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**BEFORE THE ARIZONA NAVIGABLE STREAM
ADJUDICATION COMMISSION**

In re Determination of Navigability of
the San Pedro River

No. 03-004-NAV

**SALT RIVER PROJECT AND
FREEPORT-McMoRAN
CORPORATION'S PROPOSED
FINDINGS OF FACT AND
CONCLUSIONS OF LAW**

1 Pursuant to the Chairman’s direction, the Salt River Project Agricultural Improvement
2 and Power District and Salt River Valley Water Users’ Association (collectively, “SRP”) and
3 Freeport-McMoRan Corporation (“Freeport”) hereby jointly submit their proposed findings of
4 fact and conclusions of law in this matter regarding the San Pedro River (“San Pedro”).¹
5 References herein to the reporter’s transcript of the evidentiary hearing held in June and
6 August, 2013 are set forth as “Tr. at [date:page] (witness).” A table of contents appears on
7 page 2. SRP and Freeport’s proposed findings of fact begin on page 3. SRP and Freeport’s
8 proposed conclusions of law begin on page 32.

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25 ¹ SRP separately submitted a set of proposed findings of fact and conclusions of law (“SRP’s Initial
26 Proposed Findings”) concurrently with its opening memorandum on September 13, 2013. SRP’s
27 Initial Proposed Findings remains relevant because SRP cites directly to that document in its opening
memorandum. However, for purposes of the Commission’s preparation of its order concerning the
San Pedro, this jointly submitted set of proposed findings of fact and conclusions of law subsumes
and supersedes SRP’s Initial Proposed Findings.

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1 **FINDINGS OF FACT**

2 **SUMMARY OF EVIDENCE SUBMITTED**

3 1. The Commission has held two separate sets of hearings over the course of a
4 decade to receive evidence regarding whether the San Pedro was navigable.

5 2. The first set of hearings was held in 2003 and 2004 (“2003-04 Hearings”).
6 Hearings were held on March 12, 2003, in Bisbee, the county seat of Cochise County; on
7 January 22, 2004, in Tucson, the county seat of Pima County; and on March 9, 2004, in
8 Florence, the county seat of Pinal County. Each of those 2003-04 Hearings was properly
9 noticed pursuant to the applicable statutes.

10 3. Prior to the 2003-04 Hearings, the Arizona State Land Department (“SLD”)
11 hired a technical consultant to perform a detailed and comprehensive study of the San Pedro.
12 See JE Fuller Hydrology & Geomorphology, Inc., *Arizona Stream Navigability Study for the*
13 *San Pedro River: Gila River Confluence to the Mexican Border* (revised September 1997)
14 [included in EI 6] (“Fuller 1997”).² The Fuller 1997 report was submitted to the Commission
15 in 1997.

16 4. The SLD consultant issued a revised report in 2004. See JE Fuller/Hydrology &
17 Geomorphology, Inc., *Arizona Stream Navigability Study for the San Pedro River: Gila River*
18 *Confluence to the Mexican Border* (revised January 2004) [EI 16] (“Fuller 2004”). That 2004
19 report was submitted to the Commission in 2004.

20 5. Various other individuals submitted documents or oral testimony in connection
21 with the 2003-04 Hearings. The Commission received over twenty-seven documentary
22 filings, including studies, written documents, newspapers and other historical accounts,
23 pictures, and recordings. The documents and testimony submitted during the 2003-04
24 Hearings remain part of the record in this continued proceeding.

25 6. The Commission held a public hearing in Phoenix on September 16, 2004, to
26 consider the evidence submitted during the 2003-04 Hearings and the legal briefs filed by the

27 _____
² “EI” refers to the Commission’s number system for evidence in the record.

1 parties. Following that hearing, the Commission issued a report entitled "*Report, Findings*
2 *and Determination Regarding the Navigability of the San Pedro River from the Mexican*
3 *Border to the Confluence with the Gila River*" (October 18, 2008) ("ANSAC 2008").

4 7. The Commission held another hearing in June and August 2013 ("2013
5 Hearing"). The 2013 Hearing was held on June 7, 2013, in Bisbee, the county seat of
6 Cochise County; and on August 1-2, 2013, in Phoenix.

7 8. Various individuals submitted oral testimony in connection with the 2013
8 Hearing. Those individuals included Win Hjalmarson, on behalf of the Arizona Center for
9 Law in the Public Interest ("ACLPI") and its clients; Richard Burtell, on behalf of Freeport;
10 T. Allen J. Gookin, on behalf of the Gila River Indian Community; David Smallhouse, a
11 rancher and landowner on the San Pedro, and his daughter, Hanna; Gail Griffin, a state
12 Senator from Cochise County; and Fred Davis, a resident who lives east of Tombstone.
13 Senator Griffin submitted a package of historical materials that had been provided to her by
14 her constituents, which are included as EI X009 in the Commission's record ("Griffin
15 Materials").

16 9. A court reporter prepared a transcript of the 2013 Hearing. That transcript is
17 part of the Commission's record.

18 10. The Commission received numerous additional documents during the 2013
19 Hearing. Those documents are included in the Commission's record.

20 11. Mr. Hjalmarson presented a Power Point presentation and associated exhibits
21 entitled "*Navigability along the Natural Channel of the San Pedro River, AZ, from Mexico to*
22 *the Mouth at the Gila River at Winkleman, AZ,*" dated May 2013 ("Hjalmarson 2013"). That
23 presentation is included in the Commission's record as EI X004. Mr. Hjalmarson also
24 submitted a written "executive summary" report to the Commission. *See Navigability along*
25 *the Natural Channel of the San Pedro River* (August 20, 2013) [part of EI X013]
26 ("Hjalmarson 2013b"). That executive summary was submitted after the hearing concluded,
27 and none of the other parties had an opportunity to ask him questions about it. In his written

1 presentations and in his oral testimony, Mr. Hjalmarson stated his opinion that the San Pedro,
2 from the Lewis Springs area to the mouth of the Gila River, was susceptible to navigation at
3 the time of statehood in its ordinary and natural condition using the federal standard. *See*
4 Hjalmarson 2013, at 169; Hjalmarson 2103b, at 12. He concluded that, for about eighty
5 percent of the time during a typical year, the width, depth, and velocity were acceptable for
6 use by small water craft such as canoes, kayaks, drift boats, row boats, and rafts. *See*
7 Hjalmarson 2013, at 169; Hjalmarson 2013b, at 12; Tr. at 6/7/13:27 (Hjalmarson). In
8 essence, Mr. Hjalmarson testified that the San Pedro can and should be segmented between
9 (a) its non-navigable reach from the Mexican border up to about Lewis Springs and (b) the
10 reach he opined was navigable from Lewis Springs to the Gila River confluence. *See*
11 Hjalmarson 2013, at 169; Tr. at 6/7/13:25, 27 (Hjalmarson).

12 12. Mr. Burtell submitted a declaration and associated exhibits entitled
13 “*Declaration of Rich Burtell on the Non-Navigability of the San Pedro River at and prior to*
14 *Statehood*,” dated March 2013 (“Burtell 2013”). That declaration is included in the
15 Commission’s record as EI X001. In his written declaration and in his oral testimony, Mr.
16 Burtell stated his opinion that the San Pedro “was not susceptible to navigation in its ordinary
17 and natural condition at and prior to statehood.” *Id.* ¶ 7, at 2; *id.* ¶ 34, at 6. Mr. Burtell
18 further opined that the San Pedro should not be segmented for purposes of determining its
19 navigability under the criteria set forth by the United States Supreme Court in *PPL Montana,*
20 *LLC v. Montana*, 132 S. Ct. 1215 (2012) (“*PPL Montana*”). *See* Burtell 2013, ¶ 12, at 2; *id.* ¶
21 35, at 6; Tr. at 8/1/13:122-24 (Burtell).

22 13. Mr. Gookin submitted a Power Point presentation and associated exhibits
23 entitled “*Navigability of the San Pedro River*,” dated August 1-2, 2013 (“Gookin 2013”).
24 That presentation is included in the Commission’s record as EI X008. Mr. Gookin stated his
25 opinion that the San Pedro was not navigable in its ordinary and natural condition. *See* Tr. at
26 8/2/13:155-56 (Gookin).

1 **HISTORY OF THE SAN PEDRO**

2 14. The Commission finds, as a matter of fact, that the historical evidence in the
3 record before it relating to the San Pedro shows that the San Pedro was not actually navigated,
4 nor was it susceptible to navigation, in its ordinary and natural condition. See Findings and
5 Conclusions, *infra*.

6 **The San Pedro during Prehistoric Times**

7 15. The reports submitted by the SLD consultants detail archaeological evidence
8 regarding occupation near the San Pedro in the period before settlement by non-natives. See,
9 *e.g.*, Fuller 1997, at 2-5.

10 16. The record before the Commission includes documented evidence of
11 inhabitation in the San Pedro River Valley dating back to approximately 9,550 B.C., over
12 11,000 years ago. See Fuller 1997, at 2-5; see also Stromberg & Tellman, “*Ecology and*
13 *Conservation of the San Pedro River,*” at 217 (2009) [part of EI X002] (“Stromberg 2009”)
14 (dating the first human settlement in the area to 12,000 years ago).

15 17. Prehistoric inhabitants along the river utilized its water for agricultural
16 purposes, such as floodwater farming in the low areas. See Fuller 1997, at 2-6, 2-9. There is
17 also limited evidence of prehistoric irrigation practices. *Id.* at 2-9.

18 18. Early populations settled in the San Pedro River Valley using river water as
19 their lifeline. As the SLD consultant concluded, however: “No evidence of prehistoric
20 boating on the San Pedro River, or of river conditions that would support navigation, was
21 identified during the archaeological investigation and literature search.” See Fuller 1997, at
22 2-9.

23 19. Thus, despite human presence in the San Pedro River Valley and along the river
24 for thousands of years, no evidence exists that any of those communities ever used or even
25 tried to use the San Pedro as a “highway for commerce.” See Fuller 1997, at 2-9; see also Tr.
26 at 6/7/13:159-60 (Hjalmarson).

27

1 **Early Exploration, Settlement, and Conditions before the 1880s**

2 20. Indians, Spanish explorers and missionaries, and American trappers and
3 travelers entered the San Pedro River Valley and traveled along the river, yet none used the
4 San Pedro as a means of transportation or commerce. *See generally* Huckleberry, “*Historical*
5 *Channel Changes on the San Pedro River, Southeastern Arizona*,” Arizona Geological
6 Survey, Open-File Report 96-15, at 8 (revised October 1996) [EI X005] (“Huckleberry
7 1996”); *see also* Tr. at 6/7/13:178 (Hjalmarson) (Q. “How much of the human activity over
8 the past 300 years involved use of river for commerce or trade?” . . . A. “I’m not aware of
9 any.”); *see also* Tr. at 6/7/13:181 (Hjalmarson) (“Q. Is there any evidence that you’re aware
10 of, or historical accounts, I should say, of any use of the San Pedro for shipping or
11 transportation? A. No.”).

12 21. In the 1500s, there were explorers in the area, such as Spanish explorer Fray
13 Marcos de Niza. *See* Fuller 1997, at 3-7.

14 22. The Sobaipuri Indians, an agricultural tribe, occupied the area until warfare with
15 the Apaches around 1763 forced them to the Santa Cruz River. *See* Fuller 1997, at 3-7. The
16 Sobaipuri had villages along the river with as many as 500 people each. *Id.*

17 23. Spanish missionaries, such as Father Eusebio Kino, established missions in the
18 area in 1691. *See* Fuller 1997, at 3-7.

19 24. Trapper James Ohio Pattie made two expeditions along the San Pedro between
20 1824 and 1828, referring to it as “Beaver River” due to the abundance of beavers. *See* Fuller
21 1997, at 3-10; Huckleberry 1996, at 8; Stromberg 2009, at 219; Tr. at 6/7/13:27 (Hjalmarson).

