RECLAMATION

Managing Water in the West

Draft Environmental Assessment
Fort McDowell Exchange Agreement

U.S. Department of the Interior
Bureau of Reclamation-LC
Phoenix Area Office
Cooperating Agency:
Fort McDowell Yavapai Nation

November 2012

DRAFT ENVIRONMENTAL ASSESSMENT
FORT MCDOWELL EXCHANGE AGREEMENT

PREPARED FOR

U.S. BUREAU OF RECLAMATION

PREPARED BY

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COOPERATING AGENCY:

FORT MCDOWELL YAVAPAI NATION

Mission Statements

The mission of the **Department of the Interior** is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

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The mission of the **Bureau of Reclamation** is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

ABBREVIATIONS AND ACRONYMS

ADA	Arizona Department of Administration
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AF	acre-feet
AFY	acre-feet/year
AGFD	Arizona Game and Fish Department
amsl	above mean sea level
Bartlett	Bartlett Dam and Reservoir
CAP	Central Arizona Project
CAP Contract	1994 CAP water delivery contract between the U.S. and FMYN, as amended
CAWCD	Central Arizona Water Conservation District
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CSIF	CAP/SRP Interconnection Facility
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973, as amended
Exchange Agreement	Proposed CAP Exchange Agreement between FMYN and SRP
FMIC	Fort McDowell Indian Community
FMYN	Fort McDowell Yavapai Nation
FONSI	Finding of No Significant Impact
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
gpm	gallons per minute
groundwater	All underground water except for water in the saturated floodplain Holocene alluvium
Horseshoe	Horseshoe Dam and Reservoir
ITAs	Indian Trust Assets
Listed species	Federally listed species under the ESA, as amended
MAG	Maricopa Association of Governments
MBTA	Migratory Bird Treaty Act
M&I	municipal and industrial
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System

NRHP	National Register of Historic Places
Other Water	Up to 13,933 AFY of CAP water as provided by Section 11 of the Settlement Agreement (plus return flow credits for a total diversion right of 14,666 AFY)
P.L.	Public Law
Phoenix	City of Phoenix
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
ppm	parts per million
Proposed Action	Reclamation approval of Exchange Agreement
Reservation	Fort McDowell Indian Reservation
Reclamation	Bureau of Reclamation
SHPO	State Historic Preservation Office
Settlement Agreement	1993 Fort McDowell Indian Community Water Settlement Agreement
Settlement Act	1990 Fort McDowell Indian Community Water Settlement Act, as amended
SRP	Salt River Project
SRPMIC	Salt River Pima-Maricopa Indian Community
SRPSIM	Salt River Project reservoir simulation model
STD	Standard
$\mu g/m^3$	micrograms per cubic meter
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

Unit Conversion Guide

For the reader's convenience, the following table has been included to serve as a guide in converting measurements found in this document from U.S. to metric measurements.

CONVERSION OF U.S. TO METRIC MEASUREMENTS	
U.S. Measurement	**Metric Measurement**
Distance	
1 inch	2.54 centimeters
1 foot	0.31 meter
1 mile	1.61 kilometers
Area	
1 square foot	0.09 square meter
1 acre	0.41 hectare
Volume	
1 acre-foot	1,233.5 cubic meters
Flow	
1 cubic foot per second	0.028317 cubic meters per second 28.317 liters per second

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FORT MCDOWELL EXCHANGE AGREEMENT

1.0 Purpose and Need

1.1 Introduction and Background

The Fort McDowell Indian Reservation (Reservation) was created by Executive Order (EO) on September 15, 1903 (U.S. Senate Report 101-479). The Reservation is in Maricopa County, approximately 20 miles northeast of Phoenix, Arizona. The Reservation is currently home to about 950 Tribal members of the Fort McDowell Yavapai Nation (FMYN) and several hundred community members, with approximately 300 Tribal members living off-Reservation. FMYN was formerly known as the Fort McDowell Indian Community or FMIC. The Reservation is a small parcel of land that is part of a much larger ancestral territory of the once nomadic Yavapai people, who hunted and gathered food in much of Arizona.

The Fort McDowell Indian Community Water Rights Settlement Act (Settlement Act or Act) was signed into law on November 28, 1990 (Public Law [P.L.] 101-628, Title IV; 104 Stat. 4480). The Settlement Act provides for settlement of FMYN's water rights claims against federal, state, and local entities for the annual diversion of up to 36,350 acre-feet (AF) per year (AFY) to FMYN.[1]

On January 15, 1993, the following entities entered into the Fort McDowell Indian Community Water Settlement Agreement (Settlement Agreement): FMYN; the United States of America; the State of Arizona; Salt River Project Agricultural Improvement and Power District/Salt River Valley Water Users' Association (collectively SRP); the Roosevelt Water Conservation District; the Central Arizona Water Conservation District (CAWCD); the Arizona cities of Phoenix, Scottsdale, Glendale, Mesa, Tempe, and Chandler; and the Town of Gilbert. The Settlement Agreement became effective on February 7, 1994.[2]

The Settlement Agreement, among other things, provides for FMYN's use of "Other Water" (pursuant to Paragraphs 6.1.5 and 11.0 in the Settlement Agreement and pursuant to FMYN's Central Arizona Project [CAP] Water Delivery Contract No. 3-07-30-W0308, dated December 11, 1980, as amended) through an exchange with SRP, subject to additional agreements. The proposed Exchange Agreement between FMYN and SRP (Exchange Agreement) would provide the means for FMYN to use its CAP water (i.e., "Other Water") up to the entitled amount of 13,933 AFY.

FMYN cannot currently take direct delivery of the CAP water because of the Reservation's location upstream of the CAP canal, but can divert water directly from the Verde River or indirectly through shallow FMYN wells along the Verde River, which pump from the saturated floodplain Holocene alluvium that is hydrologically connected to the Verde River (Klopatek,

[1] The Settlement Act is Exhibit 2.1 of the Settlement Agreement, which is available at: http://www.azwater.gov/AzDWR/SurfaceWater/Adjudications/default.htm.

[2] See footnote 1 for the link to the Settlement Agreement. The Settlement became effective with publication of the Statement of Findings, Implementation of the Fort McDowell Indian Community Water Rights Settlement Act of 1990, P.L. 101-628, 94 Federal Register (FR) 2679 (February 7, 1994).

FMYN, pers. comm. 2012). SRP has rights to Verde River water and can take direct delivery of CAP water at its CAP/SRP Interconnection Facility (CSIF). SRP diverts Verde River water at the Granite Reef Diversion Dam, which is near the CSIF (Figure 1). The Exchange Agreement would allow up to 13,933 AFY of FMYN's CAP water to be delivered to SRP and, in exchange, the FMYN would divert a like amount up to 14,666 AFY (13,933 AFY plus return flow credits) of Verde River water, subject to the provisions of Paragraph 7.2.2 of the Settlement Agreement.

The information contained in this environmental assessment (EA) regarding FMYN water use and related resources is presented for background and descriptive purposes only. The terms of the FMYN's water rights, entitlements, and use are established, quantified, and confirmed under federal law through the Settlement Act and Settlement Agreement, and nothing in this EA is intended to suggest that any of those rights or provisions are subject to reconsideration, limitation, or alteration through this EA or review and approval of the Exchange Agreement.

1.2 Purpose and Need

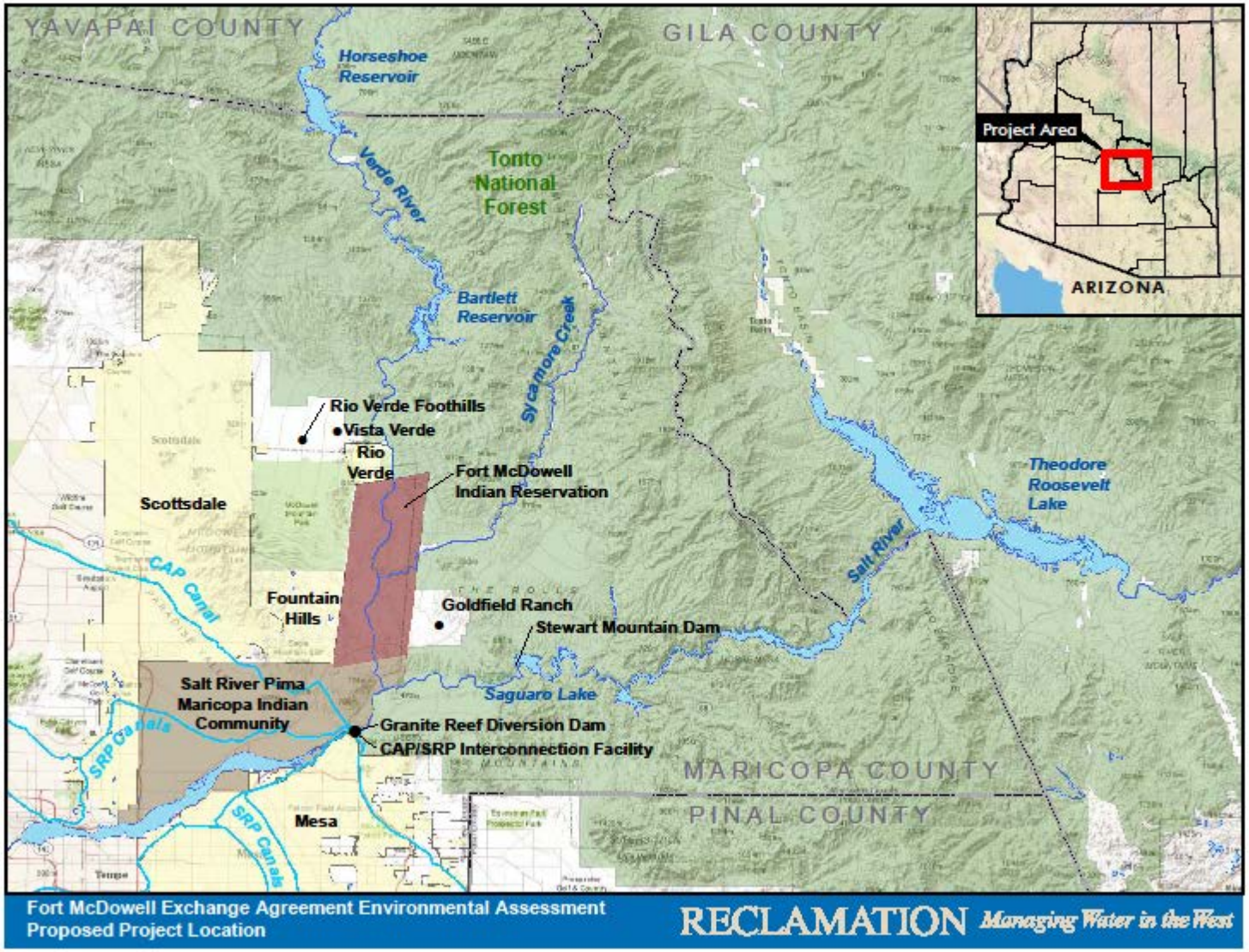
Reclamation

As discussed generally in the previous section, the Settlement Agreement obligates the Bureau of Reclamation (Reclamation) to approve the exchange of Verde River water for FMYN's Other Water subject to an additional agreement (Settlement Act, Section 406(b); Settlement Agreement, Section 11.3). The Settlement Agreement further obligates SRP to enter into an agreement for this exchange (Section 11.3). This is the purpose of the Exchange Agreement, which is the subject of this EA. Section 5.1 of the FMYN CAP Contract requires Reclamation, on behalf of the Department of the Interior, to approve all such agreements. Appendix A is the August 2011 draft of the Exchange Agreement.

Although approval of this exchange is Congressionally mandated and nondiscretionary, prior to taking action on this Exchange Agreement, Reclamation must comply with the National Environmental Policy Act of 1969, as amended (NEPA); Endangered Species Act of 1973 (ESA); National Historic Preservation Act of 1966, as amended (NHPA); and other applicable environmental rules and regulations, including amendments to the Department of the Interior's regulations for implementing NEPA (73 FR 61292; October 15, 2008). FMYN is a cooperating agency on the EA, consistent with NEPA and related requirements including Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] §§ 1501.6 and 1508.5); CEQ Memorandum on Designation of Non-Federal Agencies to be Cooperating Agencies in Implementing the Procedural Requirements of NEPA (CEQ 1998); Department of the Interior's regulations for implementing NEPA (43 CFR §§ 46.225 and 46.230); and Department of the Interior Policy on State, Local and Tribal Governments as Cooperating or Joint Lead Agencies Under NEPA (Departmental Manual 516, Environmental Quality).

As part of its decision-making process, Reclamation must evaluate the potential environmental effects of the Exchange Agreement through which FMYN may use all or part of its CAP water, and identify environmental mitigation measures if appropriate or necessary. Based upon the EA and careful consideration of comments received during the public review and comment period, Reclamation will determine whether any mitigation measures or conditions are warranted in conjunction with approval of the Exchange Agreement as proposed. This EA will also assist Reclamation in determining whether or not a Finding of No Significant Impact (FONSI) is appropriate.

Figure 1. Project Location Map.



Fort McDowell Yavapai Nation

The purpose of the Exchange Agreement is to enable FMYN to use part or all of the remaining portion of the CAP water provided under the Settlement Act and Settlement Agreement.[3] In recent years, FMYN has been fully using all of the CAP water that it has available, primarily through short-term leasing agreements (FMYN 2010, 2011a). FMYN also has nearly fully used all of its other sources of water as defined under the Settlement Agreement. In order to continue meeting existing water uses and to provide flexibility for meeting water demands during drought or in the future, FMYN would like to enter into an exchange agreement with SRP, as provided for in the Settlement Agreement.

Current water uses by FMYN are primarily for agriculture, municipal, domestic, commercial, recreation, and other minor municipal and industrial (M&I) purposes.

1.3 Location and Setting

The 40-square-mile Reservation (approximately 24,000 acres) is within Maricopa County about 20 miles northeast of Phoenix. The Reservation landscapes include, but are not limited to, undeveloped range land; desert land; farmland; sacred sites; and community, government, and other developments. The Reservation is bordered by residential development in the Town of Fountain Hills to the southwest, the communities of Rio Verde and Vista Verde to the north, and the Goldfield Ranch development near the southeast corner. Surrounding open areas include McDowell Mountain Regional Park to the northwest and U.S. Forest Service (USFS) land to the north and east. The Salt River Pima-Maricopa Indian Community (SRPMIC) is directly south of the Reservation.

Figure 1 is a map of the Reservation and study area. As part of the Exchange Agreement, Verde River water would potentially be diverted by FMYN through various wells pumping from the saturated floodplain Holocene alluvium or through an existing canal that FMYN presently uses to take delivery of its Verde River water for use within the Reservation. In return, FMYN's CAP water would be delivered by CAWCD to SRP at the CSIF (see locations, Figure 1).

The Verde River bisects the Reservation. The elevation on the Reservation ranges from about 1,840 feet above mean sea level (amsl) in the northeast corner to about 1,340 feet amsl where the Verde River exits the south edge of the Reservation. The Reservation topography includes mountain foothills, alluvial fans, old river terraces on eroded basin fill, and Holocene river terraces and floodplain deposits near the Verde River.

1.4 Public Involvement and Scoping

Scoping is an early and open process to determine the breadth of issues and alternatives to be addressed in a NEPA document. Agency and public scoping for the Exchange Agreement EA began when Reclamation's scoping memorandum was sent on October 18, 2011 to the U.S. Fish and Wildlife Service (FWS); Tonto National Forest; Bureau of Indian Affairs; SRP; Arizona Department of Water Resources (ADWR); Arizona Game and Fish Department (AGFD); Arizona Department of Environmental Quality (ADEQ); Maricopa County; various other federal, state, and local agencies; and nonprofit organizations to solicit input on issues of concern. Scoping notices were also sent to the SRPMIC, Tonto Apache, Camp Verde Yavapai Nation, Yavapai Apache, and Yavapai Prescott tribes. This scoping memorandum also was posted on

[3] FMYN has leased 4,300 AFY of its CAP water to the City of Phoenix (Phoenix) for 100 years.

Reclamation's website on October 18, 2011. The scoping period was defined as October 18, 2011 to November 4, 2011. The scoping letter is in Appendix B.

No public scoping meetings were held for this project. The public, agencies, and Native American tribes traditionally associated with this area are being given an opportunity to review and comment on this EA.

Reclamation received two agency responses during the scoping period. The first comment came from the USFS, Cave Creek District Office, requesting a copy of the draft EA for review. The second response came from the FWS. The FWS provided comments on potential impacts from the water diversion on riparian and aquatic habitat; native fish; bald eagles, flycatchers, yellow-billed cuckoo, and other riparian-dependent birds; mammals, reptiles, and amphibians, and their habitats. These concerns have been addressed in Section 3.3 of this EA.

No tribal or public comments were received during the scoping period.

Three resource areas, Geology, Visual, and Groundwater, are not expected to be affected and are not discussed in detail. These resource areas are discussed in Section 3.9—*Resources Considered But Not Affected*.

1.5 Prior NEPA and ESA Compliance for FMYN Development on the Reservation

In 1992, Reclamation issued FONSI No. LC-92-3 based on the final Environmental Assessment for the FMIC Irrigated Farmland Development Project, which was funded by a Small Reclamation Project loan as provided by the Settlement Act (Reclamation 1992). The project was to develop 1,584 acres of irrigated land in the northwest portion of the Reservation. After consultation with the FWS, Reclamation and FMYN committed to mitigate impacts and to protect and preserve wildlife habitat. After cultural resource investigations were conducted, 227 acres of irrigation development and prime farmlands were preserved from development and an alternate 227 acres were substituted and set aside for farming. However, in 2006, P.L. 109-373 (120 Stat. 2650; November 27, 2006), was passed to finalize the Settlement Agreement, which cancelled the loan repayment obligation of FMYN and resulted in a decision to not develop the alternate 227 acres (U.S. Senate Report 109-284).

2.0 Description of Alternatives

This section describes the formulation and evaluation of alternatives. Information on the alternatives evaluated in detail in this EA is provided. Because of the specific terms of the Settlement Act, only two alternatives are considered in this analysis:

- No Action Alternative
- Proposed Action – Reclamation Approval of Exchange Agreement

2.1 Formulation and Evaluation of Alternatives

The alternatives set forth below are based on the requirement to uphold the legal mandates and terms of the Settlement Act and Settlement Agreement. For the purposes of this NEPA analysis, only two alternatives were considered, including the No Action alternative, because only one action alternative would feasibly address the purpose and need of the Exchange Agreement. The

Proposed Action presents the proposed Reclamation administrative action and explains the rationale for the action.

2.2 No Action Alternative

The No Action Alternative would mean that the exchange of water as specified in the Settlement Agreement would not occur. However, the No Action Alternative would result in a violation of the Settlement Act and Settlement Agreement, which would deprive the FMYN of its legal rights to implement an exchange that would allow FMYN to use water obtained through the Settlement Act.

Because of this, the No Action Alternative would not meet the express purpose and legal requirement for the Exchange Agreement and is presented solely to compare any potential impacts that are anticipated to result from implementation of the Proposed Action.

2.3 Proposed Action (Approval of Exchange Agreement)

The Proposed Action is Reclamation's approval of the Exchange Agreement. The Exchange Agreement is under consideration for the following reasons: 1) The Exchange Agreement is required by the Settlement Agreement; and 2) FMYN wishes to exert its rights pursuant to the Settlement Agreement. The Exchange Agreement would allow FMYN to divert up to 14,666 AFY (including return flow credits) of Verde River water in exchange for delivering up to 13,933 AFY of FMYN's CAP water to SRP.

FMYN uses its water supplies for a variety of purposes, such as agricultural, residential, commercial, and recreational. Although agricultural operations use by far the most water, each use has its associated water demand. Future water needs have not been identified at this time, but it would be reasonable to assume that severe drought; additional municipal, domestic, or recreational development; or other uses would result in the need for FMYN to be able to use its "Other Water." With the Exchange Agreement in place, FMYN would have the flexibility to address drought conditions or meet potential future demands.

2.3.1 Points of Diversion

The need for new points of diversion along the Verde River within Reservation boundaries has not been identified during the development of this EA. It is anticipated that some diversions would occur directly from the river through the existing canal or indirectly through existing FMYN wells, which are close to the river. FMYN has not identified any additional wells or other points of diversion that could or would need to be developed in the future; any future construction activities related to new diversion structures would be subject to all federal and tribal laws and regulations that are applicable at that time.

The delivery of FMYN's Other Water to SRP would occur at the CSIF on the Hayden-Rhodes Aqueduct near Granite Reef Diversion Dam on the Salt River in Section 13, Township 2 North, Range 6 East of the Gila and Salt River Baseline and Meridian. No new construction would be necessary for this delivery because the necessary structures are in place.

