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IN THE SUPERIOR COURT OF THE STATE OF ARIZONA
IN AND FOR THE COUNTY OF MARICOPA

IN RE THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE GILA RIVER SYSTEM AND SOURCE	W-1 (Salt) W-2 (Verde) W-3 (Upper Gila) W-4 (San Pedro) Consolidated Contested Case No. W1-11-605 ORDER QUANTIFYING FEDERAL RESERVED WATER RIGHTS FOR FORT HUACHUCA
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CONTESTED CASE NAME: <i>In re Fort Huachuca</i>
HSR INVOLVED: San Pedro River Watershed Hydrographic Survey Report.
DESCRIPTIVE SUMMARY: Determination of purpose, quantity, and source of federal reserved water right for Fort Huachuca.
NUMBER OF PAGES: 67
DATE OF FILING: September 6, 2024

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RECORD CITATIONS

References herein to the reporter's transcript of the trial held in Oct. 2016 and Feb. 2017 are set forth as "Tr. at [Day of Trial]: [Page], [Date] (witness)." The date and witness name are not included in subsequent "*id.*" citations to the same witness' testimony on the same day of trial. Exhibits admitted during the trial are referred to as [Exhibit # at page]. References to the proposed findings of fact submitted by the parties are set forth as [Party FOF #].

1 **I. Introduction**

2 The United States claims federal reserved water rights to surface water and
3 groundwater to support the operations and missions of Fort Huachuca. This proceeding
4 adjudicates those claims and the objections to those claims. Under the federal reserved water
5 doctrine, the United States implicitly reserved water from sources that “arise on, border,
6 cross, underlie, or are encompassed” within its land withdrawn from the public domain
7 necessary to accomplish the purpose of a federal reservation. *Arizona v. Navajo Nation*, 599
8 U.S. 555, 561 (2023); *see also*, *United States v. New Mexico*, 438 U.S. 696, 698 (1978);
9 *Winters v. United States*, 207 U.S. 564 (1908); *Agua Caliente Band of Cahuilla Indians v.*
10 *Coachella Valley Water District*, 849 F.3d 1262, 1271 (9th Cir. 2017). The doctrine applies
11 to reservations of land for military bases. *In re the General Adjudication of All Rights to Use*
12 *Water in the Gila River System and Source*, 195 Ariz. 411, 417, 989 P.2d 739, 745 (1999),
13 *cert. denied sub nom. Phelps Dodge Corp. v. U.S. and Salt River Valley Water Users’ Assn.*
14 *v. U.S.*, 530 U.S. 1250 (2000) (“*Gila IIF*”).

15 Fort Huachuca is an important federal military installation that has historically
16 contributed to the national security and continues to provide essential military protection. It
17 is located on 73,142 acres in southeastern Arizona, approximately eight miles north of the
18 international border with Mexico. Tr. at 8:64-65 (Oct. 13, 2016) (Runyon); U.S. SOF 1. It
19 shares its southern and much of its western boundaries with the Coronado National Forest
20 and the Miller Peak Wilderness. The City of Sierra Vista lies to the east of the Fort, and the
21 Town of Huachuca City is located to the north.

1 Between 2005 and 2015, Fort Huachuca has had an average effective population of
2 more than 10,000 armed service personnel, active duty dependents, and civilians. U.S. FOF
3 443. The Fort provides housing for many of its military personnel stationed at the base along
4 with their dependents. Some of its service members live in the surrounding area. All civilian
5 personnel who work on the base live in the surrounding area. Averaged between 2005 and
6 2014, the Fort used 1,138 acre-feet of water each year on the base to support its military and
7 civilian personnel, which translates into approximately 97 gallons per person per day. U.S.
8 FOF 398. Objections have been made to specific uses of water at Fort Huachuca on the
9 grounds that not all of the water has been used for a military purpose and, therefore, the
10 United States is not entitled to a federal reserved water right to provide for those uses.
11

12 The United States claims a federal reserved water right to 7,380 AFA acre-feet
13 annually ("AFA"). The United States primarily quantifies its claim to water in excess to the
14 amount currently used based on the future effective population of Fort Huachuca. The
15 population necessary to the operations and missions of the Fort has fluctuated in the past and
16 is expected to fluctuate in the future. The United States expects the population to gradually
17 increase to 14,229 in the future to accomplish the operations and missions of Fort Huachuca
18 with the possibility of a short-term increase of the population by another 49,700 people to
19 respond to a catastrophic event or a Total Mobilization event such as occurred during World
20 War II. Objections have been made to the time period that the United States used to calculate
21 its current average population, to assumptions made about the growth of the population, and
22 to the likelihood that an event would occur necessitating the influx of an additional 49,700
23 personnel.
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1 Fort Huachuca is located in the foothills of the Huachuca Mountains and within the
2 Sierra Vista Subwatershed. It has three primary sources of water: stream flow from Huachuca
3 and Garden Canyons and groundwater. The median annual streamflow from the two canyons
4 in the Huachuca Mountains is 977 acre-feet. Approximately 15,600,000 acre-feet of
5 groundwater are stored beneath the Sierra Vista Subwatershed. Tr. at 9:102 (Oct. 17, 2016)
6 (Runyon); Ex. 341 at 72. An analysis of groundwater storage underlying the land reserved
7 for Fort Huachuca to a depth of 1,200 feet determined that several hundred thousand acre-
8 feet of water are available to be pumped for use on the Fort. Tr. at 17:128 (Feb. 13, 2017)
9 (Burtell). There appears to be some dispute about whether the United States should be able
10 to reserve rights to both surface water and groundwater, but the primary disagreement among
11 the parties focuses on the amounts and process by which the United States' rights could attach
12 to each source.

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15 This Order determines only the United States' claims for federal reserved water rights.
16 The implied federal reserved water rights doctrine only reserves that amount of water
17 necessary to fulfill the purpose of the reservation, no more. *Cappaert v. United States*, 426
18 U.S. 128, 141 (1976); *In re the General Adjudication of All Rights to Use Water in the Gila*
19 *River System and Source*, 201 Ariz.307, 312, ¶11 (2001) ("*Gila V*") (the quantification of a
20 federal right "must be tailored to the 'minimal need' of the reservation.") The quantification
21 of the federal right is the minimum amount necessary to achieve the purpose for which the
22 land for Fort Huachuca was reserved; it is not the maximum amount of water that the United
23 States may use for its military operations. The United States remains able to pursue more
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1 water for its operations in the same manner as any other public or private appropriator under
2 Arizona law. *United States v. New Mexico*, 438 U.S. at 701.

3 4 II. Procedural Background

5
6 The United States asserted two separate claims for federal reserved water rights. It
7 filed Statement of Claimant (“SOC”) 39-10774, last amended in 2002, to claim 7,549 AFA
8 of groundwater to meet the Fort’s present and future potable needs. It also filed SOC 39-
9 10775 to assert federal reserved water right to 434 AFA of non-potable water from 101
10 sources of surface water occurring across the installation. In the Joint Pretrial Statement filed
11 by the parties on September 13, 2016, the United States reduced the total amount of its claim
12 from 7,549 AFA to 7,387 AFA. U.S. FOF 2-4. In its Written Closing Statement, the United
13 States further reduced its claims in SOC 39-10774 to 6,952 AFA and in SOC 39-10775 to
14 428 AFA for a total claim of 7,380 AFA. (U.S. Closing at 2, fn.1)

15
16 This case has been divided into two phases. In the first phase, numerous findings of
17 fact and conclusions of law were entered and approved. *See Report of the Special Master;*
18 *Motion for Adoption of Report; and Notice for Filing Objections to the Report*, April 4, 2008
19 (“Phase I Report”) approved and modified by *Order Granting the Special Master’s Motion*
20 *for Adoption of the April 4, 2008 Report Regarding Fort Huachuca*, September 7, 2011
21 (“September 2011 Order”). The parties have offered testimony and submitted evidence and
22 they have made legal arguments in their closing written statement in the second phase of this
23 case (“Phase II”) about factual and legal issues resolved by the Phase I Report and the
24 September 2011 Order. The factual findings and legal conclusion from Phase I are not at
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1 issue and will not be reconsidered as part of this proceeding or addressed in this Order.
2 Similarly, this Order will not reconsider the decisions made in its Order Granting in Part and
3 Denying in Part Motions for Summary Judgment and for Partial Summary Judgment,
4 September 1, 2016 ("MSJ Order"), nor will it address issues beyond those specifically
5 designated for determination in Phase II.
6

7 The Court designated three evidentiary issues for trial in Phase II. *See* Order
8 Designating Issues for Consideration and Setting Schedule for the Second Phase of this Case,
9 December 19, 2011, at 3-4. The three issues are:
10

- 11 1. The scope of water uses encompassed by the term "military purposes."
- 12 2. Quantification of the federal reserved water rights to fulfill military purposes.
- 13 3. Sources of water other than groundwater adequate to fulfill military purposes
14 and, if those sources are inadequate, quantification of groundwater to fulfill
15 military purposes.
16

17 At trial, the United States, the claimant, was joined by the Salt River Project, the San
18 Carlos Apache Tribe, and the Tonto Apache Tribe. Objectors to this case are Freeport
19 Minerals Corporation ("Freeport"), Liberty Utilities (Bella Vista Water) Corporation
20 ("Liberty"), City of Sierra Vista, the State of Arizona, the City of Sierra Vista, and Pueblo del
21 Sol Water Company ("Pueblo del Sol"). Trial in this matter concluded after 18 days of
22 testimony from 16 witnesses and the admission of nearly 200 exhibits into evidence.
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2 **III. Military Purposes for a Federal Reserved Water Right**

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4 **A. Primary and Secondary Purposes**

5 The first issue in this phase of the proceeding that must be resolved involves the types
6 of water use that fulfill the military purpose for which land for Fort Huachuca was reserved.
7 The Supreme Court formulated a rule that permits water to be reserved under federal law only
8 for the primary purpose of the reservation and forbids a reservation under federal law for
9 water to meet a secondary purpose of the reservation:
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12 Where water is necessary to fulfill the very purposes for which a
13 federal reservation was created, it is reasonable to conclude, even in
14 the face of Congress' express deference to state water law in other
15 areas, that the United States intended to reserve the necessary water.
16 Where water is only valuable for a secondary use of the reservation,
17 however, there arises the contrary inference that Congress intended,
18 consistent with its other views, that the United States would acquire
19 water in the same manner as any other public or private appropriator.

20 *United States v. New Mexico*, 438 U.S. at 701.

21 The State of Arizona contends that the primary use of water for a military purpose
22 does not include the water required for a series of programs and services known as Morale
23 Welfare and Recreation ("MWR") Programs. The Army provides these programs to soldiers,
24 their families, retirees, and in certain circumstances, to the Army Reserve and the National
25 Guard forces. Tr. at 5:19-20 (Oct. 10, 2016) (Boone). The MWR Programs at Fort Huachuca
26 include a shooting range, riding stable, bowling alley, arts and crafts, an annual rodeo, an
27 annual football training event, and a desert golf course. Tr. at 5:15-18, 20-21 (Oct. 10, 2016)
28 (Boone); Oct. 7, 2016, at 196:21-197:25 (Boone); Tr. at 5:27, 29 (Oct. 10, 2016) (Boone).

1 Each one of these activities receives its water from the Fort's potable water system supplied
2 by its wells pumping groundwater.¹

3 Colonel Boone, as the Garrison Commander assigned to Fort Huachuca, testified that
4 the MWR Programs offered at the Fort maximize the readiness of the soldiers. Tr. at 5:66-67
5 (Oct. 10, 2016) (Boone). Colonel Boone explained the concept of "readiness" as follows:
6 "The simple point of readiness is that an individual soldier and organization is prepared to do
7 their mission. And when we talk about it lately, it's readiness to deploy. And as the Army has
8 been forced to get smaller, we need every soldier to be capable of deploying. And if my job,
9 my job in the case as an operations officer, as an intelligence officer, am I physically ready
10 to go, am I mentally ready to go, is my family prepared for me to deploy to Iraq, Afghanistan,
11 or fill in the blank. Is my organization trained or is our equipment ready or is our equipment
12 up to snuff, so - or up to standard and prepared. So that's kind of the total entirety of how we
13 look at readiness." Tr. at 4:198 (Oct. 6, 2016) (Boone). Colonel Boone testified that, as of
14 the end of his tenure as Garrison Commander, he had achieved the goal of selecting MWR
15 programs that maximized readiness. Tr. at 5:67 (Oct. 10, 2016) (Boone).

16 The United States called Dr. Richard Fafara to testify about the MWR Programs. Dr.
17 Fafara is a management analyst in the Army's Operations Directorate who has completed
18 post-doctorate work focused on program evaluation, survey methodologies, and sociology.
19 Tr. at 5:181-85 (Oct. 10, 2016) (Fafara); Ex. 55, at 1-2. Dr. Fafara's work involves analysis

20 ¹ The golf course uses potable water for purposes such as consumption and bathrooms. It
21 does not use potable water for irrigation. Non-potable water used for irrigation is discussed
22 separately below. The discussion of water uses for MWR Programs excludes the use of non-potable
23 water for irrigation.
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1 of the Army's MWR and family support programs, including gathering data and participating
2 in studies related to the Army's MWR Programs and the efficacy of the programs to advance
3 military readiness and contribute to retention of the soldiers. Tr. at 5:190 (Oct. 10, 2016)
4 (Fafara). He testified that the MWR Programs are designed and offered to assure that the
5 soldiers are committed to and ready to carry out the Army's mission. Tr. at 5:197 (Oct. 10,
6 2016) (Fafara). Dr. Fafara pointed to two Army studies, "Morale, Welfare, and Recreation
7 Programs and Mission" and "Groundbreaking Study Confirms Army Morale, Welfare, and
8 Recreation Programs Linked to Soldier Readiness and Retention," that demonstrated a direct
9 link between the usage of MWR Programs and soldier readiness and retention. Tr. at 5:194-
10 96 (Oct. 10, 2016) (Fafara); *see also* Ex. 55, at 3-4. In light of these studies and others, Dr.
11 Fafara opined that there "is a pretty impressive and significant body of research that expands
12 [sic] decades that demonstrates, using social science research and statistics, that the programs
13 really do have an effect on readiness and retention." Tr. at 6:66-67 (Oct. 11, 2016) (Fafara).

