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**BEFORE THE  
ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION**

IN THE MATTER OF THE NAVIGABILITY OF  
THE SALT RIVER FROM THE CONFLUENCE  
OF THE WHITE AND BLACK RIVERS TO THE  
GILA RIVER CONFLUENCE, MARICOPA  
COUNTY, ARIZONA

Nos. 03-005-NAV and 04-008-NAV  
(Consolidated) (Salt)

**ARIZONA STATE LAND  
DEPARTMENT OPENING POST-  
HEARING BRIEF ON THE  
NAVIGABILITY OF THE SALT RIVER  
FOR STATE TITLE PURPOSES**

## **I. Introduction: The Salt is a Navigable River**

The Arizona State Land Department (“ASLD” or the “State”) respectfully files this Brief in response to the Arizona Navigable Stream Adjudication Commission’s (“ANSAC” or “Commission”) question as to whether the Salt River (“Salt” or the “River”) was navigable in its natural and ordinary condition such that title passed to the State at statehood. The Salt River begins at the confluence of the White and Black Rivers and travels 191 miles to its confluence with the Gila River, after passing through the Salt River Valley. It is the largest river completely contained within Arizona, and is the lifeblood upon which the Phoenix Valley was settled. The State presented credible experts and substantial evidence that supports the River’s navigability based upon the well-established principles of the law for navigability-for-title. The Commission should find that Segments 2 through 6 of the River were navigable in their ordinary and natural condition.

## **II. The Salt River Is Navigable and Susceptible to Navigation In Its Ordinary and Natural Condition**

The determination of the Salt River’s navigability cannot be made without understanding the choice that settlers made to divert the River’s water for irrigation. In the arid Southwest, particularly Arizona, the growth and well-being of a population hinged on settlers irrigating the lands as soon as they arrived. Irrigation meant the diversion of water from the River by constructing crude diversion dams that were later supplemented by massive reservoir dams. This man-made alteration of the River had a profound impact on the navigability of the River. Nowhere is this impact more apparent than on the Lower Salt River, where the River today is dry. As such, the River must be considered in its ordinary and natural condition.

The law of navigability-for-title is a disjunctive test: a river can be determined navigable by actual use or by being susceptible to being used for trade and travel at statehood. *See The Daniel Ball*, 77 U.S. 557, 563 (1870). The test states:

Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are 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.

*The Daniel Ball*, 77 U.S. at 563; *see PPL Montana LLC v. Montana*, 132 S.Ct. 1215, 1233 (2012) (acknowledging susceptibility of use standard and quoting *United States v. Utah*, 283 U.S. 64, 82-83 (1931) (“[E]xtensive and continued [historical] use for commercial purposes’ may be the ‘most persuasive’ form of evidence, but the ‘crucial question’ is the potential for such use at the time of statehood, rather than ‘the mere manner or extent of actual use.’”) (emphasis added); *see also Defenders of Wildlife v. Hull*, 199 Ariz. 411, 420, 18 P.3d 722, 731 (App. 2001) (stating that *The Daniel Ball* test is correctly paraphrased in A.R.S. § 37-1101 (5)).

The last pronouncement on navigability-for-title by the Arizona Court of Appeals directly applies to the Commission's determination of the Salt River's navigability. *State ex rel. Winkleman v. Arizona Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 229 P.3d 242 (App. 2010). In *Winkleman*, the Court of Appeals determined that the ordinary condition of a river is the usual condition of the river absent major flooding or drought. 224 Ariz. at 241, 229 P.3d at 253. Likewise, the natural condition of a river is the river untouched by civilization, absent man-made dams, canals, or other diversions. *Id.* With respect to the Lower Salt River, the Court of Appeals found that the Salt was in its natural condition after the Native American diversions had ceased to affect the River and prior to modern-era settlement and farming in the Salt River Valley that diverted the River's ample flows. *Id.* at 242, 229 P.3d at 254. The court stated that "[e]vidence from that early period should be considered by ANSAC as the best evidence of the River's natural condition." *Id.* The relevant holding as to the ordinary and natural condition of the River articulated by the *Winkleman* court was unaffected by the United States Supreme Court's decision in *PPL Montana*. Any attempt by Opponents to limit or diminish the holding in *Winkleman* by suggesting that the law was somehow changed by the *PPL Montana* Court's decision is without merit.

The Commission should also be keenly aware that the Arizona Court of Appeals has twice before examined the evidence considered by ANSAC on the Lower Salt River and found that "'substantial evidence' exists 'from which a factfinder might conclude that [the River] met the applicable standard of navigability at the time that Arizona became a state . . . .'" *Winkleman*, 224 Ariz. at 242, 229 P.3d at 254 (quoting *Ariz. Ctr. for Law in the Pub. Interest v. Hassell*, 172 Ariz. 356, 363, 837 P.2d 158, 165 (App. 1991)). Since the *Winkleman* decision, during the most recent additional 23 days of hearings on the Salt River, the State has submitted substantial amounts of new evidence and expert testimony, including historical commercial boating accounts that further bolster the case that the Salt is a navigable River. The overwhelming weight of the evidence establishes that the Salt River was navigable in its ordinary and natural condition, although the State is only required to establish by preponderance that each segment of the River was navigable or susceptible to navigation in its natural and ordinary condition. *Winkleman*, 224 Ariz. at 236, 229 P.3d at 248.

#### **A. The River Was Actually Navigated**

The State presented the Commission with evidence that clearly showed actual, successful navigation occurred on the River, even as the River's flows were being increasingly diminished by irrigation diversions and the channel impeded by dams. Compare C053-385, at 43-46 (Fuller Rebuttal PPT) (historical boating accounts), with C030-364, at 117-19 (Fuller PPT) (canals, dams, and diversions). Each account is discussed in detail in the "Segments of the Salt River" section of this Brief, within the applicable segment where the boating occurred. There were at least 31 accounts of boating, the vast majority of which were successful, meaning that the boat, boater, and cargo arrived at the destination. C053-385, at 43-48 (Fuller Rebuttal PPT); Tr. 5/17/16, at 4663-67

(Fuller). More accounts occurred in Segment 6, the populated Salt River Valley, than any other segment. *Id.* As searching technology has improved, more boating accounts have been found; there are eighteen more accounts of boating than were first reported and presented to the Commission prior to its last decision, including new commercial boating accounts. *Id.*

Some of the boating accounts were clearly commercial in nature. Five tons of wheat was boated on a flat-boat in 1873, and the account itself stated “The Salt River is navigable for small craft . . . .” C002-5 (emphasis added). It is not coincidental that this is one of the earliest boating accounts in the record and also one of the largest amounts of cargo transported. Although by 1873, when the boating trip occurred, four diversion canals had already begun damming and diverting the River in Segment 6, by 1880, there were four more, and by 1887, canal companies were complaining that the River was over-allocated. C030-364, at 117 (Fuller PPT); L006, at 11 (Kibbey Decision). No expert is needed to inform the Commission of the obvious: dams across a river and the eventual total diversion of water will cause a river once considered “navigable for small craft” to become nonnavigable or at the very least less navigable. The law, however, requires considering the River prior to dams and diversions. *See Winkleman*, 224 Ariz. at 241, 229 P.3d at 253.

Commercial boating of the River continued after diversions were in place. The Globe Power Company used boats in 1893 for their surveys of the River in Segment 3 for power and water installations. C018-60. The Meadows and Burch commercial exploration trips of 1883 and 1885 successfully boated Segments 3 through 6. C028-320; C018-196; C018-133. Gentry and Cox moved their Ferry down the Salt in 1889, only to have it wrecked on the Gila at a later point. C018-247. In 1905, freight was hauled upriver by boat in Segment 4, to the site of Roosevelt Dam. C018-249.

The River was also boated by commercial trappers. The Day Brothers boated the Salt River in a “small boat” at least five times in the course of earning a living trapping beaver and otters on Arizona rivers. C002-8. In 1892, they specifically noted earning a “very remunerative profit out of the business.” *Id.* The Day Brothers were not alone and that account was not an anomaly: two other brothers were seen building a canoe on the Salt River above Phoenix in 1894 to trap and earn a living. C053-383. The brothers were preparing to “navigate for several miles the Salt and Gila rivers” to trap beaver, and they reported the Arizona furs were “much more valuable” than those in Alaska and “commanded a ready market.” *Id.* Trappers who traveled along the Salt River in the early 1800s did not use boats because the market at that time required travel to and from New Mexico, Missouri, and California, which could only be reached overland by horse. C018-186, at 5, 10, 17, 19, 21, 25-26 (Fur Trading: Forerunner of Industry in Arizona).

Other accounts showed that the River was used as a means for travel. In 1873, Logan traveled with three others from Fort Apache to Phoenix (Segments 1-6) in a homemade wooden boat. C053-392. Two separate parties, Thorpe and Crawford, and Ensign and Scott, traveled from Segment 4 to Segment 6 in 1910 and 1919,

respectively. 012-3-22; C018-62. Several trips were made from Fort McDowell to Phoenix (Segment 6) by reputable people stationed at the Fort. *See*, L012-3-8 (Willcox and Dr. Andrews); 012-3-13 (Fort McDowell Commandant Major Spaulding and Captain Hatfield). Trips were also made from Phoenix to Yuma by way of the Salt and Gila Rivers. *See*, 012-3-5 (Cotton and Bingham in an 18-foot flat-bottom skiff); C018-76 (Lieutenant Robinson and other soldiers in 1893); C029-363, C029-360, C029-361, C030-364, at 180 (Amos and Evans in 1895 in an 18 x 3.5 foot homemade wooden flat boat); C018-66 (Newspaper announcement for May 1905 flatboat trip, leaving foot of 7<sup>th</sup> Street Phoenix and headed to Yuma). In January of 1879, Hamilton and two others boated from Phoenix to Yuma and reported the River “perfectly practicable for navigation” such that a flat-boat drawing two feet could be loaded with goods from Phoenix and boated down to Yuma. C018-128 (emphasis added).

Ferries were also regularly used on the River at multiple locations. C030-364, at 194-196 (Fuller PPT). The use of ferries indicates the River was deep enough for heavily loaded boats for significant portions of the year, even after water was being diverted. *Id.*

All of these boating accounts describe the movement of people or things from point to point on the water, which is the essence of the navigability test. *Alaska v. United States*, 754 F.2d 851, 854 (9th Cir. 1985); *see also*, A.R.S. § 37-1101(3) (defining “highway for commerce” as “a corridor or conduit within which the exchange of goods, commodities or property or the transportation of persons may be conducted.”). These facts alone are sufficient to establish the River’s actual use as a highway for commerce under the test.

Boating accounts described the use of wooden small boats like canoes, skiffs, flatboats, and rowboats. C053-385, at 43-46 (Fuller Rebuttal PPT). Courts have recognized that title navigability may be demonstrated by evidence of small boat use alone, including the use of boats for trapping. In *United States v. Holt State Bank*, the Supreme Court stated that “navigability does not depend on the particular mode in which such use is or may be had – whether by steamboats, sailing vessels or flat boats.” 270 U.S. 49, 56 (1926); *see also*, *Econ. Light & Power Co. v. United States*, 256 U.S. 113, 117 (1921) (Court found the Desplaines River navigable where it was used by canoes or other light draft boats common to early fur trading days).

In one of the earliest cases of navigability, the Court found that “[i]t would be a narrow rule to hold that in this country, unless a river was capable of being navigated by steam or sail vessels, it could not be treated as a public highway.” *The Montello*, 87 U.S. 430, 441 (1874) (finding Fox River navigable based on the use by the fur trade); *see also*, *Alaska v. Ahtna, Inc.*, 891 F.2d 1401, 1403 (9th Cir.1989) (Court affirmed that the Gulkana is navigable where actual use was by hunters and fishermen in 16-24 feet flat-bottomed or rounded aluminum boats); *Puyallup Tribe of Indians v. Port of Tacoma*, 523 F. Supp. 65, 71-72, *aff’d*, 717 F.2d 1251 (9<sup>th</sup> Cir. 1983) (district court declared the Puyallup River navigable based on the Indians’ use of fishing boats and canoes); *North Dakota ex rel. Bd. of Univ. and State Lands v. Andrus*, 671 F.2d 271, 278 (8th Cir. 1982), *rev’d on other grounds sub nom. Block v. North Dakota ex rel. Bd. of Univ. and State Lands*, 461 U.S. 273 (1983) (Eighth Circuit found that

“[c]anoes travel at the time of North Dakota's statehood represented a viable means of transporting persons and goods.”); *Nw. Steelheaders Ass'n, Inc. v. Simantel*, 112 P.3d 383, 392 (Or. App. 2005) (Oregon Court of Appeals found the John Day river navigable and concluded that, “[i]n its ordinary condition in 1859, the John Day River . . . would have provided ample capacity for travel and trade by means of dugout canoes” which typically drafted six to eight inches).

The Court cautioned that small boat use would not indicate navigability when boats were dragged instead of floated; in other words, the river was not actually used for boating. *PPL Montana*, 132 S. Ct. at 1233 (“Mere use 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 and themselves, is not itself enough.”). No evidence in the record indicates boats were dragged rather than boated in the ordinary and natural condition of the River.

Applying these standards, the River is navigable because a variety of small boats were actually used, and as the evidence of susceptibility demonstrates, the River was certainly capable of supporting navigation by small boats, as it still does today where it has water.

#### **B. The River Was Susceptible to Navigation**

A showing of actual navigation is not necessary to prove navigability for title purposes; it is sufficient to show that the waterway *could* have been navigated. *Daniel Ball*, 77 U.S. (10 Wall.) at 563; *The Montello*, 87 U.S. (20 Wall.) at 441 (“[T]he capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the extent and manner of that use. If it be capable in its natural state of being used for purposes of commerce . . . it is navigable in fact, and becomes in law a public river or highway.”); *United States v. Utah*, 283 U.S. at 82 (“The question of that susceptibility in the ordinary condition of the rivers, rather than of the mere manner or extent of actual use, is the crucial question. . . . The extent of existing commerce is not the test.”); see *Nw. Steelheaders*, 122 P.3d at 390, 393 (John Day River found susceptible to navigability through post-statehood accounts of pleasure boating by sternwheeler on ten mile stretch, one log drive, and present day recreational use).

