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**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'S OPENING POST-  
HEARING MEMORANDUM

Maricopa County and the Flood Control District of Maricopa County, by and through counsel undersigned, submit their Opening Post-Hearing Memorandum on the Navigability of the Gila River in Maricopa County, Arizona. This Memorandum is based upon the evidence submitted prior to and at the hearing held on November 16 & 17, 2005 in Phoenix, Arizona, and on the testimony from that hearing. Based on the evidence presented, the Gila River was navigable in its "natural and ordinary" condition on February 14, 1912 at the time of statehood. It should be noted that this does not mean that the determination is based on the physical condition of the river or the modes of travel then used on that date, but only that the determination is made as of that date. *See United States v. Utah*, 283 U.S. 64, 82 (1931).

## I. LEGAL STANDARDS APPLICABLE TO THIS DETERMINATION

Determination of navigability to fix ownership of the riverbed is decided as of the date a state enters the Union. *United States v. Appalachian Elec. Power Co.*, 311 U.S. 377, 408 (1940); *United States v. Utah*, 283 U.S. 64, 75 (1931). Once found to be navigable, a river remains so even if not used for such purposes. *Appalachian Elec.*, 311 U.S. at 408. This remains true whether the disuse results from changes in commerce and travel, or changes in the waterway. *Arizona v. California*, 283 U.S. 423, 453-54 (1931); *Economy Light & Power Co. v. United States*, 256 U.S. 113, 123 (1921).

The standard of navigability for equal footing claims is established by federal law and is the same as for determining navigable waters of the United States. *United States v. Utah*, 283 U.S. at 67, 75; *Ariz. Ctr. For Law In The Pub. Interest v. Hassell*, 172 Ariz. 356, 362, 837 P.2d 158, 164 (App. 1991). The well-known test for navigability was first elucidated by the United States Supreme Court in *The Daniel Ball*, 77 U.S. (10 Wall.) 557, 563 (1870).<sup>1</sup> In that landmark case, the Court stated:

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 use, 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.

*Id.* Arizona courts have recognized that the Federal standard is to be used in determining navigability of streams in Arizona. *Defenders of Wildlife v. Hull*, 199 Ariz. 411, 420 ¶ 18, 18 P.3d 722, 731 (App. 2001); *Hassell*, 172 Ariz. at 362, 837 P.2d at 164. In accordance with the Federal definition, Arizona law defines a navigable watercourse as:

[A] watercourse that was in existence on February 14, 1912, and at that time was used or was susceptible to being used, in its ordinary and natural

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<sup>1</sup> Although *The Daniel Ball* involved determining navigability under Congress' Commerce power, there is no legitimate dispute that navigability in the equal footing context requires using *The Daniel Ball* as the standard. "Additionally, *The Daniel Ball* test remains 'the starting point in determining navigability for resolving title' under the equal footing doctrine." *Defenders of Wildlife*, 199 Ariz. at 419 ¶ 17 n.10, 18 P.3d at 430 n.10 (quoting *Alaska v. United States*, 563 F. Supp. 1223, 1226 (D. Alaska 1983)).

condition, as a highway for commerce, over which trade and travel were or could have been conducted in the customary modes of trade and travel on water.

Arizona Revised Statutes section 37-1101(5) (2003).

Later cases held that with respect to the equal footing doctrine navigability is determined by reference to the “natural and ordinary” condition of the watercourse. *See e.g. The Montello*, 87 U.S. (20 Wall) 430, 440-443 (1874); *United States v. Utah*, 283 U.S. at 76. In *The Montello*, the Supreme Court held that the Fox River in Wisconsin was a navigable water of the United States even though it had been significantly improved from its natural condition. 87 U.S. (20 Wall) at 443. The Court held that although early efforts to navigate the Fox River proceeded with difficulty,

[T]he true test of the navigability of a stream does not depend on the mode by which commerce is, or may be, conducted, nor the difficulties attending navigation. If this were so, the public would be deprived of the use of many of the large rivers of the country over which rafts of lumber of great value are constantly taken to market.

It 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 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, no matter in what mode the commerce may be conducted, it is navigable in fact, and becomes in law a public river or highway.

*Id.* at 441-42.

“[N]avigability does not depend on the particular mode in which such use is or may be had—whether by steamboats, sailing vessels or flatboats.” *United States v. Holt State Bank*, 270 U.S. 49, 56 (1926). Moreover, the mere presence of occasional difficulties in navigation does not render non-navigable an otherwise navigable river. *Id.*; *United States v. Utah*, 283 U.S. at 76.

Applying this rule, the *Montello* Court held that the district court had erred by holding that the Fox River was not navigable because various obstacles to navigation had to be removed before it was usable for navigation. *Id.* The Court stated:

Indeed, there are but few of our fresh water rivers which did not originally present serious obstructions to an uninterrupted navigation. In some cases, . . . they may be so great while they last as to prevent the use of the best instrumentalities for carrying on commerce, but the vital and essential point is whether the natural navigation of the river is such that it affords a channel for useful commerce. If this be so the river is navigable in fact, although its navigation may be encompassed with difficulties by reason of natural barriers, such as rapids and sand-bars.

*Id.* at 443; accord *Holt State Bank*, 270 U.S. at 56.