3.0 Affected Environment and Environmental Consequences

This section describes the affected environment of the area potentially impacted by the Proposed Action (referred to as the "study area," which varies by resource) and projected environmental consequences for each resource potentially impacted by the Exchange Agreement. Although the

No Action Alternative is not legally viable, a description of the future without the project is provided as a basis for comparing potential impacts of the Proposed Action. In addition, cumulative impacts, if any, are identified. Section 3.9—*Resources Considered But Not Affected* identifies resources not described in detail, summarizing the reasons why they were determined not likely to be affected.

3.1 Background for Cumulative Effects

Potential effects of the Exchange Agreement would occur in the context of other actions--both on and off the Reservation--that have already occurred, are presently occurring, or may occur in the study area in the future. Cumulative effects, or impacts, are the effects on the environment that may result from the incremental effects of the Exchange Agreement when added to the effects of other on- and off-Reservation past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions (see 40 CFR 1508.7). Cumulative effects may result from individually minor actions which, when taken collectively over time, could potentially be considered significant. The geographic study area for analyzing cumulative effects for the Exchange Agreement varies by resource.

3.1.1 Reasonably Foreseeable Actions

"Reasonably foreseeable future actions" are defined as actions that are not speculative—they have been approved, are included in short- to medium-term planning and budget documents prepared by government agencies or other entities, or are likely to occur given trends (Environmental Protection Agency [EPA] 1999).

Potential off-Reservation future actions were identified through public and agency scoping and publicly available information on known projects or actions under consideration. Actions that meet all of the following criteria are considered reasonably foreseeable and are included in the cumulative impacts analysis:

- The potential impacts of the future action would occur within the same geographic area (study area) and during the same time as the potential impacts of the Exchange Agreement.
- The future action may affect the same environmental resources as the Exchange Agreement.
- There is a reasonable expectation the future action would occur; the future action is not speculative.
- There is sufficient information available to define the future action and assess potential cumulative impacts (EPA 1999; CEQ 1997a).

Future actions identified in the study area include various proposals, primarily residential and commercial development on adjacent lands outside the Reservation. The residential and commercial development actions are described as follows.

Fountain Hills

The Town of Fountain Hills is directly west of the Reservation. The *Fountain Hills General Plan 2010* includes information on the town's existing and future proposed land uses. Although the town is landlocked and nearing its expected population build-out, it still anticipates future development to optimize use of the land within the town boundaries (Fountain Hills 2010). The plan encourages residential development that emphasizes the

character of the town, with a variety of housing types and price ranges. The plan also encourages commercial development to increase revenues to the town and to complement existing businesses. Specific planned developments preliminarily approved include more than 1,300 acres of low-density single-family and medium-density multifamily housing. However, specific development plats for this proposed development have not been submitted. Three areas within the town also have been identified as commercial growth areas; however, formal plans have not yet been developed for these areas. CAP water is the main source of water for Fountain Hills' current and future development.

Goldfield Ranch

The *Goldfield Area Plan* (Maricopa County 2007) was developed to address land use on approximately 5,000 acres of unincorporated county land in the Goldfield Ranch area. The area is currently characterized by scattered single-family, very low-density homes in a rural setting. The plan addresses needs for the community and growth areas. Although the plan does not specifically state the number of lots anticipated for residential development, it does encourage densities consistent with the current Rural-190 designation, which represents single-family houses on lots that are no greater than 1 acre, characterized by a lack of urban amenities and infrastructure. The water for the current residences of this area is supplied by exempt wells. Any future planned residential development, such as Goldfield Preserve, will require additional permitting and approvals. Development (e.g., subdivision and commercial) will also require additional water resources and water rights that have either not yet been legally acquired or may be challenged by FMYN and others if the proposed source is derived from the Verde River (Klopatek, FMYN, pers. comm. 2012).

Rio Verde Foothills

The Rio Verde Foothills community is northwest of FMYN in unincorporated Maricopa County. Similar to Goldfield Ranch, much of the Rio Verde Foothills planning area is characterized by low-density single-family homes. Residential developments are in a desert valley and constrained by rugged terrain to the north and south (Maricopa County 2005). Residents of this community favor the current type of land use and discourage commercial development. Exceptions to this are the Rio Verde, Tonto Verde, and Vista Verde communities, which lie within or adjacent to the eastern portion of the Rio Verde Foothills planning area near the Verde River. Although not yet fully developed under the Development Master Plan, the 856-acre development of Verde Vista is planned for 842 lots at an overall density of 0.98 dwelling units per acre (Id.). Adjacent to the southeast corner of the planning area, Rio Verde and Tonto Verde are retirement communities on about 1,400 acres with several golf courses and nearly 1,700 lots, most of which have been developed with single-family homes (Id.). Water for this area comes from the Verde River through CAP exchange agreements with SRP.

Salt River Pima-Maricopa Indian Community (SRPMIC)

SRPMIC is a primarily rural community on 52,600 acres. Land use in the community varies and includes 19,000 acres of natural preserve; 12,000 acres used for a variety of agricultural crops; and the remaining acreage used for other commercial, residential, industrial, and open space. The SRPMIC General Plan (SRPMIC 2006) outlines current and potential future land uses in the community. Although no specific developments are planned, the plan states, "The Community is likely to see development of low- to medium-

density homes/townhomes/apartments, both within the People's Village and at a multifamily site at Dobson and Chaparral. On average, 20 families per year purchase mobile homes and put them in the Community, while 25-30 stick/block homes are built annually." In addition, the SRPMIC Housing Division constructs a new subdivision with 40 to 60 homes every three years. The plan also states, "It is anticipated that 100 to 150 apartments will be built within five years with another phase of 100 apartments within ten years." Information on SRPMIC water resources can be found in the 1988 Salt River Pima-Maricopa Indian Community Settlement Act (P.L. 100-512).

North Mesa

The City of Mesa is south of the Reservation and is separated from it by SRPMIC and portions of the Tonto National Forest. Because of this, only the northern portion of Mesa is being considered under the cumulative impacts scenario. The City of Mesa General Plan (Mesa 2002) describes several growth areas throughout the city; however, Falcon Field is the only area in the northern portion of Mesa. Falcon Field consists of approximately 4,560 acres, including the existing airport. Although the area is not suitable for residential development due to its proximity to the airport, commercial, mixed use, and industrial development would be appropriate. No specific plans have been described for this area, but the general plan states the employment development potential is approximately 30,160 jobs. The city's potable water supply is made up of several sources including the Salt River, groundwater, and CAP.

Timing and the degree to which these planned developments will be built out is uncertain, especially in light of the current economic climate and housing market conditions in the Phoenix area. Moreover, the timing and extent of potential development on the Reservation is not known; therefore, it is not possible to quantify cumulative impacts in a meaningful way with respect to the implementation of the Exchange Agreement. However, cumulative impacts are discussed in a qualitative manner in the analysis of the resource areas identified below, as applicable.

Other reasonably foreseeable actions identified in the study area include grazing by horses and cattle on the Reservation and on surrounding lands. Continued grazing within the study area is a reasonably foreseeable action.

3.2 Water Resources

There would be no immediate (i.e., direct) impacts on water resources from Reclamation's approval of the Exchange Agreement. The water resources area that would potentially experience indirect and/or cumulative impacts is the Verde River from the head of Horseshoe Reservoir to its confluence with the Salt River, and the Salt River from the head of Roosevelt Lake to Granite Reef Diversion Dam. This is because these surface water resources could experience changes due to SRP's adjustment to reservoir and river operations to facilitate the Exchange Agreement.

3.2.1 Affected Environment

Appendix C provides an overview of surface water resources and groundwater resources (that are not affected by this exchange) in the study area, and water use within FMYN and surrounding communities. The following is a summary of the major considerations related to water resources, which are relevant to evaluation of water resource impacts, as well as recreation and biological resource effects:

- SRP operates Horseshoe Dam and Reservoir (Horseshoe) and Bartlett Dam and Reservoir (Bartlett) upstream of the Reservation on the Verde River in conjunction with five other reservoirs (four on the Salt River and one on East Clear Creek), and numerous wells, to provide water to its customers and contractors.
- Monthly and annual flows of the Verde River are highly variable due to reservoir operations and fluctuations in runoff.
- The Settlement Agreement established a minimum release of 100 cfs from Bartlett (regardless of any releases for Verde River downstream water orders) except during extreme drought or an emergency.
- FMYN may store up to 3,000 AFY of its unused Kent Decree entitlement in Bartlett and Horseshoe through February 14, 2019.
- Water use on the Reservation by the FMYN has averaged about 12,000 to 14,000 AFY in recent years.
- Most of FMYN's water use is for irrigating crops.
- Additional water on the Reservation is used for municipal, domestic, commercial, recreation, and other M&I purposes.
- FMYN water diversions for irrigation uses are taken through an existing canal with a diversion point just upstream of the Reservation, pump stations from the canal, and shallow FMYN wells.
- FMYN diversions for M&I uses are taken using shallow FMYN wells along the Verde River within the Reservation.
- The communities surrounding the Reservation primarily depend upon CAP water for their potable water supplies via exchange for Verde River water, or use small amounts of groundwater.

Table 1 provides the minimum, maximum, and average monthly flows for the period 1996 through 2010 for the Verde River gage just downstream of FMYN. The minimum monthly flow measured at this gage is sometimes less than the 100-cfs minimum release from Bartlett required by the Settlement Agreement due to evaporation and consumptive use by riparian vegetation between the upstream gage measuring the release from Bartlett and the gage just downstream from the Reservation.

Table 1. Monthly Flow of the Verde River near Scottsdale (Gage No. 11300), 1996-2010, in cfs.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min	101	89	103	89	66	59	48	57	57	92	217	151
Max	5,921	8,402	2,624	2,475	804	1,553	780	707	345	1,089	996	927
Avg	692	1,009	583	472	283	354	232	181	137	432	449	387

Source: USGS gage data.

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Because the No Action Alternative would result in a violation of the Settlement Act, and would deprive the FMYN of its legal rights and entitlements, the No Action Alternative is presented as a basis for comparison only.

Under the No Action Alternative, there would be no changes to the quantity or quality of either surface or groundwater in the study area resulting from implementation of the proposed Exchange Agreement.

3.2.2.2 Proposed Action

Under the Proposed Action, FMYN would exchange up to 13,933 AFY of CAP water with SRP for FMYN diversions of up to 14,666 AFY of Verde River water. This 5 percent difference accounts for a return flow factor and is pursuant to the Settlement Act and Agreement. FMYN would order up to 14,666 AFY of its CAP water from Reclamation for delivery to SRP under the terms of its amended CAP subcontract (Exhibit 20.1.6 to the Settlement Agreement). The FMYN CAP order would be delivered to SRP at the CSIF (Figure 1); FMYN would then order Verde River exchange water in accordance with the Exchange Agreement (Appendix A).

Once SRP receives FMYN's CAP water deliveries at the CSIF, releases from one or more of the storage reservoirs—which would have occurred to meet SRP's downstream deliveries—would be reduced by a like amount (Ester, SRP, pers. comm. 2011). In other words, up to 13,933 AFY of water historically used by SRP to meet demands below Granite Reef Dam would be supplied by CAP water instead of from the SRP Verde River system. In turn, under the exchange, water would be released from the Verde River reservoirs for diversion by FMYN.

The Verde River water supply varies seasonally as well as annually. As discussed in Appendix C, the overall Verde River water supply varies year to year, from less than 100,000 AFY to almost 1.8 million AFY. The monthly flow of the lower Verde River also varies significantly throughout the year because SRP typically takes the majority of its water supply from the Salt River reservoirs from late spring through early fall, and then switches to take the majority of the water supply from the Verde River reservoirs during the late fall to early spring (Appendix C). As a result, any impacts of the exchange would vary seasonally as well as from year to year. The range of seasonal and annual impacts, if any, is discussed below.

SRP's operations of the reservoirs on the Salt and Verde rivers are complex; it must optimize water and power operations involving highly variable surface water supplies, including CAP, and groundwater pumping while meeting its numerous water delivery obligations. SRP has developed a reservoir simulation model (SRPSIM) to plan and evaluate its long-term operations. To estimate changes in reservoir water levels and changes in flows on the Verde and Salt rivers that could be expected to occur as a result of implementing the Exchange Agreement, Reclamation requested that SRP use the SRPSIM to model what could occur under the Exchange Agreement.

Use of SRPSIM requires making certain assumptions regarding the model inputs. SRPSIM operates on a monthly time-step using actual 1889 through 2010 inflows to the reservoirs on the Salt and Verde rivers and projected water demand at Granite Reef Diversion Dam. The model also incorporates SRP groundwater pumping to satisfy water demands below Granite Reef.

Projected 2030 demand is used in this analysis, which simulates future conditions for SRP and its contractors. It also includes the 100-cfs minimum release from Bartlett that is required by the Settlement Agreement. Although FMYN currently does not have plans to exercise the full amount of the Exchange Agreement, delivery of the entire amount is assumed in order to evaluate the full range of potential impacts that may occur. A seasonal distribution reflecting municipal water use in SRP's water delivery area also is assumed for purposes of analysis because the specific water uses potentially served by the Exchange Agreement are not currently known. For purposes of running the model, based on historical cumulative demand data, FMYN's minimum

monthly water use is assumed to occur in January at 6 percent of annual demand; the maximum is assumed to occur in June and July at 11 percent of annual demand in each month. Converting to flow rates, the range would be about 15 to 27 cfs (about 930 to 1,670 AF/month), depending on the month.

The SRPSIM model runs, which incorporate operations for the proposed exchange, provide estimates of average monthly and annual results for key variables related to flow characteristics and reservoir elevations and volumes. These results are summarized below, which include increases in SRP groundwater pumping to offset any shortages of surface water supply.

- Bartlett average storage contents at the end of September could decline by about 6 percent. September was chosen because it is typically the time of year when lake levels are at the lowest but recreation demand is high.
- There is unlikely to be much effect on maximum Verde River spills from storage (flood flows), which could decline by about 0.3 percent. These changes would be minor and would be well within the natural flow variation in the Verde River.
- Average Bartlett releases are likely to remain about the same
- Average monthly flows in the Verde River below the FMYN diversions could decrease by about 4 percent. These changes would be minor and would be well within the natural flow variation in the Verde River. There could be a minor impact on other entities' storage entitlements in Horseshoe and Bartlett. SRPSIM modeling results indicate average annual deliveries to Phoenix from its Horseshoe storage could decrease by about 0.6 percent, and average annual deliveries to SRPMIC from its Bartlett storage could decrease by about 0.5 percent. These effects were anticipated and accounted for as part of the SRPMIC and FMYN water settlements.
- Average storage contents in the Salt River reservoirs at the end of September could increase by about 0.3 percent.
- The various Phoenix area cities with storage entitlements in the New Conservation Space at Roosevelt, including Phoenix, Chandler, Glendale, Mesa, Scottsdale, and Tempe, would have a minor benefit of about 0.5 percent increase in average deliveries.

Compared to historical gaged flows, the maximum release of 14,666 AFY of exchange water would be a small amount and within the natural annual variability of the total annual flow of the Verde River through and below the Reservation (Appendix C). The entire annual exchange amount represents only about 3.6 percent of the historical average annual flow, and would account for less than 1 percent of the 1.8 million AFY maximum annual flow volume. However, the future annual flow between Bartlett and the FMYN diversion during very dry years would likely increase because SRP would adjust its operations to ensure there would be sufficient supplies to fulfill the Exchange Agreement each year, while also pursuing other reservoir operation objectives. In other words, SRP is likely to maintain more storage in the Verde River reservoirs during droughts to maintain FMYN deliveries under the Exchange Agreement. SRP would accomplish this by using more water from the Salt River reservoirs, CAP exchanges, or through groundwater pumping.

As discussed in Section 3.2.1.1 and Appendix C, under the Settlement Agreement (except in cases of extreme drought or an emergency), SRP must maintain a 100-cfs minimum release from Bartlett as measured at the gage below Bartlett in addition to satisfying water orders by FMYN and others along the lower Verde River. Thus, the flow between Bartlett and the Reservation

would potentially increase during periods of low releases[4] to the extent FMYN orders additional water via the Exchange Agreement.

Downstream of FMYN's proposed diversion of the Exchange Agreement water, the lowest flows during the year likely would be slightly higher than before the post-Settlement Agreement because of return flow resulting from use of the Exchange Agreement water. However, average annual flows below the FMYN diversions could be reduced because some of the water that SRP would normally use from the Verde River to meet its own demands would be used instead by FMYN in exchange for CAP water to meet the SRP demands. However, these changes would be minor and would fall well within the natural range of flow variation in the Verde River.

Reservoir operations adopted as part of the Horseshoe-Bartlett Habitat Conservation Plan have not been incorporated into the SRPSIM; however, the Exchange Agreement would have negligible to minor effects on Horseshoe storage levels. This is because reservoir operations are driven primarily by other storage objectives such as optimizing storage among the SRP reservoirs and maintaining adequate SRP carryover storage for subsequent years in case of low runoff (SRP 2008).

The SRPSIM run results also were examined for the estimated monthly releases from the lowermost dams on the Salt River (Stewart Mountain Dam) and Verde River (Bartlett). The modeling results indicate the following:

- Minimum monthly releases from Bartlett would likely remain the same, primarily due to the requirement to meet the 100-cfs minimum release, or would increase slightly when greater releases are made to deliver exchange water to FMYN (in addition to SRP's other Verde River delivery orders).
- Average monthly releases from Bartlett could range up to 10 percent higher or lower with the Exchange Agreement, depending on SRP demand and Salt River storage conditions, with no clear seasonal pattern.
- Minimum monthly releases from Stewart Mountain would not change.
- Average monthly releases from Stewart Mountain could range up to 10 percent higher or lower with implementation of the proposed Exchange Agreement – lower during the summer and mid-winter months and higher in spring and fall months.

The modeling estimates reported above are based on exchange of the full amount covered by the Exchange Agreement. The modeled effects would be proportionally smaller for lesser amounts of water exchanged in any given time period.

As discussed in Appendix C, the Verde River reservoirs are small in proportion to average annual runoff, which means that large inflows pass through with little change in flow characteristics. Previous studies concluded that conditions on the lower Verde River are such that major changes in reservoir operations do not significantly affect the frequency and duration of inundation and mobilization of the river channel and floodplain surfaces and, thus, there would be little change in the geomorphology of the Verde River channel and floodplain below Horseshoe and Bartlett dams (MEI 2004; FWS 2008a). As a result, there would be little change to riparian vegetation or aquatic habitat from reservoir operation alternatives (Id.). The hydrologic changes as a result of the Exchange Agreement would be of a lesser magnitude than what has been evaluated in the

[4] Periods of low releases on the Verde River are when SRP is using the Salt River to meet most of its demands.

previous studies; therefore, it is anticipated the impact, if any, to the geomorphology of the Verde River channel and floodplain, and related riparian and aquatic habitat, would be minimal.

Water temperatures in the reservoirs and rivers within the study area are not anticipated to be impacted under the Proposed Action because of the small changes in lake levels and stream flows that would result from implementation of the Exchange Agreement.

The impacts of the Exchange Agreement on water resources would be minor due to the following: 1) the small magnitude of hydrologic changes involved, with both slight increases and slight decreases in river flows and lake levels; 2) the annual flow of the Verde River falling within its natural variability; 3) the required maintenance of minimum flow levels; 4) the insignificant effects on the geomorphology of the river channel and floodplain; and 5) little or no change in water temperatures.

3.2.2.3 Climate Change

Global climate models predict that flows of the Salt and Verde rivers will change in the future due to climate change. There is substantial uncertainty about the effect of climate change on runoff, with model results ranging from 50 to 127 percent of the historical annual average (Ellis et al. 2008). Using various assumptions, Ellis et al. (2008) concluded there is an 85 percent probability of less runoff in the Salt and Verde rivers in the long-term future. If average annual runoff is reduced in the future, storage in the SRP reservoirs would likely partially attenuate the impacts. Even if Salt and Verde river runoff is reduced because of climate change, SRP conjunctively manages a variety of water supplies to ensure the water demands it serves are met to the maximum extent possible (SRP 2011a).

Colorado River flows, which supply water to the CAP, are likely to decrease 5 to 20 percent due to climate change (Reclamation 2011). FMYN is part of the Colorado River Shortage Sharing Agreement and in years when a severe shortage occurs, the availability of CAP water for the proposed Exchange Agreement may be somewhat reduced. However, the FMYN CAP water has one of the highest priorities for delivery among CAP contractors and is the least likely to be reduced under shortage.

Potential impacts from climate change on the proposed Exchange Agreement are expected to be minimal.

