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received
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14 **BEFORE THE ARIZONA NAVIGABLE STREAM**
15 **ADJUDICATION COMMISSION**

16 In re Determination of Navigability of
17 the Gila River

No. 03-007-NAV

**SALT RIVER PROJECT'S
MEMORANDUM REGARDING
WHETHER GILA RIVER WAS
NAVIGABLE IN ITS "ORDINARY
AND NATURAL CONDITION"**

18 Pursuant to the Commission's order at its meeting held on June 29, 2012, the Salt
19 River Project Agricultural Improvement and Power District and Salt River Valley Water
20 Users' Association (collectively, "SRP") submit their memorandum regarding whether the
21 Gila River ("Gila") was navigable in its "ordinary and natural condition." *See State v.*
22 *Arizona Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 229 P.3d 242 (App. 2010)
23 (*"State v. ANSAC"*). The Gila was not navigable in its "ordinary and natural condition," or in
24 any other condition.

25 **I. The Proponents of Navigability Bear the Burden of Proving that the Gila is**
26 **Navigable.**

27 In prior decisions, the Arizona courts have held the proponents of navigability bear the
burden of proving that a river is navigable. *See Arizona Ctr. for Law in the Public Interest v.*

1 *Hassell*, 172 Ariz. 356, 363 n.10, 837 P.2d 158, 165 n.10 (App. 1991); *Land Dep't v.*
2 *O'Toole*, 154 Ariz. 43, 46 n.2, 739 P.2d 1360, 1363 n.2 (App. 1987); *Defenders of Wildlife v.*
3 *Hull*, 199 Ariz. 411, 420, 18 P.2d 722, 731 (App. 2001). The Arizona statutes further support
4 this allocation of the burden. In order for the Commission to determine that a particular
5 watercourse is "navigable," the proponents of navigability must establish that fact by a
6 "preponderance of the evidence." See A.R.S. § 37-1128(A). If sufficient evidence is not
7 presented to show navigability for a particular watercourse, the Commission must find the
8 watercourse non-navigable. *Id.*

9 **II. The Court of Appeals' Decision Likely Requires the Commission to Consider the**
10 **Gila in Its "Ordinary and Natural Condition."**

11 At least for purposes of the present phase of this proceeding, the Arizona Court of
12 Appeals' decision in *State v. ANSAC* likely is controlling law that the Commission must
13 follow. 224 Ariz. at 230, 229 P.3d at 242.¹ Relying in large part upon the dictionary
14 definition of "natural," the court found that the Lower Salt River must be considered as if it
15 were "untouched by civilization." *Id.* at 241, 229 P.3d at 253. The court stated: "[W]e
16 conclude that ANSAC was required to determine what the River would have looked like on
17 February 14, 1912, in its ordinary (i.e., usual, absent major flooding or drought) and natural
18 (i.e., without man-made dams, canals, or other diversions) condition." *Id.* Although the court
19 correctly determined that ANSAC (in its September 2005 final report) had taken into
20 consideration the impact of Roosevelt Dam on the character of the Lower Salt, *id.* at 240, 229
21 P.3d at 253, the court found insufficient evidence in the report to conclude that the
22 Commission also had considered the impact of other man-made dams and diversions. *Id.*

23 In addressing what constituted the "ordinary and natural condition" of the Lower Salt,
24 the Court of Appeals first started with the time "before the Hohokam people arrived many

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26 ¹ The Arizona Supreme Court has not yet addressed the "ordinary and natural" issue. The Court
27 denied discretionary review of the Court of Appeals' decision in *State v. ANSAC*, and the case was
remanded to the superior court and then to the Commission for further proceedings. 224 Ariz. at 245,
229 P.3d at 257.

1 centuries ago and developed canals and other diversions that actively diverted the River.”
2 *State v. ANSAC*, 224 Ariz. at 242, 229 P.3d at 254. Recognizing that “little if any historical
3 data exists from that period” and that the Lower Salt “largely returned to its natural state”
4 after the Hohokam disappeared, the court found that “the River could be considered to be in
5 its natural condition after many of the Hohokam’s diversions had ceased to affect the River,
6 but before the commencement of modern-era settlement and farming in the Salt River Valley.
7 . . .” *Id.*

8 Although the Court of Appeals determined that “evidence from that early period
9 should be considered by ANSAC as the best evidence of the River’s natural condition,” 224
10 Ariz. at 242, 229 P.3d at 254, the court also recognized that evidence from later (or earlier)
11 periods could have probative value. *Id.* at 243, 229 P.3d at 255. ANSAC has authority to
12 consider such evidence and to give it the appropriate weight. *Id.* The court rejected
13 arguments by the proponents of navigability that any evidence dated after the commencement
14 of man-made diversions should be thrown out and disregarded. “Even if evidence of the
15 River’s condition after man-made diversions is not dispositive, it may nonetheless be
16 informative and relevant.” *Id.*