The issue then is whether a stream must be “generally and commonly useful to some purpose of trade or agriculture,” and “affords a channel for useful commerce.” *The Montello*, 87 U.S. (20 Wall.) at 442-43. The test of susceptibility to useful commerce does not require susceptibility to large-scale commercial activity. *Utah v. United States*, 403 U.S. 9 (1971); *Hassell*, 172 Ariz. at 363, 837 P.2d at 165. In *Utah v. United States*, 403 U.S. 9, the Supreme Court examined historical evidence that in the late 1800s ranchers had used the Great Salt Lake sporadically to carry livestock between islands and the mainland. The Court deemed it irrelevant that “the business of the boats was ranching and not carrying water-borne freight” and that the carriage served only the few ranchers along the lake shores. *Id.* at 11. Because the lake was proven susceptible for usage “as a highway,” the test of navigability was met. *Id.*

In evaluating navigability, the Supreme Court has held that early observations of the stream, and actual use of a river by fur traders, explorers, surveyors, pleasure boaters, travelers, Indians, and use in connection with mining and transporting supplies or lumber are all persuasive evidence of navigability. *Appalachian Elec.*, 311 U.S. at 410-19; *United States v. Utah*, 283 U.S. at 79-82; *Economy Light*, 256 U.S. at 117-18. In *Alaska v. Ahtna, Inc.*, 891 F.2d 1401, 1405 (9th Cir. 1989), the Ninth Circuit Court of Appeals held that the lower 30 miles of the Gulkana River was navigable based on evidence that the river was used for guided fishing and sightseeing trips. The court stated that even though the river was frozen for six months each year and only flowed between 3,600 to 4,800 cfs from

May to September, the recreational use provided conclusive evidence of the river's susceptibility for commercial use at statehood. *Id.* at 1402, 1405. In an earlier Ninth Circuit case, *Puget Sound Power & Light Co. v. Federal Energy Regulatory Commission*, 644 F.2d 785, 788-89 (9th Cir. 1981), the same court recognized that, although not determinative, use of canoes by Indians was relevant to the navigability determination of the White River in Washington before the river was substantially diverted.<sup>2</sup>

Nevertheless, where such actual use is limited or infrequent, a river's susceptibility to use as a commercial highway may still be proved by evidence concerning its physical characteristics. *Appalachian Elec.*, 311 U.S. at 410-19; *United States v. Utah*, 283 U.S. at 82-83; *Economy Light*, 256 U.S. at 118.

In *Appalachian Electric Power Co.*, 311 U.S. at 407, the Supreme Court stated that "natural and ordinary" condition refers to the "volume of water, the gradients and the regularity of the flow." In that case, the Court held that "[a] waterway, otherwise suitable for navigation, is not barred from that classification merely because artificial aids must make the highway suitable for use before commercial navigation may be undertaken." *Id.* The Court recognized that there are "obvious limits to such improvements"; however, the limit is "a matter of degree." *Id.* Furthermore, "[i]mprovements that may be entirely reasonable in a thickly populated, highly developed, industrial region may have been entirely too costly for the same region in the days of the pioneers." *Id.* Accordingly, the ANSAC must consider evidence of the Gila River's "natural and ordinary" volume of water, gradients, and

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<sup>2</sup> Although the evidence of canoe use was not substantial, the Ninth Circuit upheld a determination of navigability based on evidence of shingle bolt drives on the river that ceased when the river changed course and was substantially diverted. *Puget Sound Power*, 644 F.2d at 789. The court further recognized that it "must take due account of the changes and complexities of a river, when determining the sufficiency of evidence to prove navigability. *Id.* (internal citation omitted). Among the changes considered by the court were "settlement of the region . . . did not commence[] until the 1850's, the course of the river changed in 1906, and in 1911, Puget's predecessor in interest commenced operation of the power project." *Id.*

regularity of flow and whether artificial aids would be required to make the river suitable for commercial navigation.

Moreover, the negative effects of artificial obstructions (*i.e.* dams) must be factored out of the Commission's determination of navigability. In accordance with Federal case law, the Arizona Court of Appeals, in *Defenders of Wildlife*, stated that "[t]he fact, however, that artificial obstructions exist capable of being abated by due exercise of the public authority, does not prevent the stream from being regarded as navigable in law, if, supposing them to be abated, it be navigable in fact in its natural state. 199 Ariz. at 424 ¶ 46, 18 P.3d at 735 (*quoting Economy Light*, 256 U.S. at 118).

## **II. CONVINCING, UNCONTESTED EVIDENCE WAS PRESENTED THAT DEMONSTRATES THAT THE RIVER WAS NAVIGABLE IN ITS "NATURAL AND ORDINARY" CONDITION.**

Hjalmar "Winn" Hjalmarson's testimony was the only analysis of the river in its ordinary and natural condition. ANSAC Hearing Transcript ("TR") 11/17/2005 256:21-25. He testified that based on his analysis of the hydraulics, hydrology and geomorphology, the river was navigable in its pre-diversion/pre-settlement "normal and natural" condition. *Id.* at 256:5-9. His testimony was not refuted.

