Helm, Livesay & Worthington, Ltd.
1619 E. Guadalupe, Suite One
Tempe, Arizona 85283-3970
(480) 345-9500
John D. Helm - AZ Bar # 002584
Sally Worthington - AZ Bar # 012424
Jeffrey L. Hrycko - AZ Bar # 023280
Special Counsel for Maricopa County and
The Flood Control District of Maricopa County

BEFORE THE ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION

In re: Determination of Navigability of the Gila River in Maricopa County	**No. 03-007-NAV** **Maricopa County and The Flood Control District of Maricopa County's Memorandum to the Arizona Navigable Stream Adjudication Commission (ANSAC) Regarding Navigability of Gila River in "natural and ordinary" condition on February 14, 1912.**

The Arizona Navigable Stream Adjudication Commission ("ANSAC" or "Commission") has asked interested parties to submit memoranda addressing the question whether certain rivers were navigable in their "natural and ordinary" condition on February 14, 1912 as required by *State ex rel. Winkleman v. Ariz. Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 229 P.3d 242 (App. 2010) ("*Winkleman*" or "the Opinion"). This Memorandum is submitted by Maricopa County and the Flood Control District of Maricopa County ("County and FCD") by undersigned counsel in response to that request.

I. *Winkleman* And *PPL Montana* Make Clear That The River Must Be Evaluated In Its Ordinary, Un-diverted, Natural Condition.

The *PPL Montana* court reiterated the standard formulation for navigability for title set forth in *The Daniel Ball*, 77 U.S. 557 (1871):

> 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.

PPL Montana, LLC. v. Montana, 132 S. Ct. 1215, 1228 (2012). Navigability for title purposes under the equal-footing doctrine, is determined at the time of statehood, and based on the "ordinary and natural "condition of the water. *PPL Montana, LLC.*, 132 S. Ct. at 1228.

The phrase, "ordinary and natural," requires giving effect to both words. *Winkleman*, 224 Ariz. at 241 ¶25, 229 P.3d at 253. "Ordinary" is defined as "[o]ccurring in the regular course of events; normal; usual." *Id.* at ¶ 26. "Natural" means "[u]ntouched by civilization, i.e., man-made diversion." *Id.* at ¶ 27. The court specifically held that any unnatural diversion is "not part of the natural condition of the River." *Id.* Accordingly, the Commission must consider how the diversion of the flow at the time of statehood affected the natural and ordinary flow of the Gila river.

The *PPL Montana* court discussed the types of evidence that should be considered, and the weight to be given to different classes of evidence. The court stated, the "crucial question" is the potential for such use at the time of statehood, rather than "the mere manner or extent of actual use," the river segment must only have been "susceptible" to navigation at that time for title purposes. To prove "susceptibility" to navigation, the Commission should consider all evidence showing "the river could sustain the kinds of commercial use that, as a realistic matter, might have occurred at the time of statehood." *PPL Montana, LLC*, 132 S. Ct. at 1233. Finally, pursuant to *PPL Montana*, this analysis must be performed for each discrete and administrable segment of the river.

II. Evidence In The Record Demonstrates The Lower Gila River Was Susceptible To Navigation For Commerce In Its Ordinary And Natural Condition At Statehood.

To analyze the record adequately, it should be evaluated using a three step process: 1) determine what evidence exists demonstrating the watercourse's natural conditions; 2) de-

termine what evidence exists of the ordinary condition of nature for that watercourse; and, 3) determine and analyze evidence of susceptibility to navigation under the preceding conditions characterizing "natural" and "ordinary."

A. The only relevant evidence in the record of the "natural" and "ordinary" condition of the lower Gila, was presented by Mr. Hjalmar W. Hjalmarson, P.E.

The relevant period for determining the "natural" condition of the river is after the effects of any Native American diversions had disappeared but before commencement of modern-era settlement when other man-made diversions and obstructions began affecting the river. *Winkleman*, 224 Ariz. at 242 ¶30, 229 P.3d at 254. The relevant period is the early to mid-1800s. *Id.*

As discussed *infra*, Mr. Hjalmar W. Hjalmarson's report and testimony evaluating the pre-development physical conditions of the river is the only evidence demonstrating the river's natural condition during the appropriate period. The primary goal of Mr. Hjalmarson's study was to estimate the amount and temporal distribution of the ordinary and natural flow in the Gila River from the confluence with the Salt to the Colorado using known hydrologic and geomorphic information and relationships. [ANSAC Hearing Transcript ("TR") 11/17/2005 236:14–18; EL #23 at 30] [1] The three-step methodology used was because rivers construct their own geometry, which can be estimated using hydrologic and hydraulic principles. [*Id.*] Unlike all other experts, Mr. Hjalmarson analyzed the river in its ordinary and natural condition. [TR 11/17/2005 256:21–25] His testimony was not refuted nor contradicted.

"Natural" conditions include both large volume flows (a.k.a. floods) of up to 190,000 cfs [EL #4 at VI-5], and low volume drought conditions when only base flow is present (*i.e.*, 170–290 cfs) [EL#23 at 12]. However, while "natural," the navigability analysis must exclude those unusual events because they are not "ordinary." Instead, the analysis must focus on the

---

1 References to the hearings are cited by "page number:line number(s)."

usual flows, which are established by the mean (a.k.a. average) and median flow rates, which were calculated by Mr. Hjalmar W. Hjalmarson.

