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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. W1-11-232

**ORDER QUANTIFYING FEDERAL
RESERVED WATER RIGHTS FOR
SAN PEDRO RIPARIAN NATIONAL
CONSERVATION AREA**

CONTESTED CASE NAME: *In re San Pedro Riparian National Conservation Area*
HSR INVOLVED: San Pedro River Watershed Hydrographic Survey Report.
DESCRIPTIVE SUMMARY: Federal reserved right to surface water granted in part and federal reserved water rights to maintain groundwater elevations granted in part. No federal reserved rights granted for additional groundwater pumping for augmentation and no federal reserved rights granted for point sources. The United States shall submit a form of decree consistent with the findings in this Order by December 1, 2023. Objections to the form of decree shall be filed by January 22, 2024.
NUMBER OF PAGES: 55
DATE OF FILING: August 24, 2023

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- I. Introduction**..... 4
- II. Procedural Background** 7
- III. Boundary Issues** 10
- IV. Management Issues**..... 12
- V. Standard to Quantify a Federal Reserved Water Right**..... 14
- VI. Quantification of Rights to Support the Riparian Area**..... 22
 - A. Surface Water**..... 24
 - 1. San Pedro River** 24
 - 2. Babocomari River** 31
 - B. Groundwater** 33
- VII. Quantification of Rights to Support Aquatic Resources**..... 40
 - A. Baseflow** 41
 - B. Flood Flows**..... 49
- VIII. Quantification of Right to Augmentation**..... 50
- IX. Quantification of Rights to Point Sources** 52
- X. Decree**..... 54

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RECORD CITATIONS

References to the reporter's transcript of the trial are set forth as [Date: Page (Witness)]. Exhibits admitted during the trial are referred to as [Exh. # at page]. References to the proposed findings of fact submitted by the parties are set forth as [Party FOF #].

1 **I. Introduction**
2

3 The San Pedro Riparian National Conservation Area ("SPRNCA") is a two-mile wide riparian
4 corridor covering 57,000 acres along the San Pedro River in Southern Arizona. [U.S. FOF 51; Exh.
5 513 at 10; PDF 30 fig. 1] The riparian corridor consists of the floodplain, the area nearest to and
6 encompassing the active river channel, and the terraces, which are the higher areas in SPRNCA
7 adjacent to the floodplain. [020519:75-76 (Garrett)] Cottonwood and willow trees as well as
8 herbaceous wetland plants, reliant on groundwater or streamflow, grow in the floodplain along the
9 river. [Exh. 8079 at 5, PDF 6; 051419:131-32 (Huntington)]. Mesquite trees and grasses cover the
10 terraces. [051419: 131-32 (Huntington)]. Native fish populations inhabit reaches of the San Pedro
11 River running through SPRNCA.
12
13

14 On November 18, 1988, the federal government established SPRNCA, as part of the Arizona-
15 Idaho Conservation Act of 1988 ("Act") to "protect the riparian area and the aquatic, wildlife,
16 archeological, paleontological, scientific, cultural, education, and recreational resources of the public
17 lands surrounding the San Pedro River in Cochise County, Arizona." Arizona-Idaho Conservation
18 Act of 1988 (the "SPRNCA Act"), codified as 16 U.S.C. § 460xx(a) (1988). Congress described the
19 land reserved by reference to a map but directed the Secretary of the Interior to prepare a map and
20 legal description of the reserved area after the passage of the SPRNCA Act. 16 U.S.C § 460xx(c).
21 The designated area contained federal land that also encompassed land owned by private individuals,
22 the City of Tombstone, Cochise County, and the State of Arizona. Following the passage of the
23 SPRNCA Act, the federal government acquired a portion of, but not all of the land, located within the
24 external boundaries of SPRNCA. [U.S. FOF 39] The non-federal inholdings within SPRNCA are not
25 part of the land for which the federal government seeks to reserve a water right and its Statements of
26 Claimant excludes inholdings within the boundaries of SPRNCA. [*Id.*] The quantification of federal
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1 reserved water rights in this case only applies to federal land reserved by the United States for
2 SPRNCA.

3
4 Geographically, SPRNCA begins at the international border with Mexico and extends north
5 roughly 40 miles along the San Pedro River. *See figure 1.* Historically, this area was a broad valley

6 with a shallow, meandering
7 stream surrounded by grasses
8 and wetland vegetation
9 associated with marshy
10 environments. [020519:76-80

11 (Garrett); Exh. 506 at 1, PDF

12 5] At the turn of the twentieth
13 century, virtually no riparian
14 plant community and few, if
15 any, trees existed. [Exh. 506A

16 at 3, PDF 7; Exh. 2335 at 237,

17 PRF 26] The area supported

18 mining, ranching, and

19 agricultural operations. [Exh.

20 2335 at 221, PDF 10] Cattle

21 ranchers ran an estimated

22 36,000 animals in the upper San Pedro valley as early as the 1890s. [Exh. 506 at 2, PDF 6] Due to

23 reforms undertaken in the 1930s, cattle grazing continued at more moderate levels throughout the

24 following decades. [Exh. 144 at 1188, PDF 8; Exh. 506 at 2, PDF 6] Approximately 2,000 acres of

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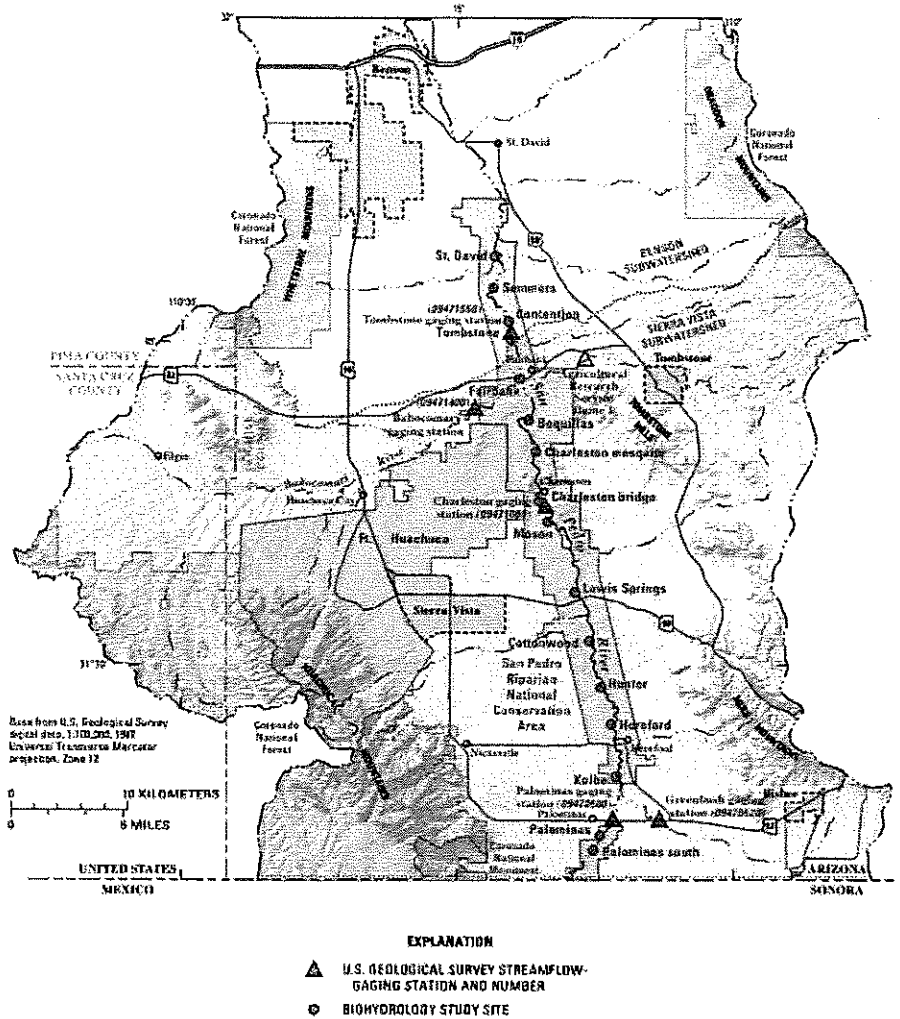


Figure 1
Source: Exh. 513 at 24, PDF 44

1 the land were farmed which, based on the United States' calculations, required 10,000 acre-feet of
2 water annually for irrigation. [Exh. 7 at 55, PDF 60; Exh. 2335 at 221, PDF 10; U.S. FOF 323]

3
4 In the early 1900s, a series of floods, an earthquake, the cattle grazing, and deforestation of
5 surrounding mountains and hills, contributed to geomorphic changes of the land. The San Pedro River
6 became entrenched, meaning that instead of flowing through a broad valley, the river channeled
7 through a narrow floodplain area bounded by steep terraces. [Exh. 513 at 14, PDF 34; Exh. 506A at
8 1-3, PDF 5-7] The geomorphic changes in the area continued through the 1950s at which point the
9 area stabilized. [Exh. 6 at 3, PDF 5] In addition to physical changes to the landscape, the surrounding
10 marshes that had previously typified the vegetation along the river underwent substantial changes.
11 [043019:65 (Fogg)] By the 1930s, cottonwood and willow forests began to develop. [Exh. 506A at
12 3, PDF 7] Following the mid-century stabilization of the area, the predominant cover type on the
13 floodplain, now a part of SPRNCA, shifted from bare ground and grasslands in the 1950s to shrubland-
14 woodland by the early 2000s. [*Id.*] The area of the cottonwood-willow forest increased nearly three-
15 fold between 1955 to 2003, and now provide key habitat for migratory birds and other species. [Exh.
16 144 at 1185, PDF 5; Exh. 2335 at 266, PDF 55] Native fish populations changed as well over the past
17 decades. Finally, as the Bureau of Land Management ("BLM") took over the area, historic land uses
18 have been eliminated. It terminated cattle grazing in the area beginning in the 1980s and ended the
19 historical irrigation uses following the passage of the SPRNCA Act. [U.S. FOF 322]

20
21 At issue here is the quantification of that amount of water sufficient to protect the riparian
22 habitat on the lands reserved for SPRNCA as it has developed since the mid-1950s with its forested
23 floodplains along with the native fish populations in the San Pedro River. In its Third Amended
24 Statement of Claimant 39-13610, the United States claimed federal reserved water rights based on
25 streamflow data collected between 1954 and 1988 at three USGS gaging stations: the Palominas gage
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1 at the south end of SPRNCA, the Charleston gage near the center of SPRNCA, and the Tombstone
2 gage located at the northern end of SPRNCA near the old town of Fairbank. [U.S. FOF 58; Exh. 1 at
3 PDF 31] The United States claims rights to 15,900 acre-feet annually (“AFA”) at Palominas, 28,000
4 AFA at Charleston, and 30,200 AFA near Tombstone. [Exh. 1 at PDF 29] It claims 2,015 AFA of
5 total streamflow for the portion of the Babocomari River that flows in SPRNCA and joins with the
6 San Pedro River. [*Id.*] The United States also claims federal reserved water rights to maintain
7 groundwater elevations at nine monitoring wells located along the length of SPRNCA. [U.S. FOF
8 120; Exh. 1 at PDF 2] Finally, the United States claims rights to an additional 300 acre-feet of
9 groundwater per year for stream augmentation under emergency conditions as well as surface water
10 from nine point sources. [U.S. FOF 201, 1113]

14 **II. Procedural Background**

15
16 The Arizona-Idaho Conservation Act directed the Secretary of the Interior to file a claim for
17 quantification of water rights “in an appropriate stream adjudication.” Pub. L. No. 100-696 §102(d),
18 102 Stat. 4571. The Bureau of Land Management (“BLM”) filed Statement of Claimant 39-13610
19 (“SOC”) in the Arizona General Stream Adjudication in 1989. [ADWR Report at 1-1, PDF 9, Exh.
20 14] On September 26, 2006, the Special Master issued a case management order identifying each of
21 the relevant Watershed File Reports (“WFR”), prepared by Arizona Department of Water Resources
22 (“ADWR”) that investigated water uses on land included in SPRNCA, and the assigned case numbers
23 that pertain to lands within the SPRNCA. All WFRs and associated case numbers were consolidated
24 with *In re San Pedro Riparian National Conservation Area*, contested case no. W1-11-232. Table 1
25 lists the WFRs and associated case numbers identified in the Special Master’s order.
26

27 The BLM subsequently amended the SOC three times and, on September 26, 2006, the Special
28

1 Master initiated this contested case,
 2 W1-11-232, to address objections
 3 to the WFRs associated with the
 4 land that comprises SPRNCA. *Id.*

5
 6 Prior to the evidentiary
 7 hearing, the Special Master reached
 8 the following conclusions of law:

9 (1) Congress withdrew public
 10 domain land for SPRNCA and
 11 reserved it for the purposes listed in
 12 §101(a) of the SPRNCA Act (2)
 13 Congress intended to make it clear
 14 and unambiguous that the purposes
 15 listed in §101(a) of the enabling
 16 statutes that reserved SPRNCA are
 17 the primary purposes of the
 18 reservation and any other purposes
 19 not listed in §§101 (a) are

20 secondary purposes; (3) Congress
 21 expressly intended to reserve
 22 unappropriated water for SPRNCA; and (4) the priority date of SPRNCA's federal reserved water
 23 right is November 18, 1988, but that same priority date does not apply to water reserved for lands

Watershed File Report No.	Contested Case No.
111-20-032	W1-11-232
111-20-065	W1-11-252
111-20-DD-001	W1-11-419
111-23-AAA-001	W1-11-629
111-23-DDA-004	W1-11-1154
111-24-082	W1-11-1211
111-24-CBB-002	W1-11-1343
111-24-CBB-003	W1-11-1344
111-24-CBB-005	W1-11-1346
111-24-CCB-011	W1-11-1374
112-17-063	W1-11-1655
112-17-088	W1-11-1675
112-17-DB-096	W1-11-2066
112-17-DCA-010	W1-11-2187
112-17-DCD-001	W1-11-2193
112-20-013	W1-11-2239

24 *Table 1. Watershed File Reports and associated contested cases consolidated in this proceeding.*

25 *Source: Order at Attachment A, (September 26, 2006)*

1 acquired by the United States after creation of the initial reservation on November 18, 1988. *See*
2 Special Master's Order at 10-15 (March 4, 2009).