The goal of Mr. Hjalmarson's study was to estimate the amount and temporal distribution of the natural flow in the Gila River from the confluence with the Salt to the Colorado. TR 11/17/2005 236:14-18. Using data from the U.S. Geological Survey, he calculated the pre-development mean (2,330 cfs), median (1,750 cfs), and base flow (290 cfs) of the river. Evidence Log ("EL") #23-Hjalmar W. Hjalmarson, *Navigability Along the Natural Channel of the Gila River* 13-14 (October 25, 2002). Based on these calculations, Mr. Hjalmarson concluded that the pre-development river was a perennial stream, with a calculated width on average of 300 feet, an average depth of 3.1 feet, and velocity of 2.5 mph. *Id.* at 244:10-22. Mr. Hjalmarson also collected measured width data from the

GLO survey notes and calculated an average width from those notes as well after adjusting for unknown angles of incidence. *Id.* at 245:19-248:8. Mr. Hjalmarson's calculated width agreed with the average from the Government Land Office ("GLO") surveys. *Id.* at 248:9-13.

Mr. Hjalmarson then used three Federal tests for navigability to determine whether the pre-development dimensions would permit navigation. *Id.* at 252:8-254:15. The first of these tests, 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. *Navigability Along the Natural Channel of the Gila River* 24. In this rating system, Class I is considered "very easy" while Class VI is "extraordinarily difficult." *Id.* at 24-25. According to this measurement, the Gila River from the confluence of the Salt to the Colorado is considered Class I or "very easy." *Id.* The second method, 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.* Throughout the studied reach of the Gila, the river met the minimum depth (*i.e.* 1 foot) and width (*i.e.* 6 feet) requirements for these small boats. *Id.* Finally, Mr. Hjalmarson evaluated the same reach using a U.S. Geological Survey engineering method developed by Langbein in 1962. *Id.* The USGS method looks at the specific force required to propel a craft upstream. *Id.* This method uses the natural condition of the river to assess if flow conditions were conducive for two-way (upstream and downstream) commercial navigation. Using this third model, Mr. Hjalmarson calculated that the Gila would have been navigable both downstream, and upstream. *Id.* at 27-29. Moreover, 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.

In the report prepared for the State Land Department by J.E. Fuller Hydrology & Geomorphology, Inc. entitled *The Arizona Stream Navigability Study for the Gila River: Colorado River Confluence to the Town of Safford* (“ASLD Navigability Study”), the authors list many accounts of the river that lead to the conclusion that it was susceptible to navigation before the water was significantly diverted. The first such account describes a party passing through the Gila River basin in November 1697. EL #2-ASLD 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.* Another later account from Father Pedro Font’s diary written during the De Anza expedition in 1775, described the river as varying from “dry” to “very deep and ran very slowly.” *Id.*

A later account by James Ohio Pattie states that while trapping along the lower Gila during December 1827, his trapping party constructed a canoe so that they could trap both sides of the river which he stated 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 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)

The *ASLD Navigability Study* lists several other accounts of successful boating trips down the Gila including the Edward Howard party in 1849, the “Yuma of Bust” trip in 1881, and the J.W. Evans



trip in 1895. *ASLD Navigability Study* at IV-2, IV-7, IV-8, 9. The *ASLD Navigability Study* also lists an 1850 account of successfully using small boats on the river to float belongings downstream thereby lightening the loads for wagon teams and a report from an 1853-54 army expedition that reports the river could probably be used to deliver logs from the Mogoyon Mountains. *ASLD Navigability Study* at IV-3.

Finally, Jon Fuller testified at the hearing that based on his research and experience and considering the Federal navigability standard, he thought that 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.

### **III. EVIDENCE PRESENTED BY OPPONENTS TO NAVIGABILITY IS UNCONVINCING.**

**A. All of the evidence cited by Dr. Littlefield relates to the condition of the river after significant diversions of water from the river or its tributaries had already begun.**

Dr. Littlefield's report is irrelevant to the ANSAC's determination and the report should be disregarded because it addresses the river as of 1912, by which time it was not in its 'normal and natural' condition. EL #19-Littlefield Deposition 5/25/2001 47:1-25; 131:25-131:7.<sup>3</sup> Dr. Littlefield admitted in his deposition that the contemporaneous observer reports that he relied upon for his report were of the river in an unnatural and disturbed condition. *Id.* at 47:20-25, 132:7. Furthermore, Dr. Littlefield acknowledged that the all of the GLO surveys, which his report relies upon, were performed after significant diversions had already begun. *Id.* at 134:7. Dr. Littlefield admitted that diversions did affect the river at the time of statehood and acknowledged that virtually all of the water was diverted by 1902. *Id.* at 67:9, 146:23. Moreover, because he 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.

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<sup>3</sup> At the hearing, Dr. Littlefield affirmed that he stood by the statements that he made in his May 25, 2001 deposition, as recorded in the transcript submitted to the ANSAC. TR 11/17/2005 128:1-17.

The fact that contemporaneous reports by observers cannot be relied upon as support for a finding of non-navigability is further supported by the fact that first annual report of the Reclamation Service recognized that irrigation in the Gila Basin had already developed to a point where there was insufficient water for the fields. 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") 99 (Nov. 3, 2005). Clearly, this is not the normal and natural condition of the river.