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17 The State of Arizona began its argument to defeat a right to water necessary for the
18 MWR Programs by asserting that the purpose of the military is to fight and win the nation's
19 wars and the military purpose of Fort Huachuca is to train soldiers to operate unmanned aerial
20 systems. It urged the denial of federal reserved water rights for the challenged uses because
21 those uses are not necessary to accomplish its defined purpose of the reservation. While the
22 State of Arizona's characterization of the purposes of the United States armed forces, in
23 general, and Fort Huachuca, in particular, are undoubtedly true, those are not controlling with
24 respect to the determination of the federal reserved water right for Fort Huachuca.
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1 In the proceedings prior to trial, the Court determined that the primary purpose for the
2 withdrawal and reservation of the land for the Fort was to provide for local and national
3 security. *See* Phase I Report; September 2011; MSJ Order at 5. The Court provided a more
4 nuanced explanation that the primary of military uses of water at the Fort are "not static and
5 include water rights required to satisfy contemporary, direct, indirect and quasi-municipal
6 needs that arise in conducting military and military-related functions important to local and
7 national security." September 2011 Order at 2. Accordingly, the purpose of Fort Huachuca
8 for which federal water rights may be found is not narrowly limited to only those uses directly
9 and exclusive focused on fighting and winning wars and training required to operate
10 unmanned aerial systems. Military uses include military and military-related functions
11 important to local and national security.
12

13
14 The State of Arizona next proposed an alternative definition of the primary purpose
15 drawn from a line of cases concerning the United States' immunity from damages for injuries
16 suffered by members of the armed forces. *Feres v. United States*, 340 U.S. 135 (1950).
17 Pursuant to the *Feres* doctrine, a suit against the United States arising from an injury suffered
18 by a member of the armed service is barred if the injury occurred during the course of an
19 activity incident to military service. Based on a case in which a court determined that the
20 *Feres* doctrine did not bar a claim for damages against the United States, the State of Arizona
21 argues that MWR Programs are not activities incident to military service and, consequently,
22 the United States cannot reserve water for their operation.
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25 In support of its position, the State of Arizona cites *Regan v. Starcraft Marine, LLC*,
26 524 F.3d 627 (5th Cir. 2008). *Regan* considered whether the United States was immune from
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1 a suit for injuries suffered by a soldier participating in a MWR boating program. The *Regan*
2 Court, after observing that the line of cases controlling determinations of activities incident
3 to military service are inconsistent and that the *Feres* doctrine requires fact-specific analysis
4 of a number of factors, summarized its view of the relevant decisions:

5
6 The nearly-universal point of the caselaw can fairly safely be stated:
7 the further from uniquely military functions an activity may be, and
8 the further from a military base the incident occurs, the less justified
is the [immunity] bar.

9 *Id.* at 645.

10 In *Regan*, the injury occurred off-base. Here, all activities, by definition, occur on
11 base because the United States has limited its claim to water to be used on base. The *Regan*
12 Court ultimately concluded that the recreational boating activity was not a uniquely military
13 function. It did not establish a bright-line rule regarding the extent to which MWR Programs
14 constitute an integral component of military readiness. A subsequent case, also decided by
15 the Fifth Circuit Court of Appeals, found that paintball game held on a “fun day” on a military
16 base was a military function and, therefore, the United States was immune from suit.
17 *Chandler v. United States*, 713 F. App'x 251 (5th Cir. 2017).

18
19 The courts, in the context of cases involving personal injuries suffered in MWR
20 Programs, have recognized that MWR Programs can improve the performance of the military
21 mission. *See, e.g., Hass v. United States*, 518 F.2d 1138, 1141(4th Cir. 1975) (“Recreational
22 activity provided by the military can reinforce both morale and health and thus serve the
23 overall military purpose.”). The Ninth Circuit Court of Appeals held that recreational
24 canoeing was incident to military service. *Bon v. United States*, 802 F.2d 1092 (9th
25 Cir.1986); *see also, Costo v. United States*, 248 F.3d 863, 867 (9th Cir. 2001) (MWR rafting
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1 program was an activity incident to military service); *Pringle v. United States*, 208 F.3d 1220
2) (10th Cir., 2000) (fight at a recreational night club on base was incident to military service);
3 *Keisel v. Buckeye Donkey Ball, Inc.*, 311 F. Supp. 370 (E.D.Va. 1970) (donkey riding during
4 a ballgame sponsored by the Special Services division of a naval air station was incident to
5 military service). The decision in *Regan* cannot be read as establishing the black letter law
6 urged by the State of Arizona that the activities provided by MWR Programs, such as the
7 annual rodeo, are not incident to military service. The relevant analysis here, however, does
8 not involve the factual and legal factors that affect the extent of the federal government's
9 sovereign immunity under the *Feres* doctrine. As stated above, the relevant test is whether
10 the contested use is a contemporary, direct, indirect and quasi-municipal use that arises in
11 conducting military and military-related functions important to local and national security.

14 The State of Arizona moved beyond redefining the primary purpose of the reservation
15 to argue that the challenged water uses constitute secondary uses that cannot be supplied by
16 federal reserved water rights. State of Arizona Closing at 6. In *United States v. New Mexico*,
17 the source of the primary-secondary purpose rule, the Court held that Congress intended to
18 reserve water to conserve the water flows and to furnish a continuous supply of timber. It
19 considered the government's proposed purposes of its claimed federal reserved water rights
20 to "maintain a minimum instream flow for aesthetic, environmental, recreational, and 'fish'
21 purposes" and rejected them as secondary to the Congressional primary purposes and
22 inconsistent with the overall goal of "enhancing the quantity of water that would be available
23 to the settler of the arid West." 438 U.S. at 704, 713.
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1 The Idaho Supreme Court applied this primary-secondary test and the *New Mexico*
2 reasoning in *United States v. State of Idaho*, 23 P.3d 117 (2001). It evaluated the United
3 States' claims for federal reserved water rights to the Snake River for islands located in the
4 river that had been withdrawn from the public domain. The court found that the purpose of
5 the island reservation was to create a sanctuary for migratory birds to protect them from
6 hunters and trappers. It determined that this primary purpose did not include an implied
7 reservation of any water: "Without water there would be no island, but there would be a
8 sanctuary as defined by the Migratory Bird Conservation Act." 23 P.3d at 126. The court
9 characterized and rejected the United States' claims for federal reserved rights to water to
10 support the island riparian habitat, maintain open water around the islands, and provide
11 isolation from predators as secondary purposes. Like the *New Mexico* Court, the Idaho
12 Supreme Court concluded that the purposes advanced by the United States were inconsistent
13 with the primary purpose and with Congressional intentions with respect to management of
14 the river water:
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16 If the Court were to adopt the position of the United States, the Court
17 would have to find that the water intended to be stored and regulated
18 by colossal federal projects for the past 98 years would now be
19 subordinated to the need to preserve water for the islands. The
20 historical context of the designations and the language of the
21 reservations rebuts the position of the United States. . . .
22 . . . It is inconceivable that President Roosevelt in 1937, in the context
23 of the dust bowl years, intended to give preference to waterfowl or
24 any other migratory bird, over people.

25 *Id.* at 128.

26 In the general adjudication of the Big Horn River System, the Supreme Court of
27 Wyoming applied the primary-secondary purpose test to evaluate the purposes for reservation
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1 of the land for the tribes of the Wind River Reservation. *In re Gen. Adjudication of All Rts.*
2 *to Use Water in the Big Horn River Sys.*, 753 P.2d 76 (Wyo. 1988), *aff'd sub nom. Wyoming*
3 *v. United States*, 492 U.S. 406 (1989). The United States sought federal reserved water rights
4 for domestic, agricultural, livestock, mining, fisheries, and wildlife purposes. Using the *New*
5 *Mexico* terminology, the *Big Horn* Court concluded that agriculture was the primary purpose
6 of the reservation and livestock, mining, fisheries, and wildlife purposes were secondary
7 purposes. Unlike the decisions in *New Mexico* and *State of Idaho*, the *Big Horn* Court did
8 not find and did not reject the secondary purposes as being inconsistent with the primary
9 purpose. Instead, the court rejected the secondary purposes because it found that those uses
10 were not intended at all based upon the language of the governing treaty and the evidence
11 introduced at trial. Notably it did approve federal reserved water rights for municipal,
12 domestic, and commercial uses because “[d]omestic and related use has traditionally been
13 subsumed in agricultural reserved rights. *Id.* at 99.”
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17 As demonstrated by the cases discussed above, as well as other decisions such as
18 *United States v. Adair*, 723 F.2d 1394 (9th Cir. 1983) and *Agua Caliente Band of Cahuilla*
19 *Indians v. Coachella Valley Water Dist.*, 849 F.3d 1262 (9th Cir. 2017) that have used the
20 primary-secondary test as a guideline, the courts broadly define the primary purpose. In *New*
21 *Mexico* the primary purpose was generally defined as “securing favorable conditions of water
22 flows,” and furnishing “a continuous supply of timber.” In *Big Horn*, the primary purpose
23 was agriculture which the court construed to incorporated domestic, municipal, and
24 commercial uses. A primary purpose is not so narrowly defined as envisaged by the State of
25 Arizona. It does not impose an obligation on the courts to minutely examine specific uses
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1 within a general category of a water use, such as a military use, and characterize those uses
2 as primary or secondary uses. The *New Mexico* Court did not identify certain species of trees
3 in its definition of approved water rights. The *Big Horn* Court did not establish an
4 agricultural water right by reference to permitted and disallowed crops. The Court is not
5 required in this case to delve into specific water uses on the Fort to parse whether water for a
6 military purpose can be used for drinking while in training, in the barracks, or in an office but
7 not at the Fort's bowling alley or shooting range.
8

9 The State of Arizona relied upon the testimony of Major General Michael T. McGuire,
10 the Adjutant General for the State of Arizona and Director of the Arizona Department of
11 Emergency and Military Affairs, to establish that the water for MWR Programs are secondary
12 purposes of the reservation. Major General McGuire stated that the MWR Programs fall
13 within a budgetary category he called "mission enhancement," which includes items such as
14 gym equipment, as opposed to another category that covers expenses incurred by the military
15 as "mission essential," such as boom operator training and ground fuel. Tr. at 16:50-52 (Feb.
16 9, 2017) (McGuire). He further testified that base operating and overhead costs, equipment
17 for soldiers, specialized training gear and equipment specific to an installation are mission
18 essential costs. Tr. at 16:51-52 (Feb. 9, 2017) (McGuire). He appeared to consider the MWR
19 Program that provides childcare necessary to fulfill the military mission. *Id.* at 57. According
20 to Major General Maguire's testimony, the military distinguishes between mission
21 enhancement and mission essential items to prioritize military expenses. Tr. at 16:54 – 55
22 (Feb. 9, 2017) (McGuire).
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1 In the context of ascertaining water rights, the assignment of different budgetary
2 priorities to a military use does not differentiate a primary purpose from a secondary purpose
3 of a reservation. In *New Mexico* and *State of Idaho*, the secondary uses were determined to
4 be affirmatively inconsistent with the primary purpose of the reservation. There is no
5 evidence that operations which are mission enhancements are inconsistent with the military
6 purpose for which the land was reserved. In *Big Horn*, the secondary uses, e.g., mining and
7 fisheries, were uses distinct from the primary agricultural use and not supported by the
8 language of the controlling documents. Using the State of Arizona's nomenclature, mission
9 enhancement activities and mission essential activities put the water to the same uses such as
10 drinking, cleaning, personal hygiene, and preparing foods. There is no distinct category of
11 water applicable to a mission enhancement activity that supports the characterization of a
12 MWR Program as a secondary use.

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16 Based on empirical and methodologically sound studies and the testimony of Dr.
17 Fafara and Colonel Boone, the MWR Programs that rely on potable water to meet the needs
18 for uses such as drinking, personal hygiene, and food preparation, contribute to the readiness
19 and retention of Army soldiers. These MWR Programs are consistent with the primarily
20 purpose of the reservation of Fort Huachuca to conduct military and military-related functions
21 and do not constitute a secondary purpose.

22
23 Freeport raises objections to another type of use for which the United States asserts
24 federal water rights. The United States filed Statement of Claimant 39-10775 to claim water
25 rights to 435 AFA from surface water sources. U.S. Closing at 30. Originally filed as a
26 claim under state law, the United States amended the Statement of Claimant to change the
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1 legal basis to a claim under federal law. U.S. SOF 4. In its Closing Statement, the United
2 States informed the Court that: "It is unknown, however, precisely how the 435 AFA was
3 calculated." United States Closing at 30. It reported that none of the sources are gauged
4 thereby preventing the collection of data to accurately quantify the surface water sources. *Id.*
5 It speculates that the quantity of 435 AFA is the sum of all surface water sources on the Fort
6 Huachuca base investigated by Arizona Department of Water Resources ("ADWR"), which
7 included 122.5 AFA for the springs in Garden and Huachuca Canyons.
8

9 The United States claims the surface water in a number of springs and ponds for
10 wildlife or game management purposes. Ex.1319 (13-19 of 68). It contends the game and
11 wildlife management fulfills a military purposes because it facilitates hunting which is part
12 of the Fort's MWR Programs. U.S. FOF 365; U.S. Closing at 14. As Freeport points out in
13 its Closing Statement, the United States presented very little evidence about hunting at trial.
14 Colonel Boone did not make the link between hunting and MWR Program. When asked on
15 direct examination "[w]hy do you allow hunting on Fort Huachuca," Colonel Boone focused
16 on the value of managing animal populations, not on any readiness or retention
17 considerations. Freeport FOF 74. In its proposed Statement of Facts, the United States simply
18 makes the general statement that "[t]o hunt game and wildlife, they must have water." U.S.
19 SOF 184. Based on the evidence offered, game and wildlife management is intended
20 precisely as Colonel Boone described and not as a MWR Program.
21

22 Freeport argues that the United States is not entitled to a federal reserved water right
23 for game and wildlife management because this use is a secondary and not a primary purpose
24 of the reservation. In both the *New Mexico* and the *State of Idaho* decisions, the courts rejected
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1 the United States' claims for federal water rights, brought decades after the initial reservation,
2 for environmental purposes because no intent existed at the time of the reservation to elevate
3 the environment generally and fish and waterfowl specifically over the agricultural and
4 domestic water needs of the people in the area. The same reasoning applies in this case. The
5 intent of the reservation of Fort Huachuca was for military use and the available, accessible
6 water was to be used for military and military-related purposes. Camp Huachuca was first
7 established at the base of the Huachuca Mountains in March 1877, at the mouth of Huachuca
8 Canyon, due in part to the availability of good water for the soldiers and their horses. No
9 intent existed to reserve significant amounts of water for wildlife that would have
10 subordinated the interests of the military personnel and livestock. The primary purpose was
11 to support military personnel and their livestock; it was not to preserve the environment and
12 protect wildlife. The Court finds that wildlife and game management/ hunting are secondary
13 purposes for which water must be obtained under state law. No federal reserved water right
14 will attach to claims asserted in SOC 39-10775 for game and wildlife management.