17 **III. Evidence in the Record**

18 The Gila’s lack of navigability in its “ordinary and natural condition” is illustrated by,
19 among other things, an historical account of the river from 1854, a time before any significant
20 non-native diversions. John R. Bartlett of the United States Army Corps of Topographical
21 Engineers, who worked on surveying the boundary between the United States and Mexico
22 from 1850 to 1853 and subsequently “prepared a two-volume report that was essentially a
23 travel book,” stated: “It is doubtful whether [the Gila] can ever be navigated, except at its
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1 floods, and these are by no means regular. At such times [i.e., during irregular floods,] flat-
2 bottomed boats might pass to the mouth of the Salinas [Salt River], near the Pima villages.”²

3 This Commission solicited and received voluminous evidence with respect to the
4 navigability of the Gila. The Commission held six hearings, in six different county seats, over
5 the course of more than two years. The transcript of the November 2005 Phoenix hearing
6 alone consists of 607 pages.³

7 The Gila has a braided channel and variable flows. *See* III(B), *infra*. The river has
8 not, in its ordinary and natural condition or otherwise,” ever been used or susceptible to being
9 used as a “highway for commerce.” The evidence submitted prior to and at the Commission’s
10 hearings supports a finding of “non-navigability,” and no credible evidence was presented to
11 support a finding that the river is now or ever was “navigable.”

12 **A. History of the Gila**

13 The historical evidence does not support a finding of navigability, in any condition.

14 **1. The prehistoric Gila**

15 The report submitted by the SLD’s consultants, and their hearing testimony, provide
16 evidence regarding the condition of the Gila in the period before settlement by non-natives.
17 One SLD report states that “it is known that the Gila River played a major role in the human
18 settlement patterns and occupational successes of prehistoric development within the study
19 area.” SLD/Upper, *supra*, at 2-3; *see also* SLD/Lower, *supra*, at III-20. “[M]ost of the
20 prehistoric habitations in the study area were close to the river.” SLD/Upper, *supra*, at 3; *see*
21 *also id.* at 2-18, 2-19. Yet, despite the concentration of prehistoric population on the banks of

22
23 ² Fuller, et al., *Arizona Stream Navigability Study for the Upper Gila River, Safford to the State*
24 *Boundary, and San Francisco River, Gila River Confluence to the State Boundary* 3-14 (June 2003)
25 [EI 2] (“SLD/Upper”); *see also id.* at 5, 8-4. To distinguish between the two reports submitted by the
26 State Land Department (“SLD”) for the Gila, this memorandum refers to the report on the Upper Gila
as “SLD/Upper” and to the report on the Lower Gila as “SLD/Lower.” *See* Fuller, et al., *Arizona*
Stream Navigability Study for the Gila River: Colorado River Confluence to the Town of Safford
(June 2003) [EI 4] (“SLD/Lower”).

27 ³ “Tr. at [date: page]” refers to the Reporter’s Transcript of the November 2005 hearing. For
instance, “Tr. at 17:1” would refer to page 1 of the transcript from November 17, 2005.

1 the river, “[a]rchaeological research has not documented any use of the river for commercial
2 trade and travel or any regular flotation of logs” on the river. *Id.* at 3, 2-23, 8-2. In fact, no
3 evidence was presented to the Commission to support the existence of any prehistoric use of
4 boats on the river (commercial or otherwise) or any flotation of logs (regular or irregular).

5 **2. Historic Indian use of the Gila**

6 The evidence shows that, although the native inhabitants of the region made extensive
7 use of water from the River for irrigation, they did not use the river for navigation during
8 recorded history.⁴ Allen Gookin, testifying on behalf of the Gila River Indian Community
9 through whose reservation the Gila directly flows, stated that he was aware of no evidence
10 that any Indians residing in the area ever used canoes or other watercraft on the river. *See*
11 Gookin, *supra*, at 3. “[T]he Pimas lived on both sides of the river for extensive distances.”
12 *Id.* They engaged in trade with various groups of Indians and non-Indians located all along
13 the river. *Id.* Their mode of transportation was to run on foot beside the river. *Id.* If the river
14 had been navigable, it surely would have been easier, faster, and more efficient for the Pimas
15 to use boats to travel rather than to run these long distances.

16 None of the other evidence detracts from Mr. Gookin’s testimony. The SLD’s
17 consultants, for instance, noted that the Chiricahua Apaches, another tribe residing in the area
18 of the Gila, “were known to construct boats made of bull hides stretched over wooden frame
19 for crossing streams,” but no evidence exists that these Apaches ever used such boats on the
20 Gila. SLD/Upper, *supra*, at 5; *see also* Tr. at 16:67-68 (Gilpin).

21 **3. Early non-Indian exploration of the area**

22 Under the Court of Appeals’ standard, evidence of the time when early explorers
23 ventured into the area is perhaps “the best evidence of the River’s natural condition.” *State v.*
24 *ANSAC*, 224 Ariz. at 242, 229 P.3d at 254. With respect to the Gila, the evidence is
25 indisputable that early forms of non-Indian transportation along the river were limited to
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27 ⁴ *See* Gookin, *Presentation to Arizona Stream and Navigability Commission 3* (November 16, 2005)
[EI 15]; Tr. at 16:227 (Gookin).