22 25. Some indication exists that members of Pattie’s trapping party might have
23 attempted to use a canoe at one point during one of these trips, but the evidence is not
24 conclusive whether this occurred on the San Pedro or one of the other rivers on which the
25 party traveled. *See* Gookin 2013, at 3; Tr. at 6/7/13:13-14, 160 (Hjalmarson); Tr. at
26 8/2/13:112, 180 (Gookin). What evidence exists shows that this event – whether it occurred
27 on the San Pedro or on another stream – happened at a time when the rivers in the area were

1 at or near flood stage, *i.e.* not in their ordinary condition. *See* Gookin 2013, at 3; Tr. at
2 8/2/13:112, 180 (Gookin) (“Q. Would that have been during an ordinary condition on the
3 river? A. No.”).

4 26. In 1846, during the Mexican War, military expedition teams led by Stephen
5 Watts Kearny crossed the San Pedro, and Emory, a surveyor, described the San Pedro as “an
6 insignificant stream a few yards wide and only a foot deep.” *See* Fuller 1997, at 3-13; Gookin
7 2013, at 83; Burtell 2013, Table 1; Tr. at 8/1/13:158-159 (Burtell).

8 27. Another member of Kearny’s group reported that the San Pedro was called
9 “Hog River” due to the amount of wild hogs found on it. *See* Fuller 1997, at 3-13.

10 28. Emory noted in 1848 that the San Pedro was a “few yards wide and one foot
11 deep.” *See* Huckleberry 1996, at 12; Burtell 2013, Table 1

12 29. Johnson reported in 1846 or 1850 that an “active man” could jump across the
13 water in the San Pedro. *See* Huckleberry 1996, at 12; Burtell 2013, Table 1; Tr. at 8/1/13:158
14 (Burtell); Tr. at 8/1/13:6 (Griffin).

15 30. Philip St. George Cooke, commander of the Mormon Battalion, also traveled
16 alongside the San Pedro during the mid-nineteenth century for more than fifty miles. *See*
17 Fuller 1997, at 3-13. Despite his boating attempts on other rivers, he never made any
18 attempts to boat on the San Pedro. *Id.*

19 31. Near the mouth of Dragoon Wash in September 1851, Bartlett reported that
20 “[t]he stream . . . was here about two feet deep and quite rapid.” *See* Burtell 2013, Table 1.
21 The account reflects that this was time of higher than typical discharge during the monsoons.
22 *Id.*

23 32. In 1854, a surveyor named Andrew Gray stated that the San Pedro “is a small
24 stream at this stage, about eight feet wide, and shallow, between steep banks of 10 feet high to
25 25 to 50 feet high.” *See* Burtell 2013, Table 1; Tr. at 8/1/13:154-55 (Burtell).

26 33. In February 1854 near Benson, surveyor John Parke reported that the San Pedro
27 was “about eighteen inches deep and twelve feet wide.” *See* Burtell 2013, Table 1; Gookin

1 2013, at 83; Stromberg 2009, at 237. During that same year at Tres Alamos, Parke described
2 the San Pedro as “about fifteen inches deep and twelve feet wide.” *See* Burtell 2013, Table 1;
3 Stromberg 2009, at 237.

4 34. In 1857, Parke reported that, in the Lower San Pedro upstream from its
5 confluence with the Gila River, the “water sinks below the surface and rarely runs above it.”
6 *See* Huckleberry 1996, at 12; Tr. at 8/1/13:157-58 (Burtell).

7 35. In late 1857, Tevis stated that, upstream from the mouth of Aravaipa Creek, the
8 San Pedro was “one foot deep” and “six feet wide,” that beaver dams were encountered every
9 five miles, and noted a location where “the bed of the river would be as dry as the road – it
10 sinks & rises again ...” *See* Burtell 2013, Table 1; Tr. at 8/1/13:159-61 (Burtell); Gookin
11 2013, at 83.

12 36. Engineers surveying a wagon road in 1858 commented that the San Pedro “is
13 not continuous all the year, but in the months of August and September disappears in several
14 places, rising again, however, clear and limpid.” *See* Fuller 1997, at 3-18.

15 37. Immediately upstream from the Narrows, Hutton in 1858 or 1859 described the
16 Upper San Pedro as having a width of approximately twelve feet and a depth of about a foot.
17 *See* Huckleberry 1996, at 9; Burtell 2013, Table 1; Tr. at 8/1/13:155-56 (Burtell); Gookin
18 2013, at 83.

19 38. Leach in September 1858 noted the variable nature of the San Pedro above the
20 Narrows. *See* Burtell 2013, Table 1. He stated: “Exceedingly to the surprise of every
21 member of the expedition who had passed over this route in the months of March and April it
22 was discovered after a march of a few miles that the waters of the San Pedro had entirely
23 disappeared from the channel of the stream. . . . Where the present reporter took quantities of
24 fine trout in March and April 1858 not a drop of water was to be seen.” *Id.*; *see also* Tr. at
25 8/1/13:156-57 (Burtell).

26 39. In at least one report presented for other purposes in 1988 (many years prior to
27 his testimony before the Commission), Mr. Hjalmarson acknowledged that, in the San Pedro

1 in the 1800s, the flow of water was not continuous and that there were locations at which the
2 water on the surface would disappear and rise again a few miles downstream. *See* Gookin
3 2013, at 11; Tr. at 8/2/13:115 (Gookin).

4 40. Mr. Gookin referred to numerous observations in the 1840s and 1850s of dry
5 reaches on the San Pedro. *See* Gookin 2013, at 11; *see also id.* Appendix A, at 1-4.

6 41. Marshy conditions existed on the San Pedro at Camp Grant located at the mouth
7 of Aravaipa Canyon in the mid-1800s. *See* Huckleberry 1996, at 12. Constructed in 1859,
8 the camp was plagued by malaria and was soon abandoned and moved. *Id.* In 1879, “the
9 Arizona Daily Star described the San Pedro as the ‘valley of the shadow of death’ because of
10 the serious incidence of malaria there, reflecting the then-pervasive swampy conditions.” *See*
11 Griffin Materials [*From Marshes and Cienegas to Gallery Forests*]; Griffin Materials [*The*
12 *Changing Mile*, at 3].

13 42. Marshy conditions existed throughout substantial reaches of the San Pedro prior
14 to the 1880s. *See* Tr. at 6/7/13:94 (Hjalmarson) (In predevelopment conditions, “[t]here was a
15 series of springs, which are cienegas. And in this climate they tend to be marshes.”); *see also*
16 Tr. at 6/7/13:145-46, 156 (Hjalmarson); Tr. at 8/1/13:161, 188-92 (Burtell); Griffin Materials
17 [*From Marshes and Cienegas to Gallery Forests*].

18 43. Researchers Hendrickson and Minckley characterized significant portions of the
19 San Pedro as cienega or riverine marsh in its predevelopment condition. *See* Hendrickson and
20 Minckley (1984) map [part of EI X007] (“Hendrickson and Minckley (1984)”). Hendrickson
21 and Minckley described cienegas as follows: “Dense stands of sedges and charophytes fill
22 shallow, braided channels between pools, or deeper, narrow, vertical-walled channels may be
23 heavily vegetated with” various aquatic plants. Hendrickson and Minckley, *Desert Plants,*
24 *Cienegas – Vanishing Climax Communities of the American Southwest*, (issued early 1985)
25 [EI 12] (“Hendrickson and Minckley (1985)”) at 133. These cienegas and riverine marshes
26 presented another significant impediment to navigation of the San Pedro in its ordinary and
27 natural condition. *Id.*; *see also* Tr. at 8/1/13:190-92.

1 44. There is evidence of stage transportation companies operating along the San
2 Pedro in 1880. *See* Fuller 1997, at 3-23. However, there is no evidence of using the river for
3 commerce. *Id.*

4 45. The San Pedro was an important transportation route through southern Arizona,
5 but travel was alongside the river via foot or horseback. *See* Fuller 1997, at 3-23; *see also*
6 Burtell 2013, ¶ 23, at 4; Tr. at 6/7/13:157-58 (Hjalmarson). For example, Mr. Burtell's
7 declaration and testimony examined efforts to supply military posts in the area before and
8 after the Civil War. *See* Burtell 2013, ¶¶ 23-26, at 4-5. In the sources Mr. Burtell reviewed,
9 only the Colorado River was mentioned as having been used to transport supplies to Arizona
10 military posts by boat. *Id.*; *see also* Tr. at 8/1/13:178 (Burtell).

11 46. Studies indicate that, prior to 1890, the river was "an irregularly flowing stream,
12 marshy in places, free-flowing in other places, entrenched or subsurface in still other places."
13 Fuller 1997, at 3-1; *see also* Burtell 2013, ¶ 13, at 2 (before 1870, "[i]ntermittent and
14 discontinuous flow conditions were also reported along the middle and lower reaches
15 indicating a variable nature of flow").

16 47. Cienegas, sand bars, and riffles also existed on the San Pedro during the period
17 before 1890, which would have been additional impediments to navigation. *See* Gookin
18 2017, at 56, 59-62; *see also* Gookin 2013, Appendix A, at 6 (quoting accounts of riffles);
19 Gookin 2013, Appendix A, at 10-11 (quoting various accounts of cienegas); Tr. at 6/7/13:51
20 (Hjalmarson); Tr. at 8/1/13:107-08 (Hjalmarson) and 239 (Burtell).

21 48. Mr. Hjalmarson presented testimony that some human impacts, including water
22 use by mines near the Mexican border, could have been occurring in the mid-1800s that made
23 these historical accounts not indicative of ordinary and natural conditions on the San Pedro.
24 *See* Tr. 6/7/13:11 (Hjalmarson). The Commission finds, as a matter of fact, that Mr.
25 Hjalmarson's evidence of water use by the mines does not establish that such use had any
26 measurable or significant effect on the flows in the river.

27

1 **Down-Cutting and Entrenchment in the 1880s**

2 49. In 1854, a railroad surveyor commented that the San Pedro flows “at about
3 twelve feet below the surface of its banks, which are nearly vertical, and of a treacherous miry
4 soil, rendering it extremely difficult to approach the water, now muddy and forbidding.” See
5 Fuller 1997, at 3-16.

6 50. The evidence presented to the Commission showed that, generally beginning
7 about the 1880s, the channel of the San Pedro began to down-cut and entrench, resulting in a
8 narrower, more defined channel than existed immediately prior to that time. See Burtell 2013,
9 ¶ 9, at 2; Gookin 2013, Appendix A, at 15 (quoting accounts of entrenchment on the San
10 Pedro in the 1880s and 1890s).

11 51. During the 1880s and 1890s, a series of large floods occurred that affected the
12 geometry of the San Pedro. See Huckleberry 1996, at 10, 13; Gookin 2013, Appendix A, at
13 16-17 (quoting accounts of flooding and entrenchment); Stromberg 2009, at 233 (“Historical
14 sources, such as newspapers, provide descriptions of extreme and rare episodes, most
15 importantly floods. These accounts serve the environmental historian well, because
16 degradation of alluvial stream channels occurs catastrophically during extreme flows.”);
17 Griffin Materials [*Bridges on the San Pedro River and Its Floods*, at 91]. Large floods
18 occurred in 1886, 1887, 1890, and 1896. See Huckleberry 1996, at 10, 13.

19 52. A large earthquake also shook the region in 1887. See Huckleberry 1996, at 10;
20 see also Stromberg 2009, at 242 (“Another factor that may have preconditioned the valley to
21 widespread arroyo cutting was the 1887 earthquake.”); Griffin Materials [*Towns Throughout*
22 *the San Pedro Valley*, at 23].

23 53. One of the worst droughts on record occurred between 1891 and 1893. See
24 Huckleberry 1996, at 10.

25 54. “Many alluvial streams in the region including the San Pedro River experienced
26 extensive entrenchment in the late 19th and early 20th centuries.” See Huckleberry 1996, at
27 7.

1 55. Almost the entire reach of the Upper San Pedro was entrenched by about 1920.
2 *See* Huckleberry 1996, at 11.