Mr. Hjalmarson is a licensed professional engineer. [Evidence Log ("EL") #23-Hjalmar W. Hjalmarson, *Navigability Along the Natural Channel of the Gila River*, curriculum vitae (October 25, 2002)] He served as an engineer and hydrologist for the U.S. Geological Survey for thirty-one years. [*Id.*] As a surface water specialist for the Arizona district for twelve years, he was responsible for ensuring the hydrologic data collected, analyzed, and compiled conformed with applicable standards. [*Id.*] As part of his duties, he directed hydrologic studies and wrote many published technical reports on surface water hydrology of arid lands. He has also testified in various Arizona courts as an expert witness on the nature of streamflow. [*Id.*]

Using data from the U.S. Geological Survey,[2] Mr. Hjalmarson computed the annual pre-development Gila River base flow using the Freethey and Anderson (1986) basin accounting method for natural stream base flow for ground-water systems. [*Id.* at 13] This method uses natural conditions existing **before human activities**. [*Id.*] Using this method, he calculated the pre-development base flow rate of the river at the Salt confluence as 290 cubic feet per second ("cfs"). [*Id.* at 13-14] Because of large amount of stored groundwater that supplied base flow, it may not have varied greatly year to year. The base flow (a.k.a. base runoff) is the amount of sustained or fair weather runoff comprised mostly of groundwater

---

2 Among many others, Mr. Hjalmarson relied upon the following three publications: B.W. Thomsen & J.H. Eychaner, U.S. Geological Survey, PREDEVELOPMENT HYDROLOGY OF THE GILA RIVER INDIAN RESERVATION, SOUTH-CENTRAL ARIZONA, Water-Resources Investigations Report 89-4174 (1991) (*available at* http://pubs.usgs.gov/wri/1989/4174/report.pdf); B.W. Thomsen & J.J. Porcello, U.S. Geological Survey, PREDEVELOPMENT OF THE SALT RIVER INDIAN RESERVATION, EAST SALT RIVER VALLEY, Arizona, Water-Resources Investigations Report 91-4132 (1991) (*available at* http://pubs.usgs.gov/wri/1991/4132/report.pdf); and, Geoffrey W. Freethey & T.W. Anderson, U.S. Geological Survey, PREDEVELOPMENT HYDROLOGIC CONDITIONS IN THE ALLUVIAL BASINS OF ARIZONA AND ADJACENT PARTS OF CALIFORNIA AND NEW MEXICO (1986) (*available at* http://pubs.er.usgs.gov/publication/ha664). [EL #23 at 31]

effluent. [*Id.* at 35] Base runoff is precipitation that seeps from the ground into uncontrolled streams and rivers. [*Id.* at 11] This is important for navigability because under natural conditions the water that seeped into the ground was temporarily stored in aquifers throughout the watershed. That water later discharged to the streams as base runoff during dry periods (a.k.a. droughts). Because precipitation was seasonal and some months had no precipitation at all, the base runoff provided perennial flow to the Gila River. [*Id.* at 11–12] This is the amount of water (290 cfs) that would flow down the Gila beginning at the confluence with the Salt River 90% of the time. [*Id.* at 13] Absent any other controverting evidence in the record, this evidence establishes by a preponderance what the "natural" conditions would have been statehood but for man's diversions.

With respect to the "ordinary" condition of the lower Gila, the Commission must disregard both the unusual flashy high-flow (a.k.a. flood) conditions, and drought low-flow conditions as both are not the usual, normal, or everyday condition of the lower Gila. *Winkleman*, 224 Ariz. at 241 ¶27, 229 P.3d at 253. The best evidence in the record of what is the usual condition is found in Mr. Hjalmarson's report. After determining the extremes of what constitutes "natural" conditions, Mr. Hjalmarson then calculated the "ordinary" (i.e., mean and median) annual predevelopment discharge at the confluence of the Gila and Salt Rivers by combining average annual predevelopment streamflow for both rivers. [*Id.* at 14] The average annual predevelopment streamflow at the confluence of the Gila and the Salt Rivers was 1,685,000 acre-feet (2,330 cfs). [*Id.* at 12, Table 2.1] The estimated median annual predevelopment streamflow was 1,265,000 acre-feet (1,750 cfs).[3] [*Id.*] Half of the days have streamflow less than 1,750 cfs, half have streamflow higher than 1,750 cfs. He estimated the average width was 300 feet, [*id.* at 19] and the average depth was 5.31 feet. [*Id.* at 20, Table 3.2] Based on his calculations, Mr. Hjalmarson concluded that the pre-development river was a perennial stream, and 90% of the year the river flow equaled or exceeded the base flow (290

---

3 The median streamflow is the flow value at 50% of the time. [*Id.*]

cfs), while approximately 30% of the year, the river flow equaled or exceeded the mean (2,330 cfs). [TR 11/17/2005 at 240:17-23; EL #23 at 13, Figure 2.2] Even at the minimal base flow of 290 cfs, the lower Gila near Gillespie Dam was between 1.5 and 3.0 feet deep [EL #23 at 52-54, Appendix E, Figures E1 & E3], and thus was susceptible to navigation by boats of that period.

Because the Commission must base its decision on what it finds are "ordinary" conditions, rather than rare or extreme conditions of flood or drought, the averages calculated by Mr. Hjalmarson for the natural river are the best available evidence. Average means, "not out of the ordinary: common." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 119 (1987). Therefore, the best evidence in the record of what constitutes "ordinary" for the purpose of navigability for title are the average and median conditions. Because no other evidence disputes his calculations, this evidence more than meets the preponderance of the evidence standard required by A.R.S. § 37-1128(A) of what is the "ordinary" condition of the lower Gila River.