The United States Supreme Court recognized that arid, western states would be disadvantaged if navigability could only be established by actual use. See *United States v. Utah*, 283 U.S. at 83 (under the equal footing doctrine, Utah would be deprived of title to its riverbeds based on limited boating evidence before its 1896 date of statehood because it was sparsely settled, lacked access to the rivers, and there was little demand for commercial uses). In the *Utah* case, the Special Master found that the first attempt to navigate the Green and Colorado rivers, which were ultimately deemed navigable, was in 1869 and 1871 by Powell, but no further attempts at navigation were made for 17 years. *Id.* at 82. The first attempts by Euro-Americans to navigate the Salt were in 1873, and 17 years later the River was fully dammed and diverted in Segment 6, and there were still very

few people living near the upstream segments. C030-364, at 115, 117-19 (Fuller PPT) (Population centers and dams). Before a significant population could develop on Segment 3, Roosevelt Dam closed and began inundating the River. *Id.* Segment 4 was a difficult to access canyon reach that likewise never developed a significant population before it was changed by dams and reservoirs. *Id.*

Unlike the *Utah* Rivers, the Salt, in part of Segment 3, and all of Segments 4 and 6, never had a chance to develop with the growth of the population. It is paramount that title navigability determinations consider growth, as the *Utah* Court has made clear: “[A]s the title of a state depends upon the issue, the possibilities of growth and future profitable use are not to be ignored.” 283 U.S. at 83. In contrast, Segments 2, part of 3, and 5 have remained substantially similar to their ordinary and natural conditions, and “the possibilities of growth and future profitable use” became a reality: these segments are frequently boated for commercial recreation purposes. While the State recognizes that changes to the River have been beneficial for the public, the State continues to retain title to a riverbed that was once part of a navigable river even when the river is no longer navigable because of man-made alterations; *see Econ. Light & Power Co.*, 256 U.S. at 124 (fact that man-made obstructions exist capable of being abated by due exercise of the public authority, does not prevent river from being regarded as navigable in law). Therefore, the applicable law and the facts of the Salt River require the Commission to examine the susceptibility of the River for navigation before it was diverted, and to consider the implications of modern boating for the River’s historical susceptibility.

### **1. The River’s Physical Characteristics Demonstrate Susceptibility to Navigation**

The determination of a river’s susceptibility of use must be in the river’s ordinary and natural condition at statehood. *PPL Montana*, 132 S.Ct. at 1233 (quoting *United States v. Utah*, 283 U.S. at 76, “For the susceptibility analysis, it must be determined whether trade and travel could have been conducted ‘in the customary modes of trade and travel on water,’ over the relevant river segment ‘in [its] natural and ordinary condition.’”). A river’s capacity to satisfy the highway for commerce requirement under the susceptibility standard “may be shown by physical characteristics and experimentation as well as by the uses to which the streams have been put.” *United States v. Utah*, 283 U.S. at 83. Moreover, a navigability determination must be made on a “segment-by-segment basis, to assess whether the segment of the river . . . is navigable or not.” *PPL Montana*, 132 S.Ct. at 1229.

The State segmented the River into six segments and made a determination that Segments 2 through 6 were navigable in their ordinary and natural condition. C030-364, at 48. The segments were differentiated from each other based on their physical conditions, consistent with the Court’s direction in *PPL Montana*. C030-364, at 48-107 (Fuller PPT); Tr. 10/20/15, at 17, 51-152 (Fuller); 132 S. Ct. at 1230 (“[S]hifts in physical conditions provide a means to determine appropriate start points and end points for the segment in question.”). Mr. Jon Fuller, the State’s chief expert witness, comprehensively presented each segment’s physical characteristics by utilizing the following: Google Earth fly-overs, historical photos, historical descriptions, historical maps, historical boating

accounts, historical hydrology and geology data, modern photos, modern boating, Salt boating videos, boating guides, testimony by and conversations with boaters, rating curves showing depths corresponding to specific flows, graphs showing changes in flow across a year, and, perhaps most importantly, extensive field work on the River which included substantial boating. C030-364 (Fuller PPT); C053-385 (Fuller Rebuttal PPT). The State has submitted maps of the segments and exact segment boundaries. C018-47 (Segment maps); C028-349 (Segment boundaries).

Mr. Fuller is a professional registered hydrologist, a civil engineer certified by the State of Arizona, and an Arizona registered geologist. C030-364, at 7-9 (Fuller PPT); Tr. 10/20/15, at 10-12, 22-25 (Fuller). He was the founder and owner of JE Fuller/Hydrology & Geomorphology, which now employs 25 people in six different offices across the State. *Id.* He wrote his Master's thesis on Salt River Flood History and has done many studies on the Salt River and almost all of its tributaries, including studies of the floodplain, erosion, restoration, and sediment transport. *Id.* He has been working on the navigability studies for Arizona rivers since 1992. *Id.* His Salt River field experience includes boating all of the areas of the River in Segments 2, 3, 5, and 6 that have water in them today, and all of the reservoir lakes formed by damming the River in Segments 3 and 4. *Id.* He has boated the River at normal flows, very low flows, and high flows. *Id.* He has also observed the River at every road crossing and river access point. *Id.* Mr. Fuller's wide-ranging and deep Salt River resume is unmatched by any opponent expert that has come before this Commission.

Based upon Mr. Fuller's comprehensive assessment, the following important findings were made: first, Segments 2, the upper part of 3, 5, and the first mile of 6 remain substantially in their natural condition today. Tr. 5/18/16, at 4848-50 (Fuller); *infra* "Segments of the Salt River." The navigability of those segments is not substantially improved; to the contrary, depletions have reduced the water in those segments and made them less navigable. *Id.* Second, in their ordinary and natural condition, Segments 2 through 6 were not subject to any significant insurmountable physical characteristics that made any part nonnavigable. C053-385, at 106-115 (Fuller Rebuttal PPT); Tr. 5/18/16, at 4806-22 (Fuller). The only four significant rapids on the River occur in Segment 2, and of those, only Quartzite, at some flows, may require lining or portaging that takes at most an hour for a solo boater. *See infra* "Segment 2: Below Apache Falls to Below Sleeper Rapid (RM 33.4 to 66.2)"; *but cf. PPL Montana*, 132 S.Ct. at 1222-24, 1230-31 (Great Falls reach of the Missouri River found nonnavigable by Supreme Court took 11 days to portage around five major waterfalls and a succession of rapids; Court finding some nonnavigable segments may be so minimal that they may be treated as part of a longer, navigable reach). This finding was confirmed by several other expert boating witnesses for the State, including Mr. Alex Mickel, owner of Mild to Wild Rafting which operates commercially in Segment 2, and Mr. Tyler Williams, author of "Paddling Arizona." *Infra* "Segment 2: Below Apache Falls to Below Sleeper Rapid (RM 33.4 to 66.2)." Third, the ordinary and natural depths and physical characteristics of the River in Segments 2 through 6 would have been sufficient for



year-round use of historical loaded canoes and maneuverable flat boats, and seasonal use of historical loaded small boats with low drafts, and seasonal depths in Segment 6 would have been sufficient for loaded flat boats with moderate drafts. C053-385, at 104. This finding is verified and supported by each of the above listed items that collectively formed Mr. Fuller’s comprehensive assessment of the physical characteristics of the River. C053-385, at 98, 105 (Fuller Rebuttal PPT); Tr. 5/18/16, at 4778-4806 (Fuller). It is also supported by an analysis showing certain modern day boats that navigate the River are meaningfully similar to historical boats that could have navigated the River. *See infra* “Modern Boating on the River Demonstrates Susceptibility to Navigation.” This finding is also supported by the recent testimony of Mr. Mickel and Mr. Williams, who have both extensively boated the River where it remains in its natural condition today. *See infra* Part III. Remarkably, in contrast to the State, no opponent expert who assessed the ordinary and natural condition of the River did an analysis to determine if the depths of the River in that condition were sufficient to support boats. Tr. 5/18/16, at 4803-04 (Fuller). The detailed analysis of the River’s physical characteristics, including the geology and hydrology for each segment, are discussed in “Segments of the Salt River.”

**(a) The River’s Predictable, Seasonal Use Alone Meets the Susceptibility of Use Standard**

The Supreme Court in *PPL Montana* acknowledged that “a river need not be susceptible of navigation at every point during the year, neither can that susceptibility be so brief that it is not a commercial reality.” *PPL Montana*, 132 S.Ct. at 1234. This is consistent with the Court’s prior decisions. *Econ. Light and Power*, 256 U.S. at 122 (“Navigability, in the sense of the law, is not destroyed because the water course is interrupted by occasional natural obstructions or portages; nor need the navigation be open at all seasons of the year, or at all stages of the water.”); *Holt State Bank*, 270 U.S. at 57 (Mud Lake navigable despite occasional “seasons of great drought” during which navigation was difficult). Other courts have similarly held that periodic navigability is enough to demonstrate navigability. *See Oregon v. Riverfront Prot. Ass’n*, 672 F.2d 792, 795 (9th Cir. 1982) (predictable, seasonal flows for log drives approximately three months of the year is evidence of navigability); *Ahtna*, 891 F.2d at 1402 (Gulkana River navigable even though frozen six months of the year).

The Salt River was susceptible to use by loaded historical canoes and maneuverable low-draft flat boats year-round in Segments 2 through 6. C053-385, at 104. It was susceptible to larger boats with deeper drafts during the seasonal high flow. *Id.* The seasonal high flow typically lasts from February to May, about four months. Tr. 5/18/16, at 4801 (Fuller). The fact that there are predictable seasonal discharges that are above the discharges typically experienced in June or July does not mean that those are flood discharges. Tr. 5/17/16, at 4729-30 (Fuller). They are normal fluctuations in response to fluctuating seasonal climate, and are a characteristic of many rivers. *Id.* As discussed, *supra*, canoes and small boats are sufficient to prove navigability. However, even if the Commission were to disregard the year-round susceptibility of the River for canoes and maneuverable low-draft

flat boats, the seasonal susceptibility of the River for use by larger boats with deeper drafts is sufficient for a finding of navigability based on the applicable law.

## **2. Modern Boating on the River Demonstrates Susceptibility to Navigation**

The susceptibility of a river may also be shown by both recreational and post-statehood evidence of use. *PPL Montana*, 132 S.Ct. at 1233; *see also Ahtna*, 891 F.2d at 1405 (guided fishing and sightseeing trips on the Gulkana River were relevant to determining navigability: such trips provide “conclusive evidence of the lower Gulkana’s susceptibility for commercial use at statehood.”). The *PPL Montana* Court cautioned that this type of evidence must show that a river “could sustain the kinds of commercial use that, as a realistic matter, might have occurred at the time of statehood.” 132 S.Ct. at 1233. The evidence must demonstrate that “(1) the watercraft are meaningfully similar to those in customary use for trade and travel at the time of statehood; and (2) the river’s post statehood condition is not materially different from its physical condition at statehood.” *Id.*

As discussed above, Segments 2, the upper part of 3, 5, and the first mile of 6 are substantially similar to their ordinary and natural condition, and therefore the first part of the *PPL Montana* test is met for those segments. Within those segments, it is uncontested that modern boating occurs. Tr. 5/17/16, at 4668 (Fuller). There is also no disagreement on the types of modern boats that are used. *Id.* The Salt is frequently navigated year-round in Segments 2, 3, 5, and 6, by various types of boats, both commercially and privately. C030-364, at 269-281 (Fuller PPT). The boats that are used include canoes, kayaks, rowboats, and inflatable rafts. *Id.* at 281. Rafts that are used on the River may hold up to eight people and gear, which is a substantial amount of weight. Tr. 10/21/15, at 387-88 (Mickel). Canoes are regularly seen on the River. *Id.* at 398. The modern boating that occurs in each segment is described in more detail in the individual segment descriptions.

The State has clearly demonstrated that many modern boats are meaningfully similar to historical boats. The State provided a detailed report, “Boating in Arizona,” which was a thorough analysis of historical and modern boats. C018-149. Mr. Fuller testified about that report in the Gila River hearings, and that testimony has also been submitted as evidence for the Salt River. C018-148. The State also presented expert testimony from Mr. Brad Dimock, an Arizona historical boat builder, author of several books about historical boating in Arizona, experienced Salt River boater, professional Grand Canyon rafting guide, and resident of Flagstaff, Arizona. C018-146, at 2817-28. Mr. Dimock has built a few dozen boats, including exact replicas of historical Arizona boats used at statehood, and is intimately familiar with boats used and available in Arizona. *Id.*

A determination regarding meaningfully similar boats begins with knowing what boats existed at statehood and what uses they had. Boats in use and available for commercial purposes in Arizona in 1912 included steamboats, flatboats, skiffs, canoes, rowboats, ferries, canvas folding boats, kayaks, canvas canoes, various wooden boats, dugout canoes, steel boats, inflatable boats, and various Native American disposable boats made from more primitive materials. C018-149, at 7-59 (Boating in Arizona); C018-146, at 2835-37 (Dimock). The

State further provided the specifications for boats that were used on the Salt. C018-149 (Boating in Arizona), at 14, 30-34 (flatboat, skiff, and raft specifications), 35-42 (row boat and dories specifications), 43-53 (canoe specifications).

Although there was not an abundance of lumber and other materials along the River from which settlers or travelers could build a boat on the spot, small boats in Arizona were commonly homemade from lumber or driftwood. C018-148, at 171 (Fuller); C018-146, at 2837 (Dimock). Boats were also available for purchase through mail order and delivery from Sears and Montgomery Ward catalogs or by special order from boat building companies, including boats like the Peterborough freight canoes, canvas and wood boats, folding boats, kayaks that held cargo, and steel boats. C018-146, at 2835-38, 2860-63 (Dimock); C018-148, at 39 (Fuller). The famous Kolb brothers, who made the film about the Grand Canyon, had their boat the Edith built in Wisconsin and shipped out West. C018-146, at 2829-30 (Dimock). Freight canoes were delivered to the Southwest by train. *Id.* at 2907. The Klepper folding kayaks were available to be shipped throughout the United States in the early 1900s, and those boats, similar in design to kayaks from the 1960s and 1970s were well suited to carrying cargo and running on Arizona's rivers. *Id.* at 2860-63.

Boats were used or could have been used in Arizona for commercial trade and travel for hauling goods or passengers, trapping, river guiding, military use, fishing, surveying, traveling, and exploration. C018-149, at 6, 17, 27, 30, 36, 46, 49 (Boating in Arizona); C018-148, at 20-21 (Fuller). Guided recreational river touring existed in 1912 in Arizona. C018-149, at 119 (Boating in Arizona); C018-148, at 91 (Fuller). In the late 1800s and early 1900s, Julius Stone hired Nathaniel Galloway to guide recreational trips down the Colorado. C018-2 at 55; C018-17; C021-6, at 26-27. The Kolb brothers then used modified Galloway-Stone boats to make a scenic travel film about the Grand Canyon that was shown commercially for 60 years at the South Rim of the Grand Canyon. C018-146, at 2829-2832 (Dimock).

Next, the State provided the types of modern boats commonly used on the segments of the River that are in their natural condition today. C053-385, at 55 (Fuller Rebuttal PPT). Those boats include rubber rafts, kayaks, canoes, row boats, dories, rafts, small motor boats, tubs, and jet and air boats. *Id.*; Tr. 5/17/16, at 4677 (Fuller).

The State then demonstrated that the overall characteristics of both modern and historic boats were meaningfully similar. Mr. Dimock considered the draw, handling, weight, durability and cargo capacity of both historical and modern boats. C018-146, at 2841-51 (Dimock). Mr. Dimock concluded that kayaks, canoes, duck boats, and flatboats used are meaningfully similar to versions of those boats that existed at statehood. *Id.* at 2850-51. *See also*, Tr. 10/22/15 at 530-531 (Dimock) (modern canoes and flatboats are meaningfully similar to historic boats).