1 horses, mule trains, wagons, and stagecoaches. *See* SLD/Upper, *supra*, at 3-1, 3-25;
2 SLD/Lower, *supra*, at IV-64. No evidence exists that any of the early explorers who ventured
3 into the Gila River Valley ever used the Gila as a regular means of transportation or
4 commerce. Instead, they traveled on horseback or on foot. *See* SLD/Upper, *supra*, at 4; Tr. at
5 16:68-69 (Gilpin). This is true despite the fact that many of these same explorers are known
6 to have used canoes, rafts, and other watercraft when they reached the navigable Colorado
7 River on these same expeditions. *See* SLD/Upper, *supra*, at 4; *see also id.* at 3-1 (“Although
8 these trappers constructed canoes and rafts to use on the Colorado River, they apparently did
9 not float the upper Gila and San Francisco rivers.”); *id.* at 8-2.

10 **4. Federal land surveys and patents**

11 Another group of individuals who were present along the Gila at a relatively early date
12 were the federal land surveyors who were responsible for conducting the rectangular survey
13 in the new territory. Dr. Douglas Littlefield testified regarding surveys on the lower portion
14 of the river (downstream from the Salt River confluence) at the November 2005 hearing.
15 Each of these surveyors was under specific instructions to distinguish between navigable and
16 non-navigable streams.⁵ None of these Government representatives ever indicated that the
17 Gila River was navigable: “[W]hile those surveys were done at varying times of the year, in
18 different years, and by several individuals, all of the descriptions and plats from this work
19 consistently portrayed the Gila River as being a non-navigable stream.” *See* Littlefield, *supra*,
20 at 55.

21 Similarly, the federal and state land patents issued along the river are persuasive
22 evidence of non-navigability. The Federal Government granted over ninety-five separate
23 patents that touched or overlay the lower portion of the Gila River (below the Salt River
24 confluence) to private individuals. *See* Littlefield, *supra*, at 88; Tr. at 16:135 (Littlefield). In
25 not one case did any of those patents (or the supporting patent files) indicate that acreage was

26 ⁵ *See* Littlefield, *Assessment of the Navigability of the Gila River Between the Mouth of the Salt River*
27 *and the Confluence with the Colorado River Prior to and on the Date of Arizona’s Statehood,*
February 14, 1912, at 10-20 (November 3, 2005) [EI 12]; Tr. at 16:128 (Littlefield).

1 being withheld because the river was navigable. *See Littlefield, supra*, at 88; Tr. at 16:135
2 (Littlefield). Dr. Littlefield, summarizing his conclusions based upon hundreds of hours of
3 historical research from a wide variety of sources (including survey records, land patents,
4 other government documents, and newspapers), stated: "From this wealth of information,
5 covering a huge array of documentary sources only one conclusion can be reached: The Gila
6 River was not navigable or susceptible of navigation on or before February 14, 1912."
7 Littlefield, *supra*, at 136.

8 **B. Hydrology and geomorphology of the Gila**

9 The other evidence presented to the Commission is similarly insufficient to constitute a
10 "preponderance of the evidence" in favor of navigability. This evidence is, like the evidence
11 relating to pre-diversion historical events, particularly persuasive under the Court of Appeals'
12 standard because it clearly relates to the "ordinary and natural condition" of the river. The
13 hydrologic evidence shows that the river was erratic and never included sufficient flows to
14 support a "highway for commerce." The geomorphic evidence shows that the river was
15 braided in long reaches and also contained bedrock controls, including numerous rapids,
16 which would be "natural" impediments to navigation.

17 **I. Hydrologic evidence**

18 The hydrologic information does not support a finding of navigability. There were few
19 stream gauge records available for this reach of the river at or before statehood. *See*
20 *SLD/Upper, supra*, at 5-19. The first flow data on the upper portions of the river, for
21 instance, was gathered in 1899. *See SLD/Upper, supra*, at 5-16; *SLD/Lower, supra*, at VI-4.
22 This was a one-day reconnaissance trip, and no continuing data was recorded. *See*
23 *SLD/Upper, supra*, at 5-16.

24 The SLD's reports rely primarily upon average annual flow data collected after
25 statehood. The reports themselves acknowledge that data regarding "average" conditions is
26 of dubious value for purposes of determining whether a river is navigable, however:
27

1 It is important to note that the flow characteristics presented in Table 23
2 represent the average condition at discrete points along the study reaches.
3 There is no doubt that there will be reaches which have obstacles such as broad
4 shallow areas, sand bars, rapids, and irrigation diversions which, at certain
5 discharges, will have significantly different flow characteristics. These
6 conditions may, in some cases, preclude or at least hinder the use by any boat,
7 especially for travel in the upstream direction.

8 SLD/Upper, *supra*, at 5-45. Knowing the average annual flow of an erratic stream like the
9 Gila provides little information about whether that river is or ever was navigable.⁶

10 The evidence also shows that the Gila River is and has been “susceptible to wide
11 seasonal and annual variations in discharge rates.” SLD/Upper, *supra*, at 8. The SLD’s
12 consultants estimated minimum monthly average flows for the Upper Gila, for example, to
13 range from 15 to 100 cfs. *Id.* at 7, 5-32. This low flow contrasts with irregular floods that
14 create up to 140,000 cfs in flow.⁷

15 2. Geomorphic evidence

16 The geomorphologic evidence in the record also refutes, rather than supports, a finding
17 of navigability. Substantial portions of the river in its “natural” condition, especially in the
18 lower portions of the river below the Salt River confluence, consisted of a braided channel.
19 Such channels are associated with sand bars and other impediments to navigation.⁸
20 Geomorphologist Dr. Stanley Schumm presented a written report and testified at the
21 November 2005 hearing regarding the geomorphology of the lower portion of the river. In his
22 report, Dr. Schumm stated that “[t]he Gila River is characterized by inherent instability and
23 frequent and destructive channel migration.” *Id.* at 3.