3.2.3 Cumulative Effects

As described in Section 3.1—*Background for Cumulative Effects*, a number of residential developments are expected to be constructed in the study area surrounding FMYN. These proposed developments would result in increased water use in the vicinity of the study area, some of which may directly affect the Verde River. Impacts on the Verde River would be minimal if the developments are served by CAP water. However, future residential developments that rely on wells could impact the Verde River (e.g., by intercepting groundwater or subflow). Moreover, if injection wells are proposed to eliminate effluent and intersect the Verde River, these would potentially be a source of contamination to the Verde River and FMYN's water. Fountain Hills has had issues related to injection wells in the past and septic systems near rivers, such as the Verde River, which are also well understood to be a source of contamination (Klopatek, FMYN, pers. comm. 2012). In any event, SRP and FMYN would continue to be vigilant in protecting their rights to the Verde River from increased depletions and pollution.

The effects of the Proposed Action would range from minor beneficial to minor adverse, if any, on river flows, storage levels, and other resources. Thus, cumulative effects on water resources are not anticipated to be significant given the reasonably foreseeable effects of the Exchange Agreement when added to the impacts of projected future water use in the study area.

Additional depletions of water upstream from Horseshoe may reduce Verde River runoff in the future (Leake and Pool 2010). However, the magnitude and timing of such additional depletions, if any, are too speculative to consider as part of the cumulative effects for the Proposed Action.

3.3 Biological Resources

There would be no immediate (i.e., direct) impacts on biological resources as a result of Reclamation's approval of the Exchange Agreement. For analysis of potential indirect and cumulative impacts on biological resources, it is expected the impacts, if any, as well as the impact area, would vary by species. For aquatic and riparian species, the impact area for indirect and cumulative impacts is the Verde River from the head of Horseshoe to the confluence with the Salt River, and the Salt River from the head of Roosevelt Lake to Granite Reef Diversion Dam. For terrestrial species, the impact area for evaluation of potential indirect effects is the Reservation. The impact area for evaluation of potential cumulative effects on terrestrial species is the Reservation and contiguous area with Sonoran Desertscrub habitat.

3.3.1 Affected Environment

3.3.1.1 Vegetation

Vegetation within the study area can be categorized into three biomes – Sonoran Desertscrub, Sonoran Riparian Scrubland, and Sonoran Riparian Deciduous Forest and Woodlands (Brown 1994). Other areas not categorized have been previously disturbed or cleared of vegetation by human activities.

Sonoran Desertscrub

Sonoran Desertscrub occurs in the uplands and low hills within the Reservation. The dominant plant community in this biome is the paloverde-cacti mixed scrub association, which is typical of coarse gravelly soils at similar elevations throughout Arizona. Common species include foothill paloverde (*Parkinsonia microphylla*), blue paloverde (*Parkinsonia florida*), ironwood (*Olneya tesota*), mesquite (*Prosopis* spp.), saguaro (*Carnegiea gigantea*), barrel cactus (*Ferocactus acanthodes*), prickly pear (*Opuntia* spp.), cholla (*Cylindropuntia* spp.), creosote bush (*Larrea tridentata*), spiny hackberry (*Celtis ehrenbergiana*), whitethorn acacia (*Acacia constricta*), wolfberry (*Lycium* ssp.), jojoba (*Simmondsia chinensis*), graythorn (*Ziziphus obtusifolia*), and triangleleaf bursage (*Ambrosia deltoidea*).

Sonoran Riparian Scrubland

Sonoran Riparian Scrubland lines the ephemeral desert washes draining the low hills on the Reservation. These desert washes contain distinct assemblages of plants that have higher moisture requirements than those in the surrounding desert, although they often include plants typical of adjacent vegetative communities. The soil texture is less gravelly than the uplands and consists of silts and sands. Common plant species include blue paloverde, mesquite, whitethorn acacia, catclaw acacia (*Acacia greggii*), desert broom (*Baccharis sarothroides*), graythorn, and spiny hackberry.

Sonoran Riparian Deciduous Forest and Woodlands

Vegetation along the Verde River and its floodplain in the study area is classified as Sonoran Riparian Deciduous Forest and Woodlands according to Brown (1994). Dominant species in the riparian woodland community type include Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), velvet ash (*Fraxinus velutina*), velvet mesquite (*Prosopis velutina*), salt cedar (*Tamarix ramosissima*), and seepwillow (*Baccharis salicifolia*). Dominant wetland plant species include cattail (*Typha* spp.), horsetail (*Equisetum* spp.), bulrush (*Scirpus* spp.), rush (*Juncus* spp.), spikerush (*Eleocharis* spp.), and sedge (*Carex* spp.) (SRP 2008).

Disturbed Habitats

Disturbed habitats are areas that have been cleared of naturally occurring vegetation as a result of human activity. Examples include roads, developed areas, and agricultural fields.

3.3.1.2 Wildlife

The study area provides habitat for a variety of terrestrial wildlife species typical of the Sonoran Desertscrub and riparian habitats in Arizona. The Verde River provides habitat for a variety of native and nonnative fish species.

Terrestrial Wildlife

The Reservation provides habitat for numerous bird species including cactus wren (*Campylorhynchus brunneicapillus*), curve-billed thrasher (*Toxostoma curvirostre*), Gila woodpecker (*Melanerpes uropygialis*), mourning dove (*Zenaida macroura*), Harris' hawk (*Parabuteo unicinctus*), red-tailed hawk (*Buteo jamaicensis*), black-throated sparrow (*Amphispiza bilineata*), and roadrunner (*Geococcyx californianus*).

Large mammals typically occurring in Sonoran Desertscrub and riparian habitats include mule deer (*Odocoileus hemonius*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), and javelina (*Pecari tajacu*). Typical small mammal species include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), white-throated woodrat (*Neotoma albigula*), kangaroo rat (*Dipodomys* spp.), cactus deermouse (*Peromyscus eremicus*), California leaf-nosed bat (*Macrotis californicus*), and California myotis (*Myotis californicus*). Furbearing species such as beaver (*Castor canadensis*) and raccoon (*Procyon lotor*) occur in riparian areas.

The Reservation also provides habitat for a variety of reptiles such as desert iguana (*Dipsosaurus dorsalis*), tiger whiptail (*Aspidoscelis tigris*), western diamond-backed rattlesnake (*Crotalus atrox*), banded gecko (*Coleonyx variegatus*), Gila monster (*Heloderma suspectum*), and chuckwalla (*Sauromalus ater*).

Aquatic Wildlife

A variety of native and introduced fish species occur in the study area from the head of Horseshoe to Granite Reef Diversion Dam. Excluding threatened and endangered species, which are discussed in the next section, common native fish species in this reach of the Verde River include desert sucker (*Catostomus clarki*), longfin dace (*Agosia chrysogaster*), and Sonora sucker (*Catostomus insignis*) (Paradzick et al. 2006). Typical nonnative species include bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), flathead catfish (*Pylodictis olivaris*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), mosquitofish (*Gambusia affinis*), red shiner (*Notropis lutrensis*), threadfin shad (*Dorosoma petenense*), and tilapia (*Tilapia spp.*) (Id.). In the past, rainbow trout (*Oncorhynchus mykiss*) also were stocked in the Verde River below Bartlett by a local fishing club under permit from AGFD (Id.).

3.3.1.3 Threatened and Endangered Species

Table 2 summarizes the federally listed species (listed species) and designated and proposed critical habitat identified by the FWS as potentially occurring in Maricopa County (FWS 2011a).

Table 2. Federally Listed, Proposed, and Candidate Species, Designated or Proposed Critical Habitats, Maricopa County, Arizona.

Common Name	Scientific Name	Federal Status	Habitat	Determination of Presence of Suitable Habitat in Study Area
MAMMALS				
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations	Outside of known range
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	Desertscrub habitat with agave and columnar cacti present as food plants	No suitable habitat present
BIRDS				
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Fresh water and brackish marshes with dense emergent vegetation	Suitable habitat present
California least tern	*Sterna antillarum browni*	Endangered	Open, bare, or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems	No suitable habitat present
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Nests in canyons and dense forests with multilayered foliage structure	No suitable habitat present
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	Suitable habitat present; revised critical habitat was proposed August 15, 2011 (76 FR 50542) and occurs about 20 miles upstream of the Reservation
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Nests in relatively dense riparian habitat, willow, cottonwood, and salt cedar	Suitable habitat present
Sprague's pipit	*Anthus spragueii*	Candidate	Native grasslands with vegetation of intermediate height and lacking woody shrubs	No suitable habitat present

Common Name	Scientific Name	Federal Status	Habitat	Determination of Presence of Suitable Habitat in Study Area
FISH				
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	Experimental, nonessential populations have been introduced in the Verde River	Outside of current range
Desert pupfish	*Cyprinodon macularius*	Endangered	Shallow springs, small streams, and marshes; tolerates saline and warm water	Outside of current range
Gila topminnow	*Poeciliopsis occidentalis*	Endangered	Small streams, springs, cienegas, and vegetated shallows	Outside of current range
Roundtail chub	*Gila robusta*	Candidate	Cool to warm waters of rivers and streams, often occupies the deepest pools and eddies of large streams	Known to occur in the lower Verde and Salt rivers
Razorback sucker	*Xyrauchen texanus*	Endangered	Riverine and lacustrine areas, generally not in fast-moving water; may use backwaters	May periodically be present in Horseshoe; critical habitat includes Horseshoe
Woundfin	*Plagopterus argentissimus*	Endangered	Shallow, warm, turbid, fast-flowing water; tolerates high salinity	Outside of current range
AMPHIBIANS AND REPTILES				
Desert tortoise, Sonoran population	*Gopherus agassizii*	Candidate	Rocky hillsides and bajadas of Mojave and Sonoran Desertscrub, also in desert grassland, juniper woodland, interior chaparral habitats, and pine communities; washes and valley bottoms may be used in dispersal	Known to occur within the Reservation
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	Candidate	Sonoran Desertscrub (mesquite/creosote) in soft, sandy soils with sparse gravel	Outside of current range
PLANTS				
Arizona cliffrose	*Purshia subintegra*	Endangered	White limestone soils derived from tertiary lakebed deposits	No suitable habitat present

Three listed species and three candidate species have suitable habitat in the study area, and thus have the potential to be affected by the Proposed Action. These species are discussed below. In addition, bald eagles, which are known to occur within the Reservation, were recently delisted, but continue to be protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Bald eagles are discussed below under *Special Management Species*.

Yuma Clapper Rail

The Yuma clapper rail is a subspecies of clapper rail that lives and nests in freshwater marshes in the southwestern United States and portions of Mexico. This subspecies was listed as endangered in 1967 (FWS 1967). Typical habitat is dominated by tall, dense cattails and bulrushes.

Additional characteristics of Yuma clapper rail habitat include shallow flooded areas with less than 1 foot of water and gradual slopes between flooded and dry areas (AGFD 2006). Emergent vegetation is used for foraging and breeding habitat. The most productive clapper rail habitat is typically a mosaic of uneven-aged marsh vegetation interspersed with open water of variable depths (Conway et al. 1993). Common food sources include crayfish, other arthropods, and fish (Ohmart and Tomlinson 1977). Most Yuma clapper rails are found in large patches of habitat; however, individual rails have been found in habitat patches as small as 1 acre (Todd 1986). Threats to the species include loss of marsh habitat from river management activities such as channelization, dredging, bank stabilization, and fluctuating reservoir levels.

In Arizona, Yuma clapper rails are found along the Colorado River as far north as Lake Mead, along the Virgin and Bill Williams rivers, along the lower Gila River from near Phoenix to the Colorado River, and along the lower Salt and Verde rivers (AGFD 2006). Occasional records outside this range include Picacho Reservoir, Tavasci Marsh, Roosevelt Lake, and Quitobaquito Pond (AGFD 2006). Most populations are thought to be nonmigratory, with the possible exception of those along the Gila River (Eddleman 1989).

There are no recent records of Yuma clapper rails from the impact area. According to the AGFD, Yuma clapper rails have not been detected anywhere in the Salt River drainage upstream of 91st Avenue since 1985 (Burger, AGFD, pers. comm. 2011) with the exception of a single isolated occurrence of a clapper rail along the Tonto Creek arm at Roosevelt Lake in 2002. The most recent record of this species in or near the study area is from the reach of the Salt River between Blue Point Bridge and Granite Reef Dam in 1985. This reach of the Salt River has been surveyed 9 of the last 10 years with no Yuma clapper rail detections (Burger, AGFD, pers. comm. 2011).

Vegetation along the Verde River in the study area is generally comprised of mesquite bosque and riparian woodland. Scattered patches of marsh habitat suitable for Yuma clapper rail may occur along the river; however, the Yuma clapper rail has not been documented in the study area in more than 25 years.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (flycatcher) was listed as endangered on February 27, 1995 (FWS 1995). Factors that contributed to the decline of the flycatcher include loss and modification of riparian habitat due to urban and agricultural development, water diversion and impoundment, channelization, groundwater pumping, livestock grazing, invasion by nonnative plant species, off-road vehicle and other recreational uses, and parasitism by the brown-headed cowbird. The breeding range of this subspecies includes Arizona, southern California, New Mexico, southern Nevada, southern Utah, and southwestern Colorado (Smith et al. 2002). Flycatchers spend winter in Mexico, Central America, and northern South America (Phillips 1948; Gorski 1969; Ridgely and Gwynne 1989; Stiles and Skutch 1989; McCabe 1991; Howell and Webb 1995; Unitt 1997, 1999; Koronkiewicz et al. 1998). Flycatchers are considered territorial (or resident within a site) if they are detected between June 15 and July 20, regardless of whether a possible or known mate is observed (Sogge et al. 2010; Smith et al. 2002).

The flycatcher is a riparian obligate species. Habitat characteristics of areas occupied by flycatchers vary across their range, and some areas that appear similar to occupied breeding areas remain unused (Paradzick et al. 2001). In general, flycatchers breed in tall dense riparian habitat with low gradient streams, wetlands, or saturated soils usually nearby, at least early in the breeding season (Bent 1940; Stafford and Valentine 1985; Harris et al. 1987; Spencer et al. 1996). "Occupied sites always have dense vegetation in the patch interior. These dense patches are often interspersed with small openings, open water, or shorter, sparser vegetation, creating a mosaic

that is not uniformly dense" (Appendix D of FWS 2002). Thin strands of dense vegetation are generally not suitable habitat. Nests are found in such diverse vegetation as seep willow, netleaf hackberry (*Celtis laevigate* var. *reticulata*), Fremont cottonwood, willow, and salt cedar.

Critical habitat currently exists along the Verde River from the confluence with the East Verde River downstream through Horseshoe to a gaging station approximately 4.1 miles downstream of Horseshoe Dam (FWS 2011c). This reach of the Verde River is known to be occupied by flycatchers and continues to be part of the proposed revision of critical habitat (Id.). Downstream from Bartlett Dam, the Verde River riparian corridor provides limited potential for breeding habitat. The substrate is generally too coarse to support the tall dense woody vegetation used by breeding flycatchers, although silty soils supporting this vegetation type are present as narrow stringers along the river. There are no known nesting territories below Bartlett Dam or within the Reservation; however, flycatchers may use this section of the Verde River during migration.

Yellow-billed Cuckoo

The yellow-billed cuckoo (cuckoo) is a neotropical migratory bird that is a summer resident throughout the United States, southern Canada, and northern Mexico, and winters from Colombia and Venezuela south to northern Argentina (Ehrlich et al. 1988; AOU 1998). On July 25, 2001, the FWS published a notice in the Federal Register that the petition to list the cuckoo as a distinct population segment under the ESA is warranted but precluded by higher listing actions (FWS 2001). Factors contributing to the decline of the cuckoo in the western U.S. include degradation and loss of riparian habitat due to vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation.

In the arid Southwest, cuckoos typically occur along densely wooded rivers and damp thickets (Corman 2005). In Arizona, most cuckoo nests are placed in willows, but they have also been found in a variety of riparian tree species. The loose platform of sticks is usually well hidden within the tree foliage. Nest height ranges from 4 to 55 feet with an average height of 19 feet (Corman 2005). Cuckoos breed in large blocks of riparian habitat, particularly in cottonwood and willow stands, which they also use extensively for foraging (Ehrlich et al. 1988). In Arizona, cuckoos prefer desert riparian woodlands with dense stands of willow, Fremont cottonwood, and mesquite; however, cuckoos have occasionally been found to nest and forage in stands with up to 50 percent salt cedar (Pima County 2001; Corman and Magill 2000; Halterman, USFS, pers. comm. 2002). For nesting, cuckoos prefer dense vegetation with canopy cover greater than 65 to 70 percent.

Typically, breeding cuckoo pairs require a patch size of 10 to 100 acres; patches less than 10 acres are generally considered unsuitable. However, some populations (i.e., Verde River) appear to use much smaller patches provided they are contained within a larger matrix of riparian forest (Van Riper, USGS, pers. comm. 2005).

Cuckoos have been recorded at Horseshoe (EEC 2005; EcoPlan 2008, 2011). Suitable cuckoo habitat (cottonwood-willow galleries and mixed riparian stands) exists both above and below Horseshoe, although some of these stands occur as narrow stringers along the Verde River. There is insufficient tall riparian forest around or near Bartlett for cuckoo habitat. Cottonwood groves that may be suitable for the species also occur on the Verde River below Bartlett at the Highway 87 crossing on the Reservation (FWS 2003).

Roundtail Chub

The roundtail chub is a native fish with a streamlined body similar in appearance to trout. The FWS determined on July 7, 2009 that listing the roundtail chub as a distinct population segment is

warranted but precluded due to higher listing priorities (FWS 2009). This species inhabits pools, eddies, and the swift waters below rapids and riffles. Spawning occurs in the late spring, when each female distributes about 2,000 eggs over the gravel and cobble stream bottom (FWS 2010b). Roundtail chub historically was widespread in larger streams and rivers and their tributaries throughout most of the Colorado River basin. The main threats to this species are habitat loss and competition from nonnative species (AGFD 2002a).

Roundtail chub are known to occur in the Verde and Salt rivers within the study area. Population and movement studies conducted by the AGFD documented the presence of roundtail chub in the Verde River downstream from Bartlett Reservoir and in the Salt River from Stewart Mountain Dam to Granite Reef Diversion Dam (Bryan and Hyatt 2004; Bryan and Robinson 2000). Bryan and Hyatt (2004) found roundtail chub were most numerous in the first 10 miles of the Verde River below Bartlett Dam. Study results indicated the population had declined by about 74 percent from 2000 to 2003.

Razorback Sucker

The razorback sucker is a large river-dwelling fish that can reach lengths greater than 3 feet and weights of more than 13 pounds over a 40-year life span. Spawning occurs mainly from January through March in flatwater areas over cobble, gravel, and coarse sand substrates (FWS 2008a).

The species was listed as endangered on October 23, 1991 (FWS 1991). Recovery goals published in 2002 supplemented the 1998 Recovery Plan. Critical habitat was designated in 1994, including Horseshoe and about 40 miles upstream in the Verde River. Threats to razorback sucker include streamflow regulation, habitat modification, predation by nonnative fish species, pesticides, and pollutants (Id.).

Razorback suckers were extirpated from the Verde River, but efforts are ongoing to reestablish this population. No long-term survival of stocked razorback sucker has been reported to date, but a few previously stocked fish are occasionally found in Horseshoe—one in 2002, seven in 2005, and three in 2006. Bartlett and the lower Verde River are not considered suitable habitat for razorback sucker recruitment because of the lack of dense aquatic vegetation and the abundance of nonnative fishes (Id.).

Desert Tortoise, Sonoran Population

The desert tortoise is brownish in color and is between 8 and 15 inches long with a high-domed shell. The FWS determined that listing the Sonoran population of the desert tortoise is warranted but precluded due to higher listing priorities (FWS 2010a). The Sonoran desert tortoise is typically found in the Arizona Upland and Lower Colorado River subdivisions of Sonoran desertscrub and Mojave desertscrub vegetation types (FWS 2011a). They occur most commonly on rocky, steep slopes, bajadas (lower mountain slopes often formed by the coalescing of several alluvial fans), and in paloverde-mixed cacti associations (FWS 2011a). Washes and valley bottoms may be used in dispersal, and in some areas as all or part of home ranges. Most Sonoran Desert tortoises in Arizona occur at elevations between about 900 and 4,198 feet amsl. Threats include invasion of nonnative plant species, altered fire regimes, urban and agricultural development, off-highway vehicles, roads, illegal collection, predation from feral dogs, human depredation, and drought.

Sonoran desert tortoises were known to occur within the Reservation but have not been observed in recent surveys (Klopatek, FMYN, pers. comm. 2012). Pedestrian surveys in 1998 documented tortoise scat, burrows, and live tortoises in the northwest corner of the Reservation (Reclamation

1998). Sonoran desert tortoises are expected to occur in suitable habitat in the higher elevations within the study area.

