395,771	1,395,771	1,395,771	1,395,771	82,541	2,119.71	2,144.46	24.75	15,918	19,679	3,761	986	3,090	53,272	55,050
	Aug	-260	-6,261	905,055		1,316,514	1,316,514	1,316,514	1,316,514	106,536	2,114.29	2,140.69	26.40	15,181	19,050	3,869	514	1,658	68,255	70,703
	Sep	-69	-7,095	858,010		1,260,716	1,260,716	1,260,716	1,260,716	75,928	2,110.40	2,137.82	27.42	14,664	18,586	3,923	771	2,522	48,388	50,200
1994	Oct	-157	-3,636	834,037		1,230,585	1,230,585	1,230,585	1,230,585	42,237	2,108.33	2,136.18	27.85	14,394	18,329	3,935	367	1,203	26,841	27,865
	Nov	-29	-1,967	850,582		1,243,959	1,243,959	1,243,959	1,243,959	5,359	2,109.76	2,136.91	27.15	14,580	18,444	3,863	-54	-173	3,412	3,539
	Dec	0	-834	874,893		1,267,610	1,267,610	1,267,610	1,267,610	191	2,111.82	2,138.18	26.36	14,851	18,645	3,793	185	585	122	127
	Jan	-31	-446	881,968		1,273,654	1,273,654	1,273,654	1,273,654	12,574	2,112.41	2,138.50	26.09	14,929	18,695	3,766	157	493	8,035	8,321
	Feb	-28	-1,398	897,336		1,287,130	1,287,130	1,287,130	1,287,130	36,415	2,113.67	2,139.20	25.53	15,097	18,808	3,711	14	42	23,311	24,120
	Mar	0	-5,798	943,505		1,327,459	1,327,459	1,327,459	1,327,459	48,499	2,117.33	2,141.23	23.91	15,591	19,139	3,548	238	702	31,200	32,209
	Apr	0	-5,069	930,423		1,308,605	1,308,605	1,308,605	1,308,605	64,077	2,116.31	2,140.29	23.99	15,452	18,985	3,533	457	1,344	41,165	42,503
	May	-658	-10,939	938,551		1,304,450	1,304,450	1,304,450	1,304,450	32,317	2,116.94	2,140.09	23.14	15,538	18,951	3,413	561	1,596	20,780	21,430
	Jun	-280	-5,935	874,893		1,233,260	1,233,260	1,233,260	1,233,260	74,960	2,111.82	2,136.33	24.51	14,851	18,352	3,501	939	2,739	47,864	49,463
	Jul	-205	-5,467	770,384		1,120,546	1,120,546	1,120,546	1,120,546	111,393	2,102.58	2,129.69	27.11	13,654	17,343	3,689	855	2,627	70,232	72,860
	Aug	-374	-6,435	670,149		1,011,249	1,011,249	1,011,249	1,011,249	115,936	2,092.68	2,122.36	29.68	12,421	16,287	3,866	779	2,509	72,097	75,092
	Sep	-326	-9,163	646,535		975,963	975,963	975,963	975,963	63,514	2,090.19	2,119.79	29.59	12,117	15,928	3,811	570	1,809	39,360	40,996
1995	Oct	-337	-1,675	622,155		948,099	948,099	948,099	951,583	39,243	2,087.56	2,117.95	30.39	11,799	15,675	3,877	383	1,237	24,229	25,267
	Nov	-678	-10,570	692,183		1,006,320	1,006,320	1,009,804	1,009,804	498	2,094.95	2,122.26	27.31	12,699	16,272	3,573	64	191	310	322
	Dec	-917	-6,123	768,220		1,076,043	1,076,043	1,079,526	1,079,526	19,067	2,102.38	2,127.05	24.67	13,628	16,956	3,328	-164	-454	12,018	12,428
	Jan	170	-6,002	1,009,678		1,311,952	1,311,952	1,315,435	1,315,435	34,188	2,122.25	2,140.64	18.39	16,271	19,041	2,770	-386	-892	22,140	22,687
	Feb	0	-1,925	1,123,619	75,221	1,500,080	1,575,301	1,503,564	1,578,784	142,272	2,129.89	2,151.97	22.08	17,372	21,020	3,649	114	347	93,082	95,815