Mr. Fuller did a similar in-depth comparison of historical and modern boats. C018-149, at 109-117 (Boating in Arizona); C018-148, at 84-89 (Fuller). Mr. Fuller concluded that the draw, weight, and design of

modern boats are essentially the same as historical boats. C018-148, at 85. River depth requirements for historical boats are similar for modern boats. A modern canoe requires a minimum river depth of six to eight inches. *Id.* at 88–89. A traditional dugout canoe required eight inches and a historical canvas canoe required about three inches. *Id.* A modern drift boat requires eight inches. C018-149, at 117. Historical flat bottomed and round bottomed boats required four and six inches, respectively. L030, at 8-3. Overall, modern canoes and historical canoes are meaningfully similar in design, purpose, weight, draw, and load. C053-385, at 57-63 (Fuller Rebuttal PPT); Tr. 5/17/16, at 4680-4703 (Fuller). Thus, historical canoes are not heavier than modern canoes. C053-385, at 60; Tr. 5/17/16, at 4699 (Fuller) (difference in weight between historic and modern canoes is immaterial). While some modern canoes may be more durable than historical canoes, historical boats were sufficiently durable for the Salt River. Tr. 5/17/16, at 4701 (Fuller). Durability is irrelevant in Segments 5 and 6 where the conditions of the River would not require a particularly durable boat. *Id.*

Mr. Dimock and Mr. Fuller stated that canoes, kayaks, and rowboats were available at statehood, and the modern versions of those boats are meaningfully similar to the historical versions. Modern boats are used in Segment 2, the upper part of 3, 5, and the first mile of 6, where the River is substantially similar to its natural condition. For those areas of the River where it is virtually unchanged, the evidence meets both parts of the *PPL Montana* test for showing the susceptibility of the River for navigation by post-statehood recreational evidence. In addition, because the areas that are boated are representative of the breadth of the physical conditions that would have been found throughout Segments 2 through 6, the evidence of modern boating should also be indicative of the navigability of the areas that are not in their natural conditions.

The Commission can look to the most recent navigability case to find support for the State’s position. In *Hardy v. State Land Bd.*, 360 P.3d 647, 662 (Or. App. Ct. 2015), a case that applied the present day evidence standard set forth in *PPL Montana*, the court upheld the Oregon State Land Board’s finding that present day and historical watercraft are “meaningfully similar.” 360 P.3d at 663. The Board compared the draft of modern recreational boats used on the Rogue River to boats commonly used at statehood. *Id.* at 662. The Board found that “the two had similar ‘floatability characteristics.’” *Id.* The Board also looked at the flow requirements of modern boats used on the Rogue River. *Id.* at 662-663. The Board similarly found that historic boats used on the river would have permitted navigability to the same or similar extent as modern boats. *Id.* Moreover, the *Hardy* Court found that the state’s evidence satisfied the requirement that the river’s post statehood condition not be materially different than it was at statehood. *Id.*; *PPL Montana*, 132 S.Ct. at 1233. The Board found that Rogue River probably had a greater flow at statehood “due to the construction of dams and the withdrawal of water from the river for irrigation and domestic and municipal purposes.” *Hardy*, 360 P.3d at 663. The *Hardy* Court concluded that “the state’s evidence indicates that, if anything, navigation is *more* difficult today than it was at statehood.” *Id.* (emphasis in original).

### 3. Modern Boating of a 1911 Historical Replica Boat Confirms the Rivers Susceptibility to Navigation

To further confirm that historical boats could have navigated the River, Mr. Dimock successfully rowed his replica 1911 Arizona historical loaded boat down all of Segment 5 and the top part of Segment 6 that still has water. Tr. 10/22/15, at 532-540 (Dimock). In 1911, the Kolb brothers had the original boat, named the Edith, designed and built specifically for rivers with whitewater like the Colorado River. The boat was about 18 feet long by 4 feet wide, and had two cargo compartments which held the Kolb brothers' film equipment and expedition gear. C018-146, at 2828-29 (Dimock). Based on Mr. Dimock's experience, the boat could carry about a ton of cargo ranging from trapping skins to mining equipment to merchant staple goods. *Id.* The original Edith traveled the rivers from Wyoming to Needles, California and today rests at a museum at the south rim of the Grand Canyon. Tr. 10/22/15, at 531-32. Mr. Dimock's replica, also called the Edith, was fastidiously built to the exact original specifications, using the same materials and building methods of the original construction, at his boat shop on his property in Flagstaff. *Id.* at 526, 529; C018-146, at 2832. His boat has been run through Grand Canyon and Cataract Canyon on the Colorado River and Lodore Canyon on the Green River, among other locations. C018-146, at 2832-33. The Edith is just one of several replica boats Mr. Dimock has built, although he builds mostly modern dories. *Id.* at 2834.

On August 31, 2015, Mr. Dimock placed his replica Edith in the water at the beginning of Segment 5, just below Stewart Mountain dam and boated 12 miles downstream to Granite Reef, which is a few miles into Segment 6. Tr. 10/22/15, at 533 (Dimock); C030-364, at 288-293. It was loaded with 850 pounds of sandbags, jugs of water, and of course Mr. Dimock. C030-364, at 288-293. This was his first time boating this stretch of the River. Over the entire 12-mile stretch, only in one location did Mr. Dimock take the wrong line with his boat and ran aground for 50 to 100 ft. Tr. 10/22/15, at 535-39, 631. After he ran aground, he looked in the hatches of his boat and found that about 500 additional pounds of water had leaked into the large hatch, which had compounded the problem of taking the wrong line by creating a deeper draft. *Id.* at 536. The leak occurred because the boat had been out of the water in Flagstaff and did not have adequate time to swell the planks and close. *Id.* After getting stuck, Mr. Dimock got out of his boat, pulled it off the rocks, walked it down a bit, and got back in. *Id.* Without the misdirection on his first descent, Mr. Dimock would not have gotten caught on any shallow spots, even with the additional 500 pounds of leaked water. *Id.* at 536, 631.

Mr. Dimock categorized the trip with the cargo as a success. *Id.* at 526, 539. He testified that someone could do that exact trip in historical times. *Id.* at 539. The flow rates in Segments 5 and 6 (below the Verde confluence) were 653 cfs and 746 cfs respectively. C030-364, at 288. Both flow rates are well within the ordinary and natural condition of the River, with 653 cfs being somewhat above the reconstructed natural median for Segment 5 and 746 cfs being somewhat below the reconstructed natural median for Segment 6. C053-396, at 8.

(Fuller Rebuttal Hydrology). Segment 5 and the first mile of Segment 6 are substantially similar to their natural conditions. *See infra* “Segments of the Salt River: Physical Descriptions and Boating Characteristics.” The trip proved that a historical loaded boat could indeed navigate the ordinary and natural River in Segments 5 and 6.

#### **4. The Susceptibility of Use Standard Focuses on the River’s Potential For Navigation and the River’s Unique Circumstances**

Navigability-for-title is not a “one size fits all” test. It is a question of fact with respect to each individual river. *See Hassell*, 172 Ariz. at 363 n.10, 837 P.2d at 165 n.10. *The Daniel Ball* test is sufficiently flexible to take into consideration that the River’s flows have been traditionally used for irrigation. *See United States v. Appalachian Elec. Power Co.*, 311 U.S. 377, 404 (1940) (stating that there is no “formula which fits every type of stream under all circumstances and at all times” and that “[o]ur past decisions have taken due account of the changes and complexities in the circumstances of a river.”). It is not only appropriate, but in fact, absolutely necessary that the Commission examine these special circumstances in determining the Salt River’s navigability. *United States v. Utah*, 283 U.S. at 82 (stating that where conditions of exploration and settlement explain the infrequency or limited nature of commercial use, the susceptibility to use as highway for commerce may be still satisfactorily proved).

There are logical reasons why the record does not contain even more accounts of boating. Very little is known of the Hohokam use of the River, but what is undisputed is that boats used in the 1400s, at the end of the Hohokam period, would have little chance of being found by archaeologists 400 years later. Tr. 3/31/16, at 4330, 4391-93 (Newell); Tr. 5/18/16, at 4857-58 (Fuller); C028-313, at 4, 6. Even so, some evidence exists that the Hohokam did use boats. *See infra* “Segment 6.”

The Native Americans that succeeded the Hohokam civilization did not live along the Lower Salt River, Segments 5 and 6. A 1701 map by Francisco Kino shows many settlements in southern Arizona, but unmistakably there are no settlements noted on the Lower Salt River. C046-376; Tr. 5/18/16, at 4859-62 (Fuller). This was because the area between the Gila and where the Apaches resided to the east was a buffer zone where no one lived. C053-390, at 108; L030, at 3-9. The record shows, however, that the Maricopa and Pima may in fact have used boats for fishing on the Salt. *See infra* “Segment 6.”

The State provided realistic explanations for the lack of thriving, shipping industries on the River at statehood. C053-385, at 7-10 (Fuller Rebuttal PPT); Tr. 5/17/16, at 4518-35 (Fuller). Some of these common sense explanations are: no Euro-Americans lived by the River in many segments; railroads came to Phoenix relatively soon after its founding; and no alternative irrigation sources existed, whereas alternative transportation sources did exist. *Id.* Diversions of the Salt River began as soon as the first settlers arrived. C030-364, at 112-113 (Fuller PPT); Tr. 4/7/03, at 217 (Roberts) (since the beginning of the Salt River Valley’s settlement, the plan was to take the water out of the River). Irrigation was the River’s highest and best use. Tr. 1/26/16, at 2014 (August).

### **III. The Testimony and Evidence from Every Salt River Boater Who Has Come Before ANSAC Supports the River's Navigability Today and at Statehood**

In the recent ANSAC hearings, the State presented expert testimony from four knowledgeable Salt boaters who confirmed the River's navigability: Mr. Jon Fuller, Mr. Alex Mickel, Mr. Tyler Williams, and Mr. Brad Dimock. In the past, the Commission has heard from John Colby, Jim Slingluff, George Marsik, Jerry Van Gasse, Dorothy Riddle, and a commercial guide who worked for Cimarron Adventures. Tr. 1/18/06, at 55 (Colby); L011-3, at 63 (Slingluff Deposition); U002 (Marsik Affidavit); U002-4 (Van Gasse); U006 (Riddle); U033. All of the evidence and testimony presents a consistent picture: where the River is still in its largely natural condition today, it is navigable by small boats year-round.

Opponents presented absolutely no contradicting testimony or evidence from Salt River boaters. Nor have they presented any such evidence at any time over the long history of this case. Only one conclusion can reasonably be drawn from their lack of supporting evidence: no honest boater can deny the obvious – small boats have no problem navigating the River.

#### **A. Mr. Williams Provided Compelling Evidence on the Salt River's Navigability Based on His Vast Amount of Experience on Rivers Across the United States**

Tyler Williams, who has lived in Flagstaff since 1977, and who is a professional boating guide and author, testified that the River is navigable historically and remains so today. Tr. 10/21/15, at 288, 361. One of his seven books, "Paddling Arizona," provides a comprehensive paddling guide to Arizona's lakes, rivers, and creeks, both flatwater and whitewater. *Id.* at 274-75; C049-5. Mr. Williams based his assessment of the River's navigability on whether the natural River could have supported boats that were hauling goods. Tr. 10/21/15, at 328-29.

Mr. Williams's work as a river guide and author has taken him all over the country, from West Virginia and South Carolina to Idaho and Washington and has provided him with experience with many rivers and types of boats, including kayaks, canoes, and rafts. Tr. 10/21/15, at 276-77. He is also familiar with Mr. Dimock's 1911 Arizona historical replica boat, the Edith. *Id.*, at 277-78. For his purposes, he prefers to use a kayak for its versatility and affordability (i.e., oceans, rivers, and creeks). His opinion on the River's navigability is not based on his ability to kayak the River, however, but rather on his extensive knowledge of rivers around the United States and of the River itself. *Id.* at 277-78, 374-75.

With respect to the Upper Salt River (Segments 1 through 3), Mr. Williams has boated Segments 2 and 3 about twenty times, in flows ranging from 150 cfs to 25,000 cfs, and most often at about 500 cfs. Tr. 10/21/15, at 278-80. In Segment 2 he has seen many types of boats, including open canoes filled with people and sufficient gear for five days on the River. *Id.* at 281-82. He has also paddled on the reservoirs (in Segment 4) as well as on the Lower Salt River between Saguaro Lake and Granite Reef Dam in Segments 5 and 6. *Id.* at 279.

Concerning the River's depths, Mr. Williams was clear that the Upper Salt is a river, not a shallow desert stream; accordingly, the depth is sufficient for a historical wooden flatboat, canoe, or rowboat, to navigate. Tr. 10/21/15, at 292-93, 286-87. At 300 cfs, near the natural median for Segments 2 and 3, Mr. Williams estimated there could be six shallow spots that might cause a historical wooden flatboat or canoe to scrape over some rocks, but there would be no undue difficulty over the course of the trip. *Id.*, at 286-87. At higher flows, well within the ordinary condition of the river, shallow spots disappear. *Id.* at 287.

With respect to the lower Salt River where it is boated today (Segments 5 and 6), and where the River is similar to its natural condition when water is released from Stewart Mountain Dam, Mr. Williams also believes that a historical wooden flatboat or canoe loaded with goods could navigate that reach. Tr. 10/21/15, at 294. He has boated this area of the River five or six times, at around 600 cfs, which is well within the ordinary and natural range of the flows for the River and close to the natural median flow for both Segments 5 and 6. *Id.* at 293-94. He characterized the River in that reach as a "nice desert river. There's a few small rapids, some Class I rapids, maybe even Class II in there. . . . it was remarkable, to me, that there was such a normal-seeming river resource there in a place where you don't really normal think of – think of that being in existence." *Id.* at 293; *see also id.* at 290-91 ("The Salt you look at and you say that's a real river . . ."). Consistent with historical descriptions and opinions of other boaters, Mr. Williams "[did not] see any obstacles in there that would prevent any kind of moderately sized boat from getting down." *Id.* at 294. It is "readily apparent" how to navigate split channels, and on the Salt, any rocks or logs can be steered around. *Id.* at 290, 365-66.

Mr. Williams closed his direct testimony by stating that while there are rivers in Arizona that are navigable today because of modern boating technology, the Salt is not one of those:

A: In my opinion, the Salt would always have been navigable regardless of what kind of boat you're taking down. Those - - those - - that evolution of craft that you referred to perhaps makes different rivers at the higher end of the spectrum more navigable.

Q: What rivers are you thinking of?

A: Oh you know, Class V, VI river, like the East – East Verde. I don't know if that the best example. West Clear Creek. Those kind of rivers maybe wouldn't be navigable in historic craft. But something like the Salt, you know, I think it's been navigable ever since someone wanted to float a log down – downstream.

Tr. 10/21/15, at 294-95.

### **1. Mr. Mickel's Perspective As a Commercial Operator on the Upper Salt Is Extremely Informative**

Mr. Alex Mickel, the owner, president, and founder of Mild to Wild Rafting, testified that the Salt was navigable by historical wooden canoes and flatboats in Segments 2 and 3, where he operates one of the area's several commercial recreation boating businesses. Tr. 10/21/15, at 384, 386-87, 397-98, 476. Mr. Mickel has been



operating Mild to Wild as a commercial river outfitter on the Upper Salt<sup>1</sup> since 1998, nearly 20 years. Tr. 10/21/15, at 384. He has boated the Upper Salt “hundreds” of times. Tr. 10/21/15, at 396. The modern conditions of Segments 1, 2, and the commercially rafted portion of Segment 3 remain similar to their ordinary and natural conditions, and therefore, Mr. Mickel’s professional opinion about the current navigability of Segments 2 and 3 by historical boats is directly informative for ANSAC. C030-364, at 252, 254-55, 257-58 (Fuller PPT); Tr. 10/22/15, at 585-592 (Fuller).