18 **B. Minimum Use**

19
20 As its second argument to foreclose a federal right to water to support the MWR
21 Programs supplied by potable groundwater, the State of Arizona claimed that the United
22 States did not provide evidence at trial of the minimum quantity of water required to meet
23 Fort Huachuca's military purpose. It argued that the minimum amount of water must be an
24 amount less than the amount pumped because no reduction is made for the MWR Programs.
25 Under controlling law, the amount of water subject to a federal reserved water right must be
26 quantified as the least amount necessary to accomplish the federal purpose. *Cappaert v.*
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1 *United States*, 426 U.S. at 141. The minimal needs standard found in *Cappaert* requires that
2 the Court examine the Fort's MWR Programs on a more granular level to determine whether
3 the water use associated with the Fort's MWR Programs represents the minimal amount of
4 water necessary. Each of the MWR Programs to which the State of Arizona objects will be
5 addressed.
6

7 Fort Huachuca runs a Sportsman Center that maintains gun, archery, and paintball
8 ranges for personal use by active duty members and their dependents, military retirees, and
9 in certain circumstances, members of the National Guard and the U.S. Army Reserve
10 (collectively DOD ID card holders). Colonel Boone testified that "many military members
11 shoot, many members own weapons or bows, so we needed to provide a safe place for them."
12 Tr. at 5:17-18 (Oct. 10, 2016) (Boone). Water is provided at the Sportsman Center and in
13 surrounding area for drinking and restrooms. Tr. at 10:118-119 (Oct. 18, 2016) (Mulhearn).
14 The Fort operates a 12-lane bowling alley, which also has a dinner and party room. Tr. at
15 5:27-29 (Oct. 10, 2016) (Boone). A Craft Center offers a variety of MWR Programs that
16 provide a summer camp for dependent children, and embroidery, pottery, and painting
17 activities for DOD ID card holders. Tr. at 5:15, 16, 20 (Oct. 10, 2016) (Boone). Each
18 program requires water to meet the participant's personal uses such as restrooms and
19 drinking. *Id.* at 18, 105. The people who live and work on the base or live off the base but
20 work on the base require water for daily personal use. Supplying water to them at the
21 Sportsman Center, the bowling alley or the Crafts Center rather than in their homes, barracks,
22 offices or other workplaces has little effect the amount of water claimed. These programs
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1 have a negligible impact on the amount of water that would otherwise be required to operate
2 Fort Huachuca in the absence of the MWR Programs.

3 The State of Arizona objected to the operation of the golf course. Potable water for
4 which the federal government seeks a reserved water right is used at the golf course, like at
5 the MWR Programs discussed in the preceding paragraph, to provide for bathrooms and
6 drinking water. Tr. at 5:25 (Oct. 10, 2016) (Boone). The material quantities of water used
7 to irrigate the golf course, as opposed to the insignificant amounts to provide for the personal
8 needs of the golfers, are provided by effluent. The Fort generates effluent from its treatment
9 of sewage generated on the base from water originally pumped as groundwater. Tr. at 5:85
10 (Oct. 10, 2016) (Boone); Tr. at 11:166-67 (Oct. 19, 2016) (Runyon); Tr. at 3:159 (Oct. 5,
11 2016) (Borer). Determining the minimum amount of water needed to irrigate the golf course
12 is a moot point. The United States does not seek a federal reserved water right to groundwater
13 or surface water to irrigate the golf course. No federal reserved water right will attach to any
14 water to irrigate the golf course.

15 The State of Arizona additionally objected to two MWR Programs that are annual
16 events held at Fort Huachuca. State of Arizona Closing at 9, 11. The Fort hosts the University
17 of Arizona Wildcats football team to a dinner with the soldiers. Tr. at 5:41-45 (Oct. 10, 2016)
18 (Boone). Water use by guests at a dinner are insignificant. The Fort also holds a rodeo once
19 a year at the Wren Arena in conjunction with a local riding club. Tr. at 5:39-46, 168-172
20 (Oct. 10, 2016) (Boone). Water use at the Fort's annual rodeo at Wren Arena is for personal
21 uses by the participants, some dust control, and for the livestock that are brought on to the
22

1 post for the event. Tr. at 3:136-137 (Oct. 6, 2016) (Borer). Again, the amounts of water used
2 for this MWR Program are negligible.

3 The State of Arizona also objected to three facilities, only one of which can be
4 considered to be a part of a MWR Program. The first facility is the Buffalo Corral Riding
5 Stables which boards 50 to 60 horses kept on Fort Huachuca, for B Troop. B Troop, 4th
6 Cavalry, "is a ceremonial troop that supports parades and changes of command and things
7 like that, purely ceremonial. The Buffalo Corral is also open to DOD ID card holders who
8 can use the "is a recreational unit for soldiers and their families - and folks that have MWR
9 benefits to be able to go out and do 24 personal riding." Tr. at 4:20-23 (Oct. 7, 2016) (Borer).
10 The horses are also available for trail rides, and it also provides a place for soldiers to board
11 their private horses. Tr. at 5:18 (Oct. 10, 2016) (Boone). The two other facilities provide
12 temporary lodging for soldiers and can also be used by DOD ID card holders when space is
13 available. Tr. at 3:125-128, 135 (Oct. 6, 2016) (Borer). The two facilities are a hotel and a
14 site providing a place for 56 recreational vehicles (RVs) to park and access water and
15 electricity. Tr. at 5:21-23 (Oct. 10, 2016) (Boone). Each facility provides water for
16 consumption, bathing, and bathrooms. None of these three facilities includes any water
17 intensive uses.
18

19 The low water use associated with the MWR Programs and facilities to which the State
20 of Arizona has lodged objections is reflected in the total annual potable water use on the base.
21 The Fort's per capita water use rate is among the lowest in Arizona. Tr. at 10:15 (Feb. 8, 2017)
22 (Burtell). The potable water used by the Fort from its groundwater pumping operations to
23 operate its MWR Programs and the lodging facilities satisfies the minimal need standard.
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1 Freeport raised the minimum use requirement in its opposition to the United States'
2 claims for surface water for firefighting, land navigation training, and recreation. Freeport
3 contends that the United States failed to prove at trial that a precise quantity of water from a
4 specific source was the minimum amount needed to fulfill its stated purpose. Freeport
5 Closing at 13. The United States, as the claimant, bears the burden of demonstrating the
6 specific quantity of water sufficient to fulfill the purposes of the reservation of Fort Huachuca.
7 *Arizona v. California*, 460 U.S. 605, 620 (1983); *Gila V*, 201 Ariz. at 312 ¶14 (2001). It must
8 present evidence that allows the Court to base its decision on a solid factual record and craft
9 a decree with sufficient precision so that when the United States acts to protect or enforce
10 those rights, an appropriately tailored remedy can be formulated.
11

12
13 The United States did not offer any data into evidence at trial as to the amount of
14 surface water needed for recreational use. It offered the bare representation that "Fort
15 Huachuca has hiking trails and picnic areas in Huachuca and Garden Canyons, and a picnic
16 area next to the pond where the Lakeside Officer's Club used to be, which is used for parties,
17 organization day events, etc." Tr. at 5:36-37, 173-174 (Oct. 10, 2016) (Boone).
18

19 With respect to uses of surface water for firefighting, the United States did not call
20 any witness who had personal knowledge about any specific quantity of water used from a
21 surface water source to suppress a fire. Oct. 17 Trans. 112:8-15 (Mulhern); Oct. 18 Trans.
22 79:25-80:611 (Mulhern). It did offer testimony that the Forest Service will carry water
23 buckets under its aircraft that it can dip into the Fort's surface water sources for use in its
24 firefighting mission. U.S. SOF 342. This statement provides no information about source
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1 or quantity. It did not present evidence as to the quantities used, or the quantification of any
2 amount needed to fulfill its stated purposes.

3 The United States also claimed surface water for land navigation training with its
4 assertion that "some surface water sources on Fort Huachuca are used in the Fort's land
5 navigation courses." U.S. SOF 363. Colonel Boone testified that Tinker Pond is the pond on
6 Fort Huachuca that is used during land navigation courses. Tr. at 5:148 (Oct. 10, 2016)
7 (Boone). He offered his opinion that that, based on his experience with the surface water
8 supplies at Fort Huachuca, Tinker Pond probably only contains water during the monsoon
9 season, and is dry throughout the rest of the year. Tr. at 5:150 (Oct. 10, 2016) (Boone). Fort
10 Huachuca, however, does not cancel the land navigation course when Tinker Pond is dry. Tr.
11 at 5:150 (Oct. 10, 2016) (Boone). Colonel Boone explained that soldiers can use Tinker Pond
12 as a reference point regardless of whether it contains water. *Id.* The Court finds that water
13 from Tinker Pond is not necessary to meet the primary purposes of the reservation because it
14 is claimed for game management and not for land navigation purposes. The United States
15 has not satisfied its burden of proof to establish a quantity of water from surface water sources
16 sufficient to establish a federal reserved water right to those sources. No federal reserved
17 water rights shall attach to those claims set forth in Statement of Claimant 39-10775. This
18 decision does not preclude the United States to asserting those claims under state law.

23 IV. Quantification of Water Subject to a Federal Reserved Water Right

24 The amount of water necessary to accomplish the military purposes of Fort Huachuca
25 requiring potable water primarily depends upon the number of people necessary to
26 accomplish the direct, indirect, and quasi-municipal needs that arise in conducting military
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1 and military-related functions important to local and national security. The United States
2 claimed 6,952 AFA for potable uses based on calculations of the amount of water needed by
3 its actual or expected population to accomplish the military purposes of the Ft. Huachuca
4 during three time periods.

5 The first calculation relies on data obtained from current water uses on Fort Huachuca.
6 The second calculation assumes a future expansion of operations with a corresponding
7 increase in a demand for water. The determination has already been made that the federal
8 reservation of water for military uses is "not static and includes water rights required to satisfy
9 contemporary, direct, indirect and quasi-municipal needs that arise in conducting military and
10 military-related functions important to local and national security." September 2011 Order at
11 2. The third calculation anticipates a substantial increase personnel to respond to a national
12 emergency or a total mobilization of the United States' armed forces to fight a war that will
13 cause a short-term increased demand for water during the total mobilization time period.
14

15 The United States called Joel Degner, a Water Resource Engineer, who holds a
16 Bachelor of Science in hydrological science, to explain each calculation. He testified that he
17 used the same methodology to calculate the water needs for each of the three time periods.
18 Mr. Degner determined that the amount of water necessary to accomplish the military
19 purposes of the Fort Huachuca could be quantified by multiplying the Effective Population²
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25 ² As discussed below, the Fort's Effective Population is the Fort's population adjusted to
26 reflect that a portion of the population lives and works on-base, another portion works on base but
27 does not live on base, and yet another component of the population works part-time on the base but
28 does not live on the base.

of the Fort by water use in gallons per capita per day for each of the relevant time periods. See Table 1. The parties disputing the United States' claim do not contest its basic methodology to determine Fort Huachuca's current and future water needs. Calculations presented by Freeport were also based on an analysis of the Effective Population multiplied by a gallons per capita per day amount. Tr. at 15:104 (Feb. 8, 2017) (Burtell); Tr. at 8:140-142 (Oct. 13, 2016) (Runyon). The United States' methodology to calculate the quantity of water claimed is a reasonable methodology for determining Fort Huachuca's current and future water needs.

Fort Huachuca Consumptive Water Need		
Categories of Population	No. of Personnel	Water Need (AFA)
Current		
Effective Population	10,447	1,138
Expansion (Long-Term)		
Effective Population	11,229	1,222
Mission Expansion (BRAC or other growth)	3,000	326
Total Expansion	14,229	1,548
Total Mobilization (Short-Term)		
Two Infantry Divisions	38,000	4,132
Additional Students	11,700	1,272
Total Mobilization	49,700	5,404
Total Future Water Needs		
Expansion	14,229	1,548
Total Mobilization	49,700	5,404
Total Future Need	63,929	6,952

Table 1

1 **A. Quantifying Current Uses**

2 **1. Background**

3
4 The current amount of water used by the Fort exceeds its historical use. The United
5 States called Scott Miltenberger, a professional historian who holds a doctorate in American
6 History, to testify about the Fort's historical military functions, water use, and associated
7 populations. Ex. 229. During the first four decades of its operation, Fort operations required
8 about 20 AFA. Over the succeeding years, water use increased as the Fort's population grew.
9 In the years leading up to the United States' engagement in World War II, the Fort's
10 population grew from about 1,300 in 1940 to more than 5,000 as the Army expanded the
11 facilities so the Fort could serve as a training center and constructed Libby Army Airfield.
12 Ex. 231 at 39:7-9 and 82:1-23 and fn. 219 (Miltenberger); Tr. at 14:124-125 (Feb. 7, 2017)
13 (Burtell). A great deal of time and effort was spent by the parties to fix the maximum
14 population of the base for a very short period of time during World War II. Considering all
15 the evidence on the maximum population of Fort Huachuca during World War II, the Court
16 finds that the precise number cannot be determined, but the population likely ranged between
17 25,000 and 40,000 personnel. U.S. SOF 54. Following World War II, demobilization and
18 de-population occurred quickly at Fort Huachuca. By June 1946, Fort Huachuca had a
19 caretaker staff of only 125 personnel (with a full population of 400, dependents included).
20 Ex. 231 at 84:31-32, 85: 11-13 (Miltenberger).