**B. Dr. Littlefield's interpretation of the GLO survey notes is not unambiguously supported by the evidence.**

Dr. Littlefield admits that there was no precise rule for determining navigability in surveyor's manuals, but there is a precise method of treating navigable streams. Littlefield Deposition 5/25/2001 122:23-123:6). He 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 95:13; however, he admitted that their notes do not specify which manual they used, if any. *Id.* at 117:20. He does not know, and did not research, whether surveyors were given any specific instructions. *Id.* at 82:17. He admitted that the surveyors never stated that the Gila was not navigable; rather, this is his interpretation of their notes. *Id.* at 117:20. He also admitted that any pre-1890 surveys meandered on both sides of rivers would be consistent with navigability. *Id.* at 120:12-21. 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-Government Land Office Survey Notes ("*Surveys*") Township ("T") 2 South ("S"), Range ("R") 5 West ("W") 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. Dr. Littlefield does not know what the phrase, "natural arteries of internal

communication,” means. *Id.* at 77:21, 78:14. He stated that several different surveyors concluded either explicitly or implicitly that the Gila was not navigable, *Littlefield Report* at 55; however, the surveyors’ notes do not support finding an explicit conclusion to that effect, and the only implicit conclusion was drawn by Littlefield himself, not the surveyors. Littlefield Deposition 5/25/2001 117:20.

He did not attempt to compare the USGS water survey maps with the observations by the surveyors. *Id.* at 139:11, 167:24. He stated that although Foreman meandered one bank, that was not related to navigability. *Littlefield Report* at 40. This statement is not supported by Foreman’s notes. Foreman stated in his notes that he only meandered one side because the other side was unusable land. He made no statement regarding navigability. *Surveys T5SR4W Book 1634 pg. 64.*

Turning to a specific review of errors in Dr. Littlefield’s report, on page 30, referring to T1NR1W, Dr. Littlefield misquotes the GLO survey notes. Dr. Littlefield states, “[i]n addition to mentioning that the Gila had a rapid current and sandy bottom, he noted that ‘[i]t is a fine stream.’” The notes actually say, “[i]t is a fine stream of water *about 10 ch[ains] wide*. The right bank and bed are sandy and has a rapid current.” *Surveys T1NR1W Book 1, pg. 423 (emphasis added)*. This means that the surveyor thought the Gila was 660 feet wide with a sandy bed and a rapid current. Also on page 30 of his report, Dr. Littlefield ignores the fact that in 1868, surveyor G.P. Ingalls set corner posts on the riverbank for fractional sections. *Littlefield Report* at 375-76, 387, 398, 408; *Surveys T1NR1W Book 1257, pg. 100*. The 1850 Survey Manual states that fractional sections were created when a survey line ran into a navigable stream. *Instructions to the Surveyors General of Public Lands of the United States, for Those Surveying Districts Established in and Since the Year 1850; Containing, Also, a Manual of Instructions to Regulate the Field Operations of Deputy Surveyors, Illustrated by Diagrams 6 (1855) reprinted in C. A. White, A History of the Rectangular Survey System, at 460 (2d*

ed. 1991). Fractional sections indicate that the surveyors, using that manual, thought the river was navigable; Dr. Littlefield does not address this in his report.

Next, on page 31 of his report, Dr. Littlefield implies that G.P. Ingalls did not think that the Gila was navigable because the map does not show meander data; however, this just highlights the fact that the surveyors did not always follow the survey manual instructions and again, that the surveyors did not specify in their notes which survey manual they followed, if any. Presumably, a survey conducted in 1868 would have followed the 1864 instructions. Those survey instructions required the surveyor to meander one bank of well-defined natural arteries of internal communication. See *Instructions to the Surveyors General of the United States, Relating to Their Duties and to the Field Operations of Deputy Surveyors* 8 (1864) (“1864 Survey Manual”) reprinted in White, at 504. Clearly, G.P. Ingalls, the surveyor, was not following instructions whether the river was navigable at that time or not. It is therefore improper to speculate as to Ingalls’s thoughts on navigability, as Dr. Littlefield has done.

On page 32 of Dr. Littlefield’s report, the surveyor did not meander the river and again ignored the instruction to meander one-bank of well-defined natural arteries of internal communication.<sup>4</sup> The river measured 3.74 chains (247 ft.) across according to the surveyor. *Surveys* T1NR2W Book 1006, pg. 24. Regardless of surveyor R.C. Powers’ failure to follow the survey manual, by the time of his survey in 1883, many diversions were already in place and therefore he was not seeing the natural river. Even as late at 1907, in the same township surveyed twenty-four years earlier by Mr. Powers,

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<sup>4</sup> According to the survey manual then in effect, surveyors were required to meander one bank of non-navigable streams that are well-defined natural arteries of internal communication. *Instructions of the Commissioner of the General Land Office to the Surveyors General of the United States Relative to the Survey of the Public Lands and Private Land Claims* 34 (1881) (“1881 Survey Manual”) reprinted in White, at 523.

surveyor John F. Hesse found 18"-24" of water in the river while also recording large canals in his notes. *Littlefield report* at 33; *Surveys T1NR2W* Book 2055, pgs. 105-107.