Mr. Mickel and his wife started their Durango, CO, based company in 1994. Tr. 10/21/15, at 384. They now employ upwards of 90 employees at the peak season and outfit trips for numerous southwest rivers, including the Lower and Upper Animas, the Lower and Upper Piedra, the San Miguel, the Dolores, the Colorado in Utah, the Verde of Arizona, and the Salt. Tr. 10/21/15, at 386-87, 406-08, 465. Along with his experience boating Southwest rivers where he operates, Mr. Mickel has boated rivers across the U.S., including in Michigan, Ohio, West Virginia, and Pennsylvania. *Id.* at 385. He has used a variety of boats, including canoes, and has specifically used a wooden flat-bottomed rowboat on the Animas River in Durango, a river with rapids. *Id.* 385, 462, 470. Mr. Mickel’s extensive river boating experience provides a valuable and indispensable background as a basis for his assessment that the Salt is navigable.

During the Upper Salt operating season, Mild to Wild employs 20 to 25 employees, of whom fourteen work full time. Tr. 10/21/15, at 386. The company offers a variety of trips, from half-day outings at \$85 to five-day trips costing \$900. *Id.* at 387. Throughout the rafting season, Mild to Wild does about 2500 user days of business, with each user day counting as a person on the river that day, whether on a half-day or five-day trip. *Id.* at 477-78. Most of the trips are one-day. *Id.* Mild to Wild is one of the four major operators of the four that the United States Forest Service (“USFS”) currently permits. The USFS estimated that those operations had about 7500 user days in 2010, which was a wet year. Tr. 10/22/15, at 605-06. Mild to Wild would have accounted for roughly a third of the total business that year.

Mild to Wild generally operates when the spring snowmelt runoff can reliably provide a whitewater experience, that is between the end of February at the earliest to early June at the latest. Tr. 10/21/15, at 386-389. Commercial trips can operate between 220 cfs and 7500 cfs as measured at the Chrysotile gage, although above 350 cfs is preferred for rafting. *Id.* at 389-90, 476.<sup>2 3</sup> On several occasions Mr. Mickel clarified that outside of the

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<sup>1</sup> Upper Salt when used for Mr. Mickel’s context means Segments 2 and 3 where he operates commercially.

<sup>2</sup> Opponent expert Mr. Burtell incorrectly cites information regarding Mr. Mickel’s own company, specifically that Mild to Wild did not operate in 2014 because of low water. C021-1, at 6 (Burtell Declaration). Mr. Mickel, when asked about his 2014 operation stated: “We operated rafts in 2014 on the river. . . . [W]e had a shortened, but fun, season.” Tr. 10/21/14, at 428.

snowmelt period, the River is nevertheless boatable but does not provide the predictable splashes that customers seek, and the River may have a few shallow spots at lower flows. Tr. 10/21/15, at 420-21, 387-89, 468, 476-77.

Mr. Mickel explained that:

[A] Class II rapid will just have a big wave that you could have gone around or you could go through. When you go through, it splashes and it's fun and exciting. So that's why we tend to -- that's why we want to raft when there's more water. That's what our business model is built on.

Tr. 10/21/15, at 420-21, 467-68.

Mild to Wild uses rafts from 12 to 16 feet long and inflatable kayaks because “they’re the best boats available for what we’re doing, transporting people down the river.” *Id.* at 387-88. One should expect a modern commercial operator to be using the best and most modern boats for his operation. Each boat carries about six to eight people, some gear and a guide for day trips, and four to six people, some gear, and a guide for longer trips. For longer trips, another accompanying boat would carry more gear and a few passengers. *Id.* Although Mr. Mickel’s operation uses rafts and inflatable kayaks, he has regularly seen canoes and “all kinds of craft” come down the Salt. *Id.* at 398. Notably, Mr. Mickel did not conclude that the River is navigable only by modern boats. Mr. Mickel’s operation depends on whitewater conditions, but the River was still navigable historically at lower flows.

#### **IV. Segments of the Salt River: Physical Descriptions and Boating Characteristics**

##### **Segment 1: Confluence of the White and Black River to Below Apache Falls (River Miles [“RM”] 0 to 33.4.)**

The State does not assert that any portion of Segment 1 is navigable, from the confluence of the White and Black rivers to below Apache Falls. Tr. 10/20/15, at 52, 61 (Fuller); C030-364, at 57 (Fuller PPT); C028-349 (Segment Boundaries). Proponent experts opined that Segment 1 is clearly distinguishable from all of the other segments, which are navigable; thus its characteristics are only briefly discussed here, sufficiently to inform the Commission of the Segment’s distinguishing features. Tr. 10/21/15, at 393 (Mickel); Tr. 10/22/15, at 582-83 (Fuller).

Segment 1 has perennial flow, although some diversions deplete the flow. Tr. 10/20/15, at 57-58 (Fuller); C030-364, at 53 (Fuller PPT). The geology differs from that of other segments: it is basically one mega unit rock type with a narrow bedrock canyon throughout and no flats. Tr. 10/20/15, at 58-59; C030-364, at 54-55. Its channel pattern is also distinct from that of the other segments; although it has a typical pool and riffle pattern in

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<sup>3</sup> Mr. Mickel’s testimony regarding the range of flows during which his company operates contradicts both ANSAC’s 2007 decision and the Southwest Paddler website, which opponent expert Mr. Burtell also incorrectly relies upon in his Declaration. ANSAC 2007, at 40-42; C021-1, at 6 (Burtell Declaration).

some areas, it has a distinct pool and drop pattern in other areas where the drops or rapids are more vertical. Tr. 10/20/15, at 57; C030-364, at 53 (Fuller PPT). The condition of Segment 1 today is similar to its ordinary and natural condition. C030-364, at 252.

The segment is entirely within Apache Indian Reservation land. The Fort Apache or White Mountain Apache Reservation is to the north (River right) and the San Carlos Apache Reservation is to the south (River left). C030-364, at 52-53 (Fuller PPT). Access to the River is allowed only by Tribal permission; currently neither Tribe permits boating in this Segment. Tr. 10/20/15, at 57 (Fuller).

Due to the limited access, no official classification of rapids or any boating map exists for this segment. Tr. 10/20/15, at 55-58 (Fuller). However, based on aerial photography, maps, and conversations with boaters it is estimated that there are 44 Class III-VI rapids, far more than in any other segment, and that 17% of the segment's length is Class II or higher rapids. *Id.* There are no Class V or VI rapids anywhere else on the River. *Id.*

Mr. Alex Mickel legally boated Segment 1 in its entirety when he escorted several White Mountain Apache Tribe members down the river to explore the idea of opening commercial operations. Tr. 10/21/15, at 391. He agreed with Mr. Fuller that Segment 1 would not have been navigable by historical craft and that rapids in Segment 1 "are not even comparable, they're so much larger" than in any other segment. Tr. 10/21/15, at 393. For example, the area called Flying V Gorge is too constricting and full of thunderous whitewater for historic craft and has 20- to 30-foot waterfalls. *Id.*, at 392-393.

Nevertheless, sometime prior to June 1873, a carpenter named Logan who was stationed at Fort Apache built a stout boat with watertight compartments at each end and boated down the White and Salt Rivers to Hayden's Ferry with three others during the spring runoff, a trip that would have included Segment 1. C053-392. The trip must have been successful because it was at the suggestion of Logan, then employed by Charles Hayden, that another trip be made to determine whether lumber could be obtained by floating logs down the White and Salt rivers. *Id.*

The subsequent trip began on May 24, 1873. C062-411; C028-326; C002 -1. Charles Hayden left his home at Hayden's Ferry with six men to prospect along the Salt headwaters for timber suitable to saw into lumber and to determine if the lumber then could be floated down to the Phoenix Valley. *Id.* After leaving Fort McDowell, they followed the Salt "as closely as possible for nearly 200 miles." C028-326. Upon finding a location on the White River where pines were plenty, the men made a canoe out of a tree and put some logs into the River to drive them down. *Id.* The scheme was a failure because logs got lodged in narrow canyons and the canoe was abandoned. C053-392; C041-19; C002-6. The failure likely occurred on the White river or Segment 1 of the Salt River, where narrow canyons exist. Tr. 5/17/16, at 4536-4548 (Fuller); 10/21/15, at 392-93 (Mickel).

## **Segment 2: Below Apache Falls to Below Sleeper Rapid (RM 33.4 to 66.2)**

Segment 2 is the frequently boated whitewater reach of the River that begins below Apache Falls and ends below Sleeper Rapid, a length of 32.8 miles. Tr. 10/20/15, at 61-62 (Fuller); C030-364, at 58-59 (Fuller PPT); C028-349 (Segment Boundaries). Its current geologic and hydrologic conditions are similar to its ordinary and natural condition. C030-364, at 254-55; Tr. 10/22/15, at 588. It has perennial flow today, although there are some upstream diversions. Tr. 10/20/15, at 62-63; C030-364, at 59. The channel is straight or slightly sinuous and mostly contained within bedrock canyons with thousand-foot-high cliffs. Tr. 10/20/15, at 62-63, 69; C030-364, at 59. The slope is less steep than in Segment 1 and the River flows in a pool and riffle pattern, with long flat reaches and short steeper reaches with riffles and some rapids. Tr. 10/20/15, at 62-63; C030-364, at 59. The surrounding land is White Mountain Apache and San Carlos land for the first few miles to the north (River right) and south (River left) respectively, and then White Mountain Apache land to the north (River right) and Tonto National Forest land to the south (River left). *Id.* All of these entities allow boating. *Id.*

This segment has the most rapids of all the segments that the State is claiming are navigable (Segments 2 through 6), but significantly fewer and smaller rapids than Segment 1. Tr. 10/20/15, at 62. Segment 2 has 16 rapids of Class III or higher, including four potential Class IV rapids; 11% of its length constitutes rapids. Tr. 10/20/15, at 66-67 (Fuller); C030-364, at 60 (Fuller PPT). The boating experts agree that boaters should approach Class IV rapids with caution; the four Class IV rapids can be boated, lined, or portaged. Tr. 10/20/15, at 80-87, 119-131 (Fuller); Tr. 10/21/15, at 283-84, 347-48 (Williams); and Tr. 10/21/15, at 393-95 (Mickel). Tr. 10/20/15, at 66-68; C030-364, at 60.

The only rapid that might require either a portage or lining at some flows is Quartzite rapid. *Id.* Quartzite rapid was dynamited in 1993 by boaters impatient with the wait to portage or line the rapid. Tr. 10/20/15, at 80-87, 119-131 (Fuller); C030-364, at 214-222. The portage or lining is a walk of merely 200 feet and could take at most an hour for a solo boater with a load of a thousand pounds. Tr. 10/20/15, at 128. Mr. Williams lined a raft through Quartzite Falls before 1993 in 30 minutes, and has also portaged the rapid. Tr. 10/21/15, at 284, 347-48. He believes there is nearly a 100 percent success rate when lining Quartzite, and that lining would be preferred to portaging. *Id.* at 372-73, 379. Mr. Mickel portaged Quartzite before 1993 at high flows, although he would line the boat at the median flow. *Id.* at 395-96. Lining entails attaching a rope to your boat and pushing it through the rapid, while you stand aside holding the rope. *Id.*

The USGS published records for the Chrysotile gage, which began reporting around 1925, and therefore shows the River's post-natural flow, show a median flow of 246 cfs.<sup>4</sup> C053-396, at 7 (Fuller Rebuttal Hydrology)

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<sup>4</sup> Median flow means that 50% of the time flow is greater and 50% of the time flow is less than that number.

(Mussetter); Tr. 5/18/16, at 4750-66.<sup>5</sup> The natural median flow at Chrysotile, absent diversions, is estimated at between 277 cfs and 298 cfs. C053-396, at 8 (Fuller), 7 (Burtell); Tr. 5/18/16, at 4750-66. Using Mr. Fuller's lower natural median flow of 277 cfs and Mr. Burtell's rating curve for the Chrysotile gage, the corresponding ordinary and natural depth is 1.6 ft. C055-400, at 18 (corrected page of Rebuttal Rating Curves C053-397); Tr. 5/18/16, at 4797-4803 (Fuller); *see also*, C055-398, at 102 (corrected page of Fuller Rebuttal PPT C053-385). Opponent expert, Mr. Burtell, calculated a median flow depth of less than 1.7 ft. The corresponding high flow seasonal depths from mid-February to mid-May are 1.3-2.8 ft., and the yearly 10% to 90% range of depths is 1.2-3.0 ft. *Id.*

These depths are calculated using Mr. Burtell's Chrysotile rating curve and thus represent average or mean depths and not depths of the boating channel or thalweg. C021-1, at Table 7, n. f. Depths of the boating channel are greater than the mean depth, as can be seen by Mr. Burtell's measured cross-section for Segment 2, which shows an average depth of 1.1 feet but a significantly deeper boating channel in the center with depths of up to 2.2 feet. C021-1, at Figure 10A; Tr. 5/18/16, at 4798-99 (Fuller). The use of Mr. Burtell's rating curve also means that the depths are for near-riffle conditions, rather than conditions at deeper pools. Tr. 5/18/16, at 4776 (Fuller). Therefore, the conservative method of using both the average depth across a section of the river and a section of the river that is near a riffle results in depths that represent more limiting conditions for navigability rather than deeper areas. *Id.* The difference between average depth and the boating channel depth may partly explain why actual Salt River boating experts consider the river navigable but theoretical experts who have not boated the river or talked to boaters consider it nonnavigable.

The limiting depths in this Segment are sufficient to support year-round use of historical, wooden, loaded canoes and historical, wooden, lightly loaded, maneuverable, flat boats. C053-385, at 104 (Fuller Rebuttal PPT); Tr. 5/19/16, at 5086, 5139-41 (Fuller); C030-364, at 255; Tr. 5/18/16, at 4804-05 (Fuller). The depths during the seasonal high flow are sufficient for historical wooden loaded canoes, historical wooden loaded maneuverable flat boats with moderate drafts, and historical wooden loaded small boats with low drafts. *Id.* The greater depths during the seasonal high flow allow boats with larger loads and drafts to navigate Segment 2. *Id.* Mr. Fuller made this conclusion not only by considering calculated depths from reconstructed hydrology and rating curves – which only rely on one point along the River – but also by observing and boating the River multiple times during various flow rates, talking with boaters, considering potential obstacles, and analyzing historical information. Tr. 5/18/16, at 4778-4822; C053-385, at 96-115. Mr. Fuller's testimony is consistent with that of the State's other experts. Mr.

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<sup>5</sup> Mr. Fuller compiled all experts' hydrology numbers in his Hydrology Rebuttal Report, C053-396, in addition to producing new information himself. To reduce confusion, only Mr. Fuller's summary compilation is cited when discussing hydrology for all segments, and an explanatory parenthetical indicates who produced a particular number. The primary sources for the experts cited can be found here: C021-1, at Tables 7, 8 (Burtell Declaration 2015); C039-1, at 81 (Mussetter Salt Presentation 2016); C022-1, at 99, 107 (Gookin Salt Report 2015).