21
22 With the outbreak of the Korean War, Fort Huachuca became a training site for
23 aviation units with a population of about 10,300 people for the 1951-1952 period. After the
24 war, the population quickly dropped to about 100 people. Tr. at 1:150 (Oct. 3, 2016)

(Miltenberger); Ex. 231 at 55:6-56. In 1954, the Army selected Fort Huachuca to serve as the Army's electronic proving ground because the physical aspects of the landscape provide an area free of electronic interference. Ex. 231 at 55:6-56; Tr. at 1:86 (Miltenberger); Ex. 382. According to Dr. Miltenberger, when Fort Huachuca assumed the role as a training and testing ground for the latest in electronics technology it was transformed into a large, permanent highly technical facility for operations and training of American military personnel." Ex. 231 at 70:11-12 (Miltenberger). Over the next few years, the Army rehabilitated existing structures, built hundreds of new houses, barracks, and other quarters on post, and constructed technical buildings, testing buildings and laboratories, a Field House (recreational facility), shop facilities, and extension of utilities and work on roads. Ex. 231 at 87:8-90:2 (Miltenberger). During this period, increased numbers of military family members resided at the Fort. Tr. at 1:152 (Oct. 3, 2016) (Miltenberger). From 1954 to 1968, Fort Huachuca's population expanded rapidly to over 7,000 in 1955; 11,000 in 1958; over 13,000 in 1960; a slight dip to about 11,000 in 1962 and 12,000 in 1963, and then a rise to about 13,000 again in 1965; 16,000 in 1967; and, 19,000 in 1968. Ex. 231 at 87:22-24, 95, Table "Fort Huachuca Population Statistics, 1951-1989," and Summary Table (Miltenberger). Through the 1970s and early 1980s, Fort Huachuca continued to add or reorganize units and missions, related to communications, electronics, military intelligence, and other responsibilities reaching a population ranging between about 15,000 to 18,000. Tr. at 1:152 (Oct. 3, 2016) (Miltenberger). During that time, the Fort's water use expanded from about 1,371 AFA in 1956, to about 3,300 AFA in the 1970s. Ex. 231, Summary Table (Miltenberger); Ex. 20 at 3 (Burtell).

1 Between 1982 and 1993, the Fort continued to pump about 3,000 AFA, ranging from
2 a low of 2,469 AFA in 1987 to a high of 3,207 AFA in 1989. Ex. 20 at Table 6 (51 of 247).
3 Beginning in the early 1990s, Fort Huachuca was involved in the mobilization of troops for
4 Operations Desert Shield and Desert Storm, including the post's 11th Signal Brigade, the
5 Arizona National Guard's 2220th Transportation Company, and other Reserve and National
6 Guard units. Ex. 231 at 64:31-65:6 (Miltenberger). In 1993, the Fort pumped 3,029 AFA.
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9 2. Current Use

10
11 The United States marks the terrorist attacks on September 11, 2001, as the start of the
12 current era of the Fort's history. As explained by Dr. Miltenberger: "The evolution of Ft.
13 Huachuca's mission profile since the 1990s left it uniquely situated for the new challenges of
14 the 21st Century - most clearly manifested in the military operations that followed in the wake
15 of the terrorist attacks of September 11, 2001." Ex. 231 at 66:14-17 (Miltenberger); Tr. at
16 1:144-145, 153-154 (Oct. 3, 2016) (Miltenberger).
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19 The growth over the past decades has resulted in the construction of additional
20 barracks, headquarters buildings, physical training fields, dining facilities, parking lots and
21 affiliated infrastructure. Tr. at 3:146-148 (Oct. 6, 2016) (Borer). As of 2015, there were
22 about 1,050 single family homes and 18 barracks facilities with approximately 4,800 barracks
23 rooms. Tr. at 3:125-128, 135 (Oct. 6, 2016) (Borer). Currently, only active-duty military
24 personnel and their families live in single family housing on Fort Huachuca. Tr. at 3:148
25 (Oct. 6, 2016) (Borer); Tr. at 5:108-112 (Oct. 10, 2016) (Boone). The base also provides
26 buildings and for: (1) two elementary schools, the middle school, and the satellite college
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1 campuses; (2) the playgrounds and public picnic areas; (3) the medical clinic, dental clinic,
2 and wellness center; (4) the post exchange; (5) the grocery store; (6) the commissary; (7) the
3 gas stations and their associated convenience stores; (8) a separate, freestanding convenience
4 store; (9) two banks; (10) two fitness centers; (11) the post office; (12) the thrift store; (13)
5 two places of worship; and (14) the cemetery. Groundwater is used at Fort Huachuca by the
6 people living and working on the base for washing, bathing, cleaning, consuming, and
7 cooking. Tr. at 147:8-18, (Oct. 19, 2016) (Higgins). The base has a swimming pool used
8 for military training, fitness, and recreation. It also has a hydrant system that transports water
9 for firefighting and minor fire suppression. Tr. at 4:152-153 (Oct. 7, 2016) (Boone). Water
10 is used to wash aircraft. Tr. at 4:153 (Oct. 7, 2016) (Boone).

13 Mr. Tom Borer, the former Deputy Garrison Commander of Fort Huachuca, described
14 the day-to-day operations and maintenance of the Fort infrastructure including water use. Tr.
15 at 3:105 (Oct. 6, 2016) (Borer). The Fort Huachuca Garrison is akin to a city manager's
16 office, with a Department of Public Works that includes engineering, housing, human
17 resources, and emergency services. Ex. 231 at 96:13-15 (Miltenerberger); Tr. at 3:113-136
18 (Oct. 6, 2016) (Borer); Tr. at 4:98 (Oct. 7, 2016) (Boone). Mr. Borer testified that numerous
19 water conservation and mitigation efforts have been implemented on base. Tr. at 3:154 (Oct.
20 6, 2016) (Borer). It has installed low flow dishwashers, toilets that use 1.28 gallons per flush,
21 low-flow shower heads, waterless urinals, replaced swamp coolers with air conditioners and
22 reduced outdoor water use. Tr. at 3:154, 165 (Oct. 5, 2016) (Borer); Tr. at 4:23, 174 (Oct. 6,
23 2016) (Boone); Tr. at 12:26 (Oct. 20, 2016) (Higgins). The Fort does not allow the residents
24 of individual houses on the base to have grass and has eliminated irrigated gardening plots.
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1 Tr. at 3:154-155 (Oct. 5, 2016) (Borer). Artificial turf has replaced grass in the physical
2 training fields and soccer fields. Tr. at 3:161-162 (Oct. 5, 2016) (Borer). The barracks,
3 schools, and facility headquarters use xeriscaping rather than grass. *Id.* at 3:158 (Oct. 5, 2016)
4 (Borer). Mr. Borer explained that "[t]he areas that have grass, it's natural grass. The only
5 water it sees that-to my knowledge- is rainwater " Tr. at 3:159 (Oct. 5, 2016) (Borer). The
6 Brown Parade Field is the only area irrigated by pumped groundwater. Tr. at 4:19, 30 (Oct.
7 6, 2016) (Borer).

9 Christopher Higgins, the Water Compliance Program Manager for Fort Huachuca,
10 further testified that the Fort prioritizes leaks, and thus any water leak in the potable water
11 system is quickly identified and fixed. Tr. at 12:27 (Oct. 20, 2016) (Higgins). As part of its
12 conservation efforts, the Fort modernized its Barnes Field House pool to prevent unnecessary
13 water use by recirculating water that spills into the gutters surrounding the surface area of the
14 pool and closed its Grierson Pool due to leakage problems that were occurring at the pool.
15 Tr. at 8:113-14 (Oct. 13, 2016) (Runyon); Ex. 21 341 at pdfp. 273. The Fort also operates an
16 educational program known as Water Wise consumer awareness to encourage its population
17 to actively conserve water. Tr. at 12:26-31 (Oct. 20, 2016) (Higgins).
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Fort Huachuca's annual groundwater pumping in the current years, which is the sole source of potable water used on the base, is substantially lower than its historic pumping. Tr. at 12:69 (Oct. 20, 2016) (Higgins); Ex.177; Ex.20, Table 6 (51 of 247). Mr. Higgins testified that beginning in the early 2000s the amount of water pumped declined until 2012 when Fort

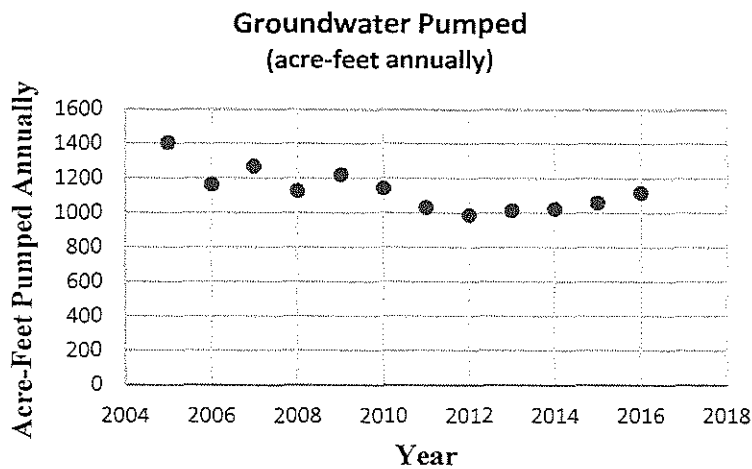


Figure 1. Amount of groundwater pumped each year 2005-2016. Sources: Tr. at 11:182-83 (Oct. 19, 2016) (Higgins); Ex. 115; Tr. at 12:4-13 (Oct. 20, 2016) (Higgins); Exhibits 115-124, at Part I; Exh. 3022.

Huachuca pumped approximately 986 AFA. Tr. at 12:20 (Oct. 20, 2016) (Higgins).

See figure 1. In the succeeding years, groundwater pumping has gradually increased from the 2012 low. Tr. at 12:19-20 (Oct.

20, 2016) (Higgins). See also Ex. 177; Tr. at 12:20 (Oct. 20, 2016) (Higgins); Tr. at 13:109-

10 (Feb. 6, 2017) (Degner); Tr. at 15:107 (Feb. 8, 2017) (Burtell); Ex. 124, at Part I. In 2016, Fort Huachuca pumped approximately 1,117 AFA for its population of 10,447. Tr. at 14:137 (Feb. 7, 2017) (Burtell); Ex.3022. Tr. Ex.3022; Joint Pretrial Statement.

No party disputes the groundwater well data provided by the United States that quantifies the amount of water pumped and used each year at Fort Huachuca. Liberty explicitly recognized that "[t]he amount of water used by Fort Huachuca in recent years is particularly well-established." Liberty Closing at 6. The United States calculated that the average amount of groundwater pumped by the Fort for the period 2005 to 2014 was 1,138

1 AFA. Ex. 25 at A-6, Table 5 (Degner); Ex. 3022, Ex.115-124, 175, and 3022; Tr.11:180-
2 184 (Oct.19, 2016) (Higgins); Tr. at 12:4-13 (Oct. 20, 2016) (Higgins).

3 No disputes, except those related to water use for the MWR Programs discussed
4 above, exist regarding the quantification of Fort Huachuca's current use of groundwater.
5 Freeport acknowledged that "Fort Huachuca's most recent pumping data represents the Fort's
6 true minimal need because conservation measures have continued to affect the amount of
7 groundwater withdrawals even in recent years." Freeport Closing at 26. *See also* Liberty
8 Closing at 2. Thus, the United States is entitled to a federal reserved water right equal to no
9 less than 1,138 AFA.
10

11 **B. Long-Term Expansion of Operations**

12 The United States seeks federal reserved water rights to an additional amount of water
13 to provide for future expansion. It contemplates a future use of 1,548 AFA for a future
14 Effective Population of 14,229. Freeport and Liberty argue that long-term future use should
15 be capped at 1,300 AFA.
16

17 The United States' claim for future use is based on a calculation of the daily use factor,
18 the gallons per capita per day, multiplied by the expected long-term population of the Fort.
19 The United States based its gallons per capita per day figure based on current use. Because
20 the Fort must provide water for people who work on the base but do not live on the base, an
21 accurate computation of the relevant population first requires a determination of the Fort's
22 Effective Population.
23

24 The United States called Donald Stadelman, an expert demographer, who holds a
25 Ph.D. in economics to testify about the population at the Fort. Tr. at 15:13 (Feb. 6, 2017)
26

1 (Stadelman); Ex. 3021. Dr. Stadelman defined the relevant population as "all military
2 members stationed at the post who reside either on-post or off-post, their dependents who
3 live on-post, the direct fulltime civilian employee and contractors who work on-post, and
4 half, the total number of part-time civilian and contractors assumed to work half-time on-
5 post." Tr. at 13:22-23 (Feb. 6, 2017) (Stadelman); Ex. 370, at 2. This designated population
6 is intended to encompass all of the people who are typically present on the Fort during the
7 work week and exclude those who neither work nor live on the Fort (e.g., the dependents of
8 soldiers who do not live on the Fort). Tr. at 13:23-24 (Feb. 6, 2017) (Stadelman). The relevant
9 demographic group can be grouped into eight categories: (1) 1,684 active duty military
10 residing on the Fort; (2) 1,237 active duty military residing outside the Fort; (3) 2,843 military
11 students; (4) 2,940 military dependents who live on the Fort; (5) 3,008 civilians who are
12 employed by an Army agency on the Fort; (6) 4,171 contractors who are employed by an
13 Army agency on the Fort; (7) personnel employed by national security organizations; and (8)
14 524 personnel from other agencies and companies. Tr. at 13:29-33 (Feb. 6, 2017)
15 (Stadelman); Ex. 370, at A-1.