	Mar	-2	-780	1,194,789	250,064	1,895,409	1,653,043	1,898,892	1,653,043	336,183	2,134.16	2,154.61	20.45	18,016	21,525	3,509	94	275	160,464	160,464
	Apr	0	-919	1,182,602		1,639,662	1,639,662	1,639,662	1,639,662	83,642	2,133.46	2,154.15	20.69	17,908	21,436	3,528	457	1,342	54,983	56,489
	May	-568	-11,330	1,235,023		1,679,412	1,653,043	1,679,412	1,653,043	17,649	2,136.43	2,154.61	18.19	18,367	21,525	3,158	606	1,595	11,647	11,927
	Jun	-419	-8,585	1,144,843		1,552,684	1,552,684	1,552,684	1,552,684	126,408	2,131.20	2,150.99	19.79	17,567	20,838	3,271	939	2,559	82,847	85,024
	Jul	-251	-6,362	1,025,157		1,424,077	1,424,077	1,424,077	1,424,077	120,339	2,123.35	2,145.73	22.38	16,426	19,897	3,471	804	2,324	78,047	80,390
	Aug	-450	-6,369	938,551		1,328,778	1,328,778	1,328,778	1,328,778	106,732	2,116.94	2,141.30	24.35	15,538	19,149	3,611	638	1,921	68,627	70,889
	Sep	-449	-4,781	868,122		1,251,648	1,251,648	1,251,648	1,251,648	86,996	2,111.25	2,137.33	26.08	14,776	18,509	3,733	577	1,794	55,507	57,481
1996	Oct	-397	-1,182	847,660		1,228,209	1,228,209	1,228,209	1,228,209	39,961	2,109.51	2,136.05	26.54	14,548	18,308	3,761	498	1,562	25,436	26,359
	Nov	-488	-1,811	858,430		1,235,606	1,235,606	1,235,606	1,235,606	470	2,110.43	2,136.46	26.02	14,668	18,372	3,704	186	573	300	311
	Dec	-496	-1,500	868,263		1,243,366	1,243,366	1,243,366	1,243,366	522	2,111.26	2,136.88	25.62	14,778	18,439	3,661	216	657	333	345
	Jan	-160	-1,272	857,028		1,230,201	1,230,201	1,230,201	1,230,201	30,975	2,110.31	2,136.16	25.85	14,653	18,326	3,673	228	697	19,738	20,434
	Feb	-30	-1,589	841,397		1,212,285	1,212,285	1,212,285	1,212,285	34,715	2,108.97	2,135.16	26.19	14,477	18,170	3,693	166	512	22,081	22,872
	Mar	0	-1,818	796,959		1,165,517	1,165,517	1,165,517	1,165,517	37,564	2,105.03	2,132.45	27.42	13,967	17,755	3,788	450	1,419	23,763	24,660
	Apr	-265	-4,928	752,092		1,114,302	1,114,302	1,114,302	1,114,302	60,588	2,100.85	2,129.30	28.45	13,435	17,285	3,849	645	2,068	38,109	39,609
	May	-111	-6,071	672,220		1,026,291	1,026,291	1,026,291	1,026,291	81,480	2,092.90	2,123.43	30.53	12,447	16,437	3,990	875	2,909	50,686	52,850
	Jun	-86	-4,424	565,167		911,905	911,905	911,905	915,388	108,160	2,081.14	2,115.12	33.98	11,033	15,292	4,259	937	3,326	66,176	69,374
	Jul	-463	-5,469	486,320		824,263	824,263	827,746	831,229	100,702	2,071.63	2,108.09	36.46	9,923	14,362	4,438	799	2,953	60,780	63,974
	Aug	-87	-5,741	389,220		718,469	718,469	725,436	728,919	109,549	2,058.87	2,098.61	39.75	8,472	13,154	4,682	729	2,846	64,902	68,691
	Sep	-485	-8,631	395,622		713,394	713,394	723,844	727,328	37,839	2,059.75	2,098.46	38.71	8,571	13,135	4,564	253	962	22,447	23,721
1997	Oct	-202	-1,997	388,479		703,292	703,292	717,226	720,709	28,933	2,058.76	2,097.81	39.04	8,461	13,054	4,593	413	1,582	17,139	18,122
	Nov	-240	-2,838	397,507		707,901	707,901	725,317	728,801	448	2,060.00	2,098.60	38.60	8,600	13,153	4,553	244	924	266	281