3
4 In 2010, the Special Master issued additional legal findings. Special Master Shade concluded
5 that Certificate of Water Right No. 90103.0000 issued under state law is a "perfected vested
6 appropriative property right of the United States to surface water" and because the vested interests in
7 the certificate and the stated purpose of the federal reservation overlap on protection of "wildlife" and
8 "recreational resources," Certificate of Water Right No. 90103.0000 must be included in the inventory
9 of available water rights for the SPRNCA. *See* Special Master's Order at 4, 7 (March 19, 2010).
10 Additionally, the Special Master determined that the beneficial uses of Certificate of Water Right
11 90103.0000 "are distinct and separate uses that partially, but not fully, fulfill the federal purposes of
12 the SPRNCA to the extent water is required." *Id.* at 7. He found that the federal purposes of SPRNCA
13 include the protection of archeological, paleontological, scientific, cultural, and educational values
14 that are not included within the scope of a Certificate of Water Right issued under state law. *Id.*

15
16
17 In 2013, the Special Master found that, as a matter of law, the quantity of water needed to
18 fulfill the purpose of SPRNCA is not based on a standard of minimal need. Instead, it is that quantity
19 of water "sufficient" to fulfill the purposes of the reservation. Special Master's Order at 1-2 (Oct. 17,
20 2013). The final legal determination made by the Special Master concerned the quantity of
21 unappropriated water at the time of the passage of SPRNCA. The Special Master determined that it
22 was necessary to determine the quantity of unappropriated water available for use as of the date
23 SPRNCA was created, but such a determination was not required prior to the quantification of the
24 federal reserved water right for SPRNCA. *Id.* at 10. The Special Master's conclusions of law were
25 not issued in the form of final report under Ariz. R. Civ. P. 53. The Special Master also did not issue
26
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1 a final report on the water rights of SPRNCA and, therefore, the parties did not file written objections
2 with the Court. *See* A.R.S. § 45-257(A)(2).

3
4 On May 29, 2013, the Special Master designated three evidentiary issues for trial. *See* Special
5 Master's Order at 2. Those three issues were:

- 6 1. Determination of the boundaries of the conservation area.
- 7 2. Quantification of the federal reserved water rights claims.
- 8 3. Interaction of Certificate of Water Right No. 90103.000 with the federal reserved water
9 rights claim.

10
11 On July 2, 2013, this case was transferred to the Court. *See* Minute Entry at 2, filed July 2,
12 2013. Only the first two issues are the subject of this Order. The parties appear to have agreed that
13 evidence concerning the third issue was excluded by the Court pursuant to the Court's ruling on the
14 motion *in limine* in *In re the General Adjudication of All Rights to Use Water in the Gila River System*
15 *and Source*, Contested Case WI-11-3342. *See* December 28, 2018 Joint Pre-Trial Statement at p. 7,
16 1. 3-19.

17
18 At trial, the United States, the claimant, was joined by the Salt River Project and the San Carlos
19 Apache Tribe. Objectors to this case are Freeport Minerals Corporation ("Freeport"), Cochise County,
20 Liberty Utilities (Bella Vista Water) Corporation, Arizona State Land Department, the City of Sierra
21 Vista, and Pueblo del Sol Water Company ("Pueblo del Sol").
22
23

24 **III. Boundary Issues**

25
26 The United States stipulated with the Arizona State Land Department that federal reserved
27 water rights do not attach to 280 acres of State Trust land within the boundaries of SPRNCA. *See*
28

1 Stipulation Regarding the Amount of State Trust Land within the Purported Boundary of the San Pedro
2 Riparian National Conservation Area (February 14, 2019).

3
4 Freeport, Cochise County, Pueblo del Sol, and the City of Sierra Vista assert that reserved
5 water rights do not attach to various parcels within the boundaries of SPRNCA. The United States
6 does not dispute that Cochise County owns in fee two inholdings within SPRNCA, a 16.193-acre
7 “gravel pit” and approximately 30 acres of Charleston Road. United States Post-Trial Brief at 98
8
9 Further, Freeport argues that reserved water rights do not attach to 26 individual parcels of land that
10 ADWR determined were acquired after SPRNCA's reservation. Freeport Closing Statement at 10–11;
11 Exh. 14 at 5-2 to 5-4. Pueblo del Sol and the City of Sierra Vista assert that ADWR found more than
12 77.19 acres that the United States did not identify and that the United States’ failure to provide an
13 accurate legal description precludes the finding of a reserved water right. Pueblo del Sol Closing Brief
14 at 17–19. Cochise County also argues that reserved water rights do not attach to approximately 75
15 acres of land over which it claims easements. Cochise County Post-Trial Brief at 26–27.

16
17 This court will not make any finding of fact regarding the above disputes. First, the Quiet Title
18 Act precludes state courts from resolving challenges to the United States’ title to real property. 28
19 U.S.C. § 2409a(a); *McClellan v. Kimball*, 623 F.2d 83, 86 (9th Cir. 1980). Second, the disputes
20 concern such small quantities of land in relation to SPRNCA’s total acreage, comprising at least
21 55,000 acres, that they are irrelevant to the quantification of reserved water rights in this case. {Exh.
22 14 at 5-2]
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1 **IV. Management Issues**

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3 Pueblo del Sol, the Town of Sierra Vista, and Cochise County contend that the appropriate
4 standard to be applied to the quantification must include an evaluation of BLM’s management of
5 SPRNCA. Pueblo del Sol and the Town of Sierra Vista read §103(a) of the SPRNCA Act as requiring
6 the federal government to prepare a management plan for SPRNCA before asserting its claims to
7 reserved water rights. Pueblo Del Sol Closing Brief at 10. The legislative provision states as follows:
8

9
10 No later than 2 years after the enactment of this title, the Secretary shall
11 develop a comprehensive plan for the long-range management and protection
12 of the conservation area. The plan shall be developed with full opportunity for
13 public participation and comment, and shall contain provisions designed to
14 assure protection of the riparian area and the aquatic, wildlife, archeological,
15 paleontological, scientific, cultural, educational, and recreation resources and
16 values of the conservation area.

17 16 U.S.C.460xx-2(a).

18 Since the adoption of the SPRNCA Act, BLM has prepared the San Pedro River Riparian
19 Management Plan and Impact Statement, a Resource Management Plan, and a San Pedro Riparian
20 National Conservation Area Habitat Management Plan. [Exh. 83; Exh. 415; Exh. 82] Pueblo del Sol
21 and the Town of Sierra Vista challenge the BLM plans as deficient and argue that federal reserved
22 water rights must be based on a management plan that has a “clearly articulated long-term vision,
23 some 50 or more years into the future, with shorter term objectives, on a reach-by reach basis, to move
24 toward the vision.” Pueblo Del Sol Closing Brief at 13.

25 While the SPRNCA Act certainly requires the development of a management plan, the explicit
26 standard for quantification of the reserved water is an amount sufficient to fulfill the purposes of
27 SPRNCA. The statute neither requires the development of a management plan prior to the assertion
28 of federal reserved water rights nor does it impose on the court the multi-step obligation that Objectors
suggest. The court need not examine management documents, determine whether those documents

1 constitute the management plan required by §103(a) of the SPRNCA Act, determine whether the
2 management plan provides for a sufficient amount of water, and finally determine whether the amount
3 claimed is in accordance with the management plan. Congress explicitly reserved federal reserved
4 water right for SPRNCA and dictated the standard to be used to quantify those rights. It did not
5 impose the expanded standard to quantify federal reserved water right advocated by the Pueblo del
6 Sol and the Town of Sierra Vista.
7

8 Pueblo del Sol and Cochise County also seek to augment the statutory standard with a
9 requirement that the court examine the management policies of BLM to determine whether BLM
10 should take action to reduce the amount of water required by the ecosystem. For example, Pueblo del
11 Sol and the City of Sierra Vista criticize BLM because it has “not even studied potential measures that
12 would control the quantity of cottonwood or willows.” Pueblo del Sol Closing Brief at 14. In its San
13 Pedro Riparian National Conservation Area Habitat Management Plan, BLM emphasized the need for
14 high recruitment of young cottonwood and willow trees and proposed planting additional cottonwood
15 and willow trees among the riparian corridor to improve avian habitat. [Exh. 82 at 12, PDF 16]. The
16 rationale that BLM provided in the planning document for increasing, and not decreasing, those types
17 of trees appears consistent with its directive to maintain and protect SPRNCA. No evidence was
18 offered by Pueblo del Sol and the City of Sierra Vista that removal or thinning of the cottonwood and
19 willow forests was necessitated by the purposes of the SPRNCA Act. Pueblo del Sol and the City of
20 Sierra Vista do note their approval of BLM’s multi-year burning of mesquite trees to reduce water
21 consumption. Pueblo del Sol Closing Brief at 14. Cochise County, however, complains that BLM
22 did not implement a more aggressive program to remove mesquite trees and that it operated a program
23 to remove tamarisk trees every other year rather than every year in order to conserve water. Cochise
24 County Post-Trial Brief at 7-8. Again, no evidence was introduced upon which to make a finding
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1 that one of the purposes for which Congress reserved the conservation area was to have BLM
2 undertake large tree removal operations to conserve water within the boundaries of SPRNCA. The
3 SPRNCA Act set the standard to quantify the amount of water. It does not require, on the record in
4 this case, an examination of either BLM's written management documents or its operational
5 management actions to quantify federal reserved water rights.
6

7 8 9 **V. Standard to Quantify a Federal Reserved Water Right**

10
11 In this evidentiary proceeding, the parties fully briefed the legal conclusion reached by Special
12 Master Shade concerning the legal standard that applies to quantification of the federal reserved water
13 right for SPRNCA. The determination of the legal standard will be reviewed *de novo* by this court.
14 Ariz. R. Civ. P. 53(f)(4).
15

16 Congress has the authority to reserve water appurtenant to lands withdrawn from the public
17 domain for specific federal purposes. *United States v. New Mexico*, 438 U.S. 696, 698 (1978).
18 Congress exercised this power when it passed the SPRNCA Act, which provided in relevant part:
19

20 SEC. 101. (a) ESTABLISHMENT. — "16 USC 460xx" In order to
21 protect the riparian area and the aquatic, wildlife, archeological,
22 paleontological, scientific, cultural, educational, and recreational resources of
23 the public lands surrounding the San Pedro River in Cochise County, Arizona,
there is hereby established in the San Pedro Riparian National Conservation
Area (hereafter in this title referred to as the "conservation area").

24

25 (d) WATER RIGHTS. — Congress reserves for the purposes of this
26 reservation, a quantity of water sufficient to fulfill the purposes of the San
27 Pedro Riparian National Conservation Area created by this title. The priority
28 date of such reserve rights shall be the date of enactment of this title. The
Secretary shall file a claim for the quantification of such rights in an
appropriate stream adjudication.

1 Unlike many other cases involving claims for federal reserved water rights, Congress explicitly
2 reserved water appurtenant to the land reserved for SPRCNA. *See, e.g., United States v. New Mexico,*
3 438 U.S. at 700; *Arizona v. California*, 373 U.S. 546, 577 (1963). Congress defined the standard to
4 be used to quantify the amount of water reserved as “a quantity of water sufficient to fulfill the
5 purposes of” SPRNCA. 16 USC § 460xx-1(d).
6

7 The parties dispute the meaning of “sufficient.” The Special Master framed the dispute as
8 whether a “sufficient” standard exceeded a “minimal need” standard, which he defined as “only that
9 amount of water necessary to fulfill the purpose of the reservation, no more.” Order Determining the
10 Issues Designated for Briefing in the Order Dated May 29, 2013 at 3 (October 17, 2013). The Special
11 Master decided that the minimal need standard differs from a sufficient standard and that the minimal
12 need standard does not apply in this case. The United States cites the decision by the Special Master
13 to argue that the applicable standard to quantify the federal reserved water rights is “enough to fulfill”
14 the purposes of SPRNCA. United States Post-Trial Brief at 9. Freeport, the Arizona State Land
15 Department, Liberty Utilities (Bella Vista Water) Corporation, Cochise County, Pueblo del Sol, and
16 the City of Sierra Vista contend that the sufficient standard adopted by Congress and included in the
17 SPRNCA Act is synonymous with a minimal need standard. Freeport Closing Statement at 4–9;
18 ASLD Post-Trial Statement at 4-7; Cochise County Closing Brief at 6; Pueblo del Sol Closing Brief
19 at 4-7.
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24 Under a standard rule of statutory interpretation, Congress is presumed to be aware of the
25 decisions issued by the United States Supreme Court and to expect that the statutes it enacts will be
26 interpreted in conformity with those decisions. *Edelman v. Lynchburg College*, 535 U.S. 106, 117, n.
27 13 (2002); *see also Cannon v. Univ. of Chicago*, 441 U.S. 677, 694 (1979); *Walmart Inc. v. U.S. Dep't*
28 *of Justice*, 517 F. Supp. 3d 637, 650 (E.D. Tex.), *aff'd*, 21 F.4th 300 (5th Cir. 2021). Twelve years

1 before the enactment of the SPRNCA Act, the Supreme Court quantified federal reserved water rights
2 for Devil’s Hole, a part of the Death Valley National Monument to protect an endangered fish.
3 *Cappaert v. United States*, 426 U.S. 128 (1976). The *Cappaert* Court found that the reservation of
4 the water right was explicit not implicit. *Id.* at 140. It continued its analysis by acknowledging that a
5 federal reservation of water rights “reserves only that amount of water necessary to fulfill the purpose
6 of the reservation, no more.” *Id.* at 141; *Winters v. United States*, 207 U. S. 564 (1908). The Court
7 next identified the purpose of the reservation and ended that portion of its legal analysis by both
8 approving the lower court’s quantification and introducing the term “minimal need” into the lexicon
9 of federal reserved water rights:

[T]he level of the pool may be permitted to drop to the extent that the drop does
not impair the scientific value of the pool as the natural habitat of the species
sought to be preserved. The District Court thus tailored its injunction, very
appropriately, to minimal need, curtailing pumping only to the extent necessary
to preserve an adequate water level at Devil's Hole, thus implementing the
stated objectives of the Proclamation.