3 **Settlement and Conditions after the 1880s**

4 56. After 1890, the San Pedro was a “highly variable stream, both seasonally and
5 along its length.” *See* Fuller 1997, at 3-26.

6 57. An additional limitation on any potential transportation or commerce in the
7 river was a drought that lasted from 1885 to 1903, accompanied by periodic flash flooding.
8 *See* Fuller 1997, at 3-26. During his testimony, Mr. Hjalmarson stated that any potential for
9 navigation would be less during periods following large floods, while the river recovered
10 from the effects of the flood. *See* Tr. at 6/7/13:174 (Hjalmarson) (A. “. . . Now, I can further
11 answer your question, instead of 80 percent of the year for navigation, because it’s been torn
12 up and so forth, it might be – it might be 70 percent. . . .” Q. “But it might be zero, right?”
13 A. “Well, yeah. . . .”).

14 58. A resurvey of the international border was conducted in 1891. *See* Burtell
15 2013, ¶ 14, at 2-3 & Table 1 attached thereto. During that resurvey, the San Pedro was
16 described in the vicinity of the border as “ordinarily a stream of about 15 feet in width and 6
17 or 8 inches in depth, fringed with a fine growth of cottonwood and willow.” *Id.* No mention
18 was made of any navigation on the river in those resurvey observations. *Id.* Little or no
19 diversions affecting streamflow existed in the upper portion of the San Pedro watershed near
20 the border at the time of the 1891 resurvey. *Id.*

21 59. If it was possible, transportation of persons or goods by boat on the San Pedro
22 would have been beneficial to the residents in the late 1800s. *See* Gookin 2013, at 4. Mines
23 began operating in the area in the 1870s, and such transportation would have been a means to
24 get needed equipment to the mine and to take products to market. *Id.*; *see also generally*
25 Stromberg 2009, at 218 (“Arrival of the railroad in the mid-1870s increased the pace of
26 development.”)

27

1 60. During historic times, “there is no documentation of boating of any kind on the
2 San Pedro River.” *See* Fuller 1997, at 3-21.

3 **Beavers on the San Pedro**

4 61. The evidence submitted to the Commission showed the presence of numerous
5 beaver dams on the San Pedro, both during the 1800s and in more recent times. *See, e.g.,*
6 Burtell 2013, ¶ 13, at 2; Tr. at 8/1/13:124, 161 (Burtell); Hjalmarson 2013, at 154; Tr. at
7 8/1/13:70 (Hjalmarson); Tr. at 8/2/13:141 (Gookin).

8 62. Before about 1870, beavers were common throughout a large portion of the San
9 Pedro. *See* Burtell 2013, ¶ 13, at 2; Gookin 2013, Appendix A, at 9-10 (quoting various
10 accounts of beavers on the San Pedro); Stromberg 2009, at 219 (“In the late 1800s, European
11 travelers, prior to floodplain entrenchment, commented on numerous beaver dams and
12 associated ponds.”).

13 63. James Ohio Pattie trapped beaver along the San Pedro during two trips, the first
14 between December 1824 and April 1825, and the second between October 1827 and February
15 1828. *See* Burtell 2013, ¶ 27, at 5; Huckleberry 1996, at 8. After trapping some “200 skins,”
16 he called the San Pedro the “Beaver River.” *See* Burtell 2013, ¶ 27, at 5; Tr. at 8/1/13:182,
17 257 (Burtell); Huckleberry 1996, at 8; Hjalmarson 2013, at 32; Tr. at 6/7/13:13, 28-29
18 (Hjalmarson); Tr. at 8/1/13:70 (Hjalmarson); Griffin Materials [*From Marshes and Cienegas*
19 *to Gallery Forests*]. No evidence was submitted to the Commission to prove that Mr. Pattie
20 traveled by boat on water, as opposed to on foot along the river. *See* Tr. at 6/7/13:170
21 (Hjalmarson); Tr. at 8/1/13:257 (Burtell).

22 64. As part of his work in performing the original survey of the international
23 boundary in 1854-55, Emory reported: “Though affording no great quantity of water, this
24 river [the San Pedro] is backed up into a series of large pools by beaver-dams and is full of
25 fishes.” *See* Burtell 2013, Table 1.

1 65. In 1857, Tevis reported that, downstream from the mouth of Aravaipa Creek,
2 “about Every 5 miles is a beaver dam this is great country for them. . . . [sic]” *See* Burtell
3 2013, Table 1.

4 66. Mr. Hjalmarson opined that, in the last 123 miles of the San Pedro, “nearly 500”
5 beaver dams were present. *See* Hjalmarson 2013, at 160; Gookin 2013, at 58. Mr. Gookin
6 stated that there could have been as many as 1,680 beaver dams on the river. *See* Gookin
7 2013, at 58.

8 67. The numerous beaver dams on some reaches of the San Pedro would have
9 posed an obstacle to navigation. *See* Burtell 2013, ¶ 13, at 2; Gookin 2013, at 56; Tr. at
10 8/2/13:141-42, 172 (Gookin); Hjalmarson 2013, at 159 (photographic depiction stating “Easy
11 going upstream except for Eager’s [beaver] dam”); Tr. at 8/1/13:72-73 (Hjalmarson). This is
12 emphasized by the efficiency with which beavers are known to multiply and to repair their
13 dams. *See* Burtell 2013, ¶ 30, at 5; Tr. at 6/7/13:28 (Hjalmarson: “[T]hey rebuilt the dams
14 pretty fast.”). The impediments posed by beaver dams were compounding factors along with
15 low depths, low flow, discontinuity, marshy cienega conditions, and other impediments
16 encountered at various locations that rendered the San Pedro neither navigable nor susceptible
17 to navigation in its ordinary and natural condition. Tr. at 8/1/13:181-88 (Burtell).

18 68. In addition to being a natural physical obstacle to navigation, beaver dams also
19 slow water flow and create deeper pools than would otherwise exist. *See* Burtell 2013, ¶ 30,
20 at 5; *see also* Hjalmarson 2013, at 165 (beaver dams create ponds that increase water depth).
21 If and when dams are removed, those deeper pools are drained, thereby resulting in lower
22 water depths. *See* Burtell 2013, ¶ 30, at 5.

23 69. By about 1900, beavers were extirpated from the Upper San Pedro. *See* Burtell
24 2013, ¶ 28, at 5; Stromberg 2009, at 219. The Bureau of Land Management reintroduced
25 fifteen beavers to the San Pedro National Riparian Conservation Area (“SPRNCA”) in 1999
26 and 2000. *See* Burtell 2013, ¶ 28, at 5; Tr. at 8/1/13:184-85 (Burtell); Hjalmarson 2013, at
27 161. SPRNCA is located on the Upper San Pedro. *See* Burtell 2013, ¶ 28, at 5. By 2008, the

1 fifteen beavers that had been introduced had expanded to about 150, with forty-six beaver
2 dams counted. *See* Burtell 2013, ¶ 28, at 5; Tr. at 8/1/13:184-85 (Burtell); Hjalmarson 2013,
3 at 162.

4 **Fishing on the San Pedro**

5 70. There is documented evidence of fish, such as squawfish, razorback sucker, and
6 flannelmouth sucker, found in the San Pedro. *See* Fuller 1997, at 3-21.

7 71. The historical record is, however, devoid of any evidence that any person ever
8 used a boat to fish on the river. For example, evidence of fishing came from journal entries of
9 men on military expeditions with Cooke, the commander of the Mormon Battalion, who
10 traveled by horseback along the San Pedro and wrote of catching fish in the river. *See* Fuller
11 1997, at 3-14.

12 72. In addition, the Fuller 1997 report briefly mentions that, from 1870 through
13 1910, a commercial business harvested razorback suckers near Tombstone. *See* Fuller 1997,
14 at 3-14. No further evidence was submitted to the Commission, however, on how the fish
15 were caught or whether the business was seasonal due to the variable streamflow of the river.

16 73. The SLD consultant stated that “. . . the presence of fish in a river does not
17 necessarily indicate that boatable conditions exist” Fuller 1997, at G-5.

18 74. What evidence of fishing exists in the record does not support a finding of
19 navigability. Evidence of fishing from the banks of the San Pedro does not make it likely
20 that the river was navigable.

21 **Boating Attempts on the San Pedro**

22 75. There are no published accounts of boating on the San Pedro prior to statehood.
23 *See* Fuller 1997, at G-4.

24 76. There is one unconfirmed anecdotal story of a ferry service on the river. Dora
25 Ohnesorgen and Nedra Sunderland recalled that Ohnesorgen’s grandfather had a ferry
26 operation on the San Pedro near Pomerene. *See* Fuller 1997, at 4-3. This supposed operation
27 was not documented in any newspaper article or any other source, nor was there a timeframe

1 of when this business was thought to have operated or any other evidence confirming this
2 story. *Id.* at 8-3.

3 77. One account exists of a lake being present in the middle of the San Pedro during
4 the 1940s. *See* Burtell 2013, ¶ 31, at 5-6. Mr. Burtell reviewed various maps and surveys of
5 the area during that period and found no evidence of such a lake. *Id.* The only reference to a
6 lake in this area was to Cooks Lake, which is about half a mile east of the San Pedro and
7 about two miles below the Aravaipa Creek confluence. *Id.*; *see also* Tr. at 8/1/13:193-96
8 (Burtell).

9 78. During interviews with local residents, there was not one account of commercial
10 or recreational boating (other than the unverified ferry story above) on the San Pedro. *See*
11 Fuller 1997, at 4-3.

12 79. The Winkelman Natural Resource Conservation District reported to the
13 Commission: “It is the overwhelming consensus that the San Pedro River has never been a
14 ‘navigable’ waterway.” *See* Letter from Virgil E. Mercer, Chairman, Winkelman Natural
15 Resource Conservation District, to Navigable Stream Adjudication Commission (July 17,
16 1996) [EI 4]. The Chairman of that district reported that his family came to the area in the
17 1880s and, although part of the family ranch was on the San Pedro, there were no stories of
18 boating on it. *Id.*

19 80. Modern records and stories indicate that there has been infrequent recreational
20 boating on the San Pedro. *See* Fuller 1997, at 8-4.

21 81. A survey by the Central Arizona Paddlers Club found six reported accounts of
22 boating on the San Pedro between 1973 and 1992. *See* Fuller 1997, at G-7. The majority of
23 the trips occurred during August, when monsoon season brings rain to Southern Arizona. *See*
24 *id.* at 8-4. The SLD consultant referred to these boating trips as “very opportunistic,”
25 describing that “boaters drive to a launching point on likely rain days, and ‘put in’ the water if
26 rain conditions favor runoff.” *Id.* at 8-5.

27

1 82. Despite these sporadic events, the Arizona State Parks Department has
2 classified the San Pedro not as a boating stream, but as a hiking or general recreation area.
3 *See Fuller 1997, at 8-5.*

4 83. The Commission received several written submissions by long-time residents of
5 the area stating that they had never seen, or even heard anyone talk about, any time in which
6 boats were used on the San Pedro. *See, e.g., Letter from Clea Curtis Brown (March 20, 2013)*
7 *[part of EI X003]; Letter from Bessie M. Shugart (April 23, 2013) [part of EI X003].*

8 84. The Commission finds, as a matter of fact, that, although there have been
9 isolated boating events on the San Pedro, the overwhelming weight of the evidence suggests
10 that the river is not and never was navigable. A handful of intermittent boating accounts in
11 recent history during the monsoon season does not make it more likely than not that the San
12 Pedro was navigated or susceptible to navigation, in its ordinary and natural condition, on
13 February 14, 1912.

14 85. The Commission received no evidence that anyone ever attempted to float logs
15 on the San Pedro for commercial purposes.