Moving downstream, in 1883, Mr. Powers also surveyed T1SR2W, presumably under the 1881 instruction manual. Dr. Littlefield states on pages 35 of his report that Powers treated the river as not navigable because he did not set meander posts on either bank. That is one interpretation of Powers work; however, not the only legitimate interpretation. Ridgley C. Powers may have had ulterior motives to find the Gila non-navigable. In addition to his surveying occupation, Powers was also the managing agent and an officer of the Gila Bend Canal Company.<sup>5</sup> According to Linda Sue Peden, in her Masters Thesis entitled "*Land Laws, Water Monopoly, and Lewis Wolfley in Gila Bend, Arizona,*" Ridgley C. Powers, Lewis Wolfley, and Royal A. Johnson, U.S. Surveyor General for Arizona and Secretary of the Gila Bend Canal Company created a land speculation scheme in the Gila Valley below Buckeye. This created a strong financial motive for Powers to find the Gila non-navigable.

Powers' plat of this township also highlights the fact that he was not viewing the river in its natural condition. Powers recorded a dam and irrigation ditches when he surveyed the township in 1883. *See Surveys T1SR2W* Plat Filed 4-23-1883. The dam was located upstream of what Powers surveyed in T1NR2W. It is not surprising that Powers might not find the river navigable under these conditions.

On page 38 of his report, Dr. Littlefield fails to note that although the plat does not have any meander information, Surveyor Solomon Foreman did indicate that he erected meander corners along the river. *Surveys T4SR4W*, Book 1161, pages 43, 47, 60. Moreover, Dr. Littlefield's assumption that the fact that Forman noted a road along the river supports non-navigability is simply unsupported by

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<sup>5</sup> Linda Sue Peden, *Land Laws, Water Monopoly, and Lewis Wolfley in Gila Bend, Arizona* 48-51 (MA thesis, Arizona State University, 1997).

any evidence and is contrary to the Federal test for navigability. *Defenders of Wildlife*, 199 Ariz. at 424-25 ¶ 48, 18 P.3d at 735-36. In his deposition for the Gillespie Dam case, Dr. Littlefield admitted that his assumption was not in accordance with the *Defenders of Wildlife* case. Littlefield Deposition 5/25/2001 114:8-13. Another interpretation could be that travel by road was a preferred means of transportation in that relatively flat part of the territory.

On page 40, Dr. Littlefield states that no meander posts were set in the right bank. He is wrong. Surveyor Foreman set meander posts in both the left and right banks. *See Surveys T5SR4W* Book 1165 p. 60; TR 11/16/05 130:20-131:1-132:5. On page 52, Dr. Littlefield ignores survey notes that indicate that Foreman set meander posts on right and left banks of the river in T5SR5W. *Surveys T5SR5W* Book 1164 pgs. 39, 56, 58.

On page 54, Dr. Littlefield states that in 1910, surveyor John F. Hesse noted that the river was only seven inches deep in T5SR8W. This observation is irrelevant to this commission's purposes because it is obviously due to the upstream diversions. By 1910, the largest source of water in the lower Gila, the Salt, was significantly diverted to fill Roosevelt Lake. TR 11/17/2005 206:4-207:2.

**C. Dr. Littlefield's interpretation that land patents supports finding the river non-navigable is also flawed.**

In his deposition, Dr. Littlefield admitted that Federal land surveyors and the Land Patent Office would not have known to exclude parcels in the riverbed if they did not know that the river was navigable. Littlefield Deposition 125:16-126:18. Furthermore, the land patent support files are irrelevant because the homesteaders did not care whether the river was navigable. The patentees were interested in obtaining farmlands. The fact that the patent files mention river bottomland does not undermine the navigability of the river because a patentee is not assumed to know the law regarding the equal footing doctrine, nor is it relevant because the State must first enforce the right. The fact that the State did not get involved is not dispositive. The Territorial and Federal governments were

promoting water use for farming and settlement. By 1877, railroads were already being constructed in Arizona, *see ASLD Navigability Study* III-24, so it is likely that the issue of navigability was not foremost on the minds of the settlers or the politicians. Patents that were issued after the Salt River was dammed are even more irrelevant to proving the river non-navigable because they only document post-diversion observations of the river.

Finally, on page 75 of his report, Dr. Littlefield misinterpreted the meaning of the Desert Land Act's irrigation provision when he stated that "the water to be used had to be taken from a non-navigable stream." The Desert Land Act, 19 Stat. 377 as codified at 43 U.S.C. § 321, states:

It shall be lawful for any citizen of the United States, . . . , and who has filed his declaration under oath with the officer designated by the Secretary of the Interior of the land district in which any desert land is situated, that he intends to reclaim a tract of desert land not exceeding on-half section, by conducting water upon the same, . . . : *Provided*, however, That the right to the use of water by the person so conducting the same, on or to any tract of desert land of three hundred and twenty acres shall depend upon a bona fide prior appropriation; and such right shall not exceed the amount of water actually appropriated, and necessarily used for the purpose of irrigation and reclamation; and all surplus water over and above such actual appropriation and use, together with the water of all lakes, rivers, and other sources of water supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining, and manufacturing purposes subject to existing rights. . . .