Moreover, Mr. Hjalmarson's calculated averages are supported by other evidence in the record. In addition to using the natural river characteristics (*e.g.*, flow data and sediment characteristics) to calculate the width, Mr. Hjalmarson also collected measured width data from historical Government Land Office ("GLO") survey notes and-after adjusting for unknown angles of incidence-calculated an average width from those notes as well. [*Id.* at 245:19-248:8; EL #23 Appendix D] Mr. Hjalmarson's calculated width agreed with the GLO measured average from the surveys. [*Id.* at 248:9-13]

Mr. Hjalmarson testified that based on the natural conditions (*e.g.*, slope, sediment, etc.) the Gila River would return to a single meandering channel when braiding occurred as the result of infrequent floods. [*Id.* at 279:12-17] Mr. Hjalmarson's conclusion that both the ordinary and natural condition of the Gila was a single, meandering channel was supported by Dr. Gary Huckleberry [TR 11/16/05 57:2-58:7], and Dr. Stanley Schumm. [TR 11/17/05 9:9-10] Drs. Schumm and Huckleberry acknowledged that the Gila River became a wide-braided river as a result of large, infrequent (*i.e.*, unusual) floods, [TR 11/16/2005 59:13-21;

EL #6-Stanley A. Schumm, *Geomorphic Character of the Lower Gila River* 8-9 (2004) ("Schumm Report")], but Dr. Schumm testified that a braided river would revert to a single meandering channel over time if natural conditions prevailed. [TR 11/17/2005 13:9-14, 34:13-16] The primary reason that the Gila River channel was braided at statehood was because a flood in 1891 caused braiding and the natural flow had been diverted, interrupting the ordinary and natural process of re-establishing a single meandering channel. [TR 11/17/2005 254:22-255:7; EL #6 at 10]

B. Only Mr. Hjalmarson's opinion regarding susceptibility to navigation of the lower Gila was based on its ordinary and natural conditions.

After calculating the physical and hydraulic conditions of the pre-modern era lower Gila River, Mr. Hjalmarson then used three federal tests for navigability to determine whether those conditions would have proven susceptible to navigation. [*Id.* at 252:8-254:15] The three tests include: the Bureau of Outdoor Recreation method developed by Cortell and Assoc. [EL #23 at 24]; the U.S. Fish and Wildlife Service method developed by Hyra [*id.* at 26]; and the U.S. Geological Survey engineering method developed by Langbein in 1962. [*Id.*]

The Bureau of Outdoor Recreation method assigns a class rating (*i.e.*, I-VI) to rate the difficulty that small watercraft (*e.g.*, canoes, kayaks, driftboats, and rafts) would have navigating on the river. [*Id.* at 24-25] In this rating system, Class I is considered "very easy" while Class VI is "extraordinarily difficult." [*Id.*] According to this method, the Gila River from the confluence of the Salt to the Colorado is considered "very easy." [*Id.* at 25, Figure 4.1] and thus suitable for navigation.

The Fish and Wildlife Method assesses the suitability of stream flow for recreation. [*Id.* at 26] This method looks at the cross-section of the river to determine the minimum necessary width and depth for canoes, kayaks, driftboats, rowboats, and powerboats. [*Id.*] Using this method, throughout the studied reach of the Gila, it met the minimum depth (one foot) and width (six feet) requirements for these small boats [*Id.* at 26, Figure 4.2] making the river navigable for them.

The U.S. Geological Survey engineering method developed by Langbein in 1962 looks at the specific force required to propel a craft upstream. [*Id.*] This method uses the natural condition of the river (*e.g.*, discharge, gradient, depth, and velocity) to assess whether flow conditions were favorable for two-way (upstream and downstream) commercial navigation by shallow-draft watercraft. [*Id.*] This method is particularly appropriate for determinations of title navigability because it is for "rivers in their approximate native state," and because it uses "the hydraulic geometry of rivers ...and the hydraulic geometry of commercial vessels." [*Id.* at 27] The Langbein method "considers hull resistance, shallow water drag, slope drag, squat and other characteristics of vessels." [*Id.*] These characteristics are used to calculate the specific tractive force of a river. Rivers with tractive forces above 0.002 are not used for navigation (*e.g.*, Red River at Terral, Okla., Rio Grande at Bernalillo, N. Mex.). [*Id.* at 27, Table 4.1] Commercial navigation is feasible within the range of 0.001 to 0.002. [*Id.* at 27] The lower Gila River has a tractive force of 0.001. [*Id.*] Therefore, although the Gila does not have an extensive history of commercial use, in its ordinary and natural condition it was susceptible to navigation both downstream and upstream. [*Id.* at 27–29] In addition to its scientific veracity, Mr. Hjalmarson's analysis agrees with other assessments and historical accounts of pre-development navigation on the river discussed below.

C. Evidence of boats used on the Gila river pre-statehood demonstrate susceptibility to commercial navigation.

In addition to Mr. Hjalmarson's unrefuted susceptibility analysis, record evidence of actual navigation supports finding the Gila River susceptible to navigation. Before 1913, there were several types of boats in use in Arizona on the Gila River, all of which were susceptible to commercial use. The list of boats includes basket boats (3'–5' long), wooden rafts (5'–25' long), canoes (8'–25' long), rowboats (6'–22' long) drawing 5"-24" of water, canvas boats (5'–12' long), scows (8'–32' long) drawing 8" of water, flat boats (8'–30' long), ferry boats (6'–35' long), and at least one steam boat (25' and up). [EL #16-Papers submitted by Barbara Tellman 23, 31 & 42; EL #12–Douglas R. Littlefield, *Assessment of the Navigability of the Gila River Between the*

Mouth of the Salt River and the Confluence with the Colorado River Prior to and on the Date of Arizona's Statehood February 14, 1912 ("Littlefield Report") 120 (Nov. 3, 2005)] *See also, United States v. Utah*, 283 U.S. 64, 82 (1931) (recognizing use of rowboats, flatboats, steamboats, motorboats, barges and scows for exploration, recreation and carrying passengers and supplies on Colorado, Green, and San Juan rivers in Utah at statehood in 1896).