3.3.1.4 Special Management Species

The bald eagle is a large bird of prey usually found along lakes, rivers, and reservoirs in Arizona (AGFD 2011). The Sonoran Desert bald eagle population was removed from the federal list of threatened and endangered species on September 2, 2011 (FWS 2011b). On November 30, 2011, the U.S. District Court set aside the February 25, 2010 12-month finding (that the Sonoran population of the bald eagle did not qualify as a Discrete Population Segment) and remanded the decision back to the FWS for reconsideration. FWS completed a new 12-month finding on April 20, 2012, which again determined that the population does not meet the significance requirement. The Sonoran population of the bald eagle remains unlisted at this time. Bald eagles nesting in the Sonoran Desert of central Arizona continue to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Impacts on bald eagles include habitat loss, human encroachment into breeding habitat, entanglement in fishing line, reduction or significant changes in fish populations, illegal shooting, and heavy metal contamination.

Bald eagles primarily breed in Arizona at elevations between 1,080 and 5,640 feet amsl. Most nesting in central Arizona occurs in the upper and lower Sonoran life zones, although a few territories occur at higher elevations in coniferous forests (FWS 2003). Typical vegetation in bald eagle habitat includes Arizona sycamore (*Platanus wrightii*), blue paloverde, cholla, Fremont cottonwood, Goodding's willow, mesquite, saguaro, and salt cedar, with piñon pine (*Pinus edulis*) and juniper (*Juniperus* spp.) occurring in the transition areas between life zones (Driscoll and Koloszar 2001). Bald eagles usually place their nests within 1 mile of a creek, lake, or river, although they occasionally have been known to nest farther from water (Id.). In 2011, 61 active bald eagle nests were known in Arizona (AGFD 2011).

Concentrations of wintering bald eagles in Arizona vary both spatially and temporally, most likely in relation to water and food availability. Between 1995 and 2003, researchers documented 324 wintering bald eagles, on average, along 115 survey routes distributed among major river drainages and lakes (Driscoll et al. 2004). Concentrations of wintering bald eagles have been found in the Gila, Salt, and Verde river drainages (Driscoll et al. 2004).

Since 2002, at least 10 pairs of bald eagles have nested along the Verde River from Horseshoe downstream to its confluence with the Salt River (AGFD 2011). The 11 bald eagle breeding areas in the study area are, from north to south, Horseshoe, Cliff, Bartlett, Needle Rock, Box Bar, Fort McDowell, Doka, Sycamore, Rodeo, Orme, and Granite Reef. In 2012, these nests produced a total of 11 fledglings (Jacobson, AGFD, pers. comm. 2012; AGFD 2012). Native suckers are an important prey species for bald eagles in the impact area. Nonnative fish are also an important food source (SRP 2008).

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Because the No Action Alternative would result in a violation of the Settlement Act and would deprive the FMYN of its rights, the No Action Alternative is presented as a basis for comparison only.

Under the No Action Alternative, there would be no impacts on biological resources on the Reservation.

3.3.2.2 Proposed Action

Vegetation

The Proposed Action may potentially result in indirect impacts on upland vegetation, depending upon the ultimate use of FMYN's exchanged water. Availability of FMYN's "Other Water" may facilitate additional land development on the Reservation, which could lead to clearing of Sonoran Desertscrub if development occurs in previously undisturbed areas. However, currently no specific developments are planned on the Reservation that would be dependent upon the additional water available under the Exchange Agreement. Any attempt to quantify or qualify impacts from additional development, such as impacts on vegetation that may result from land clearing and construction equipment, is speculative.

Potential indirect impacts on upland vegetation from the installation of new water diversions (e.g., wells and pipelines) are also impossible to quantify since neither the need for new diversions nor their number or location has been identified.

Any construction of new diversions or development of land for residential, commercial, industrial, or agricultural purposes would be subject to applicable federal and tribal laws and regulations.

Indirect impacts on riparian vegetation from the Proposed Action are not anticipated to result from the Proposed Action because riparian areas are subject to flooding and generally have been protected from development. Implementation of the Exchange Agreement may result in minor changes to flows in the Verde River; however, these changes are anticipated to have negligible impacts on riparian vegetation. An important requirement to support mature riparian vegetation is maintenance of minimum flows. SRP's requirement to release at least 100 cfs from Bartlett (except during periods of drought or in an emergency) will continue for the foreseeable future. Under the Proposed Action, flows from Bartlett would increase during times when FMYN has ordered exchange water. Therefore, with continuation of the 100-cfs minimum flow requirement and any increase in releases from Bartlett as a result of implementing the proposed Exchange Agreement, no observable effect on mature riparian vegetation along the Verde River is anticipated as a result of the Proposed Action. An important requirement for recruitment of riparian vegetation, especially trees, is the occurrence of periodic scouring flood flows during the spring, which remove competing vegetation and expose the seedbed. The seedbed must remain moist long enough following flooding for germination to occur. Modeling described above under Section 3.2—*Water Resources*, indicates that the full delivery of water of the Exchange Agreement by FMYN would have minimal effects on maximum Verde River flood flows, which would decrease by about 0.3 percent compared to current conditions. Moist conditions required for germination would continue to occur following flood events because minimum releases would be maintained or increased, as described above. For these reasons, recruitment of riparian vegetation would not be affected by the Proposed Action.

Wildlife

Terrestrial Wildlife

The Proposed Action may potentially result in indirect impacts on terrestrial wildlife on the Reservation, depending upon the amount of exhanged water used and its ultimate use. No specific planned developments by FMYN have been identified that would be dependent upon the additional water that would be available under the Exchange Agreement. Full delivery of "Other Water" through the Exchange Agreement to FMYN could be used for development on undisturbed lands, which would result in a loss of wildlife habitat. However, any attempt to

quantify impacts from additional development, such as impacts on terrestrial wildlife from land clearing and disturbance during construction, is speculative.

Potential indirect impacts on wildlife habitat from the installation of any new water diversions (e.g., wells and pipelines) are also impossible to quantify since neither the need for new diversions nor their number or location has been identified.

Any construction of new diversions or development of land for residential, commercial, industrial, or agricultural purposes would be subject to applicable federal and tribal laws and regulations.

Potential indirect impacts on riparian-dependent birds, mammals, reptiles, and amphibians are not expected under the Proposed Action because there would be no adverse effects on riparian vegetation and stream flows. Potential impacts from development are not anticipated because riparian areas are subject to recurrent flooding and have been generally protected from development by FMYN. No observable impacts on riparian vegetation from changes in flow in the Verde River are expected; thus, no indirect impacts on riparian-dependent wildlife are expected.

As previously mentioned, currently no developments are planned that are contingent upon availability of additional water from the Exchange Agreement. Consequently, it is impossible to quantify potential migratory bird impacts associated with any future development within upland habitats. Riparian corridors also provide important foraging and resting habitat for migratory birds. Streamflow modeling indicated no observable change to riparian habitat; therefore, no impacts on migratory birds are anticipated.

Aquatic Wildlife

The full delivery of FMYN's "Other Water" through the Exchange Agreement may result in slight changes in timing and quantities of flow in the Verde River as described above under Section 3.2—*Water Resources*. These changes would be minor and would be well within the natural range of flow variation in the Verde River. Flow between Bartlett and the Reservation would potentially increase during periods of low releases coupled with FMYN orders of exchange water (Section 3.2.2.2), which may benefit aquatic wildlife. As described above under Section 3.2.2.2, there would be no changes in water temperature or the depositional environment (i.e., geomorphology) in Horseshoe, Bartlett, or the Verde River that would affect fish habitat. Because the depositional environment would be unchanged, there would be no substantial changes to diversity of river habitat, depth of pools, existence of shallow riffles, or backwater areas that provide fish habitat. No changes in the distribution or abundance of native or nonnative fish are expected as a result of the Proposed Action.

Listed and Candidate Species

Under Section 7 of the ESA, any proposed action that may result in an effect (positive or negative) on federally listed or proposed species would require completion of a biological assessment (BA). As described below for each listed species, no effects are anticipated from the Proposed Action and, therefore, no BA has been prepared.

Yuma Clapper Rail

The last documented occurrence of Yuma clapper rail in the study area occurred in 1985. No Yuma clapper rails have been observed during surveys conducted over the last 10 years and it appears that suitable breeding habitat has not developed within the study area. Implementation of

the Proposed Action would not affect the potential for the Yuma clapper rail to occur in the area. No effect to the federally endangered Yuma clapper rail would occur from the Proposed Action.

Southwestern Willow Flycatcher

The Proposed Action would have no observable effect on riparian vegetation that provides potential breeding habitat for the flycatcher. There would be no effect on water levels in Horseshoe or flow rates in the Verde River below Horseshoe Dam where breeding flycatchers are known to occur. The Verde River below Bartlett Dam provides foraging habitat for migratory flycatchers. There would be no perceptible change in survival or recruitment of riparian vegetation on this reach of the river. Consequently, there would be no effect on the federally endangered flycatcher from implementation of the Proposed Action.

Yellow-billed Cuckoo

The Proposed Action would have no observable impact on riparian vegetation that provides potential breeding habitat for the cuckoo. There would be no effect on water levels in Horseshoe or flow rates in the Verde River below Horseshoe Dam where breeding cuckoos are known to occur. There would be no perceptible change in survival or recruitment of riparian vegetation within the study area. Implementation of the Proposed Action would not affect the future use of the study area by cuckoos. Consequently, there would be no impacts on the cuckoo from the Proposed Action.

Roundtail Chub

The full delivery of "Other Water" to FMYN through the Exchange Agreement may result in slight changes in timing and quantities of flow in the Verde River as described above under Section 3.2—*Water Resources*. These changes would be minor and would be well within the range of historic variation in the Verde River. As described in Section 3.2.2.2, flow between Bartlett and the Reservation would potentially increase during periods of low releases, coupled with FMYN orders of exchange water, which may benefit roundtail chub. There would be no changes in water temperature or sediment deposition in the Verde River that would affect roundtail chub habitat. Because the depositional environment would be unchanged, there would be no substantial changes to pools, eddies, or swift waters that provide habitat for roundtail chub. Consequently, there would be no effect on the roundtail chub from the Proposed Action.

Razorback Sucker

No effects to the federally endangered razorback sucker would occur because operation of Horseshoe would not change beyond the modifications adopted by SRP as part of its HCP (SRP 2008).

Desert Tortoise, Sonoran Population

Future land development on undisturbed upland habitat by FMYN could have potential indirect impacts on tortoise habitat. However, desert tortoises have not been observed on the Reservation in recent surveys (Klopatek, FMYN, pers. com. 2012). Currently, no specific developments are planned by FMYN that would depend upon the additional water that would be available under the Exchange Agreement. Any attempt to quantify impacts from future development (i.e., land clearing) would be premature and speculative at this point. Any attempt to characterize impacts on desert tortoise habitat from the installation of new water diversions (e.g., wells and pipelines) also would be premature and speculative.

Without conceptual plans and/or locations of potential developments in upland vegetative communities, no surveys can be conducted to determine whether the desert tortoise could

potentially be impacted. In addition, even if surveys were conducted today, site conditions could change before any development actually occurs. If future development is proposed that requires an action by the federal government, Section 7 of the ESA would be triggered if the desert tortoise becomes listed and its habitat is potentially impacted. Any construction of new diversions or development of land for residential, commercial, industrial, or agricultural purposes would be subject to applicable federal and tribal laws and regulations.

Special Management Species

Bald Eagle

The Proposed Action would have no detectable impact on riparian trees that provide nesting habitat for bald eagles. There would be minor changes to water levels in Bartlett but the changes would not impact foraging opportunities for the bald eagle. There would be no perceptible change in survival or recruitment of riparian trees on the Verde River. As described above under *Aquatic Wildlife*, there would be no changes in distribution or abundance of native or nonnative fish under the Proposed Action; therefore, no impacts on the food supply for nesting or wintering bald eagles are expected to occur.

Consequently, water diversions that would occur as a result of the Proposed Action would not impact bald eagle activities; even if the bald eagle is relisted under the ESA as a result of future litigation. Implementing the Proposed Action would result in a "no effect" finding for the bald eagle.

3.3.3 Cumulative Effects

Vegetation

As described in Section 3.1—*Background for Cumulative Effects*, a number of development projects have been identified that are planned to be constructed in the study area outside the Reservation. These actions may result in land-clearing activities that could affect upland vegetation. These actions may also result in a slight increase in water use in the vicinity of the Proposed Action, some of which may affect the Verde River (see Section 3.2.3), leading to potential impacts on riparian vegetation. Cumulative effects on upland vegetation are not expected to be substantial in the study area. This is because large areas of undisturbed Sonoran Desertscrub are protected from development within the nearby McDowell Mountain Regional Park and the Tonto National Forest. For the reasons discussed in Section 3.2.3, development impacts on water resources and riparian vegetation are expected to be minimal.

Grazing by cattle and horses occurs on the Reservation and surrounding lands. Grazing occurs in both Sonoran desertscrub and riparian communities along the Verde River. Grazing activities could adversely affect vegetation by reducing ground cover and negatively affecting recruitment of riparian species.

Depending on the amount of exchanged water used and its ultimate use, there may be cumulative indirect impacts to upland vegetation from the Proposed Action when added to the impacts of other development and grazing in the study area. Without specific information, efforts to qualify or quantify the cumulative impacts, if any, would be speculative.

Wildlife

The potential cumulative effects on wildlife parallel the cumulative effects on vegetation. There may be cumulative indirect effects of the Proposed Action on wildlife depending on the ultimate

use and amount of the exchanged water used. Without specific information, however, efforts to qualify or quantify the cumulative impacts, if any, would be speculative.

Sensitive Species

Consideration of potential cumulative effects under the ESA is specifically dictated by that act. Because the Proposed Action would have no effect on any federally listed species, a cumulative impacts analysis is not required. Should a future federal action affect federally listed species or designated critical habitat, the Exchange Agreement would be considered part of the baseline for any biological assessment prepared for that future project; however, that assessment will not have any bearing on the Exchange Agreement.

The reasonably foreseeable effects of the Exchange Agreement on Yuma clapper rail, flycatcher, cuckoo, roundtail chub, razorback sucker, and bald eagle are not anticipated to be significant because the Exchange Agreement is expected to minimally impact riparian habitat, upon which these listed and candidate species, and bald eagles depend. The potential cumulative effects of the Proposed Action on these sensitive species, therefore, when added to the impacts of other development and grazing in the study area, are not anticipated to be significant, for purposes of NEPA. Without specific information regarding uses of the "Other Water" in the future, however, efforts to qualify or quantify the cumulative impacts, if any, on these species, as well as to the desert tortoise (which uses Sonoran desertscrub), would be speculative.

3.4 Recreation

There would be no immediate (i.e., potential direct) impacts on recreation from Reclamation's approval of the Exchange Agreement. The study area for evaluation of indirect and potential cumulative impacts on recreation is the Verde River from the head of Horseshoe to the confluence with the Salt River, and the Salt River from the head of Roosevelt Lake to Granite Reef Diversion Dam.

3.4.1 Affected Environment

Recreation on the Reservation consists of various FMYN-run ventures such as golf courses, vacation resorts, a western-themed outdoor adventure service, recreational vehicle (RV) park, cultural festivals, and other activities open to the public. FMYN opened the first bingo hall in Arizona in 1983 (ITCA 2003). The bingo hall eventually expanded into a full-scale gaming facility and casino with food and beverage service. Fort McDowell Adventures offers several recreational opportunities including kayaking, jeep tours, horseback riding, hiking, biking, and cultural heritage tours.

Aside from FMYN commercial activities, outdoor recreation within Reservation boundaries is limited to FMYN tribal members and is not open to the public without an escort. The Verde River is a primary location for recreation on the Reservation. The Verde River is bordered by cottonwood trees and offers tribal members opportunities for floating the river, picnicking, fishing, and kayaking (ITCA 2003). Other recreational activities available to tribal members include, but are not limited to, hiking, hunting, and bird watching.

Recreation resources in the study area outside of the Reservation include activities common to SRP's reservoirs including Horseshoe and Bartlett on the Verde River and Roosevelt, Apache, Canyon, and Saguaro lakes on the Salt River. These resources include fishing, boating and other water sports (e.g., water skiing and jet skiing), camping, picnicking, wildlife viewing, and sightseeing. Public recreational use also occurs along a 12-mile segment of the Verde River

between Horseshoe and Bartlett and another 11-mile segment that extends from Bartlett to the northern Reservation boundary. These areas along the Verde River are popular for river rafting, kayaking, angling, and camping (SRP 2008). Kayaking on the Verde River is especially popular downstream of Bartlett. Paddlers access the river at a campground just downstream of the dam, but must take out just above the Reservation boundary, as boating onto the Reservation is prohibited. Also, river use in this stretch is limited during bald eagle breeding season, and paddlers are prohibited from accessing the river by foot or vehicle from December 1 through June 30 (Southwest Paddler 1997). During this time, paddlers are not allowed to stop, get out of their boats, make landfall, create noise, or otherwise disturb the nesting birds.

Recreation resources on the Salt River are similar to those on the Verde River. A notable addition is the use of the Salt River for tubing activities by local Phoenix area residents and visitors to the area. Commercial tubing activities run from May through Labor Day; the section of the Salt River used for tubing passes through the Tonto National Forest near northeast Mesa.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Because the No Action Alternative would result in a violation of the Settlement Act, which would deprive the FMYN of its rights, the No Action Alternative is presented as a basis for comparison only.

Under the No Action Alternative, recreational use would not change. Noncommercial use of the Reservation by tribal members would continue at its current rate and visitor use of available commercial recreational activities would continue at its current rate.

3.4.2.2 Proposed Action

The potential environmental consequences of the Proposed Action have been assessed based on the changes to water resources in and around the study area that may occur. Under the Proposed Action, potential impacts on recreation resources, including river, lake, and reservoir-based resources, would be negligible based on the insignificant changes to stream flows and lake levels that are anticipated to result from implementation of the Exchange Agreement. Changes to stream flows and lake levels would be imperceptible to those participating in the water-based recreational activities described in Section 3.4.1—*Affected Environment*.

An increase in the amount of water available to FMYN provides the potential for development of additional recreational activities on the Reservation that use water such as municipal or private swimming pools, golf courses, and other activities. The extent of any expansion of these activities is currently unknown and not defined, and no plans have been made based on the implementation of the Exchange Agreement. Therefore, any attempt to quantify these impacts is not possible and would be speculative at this time.

3.4.3 Cumulative Effects

Reasonably foreseeable actions described in Section 3.1 may result in additional recreational use in the area due to residential or commercial developments. Impacts on recreation from the Proposed Action are expected to be minimal. Thus, the cumulative effects of the Proposed Action are not anticipated to be significant to recreation given the minimal effects of the Exchange Agreement when added to the minor impacts of other future potential recreational development anticipated to occur in the study area.

3.5 Cultural Resources

There would be no immediate (i.e., potential direct) impacts from Reclamation's approval of the Exchange Agreement on cultural resources. The study area for evaluation of potential indirect impacts on cultural resources is the Reservation. The study area for analysis of potential cumulative impacts on cultural resources is a 5-mile radius around the Reservation, which reflects the area within which there is private land adjacent to the Reservation in unincorporated eastern Maricopa County.

3.5.1 Affected Environment

Previous research indicates that prehistoric cultural remains on the Reservation, as well as along the Lower Verde River, are primarily Hohokam. Archaeological surveys on the Reservation and surrounding area have documented dense and diverse concentrations of prehistoric Hohokam and a smaller number of historic Euro-American sites along the Lower Verde River. The former sites include large villages containing pit houses and masonry structures, multiple trash mounds, and ball courts; outlying hamlets and resource processing areas; extensive agricultural areas with canals along the Verde River and systems of runoff diversion features on the western terraces; zones of stone tool manufacturing and use; and petroglyphs (Stone 1991). The area appears to have been a major center of Hohokam occupation from A.D. 300 to 1450.

Archaeological surveys have identified several clusters of large Hohokam villages at irregular intervals along the Lower Verde River (Canouts 1975:342). Smaller dwellings and dry-farming systems were interspersed among these villages. Azatlan [AZ U:6:1, U:6:2, U:6:3, and U:6:78 (ASM)] is the northernmost habitation center, which is more than 1 square mile in area, most of which is north of the FMYN boundary. Additional research identified more than 100 trash mounds; four, possibly five, ball courts; at least two prehistoric canals; and two plazas (Neily and Kisselberg 1991; Boston et al. 2004). Hoffman (1984) and Landis (1988) suggested nearby sites were likely associated with Azatlan.