16
17 Dr. Stadelman's calculation of the Fort's population began with the data obtained from
18 the Fort's annual census. Tr. at 13:25 (Feb. 6, 7 2017) (Stadelman). He also conducted an
19 independent survey of the Fort's population to ascertain the percentage of the Fort's civilian
20 employees and contractors who were employed by more than one of the Fort's tenant
21 organizations. Tr. at 13:25-26 (Feb. 6, 2017) (Stadelman); Ex. 479. The Fort's annual census
22 necessitated this additional step because the census counted each employee in each mission,
23 so a simple summation of all contractors and employees in the missions could have resulted
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1 in one or more people being counted more than once. Tr. at 13:25-26 (Feb. 6, 2017)
2 (Stadelman). Dr. Stadelman conducted his survey via e-mail using contact information
3 provided by the Fort and received a 52% response rate, which is considered a good response
4 rate. Tr. at 13:26 (Feb. 6, 2017) (Stadelman); Ex. 479. Dr. Stadelman's survey found that
5 approximately five percent of civilian and contractor employees work on two missions. As
6 a result, Dr. Stadelman applied a "correction factor" to the census population to account for
7 the double-counting issue. Tr. at 23 at 13:26-29 (Feb. 6, 2017) (Stadelman); Ex. 351, § 3.3
8 (pp. 4-5). He also reduced the number of part-time employees and contractors by half because
9 they were not present on the Fort for the entire work week. *Id.* Based on the data, survey
10 results, and adjustments, Dr. Stadelman determined that the population for 2005 and 2014
11 was, on average, 16,497. Tr. at 13:29-33 (Feb. 6, 2017) (Stadelman); Ex. 370, atA-1.

14 Mr. Degner used Dr. Stadelman's calculations and then further reduced the population
15 count to account for individuals who live off-Fort but work on-Fort because that population
16 only used water on the Fort for approximately one-third of the day. Tr. at 13:104-05 (Feb. 6,
17 2017) (Degner). He described his process as developing a formula that calculates "a third of
18 a commuter and adds that to the resident population to get to kind of a water use unit or an
19 effective population for the per capita use rate." Tr. at 13:104 (Feb. 6, 2017) (Degner). Mr.
20 Degner's methodology is not disputed by the parties. Tr. at 14:119-20 (Feb. 7, 2017)
21 (Burtell).

24 By correcting for the commuter population present on the Fort consuming water for
25 only approximately one-third of the day, Mr. Degner was able to reach an "effective on-post
26 population" that could be used to calculate the average per-person water use at the Fort. Tr.
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1 at 13: 104-05 (Feb. 6, 2017) (Degner); Ex. 25, at A-1, A-6. 5 268. Of the total average
2 workday population of 16,497 for the Fort between 2005 and 2014, a total of 9,030 were
3 commuters who did not reside on the Fort. Tr. at 13:29-33 (Feb. 6, 2017) (Stadelman); Ex.
4 370, at A-2; Tr. at 13:106-07 (Feb. 6, 2017) (Degner); Ex. 25, 8 at A-6. 9 269. Therefore, to
5 reach the "effective on-post population," Mr. Degner multiplied the commuter population of
6 9,030 by the correction factor of 0.33 (which yields 2,980) and added the corrected commuter
7 population to the on-post population of 7,467. Tr. at 13:104-07 (Feb. 6, 2017) (Degner); Ex.
8 25, at A-6. This calculation results in a total "Effective Population" of 10,447 based on the
9 data during the ten years preceding Mr. Degner's calculations. Tr. at 13:104-107 (Feb. 6,
10 2017) (Degner); Ex. 25, at A-6. 15 b.

13 Calculating the Effective Population figure enabled Mr. Degner to determine the per
14 capita water use at the Fort. He divided the total volume of water pumped from the Fort's
15 eight production wells by the Effective Population. Tr. at 13:106-07 (Feb. 6, 2017) (Degner).
16 During the ten-year period preceding Mr. Degner's analysis, 2005 to 2014, the average on-
17 post groundwater use was 1,138 AFA. Tr. at 13:106-07 (Feb. 6, 2017) (Degner). After
18 converting this figure from acre-feet per year to gallons per day, the result is "97 gallons per
19 capita per day for the Fort's effective population from 2005 to 2014." *Id.* at 13:107, 110-11.

22 A dispute exists between the parties regarding the appropriate number of years of data
23 that should be used to calculate the average gallons per capita per day figure. The United
24 States used ten years of data while Freeport calculated the average water use based on a five-
25 year record. The five-year period of record, 2010-2014, results in an average gallon per capita
26 per day of 95. Freeport reasoned that a five-year period was more appropriate because it
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1 captured the years in which all of the conservation measures were fully operational and
2 eliminated higher-use years. A review of the record shows that the per capita use in 2007, a
3 year excluded from Freeport's data, equaled the per capita use 2014. Tr. at 15:104-05 (Feb.
4 8, 2017) (Burtell); Ex. 20, at pdfp. 51 (Table 6). Mr. Degner explained that it was appropriate
5 to use the prior ten years of population and groundwater production data to calculate the
6 gallons per capita per day figure, as opposed to a shorter time period such as five years. Tr.
7 at 13:109 (Feb. 6, 2017) (Degner). A longer period of record lessens the impact that a single
8 year of particularly unusual weather, use, or non-use has on the result. *Id.* at 13: 109-10.
9 Accordingly, the ten-year lookback period averaging 97 gallons per capita per day is a
10 reasonable basis on which to calculate future use.
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13 The United States contends that its Effective Population will increase in the future by
14 an additional 729 and that the population at the Fort will also increase by another 3,000
15 personnel due to expansions in its assigned missions. Currently, Fort Huachuca's missions
16 focus on what the Army refers to as Command, Control, Communications, Computers and
17 Intelligence (C4I). It trains virtually every military intelligence soldier in the Army. U.S.
18 Closing at 28. Fort Huachuca's extensive and technologically advanced missions now involve
19 testing of electronic equipment, military intelligence training, Unmanned Aerial Systems
20 (UAS) training and operations, and support to the Army's communications networks. The
21 Fort's unmanned aerial systems activities and related mission have continued to experience
22 growth. Tr. at 3:145 (Oct. 5, 2016) (Borer). The Gray Eagle, an aerial system, recently had a
23 threefold increase in its mission that is expected to continue into the near future. Tr. at 4:141-
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1 42 (Oct. 6, 2016) (Boone). The Fort's student population has increased due to the Gray Eagle's
2 mission activities. *Id.* at 4:142-43.

3 General McGuire also testified that there is "huge growth opportunity down at Fort
4 Huachuca in the unmanned aerial systems area " Tr. at 16:73-74 (Feb. 9, 2017) (McGuire).
5 Lieutenant General Ashley testified that the Fort's missions for testing devices for use in
6 electronic warfare are "something that's going to be a growth area for us, because we're going
7 to be investing more of that in the Fort structure in the future, and this [Fort Huachuca] is a
8 great place to do it." Tr. at 7:131-32 (Oct. 12, 2016) (Ashley).
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10 The State of Arizona challenges the assumption that a change in mission translates
11 into a change in water use. It contends that the Fort has experienced a 67 percent decrease in
12 water use during the same time period in which missions at the Fort have increased. State of
13 Arizona Closing at 32. The State of Arizona's observation highlights the fact that the Fort
14 used much greater amounts of water per person and demonstrates the importance of tying
15 anticipated future use to an estimated future population and a use measured by the current 97
16 gallons per capita per day.
17

18 Historic precedent exists for the Fort's population increasing by several thousand or
19 more as a result of new missions relocating to the Fort. The relocation of the Electronic
20 Proving Ground to the Fort in 1954 increased the Fort's population by 7,000. Tr. at 2:36
21 (Oct. 4, 2016) (Miltenberger). The Electronic Proving Ground continues to be in operation.
22 Tr. at 2:34-35 (Oct. 4, 2016) (Miltenberger). Subsequently, the Army relocated the 11th
23 Signal Group from Fort Lewis, Washington to the Fort thereby increasing the Fort population
24 by 5,000 people. Tr. at 2:38-40 (Oct. 4, 2016) (Miltenberger); Ex.231 at 59. In 1967, the
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1 Army relocated its Strategic Communications Command ("STRATCOM") to the Fort. Tr. at
2 2:40-42 (Oct. 4, 2016) (Miltenberger); Ex. 231, at 60. The arrival of STRATCOM brought
3 6,000 new troops to arrive at the Fort. Tr. at 2:41-42 (Oct. 4, 2016) 14 (Miltenberger); Ex.
4 391. In the early 1990s, the Army relocated its Intelligence School to the Fort. Tr. at 2:42
5 (Oct. 4, 2016) (Miltenberger).
6

7 Making an arguing similar to that raised by the State of Arizona, Freeport argues that
8 historic data should not be used because it was "inflated by inefficient delivery systems and
9 a lack of conservation measures." Freeport Closing at 29. Freeport is correct that the
10 determination of future use in this case should not assume that historic infrastructure and
11 conservation measures or lack thereof will be reinstated in the future. The United States,
12 however, does not quantify its likely future use based on either historic infrastructure or
13 conservation practices. It calculates the future quantity as a function of population that is
14 multiplied by the 97 gallons per capita per day amount that was derived from groundwater
15 pumping with modern infrastructure and conservation measures.
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18 Liberty and Freeport assert that 1,300 AFA, less than a 20 percent increase over the
19 average use in the previous decade, is the minimum amount necessary to fulfill the Fort's
20 foreseeable future uses accounting for increases in population and mission fluctuations.
21 Freeport Closing at 29, Liberty Closing at 2. Liberty and Freeport contend that future use
22 should be based on the Fort's estimate in its 2012 Community Water System Five-Year
23 Update filed with Arizona Department of Water Resources. The 2012 Five-Year Update
24 includes at Section F a "projected system population and projected demand" that sets forth
25 the projected population and water use at the Fort for the years 2015, 2020, and 2030. Tr. at
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1 12:16-18 (Oct. 20, 2016) (Higgins); Ex.2 126, § F. Mr. Higgins, who prepared the form,
2 predicted that the same amount, approximately 1,032 AFA, for the same population would
3 be used in 2015, 2020, and 2030. Mr. Higgins testified that he completed the form based on
4 uses reported in recent years. Tr. at 12:71 (Oct. 20, 2016) (Higgins). He explained that the
5 prediction assumes no future changes in mission or change in population. Id. Mr. Higgins
6 testified that he had no basis to actually know whether the Fort's population would be
7 consistent, noting that "I'm not privy to knowing huge mission changes, meaning equates to
8 huge population shifts up or down," and therefore he "did not project any changes in mission
9 on the -you know, I don't have access to that." Id. at 12:17-18.

12 Colonel Boone testified that given the Fort's unique geography, restricted military
13 airspace and types of missions, it could grow to support additional missions through another
14 round of Base Realignment and Closure (BRAC). U.S. FOF 416-420; Tr. at 4:180-81 (Oct.
15 6, 2016) (Boone). The Army uses the BRAC procedure to "adjust military forces, military
16 missions, and consolidate things" by reducing infrastructure and related expenditures. *Id.* at
17 4:180. In the most recent BRAC process, the Department of the Army issued a report ranking
18 all Army installations in order of "military value" based upon, among other factors, the
19 installation's available physical space to grow. Tr. at 4:183-84 (Oct. 6, 2016) (Boone); Ex.
20 10. In this analysis, the Department of the Army ranked the Fort as 21 out of 97 installations
21 in terms of military value. Tr. at 4:184-85 (Oct. 6, 2016) (Boone); Ex. 10, at 23 53 (pdf p.
22 63); Tr. at 7:141 (Oct. 12, 2016) (Ashley). Colonel Boone explained that this ranking
23 signifies that the Fort is viewed by the Army as possessing high military value. Tr. at 5:60-
24 61 (Oct. 10, 2016) (Boone); Ex. 2, at pdfp. 15. That value is due, in part, to the unique
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1 attributes of the Fort's restricted airspace which has caused units to be transferred to the Fort
2 from "other Army installations to Fort Huachuca to train, because they can't do - they can't
3 fly enough or do enough training tasks where they're located." Tr. at 4:141 (Oct. 6, 2016)
4 (Boone).

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6 In the past, the Fort has received new missions and population increases as a result of
7 the BRAC process. Tr. at 2:42-43 (Oct. 4, 2016) (Miltenberger); Tr. at 7:141-42 6 (Oct. 12,
8 2016) (Ashley). When a mission is relocated as a result of the BRAC process, it generally is
9 a long-term relocation. Tr. at 7:177-78 (Oct. 12, 2016) (Ashley). By testifying that an
10 installation where he was previously stationed received a population increase of up to 5,000
11 individuals as a result of BRAC, Colonel Boone confirmed that increases resulting from the
12 BRAC process can be significant. Tr. at 4:181-82 (Oct. 6, 2016) (Boone); Ex. 9, at C-12
13 (pdfp. 12). Lieutenant General Ashley stated that in his opinion that a BRAC could cause the
14 Fort's population to grow by a "few hundred or even a few thousand more personnel." Tr. at
15 7:145-146 (Oct. 12, 2016) (Ashley). It is reasonable to conclude the Fort's current missions
16 will continue and could grow in the future and, as a result acquire additional personnel and
17 increase the minimum amount of water required to support the Fort.
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21 Liberty contends that 1,300 AFA will suffice even if the Fort's population were to
22 increase as the United States forecasts. Liberty points to the 2009 Effective Population of
23 17,804 to argue that changes in population do not necessarily result in changes in water use
24 because the 2009 groundwater use was not more than 1,800 AFA as would be expected but
25 was less than 1,300 AFA. Liberty Closing at 10-11. While Liberty's point is well-taken
26 with respect to 2009, the observation simply reinforces the need to calculate future water
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1 rights using an extended record of water use rather than a limited period of data or a single
2 data point.

3 The third argument that Liberty and Freeport make in support of a 1,300 AFA
4 quantification draws from a 2007 groundwater model designed to assess the environmental
5 impact of the Fort's groundwater pumping through 2030. The Fort's hydrologist at the time,
6 Thomas Runyon, took the lead in selecting the assumed future groundwater pumping figure,
7 which was 1,300 AF per year. Tr. at 8:91-92 (Oct. 13, 2016) (Runyon); Tr. at 9:165-66 (Oct.
8 17, 2016) (Mulhern). Mr. Runyon explained that, in selecting the 1,300 AFA figure, he did
9 not coordinate with the Fort's military planners to determine the potential for future
10 population increases at the Fort, but instead "simply looked back at a ten-year period and
11 looked at the average pumping that occurred in that ten-year period, and we made an
12 assumption that we'll use that for moving forward in time." Tr. at 8:91-92 (Oct. 13, 2016)
13 (Runyon).