Mickel, who has boated Segment 2 hundreds of times, testified that historical wooden loaded canoes could have navigated Segment 2 year-round, and historical wooden loaded flatboats could have navigated during the flow ranges of roughly 400 to 4000 cfs, which corresponds to the seasonal, high flow snowmelt period, or about 3.5 months each year. C053-396, at 10. Mr. Mickel believes the ideal flow for a flatboat would be between 550 to 650 cfs. Tr. 10/21/15, at 475-76. Similarly, Mr. Williams, who has boated Segment 2 20 times, testified that a historical loaded flatboat could navigate Segment 2 more than 50 percent of the year, and a historical loaded canoe at least 90 percent of the year. Tr. 10/21/15, at 288-90, 361. Mr. Dimock, who testified about his trip in his replica historical boat in Segments 5 and 6, stated he had run the Upper Salt on “very high flows” back in the 1970s, and based on those flows he would not want to use a wooden boat. Tr. 10/22/15, at 543-44, 563 (Dimock). This testimony of experts who have actually boated the River demonstrates that historical loaded flatboats could navigate the River at least during the annual high-flow spring runoff which lasts about 3.5 months but would have difficulty at the very high flows and very low flows, and historical loaded canoes could navigate the River year-round.

Consistent with this testimony, in 1873, Mr. Logan and his three boat mates continued their trip through this Segment during spring runoff in a wooden boat they had built upstream at Fort Apache. C053-392. Based on that success, Logan suggested a similar trip to assess the River’s suitability for log floating. *Id.* This historical trip confirms what the boating experts know: wooden small boats can at least navigate the Salt during spring runoff.

Nevertheless, historical boating in Segment 2 was limited, in part due to the lack of a significant population nearby and because precipitous canyon walls that border the River made river access difficult. Tr. 10/20/15, at 69-70 (Fuller); Tr. 5/17/16, at 4520-23; C053-385, at 7. The closest population center was McMillenville, which was 10 miles from Segment 2 as the crow flies, but the passage to the River would have been across the Apache Peaks and down into a very deep canyon. Tr. 5/17/16, at 4522-23. Silver that was processed at McMillenville was transported to Florence, which is not on the River. *Id.* No communities were listed along Segment 2 of the Salt in the 1910 census. C030-364, at 115.

Only one limited historical description of the River exists for Segment 2, and it demonstrates the difficulties of accessing the River in this Segment:

The Salinas also, according to the account of Lieutenant Beckwith and Dr. Randall, who tried to follow its course, on their way from Zuni to the Gila, in 1849, treads a chasm of the same nature, and is as impassable with pack-mules as that near Mount Turnbull. They were obliged to leave the stream, and make their way over high and rough mountains.

C030-364, at 131.

In modern times, there is extensive commercial and private recreational boating in Segment 2. C030-364, at 268-281; Tr. 10/22/15, at 600-618. In the latest round of hearings, Mr. Mickel, the founder and president of Mild to

Wild Rafting, testified about his commercial operation in Segments 2 and 3. Tr. 10/21/15, at 383-473. Since 1998, he has operated from mid-February to mid-June, and now employs 14 full-time employees, with up to 25 total employees, to oversee 2500 user days of business, utilizing inflatable rafts and kayaks. *Id.* Mild to Wild is only one of four companies currently operating in Segments 2 and 3, with all four companies doing roughly 7500 user day's worth of business during a wet year. C030-364, at 272. This is a substantial amount of business. Mr. Mickel's company charges anywhere from \$85 to \$900 per person for a trip, depending on its length and type, which amounts to a minimum of hundreds of thousands of dollars for just his company's 2500 user days of business. Tr. 10/21/15, at 387.

Modern commercial boating is not new. In the past, ANSAC has heard from other commercial operators, including Jerry Van Gasse, George Marsik, and Dorothy Riddle. U002-4; U006; U002. George Marsik, President of Worldwide Explorations, Inc., submitted an affidavit in 1987 that his company conducts 100 trips a year on Segments 2 and 3 of the Salt, year-round. U002. In 1987, Jim Slingsluff testified that outfitters will run below 300 cfs and as low as 200 cfs. L011-3, at 63 (Slingsluff Deposition). Arizona Game and Fish personnel boat the River in canoes and rafts for fish surveys, carrying electrical shock equipment and other gear, in flow rates ranging from 122 to 700 cfs. Tr. 10/22/15, at 612-616; C030-364, at 279; C018-5 (Arizona Game and Fish Survey Trips). The Commission's previous Upper Salt decision incorrectly stated the ranges of flows when commercial operators conducted business. ANSAC 2007 Upper Salt Determination at 41.

The USFS, in coordination with the White Mountain Apache Tribe, provides joint permitting for commercial operators on the River between Highway 60 to Gleason Flats, and then the USFS provides commercial permitting for the remainder of the Segment below Gleason Flats. Tr. 10/21/15, at 390 (Mickel). Private trips also require permits during the period between March 1 and May 15, with a maximum of 4 trips allowed per day. Tr. 10/22/15, at 610; C030-364, at 273. During that period, there are about 2600 user days for private wilderness trips spanning Segments 2 and 3, and 3000 user days for daily trips in Segment 2. *Id.* Outside of March 1 through May 15, no limits on the number of trips are imposed, but a permit is required for the stretch that runs from Highway 60 to Gleason Flat. Tr. 11/18/15, at 1368; C018-158. The permit is purchased online through the White Mountain Apache Tribe and the website states: "the Salt River is open year round to river rafting." *Id.* As part of its permitting scheme, the USFS employs two river rangers to manage its portion of the River, which they do in rafts for flows as low as 350 cfs and in smaller boats at lower flows. 10/22/15, at 605.

Numerous boating guides describe boating in Segment 2. C018-1, at 114-117 (Arizona State Parks River and Streams Guide); C018-59 (Salt River Canyon Guide); C018-57 (A Riverrunner's Guide to the Salt River); C018-199 (Guide to the Upper Salt River); C018-200, at 208-215 (Paddling Arizona); C030-364, at 275; Tr. 10/22/15, at 611 (the National Park Service and the USFS). Websites have pages devoted to paddling the River,

and a survey of the Arizona Paddler's Club states that the daily reach in Segment 2 is the among the most frequently boated areas of the Salt. Tr. 10/22/15, at 604, 612.

With so much published information about boating the Salt River, it is clear that the River is boatable. With the River in a near-natural condition in this Segment, and the boating experts concluding that the River also would have been able to be boated by historical boats, the evidence is clear: Segment 2 of the Salt River is navigable.

### **Segment 3: Below Sleep Rapid to Upstream of Roosevelt Dam (RM 66.2 to 104.1)**

Segment 3 today has two distinct parts for a total length of 37.9 miles. C030-364, at 65-66; C028-349 (Segment Boundaries). The upper part of Segment 3 is located on a stretch of the River that is similar geologically and hydrologically today as it was in its ordinary and natural condition, and is frequently boated. C030-364, at 257-58; Tr. 10/22/15, at 591-92. The lower part of Segment 3 is inundated beneath what is now Roosevelt Lake and differs significantly from its ordinary and natural condition. *Id.* Roosevelt dam was completed in 1909. C030-364, at 119. Where the River is not inundated, it has perennial flow in a pool and riffle pattern, with a straight and sinuous channel. C030-364, at 66; Tr. 10/20/15, at 100. There are some areas with bedrock canyons and some flats. *Id.* The surrounding land is almost entirely USFS. *Id.* The River is much more channeled and pooled than in Segment 2, and therefore has fewer shallow places. Tr. 10/21/15, at 477 (Mickel).

Segment 3 is less steep than Segment 2 and only has five Class II rapids. C018-47; C030-364, at 67-68; Tr. 10/20/15, at 100-101 (Fuller). In the upper part that remains in its ordinary and natural condition, there are only five Class II rapids, and nothing greater. *Id.* Mr. Williams does not mention any rapids in that part of Segment 3 in his book, Paddling Arizona. C049-5, at 214. Similarly, Mr. Mickel described Segment 3 as "much milder" and did not mention any rapids that should be approached with caution. Tr. 10/21/15, at 400. For the lower part of Segment 3 that is currently inundated beneath Roosevelt Lake, it is unlikely that any significant rapids existed. C030-364, at 72; Tr. 10/20/15, at 105-108 (Fuller). The geomorphology of the River and the available historical information, including boating accounts that do not mention rapids, lead to the conclusion that this part of the River was mostly a single channel with a few splits and without any large rapids. *Id.*

The USGS published records for the near Roosevelt gage, which began reporting around 1914, show a median flow of 320 cfs. C053-396, at 7 (Fuller Rebuttal Hydrology) (Mussetter – Annual); Tr. 5/18/16, at 4750-66. The natural median flow at near Roosevelt, absent diversions, is estimated at between 385 and 443 cfs. C053-396, at 8 (Fuller), 7 (Burtell). Tr. 5/18/16, at 4750-4766. Using Mr. Fuller's lower natural median flow of 385 cfs and Mr. Burtell's rating curve for the Roosevelt gage, the corresponding ordinary and natural depth is 2.5 ft. C055-400, at 18 (corrected page of Fuller Rebuttal Rating Curves C053-397); Tr. 5/18/16, at 4797-4803 (Fuller); *see also*, C055-398, at 102 (corrected page of Fuller Rebuttal PPT C053-385). The corresponding ordinary and natural depths for the high-flow boating season of the River are 2.5-2.8 ft., and the yearly 10% to 90% range of depths is 1.2 ft. to 3.0 ft. *Id.* Opponent expert, Mr. Burtell, calculated ordinary and natural median flow depths of less than



1.6 to 2.3 feet. C021-1 (Burtell Declaration). The various depths associated with the Roosevelt gage are representative of the thalweg or boating channel depth at conditions near riffles. C021-1, Table 7 n. f (Burtell Declaration); Tr. 5/18/16, at 4798 (Fuller); *see also* C055-400, at 18 (“Notes”).

Similar to Segment 2, the depths in Segment 3 are sufficient to support year-round use of historical wooden, loaded canoes; and historical wooden, lightly loaded, maneuverable, flat boats. C053-385, at 104; Tr. 5/19/16, at 5086, 5139-41 (Fuller); C030-364, at 255; Tr. 5/18/16, at 4804-05 (Fuller). The depths during the seasonal high flow are sufficient for historical wooden, loaded canoes; historical wooden, lightly loaded, maneuverable, flat boats with moderate drafts; and historical wooden, loaded, small boats with low drafts. *Id.* The greater depths during the seasonal high flow allow boats with larger loads and drafts to navigate Segment 2. *Id.* Once again, Mr. Fuller considered multiple sources of information when making his determination regarding the River’s suitability for boats, including on the River experience in a boat at various flow rates. Tr. 5/18/16, at 4778-4822; C053-385, at 96-115. Not only has Mr. Fuller boated the upper part of Segment 3 multiple times, but historical descriptions, including boating accounts, provided additional detailed information regarding Segment 3’s suitability for boats. *Id.* Mr. Fuller also studied this Segment in-depth for his Master’s thesis, prior to his navigability work. Tr. 5/17/16, at 4613. Mr. Fuller’s assessment is consistent with that of the State’s other experts. Mr. Mickel estimated that a loaded historical wooden flatboat could navigate flows between 400 and 4,000 cfs, which corresponds to about five months a year in Segment 3. Tr. 10/21/15, at 397-98 (Mickel); C053-396, at 11 (Fuller Rebuttal Hydrology). A historical wooden canoe could navigate between flow rates of 100 to 3,000 cfs, which corresponds to year-round in Segment 3. *Id.* Mr. Williams testified that a loaded wooden historical flatboat or canoe could successfully navigate the upper part of Segment 3, where it remains in its near-natural state, most of the year. Tr. 10/21/15, at 289-90. The testimony from those who have actually boated the near-natural portion of this Segment demonstrates that historical loaded flatboats could navigate the River at least 5 months of the year, and historical loaded canoes could navigate year-round.

Historical boating accounts confirm that Segment 3 was actually navigated. Logan and his three boat mates continued their trip from Fort Apache through this Segment in a wooden boat in 1873, during spring runoff. C053-392. In 1883, Jim Meadows, a pioneer of the Tonto Basin who later lived in Yuma, traveled with three others in a boat between Livingston (Segment 3) and Tempe (Segment 6). C028-320. In 1909, the Arizona Republic published the story as a recollection of Mr. Meadows who was in town. Livingston was located in the Tonto basin in Segment 3, beneath what is now Lake Roosevelt, 10 miles above the Salt’s confluence with Tonto Creek. C030-364, at 115 (Fuller PPT); U027, at 3-17; 2/24/16, at 2974. The trip was called a “first attempt” to “navigate” the area, but of course Logan and his boatmates had navigated this reach prior, in 1873. C053-392. At one point the boat was temporarily stuck on rocks. The trip was characterized as a “success.” *Id.*

In late May and early June of 1885, William Burch and four other men traveled successfully on the Salt River from Eddy's Ranch in the Tonto basin, four miles above the mouth of Tonto creek (Segment 3), to the dam of the Grand Canal in Tempe (Segment 6), to "ascertain if logs could be floated through the canon" to Phoenix. C018-132; *see also*, C018-133; C018-134; C018-135; C018-196. "The object of the expedition combined business and [sic] well as pleasure." C018-196. Late May and early June is typically near the median daily flow of the Salt in Segment 3. C053-396, at 11 (Fuller Rebuttal Hydrology). The party had a "staunch craft" of 18 feet long by five feet wide, built by Mr. Logan, who was also a member of the boating party. C018-132. Fortunately, Mr. Logan wrote a detailed journal of the trip which was published in the *Daily Phoenix Herald* on June 5, 1885. C018-196. The trip details provide a first-hand understanding of the River beneath Roosevelt Lake (Segment 3), and beneath the inundated River downstream underneath Apache, Canyon, and Saguaro Lakes (Segment 4). The men began four miles above the point where Tonto Creek enters the Salt and encountered four or five "smooth rapids" between that point and the mouth of Tonto Creek, where they landed for the night. C018-196. This historical description of the River beneath Roosevelt Lake is consistent with what Mr. Fuller estimated would have existed based on his geomorphology assessment. *See supra*; *see also*, Tr. 10/20/15, at 224 (Fuller). There is no mention of any additional rapids between Tonto Creek and the entrance to the first canyon, which is the beginning of Segment 4. C018-196. The remaining detailed descriptions of the River in Segments 4, 5, and 6 are discussed below in the applicable sections. *See infra*. The exploratory trip to determine if logs could be floated down the River was deemed a "successful attempt here recorded," (C018-134), "successfully accomplished," C018-133, and the boatmen's "undisputed conclusion is that such work can be successfully carried on," C018-196. This was not the same trip as the prior 1883 Meadows trip. Tr. 5/17/16, at 4574-78 (Fuller).