17 *Cappaert*, 426 U.S. at 141. The Court delivered the holding of the case in the final paragraph of the
18 decision where it found that the United States had federal reserved water rights “sufficient to maintain
19 the level of the pool to preserve its scientific value” *Id.* at 146. When Congress passed the
20 SPRNCA Act, it incorporated, almost word-for-word, the descriptive standard applied by the *Cappaert*
21 Court. *Compare Cappaert*, 426 U.S. at 139 (stating that the reservation at issue implicitly “reserves
22 water rights sufficient to accomplish the purposes of the reservation.”), *with* 16 U.S.C. 460xx-1(d)
23 (reserving “water sufficient to fulfill the purposes of [SPRNCA]”).

24
25
26 The United States contends that the “sufficient” language in the SPRNCA Act signals a
27 rejection by Congress of the minimal need standard found in *Cappaert*. United States Post-Trial Brief
28 at 8-9. The *Cappaert* Court did not create two different standards, i.e., a minimal need standard and

1 a sufficient standard, in the same decision to be applied to the same pool of water to protect the same
2 endangered fish. It created a single standard to quantify federal reserved water rights for land reserved
3 for a national monument. By incorporating the language of the holding in *Cappaert* in the SPRNCA
4 Act, Congress is understood, under the applicable rules of statutory construction, to have intended that
5 the same standard used in *Cappaert* to quantify water for the fish found in Devil's Hole shall be used
6 to quantify federal water rights to protect the riparian habitat in SPRNCA. Under this standard, the
7 United States is not merely required to show that its claimed rights are enough to fulfill the purposes
8 of the Act; the United States is required to show that the quantity of water claimed is the minimal
9 amount sufficient to fulfill the purposes of the Act. It does not meet its evidentiary burden by
10 demonstrating the optimal amount of water necessary to protect the riparian area and aquatic resources
11 of SPRNCA.
12
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15 The next issue related to the applicable standard raised by the parties concerns the factors that
16 should be considered in the quantification of the federal reserved water right. One factor is streamflow
17 data collected over a number of years from the gages on the San Pedro River. No party disputes that
18 data from multiple years is necessary because it is important that the decreed rights provide a natural
19 flow regime. [043016:13 (Fogg)] The term "natural flow regime" is commonly used to describe the
20 dynamic character of streamflow that includes the magnitude, frequency, duration, timing, and rate of
21 change of flows. [Exh. 14 at 3-4, PDF 23] James Fogg, a hydrologist who holds a master of science
22 in Watershed Science, explained that a natural flow regime will maintain ecosystem integrity and the
23 seasonal variability in baseflows and highflows. [043016:13 (Fogg)] Highflows, or floods, provide
24 "environmental cues for flora and fauna, refresh ambient water quality, and trigger fish movements
25 and riparian reproduction." [Exh. 6 at 1, PDF 3] Larger floods can also create new habitats and
26 recharge the floodplain alluvium. [*Id.*]
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28

1 Mr. Fogg testified that the natural flow regime is best characterized by an annual hydrograph
2 that illustrates the typical flow fluctuations over a 12-month calendar year. [*Id.*] The annual
3 hydrograph consisting of 12 monthly flows, as opposed to a single total annual volume, assures a
4 proper distribution of the total annual volume claimed. [Exh. 6 at 5, PDF 9] No party disputes that
5 federal reserved water right for streamflow should be quantified by acre-feet per month and an annual
6 total volume that includes some amount of the annual flood flows. This court has already determined
7 that baseflows should be calculated based on the monthly median of daily mean flows calculated from
8 reliable data provided by a streamgauge over a period of record of multiple years. Order Quantifying
9 Federal Reserved Water Rights for the Aravaipa Canyon Wilderness Area, Contested Case W1-11-
10 3342 at 11-12 (December 17, 2018).

11 The United States, joined by Salt River Project, makes the argument that the relevant
12 streamflow data is the data for the period beginning in 1954 and ending in 1988, the year Congress
13 enacted the SPRNCA Act. The United States uses 1954 as the year to begin the collection of data
14 because that is the date the physical landscape stabilized. It ends its data collection in 1988 because
15 Congress passed the SPRNCA Act in 1988. The United States argues that, as a matter of law, no
16 streamflow data post-1988 should be considered because Congress intended to reserve the water
17 present in the stream when it passed the SPRNCA Act. United States Post-Trial Brief at 20. The
18 statutory language does not support the United States' legal position. The statute did not couple
19 hydrology with a date in time; it coupled hydrology with ecology. The statute did not reserve water
20 sufficient to maintain the streamflow in SPRNCA as it existed in 1988; it reserved water sufficient to
21 protect SPRNCA Act. Thus, a factual determination will be undertaken to ascertain whether the water
22 quantification based on the streamflow data collected for 1954-1988 satisfies the standard established
23 by the SPRNCA Act.

1 Freeport, joined by the Arizona State Land Department, challenges the United States' time
2 period used to collect data, arguing that quantification should be based on streamflow data collected
3 during a later 35-year time period, 1981 to 2015. Freeport Closing Statement at 18; ASLD Post-Trial
4 Statement at 12. Pueblo del Sol and the City of Sierra Vista reject the periods of record proposed by
5 both the United States and Freeport because the evidence does not support quantifying any federal
6 reserved water right at this time. They, however, acknowledge that "if the Court does grant one it must
7 be limited to the streamflow levels proposed by Freeport." Pueblo del Sol and Sierra Vista Closing
8 Brief at 20. Similarly, the Arizona State Land Department urges a rejection of the United States'
9 claim for federal reserved water rights on the ground that the United States has failed to meet its
10 evidentiary burden. ASLD Post-Trial Statement Post-Trial Brief at 13.

11 The United States and Freeport agree that the time period that defines the streamflow data is
12 the definitive question that will determine quantification. Specifically, the United States summarized:

13 [The] trial was rife with testimony and evidence having little – or nothing – to
14 do with how much water is required to protect the SPRNCA's resources. Some
15 of that evidence and testimony will be touched on below, but it can be ignored
16 for now. What cannot be ignored is the central issue in this case: the differing
17 period of records underlying the competing hydrographs embodied in the
18 proposed quantifications presented by the United States and Freeport.

19 U.S. Closing Brief at 1, PDF 8. Freeport similarly stated that "[m]ost of the evidence at trial was
20 offered to assist the Court in answering one fundamental question: which period of record is
21 representative of the SPRNCA's riparian forest, the SPRNCA's hydrology, and the SPRNCA's water
22 needs?" Freeport Closing Statement at 1, PDF 8.

23 Before turning to a factual finding to determine whether a quantity of water sufficient to protect
24 the riparian ecosystem in the conservation area is supported by either period of record, three additional
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1 arguments that do not relate hydrology to the needs of the ecosystem made by the United States and
2 Freeport must be addressed.

3
4 The United States and Freeport argue that the appropriate period of streamflow data must be
5 representative of the long-term hydrograph of the SPRNCA. Each party argues that its respective
6 period of record constitutes the representative period. United States Post Trial Brief at 14; Freeport
7 Closing Statement at 20. As discussed above, Congress reserved sufficient water to protect the current
8 conservation area, not necessarily to maintain a particular long-term hydrograph. Quantification of a
9 water right under federal law cannot be divorced from the existing needs of the ecosystem and cannot
10 be resolved by a simple determination of a “representative” long-term hydrograph generated from
11 streamflow data. Such an approach would be unavailing especially in this case where the habitat has
12 undergone a change from grass and marsh lands prior to the 1950s to an expanding riparian forest
13 decades later. [Exh. 506 at 1, PDF 5; 043019:65 (Fogg)] Accordingly, a determination that a particular
14 35-year period of record is representative of a longer period of record for the area from which Congress
15 reserved SPRNCA would not definitively quantify a federal reserved water right that must be defined
16 by and limited to that amount sufficient to protect SPRNCA.
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20 Continuing with the “representativeness” arguments, the United States and Freeport next
21 present and contest competing precipitation data to either discredit the opposing party’s period of
22 record of streamflow data or to support the adoption of its respective period of record. The United
23 States urged the rejection of the Freeport period of record because it includes a period of drought.
24 United States Closing Brief at 25–28. No dispute exists that a drought existed in SPRNCA during a
25 portion of the 1981-2015 period. Based on Palmer Hydrological Drought Severity Index (“PHDSI”),
26 drought conditions began in SPRNCA in the mid-1990s. [United Post-Trial Brief at 26; Exh. 7118 at
27 8–9; *see generally* Exh. 8182] Freeport countered by challenging the United States’ characterization
28

1 of the severity of the drought that occurred during its period of record and highlighting the fact that its
2 period of record also includes years in which there was no drought. Freeport Closing Statement at 90–
3 93. Freeport also offered evidence that the average precipitation for Freeport’s proposed period of
4 record, 13.9 inches per year, is similar to the long-term average precipitation, 14.0 inches, recorded at
5 a rain gage in Tombstone from 1898 to 2015. [Freeport Closing Statement at 18; 030319:37 (Burtell)]
6 The long-term precipitation record referenced consists of data from 1898 to 2015 from a single gage
7 in Tombstone. [Exh. 7 at 22–23, PDF 27–28]
8
9

10 The precipitation data presented would certainly be relevant to scientific questions about the
11 amount of water available in SPRNCA. Water availability, however, is not at issue in this proceeding
12 nor is it a source of dispute among the parties given that the parties all generally accept the streamflow
13 data reported by the gages on the river. In this case, federal reserved water rights are not determined
14 by the amount of available water in each of the competing periods of record; they are determined by
15 the amount of streamflow needed by the SPRNCA ecosystem. A comparison of precipitation records
16 for the offered period of record with a time period extending over a hundred years, is essentially a
17 continuation of the argument that the appropriate period of record is that period found to be a
18 representative period. A determination that the recorded precipitation during a selected period is
19 representative of a long-term average neither identifies an appropriate period of record of streamflow
20 data nor provides information about the amount of streamflow sufficient to maintain SPRNCA.
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24 Finally, the parties focus on the causes of the lower streamflows during the Freeport period of
25 record as compared to the earlier United States period of record. Freeport asserts that the increased
26 vegetation in SPRNCA is the primary cause of the lower streamflows because it consumes more water
27 by evapotranspiration. Freeport Closing Statement at 24–45. Freeport uses this position to continue
28 its argument that the United States’ period of record should be rejected as “unrepresentative of the

1 SPRNCA’s modern-day hydrology.” Freeport Closing Statement at 25. Arizona State Land
2 Department joined in Freeport’s argument that increased vegetation has reduced flows in SPRNCA to
3 claim that the United States’ claims are an attempt to “double dip.” ASLD Post-Trial Statement at 12.
4 Arizona State Land Department argues that “[t]he Federal Government can either have the overgrowth
5 of trees or the water, not both.” *Id.* The United States attributes the decreased flows found during
6 Freeport’s period of record to drought and climate change. [U.S. FOF 262; 043019:50 (Fogg)] No
7 determination need be made as to the cause or causes of the lower streamflow in this proceeding
8 because the purpose of this proceeding is to quantify a federal reserved water right to streamflow
9 sufficient to protect the resources of SPRNCA.
10
11

12
13 Arguments about which combination of years of streamflow are most representative, the
14 amount of or changes in precipitation over different time periods, and the causes of declining flows
15 address the hydrology of the ecosystem in a vacuum. They appear to be based on the presumption
16 that Congress reserved water to preserve a given hydrologic condition of SPRNCA. Congress
17 reserved water to protect the riparian area and aquatic resources of SPRNCA. Thus, the appropriate
18 basis on which to quantify the federal reserved water right requires an examination of water needs of
19 the SPRNCA ecosystem. The evidence relevant to that approach includes the vitality of riparian
20 vegetation and fish populations during the two periods of record presented by the parties.
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24 **VI. Quantification of Rights to Support the Riparian Area**

25 The floodplain of the San Pedro River in SPRNCA contains species of vegetation that vary in
26 physiology (woody or herbaceous plants) and water needs (hydric, hydromesic, mesic, and xeric
27 plants). Woody plants possess a rigid stem while herbaceous plants do not have rigid material
28

1 supporting the stem. [0129419:140 (Dixon); Exh. 8192] Hydric plants require saturated soil
2 conditions, hydromesic plants require slightly less constant water access, mesic plants require still less
3 water access, and xeric plants are extremely drought tolerant. [U.S. FOF 445; 012919:136 (Dixon)]
4
5 As discussed below, water access can be described in terms of streamflow permanence and
6 groundwater elevation. Streamflow permanence refers to the percentage of days in the year in which
7 any surface flow is present in the river. [Exh. 513 at 59, PDF 79] For instance, streamflow
8 permanence in perennial reaches such as Charleston can be 100 percent. [Exh. 29 at 43, PDF 63]
9

10 Woody vegetation in SPRNCA primarily consists of cottonwoods, willows, tamarisk, and
11 mesquite trees. Cottonwoods and willows are considered hydromesic plants because they require
12 streamflow permanence and shallower depths to groundwater. [Exh. 8192 at 1, PDF 3] Tamarisk, an
13 invasive species, is classified as mesic because it thrives in drier conditions, so the population increases
14 as site conditions become drier. [*Id.* at 2, PDF 4] Mesquite, also within the mesic class, grows on the
15 floodplains and terraces at a wide range of elevations and depths to groundwater. [*Id.*]
16