Within the Reservation, cultural resource studies, mostly associated with proposed agricultural development, began in the mid-1980s. A resource overview reevaluated sites and concluded that many were potentially eligible for inclusion in the National Register of Historic Places (NRHP) under Criterion D (Effland 1983). A small data recovery project was carried out at nine historic sites that were to be impacted by Phase I of the Fort McDowell Irrigation Betterment Project (Stein 1984). Several years later, a cultural resource overview was done in conjunction with preparation of an environmental assessment for an agricultural development project (Stone 1991). Most of the sites identified by the overview post-date 1870 and included features of the long-abandoned Fort McDowell, house sites, trash scatters, canals, and petroglyphs. In 1992, the Fort McDowell Archaeological and Historic District was listed on the NRHP based on research and the nomination form prepared by Ryden et al. (1991).

In the 1990s, Reclamation carried out a series of studies in conjunction with planned agricultural development on the Reservation. These studies included surveys of proposed agricultural fields and limited data recovery at several sites that could not be avoided by road improvements related to the agricultural development (Adams 1993; Adams et al. 1994; Hoffman and Phillips 1997). As a result of these surveys, several sites determined to be eligible for nomination to the NRHP were avoided and protected from agricultural development by fencing. Near the southern end of the Reservation, the Arizona Department of Transportation undertook archaeological investigations for the Verde Bridge Project (Hackbarth 1992). Testing and data recovery were conducted at eight sites that included Hohokam as well as late nineteenth and early twentieth century occupations.

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Under the No Action Alternative, present conditions would continue on the Reservation. Because the No Action Alternative would result in a violation of the Settlement Act, which would deprive the FMYN of its rights, the No Action Alternative is presented as a basis for comparison only.

3.5.2.2 Proposed Action

No direct impacts on known or unidentified cultural resources are expected from implementation of the Exchange Agreement. Various land uses on the Reservation – agricultural, residential, commercial, and recreational – require water for their operations. Future demands have not been identified at this time, but it would be reasonable to assume that additional development and an increase in agricultural, recreational, or other uses would result in land disturbance. Under the Proposed Action, potential indirect impacts on cultural resources could result from ground-disturbing construction activities that could destroy or alter archaeological sites. However, those impacts would be minimized or mitigated due to FMYN's ordinances within its Law and Order code.

All construction activities are subject to applicable federal and tribal regulations and permitting. The FMYN has implemented its own Antiquities Ordinance (Fort McDowell Yavapai Community 1990) that states:

> *It is the policy of the Fort McDowell Yavapai Indian Community that sites within the external boundaries of the community reflecting historic or prehistoric evidence of human activity shall be preserved so that members of this community and others may gain greater knowledge concerning the historic and prehistoric habitation of this community.*

As a result of the regulations and permitting, it is likely that impacts on cultural resources from the Exchange Agreement would be minor, if any.

3.5.3 Cumulative Effects

The study area for analysis of cumulative impacts on cultural resources is a 5-mile radius around the Reservation, which reflects the area within which there is private land adjacent to the Reservation in unincorporated eastern Maricopa County. As described in Section 3.1, cumulative effects potentially involve a number of development projects that have been identified to be constructed in the study area surrounding the Reservation. Any new construction off-Reservation would be subject to applicable federal, state, and county laws pertaining to cultural resources, if any, which would minimize impacts. Cumulative effects of the Proposed Action are not anticipated to be significant on cultural resources given the reasonably foreseeable minor effects of the Exchange Agreement when added to the impacts of other development in the study area.

3.6 Air Quality

The study area for evaluation of air quality impacts includes the Reservation and the planning area for air quality in the Maricopa Association of Governments (MAG), a metropolitan planning organization that shares the responsibility of completing State Implementation Plan requirements for ozone, carbon monoxide, and particulate pollution, for which portions of Maricopa County are designated nonattainment (Arizona Revised Statutes [ARS] § 49-406). The nonattainment designation is given to an area that fails to meet the National Ambient Air Quality Standards

(NAAQS) for a particular pollutant. In other words, the area has not attained the standard. However, it is important to note that FMYN is a sovereign Nation located within this nonattainment area.

The study area is within state-designated "Area A." Area A is one of two areas within Arizona that have been delineated in ARS § 49-541, and defined as "Vehicle Emissions Control Areas."[5] Area A encompasses all of the greater Phoenix metropolitan area. Area A was originally established by the ADEQ as the area under which the clean burning gasoline measures (e.g., emissions testing and summer and winter fuel formulations) are applicable. Since then, the boundary has been used by many other state statutes, rules, and ordinances (such as residential wood burning) as the area of applicability for those respective regulations. Although FMYN is within "Area A," this state statute does not apply to FMYN.

3.6.1 Affected Environment

The NAAQS resulted from the Clean Air Act of 1970, as amended in 1977 and 1990 (EPA 2008). The standards are designed to protect public health and indicate the maximum levels of pollution allowable, including a margin of error. The standards relate to six primary air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), and sulfur dioxide (SO_2). The State of Arizona's air quality standards are the same as those developed by the federal government. Pollutant levels for primary standards (human health) and secondary standards (e.g., human welfare and visibility) have been established by the EPA as shown in Table 3.

Table 3. National Ambient Air Quality Standards.

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[1]	None	
	35 ppm (40 mg/m^3)	1-hour[1]		
Lead	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm (100 $\mu g/m^3$)	Annual (arithmetic mean)	Same as Primary	
Particulate Matter (PM_{10})	150 $\mu g/m^3$	24-hour[2]	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15 $\mu g/m^3$	Annual[3] (arithmetic mean)	Same as Primary	
	35 $\mu g/m^3$	24-hour[4]	Same as Primary	
Ozone	0.075 ppm (2008 STD)	8-hour[5]	Same as Primary	
	0.08 ppm (1997 STD)	8-hour[6]	Same as Primary	
	0.12 ppm	1-hour[7] (applies only in limited areas)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (arithmetic mean)	0.5 ppm (1,300 $\mu g/m^3$)	3-hour[1]
	0.14 ppm	24-hour[1]		

mg/m^3 – milligrams per cubic meter.
$\mu g/m^3$ – micrograms per cubic meter.

[5] The other area is "Area B," which is in the Tucson metropolitan area.

STD – Standard.
ppm – parts per million.
[1] Not to be exceeded more than once per year.
[2] Not to be exceeded more than once per year on average over three years.
[3] To attain this standard, the three-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15 $\mu g/m^3$.
[4] To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).
[5] To attain this standard, the three-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008)
[6] To attain this standard, the three-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. The 1997 standard—and the implementation rules for that standard—would remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
[7] The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1. As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact Areas.
Source: EPA 2008.

The study area lies within areas of Maricopa County designated by the EPA as being in nonattainment of the NAAQS for O_3 and PM_{10}. The study area also falls within a designated maintenance area for CO.

The Phoenix Ozone Nonattainment Area encompasses most of central and eastern Maricopa County, including the Phoenix metropolitan area. The Phoenix Particulate Matter Nonattainment Area encompasses the Phoenix metropolitan area and is defined as an area within eastern Maricopa County, approximately 60 miles wide by 50 miles long. The Phoenix Carbon Monoxide Maintenance Area is defined as the boundaries of MAG's planning area, which also includes the Phoenix metropolitan area.

Trends regarding air quality for specific monitored and nonattainment pollutants within Maricopa County are provided below.

Carbon Monoxide

The study area is within Maricopa County, where more than 70 percent of all human-caused CO comes from motor vehicle emissions. In 2009, Maricopa County achieved its thirteenth consecutive year of compliance with the 8-hour CO standard.

Particulate Matter

The study area is within Maricopa County, which is currently in nonattainment for PM_{10} (although it is in attainment for $PM_{2.5}$) and has not met the requirements set forth in the State Implementation Plan. As a result, the EPA is implementing a 5 percent reduction of emissions plan, including the possibility of sanctions. This plan, which is required by the Clean Air Act, will continue until Maricopa County can bring the particulate matter pollution into compliance.

Ground-Level Ozone

The study area is within Maricopa County, which is currently in nonattainment for O_3 pollution, although the number of violations of the standard has been decreasing in recent years. In February 2008, the EPA lowered the NAAQS for O_3 from 0.08 ppm to 0.075 ppm. Many of the O_3 monitoring sites that were in borderline compliance with the older standard are now exceeding the new standard. Strategies will have to be developed to lower ambient O_3 levels to comply with the new standard.

ADEQ and the Maricopa County Air Quality Department maintain a network of air monitoring sites throughout the county. Monitoring sites vary in the extent and number of pollutants monitored, with some sites monitoring one pollutant and others monitoring up to five pollutants. The air monitoring stations closest to the study area include Fountain Hills, Blue Point, Pinnacle Peak, Rio Verde, and South Scottsdale. The Fountain Hills site is approximately 1 mile southeast of the study area, the Blue Point site is approximately 8 miles southeast of the project area, the Pinnacle Peak site is approximately 12 miles northwest of the study area, and the Rio Verde site is approximately 4 miles north of the study area. These stations monitor year-round for O_3. The South Scottsdale site is approximately 25 miles southeast of the study area and monitors year-round for CO, $PM_{10,}$ O_3, NO_2, and SO_2. A summary of 2007–2009 air quality values from these sites are shown in Table 4. Data from the monitoring sites indicate the air quality in the central-eastern portion of Maricopa County has been good, with the exception of ozone.

3.6.1.1 Climate Change

The CEQ has issued draft guidance on when and how federal agencies should consider greenhouse gas (GHG) emissions and climate change in NEPA documents. The draft guidance includes a presumptive effects threshold of 25,000 metric tons of CO_2 equivalent emissions annually from an action (CEQ 2010). CEQ indicates this is not necessarily a threshold of significant effects, but rather an indicator of a minimum level of GHG emissions that should be considered.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Because the No Action Alternative would result in a violation of the Settlement Act, which would deprive the FMYN of its rights, the No Action Alternative is presented as a basis for comparison only.

Under the No Action Alternative, air quality would not be affected by the Proposed Action. No additional emissions or pollutants would occur in the study area.

3.6.2.2 Proposed Action

Any future construction activities by FMYN would be subject to applicable federal and tribal regulations and permitting requirements. Regardless of permitting requirements, the Proposed Action may result in minor temporary amounts of air emissions and pollutants caused by operation of vehicles and construction equipment in the event installation of additional diversions is necessary. Construction activities related to any future development that may occur on the Reservation would also result in minor, albeit temporary, amounts of air emissions and pollutants.

3.6.2.3 Climate Change

The Proposed Action would result in minor amounts of temporary emissions over an indefinite period in the event installation of new diversions is necessary and/or if any future development occurs. These actions would most likely take place during short periods over several years; it is anticipated there would be negligible impacts to/from climate change overall.

Table 4. Air Quality Data for Fountain Hills, Blue Point, Pinnacle Peak, Rio Verde, and South Scottsdale Monitoring Sites 2007–2009.

	Fountain Hills			Blue Point			Pinnacle Peak			Rio Verde			South Scottsdale		
	2007	**2008**	**2009**	**2007**	**2008**	**2009**	**2007**	**2008**	**2009**	**2007**	**2008**	**2009**	**2007**	**2008**	**2009**
Carbon Monoxide Max. 8-hr CO Avg. (PPM)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.6	1.5	1.4
Number exceedances 8-hr CO	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Particulate Matter (PM_{10}) Max. 24-hr PM_{10} Avg. ($\mu g/ m^3$)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	73	92	135
Number exceedances 24-hr PM_{10}	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Annual PM_{10} Avg. ($\mu g/ m^3$)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	30.6	25.1	25.5
Ozone Max. 8-hr O_3 Avg. (PPM)	0.083	0.080*	0.075	0.066	0.076*	0.073	0.076	0.080*	0.079*	0.082	0.081*	0.071	0.082	0.079*	0.074
O_3 #Daily Exceedances >0.075 ppm (as of 2009)	0	7	0	0	1	0	0	2	1	0	7	0	0	6	0
O_3 Three-year average of 4th High	0.082	0.079	0.074	0.072	0.070	0.067	0.078	0.074	0.072	0.083	0.080*	0.075	0.078	0.077	0.075
Nitrogen Dioxide (NO_2) Annual NO_2 Avg. (PPM)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0163	0.0146	0.0139
Sulfur Dioxide (SO2) Max. 24-hr SO_2 Avg. (PPM)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.005	0.005	0.006
No. of Exceedances SO_2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0
Annual SO_2 Avg. (PPM)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0019	0.0013	0.0012

[1] NAAQS is the three-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year that must not exceed 0.075 ppm (effective May 27, 2008); three years of data following the new standard will not be available until May 2011.
[2] NAAQS annual average for PM_{10} was revoked in September 2006.
[3] NAAQS annual average for $PM_{2.5}$ is 15 $\mu g/m^3$.
[4] NAAQS 24-hour average for PM_{10} is 150 $\mu g/m^3$ and for $PM_{2.5}$ is 35 $\mu g/m^3$.
*Indicates an exceedance of the standard.
Source: Maricopa County 2009 Air Monitoring Network Review.

3.6.3 Cumulative Effects

As described in Section 3.1—*Background for Cumulative Effects*, anticipated development projects in the study area include residential and commercial developments. If implemented, these proposed developments would result in an increase of vehicle emissions and construction-related fugitive dust and other pollutants in the impact area. No development tied to use of the "Other Water" is currently planned. Cumulative air emission impacts from residential or commercial development off-Reservation, if any, would occur only if on-Reservation construction activities, related to use of the "Other Water," happens to occur within the same airshed at the same time. As stated in Section 3.6.2.2, any future construction activities on the Reservation would be subject to applicable permitting requirements and federal and tribal regulations regarding air quality. Construction occurring within the study area off-Reservation, if any, would be subject to local ordinances regarding dust control.

In summary, any construction related to implementation of the Exchange Agreement would add minor temporary emissions and air pollutants in the immediate vicinity of the Proposed Action (i.e., the Reservation); however, any construction, either on- or off-Reservation, would be required to comply with dust control measures. It is anticipated the Proposed Action, when added to the impacts of other development that may be occurring in the study area at the same time, would have the potential to contribute only slightly, if at all, to cumulative air quality impacts for the duration of construction.

Any potential emissions of small quantities of GHG during construction would have a negligible cumulative effect on the global processes that contribute to climate change, when added to those types of emissions from other natural and anthropogenic sources.

3.7 Land Use

There would be no immediate (i.e., potential direct) impacts on land use from Reclamation's approval of the Exchange Agreement. The study area for evaluation of potential indirect land use impacts is the Reservation. The study area for analysis of cumulative impacts on land use is a 5-mile radius around the Reservation, which reflects the area within which there is private land adjacent to the Reservation in unincorporated eastern Maricopa County.

3.7.1 Affected Environment

The Reservation consists of approximately 24,000 square miles of land used for various purposes. The *Fort McDowell Indian Community Master Land Use Plan – Update* was completed in 1994. The Master Land Use Plan was adopted to "formally establish, and adopt, a plan which represents the goals, desires and feelings of the present members of the Community, regarding existing and future land use of the ultimate benefit of future generations" (FMIC 1994). The 1994 Plan describes the following existing and potential future land uses:

- Agricultural uses occur in the northwestern and central portion of the Reservation, covering approximately 2,000 acres. Primary crops include alfalfa, wheat, pecans, and citrus.
- Commercial uses are in the southwestern portion of the Reservation. Primary commercial uses include retail, lodging, and other low- and high-density commercial.
- A special use area has been identified for the southeastern portion of the Reservation.
- Scattered residential developments make up a large portion of the southwestern area of the Reservation.

- Recreational uses run along the Verde River and are located at other miscellaneous locations on the Reservation for the golf course, RV park, Fort McDowell Adventures, and other uses.
- Industrial uses make up a small part of the Reservation and include a nursery and landscape supply and gravel mining. These are in the south-central and southwestern portions of the Reservation.
- Open space and undeveloped areas make up a large portion of the Reservation. Open space is designated throughout the Reservation and wilderness is designated throughout the northeastern portion.
- Cultural resources are identified in a small area in the central part of the Reservation.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

The No Action Alternative would not change the land use patterns in or near the study area. The No Action Alternative is presented as a basis for comparison only because the No Action Alternative would result in a violation of the Settlement Act, which would deprive the FMYN of its rights.

3.7.2.2 Proposed Action

The full delivery of "Other Water" to FMYN through the Exchange Agreement could facilitate changes to existing land uses by FMYN. Land uses that require water to sustain them (e.g., agricultural, residential, and commercial) may be expanded to further FMYN goals. However, no additional development by FMYN is currently in the planning stages.

Potential impacts on land use from the installation of new water diversions (e.g., wells and pipelines) are impossible to quantify since the number and locations for points of diversion are unknown at this time. It is also unknown if new diversions would be constructed because existing structures may be sufficient.

Any construction of new diversions or development of land for residential, commercial, industrial, or agricultural purposes would be subject to applicable federal and tribal regulations and laws.

Because there is already substantial development on the Reservation and new developments are likely to be consistent with the existing development, conflicts with existing land uses are not expected to occur.

3.7.3 Cumulative Effects

As described in Section 3.1—*Background for Cumulative Effects*, a number of development projects are expected to be constructed in the study area outside of the Reservation. These actions would result in changes in existing land use in the study area. Most of the Reservation is not developed. However, much of the adjoining land in private ownership is already developed or has plans for development, and any changes in land use are anticipated to be consistent with current uses. The potential cumulative effects of the Proposed Action are not anticipated to be significant on land use given the reasonably foreseeable impacts of the Exchange Agreement when added to the impacts and scale of other development and proposed development in the study area.

3.8 Socioeconomic Resources

The analysis of social and economic conditions addresses the relationships between the Proposed Action and the communities it may affect. There would be no immediate (i.e., direct) impacts on socioeconomic resources from Reclamation's approval of the Exchange Agreement. The impact area for evaluation of indirect socioeconomic resource impacts is the Reservation. The study area for analysis of cumulative impacts on socioeconomic resources is northeastern Maricopa County because this is the smallest area for which data are available.

3.8.1 Affected Environment

Socioeconomic Resources

The Reservation is home to members of the FMYN, which is comprised of Yavapai people. The FMYN operates a number of business enterprises, including a resort and conference center, two golf courses, casino, RV park, gravel mining, adventure park, and a farm. The farm irrigates 620 acres of annual crops, 1,000 acres of pecans, and 325 acres of citrus (FMYN 2011b).

Within northeastern Maricopa County, the social and economic conditions that may be indirectly affected by the proposed Exchange Agreement include the cities and communities that are closest to the Reservation. The Town of Fountain Hills and the Salt River Pima-Maricopa Reservation are directly adjacent to the Reservation. The cities of Scottsdale, Mesa, and Tempe are nearby.

Arizona has experienced strong population growth over the past several decades. Between the 2000 and 2010 censuses, Arizona's population grew by 24.6 percent, and Maricopa County grew at an identical rate (Table 5), which makes Arizona the second-fastest growing state in the country for the decade, following Nevada (Census 2010).

Table 5. Arizona, Maricopa County, and Target Community Population Change, 2000–2010.

Population	2000	2010	% Change
Arizona	5,130,632	6,392,017	24.6
Maricopa County	3,072,149	3,827,117	24.6
Fountain Hills	20,235	22,444	22.5
Scottsdale	202,705	217,365	17.8
Mesa	396,375	439,929	22.2
Tempe	158,625	161,974	15.6

Source: Census 2000, 2010.

In the 2000 census, the Reservation had a population of 824 (Census 2000). The 2010 census results for the Reservation have not been released yet. The most recent population estimate available for the Reservation from the Census Bureau is the American Community Survey (ACS) estimate of 1,277 for 2009, which would be a 55 percent increase in population; the estimate has a margin of error of nearly 20 percent or +/-237 (Census 2011).

The communities near the Reservation also have been growing rapidly, although the rates of growth are somewhat lower than the state and Maricopa County (Table 5).

In the 2000 Census, the neighboring SRPMIC had a population of 6,405 (Census 2000). In 2010, the Census reported the Salt River Reservation had a population of 7,264, which is a 13.4 percent increase (Census 2010).

The growth rates in Arizona, Maricopa County, and the targeted communities are projected to be lower in the latter part of the next 20 years than current levels (Table 6).

Table 6. Historic and Projected Populations – Arizona, Maricopa County, and Targeted Communities.

	2010 Population	Projected Population			
		2020	% Change 2010–2020	2030	% Change 2020–2030
Arizona	**6,392,017**	8,779,567	37.3	10,347,543	17.9
Maricopa County	**3,827,117**	5,276,074	37.8	6,207,980	17.7
Fountain Hills	24,795	33,331	34.4	33,810	1.4
Scottsdale	217,365	269,266	23.9	286,020	6.2
Mesa	439,929	565,693	28.6	584,866	3.4
Tempe	161,974	191,881	18.5	197,970	3.2

Source: Census 2010; ACA 2006; MAG 2007.

Appropriate population projections for the Fort McDowell and Salt River reservations are not available.

While the ethnic and racial make-up of those living in Maricopa County is identical to that of the state overall, the populations within the targeted communities are more variable (Table 7). Demographic data for the Reservation are from the 2000 census because the 2010 census results are not available yet. In 2000, 93.6 percent of the population on the Reservation reported being at least part American Indian.