On July 12, 1906, the Arizona Silver Belt reported that the Globe Power Company was using a boat in Segment 3 to conduct surveying work for a system of reservoirs and power works on the Upper Salt River. C053-384. A new boat was being built because a sudden rise in the River on the night of July 5 had carried the previous boat away. *Id.* The work was to require six weeks to two months longer to complete. *Id.* The flow rate on July 5 when the boat was swept away was 765 cfs, and during the week prior it was 385 cfs, which is identical to the reconstructed natural median daily flow. C053-385, at 40-41 (Fuller Rebuttal PPT); Tr. 5/17/16, at 4647-48 (Fuller); C053-396, at 11 (Fuller Rebuttal Hydrology). The historical boating account occurred through the reach opponent expert Mr. Burtell surveyed and is claiming is nonnavigable. Tr. 5/17/16, at 4648 (Fuller).

The historical descriptions of the River's physical characteristics in Segment 3 overwhelmingly describe a River that can support small boats. In 1864, F.A. Cook recorded crossing the River twice between the mouths of Pinto and Tonto creeks, and recorded fishing in the River on June 14 where "in some places it was up to our necks . . ." C021-1, at 7. June typically has flow rates below the median daily flow across a year. C053-396, at 11. In February of 1874, Army surgeon Corbusier crossed the River near Roosevelt and noted that "the water was so high

and turbulent that we could not cross, and it was some time before we found a fording place.” *Id.* Another crossing near Roosevelt is noted the following year in March, and the water there was “waist deep to a tall man . . .” *Id.* Both February and March have flow rates that are typically above the median daily flow. C053-396, at 11. Hiram Hodge, reporting about the Salt in 1877, wrote that “At low water it is a clear, beautiful stream, having an average width of two hundred feet for a distance of one hundred miles above its junction with the Gila, and a depth of two feet or more.” C030-364, at 129. The Salt River 100 miles above the Gila would be Segment 3. C028-349 (Segment Boundaries). In 1883, Archeologist Bandelier visited the Upper Salt in Segment 3 and recorded in his journal on May 26th that the Salt “is very swift, and as broad as the Gila at San Carlos, but only ‘belly deep.’” C021-1, at 8. Finally, in April of 1904, the River was described as “a shallow, rather broad stream, 10 to 50 ft. or more in width, and from a few inches to a foot or more in average depth. The bottom is sand or gravel with large boulder in places. The water is roily . . . . Throughout this stretch are small pools of enough depth to protect fish . . . . Just below Roosevelt the Salt River enters a canon and there forms good size pools.” C021-1, at 8. The year 1904 was a drought year, which may explain the anomaly of that description. Tr. 2/24/16, at 3017 (Burtell).

The modern boating that was described in Segment 2 also occurs on the upper part of Segment 3 where the River is still in its near-natural condition. C030-364, at 268-281 (Fuller PPT); Tr. 10/22/15, at 600-618 (Fuller); Rafting companies operate commercially in Segment 3 today and have in the past. *Id.* The USFS requires permits for both commercial and private groups during the period of March 1 through May 15. *Id.* Similarly, the boating guides that describe boating in Segment 2 also discuss boating in the near-natural, upper part of Segment 3. As previously noted, Segment 3 has very few and minor rapids and this is reflected in the boating guides. For example, the Guide to the Upper Salt River marks only three rapids, all Class II, and describes them as either “minor” or “easy.” C018-199, at Map 5 and 6. The Arizona River and Streams Guide states that Segment 3, from Horseshoe Bend to the diversion dam just above Roosevelt Lake, can be run by low water boaters year-round. C018-1, at 118-119.

Segment 3 is boated by modern boats, and was boated historically. Both modern and historical information confirm that the River’s characteristics support navigability by small boats, including only a few insignificant rapids that would have existed in the natural condition of the River and recorded depths that are sufficient for small boats. Segment 3 of the Salt River is navigable.

#### **Segment 4: Upstream of Roosevelt Dam to Below Stewart Mountain Dam (RM 104.1 to 139.6)**

Segment 4 is the reach of the River that today is beneath Apache, Canyon, and Saguaro reservoirs and spans a length of 35.5 miles. Tr. 10/20/15, at 108-110 (Fuller); C030-364, at 74-75 (Fuller PPT); C028-349 (Segment Boundaries). The surrounding land is USFS. *Id.* This Segment had perennial flow, a pool and riffle pattern, and a sinuous to straight channel located within bedrock canyons and small flats. *Id.* Today’s hydrology is not reflective of the natural hydrology due to the reservoirs. *Id.*

Based on a comprehensive assessment of the geology, canyon morphology, information from historical boating accounts, historical maps and descriptions, and an assessment of Segment 4's characteristics compared to other Segments of the River, it is likely that only Class II rapids were present in Segment 4. Tr. 10/20/15, at 108-119 (Fuller); C030-364, at 76-86. Class II rapids, like those in Segment 3, can be boated by a novice, according to the American Whitewater Association. C018-219. Additional maps presented by SRP's expert Dr. Mussetter of the near-natural River in Segment 4 before it was inundated show a predominantly single channel, with a few areas where the channel splits and a main channel is indicated, and no notations of rapids. C039-1, at 67-73.

The USGS published records for the near Roosevelt and Tonto Creek above Gun Creek gages were added together to provide flow data for Segment 4. C053-396, at 4, 5 (Fuller Rebuttal Hydrology). The published records through 1998 show a post-natural median flow of 365 cfs. *Id.* at 7. The natural median flow for Segment 4 is estimated at between 405 cfs and 456 cfs. *Id.* at 8 (Fuller), 7 (Burtell); Tr. 5/18/16, at 4750-66 (Fuller). Using Mr. Fuller's lower natural median flow of 405 cfs, and Mr. Burtell's rating curve for the at Roosevelt gage, the corresponding median daily depth for the ordinary and natural condition is 2.6 ft. C055-400, at 18 (corrected page of Fuller Rebuttal Rating Curves C053-397); Tr. 5/18/16, at 4797-4803 (Fuller); *see also*, C055-398, at 102 (corrected page of Fuller Rebuttal PPT C053-385). The corresponding high flow seasonal depths from mid-February to mid-May are 2.5-3.0 ft., and the yearly 10% to 90% range of depths is 1.2-3.2 ft. *Id.* The various depths associated with the Roosevelt gage are representative of the thalweg or boating channel depth at limiting conditions near riffles. C021-1, Table 7 n. f (Burtell Declaration); Tr. 5/18/16, at 4798 (Fuller); *see also* C055-400, at 18 ("Notes"). No other expert provided depth estimates for Segment 4. C053-397, at 3 (Fuller Rebuttal Hydrology).

The limiting depths in this segment are also sufficient to support the use of historical wooden, loaded, small boats. Historical wooden, loaded canoes, and historical wooden, lightly-loaded, maneuverable flat boats could navigate Segment 4 year-round. C053-385, at 104; Tr. 5/19/16, at 5086, 5139-41 (Fuller); C030-364, at 255 (Fuller PPT); Tr. 5/18/16, at 4804-05 (Fuller). During the seasonal high flow, depths would be sufficient for historical wooden, loaded canoes; historical wooden, lightly-loaded, maneuverable, flat boats with moderate drafts; and historical wooden, loaded, small boats with low drafts. *Id.* As with the other Segments, Mr. Fuller's assessment of what historical boats could navigate this Segment started with depth as a binary descriptor because "if you don't have the depth, you don't have the boating." Tr. 5/18/16, 4803 (Fuller). In addition, Mr. Fuller considered the potential of obstacles such as rapids, braiding, beaver dams, marshes, and flooding; he relied on his extensive field experience; and he studied the available historical information. Tr. 5/18/16, at 4778-4822 (Fuller); C053-385, at 96-115 (Fuller Rebuttal PPT). No other expert did an assessment of the susceptibility of Segment 4 for navigation after reconstructing the Segment's ordinary and natural depths.

Historical boating accounts also confirm that Segment 4 was navigable in its ordinary and natural condition. Mr. Logan and his three boat mates continued their trip from Fort Apache to Tempe through this Segment in their wooden boat during the spring runoff of 1873. C053-392. The Meadows party of 1883, traveled through this Segment on their way to Tempe. C028-320. It is within one of the box canyons of this Segment that the party became temporarily stuck on rocks until they could float off. *Id.*; C018-196 (Burch trip describing box canyons in Segment 4). The boat likely got stuck on a sleeper rock in the middle of a pool due to the unfamiliarity of the boaters with the River during their first ascent. Tr. 10/20/15, at 214-219 (Fuller); Tr. 5/17/16, at 4566-4574 (Fuller). It is not uncommon for a boat to become temporarily stuck on an obstacle in a navigable river on a first attempt; even Opponents agree. *Id.*; see 3/30/16, at 4283-85 (Newell).

The Burch trip of late May, 1885, continued through Segment 4, and the journal of one of the boaters provides detailed information about the conditions of this Segment at that time. C018-196. Upon first entering Segment 4, they passed over several rapids. C018-196. The River was then “deep, smooth and placidly winds and deviates in its onward course.” C018-196. Fish of two to three feet in length were seen repeatedly swimming past the boat. C018-196. After spending the night camped beside the River, the boatmen continued through a more winding channel the next day, which occasionally had large rocks in mid-channel. C018-196. The boat passed over several rapids, “bumping on rocks occasionally, but never breaking, only shipping a little sea occasionally.” C018-196. The boat shot on top of a large rock in mid-channel and was pried off with poles the next day. *Id.* Not only was this trip a first attempt for these boatmen, C018-133, but also occurred in late May and early June, which is near the time of the year with the lowest flow. C053-396 (Fuller Rebuttal Hydrology); Tr. 10/20/15, at 220. The trip continued through Segments 5 and 6, and was ultimately characterized as a “successful attempt.” C018-396.

The Hudson Reservoir and Irrigation Co. traveled through Segment 4 in late May or early June of 1893, a low water time of year, in likely another first attempt, and one of the ribbed canvas boats sustained some damage. C018-60; C030-364, at 178 (Fuller PPT); Tr. 5/17/16, at 4609-16 (Fuller); Tr. 10/20/15, at 234-236 (Fuller).

On April 20, 1905, the Arizona Republican reported that freight was being hauled upriver to Roosevelt by boat. C018-249. During the reported time, there had been heavy rains and high water in the Salt, but it is unclear from the article how frequently boats were used and under what conditions boats were used to haul freight upriver. *Id.* Tr. 10/20/15, at 241-243 (Fuller); C030-364, at 183-85 (Fuller PPT); 5/17/16, at 4619-4625. Although the account is of boating in high water, it did not occur in non-ordinary flood conditions. *Id.* This account of upriver commercial boating in Segment 4 was not in the record prior to the previous ANSAC decision. Tr. 10/20/15, at 241-42 (Fuller).

In June of 1910, Thorpe and Crawford took a trip through Segments 4, 5, and 6 in a rowboat. L012-3-22. The flow records indicate that the Salt River McDowell gage in Segment 5 had 145 cfs, which is below the 10% flow duration, and unusually low, even for the low water month of June. Tr. 10/20/15, at 248-50 (Fuller); Tr.

5/17/16, at 4629 (Fuller). The flow was outside the ordinary range. *Id.* Not surprisingly, the unusually low flow conditions meant the men had to drag their boat at times, and the bottom of the boat had some wear. L012-3-22.

In May or June of 1919, Ensign and Scott boated Segments 4 through 6 in a canoe built specifically for the trip. C018-62. In Segment 4 they encountered some rapids, turned over once, and either lined or portaged some other rapids. The trip prompted the paper to report:

“Navigable possibilities of Phoenix were unexpectedly brought to the front yesterday at the luncheon meeting of the Rotary club when Herbert Ensign and Donald Scott, two Phoenix young men, described in a most interesting manner a trip by canoe from Roosevelt Lake to Phoenix, thus placing this city on the water map in a manner that offers many future possibilities.”

C018-62.

### **Segment 5: Below Stewart Mountain Dam to Above the Verde Confluence (RM 139.6 to 148.8)**

Segment 5 is part of the frequently boated reach of the lower Salt River that begins where water is released from below Stewart Mountain Dam and ends at the point just above the Verde confluence, a length of 9.2 miles. C030-364, at 87-88 (Fuller PPT); Tr. 10/20/15, at 131-32 (Fuller); C028-349 (Segment Boundaries). It is a standalone segment because of the change in geology from the upstream bedrock canyon of Segment 4, and the significant change in flow rate where the Verde River joins the Salt River in Segment 6. *Id.* This is a perennial segment, with pool and riffle characteristics, and a sinuous to straight channel in a mostly alluvial valley with occasional bedrock. *Id.* The surrounding land is USFS and the Salt River Pima Maricopa Indian Community. *Id.* There is only one minor Class II rapid in this Segment. *Id.*

Based upon a comprehensive evaluation of the modern conditions of the River compared to its likely historical conditions, the River in this Segment remains in a substantially similar condition to its ordinary and natural condition, both hydrologically and geomorphologically. Tr. 5/18/16, at 4822-49 (Fuller); C053-385 (Fuller Rebuttal PPT), at 116-130. This assessment confirms that the modern boating that occurs in Segments 5 and part of 6 would likely have been the same conditions historic boaters would have encountered prior to man-made dams and diversions. *Id.*

Although the modern hydrology releases differ slightly in time and amount from the natural hydrology of the River, the ordinary and natural condition of the River would have had similar flow rates to the modern hydrology flow rates. Tr. 5/18/16, at 4825-28 (Fuller); C053-385, at 117-119 (Fuller Rebuttal PPT). The dams above this Segment store water and release it for municipal and irrigation uses, which have the greatest demand in the summer months, from May to October. This timing differs from the natural hydrology when the greatest flow would have been during the Spring snowmelt period, from February to May. All of the modern flow rates would have all occurred in the ordinary and natural condition of the River. *Id.* For example, the flow rate of 650 cfs that

occurred when the State's expert Mr. Dimock boated his loaded historical replica boat through Segment 5 would have occurred historically for at least three months of the year, based on the reconstructed ordinary and natural hydrograph. C053-385, at 118; *see also*, C053-396, at 13. Based on the impact of the dams, the River has become less navigable because the modern releases are effectively zero for at least four months of the year, eliminating the ability for even small boats like canoes to navigate; the natural hydrology would seldom have been below 300 cfs and would have been boatable by small boats year-round. *Id.* Tr. 5/18/16, at 4828-27.