	Dec	-202	-2,999	398,450		704,920	704,920	725,820	729,303	24,585	2,060.13	2,098.65	38.52	8,614	13,159	4,545	213	807	14,592	15,416
	Jan	-406	-5,265	438,896		739,294	739,294	763,678	767,161	12,452	2,065.55	2,102.28	36.73	9,226	13,616	4,389	-189	-689	7,450	7,848
	Feb	-560	-4,785	480,758		777,060	777,060	804,927	808,410	457	2,070.93	2,106.06	35.13	9,843	14,100	4,257	33	118	276	290
	Mar	0	-15,325	619,306		900,165	900,165	931,515	934,999	15,764	2,087.25	2,116.67	29.42	11,761	15,501	3,740	466	1,453	9,729	10,132
	Apr	0	-6,950	654,056		926,513	926,513	961,346	961,346	24,778	2,090.99	2,118.69	27.70	12,214	15,777	3,563	547	1,624	15,372	15,970
	May	-124	-13,828	607,470		864,475	864,475	899,309	902,792	80,233	2,085.94	2,114.11	28.17	11,605	15,156	3,552	838	2,481	49,424	51,391
	Jun	-108	-5,100	516,119		765,544	765,544	803,860	807,344	99,810	2,075.31	2,105.97	30.65	10,350	14,087	3,737	909	2,831	60,561	63,223
	Jul	-111	-5,469	401,089		642,213	642,213	684,013	687,497	116,332	2,060.49	2,094.47	33.98	8,655	12,640	3,986	1,061	3,525	69,086	72,525
	Aug	-497	-6,334	311,900		543,166	543,166	588,449	591,933	99,453	2,047.83	2,084.20	36.38	7,246	11,397	4,150	797	2,756	57,966	61,113
	Sep	-532	-5,825	269,764		492,449	492,449	541,216	544,699	62,514	2,041.47	2,078.74	37.28	6,552	10,751	4,199	786	2,751	36,090	38,118
1998	Oct	-282	-1,655	263,045		481,324	481,324	533,574	537,058	30,560	2,040.43	2,077.84	37.40	6,439	10,645	4,206	423	1,484	17,615	18,610
	Nov	-155	-1,463	274,406		489,739	489,739	545,472	548,956	506	2,042.18	2,079.25	37.07	6,629	10,810	4,181	221	770	293	309
	Dec	-259	-2,187	289,830		502,207	502,207	561,423	564,907	9,124	2,044.53	2,081.11	36.58	6,885	11,030	4,145	-100	-346	5,292	5,582
	Jan	-281	-2,592	305,920		516,051	516,051	578,751	582,234	6,532	2,046.94	2,083.10	36.16	7,149	11,266	4,117	42	143	3,802	4,007
	Feb	-672	-4,733	399,485		604,740	604,740	670,924	674,407	773	2,060.27	2,093.12	32.85	8,630	12,475	3,845	-274	-878	459	481
	Mar	-929	-19,273	617,694		804,554	804,554	874,221	877,704	501	2,087.07	2,112.05	24.98	11,740	14,882	3,142	81	212	309	320
	Apr	-121	-14,937	827,138		998,849	998,849	1,071,999	1,071,999	10,790	2,107.73	2,126.55	18.82	14,315	16,884	2,569	396	848	6,851	7,028
	May	-598	-23,531	878,576		1,025,908	1,025,908	1,099,058	1,099,058	55,861	2,112.13	2,128.32	16.20	14,892	17,142	2,250	720	1,350	35,684	36,471
	Jun	-229	-8,634	870,158		1,007,506	1,007,506	1,080,656	1,080,656	29,639	2,111.42	2,127.12	15.70	14,799	16,967	2,168	949	1,714	18,915	19,320
	Jul	-232	-6,054	791,572		921,153	921,153	994,303	994,303	97,299	2,104.54	2,121.14	16.60	13,904	16,116	2,212	706	1,301	61,512	62,917
	Aug	-523	-6,718	696,266		817,828	817,828	890,978	894,462	107,942	2,095.36	2,113.43	18.07	12,750	15,066	2,315	632	1,219	67,378	69,076