14 Like the form filed with ADWR, the input into the groundwater model was based
15 entirely on a short-term evaluation of immediate past use and an assumption of no future
16 change. Through the efforts of Dr. Miltenberger, it is clear that numerous external events
17 have affected the missions, operation and population of Fort Huachuca throughout the past
18 century. The past does not support an assumption of a static future. The experienced, senior
19 Army officers who testified about the future of Fort Huachuca made no assumptions that the
20 Fort's operations and missions would not change. To the contrary, they expected that
21 missions would change, and the population based at the Fort, a valuable base in the military
22 hierarchy, would grow by several thousand in the future operations of Fort Huachuca. The
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1 United States has presented sufficient evidence to demonstrate that it is reasonably likely that
2 its Effective Population will increase by approximately 3,700 or 36 percent in the future.
3 Accordingly, it is appropriate that United States should be decreed federal reserved water
4 rights to 1,548 AFA for military and military-related purposes for Fort Huachuca.
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6 7 **C. Short-Term Total Mobilization**

8 The United States claims a federal reserved water right to an additional 5,404 AFA of
9 groundwater to provide for a short-term Total Mobilization caused by a potential future
10 calamitous event. In support of this claim, the United States called as a witness David Koch,
11 the Director of the Directorate for Plans, Training, Mobilization and Security (DPTMS) at
12 Fort Huachuca. He defined Mobilization as "the process by which a portion or all of the
13 armed forces are brought to a state of readiness for entry into war, or other national
14 emergency, by activating all or part of the reserve components and assembling, organizing,
15 and preparing personnel for deployment or sustaining base support." Tr. at 6:155 (Oct. 11,
16 2016) (Koch). The short-term Total Mobilization envisioned by the Army would consist of
17 an influx of 38,000 personnel in an infantry division that could involve three to five Infantry
18 Brigade Combat Teams. This scenario also includes an increased student and support
19 personnel populations that would generate a short-term Effective Population of 49,700 that
20 would be in addition to the existing Fort population. The United States calculates that the
21 Total Mobilization population will require 5,404 AFA in addition to the 1,548 AFA need to
22 support the existing population at the time of the Total Mobilization. Joint Pretrial Statement
23 p. 10. The United States contends that as Fort Huachuca trains virtually every military
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1 intelligence Soldier in the Army, it stands to reason that in the case of a Total Mobilization
2 such as World War II, the Fort's training mission would increase substantially. U.S. Closing
3 at 32.

4 The Objectors present a series of arguments focusing on the Fort's present status as
5 barriers to future deployment. One such status concerns deployment designations.
6 Installations tasked with deploying units are designated as Power Support Platforms or Power
7 Projection Platforms. A military base can be designated as a CONUS Replacement Center
8 ("CRC"), which means that it is more likely to process soldiers for deployment. Tr. at 8:32
9 (October 13, 2016) (Koch). In the past, Fort Huachuca had such deployment designations
10 but it is not currently designated as either. Freeport asserts that the lack of a deployment
11 designation decreases the chances that Fort Huachuca would receive troops in a mobilization
12 event. Freeport Closing at 38. The testimony presented at trial is that Fort Huachuca could
13 receive the necessary designations in the future depending on the proximity of the crisis or
14 capacity needed. The Army could also choose to mobilize troops for deployment at Fort
15 Huachuca without regard to its current mobilization label. Tr. at 7:190-191 (Oct. 12, 2016)
16 (Ashley); Tr. at 7:13-14, 60-63, 68-70 (Oct. 12, 2016) (Koch): Ex. 2275. Mr. Koch testified
17 that the absence of a particular designator or status would become irrelevant in a Total
18 Mobilization scenario because all available installations would be used for mobilization. Tr.
19 at 8:38-41 (Oct. 13, 2016) (Koch). The Objectors makes an argument similar to the one
20 based on the Fort's lack of current of deployment status when it asserts that the Fort lacks
21 sufficient housing to stage a short-term Mobilization. Lieutenant General Ashley
22 acknowledged that the current configuration of the base could not house the expanded
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1 population. He testified, however, that the requisite housing and infrastructure could be built
2 for 38,000 troops, if necessary. Tr. at 6:150 (Oct. 12, 2016) (Ashley).

3 Freeport and Liberty argue that the claimed water rights should not be decreed because
4 it is unlikely that an event will occur that would cause the population increases advanced by
5 the United States. The United States does not specify any particular future event that could
6 necessitate a short-term Total Mobilization. It did provide general information about
7 potential threats. Lieutenant General Ashley, U.S. Army Deputy Chief of Staff for
8 Intelligence and the Commanding General of the U.S. Army Intelligence Center of
9 Excellence and Senior Mission Commander of Fort Huachuca from April 2013 to July 2015,
10 testified about the principal threats facing the nation listing Iran, North Korea, China, Russia,
11 and Violent Extremist Organizations such as ISIL or al-Qaeda, which he referred to as the
12 "4+ 1 ". Lieutenant General Ashley further noted that the Army must be prepared for total
13 war, such as "major combat operations against a near peer competitor like a China or Russia."
14 Tr. at 7:155-56 (Oct. 12, 2016) (Ashley). He also agreed with an assessment prepared by the
15 Chairman of the Joint Chiefs of Staff:
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19 Today's global security environment is the most unpredictable I have
20 seen in 40 years of service. Since the last National Military Strategy
21 was published in 2011, advantage has begun to erode. We now face
22 multiple, simultaneous security challenges from traditional state
23 actors and transregional networks of sub-state groups - all taking
24 advantage of rapid technological change. Future conflicts will come
25 more rapidly, last longer, and take place on a much more technically
26 challenging battlefield. They will have increasing implications to the
27 U.S. homeland.

28 Ex. 6 at i (pdf2); U.S. FOF 409-410.

1 Lieutenant General Ashley gave as his opinion that there is a low probability that a Total
2 Mobilization would occur. Freeport SOF 192-193.

3 Freeport also claims that the decreed water rights are not warranted because the Total
4 Mobilization is an intrinsically temporary event. Freeport Closing at 47. The United States
5 acknowledges that the duration of the Total Mobilization is uncertain but references the
6 expansion of Fort Huachuca during World War II which it counted as seven years from 1938
7 to 1945. U. S. Closing at 28. Based on the evidence presented, the population began its
8 expansion in late 1940 from approximately 1,300 to 5,500 personnel. Ex. 231 at 39:7-9 and
9 82:1-23 and fn. 219 (Miltenberger) US SOF 26. Additional troops moved to Fort Huachuca
10 in 1942 that caused the population to balloon to more than 30,000. U.S. SOF 30-31. The
11 number of troops Fort Huachuca declined in 1944 as they were transported to the theaters of
12 war. U.S. SOF 31. Assuming, as the United States does, that mobilization during World War
13 II is analogous to a future total mobilization event, the World War II mobilization
14 demonstrates that population increases at the Fort happens years, not weeks or months, after
15 a triggering event. Thus, the time period during which the increased water supply would be
16 needed is more probably shorter than the short-term period presented by the United States.
17 This conclusion is reinforced by Mr. Koch's testimony that all of his hypothetical
18 mobilization scenarios would be short term. In addition, Major General McGuire testified
19 that, in his experience, the timeline for emergency situations is measured in weeks or months,
20 not years. Freeport SOF 259-261. Accordingly, the short-term Total Mobilization Event can
21 be appropriately labelled as a temporary event.
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1 The legal question presented by the short-term Total Mobilization is whether such a
2 temporary event that is not likely to occur provides a proper basis for a perpetual federal
3 reserved water right. The United States contends that an event meeting even these
4 assumptions would suffice under the “reasonably feasible” standard set by *Gila V*. The
5 Arizona Supreme Court created the “reasonably feasible” standard to evaluate whether
6 proposed projects on an Indian Reservation requiring water were achievable from a practical
7 standpoint and were economically sound. *Gila V*, 201 Ariz. at 320, ¶49. As Liberty properly
8 interprets *Gila V*, an essential condition of the test is that it is likely that a future use will
9 occur. Liberty Closing at 12. A second, equally important, condition built into the test is
10 that the proposed use will be a long-term use. This inherent requirement can be seen in the
11 court’s approval of the use of master land use plans to quantify water uses and court’s
12 instruction that the trial court evaluate established water uses as proof of the likelihood that
13 proven uses will continue in the future.

14 The implicit requirements imposed by the *Gila V* test to quantify federal reserved
15 water rights are consistent with established federal law assumptions that the reserved rights
16 are for permanent uses. In its finding that the government had the power to reserve water
17 for use on its land, the *Winters* Court found that federal reserved water rights applied to
18 permanent or long term uses rather than a temporary uses: “That the government did reserve
19 them we have decided, and for a use which would be necessarily continued through years.”
20 207 U.S. at 206. The Court cited *United States v. Rio Grande Dam & Irrigation Co.*, 174
21 U.S. 690 (1899) as precedent for its determination that the federal government had the power
22 to reserve a right to water. In *Rio Grande Dam & Irrigation*, the court found that the
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1 federal government's authority to regulate navigable rivers gave it the power to reserve rights
2 to the Rio Grande River to protect the navigability of that watercourse in the interests of all
3 people in the United States. 174 U.S. at 707. Again, the Court envisioned a long-term
4 purpose for the water to which it found the United States had the ability to assert a federal
5 reserved water right. In *Arizona v. California, supra*, the Court approved a federal reserved
6 water right for a present irrigation use that was expected to continue into the future. The
7 conclusion that federal reserved water rights attach to long-term uses and cannot be created
8 for singular events is further reinforced by the decision in *United States v. Walker River Irr.*
9 *Dist.*, 104 F.2d 334 (9th Cir. 1939). In that case, the United States accepted the quantity of
10 water, 26.25 second feet of water, found to be sufficient for irrigation. It also requested that
11 the decree enable the federal government to demand as much as 150 second feet from year to
12 year at the commencement of the season. The court rejected the United States' claim for the
13 additional water: "That a decree of this sort would tend greatly to depreciate the value of the
14 water rights of the upstream owners, and to make impossible any intelligent program of
15 farming is obvious." *Walker River Irr. Dist.*, 104 F.2d at 340.

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17 The decision that a federal reserved water right must be based on a reasonably probable
18 long-term use is especially applicable in this case where the United States claims a federal
19 right to groundwater. The Arizona Supreme Court found in *Gila III* that federal reserved
20 water rights to groundwater are by nature a preserve intended to continue through years
21 enabling the federal government to protect a reservation from depletion of its underlying
22 aquifer by off-reservation pumpers. The court subsequently reinforced that view of a federal
23 reserved right to groundwater with its statement that the federal reserved water rights doctrine
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1 “effectively modifies the doctrine of reasonable use, as codified in §45-453, because it
2 restricts an overlying landowner’s right to pump groundwater.” *Silver v. Pueblo Del Sol*
3 *Water Co.*, 423 P.3d 348, 353 ¶13 (Ariz. 2018).

4 The fact pattern in *Pueblo Del Sol Water Co.* highlights the importance of the oft
5 repeated restriction that a federal reserved water right reserves only the amount necessary to
6 fulfill the purpose of the reservation and “no more”. *Cappaert*, 426 U.S. at 141. In *Cappaert*,
7 the Court applied this stricture to minimize the impact of a federal reserved water right on
8 adjacent landowners who relied on groundwater for their business. *Pueblo del Sol* highlights
9 a similar situation in Arizona. In *Pueblo del Sol*, a water company intending to pump 3,440
10 AFA of groundwater to service a new development of commercial buildings and 7,000
11 residences, filed an application with ADWR to obtain an adequate water supply designation
12 required by the county. Before ADWR could approve an adequate water supply application,
13 the agency had to find, among other elements, that sufficient groundwater, surface water or
14 effluent of adequate quality would be physically available to satisfy the water needs of the
15 proposed use for at least one hundred years. The court interpreted the physically available
16 element as requiring ADWR to evaluate the impact of existing users on the groundwater
17 supply available to the applicant. See A.A.C. R12-15-716(B)(3)(b). Liberty, referencing the
18 rule interpreted in *Pueblo del Sol*, contends that if the United States’ short-term Total
19 Mobilization claim were a decreed right, it is not clear how ADWR would treat that right for
20 purposes of determining physical availability. “The worst case is that adequate water supply
21 applicants would have to count the reserved right as an annual use, multiplying the volume
22 by 100 years, which is far more water than the Fort anticipates for a “short term” use that by
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1 its own admission is unlikely to occur at all.' Liberty Closing at 24. Liberty concludes that
2 "locking up groundwater in perpetuity to provide for a scenario that the United States admits
3 is unlikely to ever occur, is inconsistent with the narrow construction required of non-Indian
4 reserved water rights." *Id.*

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6 Liberty's conclusion is a correct interpretation of the law. A large amount of water
7 for a short-term event that has a low probability of occurrence is the maximum amount of
8 water that would be needed by Fort Huachuca to satisfy its purpose. Such a quantification
9 based on an unlikely temporary event would run afoul of the Court's mandate that federal
10 reserved water rights should be quantified as "only that amount of water necessary to fulfill
11 the purpose of the reservation, no more." *Cappaert v. United States*, 426 U.S. at 141. The
12 quantification of federal reserved water rights does not constitute a cap on the amount of
13 water that the Fort can use to meet its needs, it constitutes the floor, i.e., the minimum amount
14 of water needed to fulfill the purposes for which the Fort was reserved. The United States
15 may obtain additional water through a variety of sources to meet future needs, such as
16 pumping groundwater under state law or contracting for additional water from surrounding
17 water providers.
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22 **V. Source of Water**

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24 The third issue to be decided in this Phase II is the source of water subject to Fort
25 Huachuca's federal reserved water right. The United States claims rights to three primary
26 water sources to fulfill its annual needs: (1) streamflow from Garden Canyon, (2) streamflow
27 from Huachuca Canyon, and (3) groundwater, its current source of water. The courts have
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1 only recently recognized that the *Winters* doctrine extends to groundwater. *See Arizona v.*
2 *Navajo Nation*, 599 U.S. 555, 561 (2023); *Agua Caliente Band of Cahuilla Indians v.*
3 *Coachella Valley Water Dist.*, 849 F.3d 1262, 1271 (9th Cir. 2017); *Silver v. Pueblo Del Sol*
4 *Water Co.*, 244 Ariz. 553, 558 ¶ 13 (2018); *Gila III*, 195 Ariz. at 420 ¶ 31. Two of these
5 decisions directly addressed the question of whether a federal reserved water right can attach
6 to groundwater: *Gila III* and *Agua Caliente Band of Cahuilla Indians*. *Gila III* concluded
7 that a federal reserved water right to groundwater exists when “other water are inadequate to
8 accomplish the purpose of a reservation.” 195 Ariz. at 748, ¶31. *Agua Caliente Band of*
9 *Cahuilla Indians* found that a “a reservation without an adequate source of surface water must
10 be able to access groundwater.” 849 F.3d at 1271. Thus, a federal reserved water right
11 attaches to groundwater when adequate sources of other water do not exist to fulfill the
12 purpose of the reservation. A fact-intensive inquiry into the presence of other water on the
13 Fort is required as part of the determination of the appropriate source of the Fort's federal
14 reserved water right.