Other references cited in the record, indicate the following depths and widths needed for various vessels pre-statehood:

Boat Type	Depth (ft.)	Width (ft.)	Source	Other
Canoe	0.5	4.0	USFWS[4]	
Canoe	0.3–0.5		Slingluff[5]	4" for flat-bottomed; 6" for round-bottomed
Canoe	0.25–0.5	25.0	Cortell[6]	
Canvas Boat	0.2		Sears Catalog 1910	Hunting in calm water
Drift Boat	1.0	50.0	Cortell	
Duck Boat	0.2	3.0	Sears Catalog 1910	
Low-power boat	1.0	25.0	Cortell	
Rowboat/Drift Boat	1.0	6.0	USFWS	

[EL #16 at 38]

According to Mr. Hjalmarson's uncontroverted evidence, the "ordinary and natural" condition of the Lower Gila was a perennial stream with a average width of 300', an average depth of 3.1', and velocity of 2.5 mph. [TR 11/17/2005 at 244:10–22] In addition to the three navigability tests employed by Mr. Hjalmarson, logically the vessels described above would have been capable of navigating on the Gila under those conditions. This is further evidence that the "ordinary" and "natural" Gila River was susceptible to navigation.

---

4 U.S. Fish & Wildlife Serv. (1978): Methods of Assessing Instream Flow for Recreation. FWS/OBS.

5 Slingluff, Jim (1987): Testimony in *Maricopa County et al. v. State of Ariz. et al.*

6 Cortell and Associates (1977): Recreation and Instream Flow Vol. 1 Flow Requirements BORD 6429.

D. Historical and anecdotal evidence supports finding the lower Gila susceptible to commercial navigation at statehood.

The Arizona State Land Department report, entitled *Gila River Navigability Study Draft Final Report* dated October 1994 (revised September 1996) ("GILA RIVER NAVIGABILITY STUDY") lists many accounts of the river leading to the conclusion that it was susceptible to navigation in its natural condition. The first such account describes a party passing through the Gila River basin in November 1697. [EL #4-GILA RIVER NAVIGABILITY STUDY IV-1] In that account, in order to investigate ruins on the other side of the river, Juan Bautista de Escalante was forced to swim across the river. [*Id.*] A later account by James Ohio Pattie states that while trapping along the lower Gila during December 1827, his party constructed a canoe so that they could trap both sides of the river which he wrote was too deep to be forded on horseback. [*See* Goode P. Davis, Jr., *Man and Wildlife in Arizona: The American Exploration Period 1824-1865* 21 (Neil B. Carmony & David E. Brown eds., 2d ed. 1986)] Another account by a pre-development observer, John S. Griffin, an army surgeon who traveled with the Kearny (Emory) expedition in 1846, described the Gila below the Salt as about 80 yards wide, three feet deep, and rapid. [*Id.* at 29 (*quoting* J.S. Griffin, *A Doctor Comes to California* 35 (California Historic Soc., San Francisco 1943)] Another member of the expedition, Henry Smith Turner, noted that the river was from 100 to 150 yards wide, with an average depth of four feet – "quite deep enough to float a steamboat." [*Id.* (*quoting* H.S. Turner, *The Original Journals of H.S. Turner* (D.L. Clarke, ed. Univ. of Oklahoma Press 1966)] Indeed, Dr. Littlefield, who opined the river was not navigable, acknowledged historical records established that the steamboat, Explorer, was used on the lower Gila for seven years before it was destroyed in a flood on the Colorado. [EL #12- *Littlefield Report* at 120] A river that is deep enough to float a steamboat is certainly capable of supporting navigation in smaller vessels used for commercial navigation.

Although much of the water that could have supported boating was diverted between 1850 and 1912, there is ample evidence that boating on the river actually took place during

that period. As highlighted by Dr. Donald C. Jackson and listed in the GILA RIVER NAVIGABILITY STUDY, [exhibit 1 hereto] many people used the river to navigate while diversions were actually happening. The fact that water-borne travel was happening irrespective of the ever-growing diversions reinforces the conclusion that the lower Gila River was, and remains, susceptible to navigation in its ordinary and natural condition on February 14, 1912.[7] It bears noting, that the Treaty of Guadalupe Hidalgo in 1848 recognized the potential navigability of the Gila. Evidence of post-diversion boating supports a finding that the river was at least susceptible to commercial navigation at statehood if the diversions had not existed. Finally, Jon Fuller testified at the hearing that based on his research and experience and considering the Federal navigability standard, he believes the Gila River was navigable from the confluence of the Salt to the Painted Rocks area at the time of statehood. [TR 11/16/2005 120:24–121:22]

Notwithstanding there is ample evidence of actual navigation on the lower Gila, the susceptibility analysis performed by Mr. Hjalmarson makes it clear, by a preponderance of the evidence, that the river was susceptible to navigation in its "ordinary" and "natural" condition. Not one of the presenters at the hearings refuted Mr. Hjalmarson's study proving that the lower Gila River, at least from the confluence of the Salt to the Colorado, was susceptible to navigation at statehood.