17 Herbaceous plant groups are similarly classified by their water needs. Herbaceous plants
18 include perennials and annuals such as bulrush, rush, horsetail, rabbitsfoot grass, curlytop knotweed,
19 and white sweetclover. [Exh. 8192 at 3–10, PDF 5-12] Perennial plants such as bulrush, rush, and
20 horsetail are considered hydric because they grow near the edge of the river channel where soils are
21 saturated by surface water or inflowing groundwater. [Exh. 8192 at 4 PDF 6] Hydric herbaceous
22 annuals, such as rabbitsfoot grass and curlytop knotweed generally grow on the floodplains and
23 increase in population along the streamside with streamflow permanence. [Exh. 8192 at 5, PDF 7]
24 Mesic annuals, such as white sweetclover, can be found across the floodplains.
25

26 The United States asserts that it quantified its claim for federal reserved water rights to surface
27 water and groundwater to protect cottonwood-willow galleries and hydric perennial vegetation within
28

1 the riparian corridor. United States Post-Trial Brief at 60. The vitality of SPRNCA's cottonwood and
2 willow trees is integral to SPRNCA's identity as the site of one of the most intact remaining
3 cottonwood-willow forests in the United States. [051619:18 (Brand)] Cottonwood-willow forests
4 also play an important ecological role in SPRNCA. They have strong root systems that stabilize the
5 floodplain and provide unique habitat for over 100 documented species of birds, many of which rely
6 on SPRNCA as a migration corridor. [*Id.* at 17, 19] Hydric herbaceous perennial plants support
7 biodiversity within SPRNCA. The hydric perennial category contains the Huachuca Water Umbel,
8 which is listed as endangered under the Endangered Species Act. [U.S. FOF 452]

11 The United States claims federal reserved water rights to streamflow (baseflow and flood
12 flows) and groundwater. The United States' streamflow claims are quantified for each calendar month
13 based on the median monthly flows for the period 1954 to 1988. United States Post-Trial Brief,
14 Attachment A; U.S. FOF 63, 65, 66. Its flood flow claims are based on the difference between the
15 sum of the median sustained streamflow for 1954 to 1988 and the total annual volume at each gage,
16 calculated as the median of the annual volumes over the same period of record. U.S. FOF 79. The
17 United States describes its groundwater claims by reference to groundwater elevations at nine
18 monitoring wells.

21 **A. Surface Water**

22 **1. San Pedro River**

24 As the claimant, the United States has the burden of proof to quantify that amount of water
25 sufficient to fulfill the purposes of the reservation. The amount of water to which federal reserved
26 rights will attach is that quantity sufficient to protect the riparian area of SPRNCA, but no more.
27 *Cappaert*, 426 U.S. 128 (1976). Through investigations detailed in the report titled *Hydrologic*

1 *Requirements of and Consumptive Ground-Water Use by Riparian Vegetation Along the San Pedro*
2 *River Arizona* ("Water Needs Report"), the United States Geological Survey (USGS) analyzed the
3 relationship between streamflow permanence and vegetative health. [U.S. FOF 482; Exh. 29] The
4 USGS collected vegetation and hydrology data from 2000–2002 at 17 San Pedro River study sites and
5 validated them at 10 additional upper basin sites. [Exh. 29 at 69–86, 96, PDF 89–106, 116]. It analyzed
6 indicators recorded in the collected data such as plant height, woody-plant basal area¹, canopy cover,
7 and herbaceous cover in relation to streamflow permanence and flood intensity.
8
9

10 The study concluded that the strongest correlation between water streamflow permanence and
11 the group of indicators was the correlation between streamflow permanence and vegetation height.
12 Woody plants in wetter sites had significantly higher values for maximum floodplain vegetation
13 height. [Exh. 513 at 63] Streamflow permanence also explained differences in the basal area of
14 cottonwood and willow forests. [Exh. 8192 at 2, PDF 4] Those same trees declined in cover, basal
15 area, and age-class diversity across site gradients of decreasing flow permanence. [*Id.* at 7, PDF 9]
16 Among the herbaceous plant groups, the study found that hydric perennial groups were the most
17 sensitive to changes in water availability. In particular, the study reported that “[hydric perennials]
18 had streamside cover of up to 35 percent cover at perennial flow sites, less than 10 percent cover at
19 sites with 60- to 95- percent flow permanence, and no cover at sites with less than 60 percent flow
20 permanence.” [*Id.*]
21
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23

24 The United States contends that the Water Needs Report supports its claimed quantities based
25 on the classification system used in the Report. [Exh. 29] The Water Needs Report divided the area
26 along the river into 14 discrete sections and assigned to each reach a number between one and three
27 in order of increasing vegetative health. [*Id.* at 2, PDF 22] The United States asserts that a sufficient
28

¹ The basal area of a single tree is the cross-sectional surface area of the tree trunk measured four feet above the ground. The basal area of a stand of trees is the summation of the surface area of the individual trees.

1 amount of water is that amount necessary to maintain the conditions that the Water Needs Report
2 labeled as either Class 2 or Class 3 conditions. United States Post-Trial Brief at 61.

3
4 Class 1 (intermittent-wet) reaches are characterized by surface water that flows intermittently
5 less than 60 percent of the year. [Exh. 29 at 106, PDF 126] Class 1 areas are inhospitable to both
6 hydric perennials and cottonwood galleries and are dominated by xeric shrubs. [Exh. 8192 at 12–15,
7 PDF 14-16] Class 1 conditions, considered unhealthy by the United States, are located near St. David
8 and exist along six percent of the riparian corridor. [U.S. FOF 503] Class 2 conditions exist in reaches
9 where surface water flows 60 to 90 percent of the year. [Exh. 29 at 105–106, PDF 125-126] In these
10 reaches, cottonwood and willow trees dominate the floodplain, but only sparse patches of perennial
11 herbs exist near the channel. [Exh. 8192 at 12-15, PDF 14-16] The Water Needs Report considered
12 55% of the reaches to be Class 2 areas. [U.S. FOF 503] Finally, a Class 3 designation is assigned to
13 the reaches with the wettest conditions. They exhibit streamflow permanence in excess of 99 percent
14 and contain abundant cottonwood-willow galleries within the floodplain and hydric perennials densely
15 covering the sides of the channel. [Exh. 8192 at 12–15, PDF 14–17] The Water Needs Report
16 concluded that 39 percent of reaches studied qualify as Class 3 areas. [U.S. FOF 503]

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20 Although the Water Needs Report generally describes water needs and links vegetative health
21 to streamflow permanence, it does not identify the minimum sufficient baseflows and flood flows
22 necessary to support riparian vegetation. [Exhs. 29, 8192; *see also* 013019:9 (Dixon)] A comparison
23 of annual streamflow for the study period (2000-2003) for the Water Needs Report with amounts
24 claimed by the United States' proposed flows demonstrates that the amounts claimed by the United
25 States exceed the quantity sufficient to protect SPRNCA's riparian area. [Exh. 29 at 4, PDF 24]
26 Median annual streamflow for 2000 to 2003 at gages throughout SPRNCA are shown in Table 2. A
27 12–25 year recurrent interval flood occurred in 2000, accounting for the substantially higher flow at
28

1 the beginning of the study period. [*Id.* at 3, PDF 23] Table 2 also shows the annual streamflow
2 proposed by the United States. It demonstrates that the median annual flow that occurred during the
3 study period for the Water Needs Report is less than half the amount claimed by the United States.
4 Therefore, lesser median annual flows than the United States claims are sufficient to support the
5 conditions that the United States seeks to maintain.
6

USGS Gage	2000	2001	2002	2003	Median Annual Flow (2000-2003)	United States' Claim
Tombstone	85548	19727	7269	8628	14178	30111
Charleston	72636	18652	6767	7060	12856	28797
Palominas	65488	17122	7064	4960	12093	15908

7
8 Table 2
9 Source: Exhs. 2406 and 2408
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15
16 A report prepared in 2012 by the National Riparian Services Team (“NRST”) further confirms
17 that the quantities claimed by the United States exceed that quantity that is sufficient to protect
18 SPRNCA. The NRST conducted a “Proper Functioning Condition” qualitative assessment of the main
19 channel of the San Pedro River that flows through SPRNCA. [Exh. 26 at 8, PDF 11] The Proper
20 Functioning Condition assessment applied three categories of stream functionality to the reaches of
21 the river: proper functioning condition, functional at risk, and nonfunctional. [*Id.* at 11, PDF 14] It
22 assigned the classifications based on responses to a series of questions provided by an interdisciplinary
23 team of specialists who spent ten days investigating the area. [Exh. 26 at 10, PDF 13]
24

25 The NRST gave 54 percent of the reaches within SPRNCA the highest rating of proper
26 functioning condition and the remainder as functional at risk. [Exh. 26 at 19, PDF 22] It divided the
27 46 percent classified as functional at risk into three subcategories: 18 percent was rated functional at
28 risk demonstrating an upward trend; 20 percent was functional at risk with no trend; and 8 percent

1 (approximately 4.2 miles near St. David) was judged to be functional at risk with a downward trend.
2 [Exh. 26 at 19, PDF 22] In light of these findings, the NRST Report concluded that “after 25 years,
3 the overall activities associated with the PFC assessment demonstrates that significant improvement
4 in the condition of the river and riparian areas has occurred under BLM management” [Exh. 26 at
5 290, PDF 293] and that “riparian vegetation has expanded tremendously” since 1989. [Exh. 26 at 51,
6 PDF 54]
7

8 The United States argues that the NRST Report is inapplicable to the quantification of its water
9 right. It described the NRST Report as primarily a “geomorphological assessment of the integrity of
10 the physical function of a stream rather than a biological assessment of the communities’ health” and
11 not an assessment of whether “[a] reach has high quality riparian habitat.” United States Post-Trial
12 Brief at 63–65. Regardless of the primary motivation for the NRST Report, the members of the NRST
13 were specifically asked to evaluate the biological health of SPRNCA, and NRST included their
14 findings in the final assessment. The United States also challenges the NRST Report because the
15 United States regards the NRST’s highest rating, proper functioning condition, as only a precondition
16 to the standard that the United States deems appropriate, which is “high quality habitat.” United States
17 Post-Trial Brief at 63–64. The NRST Report supports the conclusion that flows based on post-1988
18 data are sufficient to protect SPRNCA’s riparian area.
19

20 The vegetation in the riparian corridor was also quantitatively analyzed during the post-1988
21 period by two scientists. The United States retained Dr. Justin Huntington, who holds a master of
22 science and Ph.D in hydrology. [051419: 6-9 (Huntington)] Freeport retained Christopher Garrett,
23 who is a registered hydrologist. [Exh. 8 at Appendix A, PDF 36; 020519:61-72 (Garrett)] Both experts
24 evaluated SPRNCA’s vegetation using a vegetation index known as the Normalized Difference
25 Vegetation Index (“NDVI”). The vegetation index describes the quantity of vegetation biomass in an
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28

1 area; it does not define the type of vegetation. The NDVI does not, for example, differentiate between
2 cottonwoods and tamarisk trees. [Exh. 8 at 21, PDF 25]

3
4 A vegetation index is formulated from data obtained from satellite images. The satellite images
5 of an area provide useful data to formulate a vegetation index because vegetation absorbs red light and
6 reflects near infrared light. The satellite imagery allows the amount of infrared light that vegetation
7 in a study area absorbs to be measured. [*Id.* at 13, PDF 17] The more infrared light that is absorbed
8 and the more near-infrared light that is reflected, the more vigorous the vegetation is over a given area.
9 [U.S. FOF 630; *Id.* at 8, 13] Dr. Huntington testified that NDVI is the best tool to determine if
10 vegetation has expanded in an area. [051419:76:1-3 (Huntington)]

11
12 Dr. Huntington performed an NDVI analysis to determine whether riparian vegetation has
13 increased in SPRNCA after creation of the reservation. [U.S. FOF 727] He included the entire
14 SPRNCA riparian corridor in his NDVI analysis. [U.S. FOF 730; *Id.* at 61-62; 051419:29-30
15 (Huntington)] Based on this analysis, Dr. Huntington found that five of the seven reaches studied in
16 SPRNCA for the period 1988 through 2017 had a statistically significant increase in NDVI.
17 [051419:100 (Huntington)] Significant increases in mesquite on the uplands occurred between 1973
18 and 1986. [Freeport FOF 79, 031719:144-47 (Burtell)] Mr. Garret's analysis, corrected for antecedent
19 precipitation, also showed a statistically significant increase in riparian vegetation based on changes
20 in NDVI. [Exh. 7848 at 24, PDF 29] This evidence further confirms that, at a minimum, riparian
21 vegetation in the floodplains has not decreased since the passage of the SPRNCA Act.
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25 In 2015, Dr. Stephen Carothers, a riparian and aquatic expert ecologist retained by Freeport,
26 conducted a physical inspection of SPRNCA's riparian ecosystem to evaluate the condition of the
27 riparian plant community. [Ex. 9 at 4, PDF 9] He focused on characteristics of a riparian habitat that
28 have an influence on the quality of the riparian ecosystem, including height and vigor of the vegetation,

1 age-class structure, presence of woody vegetation recruitment, and presence of livestock, among other
2 parameters. [*Id.*] Dr. Carothers found the woody riparian vegetation to be in excellent condition at
3 each of the eight sites he visited. [*Id.* at 5-11, PDF 10-21] The herbaceous vegetation noted at each
4 site was either abundant, present, or emergent. [*Id.*] Dr. Carothers also noted that on rare occurrences,
5 he observed dead or dying cottonwood trees at the SPRNCA sites. [*Id.* at 13, PDF 18] As pointed
6 out in the NRST Report, individually stressed cottonwood trees are not necessarily an indicator of
7 water stress. Entire stands, or portions of existing stands of cottonwood trees showing stress or dying
8 are the appropriate indicators of a lack of sufficient water to meet the needs of the riparian vegetation.
9
10 [Exh. 26 at 45, PDF 48]
11