Table 7. Nonwhite and Hispanic Populations for Targeted Communities.

	Nonwhite (%)	Hispanic (%)
Arizona (2010)	27.0	29.6
Maricopa County (2010)	27.0	29.6
Fort McDowell Reservation (2000)	96.0	10.8
Fountain Hills (2010)	4.6	4.1
Salt River Reservation (2010)	77.8	14.5
Scottsdale (2010)	8.7	8.8
Mesa (2010)	19.9	26.4
Tempe (2010)	24.1	21.1

Source: Census 2000, 2010.

In 2010, Arizona's unemployment rate of 10 percent resulted in the state being ranked 37th in the United States (BLS 2011). The estimated 2009 unemployment rates for all targeted communities were at or below Arizona's unemployment rate with the exception of the Salt River Reservation and Mesa, which had higher unemployment rates of 12.4 and 13.3 percent, respectively (Table 8).

Household median income was significantly higher in Fountain Hills and Scottsdale than the other targeted communities, county, or the state. Fountain Hills and Scottsdale had per capita incomes approximately two to three times greater than the other locations listed in Table 8. The Salt River Reservation and Tempe had higher percentages of families below poverty level than Arizona and Maricopa County, while Fountain Hills and Scottsdale's percentages of families below poverty level were low (Table 8). Reliable data on unemployment and income are not available for the FMYN (Klopatek, FMYN, pers. comm. 2012).

Table 8. Economic Attributes for Targeted Communities in Maricopa and Yavapai Counties, 2009–2010.

	Civilian Labor Force	Unemployment Rate (%)	Household Median Income	Per Capita Income	Families Below Poverty Level (%)
Arizona (2010)	3,176,155	10.0	$48,711	$25, 203	12.5
Maricopa County (2010)	1,997,744	9.1	$53,284	$27,185	12.2
Fountain Hills (2009)	12,762	3.1	$78,393	$48,004	3.8
Salt River Reservation (2009)	1,395	12.4	$32,401	$15,205	19.9
Scottsdale (2009)	118,580	5.1	$68.824	$47,582	3.9
Mesa (2009)	210,511	13.3	$44,747	$21,918	11.5
Tempe (2009)	92,712	9.5	$45,151	$23,948	17.2

Source: Arizona Department of Administration (ADA) 2011a, 2011b, 2011c; Census 2010, 2011.

The civilian labor force of Maricopa County makes up about 47.8 percent of the county's total population, as compared to about 50.3 percent for the state overall (Census 2010; ADA 2011a). The top three employment categories for Maricopa County are "Trade, Transportation and Utilities," "Professional and Business," and "Education and Health Services." For Maricopa County, "Leisure and Hospitality" ranks as the fifth highest employment category out of nine defined service economic categories (ADA 2011b). Current employment data by sector are not readily available for the targeted communities.

FMYN pays SRP only for stored water that it orders. In 2011, FMYN paid $7.25/AF for SRP stored water (SRP 2011b). FMYN will have to pay substantially more for CAP water. For 2011/2012, the federal/tribal rate for CAP water is $122/AF (CAP 2011).

Environmental Justice

EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued by the President of the United States on February 11, 1994. This order established requirements to address environmental justice concerns within the context of agency operations. As part of the NEPA process, agencies are required to identify and address disproportionately high and adverse human health or environmental effects on minority or low-income communities. Federal agencies are directed to ensure that federal programs or activities do not result, either directly or indirectly, in discrimination on the basis of race, color, or national origin. The order also requires that "the responsibilities set forth shall apply equally to Native American programs."

The CEQ has provided guidance on addressing environmental justice under NEPA (CEQ 1997b). Under the guidance, minority populations are identified where the percentage of minorities in the affected area exceeds 50 percent, or where the minority population percentage of the affected area is meaningfully greater than the minority population percentage of a much broader area.

Within the study area, the Fort McDowell and Salt River communities constitute EO 12898 populations. Minority populations in each of these communities exceed 50 percent, consisting mostly of Native American tribal members (Table 7).

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Because the No Action Alternative would result in a violation of the Settlement Act, which would deprive the FMYN of its rights, the No Action Alternative is presented as a basis for comparison only.

Without the Exchange Agreement, development on the Reservation would be constrained by the existing water supply. Under the No Action Alternative, FMYN would not be able to beneficially use all of the water supplies provided to it through its water Settlement Act and Settlement Agreement. Extreme drought would require a reduction in water use, most likely in the agricultural sector, which would reduce income and employment on the Reservation. Additional development on the Reservation would not be possible without reducing water use in another economic sector, most likely agriculture.

3.8.2.2 Proposed Action

The overall socioeconomic impacts of implementing the Exchange Agreement would be positive for FMYN because the Proposed Action would provide a mechanism by which FMYN would be able to use its "Other Water," providing more flexibility in supporting existing and future uses during extreme droughts, as well as providing water supplies for additional development, if any, by FMYN. The cost of CAP water is much higher than FMYN's Verde River water supply; therefore, it is likely FMYN would order the exchange water after all other available sources have been used. This is especially true for agricultural use, which typically cannot justify using higher cost water supplies. Nevertheless, existing farming operations would directly benefit from the proposed exchange because it would provide a firm source of water during shortages and would add flexibility, which would enable the farming operations to better use all of FMYN's water sources. No new farming developments are being considered as a result of the Proposed Action (Klopatek, FMYN, pers. comm. 2012).

3.8.3 Cumulative Effects

Continued development in the study area off-Reservation would likely improve socioeconomic conditions within the study area. The positive effects of the Proposed Action on the Reservation, when added to the off-Reservation impacts, would reinforce the overall socioeconomic benefits in the study area and could be expected to benefit both directions across the Reservation boundary (i.e., employment opportunities).

Impacts on water quantity and quality within a study area can lead to socioeconomic impacts. As discussed in Section 3.2.3, minor beneficial to minor adverse cumulative impacts on water resources are anticipated as a result of the Proposed Action, when added to the impacts of additional development proposed to occur within the study area. Therefore, cumulative socioeconomic impacts within the study area are also expected to range from minor beneficial to

minor adverse impacts. Consequently, no disproportionately large and adverse cumulative impacts are anticipated to occur on the FMYN and SRPMIC communities as a result of the Proposed Action.

3.9 Resources Considered But Not Affected

3.9.1 Geology

Geologic resources were dismissed from further consideration. The minimal differences in water deliveries would have negligible impacts on the geology of the area along the Verde and Salt rivers (see Section 3.2). Because the need for and/or location of future water diversions is unknown at this time, an assessment of impacts on geology resulting from construction is not possible. The potential for future development on the Reservation is also unknown at this time. As such, it is not possible to quantify effects on geology from future development.

3.9.2 Visual

The Proposed Action would not result in impacts on visual resources in the study area. As discussed in Section 3.2, the Exchange Agreement would result in minimal differences in water deliveries and would not be visible to the human eye; and as such, no visual impacts would occur to water resources (e.g., Verde and Salt rivers). Because the need for and/or locations of potential future diversions on the Verde River by FMYN are unknown at this time, it is not possible to assess impacts on visual resources. Future development by FMYN is also unknown and any attempt to quantify visual impacts from construction and other development-related activities would be speculative.

3.9.3 Groundwater

The Proposed Action would not affect groundwater resources because it only involves surface water, and use of the surface water is not anticipated to affect groundwater resources. Additional information on groundwater resources in the area is provided in Appendix C.

4.0 Environmental Laws and Directives Considered

This section presents a summary of selected federal laws, regulations, and EOs considered in preparation of this EA.

National Environmental Policy Act of 1969, as amended (P.L. 91-190)

This law requires federal agencies to evaluate the potential environmental consequences of major federal actions. NEPA also requires full public disclosure about the Proposed Action, accompanying alternatives, impacts, and mitigation.

Public and agency scoping was initiated on October 18, 2011. Two written comments were received from agencies and no public comments were received. No public scoping meetings were held for this EA. This draft EA was prepared in accordance with NEPA requirements.

Fish and Wildlife Coordination Act (FWCA) (P.L. 85-624)

The FWCA provides a procedural framework for the consideration of fish and wildlife conservation measures in federal water resource development projects. Coordination with the FWS is required on all federal water development projects. The effects of the CAP were originally addressed in an amended FWCA report prepared by the FWS in 1989. A scoping notice for this EA was sent to the Arizona Ecological Service office of the FWS and no concerns

were expressed by that agency with respect to FWCA. No further coordination pursuant to the FWCA is anticipated.

Endangered Species Act (ESA) of 1973 (P.L. 93-205)

The ESA provides protection for plants and animals that are currently in danger of extinction (endangered) and those that may become extinct in the foreseeable future (threatened). Section 7 of this law requires federal agencies to ensure that all federally associated activities do not have adverse impacts on the continued existence of threatened or endangered species or designated areas (critical habitat) that are important in conserving those species. Based on the evaluation in Sections 3.3.2 and 3.3.3, Reclamation has concluded the Proposed Action would not affect any federally listed species and that a separate BA does not need to be prepared.

The Migratory Bird Treaty Act (MBTA) of 1918, as amended

The MBTA implements various treaties and conventions between the United States and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. The MBTA prohibits the take, possession, import, export, transport, sale, or purchase of any migratory bird, their eggs, parts, or nests. FMYN currently has no formalized development plans associated with the exchange water. Therefore, a discussion of impacts on migratory bird species is too speculative to describe in this EA.

Wild and Scenic Rivers Act of 1968 (P.L. 90-542)

This law designated the initial components of the National Wild and Scenic River System, and established procedures for including other rivers or reaches of rivers that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, and preserving them in a free-flowing condition. The act applies to waters designated, or eligible for designation, as wild and scenic. Although Congress designated a portion of the Verde River as a Wild and Scenic River in 1984, the designated stream reach lies upstream of the Reservation, north of Horseshoe.

Wilderness Act of 1964 (P.L. 88-577, as amended)

This law established a National Wilderness Preservation System to be comprised of federally owned areas designated by Congress as "wilderness areas," to be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, provide for the protection of these areas, and preserve their wilderness character. No portions of the Reservation or the Salt and Verde rivers below the upstream ends of Horseshoe and Roosevelt Lake are designated wilderness areas, or are eligible for designation.

Clean Water Act (P.L. 92-500, as amended) (CWA)

This law establishes the basic structure for regulating discharges of pollutants into the nation's rivers, lakes, estuaries, and coastal waters. Under Section 404 of the CWA, the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged and/or fill material into waters of the U.S. including wetlands. If waters of the U.S. might be affected by construction of potential future diversions by FMYN, a delineation of waters of the U.S. and application(s) for 404 permit(s) would be submitted to the Corps by FMYN. Similarly, if needed, a permit under Section 402 of the CWA, the National Pollutant Discharge Elimination System (NPDES), would be obtained from the EPA by FMYN prior to construction. If required in the future, a CWA Section 401 certification would be obtained from the EPA by FMYN.

National Historic Preservation Act (P.L. 89-665) (NHPA)

Reclamation will provide notice to the Arizona State Historic Preservation Officer (SHPO) after completion of the final EA. The appropriate Native American tribes are being sent this draft EA for their information, namely the SRPMIC, Tonto Apache Tribe, Yavapai Apache Nation, and the Yavapai Prescott Indian Tribe.

Farmland Protection Policy Act (P.L. 97-98)

This law requires identification of proposed actions that would adversely affect any lands classified as prime and unique farmlands to minimize the unnecessary and irreversible conversion of farmland to nonagricultural uses. The U.S. Department of Agriculture's Natural Resources and Conservation Service administers this law. It is not anticipated that any future land development would impact any prime or unique farmlands.

Executive Order 11988 (Floodplain Management)

This Presidential directive encourages federal agencies to avoid, where practicable alternatives exist, the short- and long-term adverse impacts associated with floodplain development. Federal agencies are required to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains in carrying out agency responsibility. Because floodplains are subject to flooding, their development has generally been avoided by the FMYN. It is not anticipated that any future land development would impact floodplain development and management.

Executive Order 12898 (Environmental Justice)

EO 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of federal actions on minority populations and low-income populations. As noted in Section 3.8.1, the FMYN and SRPMIC communities constitute environmental justice populations. Overall, the impacts from the Proposed Action are expected to be beneficial to the FMYN. As described in Section 3.2.2.2, the SRPSIM model indicates there could be a slight reduction in the water supply available to SRPMIC from Bartlett storage under the Proposed Action; however, this is not anticipated to result in disproportionately high and adverse impacts on SRPMIC community members because this was anticipated and accounted for during the SRPMIC and FMYN water settlement negotiations. Thus, the Proposed Action is not an environmental justice consideration.

Executive Order 11990 (Wetlands)

EO 11990 requires federal agencies, in carrying out their land management responsibilities, to take action that would minimize the destruction, loss, or degradation of wetlands; and take action to preserve and enhance the natural and beneficial values of wetlands. No wetlands are anticipated to be affected by the Proposed Action. As noted above in the discussion under CWA, for any future activity that may affect waters of the U.S., including wetlands, the FMYN would be subject to the requirements of Section 404 of the CWA.

Department of the Interior, Secretarial Order, Indian Trust Assets (ITAs)

ITAs are legal interests in assets held in trust by the U.S. Government for Native American tribes or individual Native Americans. These assets can be real property or intangible rights including lands, minerals, water rights, hunting rights, other natural resources, and money. The trust responsibility requires that all federal agencies take actions reasonably necessary to protect ITAs. The water rights provided by the Settlement Agreement and Settlement Act are held in trust by the United States for the benefit of the FMYN (Settlement Act, Paragraph 22.9) and are assets of

the FMYN and United States on behalf of the FMYN. The Proposed Action is consistent with protection and use of these ITAs.

5.0 Agencies and Persons Consulted

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Appendix A

AGREEMENT AMONG THE FORT MCDOWELL YAVAPAI NATION, THE SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT, AND THE SALT RIVER VALLEY WATER USERS' ASSOCIATION FOR EXCHANGE OF WATER FROM THE VERDE RIVER FOR CENTRAL ARIZONA PROJECT WATER

DRAFT

8/11/2011

AGREEMENT AMONG THE FORT MCDOWELL YAVAPAI NATION, THE SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT, AND THE SALT RIVER VALLEY WATER USERS' ASSOCIATION FOR EXCHANGE OF WATER FROM THE VERDE RIVER FOR CENTRAL ARIZONA PROJECT WATER

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1. PREAMBLE:

THIS AGREEMENT, is made this _____ day of _____ 2011, pursuant to the Reclamation Act of June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto including, but not limited to the Colorado River Basin Project Act of September 30, 1968 (82 Stat. 885), as amended, the Fort McDowell Indian Community Water Settlement Agreement, dated January 15, 1993, and the Fort McDowell Indian Community Water Rights Settlement Act of November 28, 1990, Public Law 101-628, (hereinafter referred to as the "Act"), among the FORT McDOWELL YAVAPAI NATION (hereinafter referred to as the "FMYN"), the SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT and the SALT RIVER VALLEY WATER USERS' ASSOCIATION (hereinafter jointly referred to as the "Salt River Project" or "SRP"), each individually hereinafter called "Party" and collectively called "Parties"; which Agreement has been approved by the UNITED STATES OF AMERICA (hereinafter referred to as "United States"), acting through the Secretary of the Interior, represented by the Bureau of Reclamation.

2. RECITALS:

This Agreement is made with regard to the following facts, among others:

2.1 On January 15, 1993, FMYN, the United States of America, the State of Arizona, SRP, the Roosevelt Water Conservation District, the Central Arizona Water Conservation District and the Arizona Cities of Phoenix, Scottsdale, Glendale, Mesa, Tempe, and Chandler and the Town of Gilbert entered into the Fort McDowell Indian Community Water Settlement Agreement ("Settlement Agreement"), which, among other things, provides for FMYN's use of Central Arizona Project ("CAP") water through exchange with SRP subject to additional agreements. The Settlement Agreement became effective on February 7, 1994.

2.2 FMYN has executed a water delivery contract ("Contract") with the United States, dated December 11, 1980, and amended effective February 7, 1994, for the delivery of water from the CAP, Contract No. 3-07-30-W0308, as amended. The Contract provides that this Agreement is subject to approval by the United States.

2.3 Due to the location of the FMYN Reservation, the FMYN cannot physically take delivery of its CAP Water at the current time, but desires to benefit from its CAP Water entitlement by diverting water from the Verde River through a water exchange agreement with SRP.

2.4 SRP shareholders have certain water rights to the Verde River and its tributaries, and SRP has the physical capability to take delivery of, and use, CAP Water, thereby being in position to facilitate an exchange of water from the Verde River for FMYN's CAP Water.

2.5 Pursuant to the terms and conditions of this Agreement, FMYN desires to exchange, and SRP is willing to accept, FMYN CAP Water in exchange for waters of the Verde River diverted by FMYN.

3. DEFINITIONS:

3.1 "Central Arizona Project" hereinafter referred to as "CAP," shall mean the Central Arizona Project, a reclamation project authorized under Title 3 of the Colorado River Basin Project Act of 1968 (43 U.S.C. §1521, et seq.).

3.2 "CAP Water" shall mean water delivered pursuant to FMYN's CAP Water Delivery Contract No. 3-07-30-W0308, dated December 11, 1980, as amended, excluding that CAP water leased to the City of Phoenix pursuant to Paragraph 20.1.7 of the Settlement Agreement.

3.3 "Credit(s)" shall mean the amount of CAP Water the United States or FMYN delivers to SRP as measured at the United States' measurement device on the common component of the CSIF, multiplied by the return flow factor as prescribed in Paragraph 7.2.2 of the Settlement Agreement, and subsequently recorded in the Exchange Account.

3.4 "CSIF" shall mean the CAP/SRP Interconnection Facility located on the Hayden-Rhodes aqueduct of the CAP canal that provides the physical ability for the diversion of CAP Water into the SRP water delivery system.

3.5 "Debit(s)" shall mean the amount of Verde River water FMYN diverts directly from the Verde River and/or from wells operated by FMYN, as measured pursuant to Paragraph 7.3 of the Settlement Agreement and as recorded in the Exchange Account.

3.6 "Exchange Account" shall mean the record of Credits and Debits maintained by SRP pursuant to this Agreement.

3.7 "Operating Agency" shall mean the entity authorized by the Bureau of Reclamation to operate, maintain, and replace the CAP Water delivery system (currently the Central Arizona Water Conservation District).

3.8 “Secretary” shall mean the Secretary of the Interior of the United States of America, or his or her duly authorized representative.

4. EFFECTIVE DATE AND TERM OF AGREEMENT:

4.1 This Agreement shall become effective upon execution by the Parties and approval by the United States, and shall remain in effect until the earlier of the following:

4.1.1 January 1, 2061;

4.1.2 The date of expiration or termination of the FMYN CAP Water Contract;

4.1.3 The date of termination of this Agreement pursuant to Paragraph 4.2 of this Agreement;

4.1.4 The date of termination of this Agreement pursuant to Paragraph 22.1 of this Agreement;

4.1.5 The date of termination of this Agreement due to default pursuant to Paragraph 24.3 of this Agreement.

4.2 In the event FMYN becomes capable of accepting delivery of CAP water directly for use on its Reservation, FMYN may terminate this Agreement upon provision of sixty (60) days notice of such occurrence to SRP as provided in section 21 herein.

4.3 FMYN may request an extension of the term of this Agreement for an additional fifty (50) years subject to terms and conditions mutually agreed upon by the Parties at that time. Any such extension shall be subject to approval by the United States.

5. EXCHANGE OF WATER:

5.1 On or before August 15, and on or before December 31 of each year, or the next business day thereafter, SRP shall notify FMYN of the current Verde River reservoir storage levels and a non-binding runoff projection for the Verde River watershed through April 30 of the following year. Such projection shall include a forecast of drought conditions on the Verde River watershed and the likelihood of any reservoir spill on the Verde River through April 30 of the following year.

5.2 On or before September 1 of each year, or the next business day thereafter, FMYN shall notify SRP of its proposed CAP Water monthly delivery schedule for the following calendar year (up to 13,933 acre-feet per year).

5.3 On or before September 22 of each year, or the next business day thereafter, SRP shall notify FMYN of its preferred CAP Water monthly delivery schedule for the following calendar year, which may include revisions to FMYN's proposed CAP Water monthly delivery schedule. FMYN and SRP may consult and agree to revise the CAP monthly delivery schedule as necessary.