---

7 While there is no specific evidence about modern boating on the lower Gila, in addition to the historical evidence presented by the parties, at the November 2005 hearing non-parties testified about their own modern navigation on other parts of the river. For example, Mr. Jon Colby testified that he was employed as an outfitter and guide on the Upper Gila. He stated that he guided groups of people via kayaks, rubber rafts, and canoes through the Gila Box Riparian National Conservation Area managed by the Bureau of Land Management near Safford, AZ. [TR 11/17/2005 331:1–339:12] In addition, Mr. Dave Weedman, a biologist with Arizona Fish & Game, testified at the hearing that he had floated the river below San Carlos gathering information on fish populations. [TR 11/16/2005 211:8–13] The fact that boating on the Gila persists to this day, even though the vast majority of the river has long been diverted combined with the historically anecdotes is persuasive evidence that before these diversions began, the river was navigable in fact.

III. Evidence Presented By Opponents To Navigability Does Not Relate To The "Ordinary and Natural" Condition Of The River And Therefore Carries No Weight.

A. Dr. Stanley Schumm's report does not support a finding of non-navigability and in fact contains facts that support a finding of navigability.

Dr. Schumm's opinion of non-navigability should be given no weight because it is based solely on the conditions of the river in an un-natural, post diversions condition. [TR 11/17/2005 28:15-28:20, 31:8-11, 50:23-51:4] Dr. Schumm describes the Gila channel as relatively unstable that can shift during floods, but acknowledges that "human activities have significantly altered the Gila River at many locations...." [EL #6, Schumm Report at 3] His conclusion of non-navigability is premised on the channel being in a highly disturbed, depleted condition on February 14, 1912, after three major, extraordinary floods had occurred in the previous two decades.

The evidence cited in Dr. Schumm's report of the pre-flood and pre-diversion river contradicts his opinion of non-navigability. As quoted on page 8 of his report, in 1923 C.P. Ross reported in *The Lower Gila Region, Arizona,* that by 1917 a large part of the river was already dry, although small reaches still had water, and **that the position, size, and number of channels change with every flood**. [*Id.* at 8 (emphasis added)] The pre-statehood descriptions of the river compiled by Graf et al. (1994), included in Dr. Schumm's report, are contrary to the ANSAC's finding that the entire Gila River is not navigable. They describe the river bordered by willows and cottonwoods, the width ranging from 240' to 1300', with 450' the most common estimate, and the depth up to 4'. [*Id.*] Dr. Schumm notes an account detailed in Ross's 1923 report by John Montgomery, a rancher, who described the river in the summer of 1889 as a "well-defined channel with hard sloping banks lined with cottonwoods and bushes." Mr. Montgomery is also reported as saying that "[t]he water was clear, 5 or 6 feet deep and contained many fish." [*Id.*] Fish do not survive and thrive in a river that has no water.

Dr. Schumm also quotes a U.S. Geological Survey Bulletin entitled *Guidebook of the Western United States,* written by N.H. Darton in 1933 describing the Gila similarly as Mr. Montgomery. Darton is quoted as saying,

> **The Gila River channel has changed materially** in a century or less. When it was originally discovered, there was a well-defined channel with hard banks sustaining cottonwoods and other trees and plants. The current was swift and deep in places, so that the stream **could be navigated** by flat boats of moderate size, and it contained sufficient fish to be relied upon as food for many Indians... Now (1933) the Gila River is depositing sediment in its lower part and its braided course follows many narrow sand-clogged channels.

[*Id.* (emphasis added)] This evidence of the pre-development river supports finding navigability and should be given more weight than later descriptions occurring in changed conditions.

Dr. Schumm did not analyze whether the river would have been navigable in its natural and ordinary condition. [TR 11/17/2005 at 28:15–20; 31:4–11] Therefore, Dr. Schumm's conclusion that the river is not navigable at the time of statehood should be given no weight. Moreover, his report states that the river was likely navigable before diversions. [*Id.* at 8] ANSAC must carefully evaluate the evidence in the record to determine what weight to assign to each piece in the context of the *Winkleman* ruling that evidence of the river in its "ordinary and natural" condition must be given more weight than later evidence.

B. GLO surveys support finding the Gila navigable, or alternatively are ambiguous.

Careful study of the GLO surveyors' notes reveals that they meandered both banks of the Gila in places. [*See* EL # 14-Government Land Office Survey Notes *("Surveys")* T4SR4W, Book 1161, pages 43, 47, and 60; *Surveys* T5SR4W Book 1165 p. 60; TR 11/16/05 at 130:20–132:7; *Surveys* T5SR5W Book 1164 pgs. 39, 56, 58] While it is unclear why they did this, it is clear that the survey instructions are inconclusive. Dr. Littlefield himself admitted that while the survey manual had a lot of detail about how to demarcate navigable and non-navigable streams, the manuals do not provide any guidance about how to determine whether some-

thing was actually navigable or susceptible to navigation. [EL #19-Littlefield Deposition 5/25/2001 122:23-123:6] Dr. Littlefield acknowledged in his deposition that surveyor's determinations of navigability were purely discretionary. [*Id.* at 73:25, 80:9] He assumed that the surveyors were using a specific survey manual for their work, [*id.* at 95:8-20]; however, he admitted that their notes do not specify which manual they used, if any. [*Id.*] He does not know, and did not research, whether surveyors were given any specific instructions. [*Id.* at 82:8-17] He admitted that the surveyors never stated that the Gila was not navigable; rather, this is his interpretation of their notes. [*Id.* at 117:16-20] He also admitted that any pre-1890 surveys meandered on both sides of rivers would be consistent with navigability. [*Id.* at 120:12-17] He stated that he did not know of any pre-1891 surveys of the Gila River that meandered both banks, [*id.* at 121:5-9], notwithstanding the fact that surveyor Foreman did place meander posts on both banks in several townships in 1871. [*See* EL #14-*Surveys* T2SR5W Book 1635 pg. 50; T3SR4W Book 1635 pgs. 35 & 124; T4SR4W Book 1161 pgs. 43 & 47; T5SR4W Book 1634 pg. 60; T5SR5W Book 1164 pgs. 39, 56 & 58] We cannot tell from the surveyors' notes exactly which set of instruction they followed when surveying the lands abutting the river. The U.S. Supreme Court has ruled that the surveyors' actions regarding meandering have little significance because surveyors were known to meander both navigable and non-navigable streams and more importantly, because surveyors were not "clothed with power to settle questions of navigability." *Oklahoma v. Texas*, 258 U.S. 574, 585 (1922).