12 The riparian area has improved both qualitatively and quantitatively since 1988. The flow
13 regime calculated using data from 1981 to 2015 is thus sufficient to protect the existing Class 2 and 3
14 conditions throughout the SPRNCA's riparian corridor. Accordingly, the United States' claimed
15 quantities based on 1954-1988 streamflow data is not the minimal amount of water sufficient to protect
16 SPRNCA's riparian area. In contrast, based on the Water Needs Report, the NRST Report, Dr.
17 Carothers' testimony, and NDVI data, the quantity of streamflow for the period 1981-2015 is
18 demonstrably sufficient to protect SPRNCA. No other party provided evidence that some amount of
19 streamflow less than the median amounts calculated from the 1981-2015 would be sufficient to protect
20 the riparian area.
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24 Having determined that streamflow between 1981 to 2015 is sufficient to protect SPRNCA,
25 disputes still must be resolved about the data used to quantify that streamflow. Freeport calculated
26 the amount of streamflow using daily flow data from 1981 to 2015 to calculate monthly baseflows and
27 annual total runoff at the USGS stream gages at Palominas, Charleston, and Tombstone. [Exh 7 at
28 Table 2-1, PDF 88] The USGS stream gage at Palominas does not contain a complete data set so

1 Freeport used data from the International Boundary Water Commission (“IBWC”) for 1981-1995.
2 [030419: 45-46 (Burtell)] The data collected by the IBWC is reliable data because the gage was
3 monitored using USGS methodology and the gage was operated by former USGS employees. [*Id.* at
4 47] The USGS stream gage at Tombstone also did not provide a complete data set because no data
5 exists for 1986 to 1996. [Exh. 7 at Table 2-1, PDF 88, Exh. 7] A dispute exists as to whether data for
6 the ten-year period should be reconstructed using data for that period from the Charleston gage and a
7 statistical correlation between historical data from the Charleston and the Tombstone gages or to use
8 no reconstructed data for that time period. The statistical analysis presented by Freeport demonstrated
9 that a strong positive relationship exists between the historic Charleston and Tombstone data sets.
10 [030419: 42 (Burtell); Exh. 2408] Thus, the reconstructed data is a reliable measurement of the
11 streamflow in the San Pedro River during the relevant period of record.
12
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14

15 2. Babocomari River

16
17 The United States claims federal reserved water rights for streamflow in the Babocomari River,
18 which is a tributary of the San Pedro River. The confluence of the Babocomari River and the San
19 Pedro River occurs within SPRNCA near the historic town of Fairbank. [U.S. FOF 87; 043019: 14-
20 15 (Fogg)] That area is classified as a Class 2, intermittent reach and characterized by NRST as
21 “functional at risk with an upward trend.” [Exh. 513 at 100, PDF 120; Exh, 26 at 35, PDF 38] The
22 NRST stated in its report that the vegetation was improving in this reach of the San Pedro River. [*Id.*]
23 The United States claims a right to enough streamflow to improve the reach that includes flow from
24 the Babocomari River from a Class 2 to a Class 3 reach. Such an amount exceeds the sufficient
25 standard used to quantify a federal reserved water right.
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28

1 An additional issue exists with the United States' quantification of the streamflows for the
2 Babocomari River. Unlike the mainstem of the San Pedro River, the Babocomari River does not have
3 a USGS streamgage with recorded streamflow data over a 30 year period of time. The USGS
4 streamgage along the Babocomari River was installed near the confluence of the Babocomari and the
5 San Pedro in April of 2000. [U.S. FOF 92] It has provided reliable streamflow data for 2000 to 2015.
6 The United States asserts that this data should not be used to quantify its rights because this period
7 was characterized by drought. In place of data for the Babocomari River, the United States offers
8 streamflow records from Walnut Gulch watershed, which is a tributary of the San Pedro River located
9 on the east side of the SPRNCA near the town of Tombstone. [Exh. 1 at Attachment B, PDF 29;
10 043019: 14-15 (Fogg)] The streamflow record in Walnut Gulch ranges from 1957 to 1988. [*Id.*] To
11 estimate Babocomari River flows, the United States took the median annual discharge from Walnut
12 Gulch and "prorated" that value with the difference in drainage areas between the Babocomari River
13 and Walnut Gulch. [*Id.*] The Babocomari River drains 310 square miles whereas Walnut Gulch drains
14 only 58 square miles. [Burtell Expert Report at 38, PDF 43, Exh. 7] To derive monthly flow values
15 along the Babocomari, the United States distributed the annual runoff value throughout the year
16 according to observed streamflow variations between months at the Charleston USGS gage. [Exh. 1
17 at Attachment B, PDF 29-30]

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23 The Arizona Department of Water Resources, Dr. Goodrich, a hydrologist retained by the
24 United States, and Freeport criticize this method of quantification. [U.S. FOF 91] According to
25 ADWR, Walnut Gulch is not analogous to the Babocomari. Walnut Gulch is an ephemeral wash with
26 flows that occur only after summer rains whereas the Babocomari is a perennial and intermittent
27 stream with flow predominantly occurring in winter months and only a slight increase in August. [Exh
28 14 at 3-9, PDF 28] Further, ADWR asserts that the differences in drainage areas between the two

streams is too large to extrapolate flow data. [*Id.*] Freeport agrees with ADWR’s assessment and also presented statistical evidence showing a poor correlation between flow values in Walnut Gulch and the Babocomari. [Exh 7 at 38, PDF 43] Dr. Goodrich testified that he could not defend the United States’ method used to calculate streamflows in the Babocomari River. In consideration of these criticisms and the necessity basing the quantification of a federal reserved water right on reliable data, the appropriate data to determine streamflow for the Babocomari River is the USGS gage data collected since 2000.

B. Groundwater²

The United States claimed federal reserved water rights to groundwater quantified by reference to water elevations at nine wells shown in Table 3. In support of its position, the United States called Mark Dixon, who holds a master of science in wildlife biology and a Ph.D in Zoology, to testify about the riparian habitat. Dr. Dixon testified that an assured groundwater supply is more important to the riparian community than an assured surface water supply. [012919:178-179 (Dixon)] Willow trees exclusively use groundwater and cottonwood trees rely predominantly on groundwater for their survival. [*Id.*;

Well Name	Location
Palominas Well #5	31°20' 40.63704" -110° 08' 03.50040"
Hereford South monitoring well	31 ° 26' 23.09794" -110° 06' 29.80706"
Hereford North monitoring well	31° 26' 38.29823" -110° 06' 26.63238"
Cottonwood monitoring well	31° 31' 10.56285" -110° 07' 46.70368"
Lewis Springs monitoring well	31 ° 33' 10.83449" -110° 08' 18.97124"
Moson Spring monitoring well	31° 36' 42.38970" -110° 10' 03.33506"
Boquillas #2 monitoring well	31° 40' 59.98193" -110° 11' 22.02455"
Boquillas #1 monitoring well	31° 41' 23.56147" -110° 11' 11.74585"
Summers monitoring well	31° 47' 34.61492" -110° 13' 03.70638"

Table 3

020619:49 (Garrett)] Thus, surface water flows alone are insufficient for the protection of SPRNCA.

² The nomenclature “groundwater” is used to generally refer to water that is physically located below the surface of the ground. It does not imply that any legal determination as been made under state law as to whether the water is appropriable water or percolating groundwater.

1 Cottonwood and willow trees are highly sensitive to changes in depth to groundwater.
2 [012919:2:44PM (Dixon)] Riparian cottonwoods generally can withstand a decline in the
3 groundwater table of half a meter without widespread mortality, but groundwater declines of over one
4 meter will result in widespread mortality to the cottonwood trees. [012919:214 (Dixon); Exh 369]
5 Within the SPRNCA floodplain, “as the water table deepens and shows more seasonal and annual
6 variation in response to increased aridity or water extraction,” cottonwood-willow thus will decline in
7 abundance and “will be replaced by deeper rooted and shrubbier taxa, such as [tamarisk].”
8 [013019:18-20 (Dixon); Exh. 298 at 2]
9

10
11 The Water Needs Report also confirmed the relationship between groundwater elevations and
12 the health of riparian vegetation. Among the woody species, USGS determined that cottonwood and
13 willow trees were most sensitive to groundwater elevations. [Exh. 29 at 76, PDF 96] Specifically, it
14 found that the median of the annual maximum depth to groundwater beneath surfaces occupied by
15 cottonwood was 2.0 meters and the median value for willow was 1.8 meters. [*Id.* at 70, PDF 90] It
16 also found that dense forests of cottonwood and willow on average require groundwater depths of less
17 than 3 meters. [*Id.* at 76, PDF 96] Among herbaceous species, USGS determined that hydric
18 perennials, e.g. smooth scouring rush, hardstem bulrush, and Torrey rush are most sensitive to changes
19 in water availability. [*Id.* at 78, 85, PDF 98, 105] For a representative group of those plants in
20 SPRNCA, the Water Needs Report determined that mean annual maximum depths to groundwater
21 ranges from around 1.5 meters to 3.5 meters. [*Id.* at 82 fig. 33, PDF 102]
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23

24 In contrast, Class 1 reaches have groundwater depths exceeding 3.5 meters [*Id.* at 106, PDF
25 126]. These areas are inhospitable to both hydric perennials and cottonwood galleries. [Exh. 8192 at
26 12–15] Class 1 conditions cannot support cottonwood-willow galleries and are dominated by tamarisk
27 trees. U.S. FOF 501. Thus, sufficient water for SPRNCA requires that the water table in Class 2 and
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1 Class 3 reaches must be protected so that these reaches do not become Class 1 reaches. The depth to
2 groundwater in Class 2 reaches (intermittent-wet) is between 2.5 and 3.5 meters. [Exh. 29 at 105–106]
3 They can support cottonwood and willow trees. [Exh. 8192 at 12-15] Class 3 areas have depths to
4 groundwater on average less than 2.5 meters deep in the dry season with less than 0.5 meter annual
5 fluctuation. [Exh. 29 at 105-106]
6

7 Objectors raise two arguments to any grant of a right to groundwater. First, Cochise County,
8 Pueblo del Sol, and the City of Sierra Vista, argue that groundwater recharge projects and water
9 conservation programs currently implemented or planned for the future should be taken into account
10 when calculating a federal reserved water right for the SPRNCA. Cochise County argues that recharge
11 and water conservation efforts in the vicinity of SPRNCA provide water to the reservation that
12 obviates the need for reserved groundwater rights. Cochise County Closing Brief at 9–12, 14–16, 23–
13 25. It asserts that conservation and recharge projects, such as the Cochise County Recharge Network
14 (“CCRN”) and the Environmental Operations Park are other sources of water that “must be explored
15 and demonstrably exhausted before the BLM can establish a federal reserved right to groundwater.”
16

17 [Id. at 15]
18

19 The CCRN is a partnership dedicated to collecting funding for implementing groundwater
20 recharge projects to offset groundwater withdrawal and protect the baseflow of the river. [022719:
21 3:56PM (Coffman)] The CCRN consists of active recharge project sites: Horseshoe Draw, Three
22 Canyons, Riverstone, Bella Vista, Environmental Operations Park, and Palominas Recharge Project.
23

24 [Id.] Cochise County owns both Palominas and Horseshoe draw projects and intends to retain these
25 projects. [Id.] All parties to this case recognize the benefits of the CCRN on the local watershed. All
26 CCRN projects are located on land that is not owned by the United States and is subject to City of
27 Sierra Vista or Cochise County control. [042919: 40 (Potucek)]
28

1 The Environmental Operations Park (EOP) recharges approximately 2,700 acre-feet annually
2 and has been in operation for 12 years at the time of trial. [022719: 4:10PM (Call)] The intent of the
3 EOP, as with the other recharge projects, is to use effluent to create a “mound” of water between the
4 city and the SPRNCA to protect the river from the region’s expanding cone of depression. [*Id.*] At
5 the time of the trial, the EOP was governed by a contract with the Bureau of Reclamation that was
6 scheduled to expire in 2022. [U.S. FOF 434; 022819: 24-25 (Call); 042919: 38 (Potucek)]
7

8 While water conservation and recharge efforts may assist in the maintenance of desired
9 groundwater levels, these efforts cannot bar the grant of a federal reserved right to groundwater. The
10 purpose of a federal reserved water right is to provide the federal government with the ability to secure
11 the amount of water sufficient to maintain SPRNCA. Given that the relevant entities cannot guarantee
12 that their recharge efforts will continue in perpetuity or that their recharge efforts will maintain the
13 groundwater levels, the recharge and conservation efforts cannot serve as a substitute for a federal
14 reserved water right.
15

16
17 Freeport makes the second argument that a federal reserved water right to groundwater is
18 unnecessary based on the assertion that “if you protect streamflow conditions at the gage site, you will
19 protect the vegetation.” [Freeport Closing Statement at 111; 030519:46-47 (Burtell)] The United
20 States responds that it must have the right to maintain groundwater elevations because streamflow and
21 groundwater levels are not always correlated. United States Post-Trial Brief at 70. Mr. Fogg testified
22 that there is a “disconnect” between streamflow and nearby groundwater levels in SPRNCA’s losing
23 reaches where the gradient slopes away from the stream. [043019:32-34 (Fogg); Exh. 6723] Dr.
24 Goodrich reported that water levels located 0.3 miles from the USGS Tombstone gage do not track
25 streamflow at the gage. [Exh. 6723 PDF 1-2, 5-7] Subsurface geologic configuration can cause a
26 significant disconnect between surface flow and groundwater. U.S. FOF 564. Further tree ring
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28