16 86. The Commission also finds, as a matter of fact, that the San Pedro would have
17 been used for navigation if it had been susceptible to navigation in its ordinary and natural
18 condition. The evidence presented to the Commission demonstrates that the San Pedro would
19 have been used to transport personnel, supplies, and ore if the San Pedro were susceptible to
20 navigation. *See generally Tr. at 8/1/13:174-181 (Burtell) and Tr. 8/2/13:112 (Gookin).* There
21 was a need to supply multiple military installations during a period in which the San Pedro
22 was in its ordinary and natural condition, and the military did use rivers to transport supplies
23 where it was feasible. *Tr. at 8/1/13:174-181 (Burtell).* For instance, supplies were shipped
24 from San Francisco and transported by boat up the Colorado River to Yuma and La Paz. *Id.*
25 However, from there, supplies were distributed to military installations overland via wagon
26 trains, not by watercraft. *Id.* Aside from use of the lower Colorado River, there is no record
27 of the military using the San Pedro or any other Arizona stream as a means to transport

1 supplies to its various installations. *Id.* The record indicates that supplies were transported to
2 the military installations along the San Pedro during this period not by navigating the San
3 Pedro, but by traveling a road alongside the stream. *Id.*

4 87. There was also a need to transport supplies, equipment, and ore in connection
5 with the mining activity that began in the late 1800s, but there is no evidence that the San
6 Pedro was ever navigated for these purposes. *See, e.g.,* Tr. at 8/2/13:112-13.

7 **CLIMATE OF THE SAN PEDRO RIVER VALLEY**

8 88. The climate of the San Pedro River Valley is typical of a desert climate, with
9 violent summer thunderstorms and sporadic rain in the winter, rather than the type of weather
10 that would produce a regularly flowing stream. *See* Fuller 1997, at 5-4.

11 89. The San Pedro River Valley is semi-arid. *See* Fuller 1997, at 5-4. Precipitation
12 occurs mainly “during the summer when moisture entering Arizona from the south triggers
13 convective thunderstorms.” *Id.* at 5-5. During some years, intense rains hit the valley during
14 September and October “that commonly result in heavy rain and flooding.” *Id.*

15 **HYDROLOGY OF THE SAN PEDRO**

16 90. The hydrologic character of the San Pedro precludes it from being susceptible to
17 navigation. Prior to statehood, the average flow rates at the Charleston station from 1904 to
18 1906 varied from 3 cubic-feet per second (“cfs”) in June to 233 cfs in August. *See* Fuller
19 1997, at 7-13; *see also* Burtell 2013, ¶ 16, at 3; Tr. at 8/1/13:75 (Hjalmarson) (referring to
20 “pretty large” range of flows and variability); Tr. at 8/1/13:96 (Hjalmarson) (agreeing that, in
21 predevelopment conditions, San Pedro flows were “extreme and variable”); Tr. at 8/1/13:166
22 (Burtell).

23 91. This extreme variation in the monthly average flow demonstrates the volatility
24 of the San Pedro. *See* Fuller 1997, at 7-13. There was limited hydrologic data at or before
25 statehood, and no streamflow measurements during February 1912. *Id.* at 7-5.

26 92. Mr. Burtell presented data regarding median monthly flows measured at the
27 Charleston gage from 1904 to 1911 and flow measurements taken periodically at a gage near

1 Fairbank in 1912. *See* Burtell 2013, ¶ 16, at 3 & Table 2. While diversions for farming had
2 begun by this time in some locations along the San Pedro, Mr. Burtell was able to determine
3 that an insignificant number of acres were being farmed upstream of the Charleston gauge,
4 and the diversions that impacted the flows at the Fairbank gauge were accounted for by the
5 USGS in its adjusted data. Tr. at 8/1/13:163-66 (Burtell). Accordingly, these data represent
6 the San Pedro in its ordinary and natural condition. *Id.* In sixteen of the forty months with
7 data, channel depths at Charleston prior to statehood were typically less than one foot. *Id.*;
8 Burtell 2013, ¶ 16, at 3 & Table 2.

9 93. Mr. Burtell testified, not only do these data independently depict a stream that is
10 not susceptible to commercial navigation in its ordinary and natural condition, “they
11 substantiate and verify the historic accounts,” which “paint a picture of a very shallow stream
12 at various seasons of the year. These stream flow data support that and are very consistent
13 with that.” Tr. at 8/1/13:169 (Burtell).

14 94. Mr. Burtell testified further that “more times than not, the flows that were
15 recorded at these gages were more on the order of 20 CFS.... [T]here are some court cases
16 where other streams have been deemed non-navigable. And when you compare the amount
17 of flow in those streams that were not navigable to the amount of flow in the San Pedro, it’s
18 almost laughable. Streams that were deemed non-navigable have thousands of CFS of flow.”
19 Tr. at 8/1/13: 166-67 (Burtell). Mr. Burtell described the Special Master’s findings that
20 resulted in a determination that the San Juan River was not navigable in its ordinary and
21 natural condition when Utah was admitted to the union in 1896. It was determined that the
22 San Juan River had a daily discharge that exceeded 1,000 CFS for 284 days per year, and had
23 depths between one and three feet “for 219 days” each year, and for the other “146 days a
24 depth of over three feet.” *See* 1930 Special Master’s Report [EI X012] at pp. 167-68; *see also*
25 *id.* at pp. 169, 180.

26 95. The evidence demonstrates that the determination that the San Juan was non-
27 navigable despite discharges and depth of significantly greater magnitude than the San Pedro

1 is consistent with other navigability determinations in other navigability for title cases
2 concerning the equal-footing doctrine. *See, e.g.*, Selected U.S. Watercourses submitted by
3 SRP [EI X006] at summary page for each watercourse listing various information including
4 discharge figures.

5 96. Fuller examined a variety of stream flow data collected after the Charleston and
6 Fairbank data discussed by Mr. Burtell. Based upon estimates from one of four USGS stream
7 gages at Charleston, the average flow rate of February 1912 was 28 cfs. *See Fuller 1997*, at 7-
8 5. The 1912 depths at Charleston correspond to water depths of less than one foot. *See*
9 Burtell 2013, ¶ 18, at 3 & Table 2.

10 97. At the time of statehood, the Upper San Pedro at St. David had an estimated
11 median depth of half a foot and median width of ten feet. *See Fuller 1997*, at 7-21.
12 Furthermore, “portions of the San Pedro River were periodically dry or experienced low flows
13 due to irrigation diversions” when Arizona became a state in 1912. *Id.*

14 98. Following statehood, streamflow data is more reliable and documented, because
15 there are nine gaging stations on the San Pedro. Table 7-5 of the Fuller 1997 report
16 summarizes monthly and average annual flow rates gathered from stream gage data. *See*
17 Fuller 1997, at 7-9. For all stations documented, there is not one with an average annual flow
18 of greater than 60 cfs. *Id.* These flow rates correspond to water depths of less than one foot.
19 *See Burtell 2013*, ¶ 19, at 3 & Table 3.

20 99. The data demonstrates that higher flow rates (*i.e.*, between 100 and 200 cfs)
21 occur only during the monsoon season of July and August. *See Fuller 1997*, at 7-9. At some
22 points in the year (during April and May), at least one of the gages had absolutely no
23 streamflow. *Id.*; *see also Burtell 2013*, ¶ 16, at 3; *id.* ¶ 22, at 4.

24 100. The SLD consultant concluded that the water flows are “highly variable, with
25 the major component of flow resulting from direct response to precipitation.” *See Fuller*
26 1997, at 7-10; *see also Tr.* at 6/7/13:163-64 (Hjalmarson). Due to the radical changes in
27

1 streamflow, no one could rely on the San Pedro as a regular source of transportation or
2 commerce.

3 101. Floods have affected the average of streamflow rates on the San Pedro.
4 Historically, large floods began in the 1880s and 1890s and arroyo cutting began thereafter.
5 See Fuller 1997, at 3-12; see also Michelle Lee Wood, *Historical Channel Changes Along the*
6 *Lower San Pedro River*, at 1 (August 1997) [copies attached as Appendix L to both EI 6 and
7 EI 16] (“Wood 1997”); Tr. at 6/7/13:34 (Hjalmarson).

8 102. The 1890 flood has been referred to as causing the “death of the San Pedro
9 River” because it “removed or drained numerous swampland areas along its course.” See
10 Fuller 1997, at 7-19. The 1890 flood occurred due to several monsoon rains in late July and
11 early August and caused extensive entrenchment on some parts of the San Pedro. See Gookin
12 2013, at 68-70.

13 103. Floods prior to statehood largely contributed to the entrenchment of the San
14 Pedro. See Fuller 1997, at 5-11; see also Findings of Fact Nos. 101-02, 127, 129.

15 104. Typically, the flood streamflow rates range from 31,000 cfs up to 135,000 cfs.
16 See Fuller 1997, at 5-11. The influx of water due to flooding has likely skewed average flow
17 rates upward. *Id.*

18 **GEOMORPHOLOGY OF THE SAN PEDRO**

19 105. The geomorphologic evidence indicates that the San Pedro was not susceptible
20 to navigation in its ordinary and natural condition. The upper reach had a partly perennial and
21 partly intermittent flow, and the lower reach had an entrenched, broad, and braided channel
22 with only isolated reaches of perennial flow. See Fuller 1997, at 7-1; Wood 1997, at 35; Tr. at
23 8/2/13:143-46, 173 (Gookin); see also Gookin 2013, at 75; Tr. at 8/1/13:40 (Hjalmarson:
24 “There are possible multiple channels in a meandering river like the San Pedro. You can get
25 reaches where you have braided flow, for example. . . .”).

1 106. Both the upper and lower reaches experienced channel entrenchment and
2 widening during exploration and settlement of the San Pedro Valley in the last half of the 19th
3 century. *See Fuller 1997, at 5-17.*

4 107. At the time of statehood, the upper reach was a “braided channel [that]
5 meandered within the confines of the arroyo banks.” *See Fuller 1997, at 5-15.*

6 108. Modern geomorphologic characteristics demonstrate that the San Pedro is not
7 susceptible to navigation. The upper reach of the San Pedro is characterized by a “variably
8 entrenched channel” and “coarse-grained point bars that deflect streamflow.” *See Fuller*
9 *1997, at 5-7.* The channel also is described as “both braided and meandering: the low flow
10 channel is braided with several branching channels, but the high flow channel is sinuous.” *Id.*

11 109. The lower reach of the San Pedro has a wide, entrenched channel. *See Fuller*
12 *1997, at 5-8.*

13 110. The geomorphologic descriptions of the river highlight characteristics not
14 susceptible to navigation in its ordinary and natural condition. *See Findings of Fact Nos. 105-*
15 *09.*

16 111. Mr. Hjalmarson relied upon a mathematical model involving a series of
17 calculations to attempt to determine the depth of the San Pedro in its ordinary and natural
18 condition. *See Tr. at 6/7/13:97-108 (Hjalmarson).* His calculations were based upon the
19 assumption that any river with a minimum depth of one foot was navigable. *See Tr. at*
20 *6/7/13:46 (Hjalmarson); Tr. at 8/1/13:100 (Hjalmarson).* On cross-examination, however, he
21 conceded that, in addition to a minimum depth, several other physical characteristics can
22 affect navigability, such as braided channels, sandbars, and beaver dams. *See Tr. at*
23 *6/7/13:51-52, 151-53, 172, 186 (Hjalmarson).*

24 112. Mr. Hjalmarson assumed that one foot of maximum depth was sufficient for
25 navigability in reliance upon a set of recreational boating standards specifying the minimum
26 depths required for modern recreational canoes. *See, e.g., PowerPoint, Exh. X004, at 143*
27 *(chart showing required depths for recreational craft) (relying on Hyra, R., 1978, Methods of*

1 assessing instream flows for recreation: Instream Flow Information Paper No. 6, U. S. Fish
2 and Wildlife Service and others).

3 113. Mr. Hjalmarson acknowledged that he made no effort to apply the conclusions
4 that he derived from his model to commercial uses or commercial watercraft. Tr. at 6/7/13/25
5 (Hjalmarson).