C. All of the evidence cited by Drs. Littlefield & August relates to the condition of the river after significant diversions of water from the river or its tributaries had already begun.

Dr. Littlefield's opinion of non-navigability should be given no evidentiary weight because it addresses the river as of 1912, by which time the river was already significantly diverted for irrigation and not in its "ordinary" or "natural" condition. [EL #19-Littlefield Deposition 5/25/2001 47:1-25; 131:25-132:7] Dr. Littlefield did not even attempt to evaluate the

"natural" condition of the river. [*Id.* at 44:1-3, 80:18-81:11] In response to a questioning from FCD's counsel, the following exchange took place.

> Q. Okay. Does your report address the Gila River in its natural condition?
>
> A. My report addresses the Gila River as of 1912. My understanding is there were already in place a number of dams either on the Gila or its tributaries that were already in existence at that particular point. So, in terms of its natural condition, if you mean without any kind of structures on the river, clearly, **the river was not in its natural condition as of 1912.**
>
> Q. And so your report shouldn't be viewed as assessing navigability in that natural condition?
>
> A. **No, I was told that I was to address what the river was like as of 1912.**
>
> Q. Okay. Would it be fair to say that it shouldn't be presumed to determine that your report assesses the river without any diversions that were also taking place in the water in the river?
>
> A. That's correct.
>
> **Q. So your report hasn't assessed the natural and ordinary condition of the Gila River as to whether it was navigable, if there were no diversions and if there were no manmade obstructions?**
>
> **A. That's right.**

[*Id.* at 47:1-25 (emphasis added)]

Dr. Littlefield admitted in both his testimony at the hearing and in his deposition that he did not measure his "historical" finding of non-navigability against any legal standard. [TR 11/16/2005 129:10-129:24; Littlefield Deposition 40:14] He admitted not using the legal standard from *The Daniel Ball,* [Littlefield Deposition 40:23], or the standard from *Defenders of Wildlife v. Hull.* [Littlefield Deposition 42:4, 43: 25 & 163:22]. Instead, Dr. Littlefield stated that he was simply offering his opinion based on historical information. [Littlefield Deposition 44:3, 41:7 & 46:15] Nevertheless, Dr. Littlefield admitted that the contemporaneous observer reports that he relied upon for his report were of the river in an unnatural and disturbed condition. [*Id.* at 131:13-132:7] He further acknowledged that all of the land patents, which his report relies upon, were performed after significant diversions had already occurred. [*Id.*

at 132:25-134:6] Dr. Littlefield admitted that diversions affected the river at the time of statehood and that virtually all of the water was diverted by 1902. [*Id.* at 146:18–23]

Because Dr. Littlefield was merely repeating the stories told by contemporaneous observers, he did not try to reconstruct the natural river. [*Id.* at 44:1–3, 80:20–81:1] What's more, his experience and credentials do not qualify him to do such a reconstruction. He is neither a hydrologist, geomorphologist, nor a water engineer trained to do such work. [*Id.* at 31:11–32:15] Dr. Littlefield never wrote any articles on navigability, never took any classes on navigability, and never taught any classes on navigability. [*Id.* at 27:22–28:20]

The conclusion that contemporaneous reports by observers should be given less weight regarding a finding of non-navigability is also supported by the fact that first annual report of the Reclamation Service issued in 1903 recognized that irrigation in the Gila Basin had already developed to a point where there was insufficient water for the fields. [*Littlefield Report* 99] Clearly, that is not the "ordinary and natural" condition of the river.

D. Evidence of boating on the river is sufficient to find at least some portions of it susceptible to navigation.

Dr. Littlefield admitted that he has no idea how much water is necessary to make the river navigable. [*Id.* at 150:22, 167:25–168:7] Although he acknowledged historical records that the steamboat, Explorer, plied the lower Gila for seven years before it was destroyed in a flood on the Colorado, [*Littlefield Report* at 120], he has no explanation for why he disregarded that long-term use when he rendered his opinion that the lower Gila was not navigable. [EL #19-Littlefield Deposition 5/25/2001 at 61:24–63:21] Dr. Littlefield considered boating on the lower Gila a "novelty," [*Id.* at 158:12–18]; however, the evidence presented in the *ASLD Navigability Study* and by Mr. Hjalmarson and Dr. D.C. Jackson at the hearing shows that that river was at least susceptible to navigation at statehood if the diversions had been removed. Seven years of navigation by a steamboat is no longer a "novelty."