24 ⁶ For the same reasons, knowing (or estimating) the “average depth” of a river is likewise of limited
25 value to determining whether it was “navigable.”

26 ⁷ See SLD/Upper, *supra*, at 5-46; see also *id.* at 3-22 to 3-23 (describing torrential floods in the
27 Clifton area in the 1870s, 1880, 1891, 1903, 1905, 1906, and 1916); SLD/Lower, *supra*, at IV-42
(describing 1891 flood).

⁸ See Schumm, *Geomorphic Character of the Lower Gila River* 3 (June 2004) [EI 6] (“Schumm”).

1 Dr. Schumm's statements regarding the braided nature of the river channel are
2 consistent with information included in the SLD's reports and the specific findings of Dr.
3 Huckleberry, the SLD's geomorphologist. According to the SLD's report, environmental
4 reconstructions for the Gila River Valley show that the river has been braided through most of
5 its existence. Evidence of braiding exists back as early as 798-899 A.D. See SLD/Lower,
6 *supra*, at III-23. According to that evidence, the river varied between a bar-braided channel
7 and an island-braided channel from 798 A.D. to 1500 A.D. *Id.*

8 Dr. Huckleberry reported that the river has experienced "alternating periods of channel
9 stability and instability, and specifically, changes in channel form (e.g., braided vs.
10 meandering)" during the past 10,000 years. SLD/Lower, *supra*, at VII-2. "Periods of
11 increased large flood frequency are more likely to be associated with wide, braided channel
12 conditions on the Gila River." *Id.*; see also Tr. at 16:56-57 (Huckleberry). Dr. Huckleberry
13 concluded:

14 The Gila River is a classic example of a dryland river that seldom seeks
15 equilibrium form. Unlike rivers in humid regions that have more stable
16 channels adjusted for more continuous streamflow with less variance in
17 discharge, the dryland rivers are inherently more unstable and more prone to
18 changes in channel configuration. . . . [A] basic premise of this study is that the
19 Gila River responds to secular climatic variability by radical changes in channel
20 configuration, and that periods of increased, large flood frequency correlate
21 with unstable, braided channel conditions.

22 SLD/Lower, *supra*, at VII-10.

23 These conclusions that at least large parts of the Gila River consist of a braided
24 channel are also supported by early anecdotal descriptions of the river. In 1899, for instance,
25 the bed of the river was described as "sandy and shifting." See SLD/Lower, *supra*, at IV-9.
26 That same 1899 account stated that "[t]he channel of the (Gila) river at the buttes is composed
27 of quicksand and likely to change daily with any considerable amount of water in the river."
Id. at IV-10.

1 Although Dr. Schumm did not address the portions of the river above the Salt River
2 confluence, the SLD's consultants did. Those consultants reported that the bedrock geology
3 of these portions of the river "made access to the river difficult during the period around
4 statehood, prevented development of extensive irrigation systems, and prevented the
5 development of large population centers near the river." SLD/Upper, *supra*, at 4-18; *see also*
6 Tr. at 16:60 (Fuller). These same conditions likewise limited any type of navigation on the
7 upper reaches of the river.

8 **IV. The Gila Was Not Navigable in Its "Ordinary and Natural Condition."**

9 Upon reviewing the evidence and specifically considering the "ordinary and natural
10 condition" of the Gila, the Commission should again find it non-navigable. "[A] river is
11 navigable in law when it is navigable in fact." *Muckleshoot Indian Tribe v. FERC*, 993 F.2d
12 1428, 1431 (9th Cir. 1993). Thus, the Commission must consider all of the evidence in the
13 record before it. When the Commission reviews the evidence submitted, and considers the
14 totality of that evidence, it must again determine that the Gila never has been used as a
15 "highway for commerce" and was not, in its "ordinary and natural condition" (or in any other
16 condition), susceptible to being used as a highway for commerce.

17 Assessing the Gila in its "ordinary and natural condition" is particularly difficult due to
18 the extensive use of the waters of the river for irrigation by the Pima Indians and others
19 during the period prior to non-Indian exploration and settlement. The Pimas reportedly
20 diverted water and farmed on the banks of the Gila for centuries prior to non-Indian
21 exploration and settlement. Unlike the situation for the Lower Salt River, where the
22 Hohokam diverted water in prehistoric times and then diversion ceased for an extended period
23 prior to non-Indian settlement, diversions from the mainstem of the Gila upstream from the
24 Salt River confluence was present for a substantial period prior to non-Indian exploration.
25 Thus, it might be impossible to determine a specific time in recorded history when much of
26 the Gila was untouched by civilization." *State v. ANSAC*, 224 Ariz. at 241, 229 P.3d at 253.