1 analysis also demonstrated that “there wasn’t a good connection between the Charleston discharge
2 streamflow and what the actual groundwater levels were that were being experienced by the trees at
3 that site.” [013119:18-21 (Morino); Exh. 6425 at 121, PDF 122] Freeport’s argument also does not
4 address the situation where streamflow declines to zero, which occurs in segments throughout
5 SPRNCA. [U.S. FOF 129; 04302019:28 (Fogg)]. When a reach goes dry, groundwater elevations in
6 the floodplain decline with attendant consequences. [Exh. 6273 at 6] The amount of decline in the
7 water table is a function of the length of time that the stream gage goes to zero. [043019:29 (Fogg)]
8 Maintenance of streamflow conditions alone are insufficient to assure that groundwater levels are
9 maintained at levels sufficient to protect SPRNCA. Thus, a federal reserved water right for a sufficient
10 amount of water must include groundwater elevations because neither surface water nor water from
11 recharge and conservation efforts will suffice to support SPRNCA.
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15 The Objectors next oppose to the United States’ method of quantifying its claim to
16 groundwater by reference to the elevations of groundwater tables at nine specific wells. [Exh. 1 at PDF
17 2; Exh. 8192 at 19, PDF 21] The Objectors challenge both the use of fixed well locations and
18 elevations as methods to quantify a federal reserved water right. Freeport, Liberty Utilities, and
19 Cochise County argue that fixed well locations are unsuitable for groundwater monitoring in a
20 dynamic stream such as the San Pedro. Freeport Closing Statement at 112–114; Liberty Utilities
21 Closing Brief at 17; Cochise County Closing Brief at 5. No party disputes that the San Pedro River is
22 dynamic. [U.S. COL No. 145] Parties objecting to the use of fixed monitoring wells primarily argue
23 that the channel’s migration away from a fixed monitoring well will weaken that well’s connection
24 with the stream, decreasing measured elevations at that well and rendering the well useless. [Freeport
25 Closing Statement at 113–114] The United States counters that fixed monitoring wells are appropriate
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1 because groundwater-dependent riparian vegetation should be maintained throughout the floodplain,
2 not just immediately adjacent to the river. [U.S. COL 573]

3
4 A study titled *Channel Dynamics on the San Pedro River from 1935 to Present* evaluated
5 changes in the position of the San Pedro River within SPRNCA. [Exh. 350 at 2] The study indicates
6 that channel migration occurred in SPRNCA from 1935 through 2002. [Exh. 350 at 30 Table 4]
7 Specifically, the study reports cumulative lateral migration of 4.6 meters from 1996 to 2002 at
8 Cottonwood and 5.2 meters at the Fairbank site. [*Id.*] Arizona Department of Water Resources
9 compared groundwater elevations in winter 1990 with elevations in winter 2006 at BLM's
10 groundwater monitoring wells. It concluded that there is a "relatively stable long-term trend of water
11 level elevations in close proximity to the San Pedro River channel since the time of SPRNCA's
12 establishment." [Exh. 14 at 3–13] In particular, based on this comparison, ADWR found that
13 "elevations collected in December 2006 are either within the 95% or 50% confidence interval limits."
14 [*Id.*] Past channel migration within SPRNCA does not appear to significantly affect the wells'
15 connection with the stream and should not preclude the United States' use of fixed monitoring wells
16 to quantify its rights to groundwater.
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20 Liberty Utilities argues that elevations at the groundwater monitoring wells do not reflect
21 groundwater levels in the adjacent floodplain. Liberty Utilities Closing Brief at 10, 11, 13–14.
22 Arizona Department of Water Resources determined that conditions at the monitoring wells largely
23 correspond to conditions adjacent to the stream. In its report titled *Report Concerning Federal*
24 *Reserved Water Rights Claims for SPRNCA*, ADWR concluded that "water level elevations measured
25 at the nine BLM monitoring wells, circa the time of SPRNCA's establishment, are correlated to, and
26 generally representative of groundwater elevations along the river within the SPRNCA at that time."

27 [Exh. 14 at 3-12 fig. 3-19] After plotting elevations at the monitoring wells and elevations at
28

1 Groundwater Site Inventory Wells against distance along the length of the river, ADWR found that
2 elevations at BLM's monitoring wells are "within the 95% confidence intervals." [*Id.*] Therefore, the
3 monitoring wells selected do provide acceptably accurate measurements of groundwater levels in the
4 floodplain.
5

6 The United States supports its claimed groundwater elevations by asserting that they are
7 necessary to maintain Class 2 and Class 3 conditions where they exist. United States Post-Trial Brief
8 at 61. The United States' claims, however, tend to approximate groundwater elevations associated
9 with Class 3 conditions, even where monitoring wells are located in Class 2 reaches. [U.S. FOF 575;
10 Exh. 8192 at 21-25, PDF 23-27] Specifically, the Palominas #5, Boquillas #1, Boquillas #2, and the
11 Summers monitoring wells are located in Class 2 reaches, while the Hereford South, Hereford North,
12 Cottonwood, Lewis Springs, and Moson Spring monitoring wells are located in Class 3 reaches. [Exh.
13 8192 at 13 fig. 7; *id.* at 20 fig. 14]. The United States urges that the adoption of elevations greater
14 than necessary to support Class 2 conditions at the Palominas #5, Boquillas # 1, Boquillas # 2, and the
15 Summers wells because the higher elevations would provide a margin of safety, citing natural
16 fluctuations in groundwater levels and the inability of cottonwood trees to recover after the maximum
17 depth to groundwater is surpassed. [United States Post-Trial Brief at 83; U.S. FOF 581, 586]. It is
18 understandable that the United States would seek groundwater elevations beyond the amount sufficient
19 to maintain the current vegetative condition of SPRNCA in order to counteract fluctuations in
20 groundwater; nonetheless, the standard of quantification imposed here is the amount of water
21 sufficient to maintain SPRNCA's riparian area. As a result, federal reserved water rights to maintain
22 depths to groundwater for reaches that can support only Class 2 conditions cannot be granted at levels
23 that would support Class 3 conditions. [Exh. 8192 at 13 fig. 7; *id.* at 20 fig. 14]
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VII. Quantification of Rights to Support Aquatic Resources

Historically, the San Pedro River flowing through the boundaries of the conservation area provided habitat for 13 native species of fish. [Freeport FOF 163; U.S. FOF 804; 021219:48 (Carothers)] It has been characterized as an “exemplar of the discovery and subsequent extirpation of native fishes throughout southwestern North America.” [Exh. 1906 at 192, PDF 1] By the 1960s, six species were extirpated from the Upper San Pedro River. [Freeport FOF 165; 021219:41 (Carothers); Exh. 1609 at 199-200, 204-205, PDF 8-9, 13-14] Two decades later, another five native species, including the spikedace and the loach minnow, could no longer be found in the San Pedro River. [Exh. 1609 at 193, PDF 2] The Bureau of Land Management considered plans to reintroduce the spikedace and loach minnow in the reach of the San Pedro River flowing through SPRNCA, but it ultimately decided not to make the attempt. [Freeport FOF 166; 013119:97-98 (Simms)] At the time Congress passed the SPRNCA Act in 1988, only two of the original 13 species of native fish could consistently be found in the river. [013119:43 (Simms); 020419:46 (Miller)] These species, known as the longfin dace and the desert sucker, are widely distributed in the Gila River basin. [Exh. 1609 at 203, PDF 12] They inhabit that mainstem of the San Pedro River, including that portion flowing through SPRNCA. [U.S. FOF 804; Freeport FOF 180; 013119:38 (Simms); Exh. 1609 at 203, PDF 12]

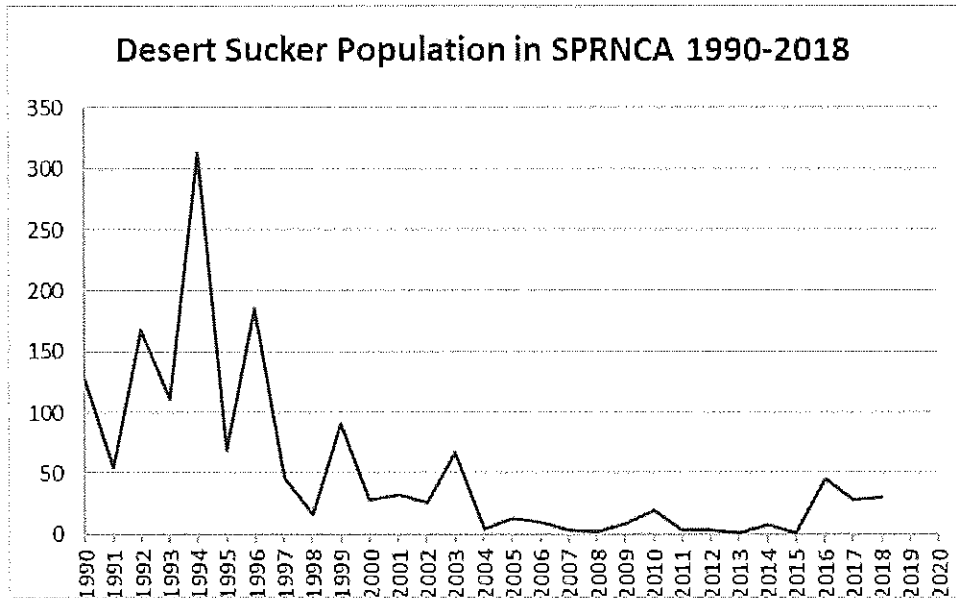
Longfin dace are very small fish measuring less than one centimeter in length. They occupy reaches with streamflow ranging from 0.03 to 1.6 feet deep. The juveniles and young fish prefer very shallow water and can be found “almost anywhere there is standing water.” [Exh. 2 at 51, PDF 61] The fish prefer shallow, sandy-bottomed streams and typically reproduce in spring and summer in sandy-bottomed, quiet water areas along the edges of the river. [Exh. 1609 at 204, PDF 13] The longfin dace are known as early colonizers, meaning they can effectively recolonize intermittent reaches once the streamflow returns. [U.S. FOF 876; 020419:80-81 (Miller)] During the 1990-2016

1 period, there are years in which it is the only fish found in a testing sites in the San Pedro River. [Exh.
2 15, PDF 2-3] It is the most common native fish species in the San Pedro River. [U.S. FOF 830; Exh.
3 1609 at 204, PDF 13; Exh. 9 at 29, PDF 34] The longfin dace population can be described as abundant
4 throughout the reaches of the San Pedro River flowing through SPRCNA and it has remained steady
5 over the decades since the passage of the SPRNCA Act. [U.S. FOF 805; Freeport FOF 226; 020519:25
6 (Miller)] The United States does not assert that the annual streamflow available after the passage of
7 the SPRNCA Act threatens the longfin dace population. [See United States Post-Trial Brief at 47 –
8
9 59]

11 **A. Baseflow**

13 The United States argues that it is entitled to federal reserved water rights based on pre-1988
14 streamflows because the other remaining native fish, the desert sucker, requires higher flows than
15 those based on the 1981 – 2015 period of record. The desert sucker is a much larger fish than the
16 longfin dace. It can grow to lengths in excess of 40 centimeters and usually occupies habitat
17 characterized by water that is one to two feet deep with the young preferring shallower water of less
18 than 0.6 feet deep. [U.S. FOF 873; Exh. 2 at 46, PDF 54; 020419:74-78 (Miller)]. They prefer habitat
19 that contains “riffles with laminar flow over gravel substrates.” [Exh. 1609 at 205, PDF 14] Riffles
20 are areas of water that flow over rocks forming miniature rapids and often occur between pools of
21 water in the riverbed. [Exh. 2 at 46, PDF 54] The desert sucker population lives primarily in the
22 perennial Charleston reach of the San Pedro River around the USGS Charleston stream gage. [*Id.* at
23 43-45, PDF 51-53] The desert sucker is not adept at recolonizing reaches without continuous flow,
24 thereby making the Charleston reach with its perennial flow the most habitable site. [U.S. FOF 878;
25 020419:80-82, 92 (Miller)] The population of the desert sucker declined from the mid-1990s until
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1 about 2015 and then returned in 2016 to levels seen in the 1990s. [Freeport FOF 230; Exh. 7072 at 6;
2 021219:116-117 (Carothers)] See figure 2.



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15 *Figure 2.* Graph shows the number of desert sucker captured at a sample site in SPRNCA. The data
16 shows that beginning in the late-1990s, the desert sucker population declined through 2015 and
17 thereafter returned to population numbers found in the late 1990s.

18 *Source:* Comments on Reintroduced Beaver and Native/Non-Native Fish Interactions Within The San
19 Pedro Riparian National Conservation Area (SPRNCA), Exh. 7072 at 4, PDF 6.

20 There are also various species of non-native fish with viable populations within SPRNCA.
21 [U.S. FOF 806; Freeport FOF 181; 013119:39 (Simms)]. They were introduced into SPRNCA in a
22 number of ways, including as a food source, sport fishing, by accident, or illegally. [Exh. 1609 at 195,
23 PDF 4] Non-native fish populations can be problematic in southwestern rivers, including SPRNCA,
24 because they prey on native fishes, feed on food sources used by native fish, bring disease, and can
25 exploit habitats better than native fish. [021219:47-48 (Carothers); Exh. 2 at 22, PDF 30] They are
26 considered one of the primary reasons for the “decline of natives fishes in the San Pedro River.” [Exh.
27 1609 at 207, PDF 16] The specific causes of this decline are “a complex mix of individual, cumulative,
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1 and synergistic actions, but the result is unequivocally a loss of native species.” [*Id.* at 209, PDF 18]
2 The non-native fish species found in the SPRNCA reaches include the green sunfish, the pikeminnow,
3 western mosquito fish, black bullhead, and channel catfish. [U.S. FOF 806; Freeport FOF 181;
4 013119:39 (Simms); Exh 2 at 22 PRF 30]. The large predators, the green sunfish and black bullhead,
5 are probably the most destructive to native fish. [Exh. 1609 at 211, PDF 20] The United States does
6 not argue that its federal reserved water rights should be quantified to protect the non-native fish in
7 SPRNCA.
8
9

10 In support of its claim that it is entitled to streamflow based on the historic streamflow data
11 from 1954 to 1988 to protect the desert sucker, the United States retained Dr. William Miller. Dr.
12 Miller, who has a Ph.D. in fisheries, analyzed the streamflows to ascertain available habitat for the
13 native fish necessary to protect SPRNCA’s aquatic resources. [020419:11-12, 14-15 (Miller)] Dr.
14 Miller used the “Instream Flow Incremental Methodology” (“IFIM”) to calculate the amount of
15 available fish habitat (in square meters) based on river channel characteristics and the flows advocated
16 by the United States [Exh. 4716 at 1, PDF 9; 020419:21-23 (Miller)] The IFIM analysis combines
17 stream hydraulics, habitat use criteria, and hydrologic data to determine a relationship between habitat
18 and stream discharge. [Exh. 4716 at 1, PDF 9] Dr. Miller’s IFIM analysis covered the entire length
19 of the San Pedro River within SPRNCA and the Baboconari River tributary. [*Id.*] He divided the
20 area into three reaches within SPRNCA, each named for the stream gage present in the reach: (1) the
21 Palominas reach; (2) the Charleston reach; and (3) the Tombstone reach. [U.S. FOF 888; 020419:92
22 (Miller); Exh. 2 at 22, PDF 30] The Palominas reach has a drier hydrological record. The Charleston
23 reach is the wetter area with perennial flow and the Tombstone reach has intermittent flow.
24 [020419:68 (Miller)] For his habitat use criteria, Dr. Miller used habitat preference data from other
25 stream systems in the San Pedro River basin pertinent to the desert sucker and validated the data with
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1 fish samples from the San Pedro and
 2 Babocomari rivers. [Exh. 2 at 17, PDF 25]
 3 Dr. Miller collected field data by capturing
 4 the targeted fish and recording
 5 observations regarding depth, velocity,
 6 substrate, and cover at each location the
 7 target fish were observed. [Id.]