6 114. Regarding his analysis, Mr. Hjalmarson stated: “The goal is for an accurate
7 analysis of the San Pedro River’s natural condition that recognizes that fine precision is
8 unlikely.” *See* Hjalmarson 2013, at 12; *see also* Tr. at 6/7/13:190-91 (Hjalmarson). During
9 his testimony, Mr. Hjalmarson agreed that his work involved, among other things, estimation
10 and extrapolation from other data. *See* Tr. at 6/7/13:138 (Hjalmarson).

11 115. The Commission finds, based upon the testimony and other evidence submitted
12 by the parties, that modeling was unnecessary because there is a significant amount of
13 historical empirical data that is more reliable and persuasive than a model lacking fine
14 precision and requiring estimations and extrapolations. *See, e.g.*, Tr. at 6/7/13:138 and 190-
15 91 (Hjalmarson) and 8/1/13:132-33 (Burtell). Furthermore, as addressed further below, the
16 Commission finds that Mr. Hjalmarson’s model is flawed in multiple respects and does not
17 calibrate to actual empirical data, and that the model is therefore unreliable.

18 116. Mr. Hjalmarson’s analysis and opinions are based upon the assumption that the
19 San Pedro has a smooth, uniform parabolic channel. *See* Hjalmarson 2013, at 122; Tr. at
20 6/7/13:102-03, 150-51 (Hjalmarson); Tr. at 8/1/13:102-05 (Hjalmarson). The other evidence
21 submitted to the Commission showed that this is not a valid assumption for the San Pedro,
22 either in its ordinary and natural condition or otherwise. *See, e.g.*, Tr. at 6/7/13:150-52
23 (Hjalmarson); Tr. at 8/1/13:102-05 (Hjalmarson).

24 117. Mr. Hjalmarson’s opinions were limited to a hypothetical cross-section of the
25 San Pedro at a theoretical point in time. *See* Tr. at 8/1/13:102-05 (Hjalmarson). His
26 technique did not examine the characteristics of the channel over any length upstream or
27 downstream. *See* Tr. at 8/1/13:102-03 (Hjalmarson). His analysis did not consider the

1 presence of rapids, riffles, sandbars, or other natural physical impediments. *See* Tr. at
2 8/1/13:105-08 (Hjalmarson).

3 118. During the 2013 Hearing, Mr. Hjalmarson agreed that the required draft for a
4 boat would depend upon the size of the occupants. *See* Tr. at 6/7/13:47-48, 50 (Hjalmarson).

5 119. Mr. Burtell presented several criticisms of Mr. Hjalmarson's analysis. *See*
6 *generally* Tr. at 8/1/13:125, 132-33. Those criticisms included, among other things:

7 a. Mr. Hjalmarson used erroneous discharge figures as inputs for his model.
8 For discharge at Charleston, Mr. Hjalmarson's analysis double-counted some of the San
9 Pedro flows. *See* Tr. at 8/1/13:219 (Burtell). For discharge at Winkelman, Mr. Hjalmarson
10 disregarded the Winkelman discharge figure set forth in the Krug Report, a figure that was
11 already corrected for diversions, and instead combined discharges from two separate sub-
12 watersheds that resulted in a significantly inflated discharge. *See, e.g.*, 8/1/13:221-224
13 (Burtell).

14 b. Mr. Hjalmarson input his discharge figures into an equation for
15 determining the width of the active channel, and Mr. Burtell described how the width
16 equation significantly underestimates the width of the active channel. Tr. at 8/1/13:227-235
17 (Burtell). Mr. Burtell was able to clearly establish this inaccuracy in the equation by referring
18 to the compilation of cross-sectional data including discharges and widths contained in the
19 Fuller Report. *Id.* Mr. Burtell was readily able to calibrate the width equation using this real
20 world empirical data. *Id.* Mr. Burtell performed a series of comparison calculations that
21 demonstrated that Mr. Hjalmarson's width equation significantly underestimates the actual,
22 measured width. *Id.* By underestimating width – i.e. constraining the same amount of
23 discharge to a narrower cross-section – Mr. Hjalmarson necessarily overstated the depth. *Id.*

24 c. The method used by Mr. Hjalmarson assumes a uniform parabolic cross-
25 section, whereas the historical evidence shows that the channel was neither uniform nor
26 parabolic in its ordinary and natural condition. *See* Tr. at 8/1/13:236 (Burtell). The evidence
27 presented to the Commission demonstrates that each cross-section varies considerably from

1 the next, and that there is no typical or “representative” cross-section for the San Pedro. *Id.*;
2 2004 Fuller at Appendix E. Mr. Hjalmarson conceded that his conceptual cross-section does
3 not exist anywhere along the San Pedro River. Tr. at 6/7/13:104-05 (Hjalmarson). The
4 Commission finds that this parabolic depth equation cannot be used to reliably calculate the
5 maximum depth of a variable and non-parabolic stream channel such as the San Pedro.

6 d. Mr. Hjalmarson’s analysis assumes that the deepest part of the channel is
7 exactly in the middle of the river, and that was not uniformly true for the San Pedro in its
8 ordinary and natural condition. See Tr. at 8/1/13:238-39 (Burtell). To the contrary, the
9 evidence reflects that the San Pedro’s channel is highly variable, and navigability is
10 undermined when conditions require the person to be able to ascertain precisely where the
11 deepest point of the channel resides. Tr. at 8/1/13:236-241.

12 e. From a scientific perspective, when employing a model it is important to
13 calibrate the results to evaluate whether the model renders reliable results, yet, as Mr. Burtell
14 described, Mr. Hjalmarson did not make appropriate efforts to calibrate is model. Tr. at
15 8/1/13:241-48, 261 (Burtell). In the absence of appropriate calibration by Mr. Hjalmarson,
16 Mr. Burtell attempted his own calibration, which he memorialized in a document titled
17 *Comparison between Historic Observations of the San Pedro River Stream Flow Conditions*
18 *and Hjalmarson’s Estimates of Predevelopment Flows*, which is part of EI X012. Tr. at
19 8/1/13:241-250 (Burtell). Mr. Burtell compared actual empirical evidence of stream
20 conditions drawn from the historic accounts to the outputs that would result from Mr.
21 Hjalmarson’s model. *Id.* Mr. Burtell found that, without exception, Mr. Hjalmarson’s
22 approach overestimates the stream discharge and thereby overstates depths. *Id.*

23 f. Mr. Burtell also described how the several lines of independent evidence
24 showing that the San Pedro was not perennial throughout in its ordinary and natural condition
25 demonstrated further that Mr. Hjalmarson’s model did not calibrate, as his model yielded flow
26 duration curves that reflected a perennial stream in contrast to the San Pedro’s true condition.
27 Tr. at 8/1/13:188-193, 250-56, 259-261; Hydrologic Atlas 664 [Exh. X012] at Plate 3.

1 g. Moreover, Mr. Hjalmarson's analysis focused only on depth, and many
2 other factors can affect navigability. See Tr. at 8/2/13:64 (Burtell). Mr. Hjalmarson's work
3 ignored these other factors. *Id.*

4 h. Because actual historical accounts exist during a period when the San
5 Pedro was in its ordinary and natural condition, Mr. Hjalmarson's hypothetical model was not
6 necessary. See Tr. at 8/2/13:10 (Burtell).

7 120. Mr. Gookin presented several criticisms of Mr. Hjalmarson's analysis, which he
8 referred to as the "channel geometry method." See Gookin 2013, at 85; Gookin 2013,
9 Appendix A, at 21-22. Those criticisms included, among other things:

10 a. The method used by Mr. Hjalmarson is useful only with regard to "[a]
11 straight, narrow reach in which flows are approximately uniform." See Gookin 2013, at 85.
12 Those characteristics did not exist on the San Pedro in its ordinary and natural condition. *Id.*

13 b. The equations Mr. Hjalmarson used should not be applied to braided
14 channels such as the San Pedro. See Gookin 2013, at 87.

15 c. The method used by Mr. Hjalmarson assumes a large amount of clay on
16 the river banks, and the San Pedro does not have much clay. See Gookin 2013, at 88; Tr. at
17 8/2/13:130-32 (Gookin).

18 d. The method used by Mr. Hjalmarson assumes a uniform parabolic cross-
19 section, and the historical accounts show that the San Pedro channel was neither uniform nor
20 parabolic in its ordinary and natural condition. See Gookin 2013, at 88; Tr. at 8/2/13:106, 157
21 (Gookin).

22 e. Mr. Hjalmarson's equations assume that the channel slopes are relatively
23 uniform, and the channel slopes on the San Pedro vary significantly. See Gookin 2013, at 89;
24 Tr. at 8/2/13:91, 134-36 (Gookin).

25 f. Mr. Hjalmarson's analysis ignores the presence of riffles, beaver dams,
26 and cienegas, all of which were present and abundant on the San Pedro in its ordinary and
27 natural condition. See Gookin 2013, at 90; Tr. at 8/2/13:91-92, 136-38 (Gookin).

1 21. The Commission appreciates the substantial effort that Mr. Hjalmarson spent in
2 attempting to analyze the depth of the San Pedro in its ordinary and natural condition. The
3 Commission finds, however, as a matter of fact, that (a) his conclusions are contrary to the
4 numerous historical observations of the river in its ordinary and natural condition and (b) even
5 aside from this contrary evidence, the methodological limitations and assumptions necessary
6 for his techniques show that his analysis does not support his conclusions regarding the
7 estimated depth of the San Pedro for any substantial portion of its course in its ordinary and
8 natural condition.

9 **ORDINARY AND NATURAL CONDITION**

10 22. The evidence presented to the Commission showed that the 1840s up to the
11 1870s was a time in which there were few, if any, diversions affecting the San Pedro, and the
12 river was therefore in its ordinary and natural condition. Prior to that time period, the region
13 was inhabited by Sobaipuri Indians and Spanish and Mexican settlers that diverted water from
14 the San Pedro for farming. However, Apache Indians increased their presence in the area in
15 the late 1700s, leading to the departure of the Sobaipuri, and by the 1840s the Spanish and
16 Mexican settlements in the San Pedro watershed were also abandoned. The Apaches largely
17 controlled the area until the 1870s after military camps were established along the San Pedro.
18 Only then did settlers resume diverting water for farming. *See* Tr. at 8/1/13:134-136 and 174-
19 179 (Burtell). The evidence indicates that the Apaches engaged in little, if any, farming
20 during this time. *See* Tr. at 8/1/13:248-250 (Burtell).

21 23. Evidence was presented concerning the existence of herds of cattle along the
22 San Pedro. The evidence indicates that these herds dwindled significantly after Cook's
23 account in 1846 and that, even if the herds remained throughout the time in which the historic
24 accounts were made, their impacts on the stream, *e.g.*, through consumption of water from the
25 stream, were essentially *de minimis* and did not materially impact the historic accounts made
26 during the 1850s. *Desert Plants Special Issue* by Dean Hendrickson and W.L. Minckley,
27 from Vera Kornylak, March 10, 2003 [EI 12] at 144; Tr. at 8/1/13:212-15 (Burtell).

1 124. The Commission finds that the period from the 1840s to the 1870s represents a
2 time when the San Pedro was in its natural and ordinary condition.

3 125. The evidence presented to the Commission demonstrates that the first
4 significant irrigation by settlers on the San Pedro began at St. David in the 1870s. *See* Tr. at
5 8/2/13:16-18 (Burtell); Griffin Materials [*Towns Throughout the San Pedro River Valley*, at
6 21]. The Commission finds, as a matter of fact, that the San Pedro was in its ordinary and
7 natural condition downstream from St. David until the 1870s. Accordingly, for that reach of
8 the river, the Commission finds the historical accounts prior to the 1870s more indicative of
9 the ordinary and natural condition than accounts occurring thereafter. Although the
10 Commission has reviewed and considered those later accounts, it has given them less weight
11 than the earlier accounts.

12 126. The evidence presented to the Commission showed that, generally beginning
13 about the 1880s, the channel of the San Pedro began to down-cut and entrench, resulting in a
14 narrower, more defined channel than existed immediately prior to that time. *See* Findings of
15 Fact Nos. 49-55.