27 . . .

1 **A. The Gila has never been used as a “highway for commerce.”**

2 A watercourse can meet the test for “navigability” under the Arizona statute and the
3 case law if it satisfies either of two elements: (1) If it was actually used as a “highway for
4 commerce,” or (2) if it, in its “ordinary and natural condition” at the time of statehood, was
5 “susceptible to being used” as a “highway for commerce.” *See* A.R.S. § 37-1101(5).⁹

6 It is beyond reasonable dispute that the Gila has never been actually used as a
7 “highway for commerce.” No evidence exists of any prehistoric boating or flotation of logs
8 on the river. *See* Section III(A)(1), *supra*. Likewise, no evidence exists that the historic
9 Indian inhabitants and the early explorers or soldiers in the area near the river who traveled
10 through the area on several occasions ever used the river, for “commerce” or otherwise. *See*
11 Section III(A)(2), (3), *supra*; *see also Lykes Bros., Inc. v. Corps of Eng’rs*, 821 F. Supp. 1457,
12 1459 (M.D. Fla. 1993), *aff’d*, 64 F.3d 630 (11th Cir. 1995) (court found that had river been
13 navigable, it would seem obvious that military and settlers would have used the river to
14 transport men and supplies rather than carrying them overland).

15 The only witness who opined that the Gila River had actually been used as a “highway
16 for commerce” was Donald Jackson, a history professor from Lafayette College in
17 Pennsylvania retained by Maricopa County. Dr. Jackson filed no formal report with the
18 Commission, but rather relied upon an eighteen-page Power Point presentation—a substantial
19 portion of which consisted of an explanation of his layman’s view of various decisions by the
20 United States Supreme Court.¹⁰

21 Dr. Jackson opined that the river was navigable based upon his cursory review of the
22 historical evidence. *See id.* His opinion relied exclusively upon a few scattered pieces of
23 spotty and often contradictory evidence. For example, Dr. Jackson cited a statement by a
24 member of the 1846 Kearney expedition that the river was “about 100 yards wide and flowing

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26 ⁹ “For state title purposes under the equal-footing doctrine, navigability is determined at the time of
27 statehood . . . and based on the ‘natural and ordinary condition’ of the water.” *PPL Montana*, 132 S.
Ct. at 1228.

¹⁰ *See* Jackson, “Lower Gila River Navigability” (November 16, 2005) [EI 21].

1 along a sandy bottom.” *Id.* at 8. Dr. Jackson failed to note, however, that the Kearney
2 expedition itself traveled over land along the river and not by boat on the water. If the
3 participants in that expedition had thought the Gila was navigable, they likely would have
4 navigated it.

5 Dr. Jackson also referred to anecdotal evidence that members of the Mormon Battalion
6 in 1847 attempted to float down the lower reaches of the river by making a boat out of two of
7 their wagons. *Id.* at 9. He largely ignored the documentary evidence, however, which clearly
8 provides that the wagons “went aground on numerous occasions” and that the participants
9 were “forced to jettison a portion of the cargo.” SLD/Lower, *supra*, at IV-2; *see* Tr. at 17:208
10 (Jackson). These difficulties were experienced at a time when the river was in its “natural”
11 condition, prior to any dams or diversions.

12 Dr. Jackson cited the “Yuma or Bust” episode, when Buckey O’Neil and others
13 unsuccessfully attempted to float a boat down the Gila River to Yuma in 1881. *Id.* Although
14 this attempt occurred prior to significant dams or diversions upstream, Dr. Jackson
15 acknowledged that “at times the boat had to be pushed by men wading in water ‘up to their
16 knees.’” *Id.* at 12. Dr. Jackson insisted, however, that this account was evidence that the
17 river was navigable at statehood. *Id.* In fact, Dr. Jackson testified that he considered walking
18 when pushing a boat to be a part of navigation on a watercourse. *See* Tr. at 17:215 (Jackson).

19 Dr. Jackson’s flawed opinion that “walking is navigation” was flatly rejected by the
20 U.S. Supreme Court in the recent *PPL Montana* case. In that opinion, the Court stated:
21 “Navigability must be assessed as of the time of statehood, and it concerns the river’s
22 usefulness for ‘trade and travel,’ rather than for other purposes. . . . Mere use by initial
23 explorers or trappers who may have dragged their boats in or alongside the river despite its
24 nonnavigability in order to avoid getting lost, or to provide water for their horses or
25 themselves, is not enough.” *PPL Montana*, 132 S. Ct. at 1233.¹¹

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27 ¹¹ *See also United States v. Oregon*, 295 U.S. 1, 20-21 (1935), *cited in PPL Montana*, 132 S. Ct. at
1233 (evidence that “trappers appear to have waded or walked” through the river, dragging their boats
rather than floating them, had “no bearing on navigability”).