Water Year/	Month	Cibecue Change in Flow (af)	Cumulative Change in Flow (af)	Historic Reservoir (af)	Historic Spill (af)	w/o CAP Trial 1 Revised Roosevelt (af)	w/o CAP Final Revised Roosevelt (af)	w/ CAP Trial 1 Revised (af)	w/ CAP Final Revised by WMAT (af)	Salt R. Below SMD (af)	Roosevelt Elevation Historic (ft)	Roosevelt Elevation Revised (ft)	Roosevelt Elevation Change (ft)	Roosevelt Surface Area Historic (ac)	Roosevelt Surface Area Revised (ac)	Roosevelt Surface Area Change (ac)	Roosevelt Evaporation Net (in x 100)	Roosevelt Evaporation Change (af)	Hydropower Historic mwh	Hydropower Revised mwh
	Sep	-235	-4,585	635,151		750,910	750,910	827,543	831,026	80,808	2,088.97	2,108.07	19.10	11,969	14,359	2,390	469	935	49,992	51,334
1999	Oct	-279	-2,183	638,914		751,555	751,555	831,672	835,155	3,834	2,089.38	2,108.43	19.05	12,018	14,406	2,388	428	851	2,373	2,437
	Nov	-367	-2,397	650,201		759,595	759,595	843,195	846,678	417	2,090.58	2,109.43	18.84	12,165	14,537	2,372	129	256	258	265
	Dec	-360	-2,346	659,634		766,426	766,426	853,509	856,992	4,617	2,091.58	2,110.31	18.73	12,286	14,652	2,366	148	291	2,867	2,942
	Jan	-248	-1,334	657,647		762,813	762,813	853,380	856,863	13,425	2,091.37	2,110.30	18.93	12,261	14,651	2,390	194	385	8,333	8,554
	Feb	-208	-1,043	665,376		769,114	769,114	863,164	866,648	472	2,092.18	2,111.13	18.95	12,360	14,760	2,400	312	624	293	301
	Mar	-203	-1,485	650,201		751,831	751,831	849,364	852,847	23,959	2,090.58	2,109.96	19.37	12,165	14,606	2,441	507	1,032	14,856	15,259
	Apr	-612	-6,520	653,671		747,749	747,749	848,765	852,249	18,806	2,090.95	2,109.91	18.95	12,210	14,599	2,390	347	691	11,666	11,977
	May	-158	-8,799	618,146		702,735	702,735	807,235	810,718	44,377	2,087.12	2,106.27	19.15	11,746	14,126	2,380	854	1,694	27,382	28,122
	Jun	-113	-4,581	553,824		632,137	632,137	740,121	743,604	69,893	2,079.82	2,100.04	20.22	10,877	13,333	2,456	1,070	2,190	42,682	43,912
	Jul	-325	-6,927	515,274		584,470	584,470	695,937	699,420	65,483	2,075.21	2,095.68	20.47	10,338	12,790	2,452	551	1,127	39,727	40,893
	Aug	-7	-17,573	519,877		570,374	570,374	685,324	688,808	64,718	2,075.77	2,094.60	18.83	10,403	12,657	2,254	433	814	39,294	40,355
	Sep	-78	-5,988	494,550		538,245	538,245	656,678	660,162	59,213	2,072.66	2,091.64	18.98	10,042	12,293	2,251	482	904	35,792	36,770
2000	Oct	-142	-1,322	473,144		514,613	514,613	636,529	640,013	43,570	2,069.97	2,089.49	19.53	9,732	12,033	2,301	526	1,009	26,234	26,974
	Nov	-152	-623	476,593		516,429	516,429	641,829	645,313	1,733	2,070.41	2,090.06	19.66	9,782	12,102	2,319	312	602	1,044	1,074
	Dec	-174	-832	479,943		518,345	518,345	647,229	650,712	454	2,070.83	2,090.64	19.81	9,831	12,171	2,340	236	460	274	282
	Jan	-203	-654	487,218		524,507	524,507	656,874	660,357	457	2,071.74	2,091.66	19.91	9,936	12,295	2,359	207	406	276	284