16 127. Much evidence was presented in the 2013 Hearing regarding the potential
17 causes of this down-cutting and entrenchment, including, among others, climate change; an
18 earthquake in Sonora, Mexico in 1887; floods in the 1890s; and cultural effects from grazing
19 and timber harvesting. *See, e.g.*, Burtell 2013, ¶ 9, at 2; Gookin 2013, at 50; Tr. at
20 8/2/13:143-45 (Gookin).

21 128. Mr. Hjalmarson stated his opinion that “much of the change [in the San Pedro]
22 probably resulted from human activity going back 300 years or more—even to 1697.” *See*
23 Hjalmarson 2013, at 7.

24 129. On cross-examination, Mr. Hjalmarson acknowledged that at least a portion of
25 the arroyo cutting and incision that occurred on the San Pedro in the 1880s likely was caused
26 by factors other than human activity. *See* Tr. at 6/7/13:123 (Hjalmarson).

27

1 130. In their 2009 book on the San Pedro, Stromberg and her co-authors stated: “To
2 date, no single explanation satisfies widespread and almost synchronous arroyo formation
3 around the turn of the century. . . . Surprisingly, attempts to explain arroyos far outnumber
4 efforts to characterize their initiation and subsequent history.” *See* Stromberg 2009, at 232.

5 131. Stromberg and her co-authors opined that the causes of down-cutting and
6 entrenchment are often impossible to determine: “Rivers like the San Pedro are complex,
7 open systems that adjust channel size, shape, and configuration in response to changes in
8 runoff and sediment yield from drainage basins. Such changes can have multiple causes, and
9 it may not be possible to determine to what degree river metamorphosis is human induced. . . .
10 Because fluvial systems are naturally prone to change due to climate variability and intrinsic
11 geomorphic processes, it is difficult to quantify the degree to which humans have caused past
12 and present transformations of the San Pedro River.” *See* Stromberg 2009, at 259, 266-67.

13 132. Mr. Huckleberry concluded in his 1996 USGS report that the driving force
14 behind the down-cutting and entrenchment on the San Pedro was “probably not
15 anthropogenic” (i.e., not “relating to, or resulting from the influence of human beings on
16 nature,” *Merriam-Webster’s Collegiate Dictionary* 53 (11th ed. 2005)). *See* Huckleberry
17 1996, at 16; *see also* Tr. at 8/1/13:137-39, 144-46 (Burtell).

18 133. Mr. Gookin opined that the changes in channel shape on the San Pedro in the
19 late 1800s were “[n]ot a unique nor a human-caused event.” *See* Gookin 2013, at 50; Tr. at
20 8/2/13:133, 140, 143-45 (Gookin).

21 134. Based upon the evidence presented to it, the Commission finds that the down-
22 cutting and entrenchment of the San Pedro in the 1880s was not caused exclusively or
23 primarily by human activities. Based upon the evidence presented, the Commission cannot
24 determine precisely what portion, if any, of that down-cutting and entrenchment was caused
25 by human activities. The Commission finds, as matter of fact, that the down-cutting and
26 entrenchment were, at least in large part, a result of natural occurrences on the San Pedro.
27

1 See, e.g., Tr. at 8/1/13:144-51 (Burtell); Tr. at 8/2/13:45-48 (Burtell); Griffin Materials [*The*
2 *Changing Mile*, at 5]; see also Findings of Fact Nos. 126-133.

3 135. Thus, as a matter of fact, the Commission finds that, with respect to channel
4 size and shape, the historical accounts of the San Pedro from both before and after 1880 are
5 persuasive evidence of the river's ordinary and natural condition.

6 136. The evidence presented to the Commission showed that no significant irrigation
7 diversions by settlers existed upstream from St. David. See Tr. at 8/1/1:164-65 (Burtell); Tr.
8 at 8/1/13:16-22, 43 (Burtell). The Commission finds, as a matter of fact, that the San Pedro
9 River remains in its ordinary and natural condition upstream from St. David.

10 **SEGMENTATION**

11 137. As part of the 2013 Hearing, the Commission examined whether the San Pedro
12 should be divided into segments for purposes of determining its navigability, under the
13 criteria set forth by the United States Supreme Court in *PPL Montana*, 132 S. Ct. at 1215.

14 138. The SLD consultants divided the San Pedro River into separate reaches due to
15 the San Pedro's "somewhat distinct" hydrologic conditions: (1) the Upper San Pedro from
16 the Mexican border to the "Narrows," a bedrock constriction located between the foothills of
17 the Rincon Mountains and the Little Dragoon Mountains; and (2) the Lower San Pedro from
18 the Narrows to the confluence with the Gila River. See Fuller 2004, at 7-1.

19 139. In its 2008 decision, although the Commission considered the San Pedro as
20 "one entire watercourse" for administrative and hearing purposes, it also evaluated the two
21 distinct reaches of the San Pedro "based on environmental, archaeological and geomorphic
22 characteristics." See ANSAC 2008, at 4. Like the Fuller 2004 report, the Commission
23 separated the Upper and Lower San Pedro reaches at the Narrows. See ANSAC 2004, at 5.

24 **BOATS AVAILABLE AT THE TIME OF STATEHOOD**

25 140. ACLPI submitted excerpts from a 1912 Sears & Roebuck catalog showing boats
26 available for purchase. See Excerpts from *Sears, Roebuck and Co. Catalog (1912)* [part of EI
27 X002]. That catalog contains three boats, including (a) a flat-bottom fishing boat made of oak

1 and spruce and ranging between thirteen and sixteen feet long and between forty and forty-
2 four inches wide; (b) a fifteen-foot “smooth silk double pointer boat” made of cedar or
3 cypress that was forty-two inches wide; and (c) a square-stern “clinker” row boat, also made
4 of cedar or cypress, ranging in width from forty-two to forty-four inches. *Id.* The evidence
5 submitted does not specify the draft of each boat. *Id.*

6 141. Mr. Gookin stated that, in order to be deemed suitable for navigation, the draft
7 of a boat would need to be no more than seventy-five percent of the depth of the river. *See*
8 *Gookin 2013*, at 101 & Appendix A, at 23-24.

9 142. Mr. Gookin also noted that birch bark cedar canoes, canvas canoes, and dugout
10 canoes were much more fragile than modern recreational canoes. 8/2/13:177-78. The
11 Commission finds that birch bark cedar canoes, canvas canoes, and dugout canoes could not
12 have safely and reliably overtopped the numerous beaver dams that existed through the San
13 Pedro in its ordinary and natural condition.

14 143. Based upon the entirety of the evidence submitted, the Commission finds, as a
15 matter of fact, that none of the boats listed in the 1912 Sears & Roebuck catalog could have
16 traversed up or down any significant stretch of the San Pedro in its ordinary and natural
17 condition.

18 CONCLUSIONS OF LAW

19 THE PUBLIC TRUST AND EQUAL FOOTING DOCTRINES

20 1. Under the “public trust doctrine,” the sovereign is generally considered to hold
21 the beds of “navigable” watercourses in trust for the benefit of the public. *See Arizona Center*
22 *for Law in the Public Interest v. Hassell*, 172 Ariz. 356, 359, 837 P.2d 158, 161 (App. 1991)
23 (“*Hassell*”).

24 2. This doctrine has origins in English common law, and when the original thirteen
25 states gained their independence from England, they succeeded to this sovereign public trust
26 interest for certain lands underlying navigable watercourses within their respective
27 boundaries. *Hassell*, 172 Ariz. at 359, 837 P.2d at 161.

1 3. The United States Supreme Court has held, under the “equal footing doctrine,”
2 that as new states were admitted to the Union, they took title to the beds of navigable
3 watercourses within their boundaries to the same extent as the original thirteen states.
4 *Hassell*, 172 Ariz. at 359, 837 P.2d at 161 (citing *Pollard’s Lessee v. Hagan*, 44 U.S. (3
5 How.) 212 (1845)).

6 **PRIOR PROCEEDINGS ON NAVIGABILITY**

7 4. In 1865, the Arizona Territorial Legislature declared the Colorado River to be
8 “navigable.” See Memorial of the Legislature of Arizona, 38th Cong., 2nd Sess., Mis. Doc.
9 No. 17 (January 25, 1865). The Territorial Legislature, in its first session, expressly held that
10 “the Colorado river is the only navigable water in this Territory” *Id.*

11 5. For the next 120 years, the public trust and equal footing doctrines were neither
12 discussed nor asserted in Arizona. Then, in 1985, the State Attorney General’s Office, in
13 litigation concerning a stretch of the Verde River, asserted an equal footing ownership claim
14 to the bed of a watercourse other than the Colorado. *Land Dep’t v. O’Toole*, 154 Ariz. 43, 46,
15 739 P.2d 1360, 1363 (App. 1987).

16 6. Subsequently, various State officials alleged that the State might hold title to
17 certain lands in or near other watercourses as well. *Id.* at 44, 739 P.2d at 1361. The State’s
18 assertion of these claims upset long-held assumptions concerning private ownership of lands
19 in or near other watercourses and cast into doubt the title to more than 40,000 separate parcels
20 of property. *Hassell*, 172 Ariz. at 359, 362, 837 P.2d at 161, 164. In Maricopa County alone,
21 the property in question was estimated to be worth “hundreds of millions, if not billions of
22 dollars” *O’Toole*, 154 Ariz. at 45, 739 P.2d at 1362.

23 7. In response to uncertainty caused by the State’s assertion of “public trust”
24 claims, the Legislature enacted House Bill 2017 in 1987. 1987 Ariz. Sess. Laws, ch. 127
25 (“1987 Act”). Under the 1987 Act, the State issued a blanket quitclaim of any public trust
26 interest it might have to lands in the beds of all watercourses in the state other than the
27 Colorado, Gila, Salt, and Verde Rivers. The 1987 Act also provided a process by which the

1 record title holders of lands in the beds of the Gila, Salt, and Verde Rivers could obtain
2 quitclaim deeds for these lands upon payment of a small fee. *See Hassell*, 172 Ariz. at 360,
3 837 P.2d at 162.

4 8. The Arizona Center for Law in the Public Interest (“ACLPI”) commenced an
5 action challenging the constitutionality of the 1987 Act. After the trial court entered summary
6 judgment in favor of the defendants, the Arizona Court of Appeals held that the 1987 Act
7 violated the public trust doctrine and the Gift Clause of the Arizona Constitution. *See*
8 *Hassell*, 172 Ariz. at 361, 837 P.2d at 163; Ariz. Const. art. 9, § 7. The court held that the
9 Gift Clause required a two-part test to determine whether the Legislature had acted properly
10 in passing the 1987 Act. 172 Ariz. at 367, 837 P.2d at 169. The court stated that, to uphold
11 the disclaimer of a potential claim by the State against a Gift Clause challenge, the reviewing
12 court must determine: (1) that the disclaimer was designed to serve a “public purpose”; and
13 (2) that the State has received “consideration” that is not “so inequitable and unreasonable
14 that it amounts to an abuse of discretion, thus providing a subsidy to the private entity” that
15 benefits from the disclaimer. *Id.*

16 9. The *Hassell* court found that the 1987 Act satisfied the first part of the test, i.e.,
17 that the enactment served a valid public purpose. Specifically, the court noted that the 1987
18 Act was “enacted in response to a valid legislative concern with the unsettling of record title
19 to extensive landholdings throughout the state.” *Id.* at 369, 837 P.2d at 171. The court found,
20 however, that the 1987 Act failed the second part of the test because “the legislature acted
21 without particularized information, and established no mechanism to provide particularized
22 information, to support even an estimate of the value of those claims.” *Id.* On this point, the
23 court stated:

24 We do not suggest that a full-blown judicial determination of historical
25 navigability and present value must precede the relinquishment of any state
26 claim to a particular parcel of riverbed land. An administrative process might
27 reasonably permit the systematic investigation and evaluation of each of the
state’s claims. Under the present act [HB 2017], however, we cannot find that

1 the gift clause requirement of equitable and reasonable consideration has been
2 met.