8
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 10 To determine usable habitat, Dr.
 11 Miller combined hydraulic simulations for
 12 both proposed flow regimes based on
 13 channel shape with habitat suitability for
 14 each life stage of the desert sucker. [Id. at
 15 19, PDF 27] On a reach-by-reach basis,
 16 Dr. Miller employed this information to
 17 link stream flows to available habitat (in
 18 square meters) for each life stage. He
 19 compiled the data in a series of graphs
 20 reproduced in *figure 3*. Dr. Miller
 21 explained that the graphs demonstrate that
 22 the amount of habitat increases in the
 23 stream channels as flows increase up to an
 24 optimum point at which further increases
 25 in streamflow either do not provide greater
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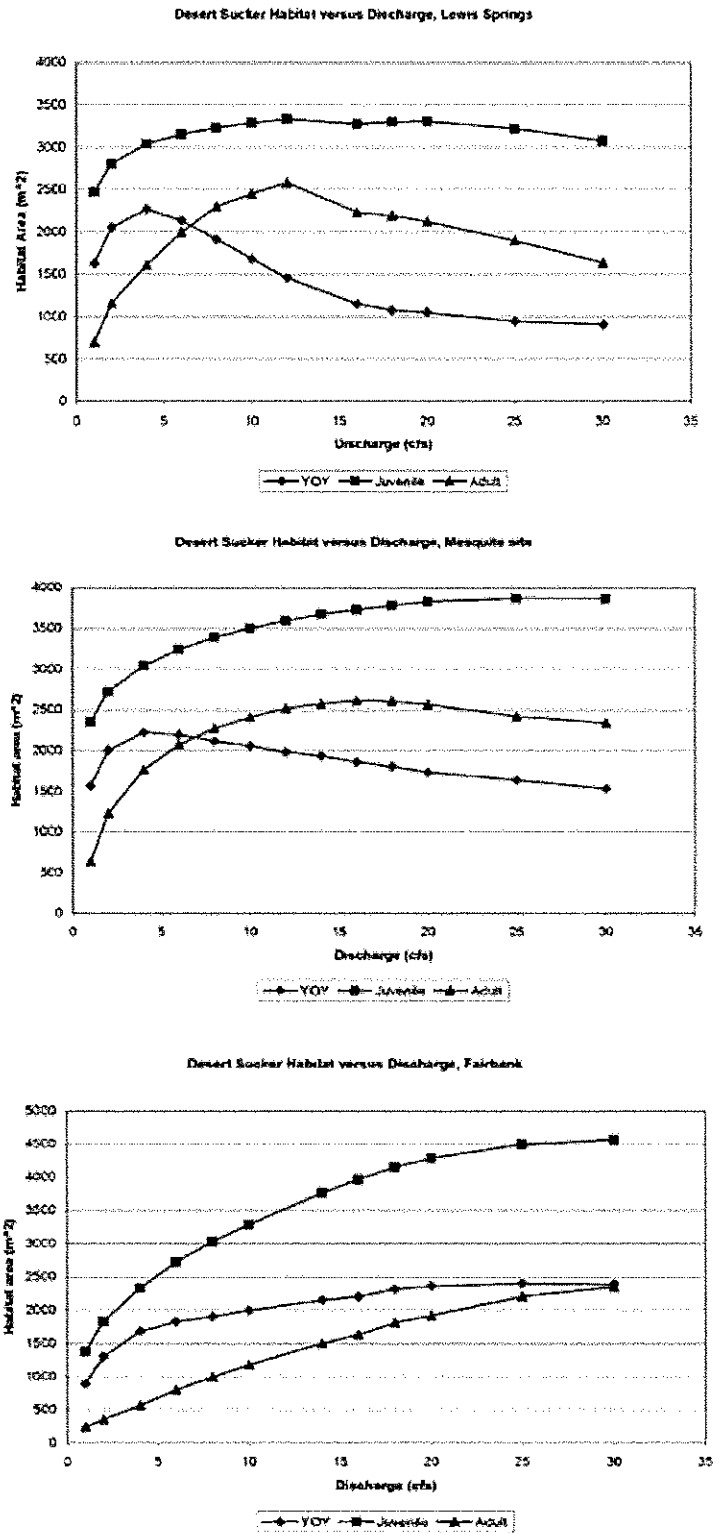
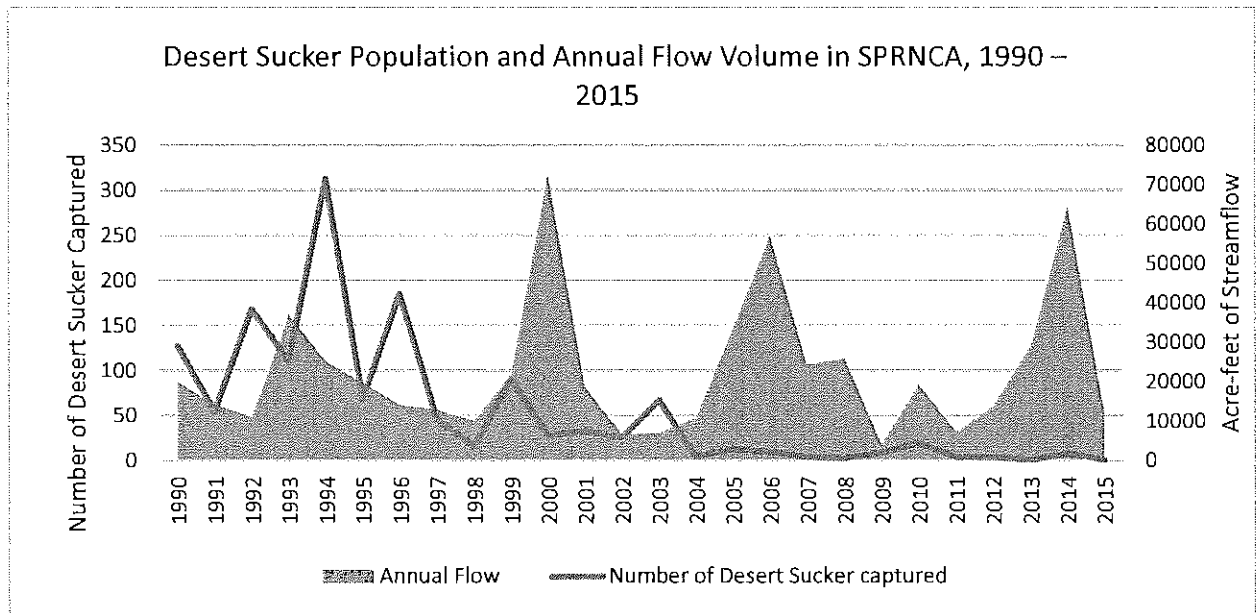


Figure 3
 Source: Exh. 2 at 66, 69, 74, PDF 76, 79, 84

1 amounts of habitat suitable for the fish or actually cause declining amounts of habitat. [Exh. 4716 at
2 65, 68, 72, PDF 73, 75, 80] Based on the results of his IFIM analysis, Dr. Miller concluded that the
3 United States claimed flows would produce more habitat for the desert sucker population and its
4 macroinvertebrate food source than the streamflow data for the post-1988 period. [Exh. 2 at 53-54,
5 57-58, 61-62, PDF 76-77,79-80, 82-83 ; Exh. 7065 at PDF 1-8,13-18, 23-28]

7 The standard governing the quantification of a federal reserved water right calls for neither the
8 optimum amount of water to provide fish habitat nor optimum streamflow. The specific quantity of
9 water is, instead, a function of the amount sufficient for the survival of the desert sucker. The implicit
10 assumption inherent in Dr. Miller's IFIM analysis is that fish population is correlated with available
11 habitat – i.e., as more suitable habitat becomes available for the fish, the actual population will
12 increase. [U.S. FOF 820] The corollary of that assumption is that reductions in habitat due to a lack
13 of streamflow will cause a reduction in the fish populations. [020519:74-76 (Miller)] Dr. Miller did
14 test his underlying assumption by engaging in a "limiting factor analysis" to determine whether other
15 factors, such as the presence of non-native fish, adversely affect the desert sucker. [U.S. FOF 822]
16 He concluded that the non-native fish populations were not a primary factor that limited native
17 populations because a review of fish count data demonstrated that non-native fish are "not the
18 dominant community" within SPRNCA. [020419:103-104 (Miller)]. Based on the evidence
19 presented, the longfin dace population but not the desert sucker population outnumbered the other
20 species. In addition, Dr. Miller concluded that neither temperature nor water quality were limiting
21 factors. [020419: 100 (Miller)] Thus, according to Dr. Miller, the pre-1988 flows are necessary to
22 protect the desert sucker because the post-1988 flows are the primary cause of the decline in the desert
23 sucker population. (U.S. FOF 917).

1 Freeport argues that a lesser amount of water quantified by the flow data from 1981-2015
 2 provides sufficient streamflow for the desert sucker population. Freeport challenges the assumption
 3 that lower flows caused the lower fish populations during the post-1990 period. A comparison of the
 4 desert sucker population with annual streamflows measured at the Charleston gage is shown in *figure*
 5
 6 4.



18 Figure 4. Graph plots the number of desert sucker captured in a given year on the left axis and total
 19 annual volume calculated from daily medians at the Charleston Gage in acre-feet on the right axis.

20 Source of Desert Sucker counts: *Comments on Reintroduced Beaver And Native/Non-Native Fish*
 21 *Interactions Within The San Pedro Riparian National Conservation Area (SPRNCA)*, Exh. 7072 at 4,
 22 PDF 6.

22 Source of annual flow volume: *Annual Flow Data at the Charleston Streamgage, 1913-2015*, Exh.
 23 6983; *see also Report Concerning Federal Reserved Water Rights Claims for SPRNCA*, Exh. 14 at
 24 figure 3-5, PDF 73.

24 The statistical evidence does not support the underlying assumption that changes in streamflow
 25 are the sole cause or even the primary explanation for changes in the desert sucker population during
 26 this period. Factors other than streamflow either alone or in combination adversely affected the native
 27 fish population in SPRNCA. [Exh. 379] In 1998, a study titled *Influence of Low Flows on Abundance*
 28 *of Fish in the Upper San Pedro River, Arizona* (“1998 Paper”) demonstrated that the changes in the

1 lowest daily mean flows from one year provided a strong explanation for the variation in the desert
2 sucker population in the San Pedro River for the following year, including at the perennial reach at the
3 Charleston gage. [Exh. 372 at 175, PDF 5] The 1998 Paper concluded that sample size of fish
4 populations “at all sites decreased after years with lower flows and increased after years with higher
5 flows. This general trend was . . . strong for lowest daily mean flows.” [Exh. 372 at 176, PDF 6]
6 The 1998 Paper based this conclusion on a statistical analysis that demonstrated that the changes in
7 mean low flows explained approximately 82 percent of the variation of the fish population during the
8 following year. [*Id.* at 167, PDF 1]. The 1998 Paper found that other statistical measurements of
9 streamflow, such as the prior year’s peak, annual mean, or highest daily mean discharges, did not
10 provide a particularly strong explanation of variations in fish populations. [*Id.*] The 1998 Paper does
11 not support the proposition that greater mean flows in one year translate into larger fish populations
12 the following year. Instead, it supports the more limited conclusion that in the 1990s, changes in mean
13 low values in one year affected the fish population in the following year.
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16
17 Dr. Carothers demonstrated that the statistical results reported in the 1998 Paper based on
18 lowest daily mean flow did not continue in the following decades. [021219:101-102 (Carothers); Exh.
19 379] A statistical analysis of the 1998-2015 data, applying the same methodology as the 1998 paper,
20 resulted in a determination that only 22 percent of the changes in the desert sucker population could
21 be explained by variation in mean low flows. [Exh. 379] Dr. Carothers testified that the statistical
22 correlation between low flows and fish population for the 1998-2015 period “broke down”.
23 [021219:102 (Carothers)]
24

25 Dr. Carothers’ conclusions are affirmed by statistical analyses performed by Albert Ruhí in the
26 2016 study titled *Declining Streamflow Induces Collapse and Replacement of Native Fish in the*
27 *American Southwest* (“2016 Study”). [Exhs. 374, 384] The 2016 Study noted that there is a “critical
28