E. Dr. August's report fails to demonstrate that the Gila was not navigable.

Just as Dr. Littlefield's report is flawed by reliance on post-diversion observations, Dr. Jack August's report is similarly flawed. Any historical information that relates to non-navigability is attributable to the fact that the contemporaneous observers were viewing the river in a depleted condition. It is not surprising that contemporaneous viewers thought the river was not navigable; however, this ignores the rule from *The Daniel Ball*, and *Winkleman*, that navigability is based on the "ordinary and natural" condition, not a diverted/unnaturally depleted condition. In his report and in his testimony at the hearing, Dr. August references and affirms Dr. Littlefield's report with respect to the GLO surveys. [EL #17-*Expert Witness Report: The Lower Gila River: A Non-Navigable Stream on February 14, 1912* 10-16; TR 11/16/2005 162:7-19; 198:19-199:6] As addressed above, reliance on the GLO surveys as evidence of non-navigability is not useful in a navigability determination

IV. The Lower Gila From The Confluence With The Salt River To The Colorado Is An Appropriate Segment.

In 2004 and 2005, ANSAC published notices in Arizona newspapers announcing that it "intends to receive, review, and consider evidence regarding the navigability or non-navigability of the Gila River. [Exhibit A1 to, FINDINGS AND DETERMINATION REGARDING THE NAVIGABILITY OF THE GILA RIVER FROM THE NEW MEXICO BORDER TO THE CONFLUENCE WITH THE COLORADO RIVER ("Gila Determination") dated January 27, 2009] Subsequently, the Commission published notices that it would hold hearings "to receive physical evidence and testimony relating to the [Gila River.]" [*Id.*] Plainly, the Notices of Public Hearing published in the Arizona newspapers make no mention of potential segmentation of the River or the Commission's willingness to receive evidence on segmentation. [*Id.*] The Evidence Log from the hearings on the Gila and the text of the ANSAC report itself demonstrate that evidence analyzing possible segmentation of the river in its ordinary and natural condition has not been presented to ANSAC, except with respect to the lower Gila from the confluence with the Salt to the Colorado. [Exhibit E to Gila Determination]

Hjalmar W. Hjalmarson's report [EL #23], Dr. Douglas Littlefield's report [EL #12], Alan Gookin's presentation [EL #5], and Dr. Stanley Schumm's report [EL #6]), did analyze this 188-mile lower Gila segment from the Salt confluence to the Colorado but only Mr. Hjalmarson's report analyzed the lower reach of the river in its "ordinary and natural" condition instead of its diverted, unnatural condition on the date of statehood. [Section II, *supra*]

As described in the EL #4-GILA RIVER NAVIGABILITY STUDY, the lower Gila, running from the confluence with the Salt to the Colorado River is located in the Basin and Range province and its flow is supplemented by the Salt River, which, before Anglo settlement, supplied a greater volume of water than the upper and middle Gila watersheds. [*Id.* at VII-5-6] The lower Gila was perennial from the Salt to the Colorado River. [*Id.*] Early Spanish explorers described natives living along the lower Gila as fisherman and the river as lined with Cottonwoods through the late 1800s. [*Id.*] There are multiple historical records of successful navigation down the lower Gila during the 1800s before upstream diversions entirely depleted the river by the 1920s. [*Id.*]

The confluence with the Salt provides a clearly defined topographic, hydraulic and logical starting point for the lower Gila segment under the requirements set forth in *PPL Montana*. This segment is clearly defined, discrete, administrable segment, which, as discussed *supra*, has ample evidence of navigability for title purposes.

Conversely, further analysis of the remainder of the Gila is necessary because the Gila is not a uniform river—quite the contrary. The GILA RIVER NAVIGABILITY STUDY states that historical changes on the Gila River "are not the same along all reaches of the river." [EL #4 at VII-1] The report states further:

> Alluvial reaches, i.e., segments not confined by bedrock, are prone to greater changes in channel position and form. Furthermore, because of physiographic variability and a climatic gradient across the Gila River watershed, different reaches have unique hydrologic characteristics (Hirschboek, 1985), and thus as one might expect, channel transformation along separate reaches **are not synchronous or uniform**. In addition, dams and irrigation diversion have altered different reaches of the Gila River.

[*Id.* (emphasis added)]

While a detailed analysis of segmentation is yet to be done for the Gila from the New Mexico state line to the Salt confluence, evidence does exist that could be used to analyze segmentation for that reach—just as Mr. Hjalmarson did for the lower Gila. Nevertheless, no one has yet done that analysis of this large portion of the river. No one, qualified as an expert, has rendered an opinion that, the Gila from New Mexico to the Salt confluence, or any portion thereof, in its ordinary and natural condition is navigable or not. Just as Mr. Hjalmarson analyzed publicly available documentation to accomplish his analysis of the lower Gila, the evidence is available for the upper Gila, but it is not presently in the record to support a segmentation decision.

V. Conclusion

The evidence presented shows that the river changed dramatically since significant diversion began and that the contemporaneous observers viewed the river in an unusual, unnatural condition. The only evidence presented about the Gila River in pre-settlement, pre-diversion, natural condition was from Hjalmar W. Hjalmarson. His testimony, along with historical evidence of actual navigation on the river, more than supports a finding that the river was navigable in its "natural and ordinary" condition, at least from the confluence with the Salt to the Colorado River by a preponderance of the evidence.