3 *Id.* at 370, 837 P.2d at 172.

4 10. Following *Hassell*, the Legislature again addressed this issue. 1992 Ariz. Sess.
5 Laws, ch. 297 ("1992 Act"). Among other things, the 1992 Act established this Commission,
6 a five-member commission appointed by the Governor. *See* former A.R.S. § 37-1121. The
7 charge given to the Commission by the 1992 Act was to conduct full evidentiary public
8 hearings across the state and to adjudicate the State's claims to ownership of lands in the beds
9 of watercourses. *See generally* former A.R.S. §§ 37-1122 to -1128.

10 11. The 1992 Act provided that the Commission would make findings of
11 navigability or non-navigability for each watercourse. *See* former A.R.S. § 37-1128(A).
12 Those findings were to be based upon the "federal test" of navigability in A.R.S. § 37-
13 1101(6). The Commission would examine the "public trust values" associated with a
14 particular watercourse only if and when it determined that the watercourse was navigable.
15 *See* former A.R.S. §§ 37-1123(A)(3), -1128(A).

16 12. The Commission began to take evidence on certain watercourses during the fall
17 of 1993 and spring of 1994. In light of perceived difficulties with the 1992 Act, the
18 Legislature revisited this issue during the 1994 session and amended the underlying
19 legislation. *See* 1994 Ariz. Sess. Laws, ch. 278 ("1994 Act"). Among other things, the 1994
20 Act provided that the Commission would make a recommendation to the Legislature, which
21 would then hold additional hearings and make a final determination of navigability by passing
22 a statute with respect to each watercourse. *See id.* The 1994 Act also established certain
23 presumptions of non-navigability and exclusions of some types of evidence. *See id.*

24 13. Based upon the 1994 Act, the Commission went forward with its job of
25 compiling evidence and making a determination of whether each watercourse in the state was
26 navigable as of February 14, 1912. The SLD issued technical reports on each watercourse,
27 and numerous private parties and public agencies submitted additional evidence in favor of or

1 opposed to navigability for particular watercourses. *See Defenders of Wildlife v. Hull*, 199
2 Ariz. 411, 416, 18 P.3d 722, 727 (App.), *reconsideration denied* (2001). The Commission
3 reviewed the evidence and issued reports on each watercourse, which were transmitted to the
4 Legislature. The Legislature then enacted legislation relating to the navigability of each
5 specific watercourse. *See id.*

6 14. The Court of Appeals struck down that legislation in its *Hull* decision, finding
7 that the Legislature had not applied the proper standards of navigability. 199 Ariz. at 427-28,
8 18 P.3d at 738-39.

9 15. In 2001, the Legislature again amended the underlying statute in another
10 attempt to comply with the court's pronouncements in *Hassell* and *Hull*. *See* 2001 Ariz. Sess.
11 Laws, ch. 166, § 1. The 2001 legislation now governs the Commission in making its findings
12 with respect to the San Pedro.

13 16. Following completion of the 2003-04 Hearings, the Commission issued its
14 report, findings, and determination. *See* ANSAC 2008. In that report, the Commission stated,
15 among other things: "[T]he Commission, pursuant to A.R.S. § 37-1128A, finds and
16 determines that the San Pedro River in Cochise, Pima, and Pinal Counties, Arizona, was not
17 navigable as of February 14, 2012." *Id.* at 28.

18 17. The Defenders of Wildlife, Donald Steuter, Jerry Van Gasse, and Jim Valler
19 filed a judicial appeal of the Commission decision on the San Pedro in the Pima County
20 Superior Court, captioned as *Defenders of Wildlife, et al. v. Arizona Navigable Stream*
21 *Adjudication Comm'n*, Case No. C20073884 ("*Defenders of Wildlife v. ANSAC*"). In that
22 action, the plaintiffs challenged the Commission's determination that the San Pedro was not
23 navigable.

24 18. Proceedings in *Defenders of Wildlife v. ANSAC* were stayed while the appellate
25 courts considered a prior challenge to the Commission's decision on the Lower Salt River in a
26 case captioned as *State of Arizona, acting by and through Mark Winkleman, State Land*
27 *Commissioner, and the Arizona State Land Department v. Arizona Navigable Stream*

1 *Adjudication Comm'n*, Maricopa County Superior Court Case No. LC2006-000413-001DT
2 (*State v. ANSAC*).

3 19. The Arizona Court of Appeals issued its opinion in *State v. ANSAC* in 2010.
4 *State v. Arizona Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 229 P.3d 242 (App.
5 2010).

6 20. Relying in large part upon the dictionary definition of “natural,” the court found
7 that the Lower Salt River must be considered as if it were “untouched by civilization.” *State*
8 *v. ANSAC*. at 241, 229 P.3d at 253. The court stated: “[W]e conclude that ANSAC was
9 required to determine what the River would have looked like on February 14, 1912, in is
10 ordinary (i.e., usual, absent major flooding or drought) and natural (i.e., without man-made
11 dams, canals, or other diversions) condition.” *Id.*

12 21. Although the Court of Appeals determined that the Commission had taken into
13 consideration the impact of Roosevelt Dam on the character of the Lower Salt, *State v.*
14 *ANSAC*. at 240, 229 P.3d at 253, the court found insufficient evidence in the report to
15 conclude that the Commission also had considered the impact of other man-made dams and
16 diversions. *Id.*

17 22. Based upon the Court of Appeals’ opinion in *State v. ANSAC*, all parties agreed
18 that the issues relating to the six watercourses on which judicial appeals were then pending
19 (Lower Salt, Upper Salt, Gila, Verde, Santa Cruz, and San Pedro) should be remanded to the
20 Commission for further proceedings consistent with the appellate opinion.

21 23. The Commission’s 2013 Hearing on the San Pedro was the result of that
22 remand. *See Findings of Fact Nos. 6-13.*

23 **THIS COMMISSION’S ROLE**

24 24. Under the applicable statutes, the Commission has the exclusive jurisdiction to
25 determine which, if any, Arizona watercourses were “navigable” on February 14, 1912 and,
26 for any watercourses deemed navigable, to identify “public trust” values. *See A.R.S. § 37-*
27 *1123(G).*

1 25. The statutes direct the Commission to make a finding of navigability or non-
2 navigability for each watercourse “[b]ased only on evidence of navigability or non-
3 navigability.” A.R.S. § 37-1123(A).

4 26. The Commission’s statutory obligation for determining navigability, as
5 amended in 2001, is relatively succinct:

6 If the preponderance of the evidence establishes that the watercourse was
7 navigable, the commission shall issue its determination confirming that the
8 watercourse was navigable. If the preponderance of the evidence fails to
9 establish that the watercourse was navigable, the commission shall issue its
determination confirming that the watercourse in question was nonnavigable.

10 A.R.S. § 37-1128(A).

11 27. The statute defines “navigable” or “navigable watercourse” as:

12 A watercourse that was in existence on February 14, 1912, and at that
13 time was used or was susceptible to being used, in its ordinary and natural
14 condition, as a highway for commerce, over which trade and travel were or
15 could have been conducted in the customary mode of trade and travel on water.

16 A.R.S. § 37-1101(5).

17 28. “Highway for commerce” is defined as “a corridor or conduit within which the
18 exchange of goods, commodities or property or the transportation of persons may be
19 conducted.” A.R.S. § 37-1101(3).

20 29. The Arizona statutory definition is a codification of the “federal test” of
21 navigability first articulated by the United States Supreme Court in 1870 and applied by over
22 one hundred courts in the last 130 years:

23 Those rivers must be regarded as public navigable rivers in law which
24 are navigable in fact. And they are navigable in fact when they are used, or are
25 susceptible of being used, in their ordinary condition, as highways for
commerce, over which trade and travel are or may be conducted in the
customary modes of trade and travel on water.

26 *The Daniel Ball*, 77 U.S. (10 Wall.) 557, 563, 19 L.Ed. 999 (1870).

27 ...

1 **BURDEN OF PROOF**

2 30. The statute establishes the burden of proof as the “preponderance of the
3 evidence” and puts that burden on the proponents of navigability. *See* A.R.S. § 37-1128(A).
4 This allocation of the burden of proof is consistent with the pronouncements of the Arizona
5 courts. *See Hassell*, 172 Ariz. at 363 n.10, 837 P.2d at 165 n.10; *O’Toole*, 154 Ariz. at 46 n.2,
6 739 P.2d at 1363 n.2; *Hull*, 199 Ariz. at 420, 18 P.2d at 731; *State v. ANSAC*, 244 Ariz. at
7 238-39, 229 P.3d at 250-51.

8 31. Thus, if sufficient evidence is not presented to show navigability for a particular
9 watercourse, the Commission must find the watercourse non-navigable. The “preponderance
10 of the evidence” standard is commonly used in Arizona civil litigation, as opposed to the
11 higher burdens of proof imposed on the prosecution in criminal cases. The Revised Arizona
12 Jury Instructions (Civil), for example, contain a suggested statement to jurors regarding how
13 they should view this standard:

14 Burden of proof means burden of persuasion. On any claim, a party who
15 has the burden of proof must persuade you, by the evidence, that the claim is
16 probably more true than not true. This means that the evidence that favors that
17 party outweighs the opposing evidence. In determining whether a party has met
18 this burden, consider all the evidence that bears on that claim, regardless of
19 which party produced it.

20 RAJI (Civil) Standard 9 (1997).

21 32. The most commonly used legal dictionary contains the following definition of
22 “preponderance of the evidence”:

23 Evidence which is of greater weight or more convincing than the
24 evidence which is offered in opposition to it; that is, evidence which as a whole
25 shows that the fact sought to be proven is more probable than not. *Braud v.*
26 *Kinchen*, La. App., 310 So.2d 657, 659. With respect to burden of proof in civil
27 actions, means greater weight of evidence, or evidence which is more credible
and convincing to the mind. That which best accords with reason and
probability. The word “preponderance” means something more than “weight”;
it denotes a superiority of weight, or outweighing. The words are not
synonymous, but substantially different. There is generally a “weight” of
evidence on each side in case of contested facts. But juries cannot properly act

1 upon the weight of evidence, in favor of the one having the *onus*, unless it
2 overbear, in some degree, the weight upon the other side.

3 *Black's Law Dictionary* 1064 (5th ed. 1979).

4 33. The "preponderance of the evidence" standard is sometimes referred to as
5 requiring "fifty percent plus one" in favor of the party with the burden of proof. One could
6 imagine a set of scales. If the evidence on each side weighs exactly evenly, the party without
7 the burden of proof must prevail. In order for the party with the burden to prevail, sufficient
8 evidence must exist in order to tip the scales (even slightly) in its favor. *See generally United*
9 *States v. Fatico*, 458 F. Supp. 388, 403-06 (E.D.N.Y. 1978), *aff'd*, 603 F.2d 1053 (2d Cir.
10 1979), *cert. denied*, 444 U.S. 1073 (1980); *United States v. Schipani*, 289 F. Supp. 43, 56
11 (E.D.N.Y. 1968).

12 **ORDINARY AND NATURAL CONDITION**

13 34. The Arizona Court of Appeals in *State v. ANSAC*, 224 Ariz. at 230, 229 P.3d at
14 242, addressed what constitutes the "ordinary and natural condition" of a river for purposes of
15 the Arizona statute and the federal test of navigability.