	Feb	-192	-621	495,906		532,168	532,168	668,018	671,501	476	2,072.83	2,092.82	19.99	10,062	12,438	2,376	279	553	288	296
	Mar	191	-816	500,911		535,804	535,804	675,137	678,621	491	2,073.45	2,093.56	20.11	10,133	12,528	2,395	197	393	297	306
	Apr	-199	-6,177	483,925		512,248	512,248	655,065	658,548	20,332	2,071.33	2,091.47	20.14	9,889	12,272	2,384	686	1,363	12,266	12,623
	May	-82	-7,406	429,383		448,938	448,938	595,238	598,721	58,831	2,064.29	2,084.97	20.67	9,084	11,488	2,404	980	1,963	35,132	36,190
	Jun	-200	-4,737	373,994		386,849	386,849	536,632	540,115	57,236	2,056.76	2,078.20	21.44	8,236	10,687	2,452	1,093	2,234	33,804	34,872
	Jul	-55	-5,941	313,907		318,587	318,587	471,854	475,337	70,252	2,048.12	2,070.25	22.12	7,279	9,764	2,485	1,118	2,314	40,964	42,316
	Aug	-201	-4,961	281,277		278,682	278,682	435,432	438,915	45,694	2,043.23	2,065.55	22.32	6,743	9,227	2,483	444	918	26,450	27,337
	Sep	-123	-4,650	276,932		268,769	268,769	429,002	432,485	12,226	2,042.57	2,064.70	22.13	6,671	9,131	2,459	776	1,591	7,070	7,306
2001	Oct	-341	-5,320	368,990		353,916	353,916	517,632	521,116	21,868	2,056.06	2,075.92	19.87	8,157	10,421	2,263	-70	-132	12,902	13,280
	Nov	-683	-8,868	368,395		344,585	344,585	511,785	515,268	9,229	2,055.97	2,075.21	19.24	8,148	10,338	2,190	122	222	5,445	5,599
	Dec	-313	-2,991	420,340		393,317	393,317	564,001	567,484	458	2,063.09	2,081.41	18.32	8,948	11,065	2,117	201	354	273	280
	Jan	-275	-2,657	437,016		406,983	406,983	581,149	584,633	540	2,065.30	2,083.38	18.08	9,198	11,298	2,100	-52	-91	323	331
	Feb	-564	-5,025	462,612		427,645	427,645	605,295	608,778	562	2,068.62	2,086.09	17.46	9,578	11,622	2,044	122	209	338	346
	Mar	-1,217	-15,159	548,503		498,169	498,169	679,302	682,785	434	2,079.19	2,093.99	14.79	10,804	12,581	1,777	263	390	265	270
	Apr	-26	-15,250	647,626		581,652	581,652	766,268	769,752	4,076	2,090.31	2,102.52	12.21	12,131	13,647	1,515	360	454	2,526	2,570
	May	-234	-14,501	631,513		550,583	550,583	738,683	742,167	64,093	2,088.58	2,099.90	11.32	11,922	13,316	1,394	787	914	39,629	40,260
	Jun	-78	-5,449	564,555		477,262	477,262	668,845	672,329	72,556	2,081.07	2,092.91	11.84	11,025	12,448	1,423	1,065	1,263	44,388	45,135
	Jul	-212	-5,599	504,265		410,110	410,110	605,177	608,660	70,882	2,073.86	2,086.07	12.21	10,181	11,620	1,439	614	736	42,919	43,672
	Aug	-391	-6,314	461,615		360,410	360,410	558,960	562,444	62,685	2,068.50	2,080.82	12.33	9,563	10,996	1,433	703	839	37,663	38,335
	Sep	-158	-4,342	399,101		292,714	292,714	494,748	498,231	82,395	2,060.22	2,073.12	12.90	8,624	10,095	1,471	790	968	48,912	49,836
2002	Oct	-143	-959	383,147		274,834	274,834	480,350	483,834	24,449	2,058.03	2,071.32	13.29	8,378	9,887	1,509	406	511	14,467	14,750
	Nov	-83	-49	388,261		279,387	279,387	488,387	491,871	484	2,058.73	2,072.33	13.59	8,457	10,004	1,546	323	416	287	293