1 knowledge gap” in the area of appropriate frameworks that can forecast how hydrological change may
2 affect the future persistence of native fish. [Exh. 374 at PDF 1] The purpose of the 2016 Study was
3 to address “this knowledge gap by projecting the resilience of fish communities to hydrologic
4 drought.” [Id.] The 2016 Study analyzed 1990 to 2013 streamflow and fish abundance data from the
5 Charleston reach of San Pedro River and found that neither high flows nor low flows had a statistically
6 significant effect on the population of the desert sucker [Freeport FOF 279; 021219:105-110
7 (Carothers); Exh. 384 at 5] The absence of a strong correlation between streamflow and native fish
8 populations in SPRNCA undermines the basic assumption of the model presented by the United States
9 that larger flow results in higher fish populations.
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12 According to Freeport, the non-native fish populations and the introduction of beavers into
13 SPRNCA are the primary factors limiting the desert sucker population. Dr. Carothers testified that he
14 attributed the steep decline of the desert sucker in the late 1990s and early 2000s to competition with
15 the non-native fish, almost all of which are predators or competitors of the desert sucker [021219:115
16 (Carothers);Freeport FOF 238; 031719:184-85 (Burtell)] Dr. Carothers did not hold a similarly firm
17 opinion about the impact of the re-introduction of the beaver on the desert sucker population. Although
18 he pointed out that “as soon as the beaver left, the desert sucker came back,” Dr. Carothers did not
19 believe that he had sufficient data to reach an opinion with a reasonable degree of scientific certainty
20 that it was more likely than not that the reintroduction of the beaver caused the decline in the desert
21 sucker population. [021219:115 (Carothers)]
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25 The United States did not meet its burden to prove that its proposed streamflow (based on the
26 1954 to 1988 period of record) is an amount sufficient, rather than optimal, to protect the native fish
27 in SPRNCA. Freeport’s more recent period of record provides lower quantities of water but the
28 evidence shows that the lower flows do not have a demonstrably adverse effect on the native fish of

1 SPRNCA. Flows based on this period of record would maintain the modern flow regime that has
2 allowed the longfin dace population to remain stable and the desert sucker to survive.
3

4 **B. Flood Flows**

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6 The United States' claim to surface water to protect the fish in the San Pedro River, as well as
7 the vegetation in the immediate vicinity of the river also includes claims to flood flows. United States
8 Post-Trial Brief at 12–13. Flood flows are high-volume flows in response to heavy rain events. These
9 events occur most often in the summer monsoon season in the southwest when thunderstorms drop
10 heavy rain on localized areas in the region leading to high volumes of runoff. [012919: 3:41PM
11 (Dixon)] Winter flood flows are typically longer in duration but occur less frequently than summer
12 floods. [*Id.*] Floods perform important ecological functions, including creating new habitats and
13 recharging the alluvial aquifer. [U.S. FOF 82; Exh. 6 at 1, PDF 3]
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16 Floods help maintain fish populations by regulating habitat and flushing out non-native fish
17 species unaccustomed to flood events. [U.S. FOF 905] The flood flows benefit native fish over non-
18 native fish because non-native fishes “are not as used to a flashing desert stream in their evolutionary
19 history.” [U.S. FOF 905; 021319:03–94 (Carothers)]. Dr. Carothers noted that flood flows can flush
20 out invasive fish, but flood flows need to be one to two orders of magnitude greater than baseflow to
21 succeed in flushing out invasive fish. [021319: 93 (Carothers)] In addition to flushing out non-native
22 fish, flood flows inundate the banks of the stream channel and recharge the alluvial aquifer. [030519:
23 66 (Burtell)] The release of water from the alluvial aquifer process can sustain streamflows well into
24 the winter months. [043019: 46 (Fogg)]
25

26 In addition to supporting the native fish populations, flood flows are also necessary to the
27 riparian vegetation. Floods can remove woody debris and existing vegetation along the river to create
28 open soil space for cottonwood seedlings to germinate and establish new cohorts of cottonwood stands.

1 [U.S. FOF 589; 013019: 27-28, 32-33 (Dixon); 021219: 42 (Carothers); Exh. 26 at 55, PDF 58]
2 Recruitment is paramount to maintain the cottonwood forests in SPRNCA that hold the floodplain
3 sediment deposits in place and when dead, contribute organic material to the riparian soils and logs
4 that create impoundments. [*Id.* at 290, PDF 293]

6 Based on the foregoing, federal reserved water rights to flood flows must be granted to protect
7 SPRNCA. The dispute between the United States and Freeport concerning floodflows centers on
8 quantifying the amount that is sufficient. Freeport proposes a lesser quantity of flood flows than the
9 amount claimed by the United States. Freeport Closing Statement at Appendix 1. The United States
10 quantifies its claimed flood flow as the difference between the median annual volume of surface flow
11 and the sum of the median monthly flows (based on the median of the mean daily flows) from 1955
12 to 1988. [U.S. FOF 79] Freeport derives its annual flood flow values from the difference between the
13 median annual volume of surface flow and the sum of monthly flows (based on the median of the
14 median daily flows) for the later period of 1981 to 2015. [Freeport FOF 29] In essence, the flood flow
15 dispute is a continuation of the broader dispute between the United States and Freeport as to the
16 appropriate period of record that should be used to quantify surface flow. For the reasons set forth
17 above, data from the streamflow gages from 1981 to 2015 shall determine the quantity of water
18 sufficient to maintain SPRNCA.

23 **VIII. Quantification of Right to Augmentation**

24 In addition to the quantities of surface water for streamflow and the maintenance of
25 groundwater levels at designated elevations that the United States represents are enough to maintain
26 SPRNCA, it also claims federal reserved water rights to an additional amount of water for “emergency
27 conditions.” Specifically, it seeks a federal reserved water right to pump up to 300 acre-feet of
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1 groundwater into the San Pedro River to augment aquatic habitat within the historically perennial
2 Charleston segment of the San Pedro River. [United States Post-Trial Brief at 14; U.S. FOF 1113]
3 Initially, the United States claimed a right to pump 11,150 acre-feet from 28 large capacity wells to
4 "be used in emergencies to prevent the loss of aquatic and riparian habitat." [Exh. 79 at PDF 17] It
5 subsequently modified its claim to assert federal reserved water rights to 300 acre-feet of water that
6 would be pumped at a maximum of five cubic feet per second ("cfs") from four wells adjacent to the
7 river for up to 30 days. [U.S. FOF Nos. 1113, 1119] The basis for the 30-day limitation on pumping
8 is based on the testimony of David Romero, a hydrologist who received his master of science degree
9 in hydrology from the University of Arizona. Mr. Romero examined the flow data from the
10 Charleston gage to determine the length of the time periods when the seven-day low flow at the
11 Charleston gage was less than 0.1 cfs. [U.S. FOF 1115] From this analysis, Mr. Romero concluded
12 that the longest period of flows at Charleston with less than 0.1 cfs was 28 days. [U.S. FOF 1117]
13 Freeport argues that the pumping of groundwater would not serve the purposes of SPRNCA and would
14 pose a significant risk to the health of the riparian area. [Freeport FOF 343] It also contends that there
15 would be only a slight increase in flow where pumped water is added to the stream and that increase
16 would be insufficient to materially affect the riparian habitat or aquatic resources of
17 SPRNCA. Freeport Closing Statement at 119. Further, Freeport argues that the United States' use of
18 augmentation could foreseeably cause elevations in monitoring wells to drop below decreed
19 elevations. Freeport Closing Statement at 102; United States Post-Trial Brief at 85. Pumping at the
20 rate of 5 cfs for 30 days would drawdown the water table in the area surrounding the Charleston area
21 by approximately 0.5 meter. [U.S. FOF 1120; Exh. 127 at 4]

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26 The United States' claim for additional water to address extreme low-flow situations, which
27 have arisen in the past and are expected to occur in the future, tests the definition of "sufficient." As
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1 decided above, the United States is entitled to federal reserved water rights to surface flow and
2 groundwater levels demonstrated to be sufficient over the past three decades to protect and maintain
3 SPRNCA. This additional claim requires a determination of whether a sufficient quantity of water
4 includes a right to water to be held by the United States essentially as insurance in the case of drought.
5 Sufficient is synonymous with adequate. The term does not encompass the concept of an additional
6 quantity that will ensure against an act of God in the form of severe drought. The limitation implicit
7 in the term sufficient to describe the quantity of water reserved is consistent with more than a century
8 of Court decisions that federal reserved water rights extend to amounts that are necessary but “no
9 more”. *Cappaert v. United States, supra; Winters v. United States, supra.* As the Court recognized
10 in *United States v. New Mexico*, 438 U.S. 696 (1978), federal reserved water rights are not the sole
11 source of water available to the United States to meet its needs. The United States has the ability to
12 acquire water in the same manner as any other non-federal public or private appropriator.
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16 **IX. Quantification of Rights to Point Sources**

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18 The United States claims rights for water from point sources close to the San Pedro River for
19 the purposes of streamflow augmentation and supporting wildlife and recreational uses within
20 SPRNCA. [U.S. FOF 201] In its Third Amended Statement of Claimant, the United States claimed
21 rights to water from 94 point sources but subsequently reduced its claim to nine point sources. [Exh.
22 1 at 37-42; U.S. FOF 201; Exh. 14 at 3-14] Five of those point sources, Cottonwood #1 Well, Snake
23 Well, Wolf #1 Well, Wolf #2 Well, and Whitehouse Well, were to provide water in case of emergency
24 caused by a drought addressed above. The remaining sources, Fairbank #2 Well, Horse Thief Draw
25 Spring, Lewis Spring South, and Moson Spring, are to provide water for wildlife and recreation
26 purposes. [U.S. FOF 204-205]
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1 The United States takes the position that its federal reserved water rights for wildlife watering
2 from the listed point sources should be adjudicated under *de minimis* procedures used to adjudicate
3 water rights for stockwatering in the San Pedro Watershed. [U.S. COL 179; Exh. 1 at 38-42] *De*
4 *minimis* adjudication procedures adopted to adjudicate state water rights defined by attributes set by
5 state law do not apply to this case. [Order of Judge Ballinger dated September 26, 2002, Contested
6 Case No. W1-11-19 ("*De Minimis* Order"); Memorandum Decision, Findings of Fact, and Conclusions
7 of Law for Group of Cases Involving Stockwatering, Stockponds, and Domestic Uses (Nov. 14, 1994)
8 ("*De Minimis* Report").] This case will adjudicate federal reserved water rights defined by attributes
9 set by federal law. Moreover, the adoption of those procedures was fundamentally a case management
10 decision by the court that the benefits of resolving certain types of disputes involving thousands of
11 claims in the San Pedro Watershed were substantially outweighed by the costs of doing so. The court
12 concluded that the amount of litigant and judicial effort that would be expended to fully litigate the
13 ownership, quantity, and other characteristics of those small water uses could not be justified by the
14 results. Those considerations do not apply to this case where a single party is asserting a small number
15 of water rights within a case that involves substantial water right claims. No reason, legal,
16 management or otherwise, exists to import summary procedures into this litigation to resolve four
17 wildlife watering claims. The United States must establish its federal reserved water rights for wildlife
18 watering just as it is required to do for its other claims.

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21 Among the elements that the United States must establish is the amount sufficient from each
22 source to protect SPRNCA, which necessitates evidence verifying the flow and volume of point
23 sources. As Freeport points out and ADWR confirmed, the United States' determinations for volume
24 and flow at the claimed point sources are not reliable. [Freeport Closing Statement at 121; Exh. 14 at
25 13-15]. In its review of the United States' quantification of flow and volume at the point sources,
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ADWR concluded that the United States "does not include complete measurement records" and that the "snapshot of 2003 - 2004 flow rates are not supported by investigations of hydrogeology and sources of water at the seeps and springs." [Exh. 14 at 3-14, 3-15] Based on the record in this case, the United States has not met its burden to show that the quantities it claimed from the various point sources were the amounts sufficient to protect SPRNCA. Therefore, no reserved water rights will be decreed at Fairbank #2 Well, Horse Thief Draw Spring, Lewis Spring South, and Moson Spring.

X. Decree

The United States is decreed a federal reserved water right to instream flows at the three San Pedro River USGS stream gages and the Babocomari streamgage within the SPRNCA for the protection of the riparian area and the aquatic, wildlife, archeological, paleontological, scientific, cultural, educational, and recreational resources of the SPRNCA. It is entitled to federal reserved water rights defined as monthly flows at each of the four stream gages, in acre-feet and cubic feet per second, for each month. Monthly flows are determined as the median rate of the mean daily flow for that month from 1981 to 2015. It is further entitled to federal reserved water rights to flood flows calculated as the difference between the sum of the monthly flows and the mean annual flows. Further, the United States is decreed a federal reserved water right to the following groundwater elevations at nine monitoring wells within the SPRNCA for the protection of the riparian area:

Well Name	Location	Elevation at Top of Casing (ft.) (Datum: NAD83, NAVD88, GEOID03)	Water Level Elevation (ft.)
Palominas Well #5	31°20' 40.63704" -110° 08' 03.50040"	4267.6	4246.1
Hereford South monitoring well	31 ° 26' 23.09794" -110° 06' 29.80706"	4153.4	4143.9
Hereford North	31° 26' 38.29823"	4155.1	4145.7

1	monitoring well	-110° 06' 26.63238"		
2	Cottonwood monitoring well	31° 31' 10.56285" -110° 07' 46.70368"	4087.1	4070.7
3	Lewis Springs monitoring well	31 ° 33' 10.83449" -110° 08' 18.97124"	4049.9	4040.9
4	Moson Spring monitoring well	31° 36' 42.38970" -110° 10' 03.33506"	3989.25	3975.5
5	Boquillas #2 monitoring well	31° 40' 59.98193" -110° 11' 22.02455"	3896.95	3879.05
6	Boquillas #1 monitoring well	31° 41' 23.56147" -110° 11' 11.74585"	3878.0	3862.2
7	Summers monitoring well	31° 47' 34.61492" -110° 13' 03.70638"	N/A	3717.3

11 The United States will submit a form of decree consistent with the decisions in this Order by
 12 December 1, 2023. The other parties may submit objections to the form of decree by January 22,
 13 2024. Objections to the form of decree must be limited to objections that the proposed decree is not
 14 consistent with this Order.
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16 Dated: August 24, 2023

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18 Hon. Mark H. Brain
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