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18 **A. Other Water Sources**
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20 The State of Arizona argues that the effluent produced by Fort Huachuca should be
21 considered as “other waters” and that the amount of effluent it produced should reduce the
22 amount of groundwater subject to federal reserved water rights. As discussed above, the
23 testimony and evidence the United States introduced at trial established that its claims for
24 federal reserved water rights do not include water for purposes that are currently
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1 accomplished with effluent, which are irrigating the golf course and recharging the aquifer.

2 U.S. SOF 248, 253.³

3 Moving beyond the moot question of whether effluent should be used to offset the golf
4 course irrigation, the more general question is whether recycled groundwater subject to the
5 federal reserved water right should be considered “other water.” Colonel Boone testified that
6 the Fort's effluent comes from water that was originally pumped as groundwater and was
7 recaptured after use on the Fort. Tr. at 5:85 (Oct. 10, 2016) (Boone). Between 2005 and 2014,
8 the Fort pumped an average of 1,138 AFA and from that water it generated 500 to 700-acre
9 feet of effluent, or between 44 percent (500/1138) and 62 percent (700/1138) of an acre-foot
10 of effluent for each acre-foot of groundwater pumped. The amount of effluent is derivative
11 of the amount of groundwater pumped. The inevitable impact of the choice to treat a
12 derivative water source as “other water” would be to permanently decrease the initial
13 quantification of a water right determined to be the minimum amount needed to accomplish
14 a primary purpose. For example, if 1,138 AFA were determined to be the correct quantity
15 for the Fort, and that amount were offset by the full amount of effluent resulting from the
16 Fort's pumped groundwater that the Fort uses to irrigate the golf course or recharge the
17 aquifer, the United States would have a water right to 638 AFA (1138-500) to 438 AFA
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24 ³ Prior to trial, the State of Arizona filed a motion seeking a ruling that the amount of effluent
25 should offset the quantity of groundwater subject to a federal reserved water right. The Court granted
26 the motion finding that the availability of effluent may affect the minimum amount of water needed.
27 It cited the irrigation of the golf course as an example of an appropriate place to consider the amount
28 of available effluent without making any determination about the impact that use of effluent, if any,
would have on the quantification of the water right. MSJ Order at 11. Based on testimony and
evidence presented at trial, it is now clear that the United States does not seek a federal reserved
water right for water to irrigate the golf course currently irrigated by effluent.

1 (1138-700) from which it could generate between 280 (.44 x 638) and 392 (.62 x 438) acre
2 feet of effluent. If the Fort could treat the recycled water to potable standards, it would have
3 only 918 to 711 AFA. (This example assumed that the process of treating effluent to potable
4 water did not further reduce the volume of water). The approach urged by the State of
5 Arizona in this case would reduce the amount of water available to the Fort below its
6 minimum need.
7

8 Effluent in this case is not reasonably available to the Fort to satisfy its primary
9 purpose. The effluent is classified as B plus, which means it cannot be used for potable
10 purposes. Tr. at 9:98-99 (Runyon) (Oct. 17, 2016); Tr. at 12:64-65 (Oct. 20, 2016) (Higgins).
11 The Fort does not have the capability to treat effluent to the potable standards with its
12 wastewater treatment plant. Moreover, effluent is not used for potable purposes anywhere in
13 Arizona. Tr. at 8:121 (Oct. 13, 2016) (Runyon); Tr. at 15:27 (Feb. 8, 2017) (Burtell).
14 Effluent from recycled water to which the decreed right will attach is not "other water."
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17 The United States also contends that "other water" for purposes of the *Gila III* analysis
18 should not include runoff and rainwater captured on the Fort grounds. Under Arizona law,
19 surface water must flow "in one of the geological or topographical features enumerated by"
20 A.R.S. § 45-141 (A). *See Arizona Pub. Serv. Co. v. Long*, 160 Ariz. 429, 437, 773 P.2d 988,
21 996 (1989). These features include water that is "flowing in streams, canyons, ravines or other
22 natural channels, or in definite underground channels, whether perennial or intermittent,
23 flood, waste or surplus water, and of lakes, ponds, and springs on the surface." A.R.S. § 45-
24 141(A). Diffuse stormwater runoff and captured rainwater are considered "developed" water,
25 i.e., water that is not available without a constructed infrastructure or other artificial
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1 assistance. *See Fourzan v. Curtis*, 43 Ariz. 140, 144-45, 29 P.2d 722, 724 (1934). Because
2 runoff that has not reached a stream, canyon or other "natural channel" and captured rainwater
3 are not appropriable, neither source of water is among the "other waters" under *Gila III* that
4 must be inadequate before the Fort's reserved water right may extend to groundwater.
5

6 **B. Streamflow**

7 The remaining dispute among the parties concerns the streamflow in Garden and Huachuca
8 Canyons. Huachuca Canyon generally runs from the southwestern boundary of Fort Huachuca to the
9 northeast. Tr. at 13:61 (Feb. 2, 2017) (Degner). Garden Canyon originates in the Huachuca
10 Mountains and is generally located within the southern portion of the land and flows to the east. *Id.*
11 The Coronado National Forest and the Miller Peak Wilderness are located along the southern and
12 much of the western boundaries of Fort Huachuca. At the time that the land for Fort Huachuca was
13 reserved, the springs in Huachuca Canyon provided 20 AFA for 280 troops and 170 horses housed
14 at Fort Huachuca. Freeport FOF 16. During the time period when the Fort relied on spring flow in
15 Huachuca Canyon, the water supply from that source was inadequate during dry periods. Tr. at 1:167
16 (Oct. 3, 2016) (Miltenberger); Tr. at 15:164-65 (Feb. 8, 2017) (Burtell). In 1887 and again in 1890,
17 the Army installed check dams in Huachuca Canyon. U.S. SOF 268-269. This additional
18 infrastructure did not create a reliable water source for the population which then numbered between
19 200 and 400 soldiers. Tr. at 2:50-51 (Oct. 4, 2016) (Miltenberger). In 1911, the Army installed a
20 collection system in Garden Canyon to deliver an additional water supply for the Fort. Tr. at 1:167,
21 170 (Oct. 3, 2016) (Miltenberger); Tr. at 2:51-52 (Oct. 4, 2016) (Miltenberger); Ex. 231, at 124; Tr.
22 at 3:27 (Oct. 5, 2016) (Miltenberger). Following the addition of Garden Canyon as a water source,
23 the Fort continued to experience water shortages. Tr. at 2:52-53 (Oct. 4, 2016) (Miltenberger). At the
24 time of these shortages, the Fort's population was no more than 1,200. *Id.* at 2:52-53.
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Dr. Miltenberger testified that, in or around 1930, the Fort constructed a 1,000,000 gallon

1 reservoir and a 900,000 gallon reservoir to increase its storage capacity beyond that of its existing
2 250,000 gallons reservoir. Tr. at 3:90-92 (Oct. 16, 2016) (Miltenberger). These reservoirs could
3 store a total of 6.6 acre-feet of water. The purpose of adding the additional reservoir capacity was to
4 enable the Fort to store extra surface water during high flow periods so that the stored water could be
5 used in times of drought. *Id.* at 3:91-92. The reservoirs did not alleviate the shortages. Tr. at 2:47
6 (Oct. 4, 2016) (Miltenberger). Consequently, the Fort drilled a well. The Completion Report for the
7 well confirmed that it was constructed to "augment [] the present supply, which for several years has
8 been restricted due to periodic annual shortages." Tr. at 2:54-55 (Oct. 4, 2016) (Miltenberger); Ex.
9 377.

11 In 1966, the USGS examined the streamflow data at the gating station on Garden Canyon
12 Creek for approximately a four-year period from 1959 to 1963. This period included reports of no
13 flow, except for intermittent runoff due to thunderstorms, from May 29 to September 7, 1961, and
14 no flow from June 3 to July 27, 1963. Ex. 23. at 4 (Degner); Ex. 29 at

15 2 (PDF 6). Based on the data, USGS concluded that Garden
16 Canyon Creek could supply 30 percent of the needed water to
17 Fort Huachuca. In reliance on this assessment, the United States
18 reinstalled the diversion systems at a cost of \$1,700,000.⁴ A
19 flood destroyed the pipeline system shortly after installation
20 requiring extensive repairs. Tr. at 3:101 (Oct. 5, 2016)

Year	Percentage of Water Demand Met
1971	7.5%
1972	4.5%
1973	0% Lines destroyed by flooding
1974	9%
1975	15%
1976	11%

22 (Miltenberger); Ex. 36, at 4 pdf p. 27; Tr. at 17:84-85 (Feb.

Table 2

23 13, 2017) (Burtell). As shown in Table 2, the new and
24 subsequently replaced diversion system provided a substantially smaller percentage of the water
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Source: Tr. at 13:86-88 (Feb. 6, 2017)
(Degner)

28 ⁴ \$1.7 million in 1969 dollars is \$14.5 million in 2024 inflation-adjusted dollars.

1 needed than anticipated. The Fort's potable water use peaked in 1974 when the Fort used 3,623 acre-
2 feet of water of which 272 acre-feet were provided by the combined Garden and Huachuca Canyon
3 systems. U.S. SOF 325. In 1977, floods again damaged the systems in Garden and Huachuca Canyon
4 requiring months of repairs. Ex. 276 at 50.

5 Mr. Higgins testified that he has seen the surface water collection and distribution system
6 damaged "multiple times" during his tenure at the Fort, "and there is a lot more, as far as historical
7 records are concerned." Tr. at 12:33 (Oct. 20, 2016) (Higgins). A flash flood that occurred in the
8 early 2010s damaged any remaining surface water infrastructure that existed in Garden Canyon
9 beyond repair. Tr. at 10:90-91 (Oct. 18, 2016) (Mulhern); Tr. at 12:33 (Oct. 20, 2016) (Higgins). Mr.
10 Higgins confirmed that the surface water infrastructure in both Garden and Huachuca Canyons has
11 been so damaged by various storms that the infrastructure is now unusable. Tr. at 12:31-32 (Oct. 20,
12 2016) (Higgins). He estimated that it would cost "millions and millions" of dollars for the Fort to
13 begin using surface water. Tr. at 12:60 (Oct. 20, 2016) (Higgins). One estimate provided at trial set
14 the cost of renovation at no less than \$20,000,000. Tr. at 15:79-80 (Feb. 8, 2017) (Burtell). Even if
15 the United States were to undertake the cost of yet another attempt to install diversion infrastructure,
16 the history of the repeated, failed efforts means that substantial additional funds would be required
17 for extensive repairs or replacement following destructive flood events in the canyons that would
18 prevent the Fort from capturing flood waters until repairs could be undertaken.

19
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21 In 1983, due to this cycle of unpredictable water flows and foreseeable destruction, the Fort
22 stopped diverting water from the Garden Canyon and Huachuca Canyon system. For more than three
23 decades, the Fort has relied solely on the water from its eight groundwater production wells. Tr. at
24 1:164 (Oct. 3, 2016) (Miltenberger). Dr. Miltenberger's conclusion, based on his review of the
25 historic report, is that the Fort would suffer periodic water shortages and would lack a reliable water
26 supply if it relied solely on the streamflow from Huachuca and Garden Canyons for its water supply.
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Tr. at 2:46-47 (Oct. 4, 2016) (Miltenberger); Ex. 231, at 114.

1. Garden Canyon

Discharge from springs, storm runoff, and snow melt runoff into the stream channels of the canyon provides the streamflow found in Garden Canyon. Tr. at 13: 94-95 (Feb. 6, 2017) (Degner). Thomas Runyon, who has a Master of Science in geology and served as the Fort's hydrologist between 2006 and 2011, explained that Garden Canyon streamflow runs through the Fort Huachuca grounds. The base flow for Garden Canyon streamflow is located within the boundaries of Fort Huachuca Tr. at 8:77-78, 85 (Oct. 13, 2016) (Runyon). Streamflow from Garden Canyon outside the Fort Huachuca boundary is ephemeral because it flows only in response to summer monsoon storms. *Id.* at 8:85.

The USGS operates a stream gage in Garden Canyon that has generated flow data from 1959 through 1964 and 1994 through the present. Tr. at 13:74-75 (Feb. 6, 2017) (Degner); Tr. at 8:69, 79 (Oct. 13, 2016) (Runyon). There is perennial flow along several miles of the streambed due to groundwater being discharged into the streambed from various springs but at the gaging station the stream become intermittent. Tr. at 8:70 (Oct. 13, 2016) (Runyon); Tr. at 13:74 (Feb. 6, 2017) (Degner). The median flow in Garden Canyon during this period of record is 858 acre-feet. Tr. at 15:32 (Feb. 8, 2017) (Burtell); Ex.53.