1 As the “linchpin” for his opinion, Dr. Jackson relied upon an 1895 account of an
2 attempt by Amos Adams and J.W. Evans to float a boat the entire length of the river. *Id.*; Tr.
3 at 17:212-15 (Jackson). Dr. Jackson ignored the documented fact that the boat itself was
4 badly damaged and that it was, in places, lowered by a 200-foot rope through rapids and
5 between boulders. *See* SLD/Lower, *supra*, at IV-8. Although Dr. Jackson acknowledged that
6 the actual participants in the trip stated that they would not do it again, he disregarded their
7 sentiments by concluding that their trip is evidence that the full length of the Gila River was
8 susceptible to navigation. *See* Tr. at 17:215 (Jackson). This position is contrary to the U.S.
9 Supreme Court’s recent opinion on the “segmentation” issues in *PPL Montana*¹² and also is
10 inconsistent with the Court’s statement that “the evidence must be confined to that which
11 shows the river could sustain the kinds of commercial use that, as a realistic matter, might
12 have occurred at the time of statehood.” 132 S. Ct. at 1233.

13
14 Dr. Jackson’s cursory and undocumented review of the historical evidence does not
15 support a finding that the river ever was actually used as a “highway for commerce.” Dr.
16 Jackson is neither a lawyer nor an expert on issues of navigability, the public trust doctrine, or
17 the equal footing doctrine.¹³ His Power Point presentation does not prove that the Gila was
18 used for navigation in its “ordinary and natural condition.”

19 **B. The Gila was not, in its “ordinary and natural condition,” susceptible**
20 **to being used” as a “highway for commerce.”**

21 Because the evidence shows that the Gila was never actually used as a “highway for
22 commerce,” the only way it can be considered navigable is if it was “susceptible” to such use.
23 No evidence exists in the record to show that the Gila, in its “ordinary and natural condition”

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25 ¹² *See generally* Salt River Project’s and Freeport-McMoRan’s Joint Supplemental Memorandum
Regarding Segmentation Issues (June 8, 2012).

26 ¹³ *See* Deposition of Donald C. Jackson, *A-Tumbling-T v. Paloma Investment* 13 (January 15, 2003)
27 (EI 22) (“Q. Is this the first voyage into the issue of navigability for you? A. Into the legal issues
regarding equal footing, yes.”).

1 or in any other condition, was capable of acting as “a corridor or conduit within which the
2 exchange of goods, commodities or property or the transportation of persons may be
3 conducted.” A.R.S § 37-1101(3) (defining “highway for commerce”).

4 Although the Gila existed in relatively close proximity to much of the exploration and
5 settlement in early Arizona, it was never used for any type of trade or transportation.¹⁴ The
6 hydrology and geomorphology of the river shows that it was not susceptible to navigation.
7 See Section III(B), *supra*.

8 It might be theoretically possible that, on one or more occasions in particular years, it
9 would have been feasible for a person to boat or float logs down some portion of the river.
10 Occasional use in exceptional times does not, however, support a finding of navigability.
11 “The mere fact that a river will occasionally float logs, poles, and rafts downstream in times
12 of high water does not make the river navigable.” *United States v. Crow, Pope & Land Ents.,*
13 *Inc.*, 340 F. Supp. at 32 (citing *United States v. Rio Grande Dam & Irr. Co.*, 174 U.S. 690
14 (1899)). “The waterway must be susceptible for use as a channel of useful commerce and not
15 merely capable of exceptional transportation during periods of high water.” *Id.* (citing
16 *Brewer-Elliott Oil & Gas Co. v. United States*, 260 U.S. 77 (1922)).¹⁵

17 No government agency, including federal land surveyors, ever indicated that the Gila
18 was navigable. See Section III(A)(4), *supra*; see also *United States v. Oregon*, 295 U.S. at 23
19 (courts should consider government’s treatment of watercourse as non-navigable in their
20 analysis of navigability); see also *Washington Water Power Co. v. Federal Energy*
21 *Regulatory Comm’n*, 775 F.2d 305, 332 (D.C. Cir. 1985) (government’s, including Army
22 Corps of Engineers’, description and treatment of river is relevant to determination of river

23 ¹⁴ “Navigability must be assessed as of the time of statehood, and it concerns the river’s usefulness
24 for ‘trade and travel,’ rather than for other purposes.” *PPL Montana*, 132 S. Ct. at 1233. “Mere use
25 by initial explorers or trappers who may have dragged their boats in or alongside the river despite its
nonnavigability in order to avoid getting lost, or to provide water for their horses or themselves, is not
enough.” *Id.*

26 ¹⁵ See also *United States v. Harrell*, 926 F.2d 1036, 1040 (11th Cir. 1991) (“susceptibility of use as a
27 highway for commerce should not be confined to ‘exceptional conditions or short periods of
temporary high water’”) (quoting *United States v. Utah*, 283 U.S. 64, 87 (1931)).

1 navigability). Likewise, no federal or state land patent indicated that the Gila River was
2 navigable. *See id.*; *see also Lykes Bros.*, 821 F. Supp. at 1460 (court found actions by State
3 show that, for many years, it considered river non-navigable, e.g., land bordering river had
4 been deeded to private ownership and owners paid taxes); *Koch v. Department of Interior*, 47
5 F.3d 1015, 1019 (10th Cir. 1995) (because Federal Government did not express intent to
6 retain island in non-navigable river, title to island passed to patent holder).