The modern channel pattern is similar to the ordinary and natural channel pattern. Based on an assessment of the flood record, historical and modern maps that show the River channel, changes in bank vegetation, and the response of the River to dams, the physical channel is substantively similar to its ordinary and natural condition. Tr. 5/18/16, at 4828-48 (Fuller); C053-385, at 119-30 (Fuller Rebuttal PPT). Maps of Segment 5 from the pre-dammed River in 1905 and the post-dammed River in 2013 show a substantively similar low flow channel, even after 108 years and numerous large floods. 10/20/15, at 39-40 (Fuller); C030-364, at 30-31 (Fuller PPT). Historical maps also confirm a channel that has a similar channel pattern and width. Tr. 5/18/16, at 4828-31; C053-385, at 120-21. Minor differences and changes since 1912 make no difference with respect to navigability. *Id.* Bank vegetation has increased in the floodplain but has not narrowed the boating channel or contributed to a deeper channel. Tr. 5/18/16, at 4833. The effects of the upstream dams have also not deepened the boating channel. *Id.* at 4834-48; C053-385, at 124-129. In fact, opponent expert, Dr. Mussetter, provided data that shows the opposite occurred: the bed elevation is slightly higher today than it was previously. Tr. 5/18/16, at 4837-38; C053-385, at 125. The Salt River's conditions in Segment 5 and the first mile of Segment 6 are not "substantially improved regarding its navigability." Tr. 5/18/16, at 4848-49. Rather, the conditions are substantively similar. *Id.*

The same USGS published records of flow used for Segment 4 were used for Segment 5. C053-396, at 4-5 (Fuller Rebuttal Hydrology); Tr. 5/18/16, at 4750-66 (Fuller). The post-natural median flow for Segment 5 is 348 cfs. C053-396, at 7 (Mussetter). The natural, reconstructed median flow for Segment 5 is at least 405 cfs. *Id.* at 8. This value is the same as the natural median flow provided for Segment 4 because of the limited gage data between Segments 4 and 5. Therefore, the value for Segment 5 underestimates what the natural median would have been because significant contributing drainage is unaccounted for. *Id.* Corresponding depths for Segment 5 also will underestimate the natural depths that would have occurred. Using the natural median flow of 405 cfs, the corresponding median daily depth for the ordinary and natural condition is 1.6 ft. C055-400, at 18 (corrected page of Fuller Rebuttal Rating Curves C053-397); Tr. 5/18/16, at 4797-4803 (Fuller); *see also*, C055-398, at 102 (corrected page of Fuller Rebuttal PPT C053-385). The ordinary and natural, high flow seasonal depths are 1.7-3.6 ft., and the yearly 10% to 90% range of depths is 1.1 ft.-3.8 ft. C055-400, at 18 (corrected page of Fuller Rebuttal Rating Curves C053-397). The depths are limiting depths for non-pool sections of the River. C053-397, at 17; C055-400, at 18 n. 2.

These depths are sufficient to support year-round use of historical wooden, loaded canoes and historical wooden, lightly-loaded, maneuverable, flat boats. C053-385, at 104; Tr. 5/19/16, at 5086, 5139-41 (Fuller); C030-364, at 255; Tr. 5/18/16, at 4804-05 (Fuller). The depths during the seasonal high flow are sufficient for historical wooden, loaded canoes; historical wooden, loaded, maneuverable, flat boats with moderate drafts; and historical wooden, loaded, small boats with low drafts. *Id.* Once again, this conclusion is based not only on calculated depths but also on field experience boating and examining the River at various flow rates, including boating a loaded historical wooden flatboat down this Segment. Tr. 5/18/16, at 4784-85 (Fuller); Tr. 10/22/15, at 628 (Fuller).

Historical boating accounts that began in upstream segments continued through Segment 5. Mr. Logan and his three boat mates continued through this Segment on their way to Tempe in 1873. C053-392. The Meadows expedition of 1883 also traveled through this Segment on its way to Tempe. C028-320. The 1885 Burch trip exited the box canyons of Segment 4 and continued through Segment 5. C018-196. The journal of one of the five boaters described the trip through Segment 5 as “floated quietly and pleasantly along till we arrived at Dr. W. W. Jones ranch above the mouth of the Verde.” *Id.* The pleasant trip is consistent with the modern condition of the River that has only one mild Class II rapid. Thorpe and Crawford boated through Segment 5 in their rowboat in June, 1910, at a flow rate that was likely below the ordinary range of the River. L012-3-22; Tr. 5/17/16, at 4629 (Fuller). Ensign and Scott continued their trip through Segment 5 in their canoe in May or June of 1919. C018-62. They reported no issues in Segment 5. *Id.*

To further confirm that historical boats could have easily navigated the River, Mr. Brad Dimock successfully rowed his replica 1911 Arizona historical loaded boat down all of Segment 5 and the top part of Segment 6 that still has water. Tr. 10/22/15, at 532-540 (Dimock). The details of the trip are discussed *supra*, in “Modern Boating of a 1911 Historical Replica Boat Confirms the Rivers Susceptibility to Navigation.”

Segment 5 is by far the most frequently boated Segment of the River, probably due in large part to its location near the Phoenix metropolitan area. Tr. 10/20/15, at 134 (Fuller). This Segment also includes the commonly known tubing reach of the River. *Id.* at 132-33. There are several boat rental companies and commercial guiding companies that operate on this Segment, including Sonoran Kayak Rentals, Arizona Outdoor Fun (canoes and kayaks), Salt River Canoe Kayak & Raft Rentals, and Saguaro Ranch C028-285; C028-286; C028-284; C028-282. Sonoran Kayak Rentals’ website states you can kayak the Salt River year-round, and describes Segment 5 as “a fun, easy river.” C028-285; C031-7. Mr. John Colby previously testified before ANSAC about his company Cimarron Adventures. Tr. 1/18/06, at 55. In 2005, one of his commercial guides wrote a letter to the Commission stating Cimarron Adventures conducts day trips on the Salt River in Segment 5 with groups of up to 150 people in 18 ft. rafts during every month of the year. U033. The launch point for the trips changes depending on the water releases, with some trips beginning at Saguaro Ranch, the top of Segment 5, and others at Water Users, but all trips finish at Granite Reef. The commercial guide said that he has personally been



conducting these trips since May of 2000 but the company has been in operation since the 1980s. He has run hundreds of commercial trips on Segment 5. U033. Boating guides describe Segment 5 as a crowded tubing reach in flatwater with some easy Class I or II water. C018-1, at 120-21 (Arizona River and Streams Guide); C018-200, at 28-31 (Paddling Arizona).

### **Segment 6: Below the Verde Confluence to the Confluence with the Gila River (RM 148.8 to 190.1)**

Segment 6 is the last Segment of the River, where substantial flow is added by the Verde River before the Salt ends at its confluence with the Gila, a length of 41.3 miles. C030-364, at 98 (Fuller PPT); Tr. 10/20/15, at 147-48 (Fuller); C028-349 (Segment Boundaries). It is a standalone segment because of the difference in hydrology from the added water from the Verde River. *Id.* The first mile of Segment 6, from the Verde confluence to before the backwater effect from Granite Reef dam, still has water, and the River's condition is substantially similar to its ordinary and natural condition. Tr. 10/22/15, at 598-600 (Fuller); Tr. 5/18/16, at 4848-49 (Fuller); C030-364, at 266 (Fuller PPT). Below that first mile until Granite Reef Dam, the River is impacted by the backwater effects of the dam and is not in its ordinary and natural condition. *Id.* Below Granite Reef dam, 150 years of changes have completely altered the River, including water diversion which leaves the River completely dry, sand and gravel mines operating in the dry channel, channelization of the River for flood control, construction of levies, and changes to the channel for urbanization. *Id.* There are many different owners of the surrounding land. Tr. 10/20/15, at 147; C030-364, at 97-98; Tr. 10/22/15, at 600.

In its ordinary and natural condition, Segment 6 had perennial flow with a sinuous to straight compound channel, and long pools separated by small riffles, all within a broad alluvial valley. Tr. 10/20/15, at 147-48 (Fuller); C030-364, at 98-99 (Fuller PPT). There is one Class I rapid in this segment. C018-47. It is unlikely that any more rapids would have existed in this segment. All of the published information indicates the River was perennial throughout this Segment, including the often cited 1882 "Kibbey Decision" that noted the River never fell below 300 cfs. *Id.*; L006, at 5. Historical maps from 1902 and 1903 surveys provide information about the historical channel. Tr. 10/20/15, at 150-52; C030-364, at 103-106. Most of the River was a single channel and there are a few areas of split channels. *Id.* The bed of the River was sandier and flatter than in Segment 5. Tr. 10/22/15, at 600.

The history of human settlement and man-made changes to the River in Segment 6 is extensive, but it is essential to understand why the River was not used extensively for navigation. Prior to Euro-American settlement, Native Americans had been using the Salt River for over a millennium for their irrigation-based civilizations, including irrigating 140,000 acres using more than 300 miles of canals, which supported a population of at least 120,000 people. L030, at 2-13-2-14; C030-364, at 108-09. The Salt River Valley was one of the most densely populated areas in the prehistoric Southwest and contained the most extensive irrigation system in prehistoric

North America. L030, at 2-17. The classic Hohokam period peaked in the 14<sup>th</sup> century and occupation had ceased by the 15<sup>th</sup> or 16<sup>th</sup> century. C028-313, at 4, 6. Some canals were very large and capable of diverting up to 240 cfs. L030, at 2-13-2-14; C030-364, at 108-09. The presence of irrigation diversions over many centuries indicates the stability of the River and the substantial flow in the River. Maintaining irrigation canal heads with relatively low technology to siphon off substantial amounts of water could only have been done with a relatively stable river that had substantial depths. Tr. 5/18/16, at 4855-56 (Fuller).

The extensive prehistoric irrigation system demonstrates the need to divert the River to grow crops above all other uses for the River, including navigation, but there is still some indication that Native Americans used boats in Segment 6. Early canal excavations speculated about boat use by the Hohokam. Hodge speculated that the canals may have been used for a crude system of navigation by means of balsas or cane rafts made from reeds and sticks, and Cushing may have discovered a canoe in a prehistoric canal. C028-313, at 111-12; *see also*, L030, at 2-13. A recent study of the canals cautiously speculated that one excavated canal feature may have been a boat or raft slip. C028-313, at 111. Even if the prehistoric Hohokam civilization did use boats on the River, both Opponent and Proponent experts agree that it would be extremely unlikely that any decomposable evidence would be found many hundreds of years later by archaeologists because of the lack of anaerobic mud that could preserve organic materials in the largely sand and gravel Salt River. Tr. 3/31/16, at 4330, 4391-93 (Newell); Tr. 5/18/16, at 4857-58 (Fuller). In addition, the large floods on the Salt would clearly make finding any boat remains very difficult and distinguishing reed bundles from other flotsam deposits extremely difficult. L030, at 7-22.

Moreover, the Native Americans that inhabited the desert following the Hohokam civilization did not live on the lower Salt River in Segment 6, so boat use on the River would be unexpected and at least difficult to observe by Euro-Americans. Francisco Kino's map of 1701 shows the many inhabitants of what is now the southern part of Arizona and conspicuously does not show any inhabitants living on the Rio Salado or Rio Azul, both of which may be understood to be the lower Salt River. C046-376; Tr. 5/18/16, at 4859-62 (Fuller). The map also notes the Apaches as occupiers northeast of the lower Salt. *Id.* The lack of lower Salt inhabitants was further confirmed in a study of the aboriginal land use and occupancy of the Pima-Maricopa Indians that stated, "No one lived permanently on the Salt River below the point where it emerged from the mountains. In fact, the whole of the open plain north of the Gila to the mountains was unoccupied as too exposed to Yavapai and Apache attacks." C053-390, at 108. The Salt River Valley was a buffer zone between the Apache who lived to the north, and the Pima and Maricopa who lived along the Gila River. L030, at 3-9. The Pima and Maricopa did move to their current territory in the upper portion of Segment 6 until 1872, after upstream diversions on the Gila River had left them with little water and the Euro-Americans in Phoenix were keen on establishing a safeguard between them and the Apache Indians to the east. C053-391, at 54. By 1872 there were several diversion dams on the Salt. 5/18/16, at

4868 (Fuller). In the late 1800s it was reported, however, that Native Americans had canoes by the Salt River, and on one occasion helped carry freight across the River when it was flooded. C018-22, at 2; C053-395.

Although the Pima and Maricopa did not reside by the lower Salt River, they may have fished Segment 6 of the River using boats. In his 1933 book “Yuman Tribes of the Gila River,” Spier reported that the Maricopa fished along the slough of the Santa Cruz River, at the Gila-Salt confluence, and on the Salt as far upstream as Phoenix, but had no settlements there. C058-11, at 108. Notably, Spier is not referencing the Colorado River when discussing Maricopa fishing habits. *Id.* In fact, he specifically notes that at least since 1800, the Maricopa have lived on the Gila above its junction with the Salt, and no mention is made of the Maricopa living on the Colorado River. *Id.* Spier further reports that the Maricopa used unshaped logs for fishing boats, as well as catamarans that had two logs side by side with sticks tied across. C059-E, at 76-77. It is unclear whether Spier also attributes to the Maricopa the use of fishing rafts that could hold ten men, such as were used on the Colorado. C059-E, at 76. Two different recent published archaeological sources have found that the available information establishes the Maricopa used boats. “The Maricopa farmed, hunted, gathered wild seeds, especially mesquite, and fished the rivers from boats, using nets and traps.” C028-276, G15 (Cultural Resources Overview for the Proposed Central Arizona Project Water Reallocation Plan). “The Cocopa, who lived along the lower Colorado River and the delta, used a wide range of boats, including the ubiquitous balsas and large ollas and baskets to transport children and small items. They also used dugouts, raft [sic] formed of logs, or brush tied together (Drucker 1941:124). Spier (1933:76-77) reports similar conveyances were used by the Maricopa and Halchidhoma.” C028-313, 112 (Archaeology for the PHX Sky Train Project).

When United States Commissioner John Bartlett was visiting the lower Salt River in 1854, he may have come across a fishing party using boats on the Salt River. After making camp for the night beside the River, and having previously been told by his Maricopa guide that the Maricopa and Pimos came to the Salt River to fish, Bartlett reported the following, “We had not long been in when we saw a body of twelve to fifteen Indians on the river making for our camp. At first some alarm was felt, until Francisco told us that they were Pimos. They proved to be a party which had been engaged in hunting and fishing.” C053-393, at 239-242 (Personal Narrative of John Russell Bartlett, United States Commissioner). Whether boats were being used in that instance is unclear, but certainly the depths, widths, and velocities of the lower Salt that Bartlett recorded that same day would have been conducive to small boat travel. *See id.* at 240 (“The river we found to be from eighty to one hundred and twenty feet wide, from two to three feet deep, and both rapid and clear.”); *see also* Tr. 5/18/16, at 4870 (Fuller) (River characteristics certainly suitable for canoes).

Euro-American settlement began in the Salt River Valley, Segment 6, in the 1860s, and immediately upon arriving, settlers built diversion dams to remove water from the River. L030, at 3-1, 3-6—3-7. In 1865, Fort McDowell was established on the Verde above the confluence with the Salt, and by 1867 the first Phoenix settlers

arrived, with John Y.T. Smith setting up a hay camp at the site of present-day Phoenix. *Id.* Jack Swilling started using ditches in the Valley in 1867 and formed the Swilling Ditch and Irrigation Company in 1868. *Id.* By 1870, there were four Salt River canals; by 1880, there were eight; and by 1891, there were eleven canals. L030, at 7-11; C030-364, at 117-118 (Fuller PPT). According to the allegations by the plaintiffs in the well-known “Kibbey Decision,” by at least January of 1887, the Salt River was over-allocated and water was not reaching ditches downstream. L006. An 1899 USGS publication states that “during ordinary seasons all of the water of Salt River is diverted, and at the present time there is a shortage in the summer months.” L030, at 7-6.