Respectfully Submitted this 7th day of September 2012

John D. Helm - AZ Bar # 002584
Sally Worthington - AZ Bar # 012424
Jeffrey L. Hrycko - AZ Bar #023280
Helm, Livesay & Worthington, Ltd.
1619 E. Guadalupe, Suite One
Tempe, Arizona 85283-3970
Telephone: (480) 345-9500
Fax: (480) 345-6559
Email: office@hlwaz.com
Special County for Maricopa County and
Flood Control District of Maricopa County

ORIGINAL AND 6 COPIES of the
foregoing HAND-DELIVERED this
7th day of September 2012, to:

George Mehnert, Executive Director
Arizona Navigable Stream Adjudication Commission
1700 W. Washington, Room B-54
Phoenix, AZ 85007

COPY of the foregoing MAILED
this 7th day of September 2012, to:

Laurie A. Hachtel
Joy L. Hernbrode
Assistant Attorneys General
Natural Resources Section
OFFICE OF THE ATTORNEY GENERAL
1275 W. Washington Street
Phoenix, AZ 85007
Attorneys for Arizona State Land Department

Joy E. Herr-Cardillo
Timothy M. Hogan
ARIZONA CENTER FOR LAW IN THE PUBLIC INTEREST
2205 E. Speedway Blvd.
Tucson, AZ 85701-1915
Attorneys for Defenders of Wildlife, Donald Steuter,
Jerry Van Gasse, and Jim Vaaler

John B. Weldon, Jr.
Mark A. McGinnis
Scott M. Deeny
SALMON, LEWIS AND WILSON, P.L.C.
2850 E. Camelback Road, Suite 200
Phoenix, AZ 85016
Attorneys for the Salt River Project Agricultural
Improvement and Power District and Salt River
Valley Water Users' Association

Cynthia M. Chandley
Robert J. Pohlman
L. William Staudenmaier
SNELL & WILMER
400 E. Van Buren
Phoenix, AZ 85004
Attorneys for Freeport-McMoRan Corporation

Thomas L. Murphy
Office of the General Counsel
GILA RIVER INDIAN COMMUNITY
P. O. Box 97
Sacaton, AZ 85147
Attorneys for Gila River Indian Community

William H. Anger, Esq.
ENGELMAN BERGER, P.C.
3636 N. Central Avenue, Suite 700
Phoenix, AZ 85012
Attorneys for City of Mesa

Charles L. Cahoy, Esq.
Assistant City Attorney
City Attorney's Office
CITY OF TEMPE
P.O. Box 5002
Tempe, AZ 85280
Attorneys for City of Tempe

Cynthia S. Campbell, Esq.
Law Department
CITY OF PHOENIX
200 W. Washington Street, Suite 1300
Phoenix, AZ 85003-1611
Attorneys for City of Phoenix

Joe P. Sparks
THE SPARKS LAW FIRM, P.C.
7503 First Street
Scottsdale AZ 85251-4573
Attorneys for San Carlos Apache Tribe
and the Tonto Apache Tribe

EXHIBIT 1

Exhibit 1

Year(s)	Party	Location	Citation
1824–27	James Ohio Pattie	Entire River	ASLD study IV-1
1846–47	Mormon Battalion-Captain Phillip George Cooke and Mormon Battalion floated supplies via a raft	Lower Gila-Gila Bend to Yuma	ASLD study IV-2
1849	Edward Howard party	Lower Gila-Gila Bend to Yuma	ASLD study IV-2
1850	Unknown 49'er letter from "Camp Salvation"	Lower Gila	ASLD study IV-3; Transcript ("TR") 11/16/2005 39:9-15; TR 11/17/2005 209:20-210:5
1857–64	Lieu., J.C. Ives, Steamboat, "Explorer"	Lower Gila-mouth to Dome	Littlefield Report 118–19; TR 11/16/2005 63:20–22
1867–92	Henry Morgan operated ferry	Maricopa Wells	ASLD study IV-5
1881	Cotton and Bingham	Lower Gila-Salt River to Yuma	ASLD study IV-7; TR 11/16/2005 39:23-40:1; TR 11/17/2005 210:18-211:3
1881	William "Buckey" O'Neill, "Yuma or Bust" party	Lower Gila-Phoenix to Yuma	ASLD study IV-7; TR 11/16/2005 39:16-22, 172:23-173:2; TR 11/17/2005 211:4-19
1884	A.J. McDonald built large ferry boat for Gila and Salt River Ferry Company to be used on Salt River below town. It will be of the same dimensions as the one sent to the Gila, viz: 16 by 18 feet.	Lower Salt/Gila	ASLD study IV-7
1891	R.M. Straus of Aztec, senior partner of Straus, Dallman & Co. has new ferry at work on the Gila River. It is large enough to carry a load 6-horse team in safety.	Lower Gila	ASLD study IV-8

1895	Evans and Amos	Upper/Middle Gila-San Francisco to Yuma (one portage from Sacaton to Phoenix)	ASLD study IV-8: TR 11/16/2005 40:1-5, TR 11/17/2005 212:2-215:9
1905	Jack Shibely	Lower Gila-Phoenix to Gila Bend	ASLD study IV-13; TR 11/16/2005 40:13-14, 116:7-20, 215:12-18.
1905	Jack Henness of Florence operates suspended cable-and-cage to transport cargo and people across river. Report looking down on Gila Queen (ferry boat) as he passes over.	Middle Gila	ASLD study IV-12
1905	Two new boats enter the thriving ferry business, the Mayflower and the Rey del Gila	Not clear	ASLD study IV-13
1905	Gila King ferry enters the ferry business. The boat is 20 feet long, 6 feet wide and capable of carrying a 3000 pound load.	Unknown	ASLD study IV-13
1909	Stanley Sykes	Entire River-New Mexico to Yuma	TR 11/16/2005 40:15-16, 106:1-16,
1959	Three unknown men entered river near Duncan with intention of traveling to Yuma. Later account reported in Yuma Courier	Entire River	ASLD study IV-21
1995-present	Jon Colby-Cimarron Adventure & River Company	Upper Gila	TR 11/17/2005 331:15-332:12
Unknown	Dave Weedman, Fish & Game Biologist	Upper Gila	TR 11/16/2005 211:8-13