7 The only evidence that purports to support a finding of “susceptibility” to navigation is
8 the report and testimony by Hjalmar Hjalmarson, a hydraulic engineer and hydrologist
9 retained by Maricopa County.¹⁶ Mr. Hjalmarson’s work was limited to answering the
10 following question: “Was the lower Gila River susceptible to navigation in it’s [sic] natural
11 and ordinary condition at statehood using the Federal Standard?” Hjalmarson Power Point,
12 *supra*, at 1. He did not examine whether the river had ever actually been used as a “highway
13 for commerce.” *See id.*

14 Mr. Hjalmarson’s work submitted to this Commission recognizes that the data
15 necessary to prove that the river ever was susceptible to navigation is severely lacking.¹⁷
16 Faced with this dearth of data, Mr. Hjalmarson did perhaps the best he could. First, he
17 obtained estimates of pre-development flows in the river at the Gila River and Salt River
18 Indian Reservations. *See Hjalmarson Report, supra*, at 12-14. Those estimates were based
19 upon a USGS numerical model “developed to simulate ground-water flow, stream-aquifer
20 connection, and evapotranspiration for purposes of evaluating predevelopment hydrologic
21 conditions on the reservation.” *Id.* at 14. Mr. Hjalmarson then summed these two estimates
22

23 ¹⁶ *See Hjalmarson Report, supra*; Hjalmarson, Power Point Presentation entitled “Navigability Along
24 the Natural Channel of the Gila River, AZ” (November 16, 2005) [EI 23] (“Hjalmarson Power
Point”).

25 ¹⁷ *See also Hjalmarson Report, supra*, at 9 (“There are few known direct observations of the flow and
26 of the morphology of the river. There are no measurements of streamflow by the U.S. Geological
27 Survey (USGS) until 1888. There are no aerial photographs or detailed topographic maps of the river
channel. . . . There are only a few available recorded observations of the river hydraulics and
morphology made by explorers.”).

1 together and ran that combined flow estimate through some equations to obtain a hypothetical
2 width and depth of the river. *Id.*¹⁸ As Mr. Hjalmarson candidly admitted in his report, in
3 order to do what the task he was asked to perform, it was “necessary to estimate the size and
4 shape of the river channel before about 1860 when the flow was natural.” *Id.* at 10.¹⁹

5 In the unedited 2001 version of his report, Mr. Hjalmarson further acknowledged the
6 lack of important data for a determination of susceptibility to navigation:

7 Obviously, a large number of historic measurements of channel characteristics,
8 especially channel width and depth for dry-weather flows, would be important
9 information for assessment of navigability. However, in the absence of historic
10 measurements of channel geometry at several locations along the river, the
11 hydraulic geometry is considered a reliable general estimate of channel width
12 and depth.

13 2001 Notes, *supra*, at 45.²⁰

14 Even using Mr. Hjalmarson’s estimates and assumptions,²¹ the river would not be
15 particularly susceptible to navigation. Mr. Hjalmarson acknowledged that “about 70% of the
16 time the flow is less than the mean annual flow. In terms of using a vessel on the Gila River,
17 the lower flows such as the base runoff, may limit navigability for at least part of a typical
18 year.” Hjalmarson Report, *supra*, at 16. Mr. Hjalmarson also conceded that, although he

18 ¹⁸ See 2001 Notes, *supra*, at 34 (“The problem with estimating channel size and shape corresponding
19 to the natural flow characteristics is there is little reliable evidence of channel width and depth before
20 about 1860. A solution is the use of regional hydraulic geometry relations to **estimate** channel width
21 using the estimate of mean annual discharge for natural watershed conditions.”) (emphasis added).

22 ¹⁹ In his 2003 deposition, Mr. Hjalmarson testified that his analysis focused solely upon hydrology
23 and hydraulic geometry and “excluded a number of other things that others have testified that they
24 utilized in trying to determine navigability, historical data and observations of pioneers and things
25 like that.” Hjalmarson Deposition, *supra*, at 123.

26 ²⁰ See also Hjalmarson Deposition, *supra*, at 20 (referring to his 2001 Notes: “These are – what I did
27 in the production of the report and because of the way I – because of my history of commonly
producing reports from the work I do, the way I go about doing the job is I put things together as if
it’s going to be published.”); see also *id.* at 21-22 (clarifying that report generated from 2001 Notes
was the one filed with this Commission).

²¹ See 2001 Notes, *supra*, at 44 (“Several assumptions and simplifications must be made before
Manning’s equation can be used to estimate” the depth relative to the amount of discharge (C) and the
slope of the discharge-depth relation (*f*).).

1 opined that the river would be “very easy” to navigate, it would be subject to difficulties
2 associated with “obstacles” such as sand bars and riffles. *Id.* at 24-25.

3 The most obvious flaw in Mr. Hjalmarson’s analysis is that his final report assumed
4 that the “natural” Gila River was a single meandering, smooth, parabolic channel. *See*
5 Hjalmarson Power Point, *supra*, at 33; *see also id.* at 27; Tr. at 17:265-66 (Hjalmarson). This
6 assumption directly conflicts with the opinions by Drs. Schumm and Huckleberry (the
7 geomorphologists), who opined that the river was unstable and had a braided channel. *See*
8 Section III(B)(2), *supra*. The assumption also is contrary to the historical evidence that the
9 river had a sandy, shifting bottom. *See id.*

10 Perhaps more important, that assumption is contrary to Mr. Hjalmarson’s own opinions
11 presented in the July 2001 unedited version of his report. *See* 2001 Notes, *supra*. In that
12 document, Mr. Hjalmarson repeatedly referred to the multiple channels and braiding of the
13 river, both in its predevelopment and current condition:

14 1. “Two of the sites where [sic] selected because they were braided channels that
15 represented the worst-case condition for navigability. It is unknown if the braided conditions
16 were representative of natural conditions.” *Id.* at 35.