16 35. In addressing what constituted the "ordinary and natural condition" of the
17 Lower Salt, the Court of Appeals first started with the time "before the Hohokam people
18 arrived many centuries ago and developed canals and other diversions that actively diverted
19 the River." *State v. ANSAC*, 224 Ariz. at 242, 229 P.3d at 254. Recognizing that "little if any
20 historical data exists from that period" and that the Lower Salt "largely returned to its natural
21 state" after the Hohokam disappeared, the court found that "the River could be considered to
22 be in its natural condition after many of the Hohokam's diversions had ceased to affect the
23 River, but before the commencement of modern-era settlement and farming in the Salt River
24 Valley. . . ." *Id.*

25 36. Although the Court of Appeals determined that "evidence from that early period
26 should be considered by ANSAC as the best evidence of the River's natural condition," 224
27 Ariz. at 242, 229 P.3d at 254, the court also recognized that evidence from later (or earlier)

1 periods could have probative value. *Id.* at 243, 229 P.3d at 255. Thus, this Commission has
2 authority to consider such evidence and to give it the appropriate weight. *Id.*

3 37. The *State v. ANSAC* court rejected arguments by the proponents of navigability
4 that any evidence dated after the commencement of man-made diversions should be thrown
5 out and disregarded. “Even if evidence of the River’s condition after man-made diversions is
6 not dispositive, it may nonetheless be informative and relevant.” *State v. ANSAC*, 224 Ariz. at
7 243, 229 P.3d at 255.

8 38. The Commission finds that the San Pedro upstream from St. David is, as a
9 practical matter, still largely in its ordinary and natural condition. *See* Findings of Fact Nos.
10 122-136. The Commission further finds that the San Pedro downstream from St. David was
11 in its ordinary and natural condition prior to the 1870s. *See* Findings of Fact Nos. 122-136.
12 After that time, diversions in and around St. David potentially had an impact on the reaches of
13 the river downstream.

14 **SEGMENTATION**

15 39. As discussed in Conclusions of Law Nos. 30-33 above, the Arizona courts have
16 held the proponents of navigability bear the burden of proving that a river is navigable.

17 40. The United States Supreme Court in *PPL Montana* found that proof of
18 navigability must be made on a “segment-by-segment” basis: “To determine title to a
19 riverbed under the equal-footing doctrine, this Court considers the river on a segment-by-
20 segment basis to assess whether the segment of the river, under which the riverbed in dispute
21 lies, is navigable or not.” 132 S. Ct. at 1229. Thus, the proponents of navigability must
22 demonstrate, by a preponderance of the evidence, that specific segments of a watercourse are
23 navigable.

24 41. The *PPL Montana* ruling on segmentation is consistent with the process set up
25 in the Arizona statutes and with what this Commission has done in the past. The relevant
26 statute defines “watercourse” as “the main body or a portion or reach of any lake, river, creek,
27 stream, wash, arroyo, channel or other body of water. . . .” *See* A.R.S. § 37-1101(11).

1 42. The Arizona statute authorizes this Commission to address watercourses in
2 segments (or “portions” or “reaches,” as used in the Arizona statute) rather than in their
3 entirety. *See* A.R.S. § 37-1101(11).

4 43. Despite the San Pedro being one of the most studied rivers in the Southwest, the
5 proponents of navigability have not shown that any segment of the river is navigable. *See*
6 Fuller 2004, at 9-2; ANSAC 2008, at 3; *see also generally* Findings of Fact. Thus, the
7 Commission has addressed the San Pedro as one entire river and has not received sufficient
8 evidence to divide the river into segments.

9 ACTUAL NAVIGATION ON THE SAN PEDRO

10 44. The Commission finds, as a matter of law and fact, that there is no evidence that
11 the San Pedro was ever used as a “highway for commerce.” Prehistoric research revealed
12 evidence of human populations in the area for over 11,000 years, yet no evidence of boating
13 on the San Pedro during the history of inhabitation of the area. *See* Findings of Fact Nos. 15-
14 19. Likewise, none of the historical research revealed that early explorers, missionaries,
15 trappers, or travelers in the San Pedro Valley ever used the river for boating or for commerce.
16 *See* Findings of Fact Nos. 20-48. There also was no evidence that logs had been floated down
17 the river. *See* Finding of Fact No. 85.

18 45. Although there is limited evidence of fishing on the San Pedro prior to
19 statehood, no evidence in the record supports a finding that boats were used. *See* Findings of
20 Fact Nos. 70-74.

21 46. The only evidence in the SLD’s report regarding any boating on the San Pedro
22 at or before the time of statehood is based upon an unsubstantiated, anecdotal story about a
23 ferry operation near Pomerene. *See* Findings of Fact Nos. 75-84.

24 47. Isolated post-statehood accounts of boating via low-draft boats, such as kayaks
25 and rafts, do not indicate that the San Pedro is navigable. Occasional use during exceptional
26 times does not support a finding of navigability. *United States v. Crow, Pope & Land Ents.,*
27 *Inc.*, 340 F. Supp. 25, 32 (N.D. Ga. 1972), *appeal dismissed*, 474 F.2d 200 (5th Cir. 1973)

1 (“The waterway must be susceptible for use as a channel of useful commerce and not merely
2 capable of exceptional transportation during periods of high water.”) (citing *Brewer-Elliott*
3 *Oil & Gas Co. v. United States*, 260 U.S. 77 (1922)).

4 48. Most of the handful of reports of recreational boating on the San Pedro from the
5 1970s to the 1990s occurred during the month of August, when monsoon season hits and
6 streamflows are typically higher due to the precipitation. See Finding of Fact No. 81.

7 49. The Commission received no credible evidence showing that the San Pedro was
8 ever used as a “highway for commerce,” over which trade and travel were conducted in the
9 customary mode of trade and travel on the water. See A.R.S. § 37-1101(5); see Findings of
10 Fact Nos. 84-87. The Commission thus finds, as a matter of law and fact, that the San Pedro
11 was never used for actual navigation, as defined in Section 37-1101(5).

12 **SUSCEPTIBILITY TO NAVIGATION**

13 50. Because the Commission has found, as matter of law and fact, that the San
14 Pedro was not actually used as a “highway for commerce,” the Commission can find the San
15 Pedro navigable only if the proponents of navigability have shown by a preponderance of the
16 evidence that the river was “susceptible” to such use.

17 51. The evidence in the record does not satisfy that standard. Evidence from the
18 San Pedro’s long history demonstrates it was not “a corridor or conduit within which the
19 exchange of goods, commodities, or property or the transportation of persons may be
20 conducted.” A.R.S. § 37-1103(3) (definition of “highway for commerce”).

21 52. While the absence of commercial navigation is not dispositive “where
22 conditions of exploration and settlement explain the infrequency or limited nature of such
23 use,” *United States v. Utah*, 283 U.S. 64, 82, 51 S. Ct. 438, 443 (1931), the evidence
24 presented to the Commission demonstrates that the San Pedro would have been used to
25 transport personnel and supplies if the San Pedro were susceptible to navigation. See
26 Findings of Fact Nos. 86-87. There was a need to supply multiple military installations
27 during a period in which the San Pedro was in its ordinary and natural condition, and the

1 military did use rivers to transport supplies where it was feasible. *Id.* For instance, supplies
2 were shipped from San Francisco and transported by boat up the Colorado River to Yuma and
3 La Paz. However, from there, supplies were distributed to military installations overland via
4 wagon trains, not by watercraft. *Id.* Aside from use of the lower Colorado River, there is no
5 record of the military using the San Pedro or any other Arizona stream as a means to transport
6 supplies to its various installations. *Id.* The record indicates that supplies were transported to
7 the military installations along the San Pedro during this period not by navigating the San
8 Pedro, but by traveling a road alongside the stream. *Id.*

9 53. The stream's physical characteristics also support a finding that the San Pedro
10 was not susceptible to navigation in its natural and ordinary condition at or before statehood.
11 Historical descriptions and historic and modern stream data lead to the conclusion that the San
12 Pedro was not susceptible to navigation. During the nineteenth century, when explorers,
13 missionaries, and travelers came to the San Pedro River Valley, the river was described as
14 "insignificant" and "not continuous." *See Findings of Fact Nos. 26, 36, 38, 39, 46.*

15 54. The evidence presented demonstrates that the San Pedro was neither navigable
16 nor susceptible to navigation in its ordinary and natural condition at or before statehood as a
17 result of its low flows, shallow depths, high variability, and discontinuity. *See, e.g., Findings*
18 *of Fact Nos. 20-47, 90, 93.*

19 55. Various impediments exacerbated the non-navigability of the San Pedro.
20 Numerous beavers and beaver dams existed throughout the San Pedro in its ordinary and
21 natural condition, and presented significant impediments to navigation. *See Findings of Fact*
22 *Nos. 24, 35, 61-69.* Other significant impediments to navigation also existed throughout the
23 San Pedro in its ordinary and natural condition, including sandbars and riffles. *See Finding of*
24 *Fact No. 47.* The impediments posed by beaver dams were compounding factors along with
25 low depths, low flow, discontinuity, marshy cienega conditions, and other impediments
26 encountered at various locations that rendered the San Pedro neither navigable nor susceptible
27 to navigation in its ordinary and natural condition. *See Finding of Fact No. 67.*

1 56. The Commission was provided evidence that early explorers in the San Pedro
2 River Valley attempted to boat on rivers other than the San Pedro. *See* Findings of Fact Nos.
3 20, 30. Thus, the absence of any records of explorers, missionaries, or travelers boating on
4 the San Pedro supports the finding that the river simply was not boatable.

5 57. The San Pedro's flow was not, in its ordinary and natural condition or
6 otherwise, continuous or reliable throughout the year. Therefore, it was not "susceptible" to
7 navigation. *See* Findings of Fact Nos. 34-36, 38-40, 46. Given the weight of the data and
8 evidence, the Commission finds, as a matter of law and fact, that the San Pedro was not
9 "susceptible" to being used as a "highway for commerce" in its ordinary and natural condition
10 on or before February 14, 1912.

11 **DETERMINATION OF NON-NAVIGABILITY**

12 58. "[A] river is navigable in law when it is navigable in fact." *Muckleshoot Indian*
13 *Tribe v. FERC*, 993 F.2d 1428, 1431 (9th Cir. 1993).

14 59. "[I]t is not . . . every small creek in which a fishing skiff or gunning canoe can
15 be made to float at high water which is deemed navigable." *Hassell*, 172 Ariz. at 363, 837
16 P.2d at 165 (quoting *The Montello*, 87 U.S. (20 Wall.) 430, 22 L. Ed. 391 (1874)). "[T]he
17 vital and essential point is whether the natural navigation of the river is such that it affords a
18 channel for useful commerce." *Id.*

19 60. "[S]egments that are nonnavigable at the time of statehood are those over which
20 commerce could not then occur." *PPL Montana*, 132 S. Ct. at 1230. "Navigability must be
21 assessed as of the time of statehood, and it concerns the river's usefulness for 'trade and
22 travel,' rather than other purposes." *Id.* at 1221.

23 61. Occasional use of rivers that flow only during exceptional times does not
24 support a finding of navigability. *See Oklahoma v. Texas*, 258 U.S. 574 (1922),
25 *reconsideration denied*, 260 U.S. 711 (1923); *Brewer-Elliott*, 260 U.S. at 77; *Crow, Pope &*
26 *Land*, 340 F. Supp. at 32. In *Oklahoma v. Texas*, the Court decided the navigability of the
27 Red River, upon which boats were able to move on the river only during times where flow on

1 the river was “intermittent, of irregular and short duration, and confined to a few months in
2 the year.” 258 U.S. at 589. In concluding that Red River was not navigable, the Court stated:
3 “Its characteristics are such that its use for transportation has been and must be exceptional,
4 and confined to the irregular and short period of temporary high water. A greater capacity for
5 practical and beneficial use in commerce is essential to establish navigability.” *Id.* at 591.
6 Although a river need not be susceptible to navigation at every point of the year, “neither can
7 that susceptibility be so brief that is it not a commercial reality.” *PPL Montana*, 132 S. Ct. at
8 1234.

9 62. Based upon the evidence submitted and its review of the applicable law, the
10 Commission hereby finds that the San Pedro was neither used nor susceptible to being used
11 for navigation in its ordinary and natural condition on or before February 14, 1912. Thus, it is
12 not and was not “navigable” as defined by the Arizona statute and the federal case law.

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1 RESPECTFULLY SUBMITTED this 27th day of September, 2013.

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