43 U.S.C.A. § 321 (WESTLAW 2005) (emphasis in original). The U.S. Supreme Court has interpreted this law to mean that a patentee of desert land can only use water according to the state and local laws, *California Oregon Power Co. v. Beaver Portland Cement Co.*, 295 U.S. 142, 162 (1935), and that water may be used, even from navigable streams, so long as the use does not diminish the stream's navigability. *United States v. Rio Grande Dam & Irrigation Co.*, 174 U.S. 690, 709-10 (1899). The Act did not require that only non-navigable waters were to be used for irrigation, rather, it stated that the Federal government was not setting up a water law system and that waters were to be

allocated under state law. Consequently, irrespective of Dr. Littlefield's interpretation any patents that were issued under the Desert Land Act are not relevant to navigability.

**D. Dr. Littlefield did not analyze the historical record using the relevant legal standard; therefore, the Commission should disregard his one-sided interpretation of history.**

Before producing his initial report on the navigability of the Lower Gila, Dr. Littlefield had worked on only one other navigability case, had published no books or magazine articles on the subject, had not taken any classes on the subject, or taught any classes on the subject, nor is he a surveyor, hydrologist, or engineer. Littlefield Deposition 26:2, 27:24, 28:17, 30:25, 31:13. Therefore, his interpretation of history regarding the navigability of rivers should be carefully scrutinized.

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. However, this determination is inherently a legal question and his failure to measure his findings against the required legal standard undermines his opinion.

Instead of using the legal standards from *The Daniel Ball* or *Defenders of Wildlife v. Hull*, Dr. Littlefield used a standard of "commercial navigability." *Id.* at 49:11, 54:1. Notwithstanding Federal case law to the contrary, *e.g. Alaska v. Ahtna, Inc.*, 891 F.2d 1401, 1405, he believes that recreational use of river does not justify finding the river navigable. *Id.* at 49:11, 50:11, 52:11. He stated in his deposition that if the river is not commercially navigable, then it is not navigable. *Id.* at 50:11, 52:11, 49:11. He opined that navigability requires carrying commerce from point A to point B. *Id.* at 52:21, 53:21. Furthermore, Dr. Littlefield believes that river travel must be commercial travel to support



finding the river navigable. *Id.* at 53:21. Under Dr. Littlefield's "commercially navigable" standard, navigability is a relative concept and depends on the state of the art of river travel at the time of statehood; therefore, different states would apply different standards depending on the date of entry into the Union. *Id.* at 54:14, 56:3. This is not the standard applied. *See Utah v. United States*, 403 U.S. 9.

Although he stated that he believes commercially navigable is the proper standard, Dr. Littlefield did admit that if travel is enough, then the river was navigable. *Id.* at 52:16. Moreover, he acknowledged that to evaluate navigability we must look at the width, depth, amount, and regularity of flow. *Id.* at 57:1. Dr. Littlefield also acknowledged that difficulty in navigation does not equal non-navigability. *Id.* at 155:24.

Dr. Littlefield's report does not address the natural and ordinary condition of the river. *Id.* at 47:20. He ignored that certain reaches of the river could be navigable and others non-navigable and instead focused on the entire river (at least up to the Salt River confluence). TR 11/16/2005 129:10-129:22; Littlefield Deposition 61:3, 105:7-25, 107:6. He did not consider portions of the river navigable even though those sections had an abundance of water if he considered other parts of the river not navigable. Littlefield Deposition 103:10-105:25). He also admitted that evidence of roads and railroads as proof of non-navigability is not supported by *Defenders of Wildlife v. Hull*. *Id.* at 114:13. Finally, Dr. Littlefield did not consider modern uses as evidence of the river's susceptibility to navigation, *id.* at 148:12-19, in contradiction with *Defenders of Wildlife*, 199 Ariz. at 422-23 ¶ 37, 18 P.3d 734-35.

**E. 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, 168:3. Although he acknowledged historical records that the steamboat,

Explorer, was used on 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. Littlefield Deposition 61:24-63:7. Dr. Littlefield considered boating on the lower Gila a “novelty,” *Id.* at 158:18; however, the evidence presented in the *ASLD Navigability Study* and by 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.

**F. 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 flawed in the same way. 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* that navigability is based on the natural and ordinary 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 dubious. Although the survey manuals instruct surveyors how to record navigable and non-navigable streams, the manuals do not clearly define what a navigable stream is. Littlefield Deposition 5/25/2001 117:20. The 1864 and 1881 survey manuals required surveyors to meander at least one bank of non-navigable streams that were well-defined natural arteries of internal communication and having a uniform width. 1865 Survey Manual 8; 1881 Survey Manual 34. The 1890 survey instructions introduced the “3 chains rule,” by which surveyors were to meander both banks of non-navigable rivers, “the right angle

width of which is three chains and upwards.” *Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims* 33 (1890) reprinted in White, at 568. In 1894, the manual changed the instructions to instruct surveyors to not meander shallow streams without well-defined channels or permanent banks. *1894 Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims* 56 (1894) reprinted in White, at 621. In 1902, the manual changed again, it then required surveyors to meander both banks of rivers three chains or less which are so deep, swift and dangerous as to be impassable through the agricultural season. *Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims* 62-63 (1902) reprinted in White, at 718. Aside from the fact that they were viewing the river in a depleted condition, it is not surprising that surveyors meandered some reaches and not others when you consider that the survey manual was not explicit in defining navigable, and the manuals changed dramatically over time regarding what was to be meandered. Clearly, surveyors did not always follow the survey manual instructions and therefore, reliance on of these surveys for proof of non-navigability is unfounded.