5.4 On or before October 1 of each year, FMYN shall notify the Operating Agency of FMYN's CAP Water monthly delivery schedule for the following calendar year as determined pursuant to Section 5.3 of this Agreement. In the event the Operating Agency cannot deliver FMYN CAP Water to SRP according to the CAP Water monthly delivery schedule agreed to by the Parties pursuant to Section 5.3 of this Agreement, FMYN shall notify SRP and the Parties shall work together with the Operating Agency to develop a schedule that is acceptable to SRP. In the event that an increase or decrease in the amount of CAP Water is necessary to conduct the water exchange under this Agreement, SRP and FMYN shall seek to modify or cancel the CAP Water monthly delivery schedule in accordance with the Operating Agency's scheduling procedures and FMYN's Contract.

5.5 In the event that SRP and FMYN cannot agree on a CAP Water monthly delivery schedule for the following calendar year, then no exchange of water shall occur for that calendar year unless and until such CAP Water monthly delivery schedule can be agreed to.

5.6 In the event a water exchange is to occur during any calendar year pursuant to this Agreement, in accordance with Section 10.6 of this Agreement, FMYN shall cause to be delivered

to SRP from the CSIF an amount of CAP Water it diverts under this Agreement from the Verde River and/or from wells operated by FMYN on the FMYN Reservation, less the return flow factor as prescribed in paragraph 7.2.2 of the Settlement Agreement. Exchange quantities shall be on an acre-foot for acre-foot basis after application of the return flow factor.

6. DIVERSION OF WATER:

6.1 Diversions of water by FMYN hereunder shall be made from the Verde River or from groundwater pumping on the FMYN Reservation in accordance with Paragraphs 7.0 and 17.0 of the Settlement Agreement and only for the uses provided for in Paragraph 15.0 of the Settlement Agreement.

6.2 FMYN shall be exclusively responsible for the diversion and delivery of all Verde River water and groundwater it diverts under the terms of this Agreement including, but not limited to, all capital costs for diversion works and operation and maintenance costs.

6.3 In no event shall diversions of Verde River water and groundwater by FMYN pursuant to this agreement exceed 14,666 acre feet (13,933 acre-feet multiplied by the return flow factor as prescribed by Paragraph 7.2.2 of the Settlement Agreement) per year.

7. SHORTAGES:

7.1 Diversions of water by FMYN hereunder shall be subject to the potential limitations and conditions described in Paragraphs 6.3 and 22.12 of the Settlement Agreement. In accordance with Paragraph 6.3 of the Settlement Agreement, SRP assumes no liability whatsoever with respect to the quantity or allocation of shortages of water available from the Verde River for exchange pursuant to this Agreement.

7.2 In no event shall SRP, its governing bodies, officers, directors, governors, agents, or employees be liable for any costs or damages, direct or indirect, of whatsoever nature, arising out of or in any way connected with any suspension or reduction in the diversion of Verde River water pursuant to this Agreement or with any shortage in the quantity of water available for exchange hereunder, under conditions set out in Paragraph 6.3 of the Settlement Agreement. SRP assumes no liability whatsoever with respect to the quantity, or allocation of shortages, of water available

from the CAP water delivery system for diversion by SRP pursuant to this Agreement. In no event shall SRP, its governing bodies, officers, directors, governors, agents, or employees be liable for any costs or damages, direct or indirect, of any nature, arising out of or in any way connected with any suspension or reduction in the diversion of CAP Water from the CAP water delivery system pursuant to this Agreement.

7.3 SRP acknowledges that the ability of the United States and FMYN to provide CAP Water to SRP is subject to the terms and conditions of FMYN's Contract with the Secretary, including but not limited to the physical capability and condition of the CAP water delivery system and CAP Water supply conditions, and forces beyond the control of the United States and FMYN.

8. WATER QUALITY:

Neither SRP nor FMYN make any representation or any warranty as to the quality of water it gives to another Party or any of them pursuant to this Agreement. Each Party assumes the responsibility for treating the water it receives pursuant to this Agreement to meet present or future water quality standards established by federal, state, or local authorities and applicable to the purpose for which the water is being used or for any other purpose.

9. MEASURING DEVICES AND RIGHT OF ACCESS:

Measurement and recording devices for all diversions of Verde River water and groundwater shall be installed and maintained by FMYN in accordance with Paragraph 7.3 of the Settlement Agreement. SRP shall have the right to install, operate, repair and maintain, at SRP's expense, water flow sensing and telemetry equipment on any or all water flow measuring devices for purposes of remotely monitoring water diversion or return flow by or on behalf of FMYN. SRP shall have the right of access to inspect and verify the accuracy of such devices, all in accordance with Paragraph 7.3 of the Settlement Agreement.

10. ACCOUNTING FOR THE EXCHANGE:

10.1 SRP shall establish and maintain an Exchange Account for the exchange of FMYN CAP Water as prescribed by Paragraph 7.4 of the Settlement Agreement, at no cost to FMYN.

10.2 In accordance with Paragraph 7.2.2 of the Settlement Agreement, the Exchange Account shall be credited with the amount of CAP Water that FMYN has caused to be delivered to SRP through the CSIF, subject to the capability of SRP to beneficially use FMYN CAP Water due to the following:

10.2.1 FMYN CAP Water delivered to SRP but spilled from the SRP water delivery system due to the determination by SRP that degradation of water quality in the SRP water delivery system is occurring or may occur as a result of the introduction of CAP water through the CSIF. Such spill shall be in proportion to all other CAP water in SRP's water delivery system at the time of the spill. SRP shall notify FMYN of such spill as soon as possible.

10.2.2 FMYN CAP Water delivered to SRP but spilled from the SRP water delivery system during periods of spillage from Granite Reef Dam or the SRP water delivery system. Such spill shall be in proportion to all other CAP water in SRP's water delivery system at the time of the spill. SRP shall notify FMYN of such spill as soon as possible.

10.3 In the event SRP is not capable of taking delivery of FMYN CAP water due to emergencies, including storm conditions, or operational constraints and required maintenance and repairs of the CSIF or the SRP water delivery system, as determined solely by SRP, FMYN CAP Water shall not be credited to the Exchange Account. SRP shall notify FMYN as soon as possible of such occurrence and FMYN, in cooperation with Reclamation and the Operating Agency, shall be responsible for locating an alternative delivery location for the FMYN CAP Water in accordance with the Contract.

10.4 SRP shall have no obligation to replace or pay for any portion of FMYN CAP Water that SRP could not beneficially use or that was spilled pursuant to Section 10.2 of this Agreement, or that was not delivered to SRP pursuant to Section 10.3 of this Agreement.

10.5 Credits recorded in the Exchange Account shall be subject to the maximum limitation, evaporation losses, and spillage from storage as prescribed by Paragraphs 7.2.2 and 22.8 of the Settlement Agreement.

10.6 In accordance with Paragraph 7.2.2 of the Settlement Agreement, there shall be a positive balance in the Exchange Account prior to the diversion of any Verde River water and groundwater by FMYN under this Agreement.

10.7 The Exchange Account shall be debited with the amount of Verde River water diverted by FMYN pursuant to Paragraph 7.2 of the Settlement Agreement and in accordance with the procedures outlined in Paragraph 7.4 of the Settlement Agreement.

10.8 Credits in the FMYN Exchange Account that remain as of midnight December 31 of any calendar year shall be carried forward to the next calendar year.

11. CAP WATER COSTS AND CSIF DELIVERY FEE:

The United States and FMYN shall pay the Operating Agency in accordance with the Operating Agency's payment policies for the CAP Water to be delivered at the CSIF prior to being entitled to divert Verde River water pursuant to this Agreement. In accordance with Paragraph 14.2 of the Settlement Agreement, no delivery fee will be charged to FMYN for SRP accepting delivery of CAP Water at the CSIF for exchange.

12. WATER RIGHTS:

This Agreement shall not be construed to recognize, confirm, ratify, validate, create, transfer, forfeit, abandon, or otherwise affect water rights.

13. ADMINISTRATION:

Each Party shall designate a representative ("Authorized Representative") and an alternate to carry out the provisions of this Agreement. The alternate shall act only in absence of the Authorized Representative. All decisions and agreements of the Authorized Representatives shall be in writing and signed by all Authorized Representatives.

14. BOOKS, RECORDS, AND REPORTS:

Subject to applicable Federal laws and regulations, each Party shall have the right during office hours to examine and make copies of the other Party's books and records relating to matters covered by this Agreement.

15. UNCONTROLLABLE FORCES:

No Party shall be considered to be in default in the performance of any of its obligations hereunder when a failure of performance shall be due to uncontrollable forces. The term "uncontrollable forces" shall mean any cause beyond the control of the Party unable to perform such obligation, including, but not limited to, failure of or threat of failure of facilities, flood, earthquake, storm, fire, lightning and other natural catastrophes, epidemic, war, riot, civil disturbance or disobedience, strike, labor dispute, labor or material shortage, sabotage, government priorities and restraint by court order or public authority, and governmental or regulatory action, inaction or failure to grant the necessary authorizations or approvals which by exercise of due diligence such Party could not reasonably have been expected to avoid and which by exercise of due diligence it shall be unable to overcome. Nothing contained herein shall be construed to require either Party to settle any strike or labor dispute in which it is involved.

16. MODIFICATION TO AGREEMENT:

This Agreement cannot be modified or amended in any manner except in writing and signed by the Parties.

17. ASSIGNMENT LIMITED – SUCCESSORS AND ASSIGNS OBLIGATED:

The provisions of this Agreement shall apply to and bind the successors and assigns of the Parties hereto, but no assignment or transfer of this Agreement or any right or interest therein shall be valid until approved in writing by all the Parties of this Agreement.

18. WAIVER:

The waiver by any Party of any breach of any term, covenant or condition in this Agreement shall not be deemed a waiver of any subsequent breach of the same or any other term, covenant or condition in this Agreement.

19. GOVERNING LAW:

This Agreement is made in accordance with, and its interpretation shall be governed by, the laws of the State of Arizona.

20. HEADINGS:

Titles and paragraph headings in this Agreement are for reference only and are not part of the Agreement among the Parties.

21. NOTICES:

Any notice, demand or request required by this Agreement shall be deemed to have been mailed, postage prepaid, or delivered to the following:

(a) Salt River Project
Associate General Manager, Resource Management, MS PAB 232
PO Box 52025
Phoenix, Arizona 85072-2025
Ref. FMYN CAP Water Exchange

(b) Fort McDowell Yavapai Nation
c/o President
P. O. Box 17779
Fountain Hills, Arizona 85269

(c) Regional Director
Bureau of Reclamation
Lower Colorado Region
PO Box 61470
Boulder City, Nevada 89006-1470
Ref. FMYN CAP Exchange

(d) Area Manager
Bureau of Reclamation
Phoenix Area Office
6150 W. Thunderbird Road
Glendale, Arizona 85306
Ref. FMYN CAP Exchange

The designation of the addressee and the address shall be changed by notice given in the same manner as provided above.

22. RESOLUTION OF DISPUTES:

22.1 A Party may give notice to the other Parties of any dispute arising from this Agreement. In the case of any dispute, the representatives of the Parties shall attempt to work together to reach consensus on how to resolve the dispute. In the event that the Parties cannot reach consensus, a Party may seek a judicial determination in U.S. District Court for the District of Arizona to interpret or enforce this Agreement. FMYN may be joined as a party to any request for the interpretation or enforcement of this Agreement as provided in Section 411(a) of the Act. In the event that FMYN successfully asserts their immunity from suit for the interpretation or enforcement of this Agreement, SRP may terminate this Agreement upon sixty (60) days written notice. Nothing in this Section is intended to diminish the right of any Party to terminate this Agreement in the event of a default Pursuant to Section 24.3 of this Agreement.

22.2. Pending the resolution of a dispute pursuant to this Section 22, the Parties shall proceed, to the legal extent possible, in a manner consistent with this Agreement, and shall make monetary and non-monetary payments required in accordance with this Agreement. Monetary and non-monetary amounts paid by a Party during the pendency of a dispute shall be subject to refund and adjustment upon a final resolution of any dispute involving such amounts. Upon such final resolution, the owed amounts shall be remitted in accordance with procedures/arrangements as agreed to by the Parties.

23. OFFICIALS NOT TO BENEFIT:

No member of or Delegate to Congress, Resident Commissioner or official of the Parties to this Agreement shall benefit from this Agreement other than as a water user or landowner in the same manner as other water users or landowners.

24. DEFAULTS:

24.1 In the event of a default by a Party in any of the terms and conditions of this Agreement, then, within thirty (30) days following the giving of written notice of such default by the non-defaulting Party or Parties, the defaulting Party shall remedy such default.

24.2 In the event that a Party shall dispute an asserted default, such Party shall remedy such default, but may do so under protest. The protest shall be in writing. After the remedy of such default, the dispute shall be resolved pursuant to Section 22 of this Agreement.

24.3 In the event that a default by a Party continues for a period of sixty (60) days following the notice provided for in Section 24.1 of this Agreement without such default being cured by the defaulting Party, this Agreement terminates upon written notification by a non-defaulting Party to the Parties.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement No. _____ the day and year first above written.

Attest:

By: _____
Secretary

Date:_____

FORT MCDOWELL YAVAPAI NATION

By:_____
President

Date:_____

SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT

Attest and Countersign:

By: _____
Corporate Secretary

Date:_____

By:_____
President

Date:_____

Approved as to form:

_____

Date:_____

SALT RIVER VALLEY WATER USERS' ASSOCIATION

Attest and Countersign:

By: _____ By: _____

Corporate Secretary President

Date:_____ Date:_____

Approved as to form:

_____

Date:_____

Reviewed and approved pursuant to Section 5.1 of the Contract:

THE UNITED STATES OF AMERICA

By: _____ By: _____

Field Solicitor Regional Director

Phoenix, Arizona Lower Colorado Region

Bureau of Reclamation

Date:_____ Date:_____

Appendix B

United States Department of the Interior
BUREAU OF RECLAMATION
Phoenix Area Ofiice
6150 West Thunderbird Road
Glendale, Arizona 85306-4001

IN REPLY REFER TO:

PXAO-1500
ENV-6.00

OCT 18 2011

MEMORANDUM

To: All Interested Parties, Organizations and Agencies

From: Randy N. Chandler
Area Manager

Subject: Notice of Public Scoping for Preparation of an Environmental Assessment (EA) on the Proposed Fort McDowell Yavapai Nation Exchange Agreement with Salt River Project for Central Arizona Project Water (Action by November 4, 2011)

The Bureau of Reclamation must approve the proposed Exchange Agreement described below between the Fort McDowell Yavapai Nation (FMYN) and the Salt River Project Agricultural Improvement and Power District/Salt River Valley Water Users' Association (collectively SRP). Pursuant to the National Environmental Policy Act, Reclamation is requiring preparation of an EA to describe the existing environment and environmental impacts, if any, from the proposed Exchange Agreement. Reclamation is inviting the public to provide input regarding issues and concerns that should be addressed in the EA.

BACKGROUND

The Fort McDowell Indian Community Water Rights Settlement Act (Settlement Act) was signed into law on November 28, 1990 (Public Law 101-628, Title IV; 104 Stat. 4480). The Settlement Act provides for settlement of FMYN's water rights claims against Federal, state, and local entities, for the annual diversion of up to 36,350 acre-feet per year to FMYN. On January 15, 1993, the following entities entered into the Fort McDowell Indian Community Water Settlement Agreement, (Settlement Agreement): FMYN; the United States of America; the State of Arizona; SRP; the Roosevelt Water Conservation District; the Central Arizona Water Conservation District (CAWCD); the Arizona cities of Phoenix, Scottsdale, Glendale, Mesa, Tempe, and Chandler; and the Town of Gilbert. The Settlement Agreement became effective on February 7, 1994.

The Settlement Agreement, among other things, provides for FMYN's use of "Other Water" through an exchange with SRP, subject to additional agreements. The proposed Exchange Agreement between FMYN and SRP will provide the means for FMYN to take and use this "Other Water," which consists of CAP water up to the entitled amount of up to 13,933 acre-feet annually (afa).

FMYN cannot take delivery of the CAP water because of Fort McDowell Reservation's location upstream from the CAP canal, but can divert water directly from the Verde River or indirectly through wells along the river. SRP can take delivery of CAP water at its CAP/SRP Interconnection Facility. The proposed Exchange Agreement would allow up to 13,933 afa of FMYN's CAP water to be delivered to SRP and, in exchange, the FMYN could divert up to 14,666 afa (including return flow credits) of Verde River water, subject to limitations established in the Settlement Agreement.

Note: The information contained in the EA regarding FMYN water use and related resources will be presented for background and descriptive purposes only. The terms of the FMYN's water entitlement and use are established under Federal law through the Settlement, and nothing in the EA is intended to suggest that any of those provisions are subject to reconsideration, limitation, or alteration through the EA or review of the proposed Exchange Agreement.

PUBLIC SCOPING COMMENTS

Reclamation is preparing an EA to describe project alternatives and anticipated environmental impacts. Attached is a map of the Fort McDowell Reservation and pertinent features of the surrounding area. The potential impacts, if any, addressed in the EA include, but are not limited to: water resources, biological resources, recreation, air quality, land use, cultural resources, and socioeconomic resources.

Reclamation is interested in receiving your input regarding potential impacts of the proposed action and/or other concerns and issues that should be addressed in the EA. To be most helpful, comments should be as specific as possible and sent to Reclamation by November 4, 2011, at the above address, Attention: PXAO-1500 (Ms. Sandra Eto). Before including your name, address, phone number, email address, or other personal identifying information in your comment, please be aware that your entire comment--including your personal identifying information--may be made publicly available at any time. While you may request that we withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

If you have any questions, please contact Ms. Eto at Reclamation's Phoenix Area Office, 623-773-6254, write to her at the above address, Attention: PXAO-1500, or email her at seto@usbr.gov.

Thank you for your interest in this project.

Appendix C

Appendix C

Water Resources – Existing Conditions

[Abbreviations and Acronyms are listed in the Environmental Assessment at the front, and citations are in Section 6.0]

C.1 Overview

The study area has a semiarid climate, exhibiting a range of temperature and precipitation conditions (Beyer 1997). Precipitation in the watershed tends to be seasonal, induced in the winter by frontal storms and in the summer by monsoon convectional events (Owen-Joyce and Bell 1983; Owen-Joyce 1984). Precipitation in the study area occurs as rain (no snowfall), with an annual average of 10 inches on the Reservation to 16 inches at the uppermost reservoirs on the Verde River (ADWR 2010). The largest runoff in the Verde River commonly occurs between March and April from snowmelt in the upper elevations of the watershed. May and June are the driest months. About 40 percent of the precipitation occurs in July, August, and September during short-duration, intense thunderstorms associated with monsoon patterns (Owen-Joyce 1984).

The climate of the study area is typical of southwestern deserts with short, mild winters and long, hot summers. June and July are generally the hottest months, while December and January are the coldest. Maximum July temperatures average 105.1°F, while minimum January temperatures average 36.4°F (Farrer 1992).

The Verde River is a perennial stream with a contributing drainage area of approximately 6,250 square miles (U.S. Geological Survey (USGS) 2011a; ADWR 2010). Sycamore Creek is a tributary to the Verde River on the west side of the Mazatzal Mountains and enters the Verde River just north of the community of Fort McDowell. This stream typically shows no surface flow on the Reservation except during periods of extended and heavy rainfall; it contributes little on average to the overall flow of the Verde River downstream. Sycamore Creek has a drainage area of 164 square miles (USGS 2011b).

Surface water quality is generally suitable for all uses on the Reservation (ADWR 2010).

Perennial flow in the Verde River and its major tributaries upstream of the study area is maintained by groundwater discharge from several large geologic units – the Verde Formation, Coconino Sandstone, Supai Formation, Naco Formation, Redwall Limestone, Martin Formation, and Tapeats Sandstone (Owen-Joyce and Bell 1983).

A variety of factors influences the hydrologic system of the Verde River. These factors include precipitation, streamflow, subsurface flow, inflow (e.g., recharge) to and outflow (e.g., spring discharge) from groundwater aquifers, and water loss from evaporation and evapotranspiration. Human influences on these factors include surface water diversions, pumping from the alluvial aquifers and source aquifers, climate change, and changes in watershed conditions that affect runoff amounts and patterns (Id.).

The Verde River joins the Salt River about 1 mile downstream of the southern boundary of the Reservation. The confluence of the Verde and Salt rivers is about 3 miles upstream of SRP's

CSIF, which is near SRP's Granite Reef Diversion Dam where all of the flow of the Salt River is normally diverted from the Salt River (Figure 1 on page 3 of the EA).

Verde River flows are comprised of baseflow from groundwater discharge and runoff due to winter precipitation and monsoon storm events (SRP 2008). Baseflow into Horseshoe Reservoir is estimated to be 185,000 AFY (FWS 2008b). Key statistics for selected gages in the study area are provided in Table C-1. The Verde River gaging station below Tangle Creek is just above the inflow to Horseshoe Reservoir (Horseshoe). The Verde River gaging station near Scottsdale is just downstream from the Reservation. The Sycamore Creek near Fort McDowell gaging station is about 8 miles upstream from the eastern Reservation boundary (Figure 1 on page 3 of the EA).