The median annual flow statistic is not the result of constant flow. Garden Canyon streamflow is characterized by a great variability in flow marked by floods "characterized by very high peak discharges, actually producing floods that inundate the floodplain" and periods of low or no flow. Tr. at 8:72-73 (Oct. 13, 2016) (Runyon). The periods of drought can last for an extended period of time. In 2002, annual flow was 246 acre-feet, 2003 annual flow, the lowest recorded, was 27 acre-feet, and 2004 had 222 acre-feet of streamflow. Tr. at 15:30-34, 154 (Feb. 8, 2017) (Burtell);

1 Ex. 53; U.S. FOF 234. Garden Canyon streamflow also exhibits a high degree of seasonal variability.
2 Tr. at 8:74-75 (Oct. 13, 2016) (Runyon). Mr. Degner testified that based on his analysis of the daily
3 streamflow data, the daily median flow in June and July is zero. Tr. at 13:75-76 (Feb. 6, 2017)
4 (Degner). No flow days are not limited to the summer months; they can also occur throughout the
5 year. Mr. Degner testified that he examined the historic streamflow data for each day of the year.
6 This daily data provides historical information about that day's minimum, maximum and mean flow.
7 For example, one data set will contain the daily minimum, maximum, and mean for every January
8 1st in the recorded history. Mr. Degner reviewed the 365 data sets and testified that most data sets
9 contained a reported minimum amount of water of zero. Tr. at 13:76 (Feb. 6, 2017) (Degner).
10
11

12 **2. Huachuca Canyon**

13 Huachuca Creek has intermittent streamflow, with the possible exception of the
14 uppermost three-quarters of a mile of stream, meaning that it "dries up most years in the
15 summer." Tr. at 13:62 (Feb. 6, 2017) (Degner); Tr. at 8:80-81 (Oct. 13, 2016) (Runyon).
16 Kim Mulhern, who served as the Fort's Chief of the Environmental and Natural Resources
17 Directorate between 2007 and 2013, testified that "I've been up in Huachuca Canyon in May
18 near where the stream gage is, and sometimes the creek is an inch wide It's not a significant
19 amount of water. There is very low flow. And there would be no water supply most years in
20 – below that gage in May and June." Tr. at 9:111-113, 188-89 (Oct. 17, 2016) (Mulhern).
21 The base flow of Huachuca Canyon also does not extend beyond the boundaries of Fort
22 Huachuca. Tr. at 8:86 (Oct. 13, 2016) (Runyon). Streamflow from Huachuca Canyon
23 between the Fort's borders and the Babocomari River is ephemeral, only flowing in response
24 to summer monsoon storms. *Id.* at 8:85. The median annual flow during the 14-year period
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1 of record for the USGS gage at Huachuca Canyon is 118.8 acre-feet. Tr. at 13:72 (Feb. 6,
2 2017) (Degner).

3 Mr. Degner testified that he examined the 14-year historic streamflow data for Huachuca
4 Canyon for each day of the year as he had done for Garden Canyon. He testified that for the
5 overwhelming majority of days of the year, there was at least one day in the 14-year period of record
6 in which Huachuca Canyon did not have any flow at the USGS gauge. Tr. at 13:67-69 (Feb. 6, 2017)
7 (Degner); Ex. 21, at Fig. 3 (p.5). The record also shows that during some years there is less than 0.1
8 cubic feet per second of flow or 0.2 acre feet per day⁵ in Huachuca Canyon for the majority of the
9 year. Tr. at 13:65-66 (Feb. 6, 2017) (Degner); Ex. 21, at Fig. 3 (p.5). Notably within the 14-year
10 period of record there were three consecutive years that the flow dropped below 20 percent of the
11 median. In 2003, 2004, and 2005, the total annual flows for Huachuca Canyon were 10.9, 7.2, and
12 21.011 acre-feet, respectively, for a three year total of less than 40 acre-feet. Tr. at 17:71-72 (Feb.
13 13, 2017) (Degner); Tr. at 15:137-38 (Feb. 8, 2017) (Burtell); Ex. 20, at pdf p. 52. In 2003, Huachuca
14 Canyon and Garden Canyon combined produced 38 acre-feet of water as measured at their USGS
15 gages. Tr. at 17:81-82 (Feb. 13, 2017) (Burtell). Mr. Degner assessed the flows in Huachuca Canyon
16 as seasonally variable and unreliable. Tr. at 13:69 (Feb. 6, 2017) (Degner).
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19 C. Groundwater

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21 At the current demand rate of 1,138 AFA, the Fort must supply 95 acre-feet of water
22 each month for its population including the summer months when the streamflow is low or
23 nonexistent. There can be no dispute that the quantity of surface water appurtenant to the
24 land reserved for Fort Huachuca is less than the quantity needed to fulfill the minimum needs
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28 ⁵ 1 cfs = 1.983 acre-foot per day

1 of the reservation and thus, the United States is entitled to a federal reserved water right to
2 groundwater. The remaining question concerns the appropriate method to allocate the federal
3 reserved water rights between groundwater and the Garden Canyon and Huachuca Canyon
4 streamflow.

5
6 The United States asserts that its reserved right applies to “all the water sources that
7 Fort Huachuca has at hand, including surface water, springs, and other underground water
8 located on or below the reservation, and the groundwater in the regional aquifer.” U.S.
9 Closing at 43. Launching from this sweeping proclamation, it contends that no allocation
10 should be made between groundwater and surface water. According to the United States, the
11 federal reserved water right should be decreed without reference to a particular source thereby
12 leaving it free to determine from year to year, in its sole discretion, the sources to be used and
13 the amounts to be diverted from each source. U.S. Closing at 41. Federal law requires a
14 federal reserved water right to be defined by its source. In *Winters*, the reserved land had a
15 large perennial source on one boundary, the Milk River, and several water sources within its
16 boundaries, the People Creek, the Big Horn Creek, Lodge Pole Creek, and Clear Creek. The
17 federal reserved water right did not generally attach to all water on the reservation; it attached
18 to 5,000 inches from the Milk River. A federal decreed right specifically designates a source
19 or sources of water. *See, e.g., Conrad Inv. Co. v. United States*, 161 F. at 834 (Birch Creek
20 defined as the source of the water to which the right attached); *United States v. Ahtanum Irr.*
21 *Dist.*, 236 F.2d 321 (9th Cir. 1956); *United States v. Walker River Irr. Dist.*, 104 F.2d 334
22 (9th Cir. 1939); *United States v. Orr Water Ditch Co.*, 309 F. Supp. 2d 1245 (D. Nev. 2004).

1 The United States also argues that a federal reserved water right defined by a surface
2 water source and a groundwater source imposes Arizona's bifurcated water rights system on
3 a federal right. An adjudicated right referencing the specific sources does not impose
4 Arizona's legal framework governing the establishment, quantification, and retention of
5 appropriative and groundwater rights under state law on a federal right. The decree properly
6 identifies the sources of water to which the federal right attaches, all of which have the same
7 priority date, use, place of use, and other characteristics associated with a federal right and
8 do not include elements such as the possibility of loss through forfeiture or abandonment that
9 could apply to a state surface water right.
10
11

12 Freeport argues that surface water variability should not cause a source to be
13 considered inadequate thereby shifting the entirety of a federal reserved right to groundwater.
14 It states that storage is a practical solution to managing surface water variability. Freeport
15 Closing at 57. Freeport called Richard Burtell, a Registered Geologist with a Master of
16 Science in hydrology and a Bachelor of Science in geology, as a witness. He testified that
17 the United States should construct storage dams to impound and store all flow, including
18 flood flows. Another proposal involved diversion dams to divert all streamflow measured
19 at the gages into pipes that would transmit the surface water to steel storage tanks or covered
20 reservoirs. *Id.* As discussed above, the United States has attempted over a hundred-year
21 period to access and store the surface water using a combination of dams and diversion
22 infrastructure. The systems repeatedly failed. Mr. Runyon testified diversion infrastructure
23 must be able to "withstand the potential high flows that can occur in those canyons." Tr. at
24 8:118-19 (Oct. 13, 2016) (Runyon).
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1 Assuming that the infrastructure could be installed and maintained to withstand the
2 flood flows, the amount of storage required by Mr. Burtell's proposal to divert and store the
3 water would be substantial. Currently, the Fort has closed storage tanks that can hold 18.4
4 acre-feet of water or approximately a six-day supply based on an average annual use of 1,138
5 acre-feet. As the United States established at trial, it would have to construct storage for
6 2,059 acre-feet of water to capture the highest flows on record that occurred in October 2000,
7 which is more than 112 times greater than its current storage capacities. Tr. at 18:12-14 (Feb.
8 14, 2017) (Degner). If it were to capture the median amount of streamflow of 976.8
9 (858+118.8) acre-feet, the United States would be required to construct and install 53 times
10 more storage than it has at present. To describe the storage requirements in terms of number
11 of tanks, the largest storage tank on Fort Huachuca holds three million gallons or 9.2 acre
12 feet. To store only the median amount would require the construction and installation of 106
13 tanks. To provide storage to hold the peak surface flow of October 2000 flow would require
14 224 tanks. Tr. at 18:14 (Feb. 14, 2017) (Degner). If the United States had installed the
15 infrastructure that could have withstood and captured the flood flows and constructed 224
16 storage tanks by 2000, it would have water for 1.8 years (2,059 acre-feet / 1,138 acre-feet of
17 average use). Even 224 tanks filled with water, however, would not have provided an
18 adequate water supply for the Fort in the following consecutive years of drought that occurred
19 from 2002 to 2004. Assuming average use, the Fort would have needed 3,414 (1,138 x 3)
20 acre feet of water for those three ⁶ years. The total recorded streamflow amounted to 495
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22 ⁶ This proposal also presents timing issues. The amount of the deficit that would be supplied
23 by groundwater could not be calculated until the end of the year in which the groundwater would
24 have been needed.
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1 acre-feet leaving a shortage of 2,919 acre-feet. Even with 224 tanks, the Fort would have
2 suffered a deficit of 860 acre-feet or more than 75 percent of a year's supply of water.
3 Storage, even 224 three-million-gallon tanks, will not reliably capture all the annual flow of
4 the streams and will not reliably fulfill the annual demand for water that the Fort must have
5 to accomplish its military mission.⁷
6

7 Freeport proposes that the decreed right require a conjunctive use of the surface water
8 and groundwater. It proposes that the United States would either be decreed a right to
9 groundwater in an amount quantified by its minimum need reduced by the 976.8 acre-feet,
10 the median combined streamflow. Alternatively, it proposes that the United States be given
11 a federal reserved water right to all of the surface flow as measured at the gages, and the
12 reserved right to groundwater would be in an amount equal to the difference between the
13 quantified right and the sum of the annual flows at the USGS gages. Freeport and Liberty
14 articulated the alternative approach in the form of a proposed decree:
15
16

17 2. The Government's Annual Right will apply first to the annual
18 surface water discharge from Huachuca Canyon and Garden Canyon
19 that is measured at the Stream Gages.

20 3. In any calendar year in which the two Stream Gages collectively
21 measure less than 1,300 acre feet of stream flow, the Annual Right
22 extends to groundwater to make up the difference.

23 Freeport Closing, Appendix A at 1.
24
25

26 ⁷ The United States also makes legal and factual arguments that it cannot divert and store the
27 streamflow because of federal environmental laws and regulations. Those arguments do not need to
28 be addressed in light of the evidence of the destructive flooding and extended droughts causing the
demonstrated failure of the Fort to divert and use the streamflow.

1 The presumption underlying these proposals is that a system can be built to control
2 and use all the surface water flow. Almost 100 years of history contradicts this assumption.
3 The United States has attempted on multiple occasions to capture the streamflow only to have
4 its efforts repeatedly destroyed by floods. At this point, based on the evidence presented,
5 the decree proposed by the Freeport would result in a futile act that would only result in
6 requiring the United States to repeatedly incur substantial expense to install and reinstall
7 infrastructure to capture streamflow that is variable, unreliable, and unlikely to be sufficient
8 to meet the Fort's needs.⁸

11 This case presents a unique combination of factors. The perennial and intermittent
12 reaches of the streamflow are on the reservation land so there do not appear to be either
13 competing upstream or downstream users.⁹ The streamflow is highly variable and unreliable
14 and the primary purpose requires a steady water supply. Huachuca and Garden Canyon
15 streamflow varies from flood to drought conditions from year to year, month to month, and
16 even day to day. The Fort's need for water, in contrast, is a constant daily need. Every single
17 day it must meet at least the current minimum demand by Fort personnel for 3.1 acre feet of
18 water (1,138 AFA /365). Unlike other uses that can tolerate flexibility in flow, the Fort
19 cannot operate using a water source that provides little to no streamflow for days, weeks or
20 months. It cannot run its operation that requires in excess of 1,100 AFA relying primarily on
21 surface water sources that may, in some years, only produce 38 acre-feet in a year as measured

25 ⁸ This proposal also appears to present a timing issue. It does not allow the United States to
26 calculate the amount of groundwater to which it is entitled until the conclusion of the year thereby
delaying access to the groundwater.

27 ⁹ Notably, no party appears to seek to protect the streamflow from a right that would convey
28 all of the streamflow to the United States.

1 at the gages for Huachuca Canyon and Garden Canyon or approximately three percent of the
2 water needed, and in other years produce over 2,000 acre-feet in a single month and destroy
3 the distribution system. Thus, the physical realities that must be accepted are that the median
4 streamflow is less than annual demand, the variability of the streamflow is great, and the
5 Fort's needs are constant.
6

7 In light of these facts and circumstances, two approaches exist. One approach is to
8 declare that the surface water is inadequate and identify groundwater as the sole source of the
9 federal reserved water right. This approach would impose the greatest demand on the aquifer
10 and the least demand on the surface water. It is also not consistent with the *Gila III* decision.
11 Implicit in the *Gila III* decision is the expectation that surface water, to the extent that it is
12 available, will be subject to the federal right and groundwater will be used to fulfill any
13 deficit. The second approach is a different form of conjunctive use than that proposed by
14 Freeport and Liberty.
15
16

17 CONCLUSION

18 The United States will have a federal reserved water right to 1,548 AFA from the
19 appurtenant groundwater, all of Huachuca Canyon streamflow and all of Garden Canyon
20 streamflow. The decree will state that if the United States were to once again construct the
21 infrastructure and storage allowing it to use the streamflow water, then its federal reserved
22 water right to groundwater, measured on a basis concurrent with its use of the surface water
23 use, would be reduced by that use.
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1 IT IS ORDERED that the United States will submit a form of decree consistent with
2 the decisions in this Order by October 15, 2024. The other parties may submit objections to
3 the form of decree by November 15, 2024.

4 Dated September 6, 2024

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7 The Honorable Mark H. Brain
8 Judge, Maricopa County Superior Court
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