Again, just like Dr. Littlefield, Dr. August claims that because land patents issued along the river did not exclude the riverbed from the patented lands that this provides further proof of the river’s non-navigability. The fact that the legislature was preoccupied with populating the territory and overlooked the navigability of the Gila is not surprising and is not evidence of the river’s non-navigability at statehood.

We next address specific problems with Dr. August’s report. On page 18, Dr. August refers to a report to Congress by George M. Wheeler. He both misquotes it and removes it from context. The actual quote is:

One of the urgent wants felt in the promotion of the mining industry is that of increased and cheapened inland transportation. River transportation upon our western coast is, to a great extent, a failure, as beyond the Columbia and Colorado Rivers, that furnish somewhat irregular avenues of connection with the interior, no streams of considerable magnitude exist; river transportation, even, in this American age, loses its great power when pitted against railroads, as instanced at many localities in the valley of the Mississippi, where railroads supersede the river modes of transportation because of speed and time.<sup>6</sup>

Wheeler's intention was to promote the use of north-south railroads. He comments that railroads are even preferable to river transportation on the Mississippi River. It is not surprising then, that Wheeler did not speak highly of water transportation in the West.

Dr. August also quotes R.H. Forbes as noting that by 1911 three railroads crossed Arizona. Subsequently, Dr. August comments that this proves that Forbes thought the Gila was not navigable. It is not clear how Forbes's comment supports August's presumption. This would be analogous to saying that De Anza forged a land route to colonize California because the Pacific Ocean was not navigable. That is an absurd proposition.

Throughout Dr. August's report, he misquotes and mischaracterizes sources. On page 3, August quotes Michael Meyer's book as evidence that even the earliest explorers thought the river was not navigable. In footnote 6, he references "[o]ther noteworthy accounts" in support of this proposition. Two of these listed accounts contradict the statements they are cited to support. In *The Great River: The Rio Grande in North American History* by Paul Horgan, one entire chapter details the story of the *Ariel* a steamboat operated on the Rio Grande by the Henry Austin, a cousin of Stephen Austin. Horgan also details the history of steamships on the Rio Grande from 1828 through 1907. Another of the "noteworthy accounts," *Killing the Hidden Waters* by Charles Bowden, states that the Pima Indians practiced irrigation from dependable streams, which included the Gila. Bowden quotes a

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<sup>6</sup> George M. Wheeler, *Report on Exploration of the Public Domain in Nevada and Arizona* 53 Ex Doc. 65, 42 Congo 2 Sess. (Washington, D.C.; U.S. Government Printing Office, 1872).

statement from a 1923 C.P. Ross report entitled, *The Lower Gila Region, Arizona*, which states that in the 1840s three men and a family, floated a sixteen-foot boat down the Gila to the Colorado. A third source cited by Dr. August in that same footnote details Dr. John S. Griffin's description of the river in 1846. In *The Gila: River of The Southwest*, Edwin Corle quotes Dr. Griffin's journal as saying that the lower Gila was sixty to eighty yards wide and on average three feet deep on November 17 and 18, 1846.

On page 21, Dr. August cites U.S. Geological Survey Water Supply Paper No. 1049 as further "compelling evidence" of the Gila's non-navigability. Dr. August's quotation is incomplete and somewhat misleading. Notes from the same reference that includes the Water Supply Paper state:

Remarks – Records for 1929-38 excellent. Records here presented for 1903-28 should be considered only as rough estimates. Except for gaging station at Dome 1903-06 there was no gage and no daily observation of flow until May 1929. Many observations and many estimates of discharge during periods of floods and subsequent flow were made by engineers of the Yuma project, Bureau of Reclamation, at various points along the 20 mile reach of the Gila River above its mouth. Many estimates of discharge of Gila River were also made by them from the difference between discharge of Colorado River at Yuma gaging station and estimated discharge of Colorado River above Gila River. From such estimates and from many general and many detailed observations, estimates of daily discharge were compiled, from which a general knowledge of runoff of Gila River was obtained. From these data of daily discharge, there have been computed the monthly and annual data here presented for 1907-28. Many diversions above station for irrigation increasing in quantity throughout period of record. Regulation by storage reservoirs began with completion of Roosevelt Dam on Salt River in 1911. No diversions nor regulation between Gillespie Dam and this station.

It seems likely that early estimates were necessary because the river flow gauges may have been damaged by flooding; and therefore the gauge would not record anything after the flood event, or alternatively, the channel itself may moved away from the gauge. Movement of the river does not prove anything with respect to the navigability of the Gila as the Colorado River, a navigable river, has also been know to move. See *Bonelli Cattle Co. v. Arizona*, 414 U.S. 313, 315-16 (1973).