Table C-1. Selected Verde River Basin Gaging Station Statistics.

Gaging Station (USGS Gage #)	Period of Record	Minimum Flow (cfs)	Maximum Flow (cfs)	Average Flow (cfs) [AFY]
Tributaries				
Sycamore Creek near Fort McDowell (Gage No. 10200)	1960-present	0	24,200	27 [19,796]
Mainstem				
Verde River below Tangle Creek (Gage No. 08500)	1945-present	31	145,000	592 [427,900]
Verde River near Scottsdale (Gage No. 11300)	1961-present	0	98,000	138 [311,000]

cfs – cubic feet per second.
Source: USGS 2011a, 2011b, 2011c.

The geomorphology of the Lower Verde River within and near the Reservation reflects the geologic setting, with a broad river valley and wide floodplain. Generally, the river exhibits a distinct low-flow channel within a wider flood channel. The floodplain contains numerous low bars, low terraces, and side channels. In general, the recent alluvium is dominated by coarse gravel and cobbles (MEI 2004).

C.2 Operation of Horseshoe and Bartlett Reservoirs

Horseshoe and Bartlett Reservoir (Bartlett) are near the downstream end of the Verde River, below nearly all of the major tributaries but upstream of the Reservation (Figure 1 on page 3 of the EA). SRP operates Horseshoe and Bartlett as part of a system of seven dams and reservoirs, and numerous wells within the SRP service area, to deliver an average of 1 million AFY to its service area. Most of SRP's deliveries are to cities, tribes, and urban irrigation users, supplying much of the water for the Phoenix metropolitan area with a population of more than 2.6 million. Annual surface water diversions by SRP average about 900,000 AF, of which approximately 40 percent is provided from the Verde River system (SRP 2008).

Horseshoe and Bartlett are small reservoirs in proportion to average runoff, which means they fill quickly and large inflows pass through with little change in flow characteristics. The outlet valves at the two dams have small capacities. Unless the reservoirs are spilling, the maximum flows below Horseshoe are 1,800 cfs and the maximum flows below Bartlett are 2,400 cfs (Id.).

Following completion of Bartlett Dam in 1939 and Horseshoe Dam in 1945, the lowest annual flows of the Verde River below Bartlett were often below 50 cfs, with some days of zero flow in many years (Graf 1999). However, the Settlement Agreement stipulates a minimum flow of 100 cfs shall be released from Bartlett Dam year-round except in extreme drought or an emergency. The minimum flow releases became effective on February 7, 1994, and have been continuous since that time except for brief interruptions in 1994 and early 1995 due to dam construction and maintenance activities and slight reductions during brief periods from 2000 to 2007. The 100-cfs minimum flow is in addition to reservoir releases made to meet water orders along the lower Verde River; it becomes part of the SRP diversion at Granite Reef Diversion Dam. Water stored in Horseshoe and Bartlett supports the minimum flow unless extended drought depletes the reservoir, which may trigger reduced releases.

The 100-cfs minimum flow is intended to help maintain fish habitat and riparian vegetation along the Verde River below Bartlett, as well as provide recharge for shallow wells on the Reservation (McNatt et al. 1980; McDonald and Padgett 1945). The minimum release of 100 cfs is larger than the historically gaged minimum inflows above Horseshoe. Above Horseshoe, the gaged minimum flow has historically dropped below 100 cfs for more than seven consecutive days in about 50 percent of years for which measurements are available (Pope et al. 1998; reporting flow statistics for the USGS gage on the Verde River below Tangle Creek, 1947–1996).

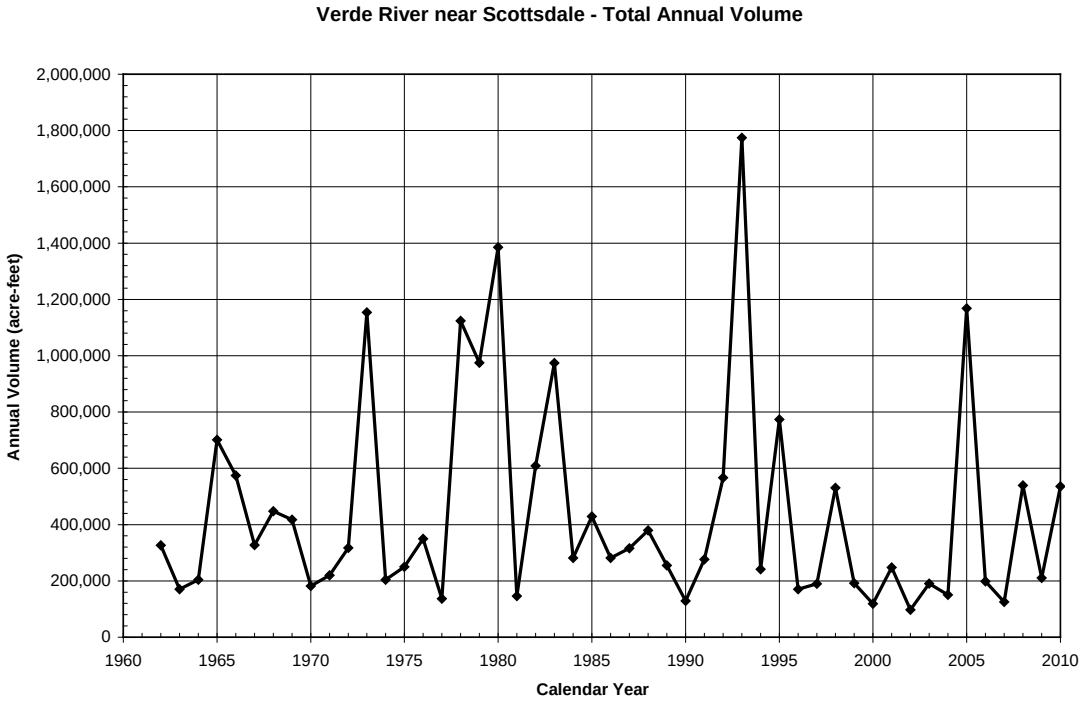
As noted above, SRP manages Horseshoe and Bartlett in conjunction with five other reservoirs (four on the Salt River and one on East Clear Creek), CAP and other exchanges, and groundwater water pumping within its service area. The variety of water sources, reservoir operation objectives, and contractual relationships with other water users results in complicated and highly variable water deliveries from each particular source. In terms of general reservoir operations, SRP releases water stored in Horseshoe first to provide storage space for additional runoff on the Verde River. Under the Horseshoe-Bartlett Habitat Conservation Plan, SRP has committed to emptying Horseshoe as quickly as feasible, except after extended drought when water will be held to provide water to willows and other tall woody vegetation in the upper end of the reservoir before being released as quickly as possible (SRP 2008). Typically, to create additional reservoir capacity to capture Verde River runoff, Bartlett storage is heavily used during the late fall and winter months. By using water stored in Horseshoe and Bartlett to the maximum extent possible, these small reservoirs provide an average of about 40 percent of the surface water used by SRP and the entities to which it delivers water under contract (SRP 2008). Making early seasonal releases from Horseshoe and Bartlett and optimizing storage yield allow for maximum use of hydropower generation at the Salt River dams to meet peak summer energy demand. Given the factors described above, water releases to meet demands are typically shifted from the Verde River reservoirs to the Salt River reservoirs in late April or early May (Id.).

C.3 Surface Water

Despite being partially regulated by storage reservoirs, the annual flow of the Verde River is highly variable. As shown in Figure C-1, the total annual flow volume downstream from the Reservation has varied from a minimum of about 97,000 AFY to almost 1.8 million AFY since 1960. The average for the period of record is about 404,000 AFY. Most of the Verde River flow occurs in the winter and early spring (Figure C-2). These months are when SRP primarily uses water stored in Bartlett and Horseshoe to meet its water demands and when floods on the Verde River occur. The monthly distributions on Figure C-2 are shown for two periods, before and after 1996. Although the requirement in the Settlement Agreement for minimum releases became effective in 1994, there were interruptions during 1994 and 1995; thus, those two years were

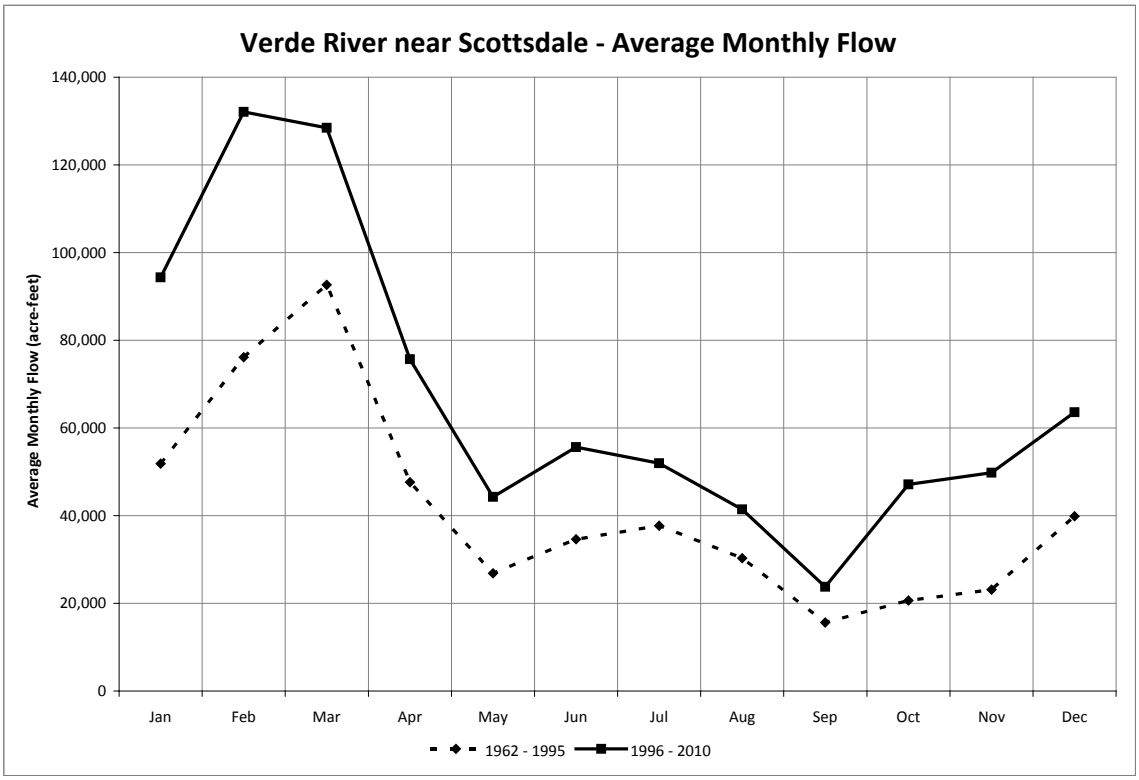
grouped with data from prior years. Note that flows since 1996 have been affected by the long-term drought in central Arizona.[1]

Figure C-1. Annual Flow of the Verde River Near the Reservation (Gage No. 11300).



[1]The drought has not been severe enough for SRP to trigger the drought provisions of the Settlement Agreement, which would reduce the 100-cfs minimum release from Bartlett.

Figure C-2. Average Monthly Flow of the Verde River Near the Reservation (Gage No. 11300).



Sycamore Creek has even more variable annual and monthly flow distributions than the Verde River because there is no storage with which to regulate the runoff. Figures C-3 and C-4 show the annual and average monthly volumes, respectively. Although highly variable, Sycamore Creek periodically contributes to the water supply for diversion on the downstream portion of the Reservation. Sycamore Creek also provides an important supply of sediment to maintain the geomorphology of the lower Verde River.

Figure C-3. Annual Flow of Sycamore Creek River Upstream of the Reservation (Gage No. 10200).

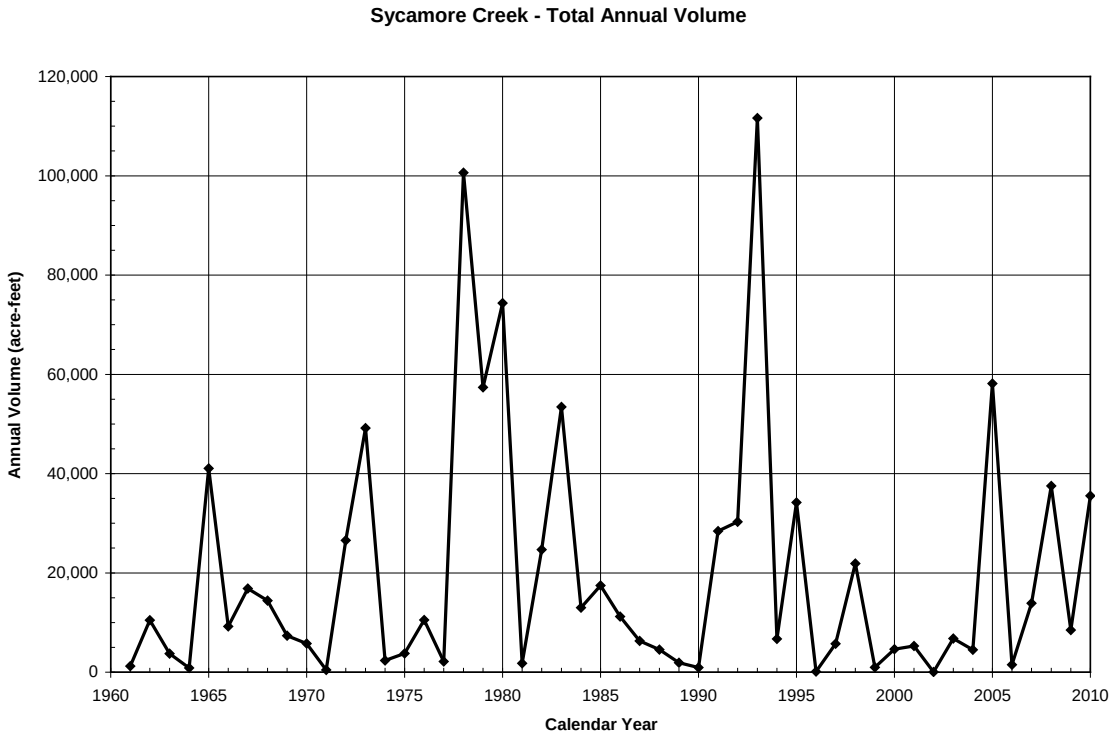
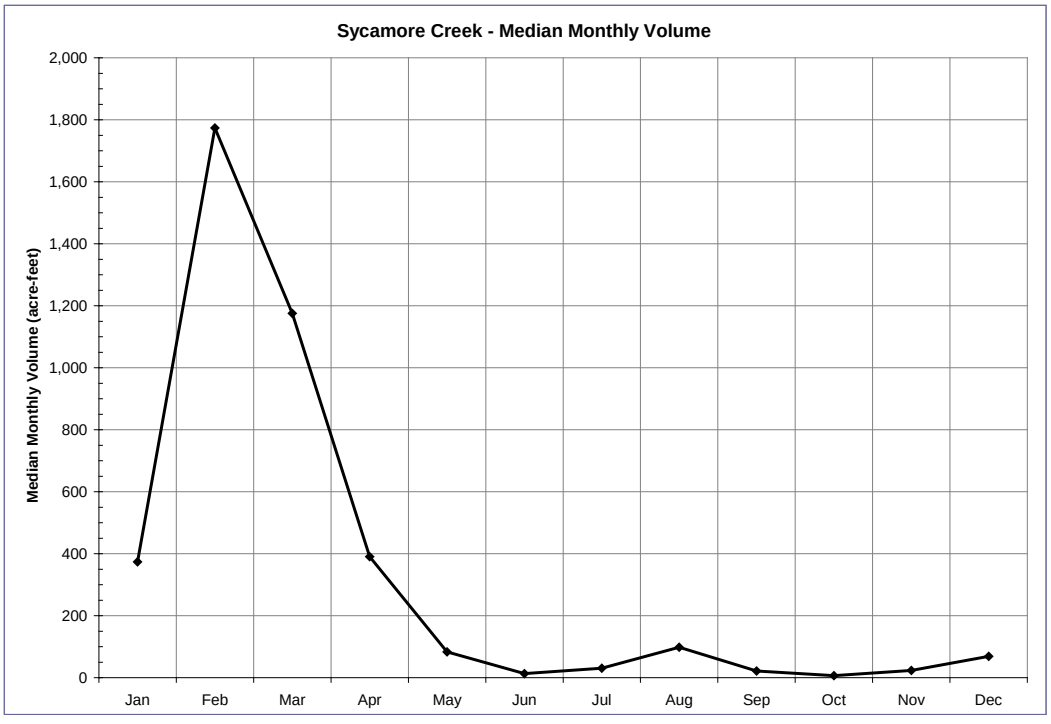


Figure C-4. Average Monthly Flow of Sycamore Creek River Upstream of the Reservation (Gage No. 10200).



C.4 Groundwater

The Reservation is within the Fountain Hills Subbasin. This subbasin is part of the Phoenix Active Management Area (AMA) (ADWR 2010); however, FMYN is neither part of nor subject to the AMA, which is a state designation. The subbasin covers approximately 360 square miles, all of which drains into the lower part of the Verde River. The subbasin includes the Rio Verde Foothills study area, FMYN, the Town of Fountain Hills, and the developments of Rio Verde and Tonto Verde. Well water is used mainly for municipal, domestic, and stock purposes (Id.).

Much of the Reservation is underlain by an alluvial basin of consolidated and unconsolidated sediments, which is ringed by basalt and Precambrian granitoid outcrops (ADWR 2010; AGS 2000). The unconsolidated sediment deposits are sands, silts, and gravels, which are very permeable. Most of the Reservation is underlain by an unconfined playa deposit (Klopatek, pers. comm. 2012). The alluvial basin is up to 1,200 feet deep beneath the Reservation (Bookman-Edmonston 1979).

The availability of groundwater varies by location with well yields from 50 to more than 500 gpm depending on the water-bearing characteristics of the geologic unit (ADWR 2010). The saturated floodplain Holocene alluvium within and adjacent to the floodplain is approximately 100 feet thick (WRA 1983; AGS 2000). A deeper aquifer in consolidated and unconsolidated alluvial materials underlies a discontinuous clay unit with variable thickness and permeability (WRA 1983).

C.5 Water Use on the Reservation and Surrounding Areas

Water use by the FMYN has averaged about 12,000 to 14,000 AFY in recent years (FMYN 2010, 2011b, 2012). Most of the water is used to irrigate about 2,000 acres of alfalfa, barley, pecans, and citrus (ADWR 2010). Water for farming operations is diverted through an existing canal with a diversion point just upstream of the Reservation (Roberts, pers. comm. 2004). The surface water diversions for agricultural irrigation uses are supplemented by three wells and two pump stations; other wells are used for potable and other water needs (Id.). Additional water used for municipal, domestic, commercial, recreation, and other M&I purposes on the Reservation is derived from shallow wells (Klopatek, pers. comm. 2012). All FMYN wells withdraw water from saturated floodplain Holocene alluvium (Id.).

Adjacent to the Reservation, Chaparral City Water Company serves Fountain Hills. Typically, groundwater use only occurs during the winter months as a result of increased demand. Groundwater use has declined due to increased use of CAP water (Roberts, pers. comm. 2004; Klopatek, pers. comm. 2012).

The water for the current residences of the Goldfield Ranch area adjacent to the southeast corner of the Reservation is derived from exempt wells. These wells are in aquifers that are hydrologically connected to the Verde River (Klopatek, pers. comm. 2012). Any future planned residential developments will require additional permitting and approvals. Future developments in the Goldfield Ranch Area will also require additional water resources and water rights that have either not yet been acquired or may be legally challenged by FMYN and others if the proposed source is derived from Verde River (Id.).

The communities of Rio Verde and Vista Verde, just north of the Reservation, are served by Rio Verde Utilities, Inc. Rio Verde Utilities has a CAP exchange agreement with SRP for withdrawal

of water along the Verde River for most of its water supply (Maricopa County 2005). Some residences rely on exempt wells. Monitoring for illegal diversions is ongoing by SRP.

Historically, Phoenix pumped up to 22,000 AFY on the Reservation for delivery to its municipal customers because the water quality was better than other sources at the time (WRA 1983; Reclamation 1976; McDonald and Padgett 1945). The original wells were drilled near the Verde River starting in 1927 to augment an infiltration gallery that had been installed by Phoenix in the early 1920s (McDonald and Padgett 1945). Over the years, 14 shallow wells were developed by Phoenix on the Reservation (WRA 1983). Phoenix stopped using these wells in 2002 and turned them over to FMYN a few years ago, many of which are no longer in use (Roberts, pers. comm. 2004; Klopatek, pers. comm. 2012).