17 2. “Following very large floods[,] the channel may have become destabilized and
18 reaches may have developed multiple channels of braids. Braided channels divide and
19 combine.” *Id.*

20 3. “There may have been channel braiding in places along the Gila River as
21 suggested by the oldest available USGS topographic maps. There was also at least one
22 historic account of multiple channels.” *Id.*

23 4. “Following a very large flood, the channel may more than double in width (at
24 the expense of flood-plain areas), straighten, and modify to a braided pattern. Most silt and
25 fine sand may be washed from the bed material, and coarse-sand to gravel sizes would be
26 added by destruction and reworking of flood-plain deposits. This braided channel condition
27 would be unstable.” *Id.* at 41.

1 5. “Navigability of the Gila River below Gillespie Damsite was limited by areas
2 with multiple (braided) channels because flow was divided among two or more channels.” *Id.*
3 at 66.²²

4 Mr. Hjalmarson’s hypothetical analysis fails if his assumption regarding a single,
5 parabolic channel is incorrect.²³ If there is not a single, smooth channel, his estimates
6 regarding the width and depth of the river have no basis. The only way to get from an
7 estimated flow rate to a width and depth is to assume that such flow goes through single,
8 smooth channel (like a man-made canal). Otherwise, the flow is dispersed into the multiple
9 braided channels, and it is impossible to reliably estimate the width or depth of the channel(s).
10 If the channel is braided, unstable, shifting, or not smooth, Mr. Hjalmarson’s calculations
11 have no meaning.

12 The primary problem with Mr. Hjalmarson’s opinion is that the Gila was not, in its
13 “ordinary and natural condition,” a single, smooth, parabolic channel. It is a real-life river
14 and, according to the geomorphology experts and all available evidence, it is and has been
15
16
17
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19

20 ²² See also Hjalmarson Deposition, *supra*, at 79-80 (“Q. Is it your opinion that under the hypothetical
21 situation, with your estimated mean annual flow, it was not braided? . . . A. I would – in most places,
22 I would expect it not to be braided. But because of the nature of the channels like the Gila, I would
23 expect to have localized areas of braided like conditions following large floods. You’d get increases
in gradient and so forth from some deposition, and braided – and braiding-like conditions might –
might – might occur.”).

24 ²³ See 2001 Notes, *supra*, at 50 (“Navigation during low flows was limited where the low-water
25 channels may have been braided. Flow appears to divide into two or more channels in these areas and
26 there may not have been much depth for rafts and small boats during long-dry periods when base
27 runoff was low. Where low water was in a single channel all of the low water was confined to the
channel and flow depths, the major limiting parameter for navigation on the Gila River, were greatest
where low water was in three channels the low water was distributed and more total flow was needed
to produce the needed depths.”).

1 primarily a braided river.²⁴ Mr. Hjalmarson's opinions are unpersuasive because the key
2 assumptions upon which he relies are demonstrably incorrect.

3 **V. Summary and Requested Action**

4 The proponents of navigability bear the burden of proof. The evidence in the record
5 does not support a finding that the Gila ever was actually used as a "highway for commerce."
6 The record likewise does not support a finding that the Gila, in its "ordinary and natural
7 condition" was susceptible to being used as a highway for commerce. The Commission
8 should find the Gila "non-navigable."

9 DATED this 7th day of September, 2012.

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19 hand-delivered for filing this 7th day of September,
20 2012 to:

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24 ²⁴ See, e.g., *Oklahoma v. Texas*, 258 U.S. 574 (1922) (river one-fourth to 1½ miles in width, depths ranging from four inches to one foot and above, with "continual shifting of the river bed, which moves from one side of the valley to the other," is not navigable watercourse); see also *Lykes Bros.*, 821 F. Supp. at 1463 ("To be considered susceptible for commercial navigation, the waterway in its ordinary and natural condition must have a sufficiently well-defined, passable channel, and the water levels must be able to sustain commercial navigation on a predictable and reliable basis.") (citations omitted); *Hanes v. Oklahoma*, 973 P.2d 330, 334 (OK CR 1999) (although river supported some past commerce in its upper reaches, court held that river lacked sufficient water and channel depth for at least fifty percent of its length to support useful commerce; river ranged from two to four feet deep over its one-hundred mile length).

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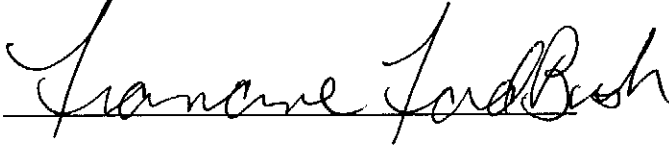
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