When the Ingalls brothers surveyed in the Phoenix area in 1868, they noted there were only 50 people in Phoenix. C028-333, Book 1, p. 494; *see also* Tr. 3/10/16 at 3812 (Littlefield) (Ingalls also noted in 1868 settlers were conducting irrigated farming). By 1890, the population of Phoenix was 3,152. C030-364, at 114 (Fuller PPT). Before the dams and diversions, there was not a significant population of Euro-Americans or Native Americans to utilize the River for navigation. After the dams and diversions, the population grew, but the dams and the lack of water were obstacles that severely impacted navigation on the River. Tr. 5/17/16, at 4656 (Fuller). Tr. 10/20/15, at 158-59, 162-63 (Fuller); C030-364, at 112-14.

The natural reconstructed median flow for Segment 6 is 819 cfs. C053-396, at 5-8 (Fuller Rebuttal Hydrology); C053-385, at 84-85 (Fuller Rebuttal PPT); Tr. 5/18/16, at 4750-66 (Fuller). This was calculated using the complete USGS available gage data, and then adding the estimates of depletion on the Verde and Salt Rivers calculated by opponent expert Mr. Burtell. *Id.* The corresponding depth in Segment 6 for the natural reconstructed median flow is 1.6 ft. at the most limiting cross-section that opponent expert Dr. Mussetter could find. C055-400, at 18 (corrected page of Fuller Rebuttal Rating Curves C053-397); Tr. 5/18/16, at 4797-4803 (Fuller); *see also*, C055-398, at 102 (corrected page of Fuller Rebuttal PPT C053-385). The ordinary and natural high flow seasonal depths are 1.7-5.5 ft., and the yearly 10% to 90% range of depths is 1.3-2.8 ft. at the most limiting cross sections, and 2.6-5.8 ft. at other cross sections. *Id.*

These depths are sufficient to support year-round use of historical wooden, loaded canoes and historical wooden, lightly-loaded, maneuverable, flat boats. C053-385, at 104; Tr. 5/19/16, at 5086, 5139-41 (Fuller); C030-364, at 255; Tr. 5/18/16, at 4804-06. The depths during the seasonal high flow are sufficient for historical wooden, loaded canoes; historical, loaded small boats with low drafts; and loaded, flat boats with moderate drafts. *Id.* This assessment is verified by historical descriptions and boating accounts, and extensive field experience, including boating the loaded 1911, historical replica Edith down the remaining ordinary and natural part of Segment 6. C053-385, at 98, 105 (Fuller Rebuttal PPT).

Historical descriptions of this Segment confirm its historical susceptibility for navigation. In July of 1852, Commissioner John Bartlett found the River 12 miles above the Gila “eighty to one hundred and twenty feet wide, from two to three feet deep, and both rapid and clear.” C053-393, at 240. That was not a description of the River

during a flood. 5/18/16, at 4874-78 (Fuller). Hiram Hodge noted that “At low water, it is a clear, beautiful stream, having an average width of two hundred feet for a distance of one hundred miles above its junction with the Gila, and a depth of two feet or more.” C030-364, at 129.

Numerous historical boating accounts occurred in Segment 6, many more than any other segment. C053-385, at 43-46 (Fuller Rebuttal PPT). Moving chronologically through the accounts, in the spring of 1873 Logan and his three boat mates ended their trip at Hayden’s Ferry in Tempe, having traveled from Fort Apache down five segments of the River, and about half of Segment 6.

Around the same time, on May 3, 1873, the Weekly Arizona Miner of Prescott published an item in the paper stating:

The Salt River is navigable for small craft as, last week, L. Vandermark and Wm. Kilgore brought five tons of wheat, in a flat boat, from Hayden Ferry, down the river to the mouth of Swilling canal and thence down the canal to Hellings & Co.’s mill.

C002-5. Based on the newspaper account and what is known about the River at that time, the boating occurred at the end of April and brought a larger quantity of wheat from just below an upstream diversion dam to its intended destination, on both a single and split channel of the River that would have been generally representative of the entire Segment. Tr. 5/17/16, at 4507-4518 (Fuller); Tr. 10/20/15, at 199-202 (Fuller). C030-364, at 158 (Fuller PPT); C053-385, at 5 (Fuller Rebuttal PPT). There is no indication this trip was outside of the ordinary and natural condition of the River. Late May is typically on the declining end of the ordinary spring snowmelt season. No further information is known about future trips, but at the time of the account, and for another 5 years, no Phoenix area newspaper existed, until the Salt River Herald first published in January of 1878. C043-368. This is the largest commercial boating account in the record, and not coincidentally, it occurred in the first year that any Euro-American boating accounts are recorded, after some diversions were already in place, but prior to the complete allocation and damming that soon transpired. 5/17/16, at 4517 (Fuller), C053-385, at 43-46 (Fuller Rebuttal PPT) (Complete list of historical boating accounts).

The Arizona Sentinel reported that in January of 1879, Hamilton, Jordan, and Halesworth built a skiff at Phoenix for \$10 and paddled it down to Yuma, with the newspaper reporting the distance traveled by boat from Phoenix, which is on the Salt River. C018-128. They reported that the route was “perfectly practicable for navigation” with no difficulties mentioned on the Salt and one narrow spot on the Gila. *Id.* The newspaper also reported the men believed the river “would then have easily floated down a flat-boat loaded with grain, pumpkins, or other fruits of the ‘Orchard of Arizona,’ and drawing two feet of water.” *Id.* The account did not occur during a flood year and may have occurred during the beginning of the ordinary high flow season. Tr. 10/20/15, at 207 (Fuller); Tr. 5/17/16, at 4553-59 (Fuller).

The Arizona Gazette published an announcement from Phoenix on February 17, 1881, that Cotton and Bingham “will leave tomorrow for Yuma by way of the Salt and rivers.” L012-3-5. The men constructed an 18-foot flat-bottom skiff which had a low draw in the water and was strong and durable. *Id.* This likely occurred during the ordinary seasonal high flow and no major floods occurred in 1881. Tr. 10/20/15, at 209 (Fuller); C030-364, at 163 (Fuller PPT).

In November of 1881, two men attempted to boat from Phoenix to Yuma in a boat 20 feet long and five feet wide. L012-3-44; L012-3-7; L012-3-6. It is unclear how far the men traveled on the Gila – although they did make it down the Salt – and if the water was shallow or the men had a poorly designed boat to go along with too much liquor to drink. The trip was made during a low flow time of year. *Id.*; Tr. 10/20/15, at 209-212 (Fuller).

On February 14, 1883, the Arizona Gazette of Phoenix reported that North Wilcox and Dr. G.E. Andrews traveled from Fort McDowell on the Verde to Barnum’s Pier in Phoenix, via the Verde River and Segment 6 of the Salt River. L012-3-8; C030-364, at 165-66. They traveled in a canvas skiff. *Id.* Before describing the details of the account, the newspaper wrote, “The Salt River is a navigable stream and should be included in the river and harbor appropriation bill.” L012-3-8. The trip was made during the ordinary high flow season and there is no indication it was made in a flood condition. Tr. 10/20/15, at 213 (Fuller); C030-364, at 165; Tr. 5/17/16, at 4561-66; C053-385, at 19-21 (Fuller Rebuttal PPT).

The Meadows expedition of 1883 successfully ended the trip at their destination in Tempe, in Segment 6 of the Salt River. C028-320. No difficulties were reported in Segment 6. *Id.* Similarly, the 1885 Burch trip completed its flatboat trip in Tempe, and the journal of one of the four men provided some insight about boating in Segment 6 at a time when the River had diversion dams. C018-196; C018-133. The journal described boating down the River from the confluence with the Verde with the men having to lift the boat over the dam of the Arizona canal, and having “shot over two others, then entered the head of the Tempe canal and sailed down within four miles of Tempe.” C018-196. No other difficulties are described. *Id.* The June trip likely occurred during a very low flow. Tr. 5/17/16, at 4578-86 (Fuller); C053-385 (Fuller Rebuttal PPT).

On December 12, 1888, the Phoenix Herald published a story about Major Spaulding and Captain Hatfield traveling in a canoe from Fort McDowell to Mesa, hunting along the way. L012-3-13. The military men had intended to travel all the way to Phoenix, but sadly Major Spaulding accidentally discharged his gun while preparing to lift the boat over the Mesa dam, killing himself instantly. Major Spaulding was Commandant at Fort McDowell, Major of the 4th Cavalry and an officer highly esteemed by his superiors and men under him. No boating issues were otherwise reported. *Id.* The trip was made during ordinary high flow. C030-364, at 171-73 (Fuller PPT); Tr. 10/20/15, at 227-28 (Fuller). Historian Dennis Gilpin concluded that it was notable that the boating was being reported as merely incidental, while the death of the commanding officer at Fort McDowell was the newsworthy item. Tr. 10/20/5, at 14-15 (Gilpin).

Gentry and Cox floated their ferry boat down the River with five men aboard in January of 1889. C018-247. The boat later snagged on a tree on the Gila River. *Id.* Stanley Sykes and Charles McLean boated from Phoenix to Yuma on a depleted River sometime near the winter of 1890 and encountered shallow water and some dry areas. C018-18; C030-364, at 175; Tr. 10/20/15, at 229-31; Tr. 5/17/16, at 4589-91 (Fuller).

On April 2, 1892, the Arizona Sentinel reported that J.K. Day and his brother George had arrived in Yuma after a six-month trapping expedition, boating down the Verde, Salt, and Gila rivers. C002-8; C053-385, at 28-32 (Fuller Rebuttal PPT); Tr. 5/17/16, at 4591-4605 (Fuller). It was the fifth trip for J.K., and the brothers planned on repeating the trip next September after returning to Prescott by rail. They used a “small boat” to transport beaver and otter furs. Trapping was described as a profitable enterprise as it was reported that “it required only experience and a little patience to make a very remunerative profit out of the business” and that the furs “always command good prices, the demand for such pelts being always greater than the supply.” Segment 6 of the Salt River was certainly boated because the newspaper reported, “After leaving the Verde, the Rio Salado, or Salt River was entered . . . .” *Id.* Several years later, J.K. Day became Fish and Game Commissioner for Arizona. C018-226. In his obituary, Mr. Day was described as a “greatly respected man, of quiet habits and never indulged in liquor” and “an experienced mountaineer and trapper.” C018-225. This commercial boating account was not presented to the Commission prior to its last decision. Tr. 10/20/15, at 236 (Fuller).

A few years after the Day Brothers account, the Arizona Republic published another commercial trapping account on February 11, 1894. C053-383. It was reported that six miles upriver from Phoenix a couple of brothers were building a boat, which was almost completed, and then intended “to navigate for several miles the Salt and Gila rivers” to trap beaver. They reported that beaver were plentiful in those streams and “commanded a ready market.” After trapping beaver in Alaska for six years, they “found the Arizona variety much more valuable.” “Beaver skins were worth from \$8 to \$20 depending upon size and condition.” They said it was “possible to drift in their canoe for whole days and never see sign of human habitation.” *Id.* The flows in January and February of 1894 were not high flows and ranged from a low of 494 cfs to a high of 591 cfs. Tr. 5/17/16, at 4650 (Fuller). This commercial boating account was also not presented to the Commission prior to its last decision. *Id.* at 4649.

In 1895, multiple newspapers reported that Amos and Evans traveled from Phoenix to Yuma in a boat, after traveling from Clifton to Sacaton. C029-363; C029-360. In his letter to the Phoenix Daily Herald, Amos Adams stated “we found nothing unusual on our voyage down the Salt and Gila rivers except that ducks were plentiful and that Evans ate so much of them that he ‘quacks’ now instead of talks.” C029-361. The men boated on an eighteen by three and half foot homemade wooden flat boat with a cabin. C030-364, at 180.

In March of 1905, the Arizona Republican published a somewhat humorous article about Jacob Shively building a wooden keeled boat and launching it from Phoenix with the intention of traveling to Yuma. C018-81. The boat successfully traveled down the Salt and was spotted in Arlington and Buckeye on the Gila. C018-201.

C030-364, at 182 (Fuller PPT); Tr. 10/20/15, at 239-240. By 1905, the River was significantly dammed and diverted. C030-364, at 117 (Fuller PPT).

Also in 1905, the Arizona Republic published a May 23rd announcement and invitation for people to join a party for a trip down the river from Phoenix to Yuma in a “flat-boat.” C018-66. The party expected to hunt big game and fish along the way, was leaving Wednesday or Thursday, and one could sign up on a “first come, first served” basis at the boat on the foot of Seventh Street. *Id.*

Several reclamation engineers boated down a portion of Segment 6 in December of 1905 and reported the Salt a poor stream for navigation after their boat got stuck on a sandbar and a rock. L012-3-20; C030-364, at 187-88 (Fuller PPT). This account is an outlier and may signify that the boaters were very inexperienced because the flow rate that day was substantial, the River would have been deep, and there are many other historical accounts of boaters who had no difficulties boating on this exact section of the River at lower flow rates. Tr. 10/20/15, at 245-46 (Fuller).

In 1909, the Bisbee Daily Review, reporting on an upcoming expedition, cited a previous trip made by Lieutenant Robison and two companions from Phoenix to Yuma by boat. C018-76. The party traveled down the Salt River. *Id.*

On April 29, 1909, the Arizona Republic reported that the boat of Tom Rains, which was kept on the River near Seventh Avenue, was stolen by several boys and boated nine miles downstream. C018-73.

On June 27, 1909, the Arizona Republic reported that “Louis Selly is turning out to be a master boat builder” after recently completing several boats, with orders for two or three more. C018-61. It is unclear where the boats are to be used, although the ongoing Roosevelt dam construction may have prompted the orders. *Id.*; Tr. 10/20/15, at 247-48 (Fuller).

Thorpe and Crawford continued their trip from Segment 4 down to Granite Reef dam, in Segment 6, in June of 1910, a low water time of year. L012-3-22; 5/17/16, at 4625-30 (Fuller). Ensign and Scott also continued their trip down Segments 4-6 in June of 1919. C018-62.

Numerous ferries operated during certain time of the year for many years on the River. Historical evidence of ferries clearly shows that both there was actual commercial use of the River, and that the River afforded a useful highway for commerce. A man built a boat to haul 60,000 pounds of freight across the River in 1884 at a profit of 12 ½ cents per 100 [wt]. L030, p.3-26-3-28 (ASLD Report). In 1889, the large Gentry and Cox ferry boat that operated at the Maricopa Crossing floated about 20 miles down the River with five men aboard toward the Gila Bend Crossing. L030, p. 3-19 (Table 3-2), 3-23, 3-25 (Table 3-3), 3-28 (ASLD Report).



**V. Conclusion**

For the foregoing reasons, the Commission should find that Segments 2 through 6 of the Salt River were both navigated and susceptible to navigation in their ordinary and natural condition.

DATED: July 18, 2016.

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The foregoing was e-mailed for filing this 18th day of July, 2016, to:

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A COPY in pdf format of the foregoing e-mailed with delivery receipt this 18th day of July, 2016, to each party listed on the ANSAC website, <http://www.ansac.az.gov/parties.asp>, with "SERVICE OF ANSAC DOCUMENT, Nos. 03-005-NAV and 04-008-NAV (Consolidated) (Salt)" written in the subject line.

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Paula Brewer

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