Finally, on page 30, Dr. August states, “[w]hen Anglos first came to the Southwest in large numbers, after 1850, the Gila “no longer carried enough water to float a raft.” He then goes on to relate an anecdote regarding a government inspector and a prank played on him by a stagecoach driver. Although he does not cite to it, the story is from *Gila: Birth and Death of an American River* by George McNamee. As written by Mr. McNamee the quote should read:

When Anglos first came to the Southwest, much of the Gila River was navigable. Within half a century it no longer carried enough water to float a raft. For newcomers who had read of the abundant water of the desert, this was a constant source of confusion. One government inspector charged with Indian Affairs who came to Arizona Territory in the 1880s, bearing an official map showing the Gila as a live river. He asked at Yuma when the next boat would sail for the Pima Villages and was told, ‘Well, when the Gila gets water, we’ll be sure to get a line of boats running for your convenience.’ The inspector thereupon produced his map and declared that the surveyors of the U.S. government could not possibly be wrong. Eventually, frustrated at his interlocutor’s refusal to admit that the river carried water, he took a stagecoach. At the stage stop at Maricopa Wells he related the story to the driver, who told him, ‘You must have fallen in with a damned lot of liars working in the interest of the stagecoach line. The Gila is navigable. A boat leaves Yuma every day for the Pima Villages. Look, yonder; there’s one now!’ He pointed to a column of whirling smoke like dust a few miles distant. The inspector grabbed his bags and went off. An hour later the driver wandered into the saloon and bragged about his prank, and a Samaritan went out and retrieved the inspector, who had fainted of thirst in the desert.

This quotation highlights the fact that the Gila was not in its normal and natural condition even as early as the 1880s due to diversions for irrigation.

**G. Dr. Stan Schumm’s report also does not support a finding of non-navigability.**

Although it is a scholarly work, Dr. Schumm’s report has no bearing on the Commission’s determination of navigability because it is based solely on the conditions of the river in an un-natural condition, post diversions. TR 11/17/2005 28:15-28:20, 31:8-11, 50:23-51:4. His report highlights the fact that the river changed significantly due to irrigation diversions. As quoted by Dr. Schumm 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. EL #6-Stanley A. Schumm, *Geomorphic Character of the Lower Gila River* 8 (2004) (“Schumm Report”). Moreover, Dr. Schumm’s report states that pre-statehood descriptions of the river compiled by Graf et al. (1994) agree that it was bordered by willows and cottonwoods. *Id.* The width ranged from 240’ to 1300’ with 450’ the most common estimate, while the depth ranged from 0’-4’. *Id.* Dr. Schumm also 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.” Dr. Schumm also relates a quotation from 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.

Clearly, the river has changed markedly since irrigation diversion began in earnest. Dr. Schumm’s report reinforces this by showing that the river has been altered by diverting the water. Moreover, because Dr. Schumm did not perform any analysis to determine whether the river would have been navigable in its normal and natural condition and his report clearly states that the river was likely navigable before diversions, his report does not support a finding of non-navigability.

**H. Government Land Office 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 Surveys T4SR4W*, Book 1161, pages 43, 47, and 60; *Surveys T5SR4W* Book 1165 p.

60; TR 11/16/05 130:20-131:1-132:5; *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. We cannot tell from the surveyors' notes exactly which set of instruction they followed when surveying the lands abutting the river. As noted by Drs. Littlefield and August, the instructions always required the surveyors to meander both banks of navigable streams, but the rules relating to meandering non-navigable streams changed over time. Furthermore, the timing of the surveys was inconsistent and transient. The surveys were performed during a very brief span of time and consequently cannot encompass the complete range of river conditions. Finally, although the evidence is not conclusive, some surveyors may have been motivated by personal gain to find the river non-navigable.

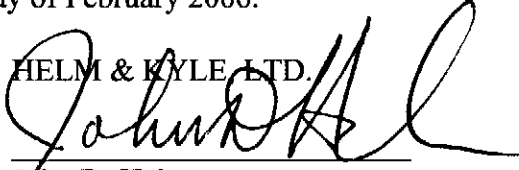
#### **IV. CONCLUSION**

The evidence presented opposing a finding of navigability merely shows that the river has changed dramatically since significant diversion began and that the contemporaneous observers viewed the river in that altered condition. The only evidence presented about the Gila River in pre-settlement, pre-diversion condition was by Winn Hjalmarson. His testimony, along with historical evidence of actual navigation on the river, supports a finding that the river was navigable in its "natural and ordinary" condition. Consequently, this commission should determine that the Gila River, at least from the confluence with the Salt, is a navigable river.

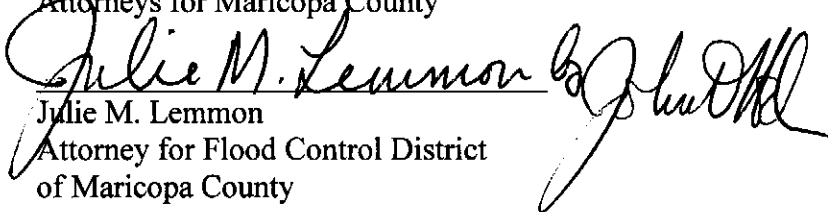


RESPECTFULLY SUBMITTED this 6th day of February 2006.

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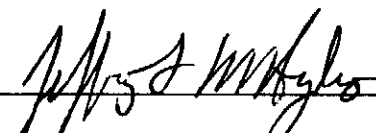
SUBSCRIBED AND SWORN TO before me this 13<sup>th</sup> day of February, 2006,

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By   
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