	Dec	-145	-671	397,291		287,330	287,330	499,814	503,297	3,361	2,059.97	2,073.74	13.77	8,596	10,167	1,571	87	114	1,994	2,035
	Jan	-105	-147	380,600		270,378	270,378	486,345	489,828	19,093	2,057.68	2,072.07	14.40	8,338	9,974	1,636	167	227	11,292	11,531
	Feb	-91	-122	379,722		269,151	269,151	488,601	492,084	12,373	2,057.55	2,072.35	14.80	8,325	10,007	1,682	327	458	7,316	7,476
	Mar	-112	-1,151	368,311		256,131	256,131	479,064	482,548	6,817	2,055.96	2,071.16	15.20	8,147	9,869	1,722	503	722	4,022	4,112
	Apr	-81	-5,339	348,887		230,647	230,647	457,063	460,547	25,315	2,053.21	2,068.36	15.15	7,841	9,547	1,707	678	964	14,874	15,207
	May	-27	-6,752	306,833		180,877	180,877	410,777	414,260	42,822	2,047.07	2,062.27	15.20	7,164	8,855	1,692	933	1,315	24,930	25,497
	Jun	-11	-4,770	239,387		107,346	107,346	340,729	344,212	70,845	2,036.73	2,052.54	15.81	6,038	7,766	1,728	1,128	1,624	40,608	41,582
	Jul	-27	-4,836	196,367		57,866	57,866	294,733	298,216	50,970	2,029.80	2,045.79	15.99	5,294	7,023	1,729	1,125	1,621	28,908	29,617
	Aug	-551	-6,137	171,035		24,775	24,775	265,125	268,609	43,012	2,025.59	2,041.29	15.70	4,846	6,532	1,686	951	1,336	24,237	24,825
	Sep	-199	-6,068	186,608		32,944	32,944	276,777	280,261	15,997	2,028.19	2,043.08	14.89	5,122	6,726	1,604	618	826	9,050	9,258
2003	Oct	-102	-411	192,310		37,409	37,409	284,726	288,209	11,867	2,029.13	2,044.28	15.15	5,223	6,858	1,635	476	649	6,724	6,880
	Nov	-142	-1,883	196,754		39,321	39,321	290,121	293,604	1,399	2,029.86	2,045.10	15.23	5,301	6,947	1,646	254	349	794	812
	Dec	-119	-1,225	208,281		49,274	49,274	303,558	307,041	531	2,031.75	2,047.11	15.36	5,502	7,167	1,665	93	128	302	309
	Jan	-108	-1,987	222,433		61,311	61,311	319,078	322,561	528	2,034.03	2,049.40	15.36	5,748	7,419	1,672	184	256	301	308
	Feb	-307	-4,809	245,616		79,429	79,429	340,679	344,162	501	2,037.71	2,052.53	14.82	6,144	7,766	1,621	-129	-175	288	294
	Mar	-970	-22,042	417,170		229,115	229,115	493,849	497,332	512	2,062.66	2,073.01	10.34	8,900	10,082	1,182	279	275	305	309
	Apr	-291	-19,233	483,719		276,156	276,156	544,373	547,856	416	2,071.31	2,079.12	7.81	9,886	10,795	909	599	454	251	254
	May	-104	-15,547	504,054		280,490	280,490	552,190	555,673	10,311	2,073.84	2,080.04	6.20	10,178	10,903	725	834	503	6,243	6,299
	Jun	-22	-5,671	474,970		245,232	245,232	520,415	523,899	26,369	2,070.20	2,076.26	6.06	9,759	10,460	701	1,024	598	15,882	16,021
	Jul	-205	-6,829	448,142		210,977	210,977	489,644	493,127	27,420	2,066.76	2,072.48	5.73	9,364	10,022	658	979	536	16,433	16,570
	Aug	-576	-7,048	435,097		190,348	190,348	472,498	475,981	26,978	2,065.05	2,070.33	5.28	9,170	9,773	604	727	366	16,128	16,252
	Sep	-296	-10,107	468,319		213,097	213,097	498,730	502,213	20,271	2,069.36	2,073.61	4.25	9,662	10,152	490	520	212	12,195	12,270
		-3,164	-69,704										9.18			1,349		5,887	459,534	464,362